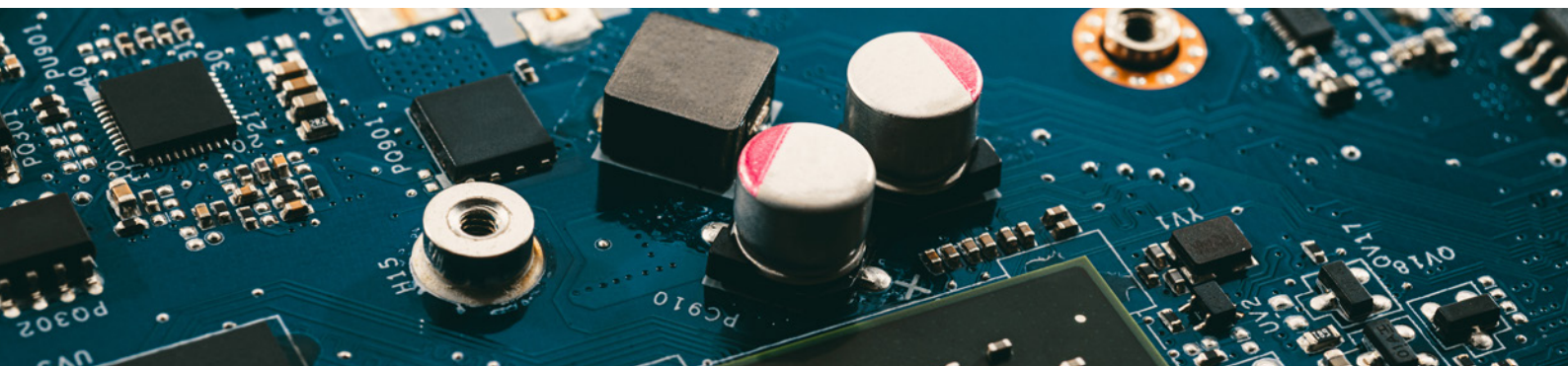
Vision for Nature

VINA ENESOL

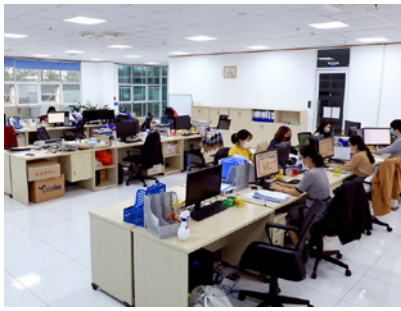
www.vinaenesol.co.kr

PRODUCTS CATALOG

CONDUCTIVE POLYMER ALUMINUM ELECTROLYTIC CAPACITORS




VINA ENESOL



GREETING

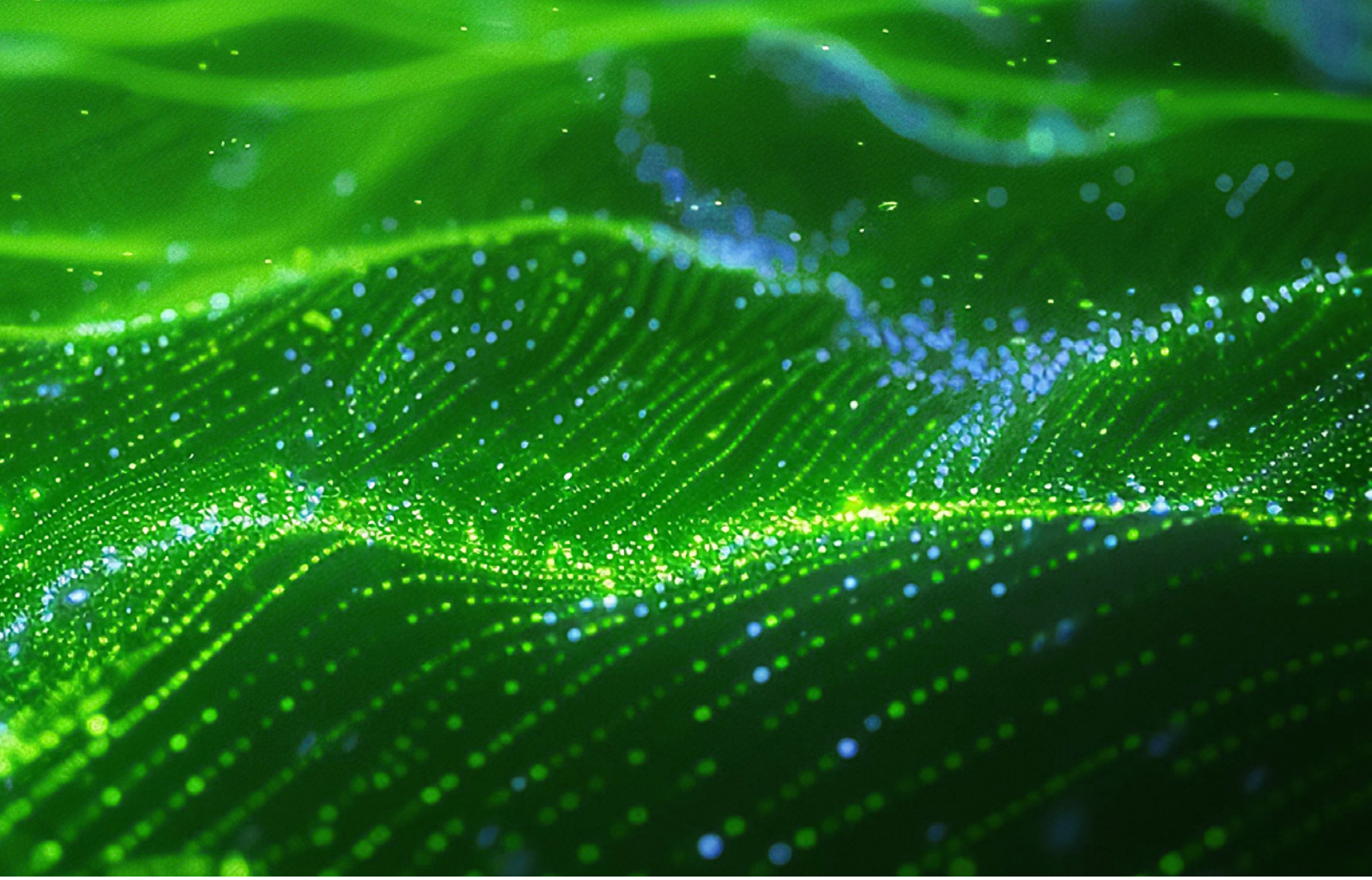
These core values are realized based on VINA ENESOL's unique corporate philosophy of affection and loyalty. The heart of VINA ENESOL is its people. It is a company where people come together to develop technology, produce products, and sell the manufactured products.
Vina ENESOL respects the fundamental principle that new technology emerges, stable quality is maintained, and valuable customers are satisfied when all members are united by the values and vision of ENESOL.

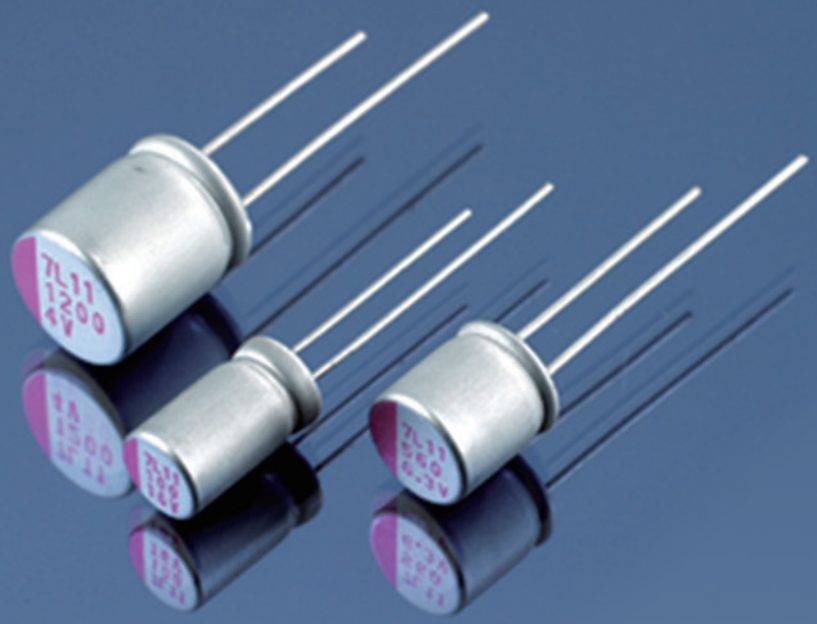
VINA ENESOL aims to be a comprehensive materials and components company related to energy storage. We are expanding our scope from conductive polymer materials for polymer capacitors to cylindrical aluminum polymer capacitors, electric double-layer capacitors, and hybrid capacitors. VINA ENESOL has been striving to align with your values and grow together, and we will continue to work diligently with the determination of "The Foolish Old Man who Moved Mountains."

VINA ENESOL Co., LTD

It is only CUSTOMER that let us exist

Contents

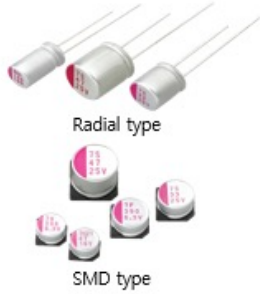




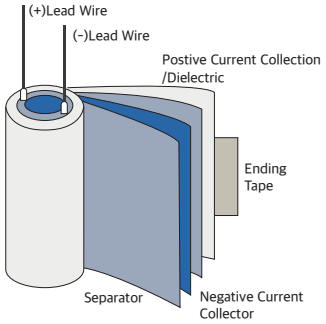
EneCap™

VINA ENESOL has developed the Aluminum Polymer capacitors that the solid electrolyte contains an electro-conductive polymer as essential constituent. This product is named the EneCap™. The conductive polymer does not use liquid electrolyte that they will not dry out, leak, or suffer gas buildup and burst. The benefits of EneCap™ on the circuit level over the standard liquid aluminum capacitors are as follows.

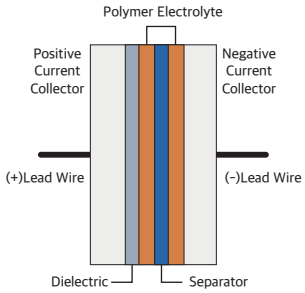
Basic structure of ENECAP



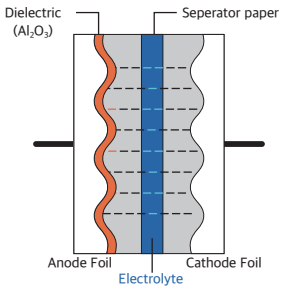
Outside View



Inside View



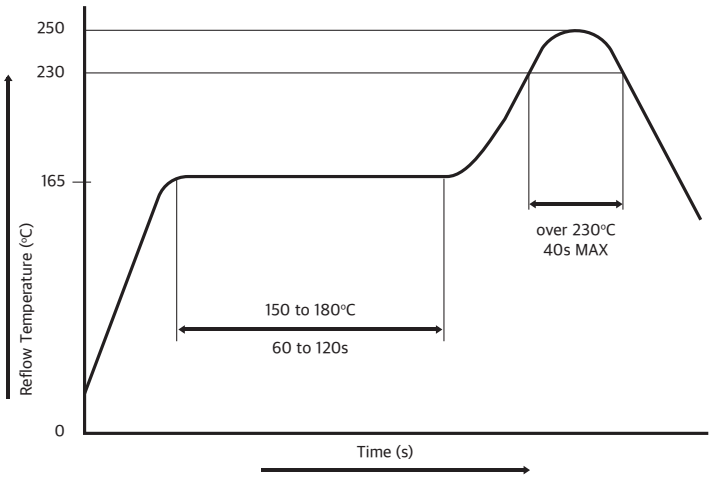
Polymer Capacitor



Hybrid Capacitor

Division	MLCC	Al Liquid	Ta Polymer	Al Polymer Al Hybrid
Electrolyte	-	Liquid Electrolyte	MnO_2, Polymer (PEDOT, Ppy)	Polymer (PEDOT/PSS)
Voltage	○	◎	x	○
Capacitance	x	◎	x	◎
Ripple Current	x	x	○	◎
ESR	○	x	○	◎
Miniaturization	◎	x	◎	○
Load Life	◎	x	◎	◎
Price	△	◎, x	x	○

◆ Resistance to soldering heat



Peak Temperature	250°C	260°C
Preheat	150°C to 180°C 90±30 sec	
200°C over time (Max.)	60 sec	60 sec
220°C over time (Max.)	50 sec	50 sec
230°C over time (Max.)	40 sec	40 sec
Reflow number	Twice or less	Only 1 time

PRECAUTIONS on Use of Capacitor

1) Polarity

Conductive Polymer Hybrid Aluminum Electrolytic Capacitors are polarized components, and reversing their polarity can cause severe electrical stress, leading to increased leakage current, reduced lifespan, or even catastrophic failure due to short circuits. It is imperative to ensure correct polarity during installation, particularly in circuits where the polarity may be influenced by ripple voltage. Capacitors should not be used in circuits where the polarity is at risk of being reversed.

2) Prohibited Circuits

The application of capacitors in certain circuits can lead to compromised performance or failure due to specific operational stresses. The following circuits are particularly unsuitable for these capacitors:

① High Impedance Circuits: These circuits are sensitive to leakage current fluctuations, which can significantly affect the performance of the capacitor.
② Coupling Circuits: Due to potential leakage current increases, these circuits may experience degraded signal integrity.
③ Time Constant Circuits: Capacitors in these circuits are highly sensitive to capacitance fluctuations caused by temperature and operational conditions, leading to inaccurate timing.
④ Series Connection for Voltage Enhancement: Connecting multiple capacitors in series to achieve higher voltage withstand capability can result in uneven voltage distribution and increased leakage current.
⑤ Circuits Sensitive to Leakage Current: Any application where leakage current could adversely affect circuit performance should avoid the use of these capacitors.

3) Over Voltage Protection

Applying a voltage that exceeds the rated voltage of the capacitor, even momentarily, can result in a significant increase in leakage current, which may lead to a short circuit or complete capacitor failure. It is crucial to design circuits such that the applied voltage remains well within the rated specifications, ideally not exceeding 80% of the rated voltage to ensure long-term reliability.

4) Sudden Charge and Discharge

Rapid charging and discharging of the capacitor can induce excessive rush currents, which pose a risk of short circuits and significant increases in leakage current. It is recommended to implement protective measures, such as incorporating a series resistor or protection circuit, especially if the rush current is expected to exceed 10A. When measuring leakage current, a series resistor of approximately 1 kΩ should be used to mitigate the impact of sudden charge and discharge cycles.

5) Soldering Guidelines

Adherence to specified soldering conditions is critical to maintaining the integrity of the capacitor. Excessive heat during soldering can lead to abnormal leakage currents, reduced capacitance, and physical deformation. Care must be taken to allow sufficient space on the PCB to accommodate any potential bulging of the sealing resin. Reflow soldering should be performed within the recommended temperature profiles, considering factors such as PCB material, thickness, and population density, which can influence the temperature experienced by the capacitor.

6) Use in Specific Equipment

- Industrial Applications: When incorporating capacitors into industrial equipment, the design must account for the capacitor's capacitance, impedance, and other critical characteristics to ensure long-term reliability under operational conditions.
- Life-Critical Systems: For applications involving equipment where human life is at risk (e.g., aerospace, medical, or nuclear systems), prior consultation with the manufacturer is mandatory. Additional documentation and approval may be required to ensure the capacitors meet the stringent reliability standards necessary for such critical applications.

7) Storage Conditions

Proper storage of capacitors is essential to maintain their performance. Store capacitors in a controlled environment with a temperature range of 15 to 35°C and relative humidity below 75%. Avoid exposure to direct sunlight, moisture, brine, oil, or corrosive gases. Capacitors should be stored in their original packaging until use and should be used as soon as possible after opening to avoid degradation from environmental exposure.

8) Operating Environment Considerations

The capacitors should not be exposed to environments that include:

① Water, Saltwater Spray, or Oil: Direct exposure can cause corrosion and failure.
② Corrosive Gases: Environments containing hydrogen sulfide, sulfur dioxide, chlorine, ammonia, or similar gases can lead to severe corrosion and failure of the capacitors.
③ Ozone, Ultraviolet Rays, or Radiation: Prolonged exposure can degrade the materials used in the capacitors, leading to performance issues.
④ Strong Electromagnetic Fields or Static Electricity: Such conditions can induce undesirable electrical stresses that may compromise capacitor performance.
⑤ High Altitude: At altitudes up to 10,000 meters, capacitors can generally operate without issues, but for higher altitudes or severe conditions, such as space applications, consultation with the manufacturer is necessary.

9) Temperature and Frequency Impact

The electrical characteristics of capacitors, including capacitance, equivalent series resistance (ESR), and leakage current, are influenced by both operating temperature and frequency. Using capacitors outside their specified temperature range, especially above the upper category temperature, can result in increased leakage current, short circuits, or other forms of degradation. Additionally, care should be taken to ensure that the peak value of the ripple voltage does not exceed the rated voltage to prevent damage.

10) Handling and Mounting Precautions

- Mechanical Stress: Capacitors are sensitive to mechanical stress; therefore, care must be taken to avoid applying excessive force to the terminals during handling and mounting. Improper handling can result in physical damage and compromised electrical performance.
- Double-Sided PCB Considerations: When using capacitors on double-sided PCBs, ensure that the wiring patterns do not contact the capacitor mounting area, as this may cause short circuits depending on the mounting conditions.
- Reuse and Reflow Considerations: Capacitors that have been assembled and energized should not be reused, as their electrical characteristics may have degraded. Special attention should be given during the reflow soldering process to ensure the capacitors are not subjected to excessive heat stress.

11) Cleaning and Fumigation

When cleaning capacitors, use solvents that are compatible with the capacitor materials as recommended by the manufacturer. During fumigation processes, especially when using halogen-based gases such as methyl bromide, care must be taken as these gases can corrode the capacitor's materials. Always consult with the manufacturer if vapor phase soldering or other specialized cleaning methods are considered.

12) Additional Considerations

Before final assembly, always verify the capacitor's ratings, including capacitance and voltage. Be cautious of transient recovery voltages, which can occur after discharging through a resistor. Lastly, capacitors that have been dropped, deformed, or subjected to harsh conditions should not be used, as they may fail prematurely.

Line up

Series Table - Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

Type	Series	Features	Long Life	Vibration-resistant	High Temperature	Endurance	Rated Voltage Range [Vdc]	Capacitance Range [μF]	Page
Radial	HRS	105°C Standard	●			105°C / 10,000hrs	16 to 80	22 to 1800	28
	HRC	125°C Standard	●			125°C / 4,000hrs	25 to 80	22 to 680	30
	HRK	High ripple, Large capacitance	●			125°C / 4,000hrs	25 to 80	22 to 680	32
	HRE	Guaranteed at 135°C	●			135°C / 4,000hrs	25 to 80	33 to 680	34
	HRG	Guaranteed at 145°C	●		●	145°C / 2,000hrs	25 to 63	33 to 330	36
	HRJ	Guaranteed at 150°C			●	150°C / 1,000hrs	25 to 63	33 to 270	38
SMD	HVS	105°C Standard	●	●		105°C / 10,000hrs	6.3 to 80	10 to 1000	42
	HVC	125°C Standard	●	●		125°C / 4,000hrs	25 to 80	10 to 560	44
	HVK	High ripple, Large capacitance	●	●		125°C / 4,000hrs	25 to 80	33 to 680	46
	HVE	Guaranteed at 135°C	●	●		135°C / 4,000hrs	25 to 80	22 to 560	48
	HVG	Guaranteed at 145°C	●	●	●	145°C / 2,000hrs	25 to 80	33 to 680	50
	HVJ	Guaranteed at 150°C		●	●	150°C / 1,000hrs	25 to 80	33 to 680	52

Series Table - Conductive Polymer Aluminum Electrolytic Capacitors

Type	Series	Features	Long Life	Vibration-resistant	High Temperature	Endurance	Rated Voltage Range [Vdc]	Capacitance Range [µF]	Page
Radial	RS	Standard				105°C / 3,000hrs	2.5 to 25	6.8 to 1,500	56
	RL	Large Capacitance, Low ESR				105°C / 3,000hrs	2.5 to 16	100 to 3,500	58
	RSL	Long Life Cycle	●			105°C / 5,000hrs	2.5 to 25	6.8 to 1,500	60
	RLL	Large Capacitance, Low ESR Long Life Cycle	●			105°C / 5,000hrs	2.5 to 16	100 to 3,500	62
	RSH	High Temperature			●	125°C / 1,000hrs	2.5 to 25	6.8 to 1,500	64
	RLH	Large Capacitance, Low ESR High Temperature			●	125°C / 1,000hrs	2.5 to 16	100 to 3,500	66
	RU	Ultra Low ESR				105°C / 2,000hrs	2.5 to 6.3	470 to 1,500	68
	RHV	High Voltage, Long Life	●			105°C / 5,000hrs	16 to 50	10 to 3,300	70
	RUH	Ultra High Voltage				105°C / 3,000hrs	63 to 125	8.2 to 330	72
	RHH	High Voltage, High Temperature			●	125°C / 3,000hrs	16 to 80	5.6 to 390	74
	RHR	High Ripple Current, Long Life	●			105°C / 10,000hrs	2.5 to 16	100 to 3,500	76
	RHVL	High Ripple Current, High Voltage, Long Life	●			105°C / 10,000hrs	16 to 50	10 to 1,500	78
	RSC	Large Capacitance, Long Life	●			105°C / 20,000hrs	2.5 to 50	18 to 2,700	80
	RHHL	High Voltage, High Temperature, Long Life	●		●	125°C / 4,000hrs	16 to 80	22 to 1,000	82
SMD	VS	Standard		●		105°C / 2,000hrs	2.5 to 25	6.8 to 1,500	86
	VL	Large Capacitance, Low ESR		●		105°C / 2,000hrs	2.5 to 16	22 to 2,700	88
	VSL	Long Life Cycle	●	●		105°C / 5,000hrs	2.5 to 25	6.8 to 1,500	90
	VLL	Long Life Cycle	●	●		105°C / 5,000hrs	2.5 to 16	39 to 2,700	92
	VSH	High Temperature		●	●	125°C / 1,000hrs	2.5 to 25	6.8 to 1,500	94
	VLH	High Temperature		●	●	125°C / 1,000hrs	2.5 to 16	39 to 2,700	96
	VU	Ultra Low ESR		●		105°C / 2,000hrs	2.5 to 16	30 to 560	98
	VHV	High Voltage, Long Life	●	●		105°C / 5,000hrs	16 to 50	10 to 1,500	100
	VUH	Ultra High Voltage		●		105°C / 3,000hrs	63 to 125	8.2 to 120	102
	VHH	High Voltage, High Temperature		●	●	125°C / 3,000hrs	16 to 50	5.6 to 390	104
	VHR	High Ripple Current, Long Life	●	●		105°C / 10,000hrs	2.5 to 16	39 to 2,700	106
	VHVL	High Ripple Current, High Voltage, Long Life	●	●		105°C / 10,000hrs	16 to 50	10 to 1,500	108
	VSC	Large Capacitance, Long Life	●	●		105°C / 20,000hrs	2.5 to 50	18 to 2,700	110
	VHHL	High Voltage, High Temperature, Long Life	●	●	●	125°C / 4,000hrs	16 to 80	22 to 1,000	112

Voltage – Capacitance Table

◆Hybrid & SMD Type

V \ μF	10	22	27	33	47	56	68	82	100	120
6.3										
16									HVS[6.3×5.9]	
25				HVS[5×5.9]	HVK[5×5.9]	HVS[6.3×5.9]	HVK[6.3×5.9]	HVK[6.3×5.9]	HVS[6.3×7.7]	
				HVC[5×5.9]		HVC[6.3×5.9]			HVC[6.3×7.7]	
						HVK[5×5.9]			HVE[6.3×7.7]	
						HVE[6.3×5.9]				
35		HVS[5×5.9]	HVS[6.3×5.9]	HVK[5×5.9]	HVS[6.3×5.9]	HVK[6.3×5.9]	HVS[6.3×7.7]		HVS[8×9.7]	
		HVC[5×5.9]			HVC[6.3×5.9]		HVC[6.3×7.7]		HVC[8×9.7]	
					HVE[6.3×5.9]		HVE[6.3×7.7]		HVK[6.3×7.7]	
									HVJ[8×9.7]	
50	HVS[5×5.9]	HVS[6.3×5.9]		HVS[6.3×7.7]	HVS[8×9.7]	HVJ[8×9.7]	HVS[8×9.7]		HVS[10×10.5]	HVC[10×10.5]
	HVC[5×5.9]	HVC[6.3×5.9]		HVC[6.3×7.7]	HVC[8×9.7]		HVC[8×9.7]		HVC[10×10.5]	HVE[8×9.7]
				HVE[8×9.7]	HVE[8×9.7]		HVE[8×9.7]		HVK[10×10.5]	
							HVG[8×9.7]		HVE[10×10.5]	
									HVG[10×10.5]	
									HVJ[10×10.5]	
63	HVS[6.3×5.9]	HVS[6.3×7.7]		HVS[8×9.7]	HVC[8×9.7]	HVC[10×10.5]	HVS[10×10.5]	HVS[10×10.5]	HVS[10×12.5]	HVS[10×12.5]
	HVC[6.3×5.9]	HVC[6.3×7.7]		HVC[8×9.7]	HVE[8×9.7]	HVE[10×10.5]	HVC[10×10.5]	HVC[10×10.5]	HVC[10×12.5]	
		HVE[8×9.7]		HVE[8×9.7]		HVG[10×10.5]		HVK[10×10.5]	HVK[10×12.5]	
				HVG[8×9.7]		HVJ[10×10.5]		HVE[10×10.5]	HVE[10×12.5]	
				HVJ[8×9.7]				HVG[10×10.5]		
80		HVS[8×9.7]		HVS[10×10.5]	HVS[10×10.5]		HVK[10×12.5]		HVS[10×16.5]	
		HVC[8×9.7]		HVC[10×10.5]	HVC[10×10.5]		HVE[10×12.5]		HVK[10×16.5]	
							HVG[10×12.5]		HVE[10×16.5]	
							HVJ[10×12.5]		HVG[10×16.5]	
									HVJ[10×16.5]	

[Voltage : 6.3 to 80 V / Rated Capacitance : 10 to 1000μF]

V \ μF	150	180	220	270	330	390	470	560	680	1000
6.3								HVS[8×9.7]		HVS[10×10.5]
16				HVS[10×10.5]						
25	HVC[8×9.7] HVK[6.3×7.7] HVJ[8×9.7]		HVS[8×9.7] HVC[8×9.7] HVE[8×9.7] HVG[8×9.7]	HVK[8×9.7] HVJ[10×10.5]	HVS[10×10.5] HVC[10×10.5] HVE[10×10.5] HVG[10×10.5]		HVS[10×12.5] HVK[10×10.5] HVE[10×12.5] HVJ[10×10.5]	HVC[8×9.7] HVE[10×12.5]	HVS[10×16.5] HVK[10×16.5] HVG[10×16.5] HVJ[10×16.5]	
35	HVS[8×9.7] HVC[8×9.7] HVE[8×9.7] HVG[8×9.7] HVJ[10×10.5]	HVK[8×9.7]	HVS[10×12.5] HVC[8×9.7] HVC[10×10.5] 	HVS[10×10.5] HVC[10×10.5] HVE[10×10.5] HVG[10×10.5]	HVK[10×10.5] HVE[10×12.5]	HVS[10×12.5] HVE[10×12.5]	HVS[10×12.5] HVC[10×12.5] HVK[10×16.5] HVG[10×16.5] HVJ[10×16.5]			
50	HVS[10×12.5] HVE[10×12.5]		HVS[10×16.5] HVC[10×16.5] HVK[10×16.5] HVG[10×16.5] HVJ[10×16.5]							
63	HVK[10×16.5] HVE[10×16.5] HVG[10×16.5] HVJ[10×16.5]	HVS[10×16.5] HVK[10×16.5] HVE[10×16.5] HVG[10×16.5] HVJ[10×16.5]								
80										

Voltage – Capacitance Table

◆ Hybrid & Radial Type

V \ μF	22	33	47	56	68	82	100	120	150	180
16										
25									HRS[8×9.5] HRC[8×9.5] HRK[8×9.5] HRJ[8×9.5]	
35					HRS[6.3×7.7]		HRK[6.3×5.9] HRC[8×9.5] HRK[8×9.5] HRJ[8×9.5]		HRS[8×9.5] HRC[8×9.5] HRK[8×9.5] HRG[8×9.5] HRJ[10×10.5]	HRK[8×9.5]
50			HRS[8×9.5] HRC[8×9.5] HRK[8×9.5]	HRJ[8×9.5]	HRS[8×9.5] HRC[8×9.5] HRK[8×9.5] HRG[8×9.5]		HRS[10×10.5] HRC[10×10.5] HRK[10×10.5] HRG[10×10.5] HRJ[10×10.5]	HRC[10×10.5] HRK[10×10.5]	HRK[10×11.5] HRE[10×11.5]	
63		HRS[8×9.5] HRC[8×9.5] HRG[8×9.5] HRJ[8×9.5]	HRS[8×9.5] HRC[8×9.5]	HRS[10×10.5] HRC[10×10.5] HRG[10×10.5] HRJ[10×10.5]	HRS[10×10.5] HRC[10×10.5]	HRS[10×10.5] HRC[10×10.5] HRG[10×10.5]	HRC[10×11.5] HRK[10×11.5] HRE[10×11.5]		HRC[10×16] HRK[10×16] HRE[10×16]	HRS[10×16] HRC[10×16] HRK[10×16] HRE[10×16]
80	HRS[8×9.5] HRC[8×9.5] HRK[8×9.5]	HRS[10×10.5] HRC[10×10.5] HRK[10×10.5] HRE[8×9.5]	HRS[8×9.5] HRC[8×9.5] HRK[8×9.5]	HRE[10×10.5]	HRC[10×11.5] HRK[10×11.5]		HRS[10×16] HRC[10×16] HRK[10×16] HRE[10×16]			

[Voltage : 16 to 80 V / Rated Capacitance : 22 to 1800μF]

V \ μF	220	270	330	390	470	560	680	1200	1800
16						HRS[8×9.5]		HRS[10×11.5]	HRS[10×16]
25	HRS[8×9.5] HRC[8×9.5] HRK[8×9.5] HRG[8×9.5]	HRK[8×9.5] HRJ[10×10.5]	HRS[10×10.5] HRC[10×10.5] HRE[8×9.5] HRG[10×10.5]		HRK[10×10.5] HRE[10×11.5]	HRK[10×10.5] HRE[10×16]	HRS[10×16] HRC[10×10.5] HRK[10×10.5] HRE[10×16]	HRS[10×16]	
35	HRS[10×10.5] HRC[8×9.5] HRC[10×10.5] HRK[8×9.5] HRK[10×10.5]	HRS[10×10.5] HRC[10×10.5] HRK[10×10.5] HRG[10×10.5]	HRS[10×10.5] HRK[10×10.5] HRE[10×11.5]	HRK[10×10.5]	HRS[8×11.5] HRE[10×16]		HRS[10×16] HRC[10×16] HRK[10×16]		
50	HRS[10×16] HRC[10×16] HRK[10×16] HRE[10×16]								
63									
80									

Voltage – Capacitance Table

◆ Polymer & SMD Type

[Voltage : 2.5 to 125 V / Rated Capacitance : 5.6 to 2700μF]

V \ μF	5.6	6.8	8.2	10	12	15	18	22	27	33
10										VS[5×5.9] VSL[5×5.9] VSH[5×5.9]
16						VS[5×5.9] VSL[5×5.9]		VS[5×5.9] VSL[5×5.9] VSH[5×5.9] VSC[5×5.9]	VSH[5×5.9]	
20				VS[5×5.9] VSL[5×5.9] VSH[5×5.9]				VS[6.3×5.9] VSL[6.3×5.9] VSH[6.3×5.9]	VS[6.3×5.9] VSL[6.3×5.9] VSH[6.3×5.9]	VS[8×6.9] VSH[8×6.9] VHH[6.3×5.9]
25		VS[6.3×5.9] VS[8×6.9] VSL[6.3×5.9] VSH[6.3×5.9]		VSH[8×6.9]				VSH[10×7.9] VHV[5×5.9] VHH[6.3×5.9]	VHVL[5×5.9]	VS[8×11.9] VSL[8×11.9] VSH[8×11.9]
32								VHV[6.3×5.9] VHVL[6.3×5.9]		
35								VHV[6.3×5.9] VHVL[6.3×5.9]	VHHL[5×5.9]	
50	VHH[6.3×5.9]			VHV[6.3×5.9] VHH[8×6.9] VHVL[6.3×5.9]			VHV[8×6.9] VHVL[8×6.9] VSC[8×6.9]	VHV[8×6.9] VHVL[8×6.9] VHHL[6.3×5.9]	VHH[8×11.9]	
63			VUH[6.3×5.9]	VUH[8×6.9]		VUH[8×6.9]		VHHL[6.3×5.9]	VUH[8×11.9]	VUH[8×11.9]
80				VHHL[6.3×5.9]	VUH[8×11.9]		VHHL[6.3×5.9]	VUH[8×11.9] VUH[10×12.6] VHHL[8×6.9]	VUH[10×12.6]	
100				VUH[8×11.9]		VUH[10×12.6]	VUH[10×12.6]	VUH[10×12.6] VUH[10×12.6]		
125				VUH[8×11.9]		VUH[8×11.9]				VUH[10×12.6]

V \ μF	39	47	56	68	82	100	120	150	180	220
2.5									VL[5×5.9]	VS[6.3×5.9]
									VLL[5×5.9]	VSL[6.3×5.9]
									VLH[5×5.9]	VSH[6.3×5.9]
									VHR[5×5.9]	
4.0	VS[5×5.9]			VS[5×5.9]				VL[5×5.9]		
	VSL[5×5.9]			VSL[5×5.9]				VSL[6.3×5.9]		
	VSH[5×5.9]			VSH[5×5.9]				VLL[5×5.9]		
								VSH[6.3×5.9]		
								VLH[5×5.9]		
								VHR[5×5.9]		
6.3		VS[5×5.9]			VS[6.3×5.9]	VS[6.3×5.9]	VS[6.3×5.9]	VU[5×5.9]	VU[5×5.9]	VS[6.3×5.9]
		VSL[5×5.9]			VSL[6.3×5.9]	VL[5×5.9]	VL[5×5.9]			VL[6.3×5.9]
		VSH[5×5.9]			VSH[6.3×5.9]	VSL[6.3×5.9]	VSL[6.3×5.9]			VSH[8×6.9]
		VSC[5×5.9]				VLL[5×5.9]	VLL[5×5.9]			VSH[10×7.9]
						VSH[6.3×5.9]	VSH[6.3×5.9]			VLH[6.3×5.9]
						VLH[5×5.9]	VLH[5×5.9]			VU[6.3×5.9]
						VHR[5×5.9]	VHR[5×5.9]			VHR[6.3×5.9]
						VSC[5×5.9]				VSC[6.3×5.9]
10		VS[6.3×5.9]	VS[6.3×5.9]	VLH[5×5.9]		VL[5×5.9]	VS[8×6.9]	VS[8×6.9]		VL[6.3×5.9]
		VL[5×5.9]	VSL[6.3×5.9]	VL[5×5.9]		VLL[5×5.9]	VL[6.3×5.9]	VL[6.3×5.9]		VLL[6.3×5.9]
		VSL[6.3×5.9]	VSH[6.3×5.9]	VLL[5×5.9]			VLL[6.3×5.9]	VSL[10×7.9]		
		VLL[5×5.9]		VHR[5×5.9]			VSH[8×6.9]	VLL[6.3×5.9]		
		VSH[6.3×5.9]					VLH[6.3×5.9]	VSH[8×6.9]		
							VHR[6.3×5.9]	VSH[10×7.9]		
								VLH[6.3×5.9]		
								VHR[6.3×5.9]		
16	VL[5×5.9]	VS[6.3×5.9]	VS[6.3×5.9]	VL[6.3×5.9]	VS[8×6.9]	VL[6.3×5.9]	VL[8×6.9]	VL[8×6.9]	VS[8×11.9]	VHH[8×11.9]
	VSL[6.3×5.9]	VSL[6.3×5.9]	VS[8×6.9]	VLL[6.3×5.9]	VL[6.3×5.9]	VSL[10×7.9]	VLL[8×6.9]	VSL[10×7.9]	VSL[10×7.9]	
	VLL[5×5.9]	VSH[6.3×5.9]	VSH[8×6.9]	VLH[6.3×5.9]	VLL[6.3×5.9]	VLL[6.3×5.9]	VLH[8×6.9]	VLL[8×6.9]	VSL[8×11.9]	
	VSH[6.3×5.9]	VHH[6.3×5.9]		VHR[6.3×5.9]	VSH[8×6.9]	VSH[10×7.9]	VHR[8×6.9]	VSH[10×7.9]	VSH[8×11.9]	
	VLH[5×5.9]				VLH[6.3×5.9]	VLH[6.3×5.9]	VSC[8×6.9]	VLH[8×5.9]	VU[6.3×9.9]	
	VHR[5×5.9]				VHV[5×5.9]	VHR[6.3×5.9]		VHR[8×6.9]	VHV[6×5.9]	
	VSC[6.3×5.9]				VHH[8×6.9]	VSC[6.3×5.9]			VHVL[6.3×5.9]	
					VHR[6.3×5.9]				VHHL[6.3×5.9]	
					VHVL[5×5.9]					
					VSC[8×6.9]					
					VHHL[5×5.9]					
20		VS[8×6.9]	VSH[10×7.9]	VSH[10×7.9]		VS[8×11.9]	VHV[6.3×5.9]	VS[10×12.6]	VHV[8×6.9]	
		VSH[8×6.9]	VHV[5×5.9]			VSL[8×11.9]	VHH[8×11.9]	VSL[10×12.6]	VHH[10×12.6]	
			VHVL[5×5.9]			VSH[8×11.9]	VHVL[6.3×5.9]	VSH[10×12.6]	VHVL[6.3×5.9]	
									VSC[8×6.9]	
25	VHH[8×6.9]	VHV[6.3×5.9]	VS[10×12.6]		VHV[8×6.9]	VS[8×11.9]	VHH[8×11.9]	VS[10×12.6]	VHV[8×11.9]	VHV[8×11.9]
		VHVL[6.3×5.9]	VHV[6.3×5.9]		VHVL[8×6.9]	VSL[8×11.9]	VHHL[6.3×5.9]	VSL[10×12.6]	VHH[10×12.6]	
			VHVL[6.3×5.9]			VSH[8×11.9]		VSH[10×12.6]	VHVL[8×11.9]	
			VHHL[5×5.9]			VLL[8×6.9]			VHHL[8×6.9]	
						VHVL[8×6.9]			VSC[8×11.9]	
						VSC[8×6.9]				
32	VHV[8×6.9]			VHVL[8×6.9]			VHV[8×6.9]			VHV[10×12.6]
							VHVL[8×11.9]			VHVL[10×12.9]
35	VHV[8×6.9]	VHV[6.3×5.3]	VHH[8×11.9]		VHV[8×11.9]	VHH[10×12.9]	VHV[10×12.6]	VHV[10×12.6]	VHV[10×12.6]	VHV[10×12.6]
	VHVL[8×6.9]	VLL[8×6.9]	VHHL[6.3×5.9]		VHVL[8×11.9]		VHVL[8×11.9]	VHVL[8×11.9]	VHVL[8×11.9]	
	VSC[8×6.9]	VHVL[8×6.9]			VSC[8×11.9]		VSC[8×11.9]		VHHL[8×11.9]	
		VHHL[6.3×5.9]			VHHL[8×6.9]					
50	VHV[8×11.9]	VHV[8×11.9]	VHVL[8×11.9]	VHV[10×12.6]		VHV[8×11.9]	VHV[8×11.9]			VHV[10×12.6]
	VHVL[8×11.9]	VHH[10×12.6]		VHVL[10×12.6]		VHV[10×12.6]	VHHL[8×11.9]			VHHL[10×12.6]
	VSC[8×11.9]	VHVL[8×11.9]		VSC[10×12.6]		VHVL[8×11.9]				
				VHHL[8×6.9]						
63	VUH[8×11.9]	VUH[10×12.6]	VUH[10×12.6]		VHHL[8×11.9]		VUH[10×12.6]	VHHL[10×12.6]	VHHL[10×12.6]	
	VHHL[8×6.9]	VHHL[8×6.9]					VHHL[10×12.6]			
80	VHHL[8×11.9]	VHHL[8×11.9]	VHHL[8×11.9]	VUH[10×12.6]	VUH[10×12.6]		VHHL[10×12.6]			
				VHHL[8×11.9]						
100				VUH[10×12.6]						
125										

V \ μF	270	330	390	470	560	680	820	1000	1200	1500
2.5	VU[5×5.9]	VU[5×5.9]	VL[6.3×5.9]	VS[8×6.9]	VL[6.3×5.9]	VS[8×11.9]	VL[8×11.9]	VL[8×11.9]		VS[10×12.6]
			VLL[6.3×5.9]	VSH[8×6.9]	VLL[6.3×5.9]	VL[8×6.9]	VLL[8×11.9]	VLL[8×11.9]		VL[8×11.9]
			VLH[6.3×5.9]		VLH[6.3×5.9]	VSL[8×11.9]	VLH[8×11.9]	VLH[8×11.9]		VSL[10×12.6]
			VU[6.3×5.9]		VU[6.3×5.9]	VLL[8×6.9]	VHR[8×11.9]	VHR[8×11.9]		VLL[8×11.9]
			VHR[6.3×5.9]		VHR[6.3×5.9]	VSH[8×11.9]				VSH[10×12.6]
					VSC[6.3×5.9]	VLH[8×6.9]				VLH[8×11.9]
						VHR[8×6.9]				VHR[8×11.9]
						VSC[8×6.9]				VSC[8×11.9]
4.0		VS[8×6.9]			VS[8×11.9]	VSL[10×7.9]			VS[8×12.6]	VL[8×11.9]
		VL[6.3×5.9]			VL[8×6.9]	VSH[10×7.9]			VL[8×11.9]	VLL[8×11.9]
		VLL[6.3×5.9]			VSL[8×11.9]				VSL[8×12.6]	VLH[8×11.9]
		VSH[8×6.9]			VLL[8×6.9]				VLL[8×11.9]	VHR[8×11.9]
		VLH[6.3×5.9]			VLL[8×11.9]				VSH[8×12.6]	VSC[8×11.9]
		VU[6.3×5.9]			VSH[8×11.9]				VLH[8×11.9]	
		VHR[6.3×5.9]			VLH[8×6.9]				VHR[8×11.9]	
					VLH[8×11.9]					
					VHR[8×6.9]					
					VHR[8×11.9]					
					VSC[8×6.9]					
6.3		VL[6.3×5.9]	VL[8×6.9]	VSL[10×7.9]			VS[10×12.6]	VS[10×12.6]		VL[8×11.9]
		VSL[10×7.9]	VLL[8×6.9]	VSL[8×11.9]			VL[8×11.9]	VSL[10×12.6]		VLL[8×11.9]
		VLL[6.3×5.9]	VHR[8×5.9]	VSH[10×7.9]			VSL[10×12.6]	VSH[10×12.6]		
		VLH[6.3×5.9]	VSC[8×6.9]	VSH[8×11.9]			VLL[8×11.9]			
		VLH[8×6.9]					VSH[10×12.6]			
		VHR[6.3×5.9]					VLH[8×11.9]			
		VSC[6.3×5.9]					VHR[8×11.9]			
							VSC[8×11.9]			
10	VL[8×6.9]	VS[8×11.9]			VS[10×12.6]			VL[8×11.9]		VL[10×12.6]
	VLL[8×6.9]	VSL[10×7.9]			VSL[10×12.6]			VL[10×12.6]		VLL[10×12.6]
	VSH[10×7.9]	VSH[10×7.9]			VSH[8×12.6]			VLL[8×11.9]		
	VLH[8×6.9]	VSH[8×11.9]						VLL[10×12.6]		
	VHR[8×11.9]									
16	VL[8×11.9]	VS[10×12.6]		VS[10×12.6]	VHV[8×11.9]			VL[10×12.6]		VHV[10×12.6]
	VLL[8×11.9]	VL[8×11.9]		VSL[10×12.6]	VHVL[8×11.9]			VLL[10×12.6]		VHVL[8×11.9]
	VLH[8×11.9]	VSL[10×12.6]		VSH[10×12.6]	VSC[10×12.6]			VHV[10×12.6]		
	VLH[8×11.9]	VLL[8×11.9]		VU[10×12.6]	VHHL[10×12.6]			VHVL[10×12.6]		
	VHV[8×6.9]	VSH[10×12.6]						VSC[10×12.6]		
	VHR[8×11.9]	VHH[10×12.6]						VHHL[10×12.6]		
	VHVL[8×6.9]	VHR[8×11.9]								
	VSC[8×6.9]									
	VHHL[8×6.9]									
20	VHVL[8×6.9]	VHH[10×12.6]	VHV[8×11.9]	VSC[10×12.6]	VHV[10×12.6]					
			VHVL[8×11.9]		VHVL[10×12.6]					
			VSC[8×11.9]		VSC[10×12.6]					
25		VHV[10×12.6]	VHHL[8×11.9]	VHV[10×12.6]	VHV[10×12.6]					
		VHH[10×12.6]			VHHL[10×12.6]					
		VHVL[10×12.6]								
		VSC[10×12.6]								
32										
35	VUH[8×11.9]	VUH[10×12.6]		VUH[10×12.6]						
		VHHL[10×12.6]								
50										
63										
80										
100										
125										

μF / V	1800	2200	2700	3300	3500
2.5			VL[10×12.6]		
			VLL[10×12.6]		
			VLH[10×12.6]		
			VHR[10×12.6]		
			VSC[10×12.6]		
4.0					
6.3		VL[10×12.6]			
		VLL[10×12.6]			

Voltage – Capacitance Table

◆ Polymer & Radial Type

V \ μF	5.6	6.8	8.2	10	15	18	22	27	33	39	47
2.5											
4.0											
6.3			RS[6.3×6]	RS[6.3×6]							
10			RS[6.3×6]	RS[8×7]			RS[8×7]				
16									RS[8×7]	RSL[6.3×6] RSH[6.3×6]	RSL[6.3×6] RSH[6.3×6] RSH[6.3×6]
20	RS[6.3×6]	RS[8×7]	RS[8×7]	RS[10×8]			RSL[6.3×6] RSH[6.3×6]		RHH[8×7] RSL[8×7]		RSL[8×7] RSH[8×7]
25		RS[6.3×6] RSL[6.3×6] RSH[6.3×6]		RS[8×7] RSL[8×7] RSH[8×7] RSH[10×8]			RS[10×8] RHH[6.3×6] RSL[10×8]		RSH[8×11.5] RSL[8×11.5]	RHH[8×7]	RHV[6.3×6] RHVL[6.3×6]
32							RHV[6.3×6] RHVL[6.3×6]				

[Voltage : 2.5 to 32 V / Rated Capacitance : 5.6 to 3500μF]

V \ μF	56	68	82	100	120	150	180	220	270	330	390
2.5						RS[6.3×6]		RL[5×9]	RL[5×9]	RL[5×9]	
								RLH[5×9]		RLH[5×9]	
								RHR[5×9]		RLH[6.3×9]	
								RLL[5×9]		RHR[5×9]	
										RLL[5×9]	
										RLL[6.3×9]	
4.0			RS[8×7]	RS[6.3×6]		RS[8×7]		RS[8×7]	RS[8×7]	RS[10×8]	
				RSL[6.3×6]		RSL[6.3×6]		RSL[8×7]		RSL[8×7]	
						RSH[6.3×6]		RSH[8×7]			
6.3			RS[8×7]	RS[8×7]	RS[10×8]	RS[10×11.5]	RS[8×11.5]	RSL[8×7]	RL[6.3×9]	RL[8×11.5]	RSC[8×7]
			RSL[6.3×6]	RSL[6.3×6]		RSL[8×7]		RLL[6.3×6]		RSH[10×8]	
			RSH[6.3×6]	RSH[6.3×6]				RSH[8×7]		RSL[10×8]	
								RHR[6.3×6]		RSC[6.3×6]	
10	RSL[6.3×6]			RS[8×11.5]	RSH[8×7]	RSH[8×7]	RS[8×9]		RL[8×11.5]	RL[8×9]	
	RSH[6.3×6]				RSL[8×7]	RLH[6.3×6]			RSH[10×8]	RSL[8×11.5]	
						RSL[8×7]			RLH[8×7]	RLL[8×7]	
						RLL[6.3×6]			RHR[8×7]		
									RSL[10×8]		
									RLL[8×7]		
16	RS[8×11.5]	RS[10×8]	RS[10×8]	RS[10×8]	RS[10×8]	RS[10×11.5]	RS[10×11.5]	RLH[8×7]	RL[8×9]	RL[8×11.5]	RHH[10×11.5]
			RSH[8×7]	RSH[8×7]		RLH[8×7]	RSH[8×11.5]	RHH[8×11.5]	RLH[8×9]	RSH[10×11.5]	
			RHH[8×7]	RLH[6.3×6]		RHV[6.3×6]	RLH[8×7]	RHHL[6.3×6]	RLH[8×11.5]	RLH[8×9]	
			RSL[8×7]	RHR[6.3×6]		RHR[8×7]	RLH[8×11.5]	RLL[8×7]	RHV[8×7]	RLH[8×11.5]	
				RSL[8×7]		RSL[10×8]	RHV[6.3×6]		RHR[8×9]	RHR[8×11.5]	
				RLL[6.3×6]		RHVL[6.3×6]	RHR[8×9]		RHR[8×11.5]	RHR[8×9]	
				RLL[6.3×6]		RLL[8×7]	RSL[8×11.5]		RHVL[8×7]	RSL[10×11.5]	
				RSC[6.3×6]			RHR[8×11.5]		RLL[6.3×9]	RHHL[8×7]	
							RHVL[6.3×6]		RLL[8×9]	RLL[8×9]	
							RLL[8×9]		RLL[8×11.5]	RLL[8×11.5]	
							RLL[8×11.5]		RSC[8×7]	RLL[10×11.5]	
20	RS[8×11.5]	RSH[10×8]		RS[8×11.5]	RHV[6.3×6]	RS[10×11.5]	RHVL[8×7]	RLH[8×11.5]	RHH[10×11.5]		RLH[8×11.5]
	RSH[10×8]	RSL[10×8]		RSH[10×8]	RHVL[6.3×6]	RSH[10×11.5]	RSC[8×7]				RHVL[8×11.5]
	RHH[8×7]			RSH[8×11.5]		RHV[8×7]					RSC[8×11.5]
	RSL[10×8]			RSL[10×8]		RHH[8×11.5]					
	RSL[10×8]			RSL[8×11.5]		RSL[10×11.5]					
25	RS[10×11.5]		RS[8×11.5]	RS[8×11.5]	RHHL[6.3×6]	RS[10×11.5]	RLH[8×11.5]	RLH[8×11.5]	RHHL[8×7]	RLH[10×11.5]	RLH[10×11.5]
	RSH[10×11.5]		RHV[8×7]	RSH[8×11.5]		RSH[10×11.5]	RHH[10×11.5]	RHVL[8×11.5]		RHVL[10×11.5]	RHVL[10×11.5]
	RHV[6.3×6]		RHVL[8×7]	RHV[8×7]		RSL[10×11.5]	RHVL[8×11.5]			RSC[10×11.5]	
	RHVL[6.3×6]			RHVL[8×7]			RSC[8×11.5]				
	RSL[10×11.5]			RSL[8×11.5]							
				RUH[8×11.5]							
				RSC[8×7]							
32		RHV[8×7]			RHV[8×11.5]			RHV[10×11.5]			
					RHVL[8×11.5]			RHVL[10×11.5]			

V \ μF	470	560	680	820	1000	1200	1500	1800	2200	2700	3300	3500
2.5	RL[5×9]	RL[5×9]	RS[8×11.5]	RL[6.3×9]	RL[8×9]	RL[8×9]	RL[8×9]			RL[10×11.5]		RL[10×11.5]
	RLH[5×9]	RLH[5×9]	RSL[8×11.5]	RLH[8×7]	RLH[8×9]	RU[8×9]	RSL[10×11.5]			RLH[10×11.5]		RLH[10×11.5]
	RHR[5×9]	RLH[6.3×9]	RSH[8×7]	RLH[6.3×9]	RSH[10×11.5]		RSH[10×11.5]			RLL[10×11.5]		RLL[6.3×6]
	RLL[5×9]	RU[8×9]	RSC[8×7]	RLH[8×9]	RHR[8×9]		RLH[8×9]			RHR[10×11.5]		RHR[6.3×6]
		RHR[5×9]		RLH[8×11.5]	RLL[8×9]		RHR[8×9]			RSC[10×11.5]		
		RLL[5×9]		RU[8×9]			RLL[8×9]					
		RLL[5×9]		RU[8×11.5]			RSC[8×11.5]					
		RLL[5×9]		RLL[6.3×9]								
		RHR[5×9]		RLL[8×7]								
		RSC[8×7]		RLL[8×9]								
				RLL[8×11.5]								
				RHR[8×7]								
				RHR[8×9]								
				RHR[8×11.5]								
4.0	RS[8×11.5]	RS[8×11.5]	RS[10×11.5]	RS[10×11.5]	RS[10×11.5]	RS[10×11.5]						
	RSL[10×8]	RSH[8×7]	RSH[8×7]	RLH[10×11.5]	RLH[10×11.5]	RSH[10×11.5]						
		RLH[6.3×9]	RLH[8×11.5]	RU[10×11.5]		RU[10×11.5]						
		RLH[8×9]	RHR[8×11.5]	RHR[10×11.5]	RLH[8×9]	RLH[8×9]						
		RLH[8×11.5]	RLL[8×11.5]	RLL[10×11.5]	RHR[8×9]	RHR[8×9]						
		RU[8×9]	RU[8×11.5]		RHR[10×11.5]	RSL[10×11.5]						
		RSL[8×11.5]			RLL[8×9]	RLL[8×9]						
		RHR[8×9]	RSL[10×8]		RLL[10×11.5]							
		RLL[6.3×9]										
		RLL[8×9]										
		RLL[8×11.5]										
		RU[8×11.5]										
		RHR[8×11.5]										
		RSC[8×7]										
6.3	RS[10×8]	RLH[6.3×9]	RL[10×11.5]	RL[8×9]	RSH[10×11.5]	RLL[8×11.5]	RL[10×11.5]					
	RSH[8×11.5]	RHR[8×9]	RLH[10×11.5]	RSH[10×11.5]	RSL[10×11.5]		RLH[10×11.5]					
	RLH[6.3×9]	RLH[8×9]	RSH[10×11.5]	RU[10×11.5]	RLL[8×9]		RHR[10×11.5]					
	RLH[8×9]	RLL[6.3×9]	RHR[10×11.5]	RLH[8×9]			RLL[10×11.5]					
	RLH[8×11.5]	RLL[8×9]	RLL[10×11.5]	RLH[8×11.5]								
	RU[8×11.5]			RHR[8×9]								
	RSL[8×11.5]			RHR[8×11.5]								
	RHR[8×9]			RSL[10×11.5]								
	RLL[6.3×9]			RLL[8×9]								
	RLL[8×9]			RLL[8×11.5]								
	RLL[8×11.5]			RSC[8×11.5]								
10		RS[10×11.5]	RL[8×11.5]		RLL[8×11.5]	RLL[10×11.5]						
		RSH[10×11.5]	RLL[8×9]									
		RSL[10×11.5]										
16	RS[10×11.5]	RS[10×11.5]	RS[10×11.5]	RS[10×11.5]	RHV[10×11.5]		RHV[10×11.5]	RHV[8×21]	RHV[10×16]		RHV[10×21]	
	RSH[10×11.5]	RHV[8×11.5]			RLL[10×11.5]		RHV[8×15]					
	RLH[10×11.5]	RHVL[8×11.5]			RSC[10×11.5]		RHVL[10×11.5]					
	RSL[10×11.5]	RSC[8×11.5]			RHVL[10×11.5]							
	RLL[10×11.5]											
20	RS[10×11.5]	RS[10×11.5]	RL[8×9]									
	RSC[10×11.5]	RHV[10×11.5]										
		RHVL[10×11.5]										
		RSC[10×11.5]										
25	RS[10×11.5]	RS[10×11.5]	RHV[10×11.5]		RHV[10×16]	RHV[8×23]			RHV[10×23]			
	RHV[10×11.5]		RHHL[8×11.5]									
32												

◆ Polymer & Radial Type

[Voltage : 35 to 125 V / Rated Capacitance : 5.6 to 3500μF]

V \ μF	5.6	6.8	8.2	10	15	18	22	27	33	39	47
35				RHV[6.6×6]		RHH[8×7]	RHVL[6.3×6]			RHV[8×7]	RHV[8×7]
										RSC[8×7]	RHH[10×11.5]
50	RHH[6.3×6]			RHH[8×7]		RSC[8×7]	RHV[8×7]	RHH[8×11.5]		RHV[8×11.5]	RHV[8×11.5]
				RHVL[6.3×6]		RHVL[8×7]	RHVL[8×7]			RSC[8×11.5]	RHVL[8×11.5]
										RHVL[8×11.5]	
63							RHHL[6.3×6]	RUH[8×11.5]	RUH[8×11.5]	RUH[8×11.5]	RUH[10×11.5]
										RHHL[8×7]	
80											
100				RUH[8×11.5]	RUH[8×11.5]	RUH[10×11.5]	RUH[10×11.5]				
125				RUH[8×11.5]	RUH[8×11.5]				RUH[10×11.5]		

V \ μF	56	68	82	100	120	150	180	220	270	330	390
35	RHH[8×11.5]	RHV[8×7]	RHV[8×11.5]	RHV[8×11.5]	RUH[10×11.5]	RHV[10×11.5]	RHHL[8×7]		RHV[8×11.5]	RHV[10×11.5]	
		RHVL[8×7]	RSC[8×11.5]	RHV[10×11.5]	RHV[10×11.5]	RHVL[10×11.5]			RHVL[8×11.5]		
		RHHL[6.3×6]	RHV[10×11.5]		RSC[10×11.5]						
			RHVL[8×11.5]		RHVL[10×11.5]						
50	RHV[8×11.5]	RHVL[10×11.5]		RHV[10×11.5]	RHV[8×11.5]			RHVL[10×11.5]	RHHL[8×11.5]		
	RHHL[8×7]	RSC[10×11.5]		RHVL[10×11.5]				RHV[10×11.5]			
	RHVL[8×11.5]										
63	RUH[10×11.5]		RUH[10×11.5]	RUH[10×11.5]	RHH[10×16]		RHH[8×21]		RUH[10×16]		
			RHH[10×16]				RHH[8×23]		RHH[10×21]		
			RHHL[8×11.5]				RHH[10×16]		RHH[10×23]		
							RHHL[10×11.5]				
80		RHH[8×15]	RUH[10×11.5]		RUH[10×16]						
		RUH[10×11.5]									
100		RUH[10×11.5]		RUH[10×16]							
125											

V \ μF	470	560	680	820	1000	1200	1500	1800	2200	2700	3300	3500
35	RHVL[8×7]	RHHL[8×11.5]			RHHL[8×11.5]							
50	RHHL[8×11.5]											
63												
80												
100												
125												

Part Numbering System

◆ Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

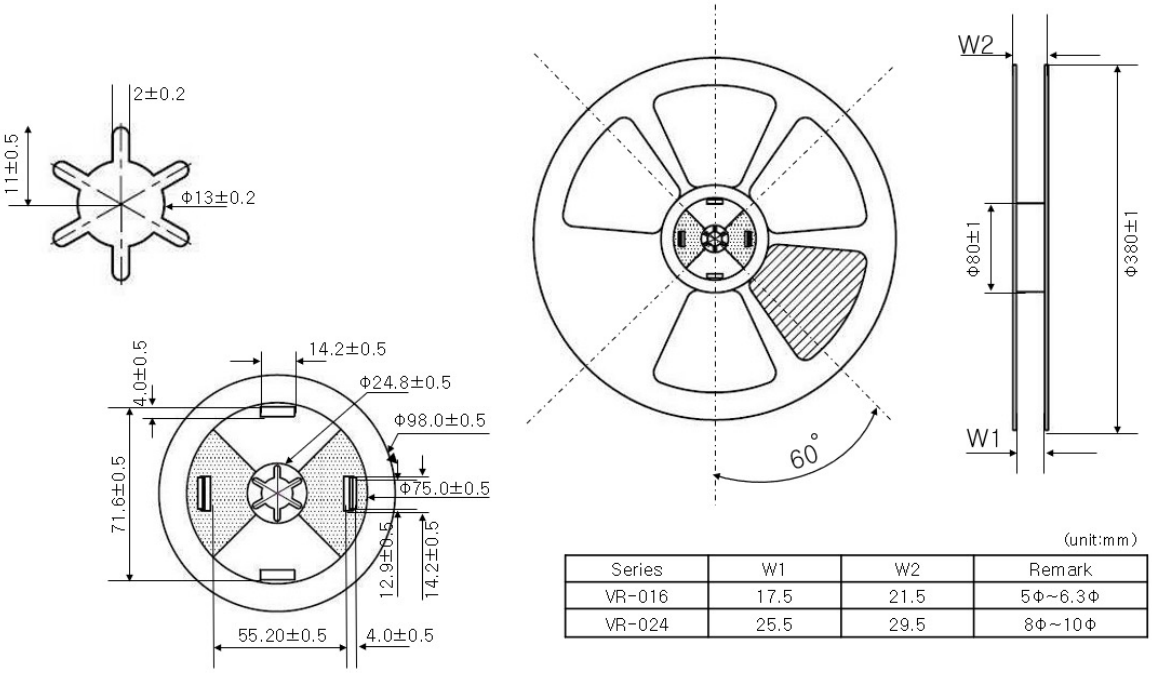
80		H	V		S		33	M		E		10		V	
Rated Voltage[V]		Hybrid	Type		Series		Rated Capacitance[μF]	Capacitance Tolerance[%]		Diameter [mm]		Length [mm]		Terminal Code	
6	6.3V		R	Radial	S	105℃ Standard		K	±10%	A	4.0	6	5.9	V	Vibration-Proof
16	16V		V	SMD	K	High ripple, Large capacitance		M	±20%	B	5.0	6	6.0		
20	20V				C	Guaranteed at 125℃				C	6.3	6	6.2		
35	35V				E	Guaranteed at 135℃				D	8.0	7	7.7		
50	50V				G	Guaranteed at 145℃				E	10.0	7	8.0		
63	63V				J	Guaranteed at 150℃						10	9.5		
80	80V											10	9.7		
												10	9.9		
												10	10.5		
												10	10.7		
												11	11.5		
												12	12.5		
												12	12.7		
												16	16.0		
												16	16.5		

◆ Conductive Polymer Aluminum Electrolytic Capacitors

16		V		HV		180	M		C		6	
Rated Voltage[V]		Type		Series		Rated Capacitance[μF]	Capacitance Tolerance[%]		Diameter [mm]		Length [mm]	
2	2.5V	R	Radial	S	Standard		K	±10%	A	4.0	6	5.9
4	4V	V	SMD	L	Large Capacitance, Low ESR		M	±20%	B	5.0	6	6.0
6	6.3V			SL	Long Life				C	6.3	7	6.9
10	10V			LL	Large Capacitance, Low ESR Long Life				D	8.0	7	7.0
16	16V			SH	High Temperature				E	10.0	8	7.9
20	20V			LH	Large Capacitance, Low ESR, High Temperature						8	8.0
25	25V			U	Ultra Low ESR						9	9.0
32	32V			HV	High Voltage						10	9.9
35	35V			UH	Ultra High Voltage						11	11.5
50	50V			HH	High Reliability, High Voltage, High Temperature						12	11.9
63	63V			HR	High Ripple Current, Long Life						12	12.6
80	80V			HVL	High Ripple Current, High Voltage, Long Life						15	15.0
100	100V			SC	Large Capacitance, Long Life						16	16.0
125	125V			HHL	High Voltage, High Temperature, Long Life						21	21.0
											23	23.0

PACKAGING specifications

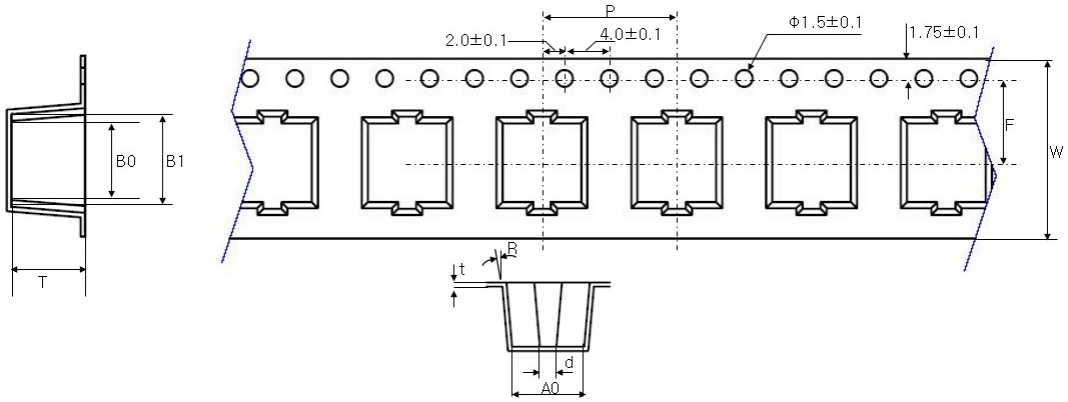
◆ Reel dimensions(SMD)



(unit:mm)

Series	W1	W2	Remark
VR-016	17.5	21.5	5Φ~6.3Φ
VR-024	25.5	29.5	8Φ~10Φ

◆ Taping dimensions(SMD)

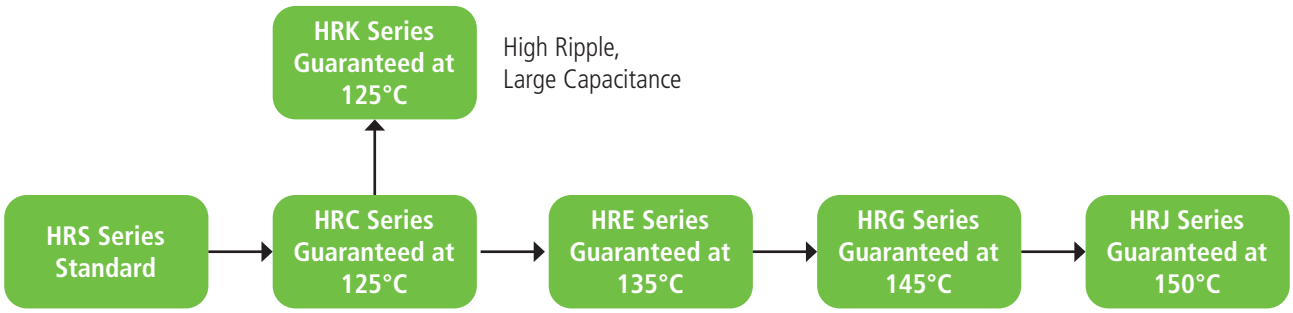


Size	A0	B0±0.1	B1±0.1	T	t	d±0.1	R	P±0.1	F±0.1	W±0.3
5Φ×5.9ℓ	5.6±0.2	5.6±0.2	6.8	6.2±0.2	0.4±0.2	1.6	5° Max.	8.0	7.5	16.0
6.3Φ×5.9ℓ	7.0±0.2	7.0±0.2	8.2	6.2±0.2	0.4±0.2	1.6	5° Max.	12.0	7.5	16.0
6.3Φ×7.7ℓ	7.0±0.2	7.0±0.2	8.2	6.2±0.2	0.4±0.2	1.6	5° Max.	12.0	7.5	16.0
8Φ×6.9ℓ	8.7±0.2	8.7±0.2	9.9	7.2±0.2	0.4±0.2	2.0	8° Max.	12.0	11.5	24.0
8Φ×9.7ℓ	8.7±0.2	8.7±0.2	9.9	10.3±0.2	0.5±0.2	2.0	8° Max.	16.0	11.5	24.0
8Φ×11.9ℓ	8.6 ±0.2	8.6±0.2	9.9	12.3±0.2	0.5±0.2	2.0	8° Max.	16.0	11.5	24.0
10Φ×7.7ℓ	10.7±0.2	10.7±0.2	11.9	8.2±0.2	0.4±0.2	2.0	8° Max.	16.0	11.5	24.0
10Φ×10.5ℓ	10.7±0.2	10.7±0.2	11.9	11.0±0.2	0.4±0.2	2.0	8° Max.	16.0	11.5	24.0
10Φ×12.5ℓ	10.7±0.2	10.7±0.2	11.9	13.0±0.2	0.4±0.2	2.0	8° Max.	16.0	11.5	24.0
10Φ×12.6ℓ	10.7±0.2	10.7±0.2	11.9	13.0±0.2	0.4±0.1	2.0	8° Max.	16.0	11.5	24.0
10Φ×16.5ℓ	10.7±0.2	10.7±0.2	11.9	17.0±0.2	0.4±0.2	2.0	8° Max.	20.0	11.5	24.0

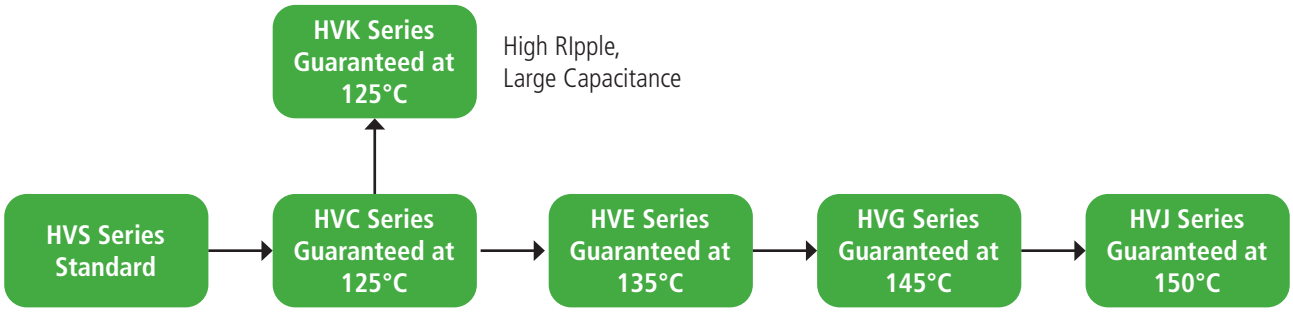
System diagram

◆ Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

Radial (Dip) Type

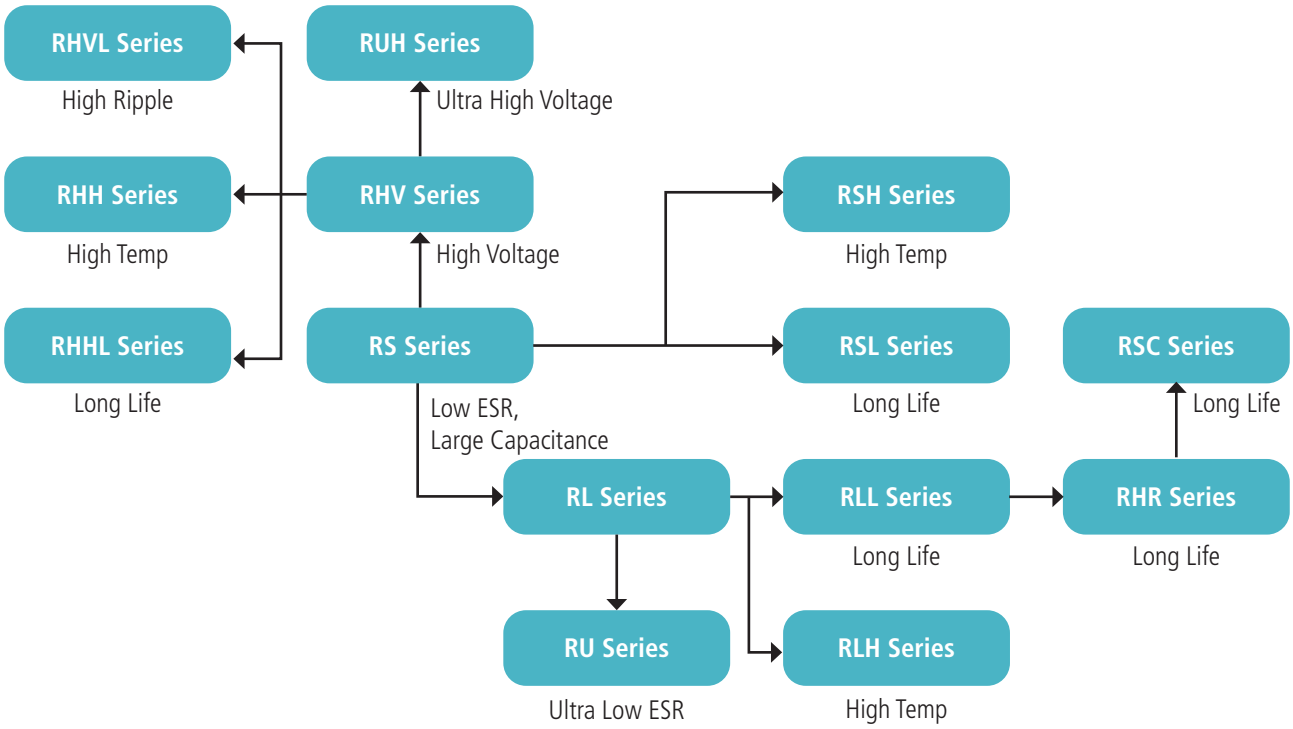


SMD Type

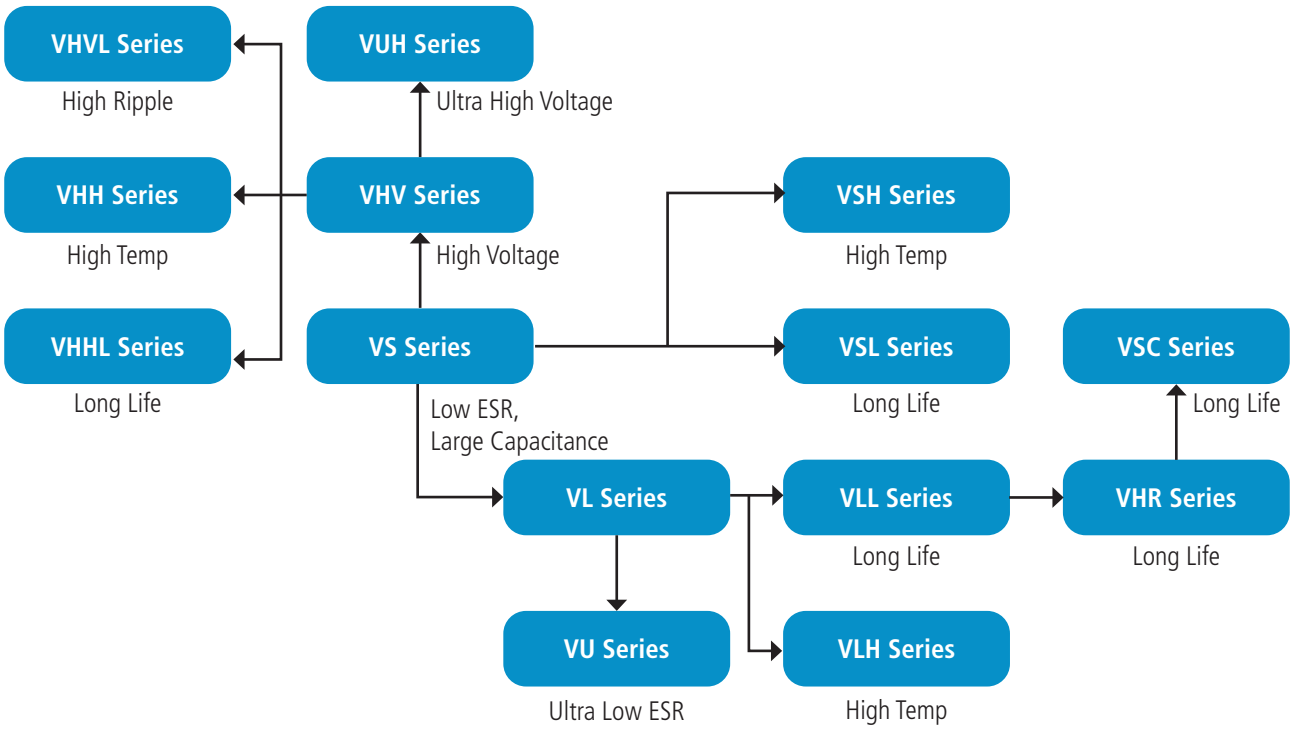


◆ Conductive Polymer Aluminum Electrolytic Capacitors

Radial (Dip) Type



SMD Type

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Conductive Polymer Hybrid Aluminum Electrolytic Capacitors _Radial

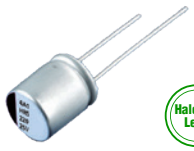
HRS series
HRC series
HRK series
HRE series
HRG series
HRJ series

HRS

Radial Lead Type

series

- Low ESR, High ripple current
- Load life of 10,000h at 105°C
- Compliance with AEC-Q200



Specifications

Items	Characteristics	
Category temperature range	-55 to +105°C	
Rated voltage range	16 to 80Vdc	
Capacitance range	22 to 1800μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Leakage current	I=0.01CV or 3μA whichever is greater (at 20°C, after 2 minutes)	
Tangent of loss angle(tanδ)	Rated voltage(V) 16 25 35 50 63 80 Tanδ 0.16 0.14 0.12 0.10 0.08 0.08 (at 20°C, 120Hz)	
ESR	Less than or equal to the value of Standard Ratings (at 20°C, 100kHz)	
Low temperature characteristics (Impedance ratio at 100kHz)	Z (-25 ℃) / Z (+20 ℃) ≤ 1.5 Z (-55 ℃) / Z (+20 ℃) ≤ 2.0	
Endurance	105℃, 10,000 hrs, apply the rated ripple current without exceeding the rated voltage	
	Capacitance change	Within±30% of the initial value
	Tangent of loss angle (tanδ)	≤200% of the initial specified value
	ESR(mΩ)	≤200% of the initial specified value
	Leakage current	≤The initial specified value
Shelf life	After storage for 1,000 hrs at 105℃ with no voltage applied and then being stabilized at 20℃, capacitors shall meet the specified values for the endurance characteristics listed above.(with voltage treatment)	
Damp Heat (Steady State)	85°C, 85% RH, 2,000 hrs, rated voltage applied	
	Capacitance change	Within±30% of the initial value
	Tangent of loss angle (tanδ)	≤200% of the initial specified value
	ESR(mΩ)	≤200% of the initial specified value
	Leakage current	≤The initial specified value

Part numbering system

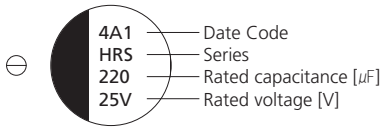
Example: HRS series, 25V / 220μF

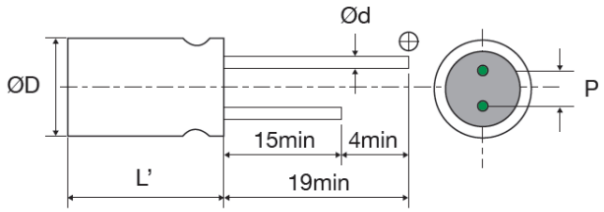
25	HRS	220	M	D	10
Voltage	Series	Capacitance	Tolerance	Diameter	Length

Frequency coefficient for ripple current

Frequency	120Hz	1kHz	10kHz	100kHz
Coefficient	0.15	0.40	0.75	1.00

Marking and Dimensions





Size	ØD±0.5	L	L'	P±0.5	Ød
6.3×7.7	6.3	7.7	L±0.5	2.5	0.50
8.0×9.5	8.0	9.5	L±1.0	3.5	0.60
10.0×10.5	10.0	10.5		5.0	0.60
10.0×11.5	10.0	11.5		5.0	0.60
10.0×16.0	10.0	16.0		5.0	0.60

Standard Ratings

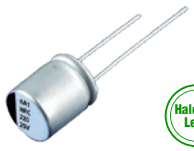
Rated Voltage [Vdc]	Rated Capacitance [µF]	Size ØD x L [mm]	ESR (20°C, 100kHz) [mΩ] [max.]	Rated Ripple Current (105°C, 100kHz) [mArms]	Part Number
16	560	8.0 x 9.5	27	3100	16HRS560MD10
	1200	10.0 x 11.5	16	4100	16HRS1200ME11
	1800	10.0 x 16.0	11	5200	16HRS1800ME16
25	150	8.0 x 9.5	27	2300	25HRS150MD10
	220	8.0 x 9.5	27	2300	25HRS220MD10
	330	10.0 x 10.5	20	2500	25HRS330ME10
	680	10.0 x 16.0	16	4100	35HRS680ME16
	1200	10.0 x 16.0	11	5200	35HRS1200ME16
35	68	6.3 x 7.7	35	2700	35HRS68MC8
	100	8.0 x 9.5	27	2300	35HRS100MD10
	150	8.0 x 9.5	27	2300	35HRS150MD10
	220	10.0 x 10.5	20	2500	35HRS220ME10
	270	10.0 x 10.5	20	2500	35HRS270ME10
	330	10.0 x 10.5	14	4700	35HRS330ME10
	470	8.0 x 11.5	11	5200	35HRS470MD11
	680	10.0 x 16.0	11	5700	35HRS680ME16
50	47	8.0 x 9.5	30	1800	50HRS47MD10
	68	8.0 x 9.5	30	1800	50HRS68MD10
	100	10.0 x 10.5	28	2000	50HRS100ME10
	220	10.0 x 16.0	13	5100	50HRS220ME16
63	33	8.0 x 9.5	40	1700	63HRS33MD10
	47	8.0 x 9.5	40	1700	63HRS47MD10
	56	10.0 x 10.5	30	1800	63HRS56ME10
	68	10.0 x 10.5	30	1800	63HRS68ME10
	82	10.0 x 10.5	30	1800	63HRS82ME10
	180	10.0 x 16.0	15	4900	63HRS180ME16
80	22	8.0 x 9.5	45	1550	80HRS22MD10
	33	10.0 x 10.5	36	1700	80HRS33ME10
	47	10.0 x 10.5	36	1700	80HRS47ME10
	100	10.0 x 16.0	16	4400	80HRS100ME16

HRC

Radial Lead Type

series

- Low ESR, High ripple current
- Load life of 4,000h at 125°C
- Compliance with AEC-Q200



LEAD FREE

Halogen Less

RoHS COMPLIANT

Specifications

Items	Characteristics	
Category temperature range	-55 to +125°C	
Rated voltage range	25 to 80Vdc	
Capacitance range	22 to 680μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Leakage current	I=0.01CV or 3μA whichever is greater (at 20°C, after 2 minutes)	
Tangent of loss angle(tanδ)	Rated voltage(V) 16 25 35 50 63 80 Tanδ 0.16 0.14 0.12 0.10 0.08 0.08 (at 20°C, 120Hz)	
ESR	Less than or equal to the value of Standard Ratings (at 20°C, 100kHz)	
Low temperature characteristics (Impedance ratio at 100kHz)	Z (-25 ℃) / Z (+20 ℃) ≤ 1.5 Z (-55 ℃) / Z (+20 ℃) ≤ 2.0	
Endurance	125℃, 4,000 hrs, apply the rated ripple current without exceeding the rated voltage	
	Capacitance change	Within±30% of the initial value
	Tangent of loss angle (tanδ)	≤200% of the initial specified value
	ESR(mΩ)	≤200% of the initial specified value
	Leakage current	≤The initial specified value
Shelf life	After storage for 1,000 hrs at 105℃ with no voltage applied and then being stabilized at 20℃, capacitors shall meet the specified values for the endurance characteristics listed above.(with voltage treatment)	
Damp Heat (Steady State)	85°C, 85% RH, 2,000 hrs, rated voltage applied	
	Capacitance change	Within±30% of the initial value
	Tangent of loss angle (tanδ)	≤200% of the initial specified value
	ESR(mΩ)	≤200% of the initial specified value
	Leakage current	≤The initial specified value

Part numbering system

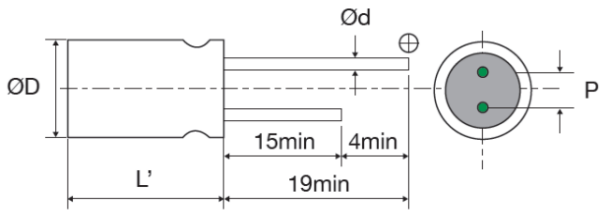
Example: HRC series, 25V / 220μF

25	HRC	220	M	D	10
Voltage	Series	Capacitance	Tolerance	Diameter	Length

Frequency coefficient for ripple current

Frequency	120Hz	1kHz	10kHz	100kHz
Coefficient	0.15	0.40	0.75	1.00

Marking and Dimensions



Size	ØD±0.5	L	L'	P±0.5	Ød
8.0×9.5	8.0	9.5	L±1.0	3.5	0.60
10.0×10.5	10.0	10.5		5.0	0.60
10.0×11.5	10.0	11.5		5.0	0.60
10.0×16.0	10.0	16.0		5.0	0.60

Standard Ratings

Rated Voltage [Vdc]	Rated Capacitance [µF]	Size ØD x L [mm]	ESR (20°C, 100kHz) [mΩ] [max.]	Rated Ripple Current (125°C, 100kHz) [mArms]	Part Number
25	150	8.0 x 9.5	27	1600	25HRC150MD10
	220	8.0 x 9.5	27	1600	25HRC220MD10
	330	10.0 x 10.5	20	2000	25HRC330ME10
	680	10.0 x 10.5	20	3600	25HRC680ME10
35	100	8.0 x 9.5	27	1600	35HRC100MD10
	150	8.0 x 9.5	27	1600	35HRC150MD10
	220	8.0 x 9.5	20	2000	35HRC220MD10
	220	10.0 x 10.5	20	2000	35HRC220ME10
	270	10.0 x 10.5	20	2000	35HRC270ME10
	680	10.0 x 16.0	11	4200	35HRC680ME16
50	47	8.0 x 9.5	30	1250	50HRC47MD10
	68	8.0 x 9.5	30	1250	50HRC68MD10
	100	10.0 x 10.5	28	1600	50HRC100ME10
	120	10.0 x 10.5	28	1600	50HRC120ME10
	220	10.0 x 16.0	13	4000	50HRC220ME16
63	33	8.0 x 9.5	40	1100	63HRC33MD10
	47	8.0 x 9.5	40	1100	63HRC47MD10
	56	10.0 x 10.5	30	1400	63HRC56ME10
	68	10.0 x 10.5	30	1400	63HRC68ME10
	82	10.0 x 10.5	30	1400	63HRC82ME10
	100	10.0 x 11.5	22	3700	63HRC100ME11
	150	10.0 x 16.0	15	4500	63HRC150ME16
	180	10.0 x 16.0	15	4500	63HRC180ME16
80	22	8.0 x 9.5	45	1050	80HRC22MD10
	33	10.0 x 10.5	36	1360	80HRC33ME10
	47	10.0 x 10.5	36	1360	80HRC47ME10
	68	10.0 x 11.5	32	3000	80HRC68ME11
	100	10.0 x 16.0	15	4000	80HRC100ME16

HRK

Radial Lead Type

series

- Large capacitance, High ripple current compared with HRC series
- Load life of 4,000h at 125°C
- Compliance with AEC-Q200

LEAD FREE

Halogen Less

RoHS COMPLIANT

Specifications

Items	Characteristics	
Category temperature range	-55 to +125°C	
Rated voltage range	25 to 80Vdc	
Capacitance range	22 to 680μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Leakage current	I=0.01CV or 3μA whichever is greater (at 20°C, after 2 minutes)	
Tangent of loss angle(tanδ)	Rated voltage(V) 25 35 50 63 80 Tanδ 0.14 0.12 0.10 0.08 0.08 (at 20°C, 120Hz)	
ESR	Less than or equal to the value of Standard Ratings (at 20°C, 100kHz)	
Low temperature characteristics (Impedance ratio at 100kHz)	Z (-25 ℃) / Z (+20 ℃) ≤ 1.5 Z (-55 ℃) / Z (+20 ℃) ≤ 2.0	
Endurance	125°C, 4,000 hrs, apply the rated ripple current without exceeding the rated voltage	
	Capacitance change	Within±30% of the initial value
	Tangent of loss angle (tanδ)	≤200% of the initial specified value
	ESR(mΩ)	≤200% of the initial specified value
	Leakage current	≤The initial specified value
Shelf life	After storage for 1,000 hrs at 125°C with no voltage applied and then being stabilized at 20°C, capacitors shall meet the specified values for the endurance characteristics listed above.(with voltage treatment)	
Damp Heat (Steady State)	85°C, 85% RH, 2,000 hrs, rated voltage applied	
	Capacitance change	Within±30% of the initial value
	Tangent of loss angle (tanδ)	≤200% of the initial specified value
	ESR(mΩ)	≤200% of the initial specified value
	Leakage current	≤The initial specified value

Part numbering system

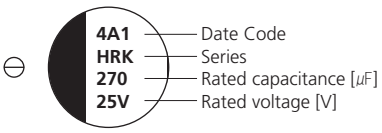
Example: HRK series, 25V / 270μF

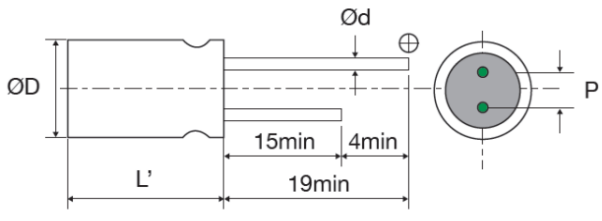
25	HRK	270	M	D	10
Voltage	Series	Capacitance	Tolerance	Diameter	Length

Frequency coefficient for ripple current

Frequency	120Hz	1kHz	10kHz	100kHz
Coefficient	0.15	0.40	0.75	1.00

Marking and Dimensions





Size	ØD±0.5	L	L'	P±0.5	Ød
8.0×9.5	8.0	9.5	L±1.0	3.5	0.60
10.0×10.5	10.0	10.5		5.0	0.60
10.0×11.5	10.0	11.5		5.0	0.60
10.0×16.0	10.0	16.0		5.0	0.60

Standard Ratings

Rated Voltage [Vdc]	Rated Capacitance [µF]	Size ØD x L [mm]	ESR (20°C, 100kHz) [mΩ] [max.]	Rated Ripple Current (125°C, 100kHz) [mArms]	Part Number
25	150	8.0 x 9.5	27	1600	25HRK150MD10
	220	8.0 x 9.5	27	1600	25HRK220MD10
	270	8.0 x 9.5	27	2000	25HRK270MD10
	330	8.0 x 9.5	27	2000	25HRK330MD10
	470	10.0 x 10.5	20	2800	25HRK470ME10
	560	10.0 x 10.5	20	2800	25HRK560ME10
	680	10.0 x 10.5	20	5700	25HRK680ME10
35	100	8.0 x 9.5	27	1600	35HRK100MD10
	150	8.0 x 9.5	27	1600	35HRK150MD10
	180	8.0 x 9.5	27	2000	35HRK180MD10
	220	8.0 x 9.5	27	2000	35HRK220MD10
	220	10.0 x 10.5	20	2000	35HRK220ME10
	270	10.0 x 10.5	20	2000	35HRK270ME10
	330	10.0 x 10.5	20	2800	35HRK330ME10
	390	10.0 x 10.5	20	2800	35HRK390ME10
	680	10.0 x 16.0	11	5200	35HRK680ME16
50	33	8.0 x 9.5	40	1100	50HRK33MD10
	47	8.0 x 9.5	40	1100	50HRK47MD10
	56	10.0 x 10.5	30	1400	50HRK56ME10
	68	10.0 x 10.5	30	1400	50HRK68ME10
	82	10.0 x 10.5	30	1400	50HRK82ME10
	150	10.0 x 11.5	19	3900	63HRK15z0ME11
	220	10.0 x 16.0	13	5100	63HRK220ME16
63	100	10.0 x 11.5	22	3700	63HRK100ME11
	150	10.0 x 16.0	15	4900	63HRK150ME16
	180	10.0 x 16.0	15	4900	63HRK180ME16
80	22	8.0 x 9.5	45	1050	80HRK22MD10
	33	10.0 x 10.5	36	1360	80HRK33ME10
	47	10.0 x 10.5	36	1360	80HRK47ME10
	68	10.0 x 11.5	32	3500	80HRK68ME11
	100	10.0 x 16.0	15	4400	80HRK100ME16

HRE

Radial Lead Type

series

- Low ESR, High ripple current
- Load life of 4,000h at 135°C
- Compliance with AEC-Q200

Specifications

Items	Characteristics	
Category temperature range	-55 to +135°C	
Rated voltage range	25 to 80Vdc	
Capacitance range	33 to 680μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Leakage current	I=0.01CV or 3μA whichever is greater (at 20°C, after 2 minutes)	
Tangent of loss angle(tanδ)	Rated voltage(V) 25 35 50 63 Tanδ 0.14 0.12 0.10 0.08 (at 20°C, 120Hz)	
ESR	Less than or equal to the value of Standard Ratings (at 20°C, 100kHz)	
Low temperature characteristics (Impedance ratio at 100kHz)	Z (-25 ℃) / Z (+20 ℃) ≤ 1.5 Z (-55 ℃) / Z (+20 ℃) ≤ 2.0	
Endurance	135℃, 4,000 hrs apply the rated ripple current without exceeding the rated voltage	
	Capacitance change	Within±30% of the initial value
	Tangent of loss angle (tanδ)	≤200% of the initial specified value
	ESR(mΩ)	≤200% of the initial specified value
	Leakage current	≤The initial specified value
Shelf life	After storage for 1,000 hrs at 135°C with no voltage applied and then being stabilized at 20°C, capacitors shall meet the specified values for the endurance characteristics listed above.(with voltage treatment)	
Damp Heat (Steady State)	85°C, 85% RH, 2,000 hrs, rated voltage applied	
	Capacitance change	Within±30% of the initial value
	Tangent of loss angle (tanδ)	≤200% of the initial specified value
	ESR(mΩ)	≤200% of the initial specified value
	Leakage current	≤The initial specified value

Part numbering system

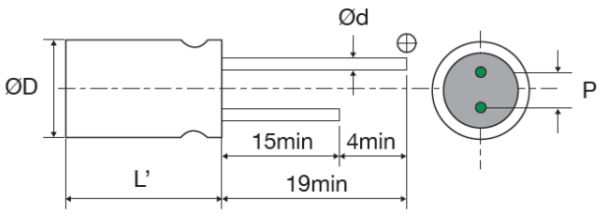
Example: HRE series, 25V / 470μF

25	HRE	470	M	E	11
Voltage	Series	Capacitance	Tolerance	Diameter	Length

Frequency coefficient for ripple current

Frequency	120Hz	1kHz	10kHz	100kHz
Coefficient	0.15	0.40	0.75	1.00

Marking and Dimensions



Size	ØD±0.5	L	L'	P±0.5	Ød
8.0×9.5	8.0	9.5	L±1.0	3.5	0.60
10.0×10.5	10.0	10.5		5.0	0.60
10.0×11.5	10.0	11.5		5.0	0.60
10.0×16.0	10.0	16.0		5.0	0.60

Standard Ratings

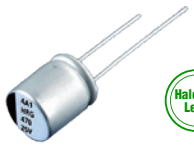
Rated Voltage [Vdc]	Rated Capacitance [µF]	Size ØD x L [mm]	ESR (20°C, 100kHz) [mΩ] [max.]	Rated Ripple Current (100kHz) [mArms]		Part Number
				125°C	135°C	
25	470	10.0 x 11.5	14	3500	2500	25HRE470ME11
	560	10.0 x 16.0	11	4000	2900	25HRE560ME16
	680	10.0 x 16.0	11	5700	4100	32HRE680ME16
35	330	10.0 x 11.5	14	3500	2500	35HRE330ME11
	470	10.0 x 16.0	11	4000	2900	35HRE470ME16
50	150	10.0 x 11.5	17	3200	2250	50HRE150ME11
	220	10.0 x 16.0	13	3700	2600	50HRE220ME16
63	100	10.0 x 11.5	19	3000	2100	63HRE100ME11
	150	10.0 x 16.0	15	3500	2400	63HRE150ME16
	180	10.0 x 16.0	15	4900	3500	63HRE180ME16
80	33	8.0 x 9.5	45	2500	1700	80HRE33MD10
	56	10.0 x 10.5	36	3200	2200	80HRE56ME10
	100	10.0 x 16.0	16	4400	3200	80HRE100ME16

HRG

Radial Lead Type

series

- Low ESR, High ripple current
- Load life of 2,000h at 145°C
- Compliance with AEC-Q200



LEAD FREE

Halogen Less

RoHS COMPLIANT

Specifications

Items	Characteristics	
Category temperature range	-55 to +145°C	
Rated voltage range	25 to 63Vdc	
Capacitance range	33 to 330μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Leakage current	I=0.01CV or 3μA whichever is greater (at 20°C, after 2 minutes)	
Tangent of loss angle(tanδ)	Rated voltage(V) / 25 / 35 / 50 / 63 Tanδ / 0.14 / 0.12 / 0.10 / 0.08 (at 20°C, 120Hz)	
ESR	Less than or equal to the value of Standard Ratings (at 20°C, 100kHz)	
Low temperature characteristics (Impedance ratio at 100kHz)	Z (-25 ℃) / Z (+20 ℃) ≤ 1.5 Z (-55 ℃) / Z (+20 ℃) ≤ 2.0	
Endurance	145°C, 2,000 hrs(6.3Ø : 2,000 hrs), apply the rated ripple current without exceeding the rated voltage	
	Capacitance change	Within±30% of the initial value
	Tangent of loss angle (tanδ)	≤200% of the initial specified value
	ESR(mΩ)	≤200% of the initial specified value
	Leakage current	≤The initial specified value
Shelf life	After storage for 1,000 hrs at 145°C with no voltage applied and then being stabilized at 20°C, capacitors shall meet the specified values for the endurance characteristics listed above.(with voltage treatment)	
Damp Heat (Steady State)	85°C, 85% RH, 2,000 hrs, rated voltage applied	
	Capacitance change	Within±30% of the initial value
	Tangent of loss angle (tanδ)	≤200% of the initial specified value
	ESR(mΩ)	≤200% of the initial specified value
	Leakage current	≤The initial specified value

Part numbering system

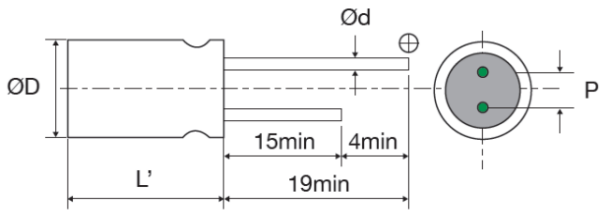
Example: HRG series, 25V / 330μF

25	HRG	330	M	E	11
Voltage	Series	Capacitance	Tolerance	Diameter	Length

Frequency coefficient for ripple current

Frequency	120Hz	1kHz	10kHz	100kHz
Coefficient	0.15	0.40	0.75	1.00

Marking and Dimensions



(unit: mm)

Size	ØD±0.5	L	L'	P±0.5	Ød
8.0×9.5	8.0	9.5	L±1.0	3.5	0.60
10.0×10.5	10.0	10.5		5.0	0.60

Standard Ratings

Rated Voltage [Vdc]	Rated Capacitance [µF]	Size ØD x L [mm]	ESR (20°C, 100kHz) [mΩ] [max.]	Rated Ripple Current (100kHz) [mArms]		Part Number
				135°C	145°C	
25	220	8.0 x 9.5	27	1600	700	25HRG220MD10
	330	10.0 x 10.5	20	2000	900	25HRG330ME10
35	150	8.0 x 9.5	27	1600	700	35HRG150MD10
	270	10.0 x 10.5	20	2000	900	35HRG270ME10
50	68	8.0 x 9.5	30	1250	600	50HRG68MD10
	100	10.0 x 10.5	28	1600	800	50HRG100ME10
63	33	8.0 x 9.5	40	1100	600	63HRG33MD10
	56	10.0 x 10.5	30	1400	800	63HRG56ME10
	82	10.0 x 10.5	30	1400	800	63HRG82ME10

HRJ

Radial Lead Type

series

- Low ESR, High ripple current
- Load life of 1,000h at 150°C
- Compliance with AEC-Q200

Specifications

Items	Characteristics	
Category temperature range	-55 to +150°C	
Rated voltage range	25 to 63Vdc	
Capacitance range	33 to 270μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Leakage current	I=0.01CV or 3μA whichever is greater (at 20°C, after 2 minutes)	
Tangent of loss angle(tanδ)	Rated voltage(V) 25 35 50 63 Tanδ 0.14 0.12 0.10 0.08 (at 20°C, 120Hz)	
ESR	Less than or equal to the value of Standard Ratings (at 20°C, 100kHz)	
Low temperature characteristics (Impedance ratio at 100kHz)	Z (-25 ℃) / Z (+20 ℃) ≤ 1.5 Z (-55 ℃) / Z (+20 ℃) ≤ 2.0	
Endurance	150°C, 1,000 hrs(6.3Ø : 2,000 hrs), apply the rated ripple current without exceeding the rated voltage	
	Capacitance change	Within±30% of the initial value
	Tangent of loss angle (tanδ)	≤200% of the initial specified value
	ESR(mΩ)	≤200% of the initial specified value
	Leakage current	≤The initial specified value
Shelf life	After storage for 1,000 hrs at 150°C with no voltage applied and then being stabilized at 20°C, capacitors shall meet the specified values for the endurance characteristics listed above.(with voltage treatment)	
Damp Heat (Steady State)	85°C, 85% RH, 2,000 hrs, rated voltage applied	
	Capacitance change	Within±30% of the initial value
	Tangent of loss angle (tanδ)	≤200% of the initial specified value
	ESR(mΩ)	≤200% of the initial specified value
	Leakage current	≤The initial specified value

Part numbering system

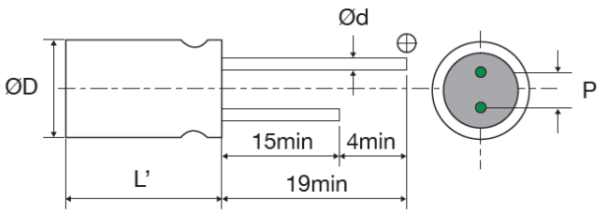
Example: HRJ series, 25V / 270μF

25	HRJ	270	M	E	11
Voltage	Series	Capacitance	Tolerance	Diameter	Length

Frequency coefficient for ripple current

Frequency	120Hz	1kHz	10kHz	100kHz
Coefficient	0.15	0.40	0.75	1.00

Marking and Dimensions



(unit: mm)

Size	ØD±0.5	L	L'	P±0.5	Ød
8.0×9.5	8.0	9.5	L±1.0	3.5	0.60
10.0×10.5	10.0	10.5		5.0	0.60

Standard Ratings

Rated Voltage [Vdc]	Rated Capacitance [µF]	Size ØD x L [mm]	ESR (20°C, 100kHz) [mΩ] [max.]	Rated Ripple Current (150°C, 100kHz) [mArms]	Part Number
25	150	8.0 x 9.5	27	800	25HRJ150MD10
	270	10.0 x 10.5	20	1000	25HRJ270ME10
35	100	8.0 x 9.5	30	770	35HRJ100MD10
	150	10.0 x 10.5	23	950	35HRJ150ME10
50	56	8.0 x 9.5	35	700	50HRJ56MD10
	100	10.0 x 10.5	28	900	50HRJ100ME10
63	33	8.0 x 9.5	40	650	63HRJ33MD10
	56	10.0 x 10.5	30	840	63HRJ56ME10

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Conductive Polymer Hybrid Aluminum Electrolytic Capacitors_SMD

HVS series
HVC series
HVK series
HVE series
HVG series
HVJ series

HVS

Surface mount type

series

- Low ESR, High ripple current
- Load life of 10,000h at 105°C
- Compliance with AEC-Q200

• Specifications

Items	Characteristics	
Category temperature range	-55 to +105°C	
Rated voltage range	6.3 to 80Vdc	
Capacitance range	10 to 1000μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Leakage current	I=0.01CV or 3μA whichever is greater (at 20°C, after 2 minutes)	
Tangent of loss angle(tanδ)	Rated voltage(V) 6.3 16 25 35 50 63 80 Tanδ 0.18 0.16 0.14 0.12 0.10 0.08 0.08 (at 20°C, 120Hz)	
ESR	Less than or equal to the value of Standard Ratings (at 20°C, 100kHz)	
Low temperature characteristics (Impedance ratio at 100kHz)	Z (-25 ℃) / Z (+20 ℃) ≤ 1.5 Z (-55 ℃) / Z (+20 ℃) ≤ 2.0	
Endurance	105°C, 10,000 hrs, apply the rated ripple current without exceeding the rated voltage	
	Capacitance change	Within±30% of the initial value
	Tangent of loss angle (tanδ)	≤200% of the initial specified value
	ESR(mΩ)	≤200% of the initial specified value
	Leakage current	≤The initial specified value
Shelf life	After storage for 1,000 hrs at 105°C with no voltage applied and then being stabilized at 20°C, capacitors shall meet the specified values for the endurance characteristics listed above.(with voltage treatment)	
Damp Heat (Steady State)	85°C, 85% RH, 2,000 hrs, rated voltage applied	
	Capacitance change	Within±30% of the initial value
	Tangent of loss angle (tanδ)	≤200% of the initial specified value
	ESR(mΩ)	≤200% of the initial specified value
	Leakage current	≤The initial specified value

• Part numbering system

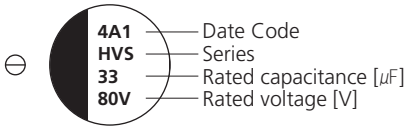
Example: HVS series, 80V / 33μF / Vibration resistant structure

80	HVS	33	M	E	10	V
Voltage	Series	Capacitance	Tolerance	Diameter	Length	Vibration resistant structure

• Frequency coefficient for ripple current

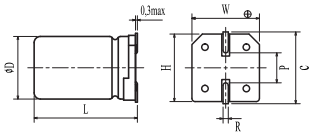
Frequency	120Hz	1kHz	10kHz	100kHz
Coefficient	0.15	0.40	0.75	1.00

• Marking and Dimensions

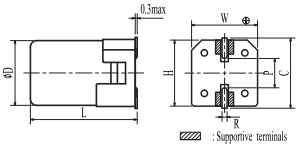


• Dimensions

[Standard]



[Vibration Resistance]



[Standard] (unit: mm)

Size	ØD±0.5	L	W±0.2	H±0.2	C±0.2	R	P±0.2
5.0×5.9	5.0	5.9±0.3	5.3	5.3	6.0	0.6 to 0.8	1.4
6.3×5.9	6.3	5.9±0.3	6.6	6.6	7.3	0.6 to 0.8	2.1
6.3×7.7	6.3	7.7±0.3	6.6	6.6	7.3	0.6 to 0.8	2.1
8.0×9.7	8.0	9.7±0.5	8.3	8.3	9.0	0.8 to 1.1	3.2
10.0×10.5	10.0	10.5±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6
10.0×12.5	10.0	12.5±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6
10.0×16.5	10.0	16.5±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6

[Vibration Resistance] (unit: mm)

Size	ØD±0.5	L	W±0.2	H±0.2	C±0.2	R	P±0.2
6.3×6.2	6.3	6.2±0.3	6.6	6.6	7.3	0.6 to 0.8	2.1
6.3×8.0	8.0	8.0±0.3	6.6	6.6	7.3	0.6 to 0.8	2.1
8.0×9.9	8.0	9.9±0.5	8.3	8.3	9.0	0.8 to 1.1	3.2
10.0×10.7	10.0	10.7±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6
10.0×12.7	10.0	12.7±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6
10.0×16.7	10.0	16.7±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6

• Standard Ratings

Rated Voltage [Vdc]	Rated Capacitance [μF]	Size ØD x L [mm]	ESR (20°C, 100kHz) [mΩ] [max.]	Rated Ripple Current (105°C, 100kHz) [mArms]	Part Number
6.3	560	8.0 x 9.7	16	3200	6HVS560MD10□
	1000	10.0 x 10.5	15	3900	6HVS1000ME10□
16	22	5.0 x 5.9	80	900	16HVS22MB6□
	100	6.3 x 5.9	38	2900	16HVS100MC6□
	270	10.0 x 10.5	23	2850	16HVS220ME10□
25	33	5.0 x 5.9	80	900	25HVS33MB6
	56	6.3 x 5.9	50	1300	25HVS56MC6□
	100	6.3 x 7.7	30	2000	25HVS100MC8□
	220	8.0 x 9.7	27	2300	25HVS220MD10□
	330	10.0 x 10.5	20	2500	25HVS330ME10□
	470	10.0 x 12.5	20	3200	25HVS470ME12□
	680	10.0 x 16.5	11	5700	25HVS680ME16□
35	22	5.0 x 5.9	100	900	35HVS22MB6
	27	6.3 x 5.9	60	1300	35HVS27MC6□
	47	6.3 x 5.9	60	1300	35HVS47MC6□
	68	6.3 x 7.7	35	2000	35HVS68MC8□
	100	8.0 x 9.7	28	2100	35HVS100MD10□
	150	8.0 x 9.7	27	2300	35HVS150MD10□
	220	10.0 x 12.5	22	2350	35HVS220ME12□
	270	10.0 x 10.5	20	2500	35HVS270ME10□
	390	10.0 x 12.5	18	3500	35HVS390ME12□
	470	10.0 x 12.5	16	4000	35HVS470ME12□
50	10	5.0 x 5.9	120	750	50HVS10MB6
	22	6.3 x 5.9	80	1100	50HVS22MC6□
	33	6.3 x 7.7	40	1600	50HVS33MC8□
	47	8.0 x 9.7	35	1700	35HVS47MD10□
	68	8.0 x 9.7	30	1800	50HVS68MD10□
	100	10.0 x 10.5	28	2000	50HVS100ME10□
	150	10.0 x 12.5	25	3000	50HVS150ME12□
	220	10.0 x 16.5	13	5100	50HVS220ME16□
63	10	6.3 x 5.9	120	1000	63HVS10MC6□
	22	6.3 x 7.7	80	1500	63HVS22MC8□
	33	8.0 x 9.7	40	1600	63HVS33MD10□
	56	10.0 x 10.5	30	1800	63HVS56ME10□
	68	10.0 x 10.5	30	1800	63HVS68ME10□
	82	10.0 x 10.5	30	2000	63HVS82ME10□
	100	10.0 x 12.5	25	2500	63HVS100ME12□
	120	10.0 x 12.5	30	4100	63HVS120ME12□
	180	10.0 x 16.5	15	4900	63HVS180ME16□
80	22	8.0 x 9.7	45	1600	80HVS22MD10□
	33	10.0 x 10.5	35	1700	80HVS33ME10□
	47	10.0 x 10.5	35	1700	80HVS47ME10□
	100	10.0 x 16.5	16	4400	80HVS100ME16□

*Terminal Code : V(Vibration-proof products)

HVC

Surface mount type

series

- Low ESR, High ripple current
- Load life of 4,000h at 125°C
- Compliance with AEC-Q200

• Specifications

Items	Characteristics	
Category temperature range	-55 to +125°C	
Rated voltage range	25 to 80Vdc	
Capacitance range	10 to 560μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Leakage current	I=0.01CV or 3μA whichever is greater (at 20°C, after 2 minutes)	
Tangent of loss angle(tanδ)	Rated voltage(V) 25 35 50 63 80 Tanδ 0.14 0.12 0.10 0.08 0.08 (at 20°C, 120Hz)	
ESR	Less than or equal to the value of Standard Ratings (at 20°C, 100kHz)	
Low temperature characteristics (Impedance ratio at 100kHz)	Z (-25 ℃) / Z (+20 ℃) ≤ 1.5 Z (-55 ℃) / Z (+20 ℃) ≤ 2.0	
Endurance	125℃, 4,000 hrs, apply the rated ripple current without exceeding the rated voltage	
	Capacitance change	Within±30% of the initial value
	Tangent of loss angle (tanδ)	≤200% of the initial specified value
	ESR(mΩ)	≤200% of the initial specified value
	Leakage current	≤The initial specified value
Shelf life	After storage for 1,000 hrs at 125°C with no voltage applied and then being stabilized at 20°C, capacitors shall meet the specified values for the endurance characteristics listed above.(with voltage treatment)	
Damp Heat (Steady State)	85°C, 85% RH, 2,000 hrs, rated voltage applied	
	Capacitance change	Within±30% of the initial value
	Tangent of loss angle (tanδ)	≤200% of the initial specified value
	ESR(mΩ)	≤200% of the initial specified value
	Leakage current	≤The initial specified value

• Part numbering system

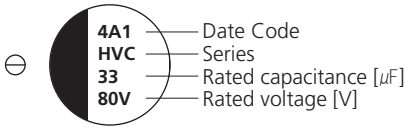
Example: HVC series, 80V / 33μF / Vibration resistant structure

80	HVC	33	M	E	10	V
Voltage	Series	Capacitance	Tolerance	Diameter	Length	Vibration resistant structure

• Frequency coefficient for ripple current

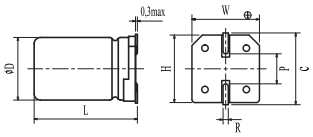
Frequency	120Hz	1kHz	10kHz	100kHz
Coefficient	0.15	0.40	0.75	1.00

• Marking and Dimensions

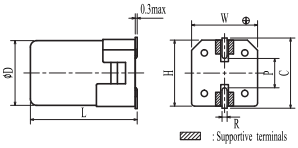


• Dimensions

[Standard]



[Vibration Resistance]



[Standard] (unit: mm)

Size	ØD±0.5	L	W±0.2	H±0.2	C±0.2	R	P±0.2
5.0×5.9	5.0	5.9±0.3	5.3	5.3	6.0	0.6 to 0.8	1.4
6.3×5.9	6.3	5.9±0.3	6.6	6.6	7.3	0.6 to 0.8	2.1
6.3×7.7	6.3	7.7±0.3	6.6	6.6	7.3	0.6 to 0.8	2.1
8.0×9.7	8.0	9.7±0.5	8.3	8.3	9.0	0.8 to 1.1	3.2
10.0×10.5	10.0	10.5±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6
10.0×12.5	10.0	12.5±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6
10.0×16.5	10.0	16.5±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6

[Vibration Resistance] (unit: mm)

Size	ØD±0.5	L	W±0.2	H±0.2	C±0.2	R	P±0.2
6.3×6.2	6.3	6.2±0.3	6.6	6.6	7.3	0.6 to 0.8	2.1
6.3×8.0	8.0	8.0±0.3	6.6	6.6	7.3	0.6 to 0.8	2.1
8.0×9.9	8.0	9.9±0.5	8.3	8.3	9.0	0.8 to 1.1	3.2
10.0×10.7	10.0	10.7±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6
10.0×12.7	10.0	12.7±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6
10.0×16.7	10.0	16.7±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6

• Standard Ratings

Rated Voltage [Vdc]	Rated Capacitance [μF]	Size ØD x L [mm]	ESR (20°C, 100kHz) [mΩ] [max.]	Rated Ripple Current (125°C, 100kHz) [mArms]	Part Number
25	33	5.0 x 5.9	80	550	25HVC33MB6
	56	6.3 x 5.9	50	900	25HVC56MC6□
	100	6.3 x 7.7	30	1400	25HVC100MC8□
	100	8.0 x 7.7	30	1400	25HVC100MD8□
	150	8.0 x 9.7	27	1600	25HVC150MD10□
	220	8.0 x 9.7	27	1600	25HVC220MD10□
	330	10.0 x 10.5	20	2000	25HVC330ME10□
	560	10.0 x 10.5	20	2800	25HVC560ME10□
35	22	5.0 x 5.9	100	550	35HVC22MB6
	47	6.3 x 5.9	60	900	35HVC47MC6□
	68	6.3 x 7.7	35	1400	35HVC68MC8□
	100	8.0 x 9.7	27	1600	35HVC100MD10□
	150	8.0 x 9.7	27	1600	35HVC150MD10□
	220	8.0 x 10.5	27	2000	35HVC220MD10□
	220	10.0 x 10.5	20	2000	35HVC220ME10□
	270	10.0 x 10.5	20	2000	35HVC270ME10□
	470	10.0 x 12.5	16	4100	35HVC470ME12□
50	10	5.0 x 5.9	120	500	50HVC10MB6
	22	6.3 x 5.9	80	750	50HVC22MC6□
	33	6.3 x 7.7	40	1100	50HVC33MC8□
	47	8.0 x 9.7	35	1250	50HVC47MD10□
	68	8.0 x 9.7	30	1250	50HVC68MD10□
	100	10.0 x 10.5	28	1600	50HVC100ME10□
	120	10.0 x 10.5	28	1600	50HVC120ME10□
	220	10.0 x 16.5	13	3900	50HVC220ME16□
63	10	6.3 x 5.9	120	700	63HVC10MC6□
	22	6.3 x 7.7	80	900	63HVC22MC8□
	33	8.0 x 9.7	40	1100	63HVC33MD10□
	47	8.0 x 9.7	40	1100	63HVC47MD10□
	56	10.0 x 10.5	30	1400	63HVC56ME10□
	68	10.0 x 10.5	30	1400	63HVC68ME10□
	82	10.0 x 10.5	30	1400	63HVC82ME10□
	100	10.0 x 12.5	28	2100	63HVC100ME12□
80	22	8.0 x 9.7	45	1050	80HVC22MD10□
	33	10.0 x 10.5	35	1360	80HVC33ME10□
	47	10.0 x 10.5	35	1360	80HVC47ME10□

*Terminal Code : V(Vibration-proof products)

HVK

Surface mount type

series

- Large capacitance, High ripple current compared with HVC series
- Load life of 4,000h at 125°C
- Compliance with AEC-Q200

• Specifications

Items	Characteristics	
Category temperature range	-55 to +125°C	
Rated voltage range	25 to 80Vdc	
Capacitance range	33 to 680μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Leakage current	I=0.01CV or 3μA whichever is greater (at 20°C, after 2 minutes)	
Tangent of loss angle(tanδ)	Rated voltage(V) 25 35 50 63 80 Tanδ 0.14 0.12 0.10 0.08 0.08 (at 20°C, 120Hz)	
ESR	Less than or equal to the value of Standard Ratings (at 20°C, 100kHz)	
Low temperature characteristics (Impedance ratio at 100kHz)	Z (-25 ℃) / Z (+20 ℃) ≤ 1.5 Z (-55 ℃) / Z (+20 ℃) ≤ 2.0	
Endurance	125°C, 4,000 hrs, apply the rated ripple current without exceeding the rated voltage	
	Capacitance change	Within±30% of the initial value
	Tangent of loss angle (tanδ)	≤200% of the initial specified value
	ESR(mΩ)	≤200% of the initial specified value
	Leakage current	≤The initial specified value
Shelf life	After storage for 1,000 hrs at 125°C with no voltage applied and then being stabilized at 20°C, capacitors shall meet the specified values for the endurance characteristics listed above.(with voltage treatment)	
Damp Heat (Steady State)	85°C, 85% RH, 2,000 hrs, rated voltage applied	
	Capacitance change	Within±30% of the initial value
	Tangent of loss angle (tanδ)	≤200% of the initial specified value
	ESR(mΩ)	≤200% of the initial specified value
	Leakage current	≤The initial specified value

• Part numbering system

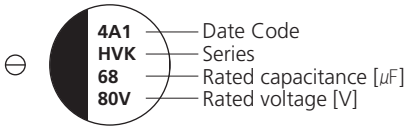
Example: HVK series, 80V / 33μF / Vibration resistant structure

80	HVK	33	M	E	10	V
Voltage	Series	Capacitance	Tolerance	Diameter	Length	Vibration resistant structure

• Frequency coefficient for ripple current

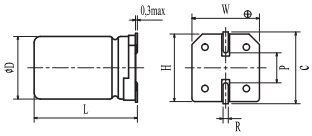
Frequency	120Hz	1kHz	10kHz	100kHz
Coefficient	0.15	0.40	0.75	1.00

• Marking and Dimensions

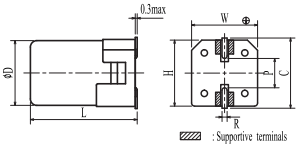


• Dimensions

[Standard]



[Vibration Resistance]



[Standard] (unit: mm)

Size	ØD±0.5	L	W±0.2	H±0.2	C±0.2	R	P±0.2
5.0×5.9	5.0	5.9±0.3	5.3	5.3	6.0	0.6 to 0.8	1.4
6.3×5.9	6.3	5.9±0.3	6.6	6.6	7.3	0.6 to 0.8	2.1
6.3×7.7	6.3	7.7±0.3	6.6	6.6	7.3	0.6 to 0.8	2.1
8.0×9.7	8.0	9.7±0.5	8.3	8.3	9.0	0.8 to 1.1	3.2
10.0×10.5	10.0	10.5±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6
10.0×12.5	10.0	12.5±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6
10.0×16.5	10.0	16.5±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6

[Vibration Resistance] (unit: mm)

Size	ØD±0.5	L	W±0.2	H±0.2	C±0.2	R	P±0.2
6.3×6.2	6.3	6.2±0.3	6.6	6.6	7.3	0.6 to 0.8	2.1
6.3×8.0	8.0	8.0±0.3	6.6	6.6	7.3	0.6 to 0.8	2.1
8.0×9.9	8.0	9.9±0.5	8.3	8.3	9.0	0.8 to 1.1	3.2
10.0×10.7	10.0	10.7±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6
10.0×12.7	10.0	12.7±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6
10.0×16.7	10.0	16.7±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6

• Standard Ratings

Rated Voltage [Vdc]	Rated Capacitance [μF]	Size ØD x L [mm]	ESR (20°C, 100kHz) [mΩ] [max.]	Rated Ripple Current (125°C, 100kHz) [mArms]	Part Number
25	47	5.0 x 5.9	80	850	25HVK47MB6
	56	5.0 x 5.9	60	900	25HVK56MB6
	68	6.3 x 5.9	50	1300	25HVK68MC6□
	82	6.3 x 5.9	50	1300	25HVK82MC6□
	150	6.3 x 7.7	30	1800	25HVK150MC8□
	270	8.0 x 9.7	27	2000	25HVK270MD10□
	470	10.0 x 10.5	20	2800	25HVK470ME10□
	680	10.0 x 16.5	11	5700	25HVK680ME16□
35	33	5.0 x 5.9	100	750	35HVK33MB6
	56	6.3 x 5.9	60	1200	35HVK56MC6□
	100	6.3 x 7.7	35	1700	35HVK100MC8□
	180	8.0 x 9.7	27	2000	35HVK180MD10□
	330	10.0 x 10.5	20	2800	35HVK330ME10□
	470	10.0 x 16.5	11	5700	35HVK470ME16□
50	100	10.0 x 10.5	28	3000	50HVK100ME10□
	220	10.0 x 16.5	13	5100	50HVK220ME16□
63	82	10.0 x 10.5	30	1400	63HVK82ME10□
	100	10.0 x 12.5	28	2100	63HVK100ME12□
	150	10.0 x 16.5	15	4900	63HVK150ME16□
	180	10.0 x 16.5	15	4900	63HVK180ME16□
80	68	10.0 x 12.5	32	3500	63HVK68ME12□
	100	10.0 x 16.5	16	4400	63HVK100ME16□

*Terminal Code : V(Vibration-proof products)

HVE

Surface mount type

series

- Low ESR, High ripple current
- Load life of 4,000h at 135°C
- Compliance with AEC-Q200

• Specifications

Items	Characteristics	
Category temperature range	-55 to +135°C	
Rated voltage range	25 to 80Vdc	
Capacitance range	22 to 560μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Leakage current	I=0.01CV or 3μA whichever is greater (at 20°C, after 2 minutes)	
Tangent of loss angle(tanδ)	Rated voltage(V) 25 / 35 / 50 / 63 / 80 Tanδ 0.14 / 0.12 / 0.10 / 0.08 / 0.08 (at 20°C, 120Hz)	
ESR	Less than or equal to the value of Standard Ratings (at 20°C, 100kHz)	
Low temperature characteristics (Impedance ratio at 100kHz)	Z (-25°C) / Z (+20°C) ≤ 1.5 Z (-55°C) / Z (+20°C) ≤ 2.0	
Endurance	135°C, 4,000 hrs(6.3Ø : 2,000 hrs), apply the rated ripple current without exceeding the rated voltage	
	Capacitance change	Within±30% of the initial value
	Tangent of loss angle (tanδ)	≤200% of the initial specified value
	ESR(mΩ)	≤200% of the initial specified value
	Leakage current	≤The initial specified value
Shelf life	After storage for 1,000 hrs at 135°C with no voltage applied and then being stabilized at 20°C, capacitors shall meet the specified values for the endurance characteristics listed above.(with voltage treatment)	
Damp Heat (Steady State)	85°C, 85% RH, 2,000 hrs, rated voltage applied	
	Capacitance change	Within±30% of the initial value
	Tangent of loss angle (tanδ)	≤200% of the initial specified value
	ESR(mΩ)	≤200% of the initial specified value
	Leakage current	≤The initial specified value

• Part numbering system

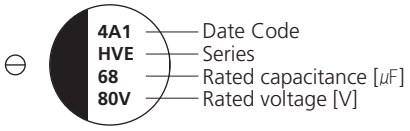
Example: HVE series, 80V / 33μF / Vibration resistant structure

80	HVE	33	M	E	10	V
Voltage	Series	Capacitance	Tolerance	Diameter	Length	Vibration resistant structure

• Frequency coefficient for ripple current

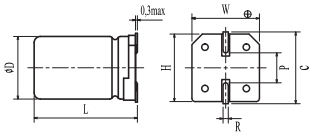
Frequency	120Hz	1kHz	10kHz	100kHz
Coefficient	0.15	0.40	0.75	1.00

• Marking and Dimensions

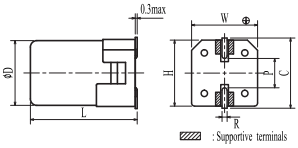


• Dimensions

[Standard]



[Vibration Resistance]



[Standard] (unit: mm)

Size	ØD±0.5	L	W±0.2	H±0.2	C±0.2	R	P±0.2
6.3×5.9	6.3	5.9±0.3	6.6	6.6	7.3	0.6 to 0.8	2.1
6.3×7.7	6.3	7.7±0.3	6.6	6.6	7.3	0.6 to 0.8	2.1
8.0×9.7	8.0	9.7±0.5	8.3	8.3	9.0	0.8 to 1.1	3.2
10.0×10.5	10.0	10.5±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6
10.0×12.5	10.0	12.5±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6
10.0×16.5	10.0	16.5±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6

[Vibration Resistance] (unit: mm)

Size	ØD±0.5	L	W±0.2	H±0.2	C±0.2	R	P±0.2
6.3×6.2	6.3	6.2±0.3	6.6	6.6	7.3	0.6 to 0.8	2.1
6.3×8.0	8.0	8.0±0.3	6.6	6.6	7.3	0.6 to 0.8	2.1
8.0×9.9	8.0	9.9±0.5	8.3	8.3	9.0	0.8 to 1.1	3.2
10.0×10.7	10.0	10.7±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6
10.0×12.7	10.0	12.7±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6
10.0×16.7	10.0	16.7±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6

• Standard Ratings

Rated Voltage [Vdc]	Rated Capacitance [μF]	Size ØD x L [mm]	ESR (20°C, 100kHz) [mΩ] [max.]	Rated Ripple Current (100kHz) [mArms]		Part Number
				125°C	135°C	
25	56	6.3 x 5.9	50	1400	900	25HVE56MC6□
	100	6.3 x 7.7	30	2100	1400	25HVE100MC8□
	220	8.0 x 9.7	22	2900	1600	25HVE220MD10□
	330	10.0 x 10.5	20	3300	2000	25HVE330ME10□
	470	10.0 x 12.5	16	3900	2300	25HVE470ME12□
	560	10.0 x 12.5	14	4200	2500	25HVE560ME12□
35	47	6.3 x 5.9	60	1400	900	35HVE47MC6□
	68	6.3 x 7.7	35	2100	1400	35HVE68MC8□
	150	8.0 x 9.7	22	2900	1600	35HVE150MD10□
	270	10.0 x 10.5	20	3300	2000	35HVE270ME10□
	330	10.0 x 12.5	17	3800	2200	35HVE330ME12□
	390	10.0 x 12.5	14	4100	2400	35HVE390ME12□
50	33	8.0 x 9.7	30	2400	1250	50HVE33MD10□
	47	8.0 x 9.7	30	2400	1250	50HVE47MD10□
	68	8.0 x 9.7	30	2400	1250	50HVE68MD10□
	100	10.0 x 10.5	25	2900	1600	50HVE100ME10□
	120	10.0 x 10.5	25	2900	1600	50HVE120ME10□
	150	10.0 x 12.5	19	3400	2000	50HVE150ME12□
63	22	8.0 x 9.7	40	2100	1100	63HVE22MD10□
	33	8.0 x 9.7	40	2100	1100	63HVE33MD10□
	47	8.0 x 9.7	40	2100	1100	63HVE47MD10□
	56	10.0 x 10.5	30	2600	1400	63HVE56ME10□
	82	10.0 x 10.5	30	2600	1400	63HVE82ME10□
	100	10.0 x 12.5	22	3200	1900	63HVE100ME12□
	150	10.0 x 16.5	15	4900	3500	63HVE150ME16□
	180	10.0 x 16.5	15	4900	3500	63HVE180ME16□
80	68	10.0 x 12.5	32	3500	2400	80HVE68ME12□
	100	10.0 x 16.5	16	4400	3200	80HVE100ME16□

*Terminal Code : V(Vibration-proof products)

HVG

Surface mount type

series

- Low ESR, High ripple current
- Load life of 2,000h at 145°C
- Compliance with AEC-Q200

Specifications

Items	Characteristics	
Category temperature range	-55 to +145°C	
Rated voltage range	25 to 80Vdc	
Capacitance range	33 to 680μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Leakage current	I=0.01CV or 3μA whichever is greater (at 20°C, after 2 minutes)	
Tangent of loss angle(tanδ)	Rated voltage(V) 25 / 35 / 50 / 63 / 80 Tanδ 0.14 / 0.12 / 0.10 / 0.08 / 0.08 (at 20°C, 120Hz)	
ESR	Less than or equal to the value of Standard Ratings (at 20°C, 100kHz)	
Low temperature characteristics (Impedance ratio at 100kHz)	Z (-25 ℃) / Z (+20 ℃) ≤ 1.5 Z (-55 ℃) / Z (+20 ℃) ≤ 2.0	
Endurance	145°C,2,000 hrs, apply the rated ripple current without exceeding the rated voltage	
	Capacitance change	Within±30% of the initial value
	Tangent of loss angle (tanδ)	≤200% of the initial specified value
	ESR(mΩ)	≤200% of the initial specified value
	Leakage current	≤The initial specified value
Shelf life	135°C,4,000 hrs, apply the rated ripple current without exceeding the rated voltage	
Damp Heat (Steady State)	Capacitance change	Within±30% of the initial value
	Tangent of loss angle (tanδ)	≤200% of the initial specified value
	ESR(mΩ)	≤200% of the initial specified value
	Leakage current	≤The initial specified value
	After storage for 1,000 hrs at 145°C with no voltage applied and then being stabilized at 20°C, capacitors shall meet the specified values for the endurance characteristics listed above.(with voltage treatment)	
Damp Heat (Steady State)	85°C, 85% RH, 2,000 hrs, rated voltage applied	
	Capacitance change	Within±30% of the initial value
	Tangent of loss angle (tanδ)	≤200% of the initial specified value
	ESR(mΩ)	≤200% of the initial specified value
	Leakage current	≤The initial specified value

Part numbering system

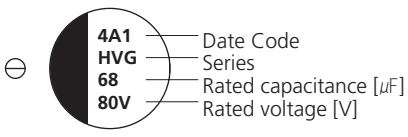
Example: HVG series, 80V / 33μF / Vibration resistant structure

80	HVG	33	M	E	10	V
Voltage	Series	Capacitance	Tolerance	Diameter	Length	Vibration resistant structure

Frequency coefficient for ripple current

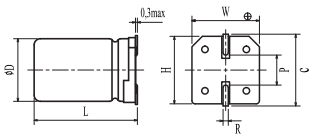
Frequency	120Hz	1kHz	10kHz	100kHz
Coefficient	0.15	0.40	0.75	1.00

Marking and Dimensions

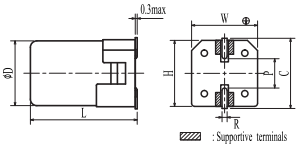


Dimensions

[Standard]



[Vibration Resistance]



[Standard] (unit: mm)

Size	ØD±0.5	L	W±0.2	H±0.2	C±0.2	R	P±0.2
8.0×9.7	8.0	9.7±0.5	8.3	8.3	9.0	0.8 to 1.1	3.2
10.0×10.5	10.0	10.5±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6
10.0×12.5	10.0	12.5±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6
10.0×16.5	10.0	16.5±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6

[Vibration Resistance] (unit: mm)

Size	ØD±0.5	L	W±0.2	H±0.2	C±0.2	R	P±0.2
8.0×9.9	8.0	9.9±0.5	8.3	8.3	9.0	0.8 to 1.1	3.2
10.0×10.7	10.0	10.7±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6
10.0×12.7	10.0	12.7±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6
10.0×16.7	10.0	16.7±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6

• Standard Ratings

Rated Voltage [Vdc]	Rated Capacitance [μF]	Size ØD x L [mm]	ESR (20°C, 100kHz) [mΩ] [max.]	Rated Ripple Current (100kHz) [mArms]		Part Number
				135°C	145°C	
25	220	8.0 x 9.7	27	1600	700	25HVG220MD10□
	330	10.0 x 10.5	20	2000	900	25HVG330ME10□
	680	10.0 x 16.5	11	4100	2000	25HVG680ME16□
35	150	8.0 x 9.7	27	1600	700	35HVG150MD10□
	270	10.0 x 10.5	20	2000	900	35HVG270ME10□
	470	10.0 x 16.5	11	4100	2400	35HVG770ME16□
50	68	8.0 x 9.7	30	1250	600	50HVG68MD10□
	100	10.0 x 10.5	28	1600	800	50HVG100ME10□
	220	10.0 x 16.5	13	3700	2200	50HVG220ME16□
63	33	8.0 x 9.7	40	1100	600	63HVG33MD10□
	56	10.0 x 10.5	30	1400	800	63HVG56ME10□
	82	10.0 x 10.5	30	1400	800	63HVG82ME10□
	150	10.0 x 16.5	15	3500	2200	63HVG150ME16□
	180	10.0 x 16.5	15	3500	2200	63HVG180ME16□
80	68	10.0 x 12.5	32	2400	1400	80HVG68ME12□
	100	10.0 x 16.5	16	3200	2000	80HVG100ME16□

*Terminal Code : V(Vibration-proof products)

HVJ

Surface mount type

series

- Low ESR, High ripple current
- Load life of 1,000h at 150°C
- Compliance with AEC-Q200

• Specifications

Items	Characteristics	
Category temperature range	-55 to +150°C	
Rated voltage range	25 to 80Vdc	
Capacitance range	33 to 680μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Leakage current	I=0.01CV or 3μA whichever is greater (at 20°C, after 2 minutes)	
Tangent of loss angle(tanδ)	Rated voltage(V) 25 35 50 63 80 Tanδ 0.14 0.12 0.10 0.08 0.08 (at 20°C, 120Hz)	
ESR	Less than or equal to the value of Standard Ratings (at 20°C, 100kHz)	
Low temperature characteristics (Impedance ratio at 100kHz)	Z (-25 ℃) / Z (+20 ℃) ≤ 1.5 Z (-55 ℃) / Z (+20 ℃) ≤ 2.0	
Endurance	150°C, 1,000 hrs, apply the rated ripple current without exceeding the rated voltage	
	Capacitance change	Within±30% of the initial value
	Tangent of loss angle (tanδ)	≤200% of the initial specified value
	ESR(mΩ)	≤200% of the initial specified value
	Leakage current	≤The initial specified value
Shelf life	After storage for 1,000 hrs at 150°C with no voltage applied and then being stabilized at 20°C, capacitors shall meet the specified values for the endurance characteristics listed above.(with voltage treatment)	
Damp Heat (Steady State)	85°C, 85% RH, 2,000 hrs, rated voltage applied	
	Capacitance change	Within±30% of the initial value
	Tangent of loss angle (tanδ)	≤200% of the initial specified value
	ESR(mΩ)	≤200% of the initial specified value
	Leakage current	≤The initial specified value

• Part numbering system

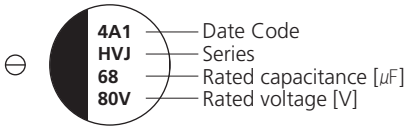
Example: HVJ series, 80V / 33μF / Vibration resistant structure

80	HVJ	33	M	E	10	V
Voltage	Series	Capacitance	Tolerance	Diameter	Length	Vibration resistant structure

• Frequency coefficient for ripple current

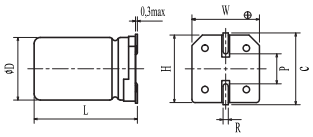
Frequency	120Hz	1kHz	10kHz	100kHz
Coefficient	0.15	0.40	0.75	1.00

• Marking and Dimensions

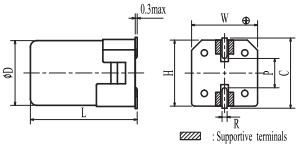


• Dimensions

[Standard]



[Vibration Resistance]



[Standard] (unit: mm)

Size	ØD±0.5	L	W±0.2	H±0.2	C±0.2	R	P±0.2
8.0×9.7	8.0	9.7±0.5	8.3	8.3	9.0	0.8 to 1.1	3.2
10.0×10.5	10.0	10.5±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6
10.0×12.5	10.0	12.5±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6
10.0×16.5	10.0	16.5±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6

[Vibration Resistance] (unit: mm)

Size	ØD±0.5	L	W±0.2	H±0.2	C±0.2	R	P±0.2
8.0×9.9	8.0	9.9±0.5	8.3	8.3	9.0	0.8 to 1.1	3.2
10.0×10.7	10.0	10.7±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6
10.0×12.7	10.0	12.7±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6
10.0×16.7	10.0	16.7±0.5	10.3	10.3	11.0	0.8 to 1.1	4.6

• Standard Ratings

Rated Voltage [Vdc]	Rated Capacitance [μF]	Size ØD x L [mm]	ESR (20°C, 100kHz) [mΩ] [max.]	Rated Ripple Current (150°C, 100kHz) [mArms]	Part Number
25	150	8.0 x 9.7	27	800	25HVJ150MD10□
	270	10.0 x 10.5	20	1000	25HVJ270ME10□
	470	10.0 x 12.5	14	1800	25HVJ470ME12□
	680	10.0 x 16.5	11	2200	25HVJ680ME16□
35	100	8.0 x 9.7	30	770	35HVJ100MD10□
	150	10.0 x 10.5	23	950	35HVJ150ME10□
	470	10.0 x 16.5	11	2200	35HVJ470ME16□
50	56	8.0 x 9.7	35	700	50HVJ56MD10□
	100	10.0 x 10.5	28	900	50HVJ100ME10□
	220	10.0 x 16.5	13	2100	50HVJ220ME16□
63	33	8.0 x 9.7	40	650	63HVJ33MD10□
	56	10.0 x 10.5	30	840	63HVJ56ME10□
	150	10.0 x 16.5	15	1500	63HVJ150ME16□
	180	10.0 x 16.5	15	1800	63HVJ180ME16□
80	68	10.0 x 12.5	32	1300	80HVJ68ME12□
	100	10.0 x 16.5	16	1800	80HVJ100ME16□

*Terminal Code : V(Vibration-proof products)

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Conductive Polymer Aluminum Electrolytic Capacitors_Radial

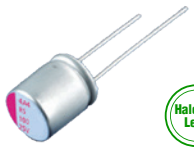
RS series	RHV series
RL series	RUH series
RSL series	RHH series
RLL series	RHR series
RSH series	RHVL series
RLH series	RSC series
RU series	RHHL series

RS

Radial Lead Type

series

- Standard
- Low ESR, High ripple current
- Load life of 3,000h at 105°C



Specifications

Items	Characteristics	
Temperature range	-55 to +105°C	
Rated voltage range	2.5 to 25Vdc	
Capacitance range	6.8 to 1,500μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Tangent of loss angle	Less than or equal to the value of Standard Ratings (at 20°C, 120Hz)	
Leakage current	Less than or equal to the value of Standard Ratings (at 20°C, after 2 minutes)	
ESR	Less than or equal to the value of Standard Ratings	
Characteristics of impedance	$Z_{+105°C}/Z_{+20°C} \leq 1.25$, $Z_{-55°C}/Z_{+20°C} \leq 1.25$ at 100kHz	
Endurance	105°C, 3,000 hrs at rated voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Damp Heat (Steady State)	60°C, 90 to 95% RH, 1,000 hrs, No-applied Voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Resistance to soldering heat	Flow method (260±5°C, 10s)	
	Appearance	No significant damage
	Capacitance change	Within±10% of the initial value
	Tangent of loss angle (tanδ)	≤130% of the initial specified value
	ESR(mΩ)	≤130% of the initial specified value
	Leakage current	≤The initial specified value

* In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C

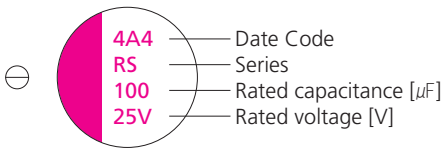
Size List

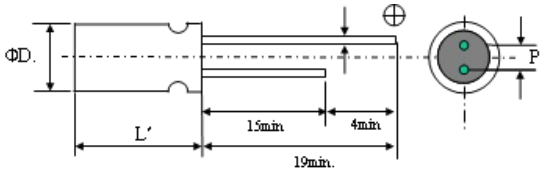
(unit: mm)

μF \ RV (SV)	2.5 (2.9)	4 (4.6)	6.3 (7.2)	10 (11.5)	16 (18.4)	2.0 (23.0)	25 (28.7)
6.8							6.3×6
10							8×7
22						6.3×6	10×8
33						8×7	8×11.5
39					6.3×6		
47					6.3×6	8×7	
56				6.3×6		10×8	10×11.5
68						10×8	
82			6.3×6		8×7		
100		6.3×6	6.3 ×6		8×7	10×8 8×11.5	8×11.5
120				8×7			
150		6.3×6	8×7	8×7	10×8	10×11.5	10×11.5
180					8×11.5		
220		8×7	8×7				
270				10×8			
330		8×7	10×8	8×11.5	10×11.5		
470		10×8	8×11.5		10×11.5		
560		8×11.5		10×11.5			
680	8×11.5	10×8					
820			10×11.5				
1000			10×11.5				
1200		10×11.5					
1500	10×11.5						

RV: Rated Voltage [V] SV: Surge Voltage [V] (at room temperature)

Marking and Dimensions





(unit: mm)

Size	ØD±0.5	L	L'	P±0.5	Ød
6.3×6	6.3	6.0	L max.	2.5	0.45
8×7	8.0	7.0		3.5	0.45
10×8	10.0	8.0		5.0	0.60
6.3×11.5	6.3	11.5	L+1.0max.	2.5	0.50
8×11.5	8.0	11.5		3.5	0.60
10×11.5	10.0	11.5		5.0	0.60

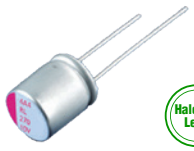
Standard Ratings

Rated Voltage [Vdc]	Rated Capacitance [μF]	Size ØD x L [mm]	ESR (20°C,100kHz) [mΩ] [max.]	Rated Ripple Current (105°C,100kHz) [mArms]	Tangent of Loss Angel [max.]	Leakage Current [μA, max.]	Part Number
2.5	680	8 x 11.5	13	4520	0.10	340	2RS680MD11
	1500	10 x 11.5	13	5440	0.10	750	2RS1500ME11
4	100	6.3 x 6	40	1810	0.10	200	4RS100MC6
	150	6.3 x 6	40	1810	0.10	300	4RS150MC6
	220	8 x 7	35	2560	0.10	440	4RS220MD7
	330	8 x 7	35	2560	0.10	660	4RS330MD7
	470	10 x 8	25	3700	0.10	376	4RS470ME8
	560	8 x 11.5	13	4520	0.10	448	4RS560MD11
	680	10 x 8	25	3700	0.10	544	4RS680ME8
	1200	10 x 11.5	13	5440	0.10	960	4RS1200ME11
6.3	82	6.3 x 6	45	1700	0.10	258	6RS82MC6
	100	6.3 x 6	40	1810	0.10	315	6RS100MC6
	150	8 x 7	35	2560	0.10	472	6RS150MD7
	220	8 x 7	35	2560	0.10	693	6RS220MD7
	330	10 x 8	25	3700	0.10	416	6RS330ME8
	470	8 x 11.5	15	4210	0.10	592	6RS470MD11
	820	10 x 11.5	12	5440	0.10	1033	6RS820ME11
	1000	10 x 11.5	12	5440	0.10	1260	6RS1000ME11
10	56	6.3 x 6	45	1700	0.10	280	10RS56MC6
	120	8 x 7	35	2560	0.10	600	10RS120MD7
	150	8 x 7	35	2560	0.10	750	10RS150MD7
	270	10 x 8	25	3700	0.10	540	10RS270ME8
	330	8 x 11.5	17	3950	0.10	660	10RS330MD11
	560	10 x 11.5	13	5230	0.10	1120	10RS560ME11
16	39	6.3 x 6	50	1620	0.10	312	16RS39MC6
	47	6.3 x 6	50	1620	0.10	376	16RS47MC6
	82	8 x 7	40	2120	0.10	656	16RS82MD7
	100	8 x 7	40	2120	0.10	800	16RS100MD7
	150	10 x 8	30	3020	0.10	480	16RS150ME8
	180	8 x 11.5	20	3640	0.10	576	16RS180MD11
	330	10 x 11.5	16	4720	0.10	1056	16RS330ME11
	470	10 x 11.5	16	4720	0.10	1504	16RS470ME11
20	22	6.3 x 6	60	1450	0.10	220	20RS22MC6
	33	8 x 7	45	1890	0.10	330	20RS33MD7
	47	8 x 7	45	1890	0.10	470	20RS47MD7
	56	10 x 8	40	2400	0.10	224	20RS56ME8
	68	10 x 8	40	2400	0.10	272	20RS68ME8
	100	10 x 8	35	2570	0.10	400	20RS100ME8
	100	8 x 11.5	24	3320	0.10	400	20RS100MD11
	150	10 x 11.5	20	4320	0.10	600	20RS150ME11
25	6.8	6.3 x 6	80	1200	0.10	170	25RS6R8MC6
	10	8 x 7	60	1500	0.10	250	25RS10MD7
	22	10 x 8	50	2000	0.10	275	25RS22ME8
	33	8 x 11.5	30	2980	0.10	413	25RS33MD11
	56	10 x 11.5	28	3800	0.10	700	25RS56ME11
	100	8 x 11.5	30	3320	0.10	500	25RS100MD11
	150	10 x 11.5	25	4320	0.10	750	25RS150ME11

RL series

Radial Lead Type

- Super low ESR, High ripple current
- Large capacitance, Small size
- Load life of 3,000h at 105°C



LEAD FREE

Halogen Less

RoHS COMPLIANT

Specifications

Items	Characteristics	
Temperature range	-55 to +105°C	
Rated voltage range	2.5 to 16Vdc	
Capacitance range	100 to 3,500μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Tangent of loss angle	Less than or equal to the value of Standard Ratings (at 20°C, 120Hz)	
Leakage current	Less than or equal to the value of Standard Ratings (at 20°C, after 2 minutes)	
ESR	Less than or equal to the value of Standard Ratings	
Characteristics of impedance	$Z_{+105°C}/Z_{+20°C} \leq 1.25$, $Z_{-55°C}/Z_{+20°C} \leq 1.25$ at 100kHz	
Endurance	105°C, 3,000 hrs at rated voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Damp Heat (Steady State)	60°C, 90 to 95% RH, 1,000 hrs, No-applied Voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Resistance to soldering heat	Flow method (260±5°C, 10s)	
	Appearance	No significant damage
	Capacitance change	Within±10% of the initial value
	Tangent of loss angle (tanδ)	≤130% of the initial specified value
	ESR(mΩ)	≤130% of the initial specified value
	Leakage current	≤The initial specified value

* In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C

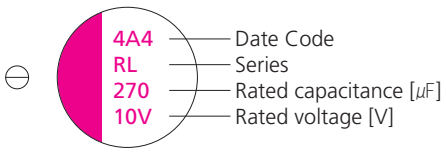
Size List

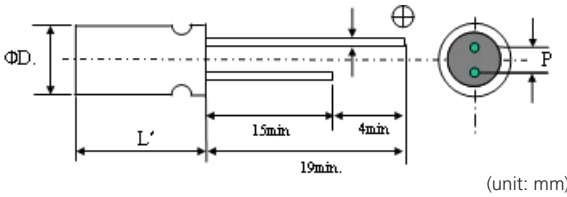
(unit: mm)

μF \ RV (SV)	2.5 (2.9)	4 (4.6)	6.3 (7.2)	10 (11.5)	16 (18.4)
100					6.3×6 / 6.3×9
150					8×7
180					8×9 / 8×11.5
220	5×9		6.3×6		8×7
270				8×7	6.3×9 / 8×9 8×11.5
330	5×9 6.3×9			8×7	8×9 / 8×11.5 10×11.5
470	5×9		6.3×9 / 8×9 8×11.5		10×11.5
560	5×9 / 6.3×9 8×9	6.3×9 / 8×9 8×11.5	6.3×9 8×9		
680		8×11.5	10×11.5	8×9	
820	6.3×9 / 8×7 8×9 / 8×11.5	10×11.5	8×9 8×11.5		
1000	8×9	8×9 10×11.5	8×9	8×11.5	10×11.5
1200		8×9	8×11.5	10×11.5	
1500	8×9		10×11.5		
2700	10×11.5				
3500	10×11.5				

RV: Rated Voltage [V] SV: Surge Voltage [V] (at room temperature)

Marking and Dimensions





(unit: mm)

Size	ØD±0.5	L	L'	P±0.5	Ød
5×9	5.0	9.0	L max.	2.0	0.6
6.3×6	6.3	6.0		2.5	0.45
8×7	8.0	7.0		3.5	0.45
6.3×9	6.3	9.0		2.5	0.6
8×9	8.0	9.0		3.5	0.6
8×11.5	8.0	11.5	L + 1.0 max.	3.5	0.6
10×11.5	10.0	11.5		5.0	0.6

Standard Ratings

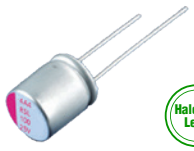
Rated Voltage [Vdc]	Rated Capacitance [µF]	Size ØD x L [mm]	ESR (20°C,100kHz) [mΩ] [max.]	Rated Ripple Current (105°C,100kHz) [mArms]	Tangent of Loss Angel [max.]	Leakage Current [µA, max.]	Part Number
2.5	220	5 x 9	7	4180	0.10	500	2RL220MB9
	330	5 x 9	7	4180	0.10	500	2RL330MB9
	330	6.3 x 9	7	5600	0.10	500	2RL330MC9
	470	5 x 9	7	4180	0.10	500	2RL470MB9
	560	5 x 9	7	4180	0.10	500	2RL560MB9
	560	6.3 x 9	7	5600	0.10	500	2RL560MC9
	560	8 x 9	7	6100	0.10	500	2RL560MD9
	820	6.3 x 9	7	5600	0.10	500	2RL820MC9
	820	8 x 7	8	5300	0.10	500	2RL820MD7
	820	8 x 9	7	6100	0.10	500	2RL820MD9
	820	8 x11.5	7	6100	0.10	500	2RL820MD11
	1000	8 x 9	7	6100	0.10	500	2RL1000MD9
	1500	8 x 9	7	6100	0.10	750	2RL1500MD9
	2700	10 x 11.5	10	5560	0.10	1350	2RL2700ME11
	3500	10 x 11.5	10	5560	0.10	1750	2RL3500ME11
4	560	6.3 x 9	7	5600	0.10	500	4RL560MC9
	560	8 x 9	7	6100	0.10	500	4RL560MD9
	560	8 x 11.5	7	6100	0.10	500	4RL560MD11
	680	8 x 11.5	7	6100	0.10	544	4RL680MD11
	820	10 x 11.5	7	6640	0.10	656	4RL820ME11
	1000	8 x 9	7	6100	0.10	800	4RL1000MD9
	1000	10 x 11.5	7	6640	0.10	800	4RL1000ME11
	1200	8 x 9	7	6100	0.10	960	4RL1200MD9
6.3	220	6.3 x 6	18	2980	0.10	277	6RL220MC6
	470	6.3 x 9	7	5600	0.10	592	6RL470MC9
	470	8 x 9	7	5700	0.10	592	6RL470MD9
	470	8 x 11.5	7	5700	0.10	592	6RL470MD11
	560	6.3 x 9	7	5600	0.10	705	6RL560MC9
	560	8 x 9	7	5700	0.10	705	6RL560MD9
	680	10 x 11.5	7	6640	0.10	857	6RL680ME11
	820	8 x 9	7	5700	0.10	1033	6RL820MD9
	820	8 x 11.5	7	5700	0.10	1033	6RL820MD11
	1000	8 x 9	7	5700	0.10	1260	6RL1000MD9
	1200	8.x 11.5	7	5700	0.10	1512	6RL1000MD11
	1500	10 x 11.5	10	5560	0.10	1890	6RL1500ME11
10	150	6.3 x 6	26	2400	0.10	300	10RL150MC6
	270	8 x 7	22	3220	0.10	500	10RL270MD7
	330	8 x 7	22	3390	0.10	500	10RL330MD7
	680	8 x 9	9	5600	0.10	1360	10RL680MC9
	1000	8 x 11.5	10	6100	0.10	2000	10RL1000MD11
	1200	10 x 11.5	8	6100	0.10	2400	10RL1200ME11
16	100	6.3 x 6	24	2490	0.10	320	16RL100MC6
	100	6.3 x 9	10	4680	0.10	500	16RL100MC9
	150	8 x 7	22	3220	0.10	500	16RL150MD7
	180	8 x 9	10	5000	0.10	576	16RL180MD9
	180	8 x 11.5	16	4360	0.10	576	16RL180MD11
	220	8 x 7	13	4150	0.10	704	16RL220MD7
	270	6.3 x 9	10	4680	0.10	864	16RL270MC9
	270	8 x 9	10	5000	0.10	864	16RL270MD9
	270	8 x 11.5	11	5000	0.10	864	16RL270MD11
	330	8 x 9	11	4520	0.10	1056	16RL330MD9
	330	8 x 11.5	11	5000	0.10	1056	16RL330MD11
	330	10 x 11.5	8	6000	0.10	1056	16RL330ME11
	470	10 x 11.5	10	6100	0.10	1504	16RL470ME11
	1000	10 x 11.5	10	6100	0.10	3200	16RL1000ME11

RSL

Radial Lead Type

series

- Low ESR, High ripple current
- Load life of 5,000h at 105°C



Specifications

Items	Characteristics	
Temperature range	-55 to +105°C	
Rated voltage range	2.5 to 25Vdc	
Capacitance range	6.8 to 1,500μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Tangent of loss angle	Less than or equal to the value of Standard Ratings (at 20°C, 120Hz)	
Leakage current	Less than or equal to the value of Standard Ratings (at 20°C, after 2 minutes)	
ESR	Less than or equal to the value of Standard Ratings	
Characteristics of impedance	$Z_{+105°C}/Z_{+20°C} \leq 1.25$, $Z_{-55°C}/Z_{+20°C} \leq 1.25$ at 100kHz	
Endurance	105°C, 5,000 hrs at rated voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Damp Heat (Steady State)	60°C, 90 to 95% RH, 1,000 hrs, No-applied Voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Resistance to soldering heat	Flow method (260±5°C, 10s)	
	Appearance	No significant damage
	Capacitance change	Within±10% of the initial value
	Tangent of loss angle (tanδ)	≤130% of the initial specified value
	ESR(mΩ)	≤130% of the initial specified value
	Leakage current	≤The initial specified value

* In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C

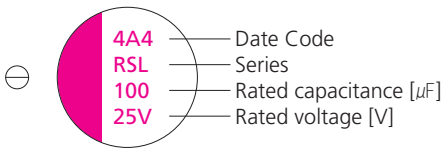
Size List

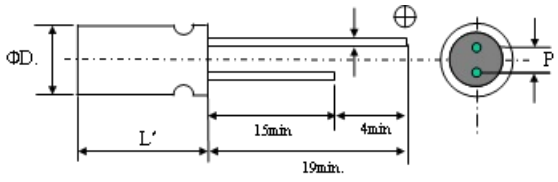
(unit: mm)

μF \ RV (SV)	2.5 (2.9)	4 (4.6)	6.3 (7.2)	10 (11.5)	16 (18.4)	2.0 (23.0)	25 (28.7)
6.8							6.3×6
10							8×7
22						6.3×6	10×8
33						8×7	8×11.5
39					6.3×6		
47					6.3×6	8×7	
56				6.3×6		10×8	10×11.5
68						10×8	
82			6.3×6		8×7		
100		6.3×6	6.3×6		8×7	10×8 8×11.5	8×11.5
120				8×7			
150		6.3×6	8×7	8×7	10×8	10×11.5	10×11.5
180					8×11.5		
220		8×7	8×7				
270				10×8			
330		8×7	10×8	8×11.5	10×11.5		
470		10×8	8×11.5		10×11.5		
560		8×11.5		10×11.5			
680	8×11.5	10×8					
820			10×11.5				
1000			10×11.5				
1200		10×11.5					
1500	10×11.5						

RV: Rated Voltage [V] SV: Surge Voltage [V] (at room temperature)

Marking and Dimensions





(unit: mm)

Size	ØD±0.5	L	L'	P±0.5	Ød
6.3×6	6.3	6.0	L max.	2.5	0.45
8×7	8.0	7.0		3.5	0.45
10×8	10.0	8.0		5.0	0.60
6.3×11.5	6.3	11.5	L+1.0max.	2.5	0.50
8×11.5	8.0	11.5		3.5	0.60
10×11.5	10.0	11.5		5.0	0.60

Standard Ratings

Rated Voltage [Vdc]	Rated Capacitance [μF]	Size ØD x L [mm]	ESR (20°C,100kHz) [mΩ] [max.]	Rated Ripple Current (105°C,100kHz) [mArms]	Tangent of Loss Angel [max.]	Leakage Current [μA, max.]	Part Number
2.5	680	8 x 11.5	13	4520	0.10	340	2RSL680MD11
	1500	10 x 11.5	13	5440	0.10	750	2RSL1500ME11
4	100	6.3 x 6	40	1810	0.10	200	4RSL100MC6
	150	6.3 x 6	40	1810	0.10	300	4RSL150MC6
	220	8 x 7	35	2560	0.10	440	4RSL220MD7
	330	8 x 7	35	2560	0.10	660	4RSL330MD7
	470	10 x 8	25	3700	0.10	376	4RSL470ME8
	560	8 x 11.5	13	4520	0.10	448	4RSL560MD11
	680	10 x 8	25	3700	0.10	544	4RSL680ME8
	1200	10 x 11.5	13	5440	0.10	960	4RSL1200ME11
6.3	82	6.3 x 6	45	1700	0.10	258	6RSL82MC6
	100	6.3 x 6	40	1810	0.10	315	6RSL100MC6
	150	8 x 7	35	2560	0.10	472	6RSL150MD7
	220	8 x 7	35	2560	0.10	693	6RSL220MD7
	330	10 x 8	25	3700	0.10	416	6RSL330ME8
	470	8 x 11.5	15	4210	0.10	592	6RSL470MD11
	820	10 x 11.5	12	5440	0.10	1033	6RSL820ME11
	1000	10 x 11.5	12	5440	0.10	1260	6RSL1000ME11
10	56	6.3 x 6	45	1700	0.10	280	10RSL56MC6
	120	8 x 7	35	2560	0.10	600	10RSL120MD7
	150	8 x 7	35	2560	0.10	750	10RSL150MD7
	270	10 x 8	25	3700	0.10	540	10RSL270ME8
	330	8 x 11.5	17	3950	0.10	660	10RSL330MD11
	560	10 x 11.5	13	5230	0.10	1120	10RSL560ME11
16	39	6.3 x 6	50	1620	0.10	312	16RSL39MC6
	47	6.3 x 6	50	1620	0.10	376	16RSL47MC6
	82	8 x 7	40	2120	0.10	656	16RSL82MD7
	100	8 x 7	40	2120	0.10	800	16RSL100MD7
	150	10 x 8	30	3020	0.10	480	16RSL150ME8
	180	8 x 11.5	20	3640	0.10	576	16RSL180MD11
	330	10 x 11.5	16	4720	0.10	1056	16RSL330ME11
	470	10 x 11.5	16	4720	0.10	1504	16RSL470ME11
20	22	6.3 x 6	60	1450	0.10	220	20RSL22MC6
	33	8 x 7	45	1890	0.10	330	20RSL33MD7
	47	8 x 7	45	1890	0.10	470	20RSL47MD7
	56	10 x 8	40	2400	0.10	224	20RSL56ME8
	68	10 x 8	40	2400	0.10	272	20RSL68ME8
	100	10 x 8	35	2570	0.10	400	20RSL100ME8
	100	8 x 11.5	24	3320	0.10	400	20RSL100MD11
	150	10 x 11.5	20	4320	0.10	600	20RSL150ME11
25	6.8	6.3 x 6	80	1200	0.10	170	25RSL6R8MC6
	10	8 x 7	60	1500	0.10	250	25RSL10MD7
	22	10 x 8	50	2000	0.10	275	25RSL22ME8
	33	8 x 11.5	30	2980	0.10	413	25RSL33MD11
	56	10 x 11.5	28	3800	0.10	700	25RSL56ME11
	100	8 x 11.5	30	3320	0.10	500	25RSL100MD11
	150	10 x 11.5	25	4320	0.10	750	25RSL150ME11

RLL

Radial Lead Type

series

- Super low ESR, High ripple current
- Large capacitance, Small size
- Load life of 5,000h at 105°C

Specifications

Items	Characteristics	
Temperature range	-55 to +105°C	
Rated voltage range	2.5 to 16Vdc	
Capacitance range	100 to 3,500μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Tangent of loss angle	Less than or equal to the value of Standard Ratings (at 20°C, 120Hz)	
Leakage current	Less than or equal to the value of Standard Ratings (at 20°C, after 2 minutes)	
ESR	Less than or equal to the value of Standard Ratings	
Characteristics of impedance	$Z_{+105°C}/Z_{+20°C} \leq 1.25$, $Z_{-55°C}/Z_{+20°C} \leq 1.25$ at 100kHz	
Endurance	105°C, 5,000 hrs at rated voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Damp Heat (Steady State)	60°C, 90 to 95% RH, 1,000 hrs, No-applied Voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Resistance to soldering heat	Flow method (260±5°C, 10s)	
	Appearance	No significant damage
	Capacitance change	Within±10% of the initial value
	Tangent of loss angle (tanδ)	≤130% of the initial specified value
	ESR(mΩ)	≤130% of the initial specified value
	Leakage current	≤The initial specified value

* In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C

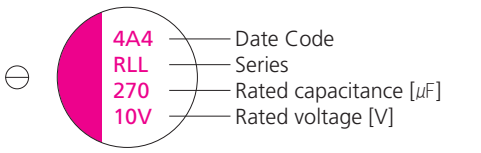
Size List

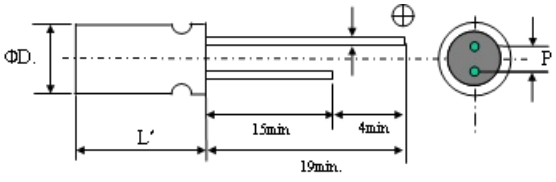
(unit: mm)

μF \ RV (SV)	2.5 (2.9)	4 (4.6)	6.3 (7.2)	10 (11.5)	16 (18.4)
100					6.3×6 / 6.3×9
150				6.3×6	8×7
180					8×9 / 8×11.5
220	5×9		6.3×6		8×7
270				8×7	6.3×9 / 8×9 8×11.5
330	5×9 6.3×9			8×7	8×9 /8×11.5 10×11.5
470	5×9		6.3×9 / 8×9 8×11.5		10×11.5
560	5×9 /6.3×9 8×9	6.3×9 / 8×9 8×11.5	6.3×9 8×9		
680		8×11.5	10×11.5	8×9	
820	6.3×9 / 8×7 8×9 / 8×11.5	10×11.5	8×9 8×11.5		
1000	8×9	8×9 10×11.5	8×9	8×11.5	10×11.5
1200		8×9	8×11.5	10×11.5	
1500	8×9		10×11.5		
2700	10×11.5				
3500	10×11.5				

RV: Rated Voltage [V] SV: Surge Voltage [V] (at room temperature)

Marking and Dimensions





(unit: mm)

Size	ØD±0.5	L	L'	P±0.5	Ød
5×9	5.0	9.0	L max.	2.0	0.6
6.3×6	6.3	6.0		2.5	0.45
8×7	8.0	7.0		3.5	0.45
6.3×9	6.3	9.0		2.5	0.6
8×9	8.0	9.0		3.5	0.6
8×11.5	8.0	11.5	L + 1.0 max.	3.5	0.6
10×11.5	10.0	11.5		5.0	0.6

Standard Ratings

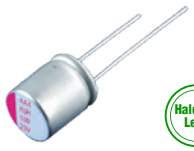
Rated Voltage [Vdc]	Rated Capacitance [µF]	Size ØD x L [mm]	ESR (20°C,100kHz) [mΩ] [max.]	Rated Ripple Current (105°C,100kHz) [mArms]	Tangent of Loss Angel [max.]	Leakage Current [µA, max.]	Part Number
2.5	220	5 x 9	7	4180	0.10	500	2RLL220MB9
	330	5 x 9	7	4180	0.10	500	2RLL330MB9
	330	6.3 x 9	7	5600	0.10	500	2RLL330MC9
	470	5 x 9	7	4180	0.10	500	2RLL470MB9
	560	5 x 9	7	4180	0.10	500	2RLL560MB9
	560	6.3 x 9	7	5600	0.10	500	2RLL560MC9
	560	8 x 9	7	6100	0.10	500	2RLL560MD9
	820	6.3 x 9	7	5600	0.10	500	2RLL820MC9
	820	8 x 7	8	5300	0.10	500	2RLL820MD7
	820	8 x 9	7	6100	0.10	500	2RLL820MD9
	820	8 x11.5	7	6100	0.10	500	2RLL820MD11
	1000	8 x 9	7	6100	0.10	500	2RLL1000MD9
	1500	8 x 9	7	6100	0.10	750	2RLL1500MD9
	2700	10 x 11.5	10	5560	0.10	1350	2RLL2700ME11
	3500	10 x 11.5	10	5560	0.10	1750	2RLL3500ME11
4	560	6.3 x 9	7	5600	0.10	500	4RLL560MC9
	560	8 x 9	7	6100	0.10	500	4RLL560MD9
	560	8 x 11.5	7	6100	0.10	500	4RLL560MD11
	680	8 x 11.5	7	6100	0.10	544	4RLL680MD11
	820	10 x 11.5	7	6640	0.10	656	4RLL820ME11
	1000	8 x 9	7	6100	0.10	800	4RLL1000MD9
	1000	10 x 11.5	7	6640	0.10	800	4RLL1000ME11
	1200	8 x 9	7	6100	0.10	960	4RLL1200MD9
6.3	220	6.3 x 6	18	2980	0.10	277	6RLL220MC6
	470	6.3 x 9	7	5600	0.10	592	6RLL470MC9
	470	8 x 9	7	5700	0.10	592	6RLL470MD9
	470	8 x 11.5	7	5700	0.10	592	6RLL470MD11
	560	6.3 x 9	7	5600	0.10	705	6RLL560MC9
	560	8 x 9	7	5700	0.10	705	6RLL560MD9
	680	10 x 11.5	7	6640	0.10	857	6RLL680ME11
	820	8 x 9	7	5700	0.10	1033	6RLL820MD9
	820	8 x 11.5	7	5700	0.10	1033	6RLL820MD11
	1000	8 x 9	7	5700	0.10	1260	6RLL1000MD9
	1200	8.x 11.5	7	5700	0.10	1512	6RLL1000MD11
	1500	10 x 11.5	10	5560	0.10	1890	6RLL1500ME11
10	150	6.3 x 6	26	2400	0.10	300	10RLL150MC6
	270	8 x 7	22	3220	0.10	500	10RLL270MD7
	330	8 x 7	22	3390	0.10	500	10RLL330MD7
	680	8 x 9	9	5600	0.10	1360	10RLL680MC9
	1000	8 x 11.5	10	6100	0.10	2000	10RLL1000MD11
	1200	10 x 11.5	8	6100	0.10	2400	10RLL1200ME11
16	100	6.3 x 6	24	2490	0.10	320	16RLL100MC6
	100	6.3 x 9	10	4680	0.10	500	16RLL100MC9
	150	8 x 7	22	3220	0.10	500	16RLL150MD7
	180	8 x 9	10	5000	0.10	576	16RLL180MD9
	180	8 x 11.5	16	4360	0.10	576	16RLL180MD11
	220	8 x 7	13	4150	0.10	704	16RLL220MD7
	270	6.3 x 9	10	4680	0.10	864	16RLL270MC9
	270	8 x 9	10	5000	0.10	864	16RLL270MD9
	270	8 x 11.5	11	5000	0.10	864	16RLL270MD11
	330	8 x 9	11	4520	0.10	1056	16RLL330MD9
	330	8 x 11.5	11	5000	0.10	1056	16RLL330MD11
	330	10 x 11.5	8	6000	0.10	1056	16RLL330ME11
	470	10 x 11.5	10	6100	0.10	1504	16RLL470ME11
	1000	10 x 11.5	10	6100	0.10	3200	16RLL1000ME11

RSH

Radial Lead Type

series

- Higher temperature endurance guaranteed than RS series
- Low ESR, High ripple current
- Load life of 1,000h at 125°C



LEAD FREE

Halogen Less

RoHS COMPLIANT

Specifications

Items	Characteristics	
Temperature range	-55 to +125°C	
Rated voltage range	2.5 to 25Vdc	
Capacitance range	6.8 to 1,500μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Tangent of loss angle	Less than or equal to the value of Standard Ratings (at 20°C, 120Hz)	
Leakage current	Less than or equal to the value of Standard Ratings (at 20°C, after 2 minutes)	
ESR	Less than or equal to the value of Standard Ratings	
Characteristics of impedance	$Z_{+125°C}/Z_{+20°C} \leq 1.25$, $Z_{-55°C}/Z_{+20°C} \leq 1.25$ at 100kHz	
Endurance	125°C, 1,000 hrs at rated voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Damp Heat (Steady State)	60°C, 90 to 95% RH, 1,000 hrs, No-applied Voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Resistance to soldering heat	Flow method (260±5°C, 10s)	
	Appearance	No significant damage
	Capacitance change	Within±10% of the initial value
	Tangent of loss angle (tanδ)	≤130% of the initial specified value
	ESR(mΩ)	≤130% of the initial specified value
	Leakage current	≤The initial specified value

* In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 125°C

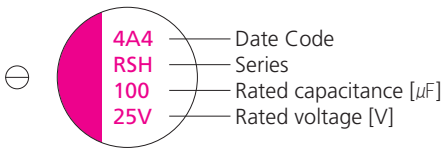
Size List

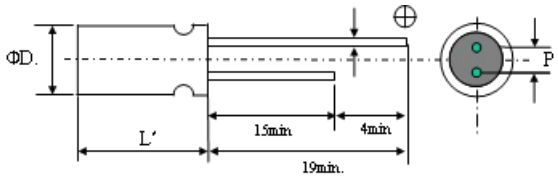
(unit: mm)

μF \ RV (SV)	2.5 (2.9)	4 (4.6)	6.3 (7.2)	10 (11.5)	16 (18.4)	2.0 (23.0)	25 (28.7)
6.8							6.3×6
10							8×7
22						6.3×6	10×8
33						8×7	8×11.5
39					6.3×6		
47					6.3×6	8×7	
56				6.3×6		10×8	10×11.5
68						10×8	
82			6.3×6		8×7		
100		6.3×6	6.3×6		8×7	10×8 8×11.5	8×11.5
120				8×7			
150		6.3×6	8×7	8×7	10×8	10×11.5	10×11.5
180					8×11.5		
220		8×7	8×7				
270				10×8			
330		8×7	10×8	8×11.5	10×11.5		
470		10×8	8×11.5		10×11.5		
560		8×11.5		10×11.5			
680	8×11.5	10×8					
820			10×11.5				
1000			10×11.5				
1200		10×11.5					
1500	10×11.5						

RV: Rated Voltage [V] SV: Surge Voltage [V] (at room temperature)

Marking and Dimensions





(unit: mm)

Size	ØD±0.5	L	L'	P±0.5	Ød
6.3×6	6.3	6.0	L max.	2.5	0.45
8×7	8.0	7.0		3.5	0.45
10×8	10.0	8.0		5.0	0.60
6.3×11.5	6.3	11.5	L+1.0max.	2.5	0.50
8×11.5	8.0	11.5		3.5	0.60
10×11.5	10.0	11.5		5.0	0.60

Standard Ratings

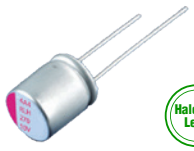
Rated Voltage [Vdc]	Rated Capacitance [µF]	Size ØD x L [mm]	ESR (20°C, 100kHz) [mΩ] [max.]	Rated Ripple Current (100kHz)[mArms]		Tangent of Loss Angel [max.]	Leakage Current [µA, max.]	Part Number
				-55 to +105°C	+105 to +125°C			
2.5	680	8 x 11.5	13	4520	1430	0.10	340	2RSH680MD11
	1500	10 x 11.5	13	5440	1721	0.10	750	2RSH1500ME11
4	100	6.3 x 6	40	1810	572	0.10	200	4RSH100MC6
	150	6.3 x 6	40	1810	572	0.10	300	4RSH150MC6
	220	8 x 7	35	2560	810	0.10	440	4RSH220MD7
	330	8 x 7	35	2560	810	0.10	660	4RSH330MD7
	470	10 x 8	25	3700	1170	0.10	376	4RSH470ME8
	560	8 x 11.5	13	4520	1430	0.10	448	4RSH560MD11
	680	10 x 8	25	3700	1170	0.10	544	4RSH680ME8
	1200	10 x 11.5	13	5440	1721	0.10	960	4RSH1200ME11
6.3	82	6.3 x 6	45	1700	537	0.10	258	6RSH82MC6
	100	6.3 x 6	40	1810	572	0.10	315	6RSH100MC6
	150	8 x 7	35	2560	810	0.10	472	6RSH150MD7
	220	8 x 7	35	2560	810	0.10	693	6RSH220MD7
	330	10 x 8	25	3700	1170	0.10	416	6RSH330ME8
	470	8 x 11.5	15	4210	1332	0.10	592	6RSH470MD11
	820	10 x 11.5	12	5440	1721	0.10	1033	6RSH820ME11
	1000	10 x 11.5	12	5440	1721	0.10	1260	6RSH1000ME11
10	56	6.3 x 6	45	1700	537	0.10	280	10RSH56MC6
	120	8 x 7	35	2560	810	0.10	600	10RSH120MD7
	150	8 x 7	35	2560	810	0.10	750	10RSH150MD7
	270	10 x 8	25	3700	1170	0.10	540	10RSH270ME8
	330	8 x 11.5	17	3950	1250	0.10	660	10RSH330MD11
	560	10 x 11.5	13	5230	1655	0.10	1120	10RSH560ME11
16	39	6.3 x 6	50	1620	512	0.10	312	16RSH39MC6
	47	6.3 x 6	50	1620	512	0.10	376	16RSH47MC6
	82	8 x 7	40	2120	670	0.10	656	16RSH82MD7
	100	8 x 7	40	2120	670	0.10	800	16RSH100MD7
	150	10 x 8	30	3020	955	0.10	480	16RSH150ME8
	180	8 x 11.5	20	3640	1151	0.10	576	16RSH180MD11
	330	10 x 11.5	16	4720	1493	0.10	1056	16RSH330ME11
	470	10 x 11.5	16	4720	1493	0.10	1504	16RSH470ME11
20	22	6.3 x 6	60	1450	458	0.10	220	20RSH22MC6
	33	8 x 7	45	1890	598	0.10	330	20RSH33MD7
	47	8 x 7	45	1890	598	0.10	470	20RSH47MD7
	56	10 x 8	40	2400	759	0.10	224	20RSH56ME8
	68	10 x 8	40	2400	759	0.10	272	20RSH68ME8
	100	10 x 8	35	2570	810	0.10	400	20RSH100ME8
	100	8 x 11.5	24	3320	1050	0.10	400	20RSH100MD11
	150	10 x 11.5	20	4320	1367	0.10	600	20RSH150ME11
25	6.8	6.3 x 6	80	1200	377	0.10	170	25RSH6R8MC6
	10	8 x 7	60	1500	471	0.10	250	25RSH10MD7
	22	10 x 8	50	2000	632	0.10	275	25RSH22ME8
	33	8 x 11.5	30	2980	943	0.10	413	25RSH33MD11
	56	10 x 11.5	28	3800	1202	0.10	700	25RSH56ME11
	100	8 x 11.5	30	3320	1050	0.10	500	25RSH100MD11
	150	10 x 11.5	25	4320	1367	0.10	750	25RSH150ME11

RLH

Radial Lead Type

series

- Higher temperature endurance guaranteed than RL series
- Super low ESR, High ripple current
- Large capacitance, Small size
- Load life of 1,000h at 125°C



Specifications

Items	Characteristics	
Temperature range	-55 to +125°C	
Rated voltage range	2.5 to 16Vdc	
Capacitance range	100 to 3,500μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Tangent of loss angle	Less than or equal to the value of Standard Ratings (at 20°C, 120Hz)	
Leakage current	Less than or equal to the value of Standard Ratings (at 20°C, after 2 minutes)	
ESR	Less than or equal to the value of Standard Ratings	
Characteristics of impedance	$Z_{+125°C}/Z_{+20°C} \leq 1.25$, $Z_{-55°C}/Z_{+20°C} \leq 1.25$ at 100kHz	
Endurance	125°C, 1,000 hrs at rated voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Damp Heat (Steady State)	60°C, 90 to 95% RH, 1,000 hrs, No-applied Voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Resistance to soldering heat	Flow method (260±5°C, 10s)	
	Appearance	No significant damage
	Capacitance change	Within±10% of the initial value
	Tangent of loss angle (tanδ)	≤130% of the initial specified value
	ESR(mΩ)	≤130% of the initial specified value
	Leakage current	≤The initial specified value

* In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 125°C

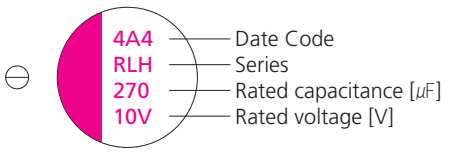
Size List

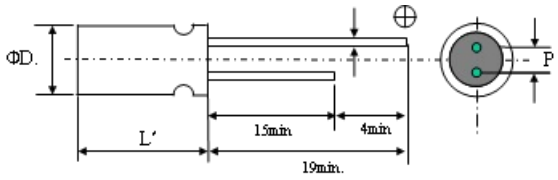
(unit: mm)

μF \ RV (SV)	2.5 (2.9)	4 (4.6)	6.3 (7.2)	10 (11.5)	16 (18.4)
100					6.3×6 / 6.3×9
150				6.3×6	8×7
180					8×9 8×11.5
220	5×9		6.3×6		8×7
270				8×7	8×9 8×11.5
330	5×9 6.3×9				8×9 8×11.5
470	5×9		6.3×9 / 8×9 8×11.5		10×11.5
560	5×9 / 6.3×9 8×9	6.3×9 / 8×9 8×11.5	6.3×9 8×9		
680		8×11.5	10×11.5		
820	6.3×9 /8×7 8×9 /8×11.5	10×11.5	8×9 8×11.5		
1000	8×9	8×9 10×11.5			
1200		8×9			
1500	8×9		10×11.5		
2700	10×11.5				
3500	10×11.5				

RV: Rated Voltage [V] SV: Surge Voltage [V] (at room temperature)

Marking and Dimensions





(unit: mm)

Size	ØD±0.5	L	L'	P±0.5	Ød
5×9	5.0	9.0	L max.	2.0	0.6
6.3×6	6.3	6.0		2.5	0.45
8×7	8.0	7.0		3.5	0.45
6.3×9	6.3	9.0		2.5	0.6
8×9	8.0	9.0		3.5	0.6
8×11.5	8.0	11.5	L + 1.0 max.	3.5	0.6
10×11.5	10.0	11.5		5.0	0.6

Standard Ratings

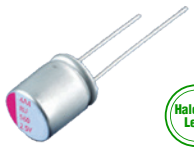
Rated Voltage [Vdc]	Rated Capacitance [µF]	Size ØD x L [mm]	ESR (20°C, 100kHz) [mΩ] [max.]	Rated Ripple Current (100kHz)[mArms]		Tangent of Loss Angel [max.]	Leakage Current [µA, max.]	Part Number
				-55 to +105°C	+105 to +125°C			
2.5	220	5 x 9	7	4180	1323	0.10	500	2RLH220MB9
	330	5 x 9	7	4180	1323	0.10	500	2RLH330MB9
	330	6.3 x 9	7	5600	1772	0.10	500	2RLH330MC9
	470	5 x 9	7	4180	1323	0.10	500	2RLH470MB9
	560	5 x 9	7	4180	1323	0.10	500	2RLH560MB9
	560	6.3 x 9	7	5600	1772	0.10	500	2RLH560MC9
	560	8 x 9	7	6100	1930	0.10	500	2RLH560MD9
	820	6.3 x 9	7	5600	1772	0.10	500	2RLH820MC9
	820	8 x 7	8	5300	1677	0.10	500	2RLH820MD7
	820	8 x 9	7	6100	1930	0.10	500	2RLH820MD9
	820	8 x11.5	7	6100	1930	0.10	500	2RLH820MD11
	1000	8 x 9	7	6100	1930	0.10	500	2RLH1000MD9
	1500	8 x 9	7	6100	1930	0.10	750	2RLH1500MD9
	2700	10 x 11.5	10	5560	1759	0.10	1350	2RLH2700ME11
	3500	10 x 11.5	10	5560	1759	0.10	1750	2RLH3500ME11
4	560	6.3 x 9	7	5600	1772	0.10	500	4RLH560MC9
	560	8 x 9	7	6100	1930	0.10	500	4RLH560MD9
	560	8 x 11.5	7	6100	1930	0.10	500	4RLH560MD11
	680	8 x 11.5	7	6100	1930	0.10	544	4RLH680MD11
	820	10 x 11.5	7	6640	2101	0.10	656	4RLH820ME11
	1000	8 x 9	7	6100	1930	0.10	800	4RLH1000MD9
	1000	10 x 11.5	7	6640	2101	0.10	800	4RLH1000ME11
	1200	8 x 9	7	6100	1930	0.10	960	4RLH1200MD9
6.3	220	6.3 x 6	18	2980	943	0.10	277	6RLH220MC6
	470	6.3 x 9	7	5600	1772	0.10	592	6RLH470MC9
	470	8 x 9	7	5700	1803	0.10	592	6RLH470MD9
	470	8 x 11.5	7	5700	1803	0.10	592	6RLH470MD11
	560	6.3 x 9	7	5600	1772	0.10	705	6RLH560MC9
	560	8 x 9	7	5700	1803	0.10	705	6RLH560MD9
	680	10 x 11.5	7	6640	2101	0.10	857	6RLH680ME11
	820	8 x 9	7	5700	1803	0.10	1033	6RLH820MD9
	820	8 x 11.5	7	5700	1803	0.10	1033	6RLH820MD11
	1500	10 x 11.5	10	5560	1759	0.10	1890	6RLH1500ME11
	150	6.3 x 6	26	2400	759	0.10	300	10RLH150MC6
	270	8 x 7	22	3220	1019	0.10	500	10RLH270MD7
10	100	6.3 x 6	24	2490	788	0.10	100	16RLH100MC6
	100	6.3 x 9	10	4680	1481	0.10	100	16RLH100MC9
	150	8 x 7	22	3220	1019	0.10	150	16RLH150MD7
	180	8 x 9	10	5000	1582	0.10	180	16RLH180MD9
	180	8 x 11.5	16	4360	1380	0.10	180	16RLH180MD11
	220	8 x 7	13	4150	1313	0.10	220	16RLH220MD7
16	270	8 x 9	10	5000	1582	0.10	270	16RLH270MD9
	270	8 x 11.5	11	5000	1582	0.10	270	16RLH270MD11
	330	8 x 9	11	4520	1430	0.10	330	16RLH330MD9
	330	8 x 11.5	11	5000	1582	0.10	330	16RLH330MD11
	470	10 x11.5	10	6100	1930	0.10	470	16RLH470ME11

RU

Radial Lead Type

series

- Lower ESR than RL series
- Ultra Low ESR, High ripple current
- Load life of 2,000h at 105°C



Specifications

Items	Characteristics	
Temperature range	-55 to +105°C	
Rated voltage range	2.5 to 6.3Vdc	
Capacitance range	470 to 1,500μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Tangent of loss angle	Less than or equal to the value of Standard Ratings (at 20°C, 120Hz)	
Leakage current	Less than or equal to the value of Standard Ratings (at 20°C, after 2 minutes)	
ESR	Less than or equal to the value of Standard Ratings	
Characteristics of impedance	$Z_{+125°C}/Z_{+20°C} \leq 1.25$, $Z_{-55°C}/Z_{+20°C} \leq 1.25$ at 100kHz	
Endurance	105°C, 2,000 hrs at rated voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Damp Heat (Steady State)	60°C, 90 to 95% RH, 1,000 hrs, No-applied Voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Resistance to soldering heat	Flow method (260±5°C , 10s)	
	Appearance	No significant damage
	Capacitance change	Within±10% of the initial value
	Tangent of loss angle (tanδ)	≤130% of the initial specified value
	ESR(mΩ)	≤130% of the initial specified value
	Leakage current	≤The initial specified value

* In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C

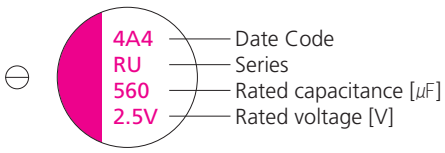
Size List

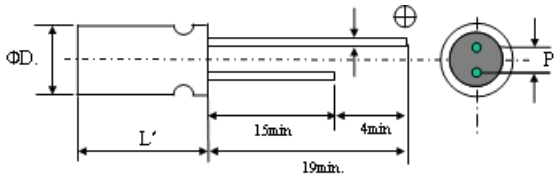
(unit: mm)

μF \ R.V (SV)	2.5 (2.9)	4 (4.6)	6.3 (7.2)
470			8×11.5
560	8×9	8×9 8×11.5	
680		8×11.5	10×11.5
820	8×9 8×11.5	10×11.5	10×11.5
1000	10×11.5		
1200		10×11.5	
1500	10×11.5		

RV: Rated Voltage [V] SV: Surge Voltage [V] (at room temperature)

Marking and Dimensions





(unit: mm)

Size	ØD±0.5	L	L'	P±0.5	Ød
8×9	8.0	9.0	L max.	3.5	0.6
8×11.5	8.0	11.5	L+1.0max.	3.5	0.6
10×11.5	10.0	11.5		5.0	0.6

Standard Ratings

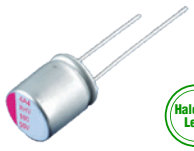
Rated Voltage [Vdc]	Rated Capacitance [µF]	Size ØD x L [mm]	ESR (20°C,100kHz) [mΩ] [max.]	Rated Ripple Current (105°C,100kHz) [mArms]	Tangent of Loss Angel [max.]	Leakage Current [µA, max.]	Part Number
2.5	560	8 x 9	5	6300	0.10	500	2RU560MD9
	820	8 x 9	5	6300	0.10	500	2RU820MD9
	820	8 x 11.5	5	6600	0.10	500	2RU820MD11
	1000	10 x 11.5	5	7100	0.10	500	2RU1000ME11
	1500	10 x 11.5	5	7300	0.10	750	2RU1500ME11
4	560	8 x 9	5	6300	0.10	500	4RU560MD9
	560	8 x 11.5	5	6300	0.10	500	4RU560MD11
	680	8 x 11.5	5	6500	0.10	544	4RU680MD11
	820	10 x 11.5	5	7000	0.10	656	4RU820ME11
	1200	10 x 11.5	5	7200	0.10	960	4RU1200ME11
6.3	470	8 x 11.5	5	6400	0.10	592	6RU470MD11
	680	10 x 11.5	5	6700	0.10	857	6RU680ME11
	820	10 x 11.5	5	6800	0.10	1033	6RU820ME11

RHV

Radial Lead Type

series

- High Voltage, High Capacitance
- Low ESR, High ripple current
- Load life of 5,000h at 105°C



Specifications

Items	Characteristics	
Temperature range	-55 to +105°C	
Rated voltage range	16 to 50Vdc	
Capacitance range	10 to 3,300μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Tangent of loss angle	Less than or equal to the value of Standard Ratings (at 20°C, 120Hz)	
Leakage current	Less than or equal to the value of Standard Ratings (at 20°C, after 2 minutes)	
ESR	Less than or equal to the value of Standard Ratings	
Characteristics of impedance	$Z_{+105°C}/Z_{+20°C} \leq 1.25$, $Z_{-55°C}/Z_{+20°C} \leq 1.25$ at 100kHz	
Endurance	105°C, 5,000 hrs at rated voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Damp Heat (Steady State)	60°C, 90 to 95% RH, 1,000 hrs, No-applied Voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Resistance to soldering heat	Flow method (260±5°C, 10s)	
	Appearance	No significant damage
	Capacitance change	Within±10% of the initial value
	Tangent of loss angle (tanδ)	≤130% of the initial specified value
	ESR(mΩ)	≤130% of the initial specified value
	Leakage current	≤The initial specified value

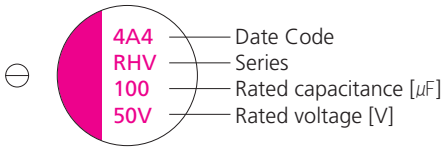
Size List

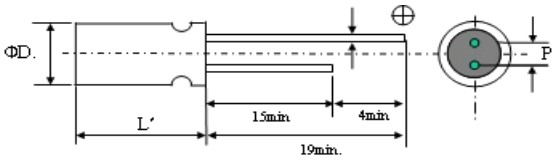
(unit: mm)

RV (SV) / μF	16 (18.4)	20 (23)	25 (28.7)	32 (36.8)	35 (40.2)	50 (57.5)
10						6.3×6
22				6.3×6	6.3×6	8×7
27			6.3×6			
39					8×7	8×11.5
47			6.3×6		8×7	8×11.5
56			6.3×6			8×11.5
68				8×7	8×7	10×11.5
82			8×7		8×11.5	
100			8×7		8×11.5	10×11.5
120		6.3×6		8×11.5	10×11.5	8×11.5
150	6.3×6				10×11.5	
180	6.3×6	8×7	8×11.5			
220		8×11.5	8×11.5	10×11.5	10×11.5	10×11.5
270	8×7				8×11.5	
330			10×11.5		10×11.5	
390		8×11.5	10×11.5			
470			10×11.5			
560	8×11.5	10×11.5				
680			10×11.5		10×16	
1000	10×11.5		10×16			
1200	8×15		8×23			
1500	10×11.5					
1800	8×21					
2200	10×16		10×23			
3300	10×21					

RV: Rated Voltage [V] SV: Surge Voltage [V] (at room temperature)

Marking and Dimensions





(unit: mm)

Size	ØD±0.5	L	L'	P±0.5	Ød
6.3×6	6.3	6.0	Lmax.	2.5	0.45
8×7	8.0	7.0		3.5	0.45
8×11.5	8.0	11.5	L + 1.0 max.	3.5	0.60
10×11.5	10.0	11.5		5.0	0.60
8×15	8.0	15.0		3.5	0.60
10×16	10.0	16.0		5.0	0.60
8×21	8.0	21.0		3.5	0.60
10×21	10.0	21.0		5.0	0.60
8×23	8.0	23.0		3.5	0.60
10×23	10.0	23.0		5.0	0.60

Standard Ratings

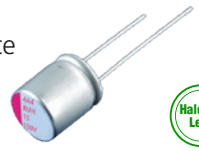
Rated Voltage [Vdc]	Rated Capacitance [µF]	Size ØD x L [mm]	ESR (20°C,100kHz) [mΩ] [max.]	Rated Ripple Current (105°C,100kHz) [mArms]	Tangent of Loss Angel [max.]	Leakage Current [µA, max.]	Part Number
16	150	6.3 x 6	30	2590	0.12	480	16RHV150MC6
	180	6.3 x 6	22	3300	0.12	576	16RHV180MC6
	270	8 x 7	22	3300	0.12	864	16RHV270MD7
	560	8 x 11.5	14	4950	0.12	1792	16RHV560MD11
	1000	10 x 11.5	12	5400	0.12	3200	16RHV1000ME11
	1200	8 x 15	11	7000	0.12	2880	16RHV1200MD15
	1500	10 x 11.5	12	5600	0.12	4800	16RHV1500ME11
	1800	8 x 21	9	7500	0.12	4320	16RHV1800MD21
	2200	10 x 16	11	8100	0.12	5280	16RHV2200ME16
	3300	10 x 21	11	10000	0.12	7920	16RHV3300ME21
20	120	6.3 x 6	25	3200	0.12	480	20RHV120MC6
	180	8 x 7	25	3200	0.12	720	20RHV180MD7
	220	8 x 11.5	24	3320	0.12	880	20RHV220MD11
	390	8 x 11.5	14	4950	0.12	1560	20RHV390MD11
	560	10 x 11.5	12	5400	0.12	2240	20RHV560ME11
25	27	6.3 x 6	40	2450	0.12	135	25RHV27MC6
	47	6.3 x 6	30	2800	0.12	235	25RHV47MC6
	56	6.3 x 6	30	2800	0.12	280	25RHV56MC6
	82	8 x 7	28	3000	0.12	410	25RHV82MD7
	100	8 x 7	28	3000	0.12	500	25RHV100MD7
	180	8 x 11.5	16	4650	0.12	900	25RHV180MD11
	220	8 x 11.5	16	4650	0.12	1100	25RHV220MD11
	330	10 x 11.5	14	5000	0.12	1650	25RHV330ME11
	390	10 x 11.5	14	5000	0.12	1950	25RHV390ME11
	470	10 x 11.5	14	5000	0.12	2350	25RHV470ME11
	680	10 x 11.5	14	5000	0.12	3400	25RHV680ME11
	1000	10 x 16	10	5600	0.12	2500	25RHV1000ME16
	1200	8 x 23	10	5600	0.12	3000	25RHV1200MD23
	2200	10 x 23	10	8100	0.12	5500	25RHV2200ME23
32	22	6.3 x 6	35	2700	0.12	140	32RHV22MC6
	68	8 x 7	25	3200	0.12	435	32RHV68MD7
	120	8 x 11.5	20	4000	0.12	768	32RHV120MD11
	220	10 x 11.5	18	4650	0.12	1408	32RHV220ME11
35	22	6.3 x 6	35	2600	0.12	154	35RHV22MC6
	39	8 x 7	30	2800	0.12	273	35RHV39MD7
	47	8 x 7	30	2800	0.12	329	35RHV47MD7
	68	8 x 7	28	3000	0.12	476	35RHV68MD7
	82	8 x 11.5	20	4000	0.12	574	35RHV82MD11
	100	8 x 11.5	20	4000	0.12	700	35RHV100MD11
	120	10 x 11.5	18	4400	0.12	840	35RHV120ME11
	150	10 x 11.5	18	4400	0.12	1050	35RHV150ME11
	220	10 x 11.5	18	4650	0.12	1540	35RHV220ME11
	270	8 x 11.5	20	4200	0.12	1890	35RHV270MD11
	330	10 x 11.5	17	4650	0.12	2310	35RHV330ME11
	680	10 x 16	14	5000	0.12	4760	35RHV680ME16
50	10	6.3 x 6	40	2500	0.12	100	50RHV10MC6
	22	8 x 7	35	2700	0.12	220	50RHV22MD7
	39	8 x 11.5	25	3800	0.12	390	50RHV39MD11
	47	8 x 11.5	25	3800	0.12	470	50RHV47MD11
	56	8 x 11.5	25	3800	0.12	560	50RHV56MD11
	68	10 x 11.5	20	4300	0.12	680	50RHV68ME11
	100	10 x 11.5	20	4300	0.12	1000	50RHV100ME11
	120	8 x 11.5	20	3900	0.12	1200	50RHV120MD11
	220	10 x 11.5	25	4650	0.12	2200	50RHV220ME11

RUH

Radial Lead Type

series

- Ultra-High Voltage, High Capacitance
- Low ESR, High ripple current
- Load life of 3,000h at 105°C



Specifications

Items	Characteristics	
Temperature range	-55 to +105°C	
Rated voltage range	63 to 125Vdc	
Capacitance range	8.2 to 330μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Tangent of loss angle	Less than or equal to the value of Standard Ratings (at 20°C, 120Hz)	
Leakage current	Less than or equal to the value of Standard Ratings (at 20°C, after 2 minutes)	
ESR	Less than or equal to the value of Standard Ratings	
Characteristics of impedance	$Z_{+105°C}/Z_{+20°C} \leq 1.25$, $Z_{-55°C}/Z_{+20°C} \leq 1.25$ at 100kHz	
Endurance	105°C, 3,000 hrs at rated voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Damp Heat (Steady State)	60°C, 90 to 95% RH, 1,000 hrs, No-applied Voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Resistance to soldering heat	Flow method (260±5°C, 10s)	
	Appearance	No significant damage
	Capacitance change	Within±10% of the initial value
	Tangent of loss angle (tanδ)	≤130% of the initial specified value
	ESR(mΩ)	≤130% of the initial specified value
	Leakage current	≤The initial specified value

* In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C

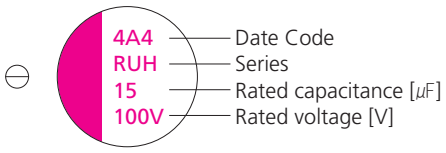
Size List

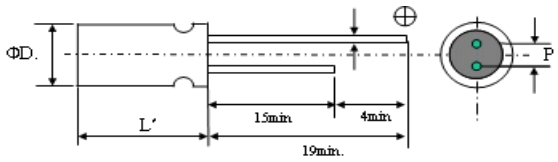
(unit: mm)

μF \ R V (SV)	63 (72.4)	80 (92)	100 (115)	125 (143)
8.2	6.3×6			
10	8×7		8×11.5	8×11.5
12		8×11.5		
15	8×7		8×11.5	8×11.5
18			10×11.5	
22		10×11.5	10×11.5	
27	8×11.5	10×11.5		
33	8×11.5			10×11.5
39	8×11.5			
47	10×11.5			
56	10×11.5			
68		10×11.5	10×11.5	
82		10×11.5		
100	10×11.5		10×16	
120	10×11.5			
330	10×16			

RV: Rated Voltage [V] SV: Surge Voltage [V] (at room temperature)

Marking and Dimensions





(unit: mm)

Size	ØD±0.5	L	L'	P±0.5	Ød
6.3×6	6.3	6.0	Lmax.	2.5	0.45
8×7	8.0	7.0		3.5	0.45
8×11.5	8.0	11.5	L+1.0max.	3.5	0.60
10×11.5	10.0	11.5		5.0	0.60
10×16	10.0	16.0		5.0	0.60

Standard Ratings

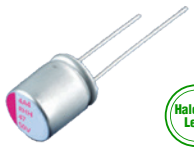
Rated Voltage [Vdc]	Rated Capacitance [μF]	Size ØD x L [mm]	ESR (20°C,100kHz) [mΩ] [max.]	Rated Ripple Current (105°C,100kHz) [mArms]	Tangent of Loss Angel [max.]	Leakage Current [μA, max.]	Part Number
63	8.2	6.3 x 6	55	1200	0.12	103	63RUH6R8MC6
	10	8 x 7	50	1400	0.12	126	63RUH10MD7
	15	8 x 7	50	1500	0.12	189	63RUH15MD7
	27	8 x 11.5	35	2800	0.12	340	63RUH27MD11
	33	8 x 11.5	30	3000	0.12	416	63RUH33MD11
	39	8 x 11.5	29	3400	0.12	491	63RUH39MD11
	47	10 x 11.5	29	3300	0.12	592	63RUH47ME11
	56	10 x 11.5	28	3400	0.12	706	63RUH56ME11
	100	10 x 11.5	25	4000	0.12	1260	63RUH100ME11
	120	10 x 11.5	25	4000	0.12	1512	63RUH120ME11
	330	10 x 16	20	4500	0.12	4158	63RUH330ME11
80	12	8 x 11.5	38	1900	0.12	192	80RUH12MD11
	22	8 x 11.5	38	2000	0.12	352	80RUH22MD11
	22	10 x 11.5	35	2300	0.12	352	80RUH22ME11
	27	10 x 11.5	35	2400	0.12	432	80RUH27ME11
	47	8 x 11.5	35	2600	0.12	752	80RUH47MD11
	47	10 x 11.5	28	3000	0.12	752	80RUH47ME11
	68	10 x 11.5	30	3000	0.12	1088	80RUH68ME11
	82	10 x 11.5	30	3200	0.12	1312	80RUH82ME11
100	10	8 x 11.5	42	1800	0.12	200	100RUH10MD11
	15	8 x 11.5	40	2000	0.12	300	100RUH15MD11
	18	10 x 11.5	38	2200	0.12	360	100RUH18ME11
	22	10 x 11.5	38	2300	0.12	440	100RUH22ME11
	39	10 x 11.5	35	2500	0.12	780	100RUH39ME11
	47	10 x 11.5	35	2600	0.12	940	100RUH47ME11
	68	10 x 11.5	30	2800	0.12	1360	100RUH68ME11
	100	10 x 16	25	3200	0.12	2000	100RUH100ME16
125	10	8 x 11.5	50	1500	0.12	250	125RUH10MD11
	15	8 x 11.5	50	1800	0.12	375	125RUH15MD11
	33	10 x 11.5	40	2000	0.12	825	125RUH33ME11

RHH

Radial Lead Type

series

- High Reliability, High Voltage, High Temperature
- Low ESR, High ripple current
- Load life of 3,000h at 125°C



Specifications

Items	Characteristics	
Temperature range	-55 to +125°C	
Rated voltage range	16 to 80Vdc	
Capacitance range	5.6 to 390μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Tangent of loss angle	Less than or equal to the value of Standard Ratings (at 20°C, 120Hz)	
Leakage current	Less than or equal to the value of Standard Ratings (at 20°C, after 2 minutes)	
ESR	Less than or equal to the value of Standard Ratings	
Characteristics of impedance	$Z_{+125°C}/Z_{+20°C} \leq 1.25$, $Z_{-55°C}/Z_{+20°C} \leq 1.25$ at 100kHz	
Endurance	125°C, 3,000 hrs at rated voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Damp Heat (Steady State)	60°C, 90 to 95% RH, 1,000 hrs, No-applied Voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Resistance to soldering heat	Flow method (260±5°C, 10s)	
	Appearance	No significant damage
	Capacitance change	Within±10% of the initial value
	Tangent of loss angle (tanδ)	≤130% of the initial specified value
	ESR(mΩ)	≤130% of the initial specified value
	Leakage current	≤The initial specified value

* In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 125°C

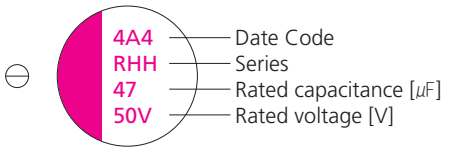
Size List

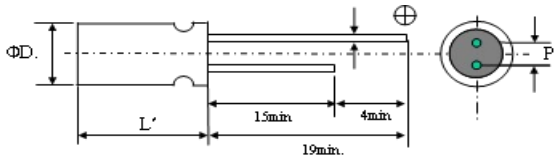
(unit: mm)

μF \ RV (SV)	16 (18.4)	20 (23)	25 (28.7)	35 (40.2)	50 (57.5)	63 (72.4)	80 (92)
5.6					6.3×6		
10				6.3×6	8×7		
18				8×7			
22			6.3×6				
27					8×11.5		
33		6.3×6					
39			8×7				
47	6.3×6				10×11.5		
56		8×7		8×11.5			
68							8×15
82	8×7						
100				10×11.5			10×16
120			8×11.5				
150		8×11.5					10×16
180			10×11.5				
220	8×11.5					8×21 8×23 10×16	
270		10×11.5					
330						10×21 10×23	
390	10×11.5						

RV: Rated Voltage [V] SV: Surge Voltage [V] (at room temperature)

Marking and Dimensions





(unit: mm)

Size	ØD±0.5	L	L'	P±0.5	Ød
6.3×6	6.3	6.0	Lmax.	2.5	0.45
8×7	8.0	7.0		3.5	0.45
8×11.5	8.0	11.5	L+1.0max.	3.5	0.60
10×11.5	10.0	11.5		5.0	0.60
8×15	8.0	11.5		3.5	0.60
10×16	10.0	11.5		5.0	0.60
8×21	8.0	11.5		3.5	0.60
10×21	10.0	11.5		5.0	0.60
8×23	8.0	11.5		3.5	0.60
10×23	10.0	11.5		5.0	0.60

Standard Ratings

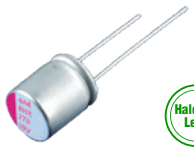
Rated Voltage [Vdc]	Rated Capacitance [μF]	Size ØD x L [mm]	ESR (20°C,100kHz) [mΩ] [max.]	Rated Ripple Current (125°C,100kHz) [mArms]	Tangent of Loss Angel [max.]	Leakage Current [μA, max.]	Part Number
16	47	6.3 x 6	50	512	0.12	150	16RHH47MC6
	82	8 x 7	40	670	0.12	262	16RHH82MD7
	220	8 x 11.5	20	1151	0.12	704	16RHH220MD11
	390	10 x 11.5	16	1493	0.12	1248	16RHH390ME11
20	33	6.3 x 6	60	459	0.12	132	20RHH33MC6
	56	8 x 7	50	598	0.12	224	20RHH56MD7
	150	8 x 11.5	28	1050	0.12	600	20RHH150MD11
	270	10 x 11.5	25	1367	0.12	1080	20RHH270ME11
25	22	6.3 x 6	60	474	0.12	110	25RHH22MC6
	39	8 x 7	50	580	0.12	195	25RHH39MD7
	120	8 x 11.5	28	943	0.12	600	25RHH120MD11
	180	10 x 11.5	25	1202	0.12	900	25RHH180ME11
35	10	6.3 x 6	70	340	0.12	70	35RHH10MC6
	18	8 x 7	60	400	0.12	126	35RHH18MD7
	56	8 x 11.5	30	700	0.12	392	35RHH56MD11
	100	10 x 11.5	28	1150	0.12	700	35RHH100ME11
50	5.6	6.3 x 6	70	310	0.12	56	50RHH5R6MC6
	10	8 x 7	60	371	0.12	100	50RHH10MD7
	27	8 x 11.5	35	665	0.12	270	50RHH27MD11
	47	10 x 11.5	30	825	0.12	470	50RHH47ME11
63	220	8 x 21	20	3000	0.12	693	63RHH220MD21
	220	8 x 23	20	3100	0.12	693	63RHH220MD23
	220	10 x 16	20	3100	0.12	1039	63RHH220ME16
	330	10 x 21	20	4000	0.12	1039	63RHH330ME21
	330	10 x 23	20	4100	0.12	1039	63RHH330ME23
80	68	8 x 15	30	2100	0.12	272	80RHH68MD15
	120	10 x 16	25	2500	0.12	480	80RHH220ME16
	150	10 x 16	25	2600	0.12	600	80RHH150ME16

RHR

Radial Lead Type

series

- High Reliability, High Voltage, High Temperature
- Low ESR, High ripple current
- Load life of 3,000h at 125°C



Specifications

Items	Characteristics	
Temperature range	-55 to +105°C	
Rated voltage range	2.5 to 16Vdc	
Capacitance range	100 to 3,500μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Tangent of loss angle	Less than or equal to the value of Standard Ratings (at 20°C, 120Hz)	
Leakage current	Less than or equal to the value of Standard Ratings (at 20°C, after 2 minutes)	
ESR	Less than or equal to the value of Standard Ratings	
Characteristics of impedance	$Z_{+105°C}/Z_{+20°C} \leq 1.25$, $Z_{-55°C}/Z_{+20°C} \leq 1.25$ at 100kHz	
Endurance	125°C, 3,000 hrs at rated voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Damp Heat (Steady State)	60°C , 90 to 95% RH , 1,000 hrs , No-applied Voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Resistance to soldering heat	Flow method (260±5°C , 10s)	
	Appearance	No significant damage
	Capacitance change	Within±10% of the initial value
	Tangent of loss angle (tanδ)	≤130% of the initial specified value
	ESR(mΩ)	≤130% of the initial specified value
	Leakage current	≤The initial specified value

* In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C

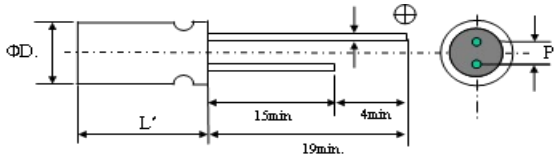
Size List

(unit: mm)

RV (SV) / μF	2.5 (2.9)	4 (4.6)	6.3 (7.2)	10 (11.5)	16 (18.4)
100					6.3×6 / 6.3×9
150				6.3×6	
180					8×9 / 8×11.5
220	5×9		6.3×6		8×9
270				8×7	8×9 / 8×11.5
330	5×9 / 6.3×6				8×9 / 8×11.5
470	5×9		6.3×9 / 8×9 8×11.5		10×11.5
560	5×9 / 6.3×9 8×9	6.3×9 / 8×9 8×11.5	6.3×9 8×9		
680		8×11.5	10×11.5		
820	6.3×9 / 8×7 8×9 / 8×11.5	10×11.5	8×9 8×11.5		
1000	8×9	8×9 10×11.5			
1200		8×9			
1500	8×9		10×11.5		
2700	10×11.5				
3500	10×11.5				

RV: Rated Voltage [V] SV: Surge Voltage [V] (at room temperature)

Marking and Dimensions



(unit: mm)

Size	ØD±0.5	L	L'	P±0.5	Ød
5×9	5.0	9.0	L max.	2.0	0.6
6.3×6	6.3	6.0		2.5	0.45
8×7	8.0	7.0		3.5	0.45
6.3×9	6.3	9.0		2.5	0.6
8×9	8.0	9.0		3.5	0.6
8×11.5	8.0	11.5	L + 1.0 max.	3.5	0.6
10x11.5	10.0	11.5		5.0	0.6

Standard Ratings

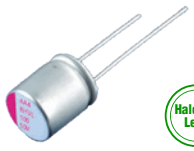
Rated Voltage [Vdc]	Rated Capacitance [µF]	Size ØD x L [mm]	ESR (20°C,100kHz) [mΩ] [max.]	Rated Ripple Current (125°C,100kHz) [mArms]	Tangent of Loss Angel [max.]	Leakage Current [µA, max.]	Part Number
2.5	220	5 x 9	7	4180	0.10	500	2RHR220MB9
	330	5 x 9	7	4180	0.10	500	2RHR330MB9
	330	6.3 x 9	7	5600	0.10	500	2RHR330MC9
	470	5 x 9	7	4180	0.10	500	2RHR470MB9
	560	5 x 9	7	4180	0.10	500	2RHR560MB9
	560	6.3 x 9	7	5600	0.10	500	2RHR560MC9
	560	8 x 9	7	6100	0.10	500	2RHR560MD9
	820	6.3 x 9	7	5600	0.10	500	2RHR820MC9
	820	8 x 7	8	5300	0.10	500	2RHR820MD7
	820	8 x 9	7	6100	0.10	500	2RHR820MD9
	820	8 x11.5	7	6100	0.10	500	2RHR820MD11
	1000	8 x 9	7	6100	0.10	500	2RHR1000MD9
	1500	8 x 9	7	6100	0.10	750	2RHR1500MD9
	2700	10 x 11.5	10	5560	0.10	1350	2RHR2700ME11
	3500	10 x 11.5	10	5560	0.10	1750	2RHR3500ME11
4	560	6.3 x 9	7	5600	0.10	500	4RHR560MC9
	560	8 x 9	7	6100	0.10	500	4RHR560MD9
	560	8 x 11.5	7	6100	0.10	500	4RHR560MD11
	680	8 x 11.5	7	6100	0.10	544	4RHR680MD11
	820	10 x 11.5	7	6640	0.10	656	4RHR820ME11
	1000	8 x 9	7	6100	0.10	800	4RHR1000MD9
	1000	10 x 11.5	7	6640	0.10	800	4RHR1000ME11
	1200	8 x 9	7	6100	0.10	960	4RHR1200MD9
6.3	220	6.3 x 6	18	2980	0.10	277	6RHR220MC6
	470	6.3 x 9	7	5600	0.10	592	6RHR470MC9
	470	8 x 9	7	5700	0.10	592	6RHR470MD9
	470	8 x 11.5	7	5700	0.10	592	6RHR470MD11
	560	6.3 x 9	7	5600	0.10	705	6RHR560MC9
	560	8 x 9	7	5700	0.10	705	6RHR560MD9
	680	10 x 11.5	7	6640	0.10	857	6RHR680ME11
	820	8 x 9	7	5700	0.10	1033	6RHR820MD9
	820	8 x 11.5	7	5700	0.10	1033	6RHR820MD11
	1500	10 x 11.5	10	5560	0.10	1890	6RHR1500ME11
10	150	6.3 x 6	26	2400	0.10	300	10RHR150MC6
	270	8 x 7	22	3220	0.10	500	10RHR270MD7
16	100	6.3 x 6	24	2490	0.10	320	16RHR100MC6
	100	6.3 x 9	10	4680	0.10	500	16RHR100MC9
	150	8 x 7	22	3220	0.10	500	16RHR150MD7
	180	8 x 9	10	5000	0.10	576	16RHR180MD9
	180	8 x 11.5	16	4360	0.10	576	16RHR180MD11
	270	8 x 9	10	5000	0.10	864	16RHR270MD9
	270	8 x 11.5	11	5000	0.10	864	16RHR270MD11
	330	8 x 9	11	4520	0.10	1056	16RHR330MD9
	330	8 x 11.5	11	5000	0.10	1056	16RHR330MD11
	470	10 x11.5	10	6100	0.10	1504	16RHR470ME11

RHVL

Radial Lead Type

series

- High Voltage, High Capacitance
- Low ESR, High ripple current
- Load life of 10,000h at 105°C



Specifications

Items	Characteristics	
Temperature range	-55 to +105°C	
Rated voltage range	16 to 50Vdc	
Capacitance range	10 to 1,500μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Tangent of loss angle	Less than or equal to the value of Standard Ratings (at 20°C, 120Hz)	
Leakage current	Less than or equal to the value of Standard Ratings (at 20°C, after 2 minutes)	
ESR	Less than or equal to the value of Standard Ratings	
Characteristics of impedance	$Z_{+105°C}/Z_{+20°C} \leq 1.25$, $Z_{-55°C}/Z_{+20°C} \leq 1.25$ at 100kHz	
Endurance	105°C, 10,000 hrs at rated voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Damp Heat (Steady State)	60°C, 90 to 95% RH, 1,000 hrs, No-applied Voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Resistance to soldering heat	Flow method (260±5°C, 10s)	
	Appearance	No significant damage
	Capacitance change	Within±10% of the initial value
	Tangent of loss angle (tanδ)	≤130% of the initial specified value
	ESR(mΩ)	≤130% of the initial specified value
	Leakage current	≤The initial specified value

* In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C

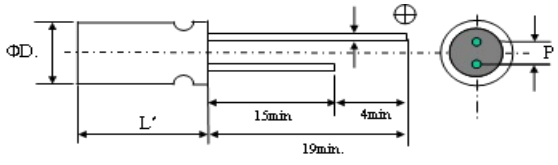
Size List

(unit: mm)

μF \ RV (SV)	16 (18.4)	20 (23)	25 (28.7)	32 (36.8)	35 (40.2)	50 (57.5)
10						6.3×6
18						8×7
22				6.3×6	6.3×6	8×7
39					8×7	8×11.5
47			6.3×6		8×7	8×11.5
56			6.3×6			8×11.5
68				8×7	8×7	10×11.5
82			8×7		8×11.5	
100			8×7			10×11.5
120		6.3×6		8×11.5	10×11.5	
150	6.3×6				10×11.5	
180	6.3×6	8×7	8×11.5			
220		8×11.5	8×11.5	10×11.5	10×11.5	10×11.5
270	8×7					
330			10×11.5			
390		8×11.5	10×11.5			
470					10×11.5	
560	8×11.5	10×11.5				
1000	10×11.5					
1500	10×11.5					

RV: Rated Voltage [V] SV: Surge Voltage [V] (at room temperature)

Marking and Dimensions



(unit: mm)

Size	ØD±0.5	L	L'	P±0.5	Ød
6.3×6	6.3	6.0	Lmax.	2.5	0.45
8×7	8.0	7.0		3.5	0.45
8×11.5	8.0	11.5	L+1.0max.	3.5	0.60
10×11.5	10.0	11.5		5.0	0.60

Standard Ratings

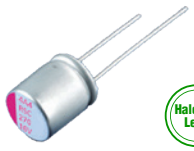
Rated Voltage [Vdc]	Rated Capacitance [µF]	Size ØD x L [mm]	ESR (20°C,100kHz) [mΩ] [max.]	Rated Ripple Current (105°C,100kHz) [mArms]	Tangent of Loss Angel [max.]	Leakage Current [µA, max.]	Part Number
16	150	6.3 x 6	30	2590	0.12	480	16RHVL150MC6
	180	6.3 x 6	22	3300	0.12	576	16RHVL180MC6
	270	8 x 7	22	3300	0.12	864	16RHVL270MD7
	560	8 x 11.5	14	4950	0.12	1792	16RHVL560MD11
	1000	10 x 11.5	12	5400	0.12	3200	16RHVL1000ME11
	1500	10 x 11.5	12	5600	0.12	4800	16RHVL1500ME11
20	120	6.3 x 6	25	3200	0.12	480	20RHVL120MC6
	180	8 x 7	25	3200	0.12	720	20RHVL180MD7
	220	8 x 11.5	24	3320	0.12	880	20RHVL220MD11
	390	8 x 11.5	14	4950	0.12	1560	20RHVL390MD11
	560	10 x 11.5	12	5400	0.12	2240	20RHVL560ME11
25	47	6.3 x 6	30	2800	0.12	235	25RHVL47MC6
	56	6.3 x 6	30	2800	0.12	280	25RHVL56MC6
	82	8 x 7	28	3000	0.12	410	25RHVL82MD7
	100	8 x 7	28	3000	0.12	500	25RHVL100MD7
	180	8 x 11.5	16	4650	0.12	900	25RHVL180MD11
	220	8 x 11.5	16	4650	0.12	1100	25RHVL220MD11
	330	10 x 11.5	14	5000	0.12	1650	25RHVL330ME11
	390	10 x 11.5	14	5000	0.12	1950	25RHVL390ME11
32	22	6.3 x 6	35	2700	0.12	140	32RHVL22MC6
	68	8 x 7	25	3200	0.12	435	32RHVL68MD7
	120	8 x 11.5	20	4000	0.12	768	32RHVL120MD11
	220	10 x 11.5	18	4650	0.12	1408	32RHVL220ME11
35	22	6.3 x 6	35	2600	0.12	154	35RHVL22MC6
	39	8 x 7	30	2800	0.12	273	35RHVL39MD7
	47	8 x 7	30	2800	0.12	329	35RHVL47MD7
	68	8 x 7	28	3000	0.12	476	35RHVL68MD7
	82	8 x 11.5	20	4000	0.12	574	35RHVL82MD11
	120	10 x 11.5	18	4400	0.12	840	35RHVL120ME11
	150	10 x 11.5	18	4400	0.12	1050	35RHVL150ME11
	220	10 x 11.5	18	4650	0.12	1540	35RHVL220ME11
	470	10 x 11.5	16	4950	0.12	3290	35RHVL470ME11
50	10	6.3 x 6	40	2500	0.12	100	50RHVL10MC6
	18	8 x 7	35	2700	0.12	180	50RHVL18MD7
	22	8 x 7	35	2700	0.12	220	50RHVL22MD7
	39	8 x 11.5	25	3800	0.12	390	50RHVL39MD11
	47	8 x 11.5	25	3800	0.12	470	50RHVL47MD11
	56	8 x 11.5	25	3800	0.12	560	50RHVL56MD11
	68	10 x 11.5	20	4300	0.12	680	50RHVL68ME11
	100	10 x 11.5	20	4300	0.12	1000	50RHVL100ME11
	220	10 x 11.5	25	4650	0.12	2200	50RHVL220ME11

RSC

Radial Lead Type

series

- Super low ESR, High ripple current
- Large capacitance, Small size
- Load life of 20,000h at 105°C



Specifications

Items	Characteristics	
Temperature range	-55 to +105°C	
Rated voltage range	2.5 to 50Vdc	
Capacitance range	18 to 2,700μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Tangent of loss angle	Less than or equal to the value of Standard Ratings (at 20°C, 120Hz)	
Leakage current	Less than or equal to the value of Standard Ratings (at 20°C, after 2 minutes)	
ESR	Less than or equal to the value of Standard Ratings	
Characteristics of impedance	$Z_{+105°C}/Z_{+20°C} \leq 1.25$, $Z_{-55°C}/Z_{+20°C} \leq 1.25$ at 100kHz	
Endurance	105°C, 20,000 hrs at rated voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Damp Heat (Steady State)	60°C, 90 to 95% RH, 1,000 hrs, No-applied Voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Resistance to soldering heat	Flow method (260±5°C, 10s)	
	Appearance	No significant damage
	Capacitance change	Within±10% of the initial value
	Tangent of loss angle (tanδ)	≤130% of the initial specified value
	ESR(mΩ)	≤130% of the initial specified value
	Leakage current	≤The initial specified value

* In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C

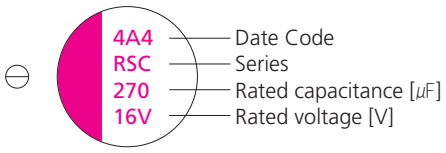
Size List

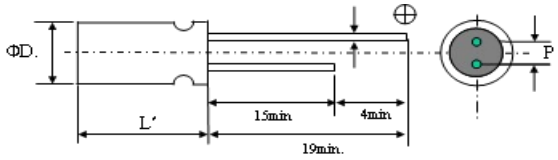
(unit: mm)

μF \ RV (SV)	2.5 (2.9)	4 (4.6)	6.3 (7.2)	16 (18.4)	20 (23)	32 (36.8)	35 (40.2)	50 (57.5)
18								8×7
39							8×7	8x11.5
68								10x11.5
82							8x11.5	
100				6.3×6		8×7		
120							10x11.5	
180					8×7	8×11.5		
270				8×7				
330			6.3×6			10x11.5		
390			8×7		8x11.5			
470					10x11.5			
560	6.3×6	8×7		8x11.5	10x11.5			
680	8×7							
820			8x11.5					
1000				10x11.5				
1500	8x11.5	8x11.5						
2700	10x11.5							

RV: Rated Voltage [V] SV: Surge Voltage [V] (at room temperature)

Marking and Dimensions





(unit: mm)

Size	ØD±0.5	L	L'	P±0.5	Ød
6.3×6	6.3	6.0	L max.	2.5	0.45
8×7	8.0	7.0		3.5	0.45
8×11.5	8.0	11.5	L + 1.0 max.	3.5	0.6
10x11.5	10.0	11.5		5.0	0.6

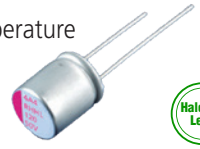
Standard Ratings

Rated Voltage [Vdc]	Rated Capacitance [µF]	Size ØD x L [mm]	ESR (20°C,100kHz) [mΩ] [max.]	Rated Ripple Current (105°C,100kHz) [mArms]	Tangent of Loss Angel [max.]	Leakage Current [µA, max.]	Part Number
2.5	560	6.3 x 6	16	3500	0.12	300	2RSC560MC6
	680	8 x 7	20	3370	0.12	500	2RSC820MD9
	1500	8 x 11.5	10	5150	0.12	750	2RSC1500MD11
	2700	10 x 11.5	12	5070	0.12	1350	2RSC2700ME11
4	560	8 x 7	22	3220	0.12	500	4RSC560MD7
	1500	8 x 11.5	12	4700	0.12	1200	4RSC1500MD11
6.3	330	6.3 x 6	15	3390	0.12	415	6RSC330MC6
	390	8 x 7	22	3220	0.12	491	6RSC390MD7
	820	8 x 11.5	12	4700	0.12	1033	6RSC820MD11
16	100	6.3 x 6	24	2490	0.12	320	16RSC100MC6
	270	8 x 7	22	3300	0.12	864	16RSC270MD7
	560	8 x 11.5	14	4950	0.12	1792	16RSC560MD11
	1000	10 x 11.5	12	5400	0.12	3200	16RSC1000ME11
20	180	8 x 7	25	3200	0.12	720	20RSC180MD7
	390	8 x 11.5	14	4950	0.12	1560	20RSC390MD11
	470	10 x 11.5	15	5000	0.12	1880	20RSC470ME11
	560	10 x 11.5	12	5400	0.12	2240	20RSC560ME11
25	100	8 x 7	24	3200	0.12	410	25RSC100MD7
	180	8 x 11.5	16	4650	0.12	900	25RSC180MD11
	330	10 x 11.5	14	5000	0.12	1650	25RSC330ME11
35	39	8 x 7	30	2800	0.12	273	35RSC39MD7
	82	8 x 11.5	20	4000	0.12	574	35RSC82MD11
	120	10 x 11.5	18	4400	0.12	840	35RSC120ME11
50	18	8 x 7	35	2700	0.12	180	50RSC18MD7
	39	8 x 11.5	25	3800	0.12	390	50RSC39MD11
	68	10 x 11.5	15	4300	0.12	680	50RSC68ME11

RHHL series

Radial Lead Type

- High Reliability, High Voltage, High Temperature
- Low ESR, High ripple current
- Load life of 4,000h at 125°C
- Compliance with AEC-Q200



Specifications

Items	Characteristics	
Temperature range	-55 to +125°C	
Rated voltage range	16 to 80Vdc	
Capacitance range	22 to 1,000μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Tangent of loss angle	Less than or equal to the value of Standard Ratings (at 20°C, 120Hz)	
Leakage current	Less than or equal to the value of Standard Ratings (at 20°C, after 2 minutes)	
ESR	Less than or equal to the value of Standard Ratings	
Characteristics of impedance	$Z_{+125°C}/Z_{+20°C} \leq 1.25$, $Z_{-55°C}/Z_{+20°C} \leq 1.25$ at 100kHz	
Endurance	125°C, 4,000 hrs at rated voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Damp Heat (Steady State)	60°C, 90 to 95% RH, 1,000 hrs, No-applied Voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Resistance to soldering heat	Flow method (260±5°C, 10s)	
	Appearance	No significant damage
	Capacitance change	Within±10% of the initial value
	Tangent of loss angle (tanδ)	≤130% of the initial specified value
	ESR(mΩ)	≤130% of the initial specified value
	Leakage current	≤The initial specified value

*In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 125°C

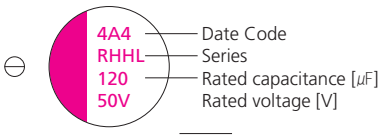
Size List

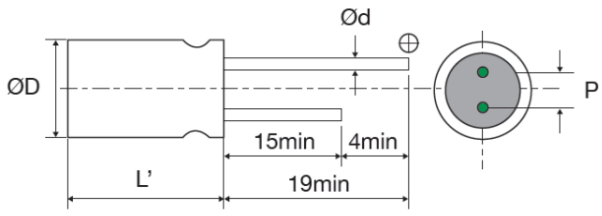
(unit: mm)

μF \ RV (SV)	16 (20.0)	25 (31.3)	35 (43.8)	50 (62.5)	63 (78.8)	80 (100.0)
22					6.3×6	
39				6.3×6	8×7	
56				8×7		
68			6.3×6			
100					8×11.5	
120		6.3×6				
180			8×7			
220	6.3×6				10×11.5	
270		8×7		8×11.5		
330	8×7					
470				10×11.5		
560			8×11.5			
680		8×11.5				
1000			10×11.5			

RV: Rated Voltage [V] SV: Surge Voltage [V] (at room temperature)

Marking and Dimensions





(unit: mm)

Size	ØD±0.5	L	L'	P±0.5	Ød
6.3×6	6.3	6.0	Lmax	2.5	0.45
8×7	8.0	7.0		3.5	0.45
8×11.5	8.0	11.5	L+1.0max	3.5	0.60
10.0×11.5	10.0	11.5		5.0	0.60

Standard Ratings

Rated Voltage [Vdc]	Rated Capacitance [μF]	Size ØD x L [mm]	ESR (20°C, 100kHz) [mΩ] [max.]	Rated Ripple Current (125°C, 100kHz) [mArms]	Tangent of Loss Angel [max]	Leakage Current [μA, max]	Part Number
16	220	8 x 7.0	30	1500	0.1	105	16RHHL220MD7
	560	8 x 11.5	16	3800	0.1	268	16RHHL560MD12
	1000	10 x 11.5	13	4300	0.1	480	16RHHL1000ME12
25	100	8 x 7.0	41	1200	0.1	75	25RHHL100MD7
	270	8 x 11.5	19	3300	0.1	202	25RHHL270MD12
	470	10 x 11.5	15	4100	0.1	352	25RHHL470ME12
35	68	8 x 7.0	44	1200	0.1	71	35RHHL68MD7
	220	8 x 11.5	21	3300	0.1	231	35RHHL220MD12
	330	10 x 11.5	16	3900	0.1	346	35RHHL330ME12
50	39	8 x 7.0	45	1300	0.1	58	50RHHL39MD7
	120	8 x 11.5	25	2900	0.1	180	50RHHL120MD12
	180	10 x 11.5	19	3500	0.1	270	50RHHL180ME12
63	22	8 x 7.0	48	1100	0.1	42	63RHHL22MD7
	56	8 x 11.5	27	2900	0.1	105	63RHHL56MD12
	100	10 x 11.5	24	3000	0.1	189	63RHHL100ME12
80	39	8 x 11.5	35	1600	0.1	93	80RHHL39MD12
	68	10 x 11.5	28	2100	0.1	163	80RHHL68ME12

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VS series
VL series
VSL series
VLL series
VSH series
VLH series
VU series

VU series
VHV series
VUH series
VHH series
VHR series
VHVL series
VSC series
VHHL series

VS

Surface mount type

series

- Standard
- Low ESR, High ripple current
- Load life of 2,000h at 105°C

Specifications

Items	Characteristics	
Temperature range	-55 to +105°C	
Rated voltage range	2.5 to 25Vdc	
Capacitance range	6.8 to 1,500μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Tangent of loss angle	Less than or equal to the value of Standard Ratings (at 20°C, 120Hz)	
Leakage current	Less than or equal to the value of Standard Ratings (at 20°C, after 2 minutes)	
ESR	Less than or equal to the value of Standard Ratings	
Characteristics of impedance	$Z_{+105°C}/Z_{+20°C} \leq 1.25$, $Z_{-55°C}/Z_{+20°C} \leq 1.25$ at 100kHz	
Endurance	105°C, 2,000 hrs at rated voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Damp Heat (Steady State)	60°C, 90 to 95% RH, 1,000 hrs, No-applied Voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Resistance to soldering heat	VPS (230°C, 75s)	
	Appearance	No significant damage
	Capacitance change	Within±10% of the initial value
	Tangent of loss angle (tanδ)	≤130% of the initial specified value
	ESR(mΩ)	≤130% of the initial specified value
	Leakage current	≤The initial specified value

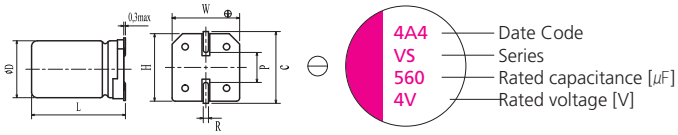
*In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C

Size List

(unit: mm)

μF \ RV (SV)	2.5 (2.9)	4 (4.6)	6.3 (7.2)	10 (11.5)	16 (18.4)	20 (23.0)	25 (28.7)
6.8							6.3×5.9
10						5×5.9	8×6.9
15					5×5.9		
22					5×5.9	6.3×5.9	10×7.9
27						6.3×5.9	
33				5×5.9		8×6.9	8×11.9
39		5×5.9			6.3×5.9		
47			5×5.9	6.3×5.9	6.3×5.9	8×6.9	
56				6.3×5.9	8×6.9	10×7.9	10×12.6
68		5×5.9				10×7.9	
82			6.3×5.9		8×6.9		
100			6.3×5.9		10×7.9	8×11.9	8×11.9
120			6.3×5.9	8×6.9			
150		6.3×5.9		8×6.9 10×7.9	10×7.9	10×12.6	10×12.6
180					8×11.9 10×7.9		
220	6.3×5.9		8×6.9 10×7.9				
270				10×7.9			
330		8×6.9	10×7.9	8×11.9 10×7.9	10×12.6		
470	8×6.9		8×11.9 10×7.9		10×12.6		
560		8×11.9		10×12.6			
680	8×11.9	10×7.9					
820			10×12.6				
1000			10×12.6				
1200		10×12.6					
1500	10×12.6						

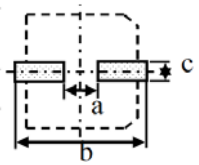
Marking and Dimensions



(unit: mm)

Size	ØD±0.5	L +0.1 -0.4	W±0.2	H±0.2	C±0.2	R	P±0.2
5×5.9	5.0	5.9	5.3	5.3	6.0	0.6~0.8	1.4
6.3×5.9	6.3	5.9	6.6	6.6	7.3	0.6~0.8	2.1
8×6.9	8.0	6.9	8.3	8.3	9.0	0.6~0.8	3.2
10×7.9	10.0	7.9	10.3	10.3	11.0	0.6~0.8	4.6
8×11.9	8.0	11.9	8.3	8.3	9.0	0.8~1.1	3.2
10×12.6	10.0	12.6	10.3	10.3	11.0	0.8~1.1	4.6

Recommended Land Pattern Dimension of PCB



(unit: mm)

Size	a	b	c
5×5.9	1.4	7.4	1.6
6.3×5.9	2.1	9.1	1.6
8×6.9	2.8	11.1	1.9
10×7.9	4.3	13.1	1.9
8×11.9	2.8	11.1	1.9
10×12.6	4.3	13.1	1.9

• Standard Ratings

Rated Voltage [Vdc]	Rated Capacitance [µF]	Size ØD x L [mm]	ESR (20°C, 100kHz) [mΩ] [max.]	Rated Ripple Current (105°C, 100kHz) [mArms]	Tangent of Loss Angel [max]	Leakage Current [µA, max]	Part Number
2.5	220	6.3 x 5.9	23	2390	0.1	110	2VS220MC6
	470	8 x 6.9	23	3300	0.1	235	2VS470MD7
	680	8 x 11.9	13	4520	0.1	340	2VS680MD12
	1500	10 x 12.6	12	5440	0.1	750	2VS1500ME12
4	39	5 x 5.9	70	1100	0.1	78	4VS39MB6
	68	5 x 5.9	60	1400	0.1	136	4VS68MB6
	150	6.3 x 5.9	40	1810	0.1	120	4VS150MC6
	330	8 x 6.9	35	2560	0.1	264	4VS330MD7
	560	8 x 11.9	13	4520	0.1	448	4VS560MD12
	680	10 x 7.9	25	3700	0.1	544	4VS680ME8
	1200	10 x 12.6	12	5440	0.1	960	4VS1200ME12
6.3	47	5 x 5.9	70	1100	0.1	148	6VS47MB6
	82	6.3 x 5.9	45	1700	0.1	103	6VS82MC6
	100	6.3 x 5.9	40	1810	0.1	126	6VS100MC6
	120	6.3 x 5.9	40	1810	0.1	151	6VS120MC6
	220	8 x 6.9	35	2560	0.1	277	6VS220MD7
	220	10 x 7.9	25	3700	0.1	277	6VS220ME8
	330	10 x 7.9	25	3700	0.1	416	6VS330ME8
	470	10 x 7.9	25	3700	0.1	592	6VS470ME8
	470	8 x 11.9	15	4210	0.1	592	6VS470MD12
	820	10 x 12.6	12	5440	0.1	1033	6VS820ME12
	1000	10 x 12.6	12	5440	0.1	1260	6VS1000ME12
10	33	5 x 5.9	70	1100	0.1	165	10VS33MB6
	47	6.3 x 5.9	50	1620	0.1	94	10VS47MC6
	56	6.3 x 5.9	45	1700	0.1	112	10VS56MC6
	120	8 x 6.9	35	2560	0.1	240	10VS120MD7
	150	8 x 6.9	35	2560	0.1	300	10VS150MD7
	150	10 x 7.9	30	3020	0.1	300	10VS150ME8
	270	10 x 7.9	25	3700	0.1	540	10VS270ME8
	330	8 x 11.9	17	3950	0.1	660	10VS330MD12
	330	10 x 7.9	25	3700	0.1	660	10VS330ME8
	560	10 x 12.6	13	5230	0.1	1120	10VS560ME12
16	15	5 x 5.9	120	1020	0.1	120	10VS15MB6
	22	5 x 5.9	90	1060	0.1	176	10VS22MB6
	39	6.3 x 5.9	50	1620	0.1	125	16VS39MC6
	47	6.3 x 5.9	50	1620	0.1	150	16VS47MC6
	56	8 x 6.9	45	1890	0.1	179	16VS56MD7
	82	8 x 6.9	40	2120	0.1	262	16VS82MD7
	100	10 x 7.9	35	2670	0.1	320	16VS100ME8
	150	10 x 7.9	30	3020	0.1	480	16VS150ME8
	180	8 x 11.9	20	3640	0.1	576	16VS180MD12
	180	10 x 7.9	30	3020	0.1	576	16VS180ME8
	330	10 x 12.6	16	4720	0.1	1056	16VS330ME12
	470	10 x 12.6	16	4720	0.1	1504	16VS470ME12
20	10	5 x 5.9	120	1020	0.1	100	20VS10MB6
	22	6.3 x 5.9	60	1450	0.1	88	20VS22MC6
	27	6.3 x 5.9	60	1450	0.1	108	20VS27MC6
	33	8 x 6.9	45	1890	0.1	132	20VS33MD7
	47	8 x 6.9	45	1890	0.1	188	20VS47MD7
	56	10 x 7.9	40	2400	0.1	224	20VS56ME8
	68	10 x 7.9	40	2400	0.1	272	20VS68ME8
	100	8 x 11.9	24	3320	0.1	400	20VS100MD12
	150	10 x 12.6	20	4320	0.1	600	20VS150ME12
25	6.8	6.3 x 5.9	80	1200	0.1	85	25VS6R8MC6
	10	8 x 6.9	60	1500	0.1	125	25VS10MD7
	22	10 x 7.9	50	2000	0.1	275	25VS22ME8
	33	8 x 11.9	30	2980	0.1	413	25VS33MD12
	56	10 x 12.6	28	3800	0.1	700	25VS56ME12
	100	8 x 11.9	30	3320	0.1	500	25VS100MD12
	150	10 x 12.6	25	3800	0.1	750	25VS150ME12

VL

Surface mount type

series

- Super low ESR, High ripple current
- Large capacitance, Small size
- Load life of 2,000h at 105°C

Specifications

Items	Characteristics	
Temperature range	-55 to +105°C	
Rated voltage range	2.5 to 16Vdc	
Capacitance range	22μF is not found	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Tangent of loss angle	Less than or equal to the value of Standard Ratings (at 20°C, 120Hz)	
Leakage current	Less than or equal to the value of Standard Ratings (at 20°C, after 2 minutes)	
ESR	Less than or equal to the value of Standard Ratings	
Characteristics of impedance	$Z_{+105°C}/Z_{+20°C} \leq 1.25$, $Z_{-55°C}/Z_{+20°C} \leq 1.25$ at 100kHz	
Endurance	105°C, 2,000 hrs at rated voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Damp Heat (Steady State)	60°C, 90 to 95% RH, 1,000 hrs, No-applied Voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Resistance to soldering heat	VPS (230°C, 75s)	
	Appearance	No significant damage
	Capacitance change	Within±10% of the initial value
	Tangent of loss angle (tanδ)	≤130% of the initial specified value
	ESR(mΩ)	≤130% of the initial specified value
	Leakage current	≤The initial specified value

*In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C

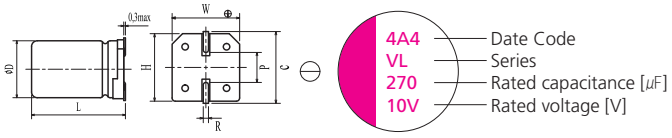
Size List

(unit: mm)

RV (SV) / μF	2.5 (2.9)	4 (4.6)	6.3 (7.2)	10 (11.5)	16 (18.4)
39					5×5.9
47				5×5.9	
68				5×5.9	6.3×5.9
82					6.3×5.9
100			5×5.9	5×5.9	6.3×5.9
120			5×5.9	6.3×5.9	8×6.9
150		5×5.9		6.3×5.9	8×6.9
180	5×5.9				
220			6.3×5.9	6.3×5.9	
270				8×6.9	8×11.9
330		6.3×5.9	6.3×5.9		8×11.9
390	6.3×5.9		8×6.9		
560	6.3×5.9	8×6.9 8×11.9			
680	8×6.9				
820	8×11.9		8×11.9		
1000	8×11.9			8×11.9 10×12.6	10×12.6
1200		8×11.9			
1500	8×11.9	8×11.9	8×11.9	10×12.6	
2200			10×12.6		
2700	10×12.6				

RV: Rated Voltage [V] SV: Surge Voltage [V] (at room temperature)

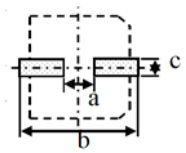
Marking and Dimensions



(unit: mm)

Size	ØD±0.5	L +0.1 -0.4	W±0.2	H±0.2	C±0.2	R	P±0.2
5×5.9	5.0	5.9	5.3	5.3	6.0	0.6 to 0.8	1.4
6.3×5.9	6.3	5.9	6.6	6.6	7.3	0.6 to 0.8	2.1
8×6.9	8.0	6.9	8.3	8.3	9.0	0.6 to 0.8	3.2
8×11.9	8.0	11.9	8.3	8.3	9.0	0.8 to 1.1	3.2
10×12.6	10.0	12.6	10.3	10.3	11.0	0.8 to 1.1	4.6

Recommended Land Pattern Dimension of PCB



(unit: mm)

Size	a	b	c
5×5.9	1.4	7.4	1.6
6.3×5.9	2.1	9.1	1.6
8×6.9	2.8	11.1	1.9
8×11.9	2.8	11.1	1.9
10×12.6	4.3	13.1	1.9

• Standard Ratings

Rated Voltage [Vdc]	Rated Capacitance [µF]	Size ØD x L [mm]	ESR (20°C, 100kHz) [mΩ] [max.]	Rated Ripple Current (105°C, 100kHz) [mArms]	Tangent of Loss Angel [max]	Leakage Current [µA, max]	Part Number
2.5	180	5 x 5.9	19	2800	0.1	300	2VL180MB6
	390	6.3 x 5.9	15	3160	0.1	300	2VL390MC6
	560	6.3 x 5.9	16	3500	0.1	300	2VL560MC6
	680	8 x 6.9	20	3370	0.1	500	2VL680MD7
	820	8 x 11.9	9	5380	0.1	500	2VL820MD12
	1000	8 x 11.9	10	5380	0.1	500	2VL1000MD12
	1500	8 x 11.9	10	5150	0.1	750	2VL1500MD12
	2700	10 x 12.6	12	5070	0.1	1350	2VL2700ME12
4	150	5 x 5.9	20	2730	0.1	300	4VL150MB6
	330	6.3 x 5.9	15	3160	0.1	300	4VL330MC6
	560	8 x 6.9	22	3220	0.1	500	4VL560MD7
	560	8 x 11.9	9	5380	0.1	500	4VL560MD12
	1200	8 x 11.9	12	4700	0.1	960	4VL1200MD12
	1500	8 x 11.9	12	4700	0.1	1200	4VL1500MD12
6.3	100	5 x 5.9	25	2150	0.1	300	6VL100MB6
	120	5 x 5.9	21	2660	0.1	300	6VL120MB6
	220	6.3 x 5.9	15	3160	0.1	300	6VL220MC6
	330	6.3 x 5.9	17	3390	0.1	415	6VL330MC6
	390	8 x 6.9	22	3220	0.1	491	6VL390MD7
	820	8 x 11.9	12	4700	0.1	1033	6VL820MD12
	1500	8 x 11.9	11	5000	0.1	1800	6VL1500MD12
	2200	10 x 12.6	11	5500	0.1	2640	6VL2200ME12
10	47	5 x 5.9	40	1270	0.1	300	10VL47MB6
	68	5 x 5.9	28	2540	0.1	300	10VL68MB6
	100	5 x 5.9	30	2540	0.1	300	10VL100MB6
	120	6.3 x 5.9	22	2600	0.1	300	10VL120MC6
	150	6.3 x 5.9	22	2600	0.1	300	10VL150MC6
	220	6.3 x 5.9	22	2600	0.1	440	10VL220MC6
	270	8 x 6.9	22	2600	0.1	500	10VL270MD7
	1000	8 x 11.9	15	4000	0.1	2000	10VL1000MD12
	1000	10 x 12.6	13	4800	0.1	2000	10VL1000ME12
	1500	10 x 12.6	13	4900	0.1	3000	10VL1500ME12
16	39	5 x 5.9	27	2350	0.1	300	16VL39MB6
	68	6.3 x 5.9	25	2440	0.1	300	16VL68MC6
	82	6.3 x 5.9	25	2490	0.1	300	16VL82MC6
	100	6.3 x 5.9	24	2490	0.1	300	16VL100MC6
	120	8 x 6.9	27	2900	0.1	500	16VL120MD7
	150	8 x 6.9	22	3220	0.1	500	16VL150MD7
	270	8 x 11.9	16	4070	0.1	864	16VL270MD12
	330	8 x 11.9	16	4070	0.1	1056	16VL330MD12
	1000	10 x 12.6	10	6100	0.1	3200	16VL1000ME12

VSL

Surface mount type

series

- Low ESR, High ripple current
- Load life of 5,000h at 105°C

Specifications

Items	Characteristics	
Temperature range	-55 to +105°C	
Rated voltage range	2.5 to 25Vdc	
Capacitance range	6.8 to 1,500μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Tangent of loss angle	Less than or equal to the value of Standard Ratings (at 20°C, 120Hz)	
Leakage current	Less than or equal to the value of Standard Ratings (at 20°C, after 2 minutes)	
ESR	Less than or equal to the value of Standard Ratings	
Characteristics of impedance	$Z_{+105°C}/Z_{+20°C} \leq 1.25$, $Z_{-55°C}/Z_{+20°C} \leq 1.25$ at 100kHz	
Endurance	105°C, 5,000 hrs at rated voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Damp Heat (Steady State)	60°C, 90 to 95% RH, 1,000 hrs, No-applied Voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Resistance to soldering heat	VPS (230°C, 75s)	
	Appearance	No significant damage
	Capacitance change	Within±10% of the initial value
	Tangent of loss angle (tanδ)	≤130% of the initial specified value
	ESR(mΩ)	≤130% of the initial specified value
	Leakage current	≤The initial specified value

*In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C

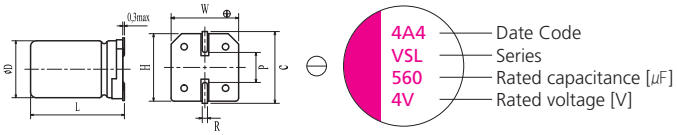
Size List

(unit: mm)

μF \ RV (SV)	2.5 (2.9)	4 (4.6)	6.3 (7.2)	10 (11.5)	16 (18.4)	20 (23.0)	25 (28.7)
6.8							6.3×5.9
10						5×5.9	8×6.9
15					5×5.9		
22					5×5.9	6.3×5.9	10×7.9
27						6.3×5.9	
33				5×5.9		8×6.9	8×11.9
39		5×5.9			6.3×5.9		
47			5×5.9	6.3×5.9	6.3×5.9	8×6.9	
56				6.3×5.9	8×6.9	10×7.9	10×12.6
68		5×5.9				10×7.9	
82			6.3×5.9		8×6.9		
100			6.3×5.9		10×7.9	8×11.9	8×11.9
120			6.3×5.9	8×6.9			
150		6.3×5.9		8×6.9 10×7.9	10×7.9	10×12.6	10×12.6
180					8×11.9 10×7.9		
220	6.3×5.9		8×6.9 10×7.9				
270				10×7.9			
330		8×6.9	10×7.9	8×11.9 10×7.9	10×12.6		
470	8×6.9		8×11.9 10×7.9			10×12.6	
560		8×11.9		10×12.6			
680	8×11.9	10×7.9					
820			10×12.6				
1000			10×12.6				
1200		10×12.6					
1500	10×12.6						

RV: Rated Voltage [V] SV: Surge Voltage [V] (at room temperature)

Marking and Dimensions

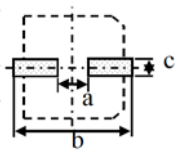


(unit: mm)

Size	ØD±0.5	L +0.1 -0.4	W±0.2	H±0.2	C±0.2	R	P±0.2
5×5.9	5.0	5.9	5.3	5.3	6.0	0.6~0.8	1.4
6.3×5.9	6.3	5.9	6.6	6.6	7.3	0.6~0.8	2.1
8×6.9	8.0	6.9	8.3	8.3	9.0	0.6~0.8	3.2
10×7.9	10.0	7.9	10.3	10.3	11.0	0.6~0.8	4.6
8×11.9	8.0	11.9	8.3	8.3	9.0	0.8~1.1	3.2
10×12.6	10.0	12.6	10.3	10.3	11.0	0.8~1.1	4.6

Recommended Land Pattern Dimension of PCB

(unit: mm)



Size	a	b	c
5×5.9	1.4	7.4	1.6
6.3×5.9	2.1	9.1	1.6
8×6.9	2.8	11.1	1.9
10×7.9	4.3	13.1	1.9
8×11.9	2.8	11.1	1.9
10×12.6	4.3	13.1	1.9

Standard Ratings

Rated Voltage [Vdc]	Rated Capacitance [µF]	Size ØD x L [mm]	ESR (20°C, 100kHz) [mΩ] [max.]	Rated Ripple Current (105°C, 100kHz) [mArms]	Tangent of Loss Angel [max]	Leakage Current [µA, max]	Part Number
2.5	220	6.3 x 5.9	23	2390	0.1	110	2VSL220MC6
	470	8 x 6.9	23	3300	0.1	235	2VSL470MD7
	680	8 x 11.9	13	4520	0.1	340	2VSL680MD12
	1500	10 x 12.6	12	5440	0.1	750	2VSL1500ME12
4	39	5 x 5.9	70	1100	0.1	78	4VSL39MB6
	68	5 x 5.9	60	1400	0.1	136	4VSL68MB6
	150	6.3 x 5.9	40	1810	0.1	120	4VSL150MC6
	330	8 x 6.9	35	2560	0.1	264	4VSL330MD7
	560	8 x 11.9	13	4520	0.1	448	4VSL560MD12
	680	10 x 7.9	25	3700	0.1	544	4VSL680ME8
	1200	10 x 12.6	12	5440	0.1	960	4VSL1200ME12
6.3	47	5 x 5.9	70	1100	0.1	148	6VSL47MB6
	82	6.3 x 5.9	45	1700	0.1	103	6VSL82MC6
	100	6.3 x 5.9	40	1810	0.1	126	6VSL100MC6
	120	6.3 x 5.9	40	1810	0.1	151	6VSL120MC6
	220	8 x 6.9	35	2560	0.1	277	6VSL220MD7
	220	10 x 7.9	25	3700	0.1	277	6VSL220ME8
	330	10 x 7.9	25	3700	0.1	416	6VSL330ME8
	470	10 x 7.9	25	3700	0.1	592	6VSL470ME8
	470	8 x 11.9	15	4210	0.1	592	6VSL470MD12
	820	10 x 12.6	12	5440	0.1	1033	6VSL820ME12
	1000	10 x 12.6	12	5440	0.1	1260	6VSL1000ME12
10	33	5 x 5.9	70	1100	0.1	165	10VSL33MB6
	47	6.3 x 5.9	50	1620	0.1	94	10VSL47MC6
	56	6.3 x 5.9	45	1700	0.1	112	10VSL56MC6
	120	8 x 6.9	35	2560	0.1	240	10VSL120MD7
	150	8 x 6.9	35	2560	0.1	300	10VSL150MD7
	150	10 x 7.9	30	3020	0.1	300	10VSL150ME8
	270	10 x 7.9	25	3700	0.1	540	10VSL270ME8
	330	8 x 11.9	17	3950	0.1	660	10VSL330MD12
	330	10 x 7.9	25	3700	0.1	660	10VSL330ME8
	560	10 x 12.6	13	5230	0.1	1120	10VSL560ME12
16	15	5 x 5.9	120	1020	0.1	120	10VSL15MB6
	22	5 x 5.9	90	1060	0.1	176	10VSL22MB6
	39	6.3 x 5.9	50	1620	0.1	125	16VSL39MC6
	47	6.3 x 5.9	50	1620	0.1	150	16VSL47MC6
	56	8 x 6.9	45	1890	0.1	179	16VSL56MD7
	82	8 x 6.9	40	2120	0.1	262	16VSL82MD7
	100	10 x 7.9	35	2670	0.1	320	16VSL100ME8
	150	10 x 7.9	30	3020	0.1	480	16VSL150ME8
	180	8 x 11.9	20	3640	0.1	576	16VSL180MD12
	180	10 x 7.9	30	3020	0.1	576	16VSL180ME8
	330	10 x 12.6	16	4720	0.1	1056	16VSL330ME12
	470	10 x 12.6	16	4720	0.1	1504	16VSL470ME12
20	10	5 x 5.9	120	1020	0.1	100	20VSL10MB6
	22	6.3 x 5.9	60	1450	0.1	88	20VSL22MC6
	27	6.3 x 5.9	60	1450	0.1	108	20VSL27MC6
	33	8 x 6.9	45	1890	0.1	132	20VSL33MD7
	47	8 x 6.9	45	1890	0.1	188	20VSL47MD7
	56	10 x 7.9	40	2400	0.1	224	20VSL56ME8
	68	10 x 7.9	40	2400	0.1	272	20VSL68ME8
	100	8 x 11.9	24	3320	0.1	400	20VSL100MD12
	150	10 x 12.6	20	4320	0.1	600	20VSL150ME12
25	6.8	6.3 x 5.9	80	1200	0.1	85	25VSL6R8MC6
	10	8 x 6.9	60	1500	0.1	125	25VSL10MD7
	22	10 x 7.9	50	2000	0.1	275	25VSL22ME8
	33	8 x 11.9	30	2980	0.1	413	25VSL33MD12
	56	10 x 12.6	28	3800	0.1	700	25VSL56ME12
	100	8 x 11.9	30	3320	0.1	500	25VSL100MD12
	150	10 x 12.6	25	3800	0.1	750	25VSL150ME12

VLL

Surface mount type

series

- Super low ESR, High ripple current
- Large capacitance, Small size
- Load life of 5,000h at 105°C

Specifications

Items	Characteristics	
Temperature range	-55 to +105°C	
Rated voltage range	2.5 to 16Vdc	
Capacitance range	39 to 2,700μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Tangent of loss angle	Less than or equal to the value of Standard Ratings (at 20°C, 120Hz)	
Leakage current	Less than or equal to the value of Standard Ratings (at 20°C, after 2 minutes)	
ESR	Less than or equal to the value of Standard Ratings	
Characteristics of impedance	$Z_{+105°C}/Z_{+20°C} \leq 1.25$, $Z_{-55°C}/Z_{+20°C} \leq 1.25$ at 100kHz	
Endurance	105°C, 5,000 hrs at rated voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Damp Heat (Steady State)	60°C, 90 to 95% RH, 1,000 hrs, No-applied Voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Resistance to soldering heat	VPS (230°C, 75s)	
	Appearance	No significant damage
	Capacitance change	Within±10% of the initial value
	Tangent of loss angle (tanδ)	≤130% of the initial specified value
	ESR(mΩ)	≤130% of the initial specified value
	Leakage current	≤The initial specified value

*In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C

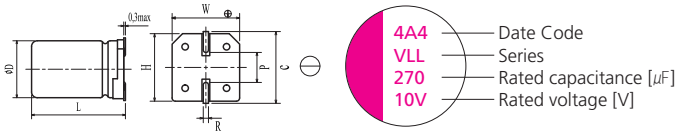
Size List

(unit: mm)

μF \ RV (SV)	2.5 (2.9)	4 (4.6)	6.3 (7.2)	10 (11.5)	16 (18.4)
39					5×5.9
47				5×5.9	
68				5×5.9	6.3×5.9
82					6.3×5.9
100			5×5.9	5×5.9	6.3×5.9
120			5×5.9	6.3×5.9	8×6.9
150		5×5.9		6.3×5.9	8×6.9
180	5×5.9				
220			6.3×5.9	6.3×5.9	
270				8×6.9	8×11.9
330		6.3×5.9	6.3×5.9		8×11.9
390	6.3×5.9		8×6.9		
560	6.3×5.9	8×6.9 8×11.9			
680	8×6.9				
820	8×11.9		8×11.9		
1000	8×11.9			8×11.9 10×12.6	10×12.6
1200		8×11.9			
1500	8×11.9	8×11.9	8×11.9	10×12.6	
2200			10×12.6		
2700	10×12.6				

RV: Rated Voltage [V] SV: Surge Voltage [V] (at room temperature)

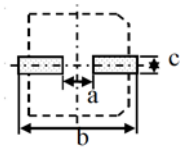
Marking and Dimensions



(unit: mm)

Size	ØD±0.5	L +0.1 -0.4	W±0.2	H±0.2	C±0.2	R	P±0.2
5×5.9	5.0	5.9	5.3	5.3	6.0	0.6~0.8	1.4
6.3×5.9	6.3	5.9	6.6	6.6	7.3	0.6~0.8	2.1
8×6.9	8.0	6.9	8.3	8.3	9.0	0.6~0.8	3.2
8×11.9	8.0	11.9	8.3	8.3	9.0	0.8~1.1	3.2
10×12.6	10.0	12.6	10.3	10.3	11.0	0.6~0.8	4.6

Recommended Land Pattern Dimension of PCB



(unit: mm)

Size	a	b	c
5×5.9	1.4	7.4	1.6
6.3×5.9	2.1	9.1	1.6
8×6.9	2.8	11.1	1.9
8×11.9	2.8	11.1	1.9
10×12.6	4.3	13.1	1.9

• Standard Ratings

Rated Voltage [Vdc]	Rated Capacitance [µF]	Size ØD x L [mm]	ESR (20°C, 100kHz) [mΩ] [max.]	Rated Ripple Current (105°C, 100kHz) [mArms]	Tangent of Loss Angel [max]	Leakage Current [µA, max]	Part Number
2.5	180	5 x 5.9	19	2800	0.1	300	2VLL180MB6
	390	6.3 x 5.9	15	3160	0.1	300	2VLL390MC6
	560	6.3 x 5.9	16	3500	0.1	300	2VLL560MC6
	680	8 x 6.9	20	3370	0.1	500	2VLL680MD7
	820	8 x 11.9	9	5380	0.1	500	2VLL820MD12
	1000	8 x 11.9	10	5380	0.1	500	2VLL1000MD12
	1500	8 x 11.9	10	5150	0.1	750	2VLL1500MD12
	2700	10 x 12.6	12	5070	0.1	1350	2VLL2700ME12
4	150	5 x 5.9	20	2730	0.1	300	4VLL150MB6
	330	6.3 x 5.9	15	3160	0.1	300	4VLL330MC6
	560	8 x 6.9	22	3220	0.1	500	4VLL560MD7
	560	8 x 11.9	9	5380	0.1	500	4VLL560MD12
	1200	8 x 11.9	12	4700	0.1	960	4VLL1200MD12
	1500	8 x 11.9	12	4700	0.1	1200	4VLL1500MD12
6.3	100	5 x 5.9	25	2150	0.1	300	6VLL100MB6
	120	5 x 5.9	21	2660	0.1	300	6VLL120MB6
	220	6.3 x 5.9	15	3160	0.1	300	6VLL220MC6
	330	6.3 x 5.9	17	3390	0.1	415	6VLL330MC6
	390	8 x 6.9	22	3220	0.1	491	6VLL390MD7
	820	8 x 11.9	12	4700	0.1	1033	6VLL820MD12
10	68	5 x 5.9	28	2540	0.1	300	10VLL68MB6
	120	6.3 x 5.9	22	2600	0.1	300	10VLL120MC6
	150	6.3 x 5.9	22	2600	0.1	300	10VLL150MC6
	270	8 x 6.9	22	3220	0.10	500	10VLL270MD7
	1000	8 x 11.9	15	4000	0.10	2000	10VLL1000MD12
	1000	10 x 12.6	13	4800	0.10	2000	10VLL1000ME12
	1500	10 x 12.6	13	4900	0.10	3000	10VLL1500ME12
16	39	5 x 5.9	27	2350	0.1	300	16VLL39MB6
	68	6.3 x 5.9	25	2440	0.1	300	16VLL68MC6
	82	6.3 x 5.9	25	2490	0.1	300	16VLL82MC6
	100	6.3 x 5.9	24	2490	0.1	300	16VLL100MC6
	120	8 x 6.9	27	2900	0.1	500	16VLL120MD7
	150	8 x 6.9	22	3220	0.1	500	16VLL150MD7
	270	8 x 11.9	16	4070	0.1	864	16VLL270MD12
	330	8 x 11.9	16	4070	0.1	1056	16VLL330MD12
	1000	10 x 12.6	10	6100	0.10	3200	16VLL1000ME12

VSH

Surface mount type

series

- Higher temperature endurance guaranteed than VS series
- Low ESR, High ripple current
- Load life of 1,000h at 125°C

LEAD FREE

Halogen Less

RoHS COMPLIANT

• Specifications

Items	Characteristics	
Temperature range	-55 to +125°C	
Rated voltage range	2.5 to 25Vdc	
Capacitance range	6.8 to 1,500μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Tangent of loss angle	Less than or equal to the value of Standard Ratings (at 20°C, 120Hz)	
Leakage current	Less than or equal to the value of Standard Ratings (at 20°C, after 2 minutes)	
ESR	Less than or equal to the value of Standard Ratings	
Characteristics of impedance	$Z_{+125°C}/Z_{+20°C} \leq 1.25$, $Z_{-55°C}/Z_{+20°C} \leq 1.25$ at 100kHz	
Endurance	125°C, 1,000 hrs at rated voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Damp Heat (Steady State)	60°C, 90 to 95% RH, 1,000 hrs, No-applied Voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Resistance to soldering heat	VPS (230°C, 75s)	
	Appearance	No significant damage
	Capacitance change	Within±10% of the initial value
	Tangent of loss angle (tanδ)	≤130% of the initial specified value
	ESR(mΩ)	≤130% of the initial specified value
	Leakage current	≤The initial specified value

*In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 125°C

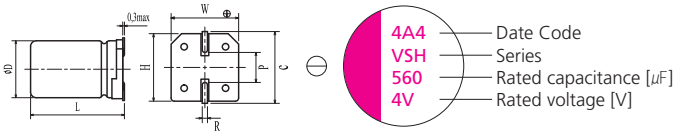
• Size List

(unit: mm)

RV (SV) / μF	2.5 (2.9)	4 (4.6)	6.3 (7.2)	10 (11.5)	16 (18.4)	20 (23.0)	25 (28.7)
6.8							6.3×5.9
10						5×5.9	8×6.9
15					5×5.9		
22					5×5.9	6.3×5.9	10×7.9
27						6.3×5.9	
33				5×5.9		8×6.9	8×11.9
39		5×5.9			6.3×5.9		
47			5×5.9	6.3×5.9	6.3×5.9	8×6.9	
56				6.3×5.9	8×6.9	10×7.9	10×12.6
68		5×5.9				10×7.9	
82			6.3×5.9		8×6.9		
100			6.3×5.9		10×7.9	8×11.9	8×11.9
120			6.3×5.9	8×6.9			
150		6.3×5.9		8×6.9 10×7.9	10×7.9	10×12.6	10×12.6
180					8×11.9 10×7.9		
220	6.3×5.9		8×6.9 10×7.9				
270				10×7.9			
330			8×6.9	10×7.9	8×11.9 10×7.9	10×12.6	
470	8×6.9		8×11.9 10×7.9			10×12.6	
560		8×11.9		10×12.6			
680	8×11.9	10×7.9					
820			10×12.6				
1000			10×12.6				
1200		10×12.6					
1500	10×12.6						

RV: Rated Voltage [V] SV: Surge Voltage [V] (at room temperature)

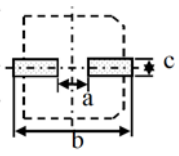
• Marking and Dimensions



(unit: mm)

Size	ØD±0.5	L +0.1 -0.4	W±0.2	H±0.2	C±0.2	R	P±0.2
5×5.9	5.0	5.9	5.3	5.3	6.0	0.6~0.8	1.4
6.3×5.9	6.3	5.9	6.6	6.6	7.3	0.6~0.8	2.1
8×6.9	8.0	6.9	8.3	8.3	9.0	0.6~0.8	3.2
10×7.9	10.0	7.9	10.3	10.3	11.0	0.6~0.8	4.6
8×11.9	8.0	11.9	8.3	8.3	9.0	0.8~1.1	3.2
10×12.6	10.0	12.6	10.3	10.3	11.0	0.8~1.1	4.6

• Recommended Land Pattern Dimension of PCB



(unit: mm)

Size	a	b	c
5×5.9	1.4	7.4	1.6
6.3×5.9	2.1	9.1	1.6
8×6.9	2.8	11.1	1.9
10×7.9	4.3	13.1	1.9
8×11.9	2.8	11.1	1.9
10×12.6	4.3	13.1	1.9

• Standard Ratings

Rated Voltage [Vdc]	Rated Capacitance [μF]	Size ØD x L [mm]	ESR (20°C, 100kHz) [mΩ] [max.]	Rated Ripple Current (100kHz)[mArms]		Tangent of Loss Angel [max]	Leakage Current [μA, max]	Part Number
				-55 to +105°C	+105 to +125°C			
2.5	220	6.3 x 5.9	23	2390	756	0.10	110	2VSH220MC6
	470	8 x 6.9	23	3300	1044	0.10	235	2VSH470MD7
	680	8 x 11.9	13	4520	1430	0.10	340	2VSH680MD12
	1500	10 x 12.6	12	5440	1721	0.10	750	2VSH1500ME12
4	39	5 x 5.9	70	1100	348	0.10	78	4VSH39MB6
	68	5 x 5.9	60	1400	443	0.10	136	4VSH68MB6
	150	6.3 x 5.9	40	1810	572	0.10	120	4VSH150MC6
	330	8 x 6.9	35	2560	810	0.10	264	4VSH330MD7
	560	8 x 11.9	13	4520	1430	0.10	448	4VSH560MD12
	680	10 x 7.9	25	3700	1170	0.10	544	4VSH680ME8
	1200	10 x 12.6	12	5440	1721	0.10	960	4VSH1200ME12
6.3	47	5 x 5.9	70	1100	348	0.10	148	6VSH47MB6
	82	6.3 x 5.9	45	1700	537	0.10	103	6VSH82MC6
	100	6.3 x 5.9	40	1810	572	0.10	126	6VSH100MC6
	120	6.3 x 5.9	40	1810	572	0.10	151	6VSH120MC6
	220	8 x 6.9	35	2560	810	0.10	277	6VSH220MD7
	220	10 x 7.9	25	3700	1170	0.10	277	6VSH220ME8
	330	10 x 7.9	25	3700	1170	0.10	416	6VSH330ME8
	470	10 x 7.9	25	3700	1170	0.10	592	6VSH470ME8
	470	8 x 11.9	15	4210	1332	0.10	592	6VSH470MD12
	820	10 x 12.6	12	5440	1721	0.10	1033	6VSH820ME12
	1000	10 x 12.6	12	5440	1721	0.10	1260	6VSH1000ME12
10	33	5 x 5.9	70	1100	348	0.10	165	10VSH33MB6
	47	6.3 x 5.9	50	1620	512	0.10	94	10VSH47MC6
	56	6.3 x 5.9	45	1700	537	0.10	112	10VSH56MC6
	120	8 x 6.9	35	2560	810	0.10	240	10VSH120MD7
	150	8 x 6.9	35	2560	810	0.10	300	10VSH150MD7
	150	10 x 7.9	30	3020	955	0.10	300	10VSH150ME8
	270	10 x 7.9	25	3700	1170	0.10	540	10VSH270ME8
	330	8 x 11.9	17	3950	1250	0.10	660	10VSH330MD12
	330	10 x 7.9	25	3700	1170	0.10	660	10VSH330ME8
	560	10 x 12.6	13	5230	1655	0.10	1120	10VSH560ME12
16	15	5 x 5.9	120	1020	322	0.10	120	16VSH15MB6
	22	5 x 5.9	90	1060	335	0.10	176	16VSH22MB6
	39	6.3 x 5.9	50	1620	512	0.10	125	16VSH39MC6
	47	6.3 x 5.9	50	1620	512	0.10	150	16VSH47MC6
	56	8 x 6.9	45	1890	598	0.10	179	16VSH56MD7
	82	8 x 6.9	40	2120	670	0.10	262	16VSH82MD7
	100	10 x 7.9	35	2670	845	0.10	320	16VSH100ME8
	150	10 x 7.9	30	3020	955	0.10	480	16VSH150ME8
	180	8 x 11.9	20	3640	1151	0.10	576	16VSH180MD12
	180	10 x 7.9	30	3020	955	0.10	576	16VSH180ME8
	330	10 x 12.6	16	4720	1493	0.10	1056	16VSH330ME12
	470	10 x 12.6	16	4720	1493	0.10	1504	16VSH470ME12
20	10	5 x 5.9	120	1020	322	0.10	100	20VSH10MB6
	22	6.3 x 5.9	60	1450	458	0.10	88	20VSH22MC6
	27	6.3 x 5.9	60	1450	458	0.10	108	20VSH27MC6
	33	8 x 6.9	45	1890	598	0.10	132	20VSH33MD7
	47	8 x 6.9	45	1890	598	0.10	188	20VSH47MD7
	56	10 x 7.9	40	2400	759	0.10	224	20VSH56ME8
	68	10 x 7.9	40	2400	759	0.10	272	20VSH68ME8
	100	8 x 11.9	24	3320	1050	0.10	400	20VSH100MD12
	150	10 x 12.6	20	4320	1367	0.10	600	20VSH150ME12
25	6.8	6.3 x 5.9	80	1200	377	0.10	85	25VSH6R8MC6
	10	8 x 6.9	60	1500	471	0.10	125	25VSH10MD7
	22	10 x 7.9	50	2000	632	0.10	275	25VSH22ME8
	33	8 x 11.9	30	2980	943	0.10	413	25VSH33MD12
	56	10 x 12.6	28	3800	1202	0.10	700	25VSH56ME12
	100	8 x 11.9	30	3320	1050	0.10	500	25VSH100MD12
	150	10 x 12.6	25	4320	1367	0.10	750	25VSH150ME12

VLH

Surface mount type

series

- Higher temperature endurance guaranteed than VL series
- Super low ESR, High ripple current
- Large capacitance, Small size
- Load life of 1,000h at 125°C

LEAD FREE

Halogen Less

RoHS COMPLIANT

Specifications

Items	Characteristics	
Temperature range	-55 to +125°C	
Rated voltage range	2.5 to 16Vdc	
Capacitance range	39 to 2,700μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Tangent of loss angle	Less than or equal to the value of Standard Ratings (at 20°C, 120Hz)	
Leakage current	Less than or equal to the value of Standard Ratings (at 20°C, after 2 minutes)	
ESR	Less than or equal to the value of Standard Ratings	
Characteristics of impedance	$Z_{+125°C}/Z_{+20°C} \leq 1.25$, $Z_{-55°C}/Z_{+20°C} \leq 1.25$ at 100kHz	
Endurance	125°C, 1,000 hrs at rated voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Damp Heat (Steady State)	60°C, 90 to 95% RH, 1,000 hrs, No-applied Voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Resistance to soldering heat	VPS (230°C, 75s)	
	Appearance	No significant damage
	Capacitance change	Within±10% of the initial value
	Tangent of loss angle (tanδ)	≤130% of the initial specified value
	ESR(mΩ)	≤130% of the initial specified value
	Leakage current	≤The initial specified value

*In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 125°C

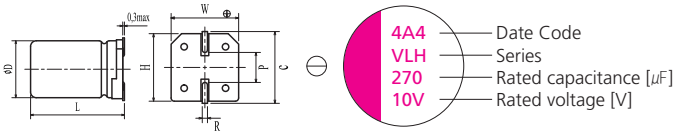
Size List

(unit: mm)

RV (SV) / μF	2.5 (2.9)	4 (4.6)	6.3 (7.2)	10 (11.5)	16 (18.4)
39					5×5.9
68				5×5.9	6.3×5.9
82					6.3×5.9
100			5×5.9		6.3×5.9
120			5×5.9	6.3×5.9	8×6.9
150		5×5.9		6.3×5.9	8×6.9
180	5×5.9				
220			6.3×5.9		
270				8×6.9	8×11.9
330		6.3×5.9	6.3×5.9		8×11.9
390	6.3×5.9		8×6.9		
560	6.3×5.9	8×6.9 8×11.9			
680	8×6.9				
820	8×11.9		8×11.9		
1000	8×11.9				
1200		8×11.9			
1500	8×11.9	8×11.9			
2700	10×12.6				

RV: Rated Voltage [V] SV: Surge Voltage [V] (at room temperature)

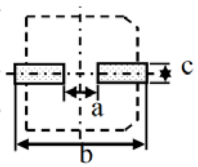
Marking and Dimensions



(unit: mm)

Size	ØD±0.5	L +0.1 -0.4	W±0.2	H±0.2	C±0.2	R	P±0.2
5×5.9	5.0	5.9	5.3	5.3	6.0	0.6 to 0.8	1.4
6.3×5.9	6.3	5.9	6.6	6.6	7.3	0.6 to 0.8	2.1
8×6.9	8.0	6.9	8.3	8.3	9.0	0.6 to 0.8	3.2
8×11.9	8.0	11.9	8.3	8.3	9.0	0.8 to 1.1	3.2
10×12.6	10.0	12.6	10.3	10.3	11.0	0.8 to 1.1	4.6

Recommended Land Pattern Dimension of PCB



(unit: mm)

Size	a	b	c
5×5.9	1.4	7.4	1.6
6.3×5.9	2.1	9.1	1.6
8×6.9	2.8	11.1	1.9
8×11.9	2.8	11.1	1.9
10×12.6	4.3	13.1	1.9

• Standard Ratings

Rated Voltage [Vdc]	Rated Capacitance [μF]	Size ØD x L [mm]	ESR (20°C, 100kHz) [mΩ] [max.]	Rated Ripple Current (100kHz)[mArms]		Tangent of Loss Angel [max]	Leakage Current [μA, max]	Part Number
				-55 to +105°C	+105 to +125°C			
2.5	180	5 x 5.9	19	2800	886	0.1	300	2VLH180MB6
	390	6.3 x 5.9	15	3160	1000	0.1	300	2VLH390MC6
	560	6.3 x 5.9	16	3500	1107	0.1	300	2VLH560MC6
	680	8 x 6.9	20	3370	1066	0.1	500	2VLH680MD7
	820	8 x 11.9	9	5380	1702	0.1	500	2VLH820MD12
	1000	8 x 11.9	10	5380	1702	0.1	500	2VLH1000MD12
	1500	8 x 11.9	10	5150	1630	0.1	750	2VLH1500MD12
	2700	10 x 12.6	12	5070	1604	0.1	1350	2VLH2700ME12
4	150	5 x 5.9	20	2730	864	0.1	300	4VLH150MB6
	330	6.3 x 5.9	15	3160	1000	0.1	300	4VLH330MC6
	560	8 x 6.9	22	3220	1019	0.1	500	4VLH560MD7
	560	8 x 11.9	9	5380	1702	0.1	500	4VLH560MD12
	1200	8 x 11.9	12	4700	1487	0.1	960	4VLH1200MD12
	1500	8 x 11.9	12	4700	1487	0.1	1200	4VLH1500MD12
6.3	100	5 x 5.9	25	2150	680	0.1	300	6VLH100MB6
	120	5 x 5.9	21	2660	841	0.1	300	6VLH120MB6
	220	6.3 x 5.9	15	3160	841	0.1	300	6VLH220MC6
	330	6.3 x 5.9	17	3390	1073	0.1	415	6VLH330MC6
	390	8 x 6.9	22	3220	1019	0.1	491	6VLH390MD7
	820	8 x 11.9	12	4700	1487	0.1	1033	6VLH820MD12
10	68	5 x 5.9	28	2540	804	0.1	300	10VLH68MB6
	120	6.3 x 5.9	22	2600	823	0.1	300	10VLH120MC6
	150	6.3 x 5.9	22	2600	823	0.1	300	10VLH150MC6
	270	8 x 6.9	22	2600	1019	0.1	500	10VLH270MD7
16	39	5 x 5.9	27	2350	743	0.1	300	16VLH39MB6
	68	6.3 x 5.9	25	2440	772	0.1	300	16VLH68MC6
	82	6.3 x 5.9	25	2490	788	0.1	300	16VLH82MC6
	100	6.3 x 5.9	24	2490	788	0.1	300	16VLH100MC6
	120	8 x 6.9	27	2900	917	0.1	500	16VLH120MD7
	150	8 x 6.9	22	3220	1019	0.1	500	16VLH150MD7
	270	8 x 11.9	16	4070	1288	0.1	864	16VLH270MD12
	330	8 x 11.9	16	4070	1288	0.1	1056	16VLH330MD12

VU

Surface mount type

series

- Lower ESR than VL series
- High ripple current
- Load life of 2,000h at 105°C

Specifications

Items	Characteristics	
Temperature range	-55 to +105°C	
Rated voltage range	2.5 to 16Vdc	
Capacitance range	30 to 560μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Tangent of loss angle	Less than or equal to the value of Standard Ratings (at 20°C, 120Hz)	
Leakage current	Less than or equal to the value of Standard Ratings (at 20°C, after 2 minutes)	
ESR	Less than or equal to the value of Standard Ratings	
Characteristics of impedance	$Z_{+105°C}/Z_{+20°C} \leq 1.25$, $Z_{-55°C}/Z_{+20°C} \leq 1.25$ at 100kHz	
Endurance	105°C, 2,000 hrs at rated voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Damp Heat (Steady State)	60°C, 90 to 95% RH, 1,000 hrs, No-applied Voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Resistance to soldering heat	VPS (230°C, 75s)	
	Appearance	No significant damage
	Capacitance change	Within±10% of the initial value
	Tangent of loss angle (tanδ)	≤130% of the initial specified value
	ESR(mΩ)	≤130% of the initial specified value
	Leakage current	≤The initial specified value

*In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C

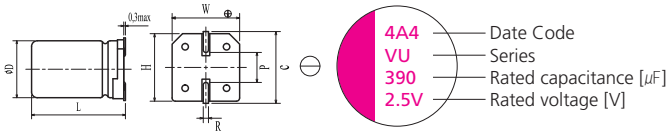
Size List

(unit: mm)

RV (SV) / μF	2.5 (2.9)	4 (4.6)	6.3 (7.2)	10 (11.5)	16 (18.4)
150			5×5.9		
180			5×5.9		6.3×9.9
220			6.3×5.9		
270	5×5.9				
330	5×5.9	6.3×5.9			
390	6.3×5.9				
470					
560	6.3×5.9				

RV: Rated Voltage [V] SV: Surge Voltage [V] (at room temperature)

Marking and Dimensions

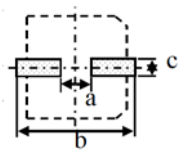


(unit: mm)

Size	ØD±0.5	L +0.1 -0.4	W±0.2	H±0.2	C±0.2	R	P±0.2
5×5.9	5.0	5.9	5.3	5.3	6.0	0.6~0.8	1.4
6.3×5.9	6.3	5.9	6.6	6.6	7.3	0.6~0.8	2.1
6.3×9.9	6.3	9.9	6.6	6.6	7.3	0.6~0.8	2.1
10×12.6	10.0	12.6	10.3	10.3	11.0	0.8~0.11	4.6

Recommended Land Pattern Dimension of PCB

(unit: mm)



Size	a	b	c
5×5.9	1.4	7.4	1.6
6.3×5.9	2.1	9.1	1.6
6.3×9.9	2.1	9.1	1.6
10×12.6	4.3	13.1	1.9

• Standard Ratings

Rated Voltage [Vdc]	Rated Capacitance [μF]	Size ØD x L [mm]	ESR (20°C, 100kHz) [mΩ] [max.]	Rated Ripple Current (105°C, 100kHz) [mArms]	Tangent of Loss Angel [max]	Leakage Current [μA, max]	Part Number
2.5	270	5.0 x 5.9	10	3860	0.12	500	2VU270MB6
	330	5.0 x 5.9	10	3860	0.12	500	2VU330MB6
	390	5.0 x 5.9	10	3860	0.12	700	2VU390MB6
	390	6.3 x 5.9	10	3900	0.12	500	2VU390MC6
	560	6.3 x 5.9	10	3900	0.12	500	2VU560MC6
4	30	6.3 x 5.9	10	3900	0.12	500	4VU330MC6
6.3	150	5.0 x 5.9	12	3520	0.12	500	6VU150MB6
	180	5.0 x 5.9	15	3150	0.12	500	6VU180MB6
	220	6.3 x 5.9	10	3900	0.12	500	6VU220MC6
16	180	6.3 x 9.9	11	4460	0.12	576	16VU180MC10
	470	10 x 12.6	10	6100	0.12	1504	16VU470ME12

VHV

Surface mount type

series

- High Rated Voltage, High Capacitance
- Low ESR, High ripple current
- Load life of 5,000h at 105°C

Specifications

Items	Characteristics	
Temperature range	-55 to +105°C	
Rated voltage range	16 to 50Vdc	
Capacitance range	10 to 1,500μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Tangent of loss angle	Less than or equal to the value of Standard Ratings (at 20°C, 120Hz)	
Leakage current	Less than or equal to the value of Standard Ratings (at 20°C, after 2 minutes)	
ESR	Less than or equal to the value of Standard Ratings	
Characteristics of impedance	$Z_{+1025°C}/Z_{+20°C} \leq 1.25$, $Z_{-55°C}/Z_{+20°C} \leq 1.25$ at 100kHz	
Endurance	105°C, 5,000 hrs at rated voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Damp Heat (Steady State)	60°C, 90 to 95% RH, 1,000 hrs, No-applied Voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Resistance to soldering heat	VPS (230°C, 75s)	
	Appearance	No significant damage
	Capacitance change	Within±10% of the initial value
	Tangent of loss angle (tanδ)	≤130% of the initial specified value
	ESR(mΩ)	≤130% of the initial specified value
	Leakage current	≤The initial specified value

*In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C

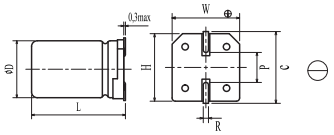
Size List

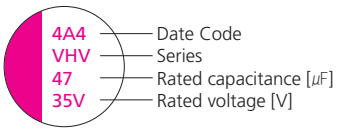
(unit: mm)

RV (SV) / μF	16 (18.4)	20 (23)	25 (28.7)	32 (36.8)	35 (40.2)	50 (57.5)
10						6.3×5.9
18						8×6.9
22				6.3×5.9	6.3×5.9	8×6.9
27			5×5.9			
33						
39					8×6.9	8×11.9
47			6.3×5.9		6.3×5.9 8×6.9	8×11.9
56		5×5.9	6.3×5.9			8×11.9
68				8×6.9		10×12.6
82	5×5.9		8×6.9		8×11.9	
100			8×6.9			8×11.9 10×12.6
120		6.3×5.9		8×11.9	10×12.6	8×11.9
150					10×12.6	
180	6.3×5.9	8×6.9	8×11.9		10×12.6	
220			8×11.9	10×12.6	10×12.6	10×12.6
270	8×6.9				8×11.9	
330			10×12.6		10×12.6	
390		8×11.9				
470			10×12.6		10×12.6	
560	8×11.9	10×12.6	10×12.6			
1000	10×12.6					
1500	10×12.6					

RV: Rated Voltage [V] SV: Surge Voltage [V] (at room temperature)

Marking and Dimensions

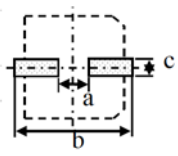




(unit: mm)

Size	ØD±0.5	L +0.1 -0.4	W±0.2	H±0.2	C±0.2	R	P±0.2
5×5.9	5.0	5.9	5.3	5.3	6.0	0.6~0.8	1.4
6.3×5.9	6.3	5.9	6.6	6.6	7.3	0.6~0.8	2.1
8×6.9	8.0	6.9	8.3	8.3	9.0	0.6~0.8	3.2
8×11.9	8.0	11.9	8.3	8.3	9.0	0.8~1.1	3.2
10×12.6	10.0	12.6	10.3	10.3	11.0	0.6~0.8	4.6

Recommended Land Pattern Dimension of PCB



(unit: mm)

Size	a	b	c
5×5.9	1.4	7.4	1.6
6.3×5.9	2.1	9.1	1.6
8×6.9	2.8	11.1	1.9
8×11.9	2.8	11.1	1.9
10×12.6	4.3	13.1	1.9

• Standard Ratings

Rated Voltage [Vdc]	Rated Capacitance [µF]	Size ØD x L [mm]	ESR (20°C, 100kHz) [mΩ] [max.]	Rated Ripple Current (105°C, 100kHz) [mArms]	Tangent of Loss Angel [max]	Leakage Current [µA, max]	Part Number
16	82	5 x 5.9	27	3000	0.12	262	16VHV82MB6
	180	6.3 x 5.9	22	3300	0.12	576	16VHV180MC6
	270	8 x 6.9	22	3300	0.12	864	16VHV270MD7
	560	8 x 11.9	14	4950	0.12	1792	16VHV560MD12
	1000	10 x 12.6	12	5400	0.12	3200	16VHV1000ME12
	1500	10 x 12.6	12	5400	0.12	4800	16VHV1500ME12
20	56	5 x 5.9	30	2800	0.12	224	20VHV56MB6
	120	6.3 x 5.9	25	3200	0.12	480	20VHV120MC6
	180	8 x 6.9	25	3200	0.12	720	20VHV180MD7
	390	8 x 11.9	14	4950	0.12	1560	20VHV390MD12
	560	10 x 12.6	12	5400	0.12	2240	20VHV560ME12
25	27	5 x 5.9	40	2450	0.12	135	25VHV27MB6
	47	6.3 x 5.9	30	2800	0.12	235	25VHV47MC6
	56	6.3 x 5.9	30	2800	0.12	280	25VHV56MC6
	82	8 x 6.9	28	3000	0.12	410	25VHV82MD7
	100	8 x 6.9	25	3200	0.12	500	25VHV100MD7
	180	8 x 11.9	16	4650	0.12	900	25VHV180MD12
	220	8 x 11.9	16	4650	0.12	1100	20VHV220MD12
	330	10 x 12.6	14	5000	0.12	1650	25VHV330ME12
	470	10 x 12.6	14	5000	0.12	2350	25VHV470ME12
	560	10 x 12.6	14	5000	0.12	2800	25VHV560ME12
32	22	6.3 x 5.9	35	2700	0.12	141	32VHV22MC6
	68	8 x 6.9	25	3200	0.12	435	32VHV68MD7
	120	8 x 11.9	20	4000	0.12	768	32VHV120MD12
	220	10 x 12.6	18	4650	0.12	1408	32VHV220ME12
35	22	6.3 x 5.9	35	2600	0.12	154	35VHV22MC6
	39	8 x 6.9	30	2800	0.12	273	35VHV39MD7
	47	6.3 x 5.9	30	2800	0.12	329	35VHV47MC6
	47	8 x 6.9	30	2800	0.12	329	35VHV47MD7
	82	8 x 11.9	20	4000	0.12	574	35VHV82MD12
	100	8 x 11.9	20	4000	0.12	700	35VHV100MD12
	120	10 x 12.6	18	4400	0.12	840	35VHV120ME12
	150	10 x 12.6	18	4400	0.12	1050	35VHV150ME12
	220	10 x 12.6	18	4400	0.12	1260	35VHV220ME12
	270	8 x 11.9	20	4200	0.12	1890	35VHV270MD12
	330	10 x 12.6	17	4650	0.12	2310	35VHV330ME12
	470	10 x 12.6	17	4750	0.12	3290	35VHV470ME12
50	10	6.3 x 5.9	40	2500	0.12	100	50VHV10MC6
	18	8 x 6.9	35	2700	0.12	180	50VHV18MD7
	22	8 x 6.9	35	2700	0.12	220	50VHV22MD7
	39	8 x 11.9	25	3800	0.12	390	50VHV39MD12
	47	8 x 11.9	25	3800	0.12	470	50VHV47MD12
	56	8 x 11.9	25	3800	0.12	560	50VHV56MD12
	68	10 x 12.6	20	4300	0.12	680	50VHV68ME12
	100	8 x 11.9	25	3900	0.12	1000	50VHV100MD12
	100	10 x 12.6	20	4300	0.12	1000	50VHV100ME12
	120	8 x 11.9	25	3900	0.12	1200	50VHV120MD12
	220	10 x 12.6	20	4650	0.12	2200	50VHV220ME12

VUH

Surface mount type

series

- Ultra-High Voltage, High Capacitance
- Low ESR, High ripple current
- Load life of 3,000h at 105°C

Specifications

Items	Characteristics	
Temperature range	-55 to +105°C	
Rated voltage range	63 to 125Vdc	
Capacitance range	8.2 to 120μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Tangent of loss angle	Less than or equal to the value of Standard Ratings (at 20°C, 120Hz)	
Leakage current	Less than or equal to the value of Standard Ratings (at 20°C, after 2 minutes)	
ESR	Less than or equal to the value of Standard Ratings	
Characteristics of impedance	$Z_{+105°C}/Z_{+20°C} \leq 1.25$, $Z_{-55°C}/Z_{+20°C} \leq 1.25$ at 100kHz	
Endurance	105°C, 3,000 hrs at rated voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Damp Heat (Steady State)	60°C, 90 to 95% RH, 1,000 hrs, No-applied Voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Resistance to soldering heat	VPS (230°C, 75s)	
	Appearance	No significant damage
	Capacitance change	Within±10% of the initial value
	Tangent of loss angle (tanδ)	≤130% of the initial specified value
	ESR(mΩ)	≤130% of the initial specified value
	Leakage current	≤The initial specified value

*In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C

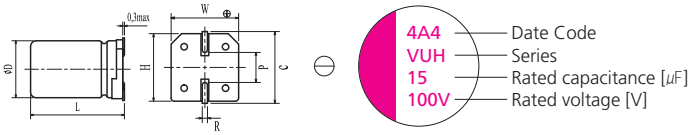
Size List

(unit: mm)

μF \ RV (SV)	63 (72.4)	80 (92)	100 (115)	125 (143)
8.2	6.3×5.9			
10	8×6.9		8×11.9	8×11.9
12		8×11.9		
15	8×6.9		8×11.9	8×11.9
18			10×12.6	
22		8×11.9 10×12.6	8×11.9 10×12.6	
27	8×11.9	10×12.6		
33	8×11.9		10×12.6	10×12.6
39	8×11.9		10×12.6	
47	10×12.6	8×11.9 10×12.6	10×12.6	
56	10×12.6			
68		10×12.6	10×12.6	
82		10×12.6		
120	10×12.6			

RV: Rated Voltage [V] SV: Surge Voltage [V] (at room temperature)

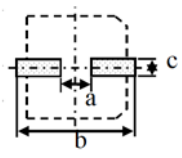
Marking and Dimensions



(unit: mm)

Size	ØD±0.5	L +0.1 -0.4	W±0.2	H±0.2	C±0.2	R	P±0.2
6.3×5.9	6.3	5.9	6.6	6.6	7.3	0.6~0.8	2.1
8×6.9	8.0	6.9	8.3	8.3	9.0	0.8~0.11	3.2
8×11.9	8.0	11.9	8.3	8.3	9.0	0.8~0.11	3.2
10×12.6	10.0	12.6	10.3	10.3	11.0	0.8~0.11	4.6

Recommended Land Pattern Dimension of PCB



(unit: mm)

Size	a	b	c
6.3×5.9	2.1	9.1	1.6
8×6.9	2.8	11.1	1.9
8×11.9	2.8	11.1	1.9
10×12.6	4.3	13.1	1.9

• Standard Ratings

Rated Voltage [Vdc]	Rated Capacitance [μF]	Size ØD x L [mm]	ESR (20°C, 100kHz) [mΩ] [max.]	Rated Ripple Current (105°C, 100kHz) [mArms]	Tangent of Loss Angel [max]	Leakage Current [μA, max]	Part Number
63	8.2	6.3 x 5.9	55	1200	0.12	103	63VUH8R2MB6
	10	8 x 6.9	50	1400	0.12	126	63VUH10MD7
	15	8 x 6.9	50	1500	0.12	189	63VUH15MD7
	27	8 x 11.9	35	2800	0.12	340	63VUH27MD12
	33	8 x 11.9	30	3000	0.12	416	63VUH33MD12
	39	8 x 11.9	29	3400	0.12	491	63VUH39MD12
	47	10 x 12.6	29	3300	0.12	592	63VUH47ME12
	56	10 x 12.6	28	3400	0.12	706	63VUH56ME12
	120	10 x 12.6	25	4000	0.12	1512	63VUH120ME12
80	12	8 x 11.9	38	1900	0.12	192	80VUH12MD12
	22	8 x 11.9	38	2000	0.12	352	80VUH22MD12
	22	10 x 12.6	35	2300	0.12	352	80VUH22ME12
	27	10 x 12.6	35	2400	0.12	432	80VUH27ME12
	47	8 x 11.9	35	2600	0.12	752	80VUH47MD12
	47	10 x 12.6	28	3000	0.12	752	80VUH47ME12
	68	10 x 12.6	30	3000	0.12	1088	80VUH68ME12
	82	10 x 12.6	30	3200	0.12	1312	80VUH86ME12
100	10	8 x 11.9	42	1800	0.12	200	100VUH10MD12
	15	8 x 11.9	40	2000	0.12	300	100VUH15MD12
	18	10 x 12.6	38	2200	0.12	360	100VUH18ME12
	22	8 x 11.9	40	2000	0.12	440	100VUH22MD12
	22	10 x 12.6	38	2300	0.12	440	100VUH22ME12
	33	10 x 12.6	36	2400	0.12	660	100VUH33ME12
	39	10 x 12.6	35	2500	0.12	780	100VUH39ME12
	47	10 x 12.6	35	2600	0.12	940	100VUH47ME12
	68	10 x 12.6	30	2800	0.12	1360	100VUH68ME12
125	10	8 x 11.9	50	1500	0.12	250	125VUH10MD12
	15	8 x 11.9	50	1800	0.12	375	125VUH15MD12
	33	10 x 12.6	40	2000	0.12	825	125VUH33ME12

VHH

Surface mount type

series

- High Reliability, High Voltage, High Capacitance
- Low ESR, High ripple current
- Load life of 3,000h at 125°C

Specifications

Items	Characteristics	
Temperature range	-55 to +125°C	
Rated voltage range	16 to 50Vdc	
Capacitance range	5.6 to 390μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Tangent of loss angle	Less than or equal to the value of Standard Ratings (at 20°C, 120Hz)	
Leakage current	Less than or equal to the value of Standard Ratings (at 20°C, after 2 minutes)	
ESR	Less than or equal to the value of Standard Ratings	
Characteristics of impedance	$Z_{+125°C}/Z_{+20°C} \leq 1.25$, $Z_{-55°C}/Z_{+20°C} \leq 1.25$ at 100kHz	
Endurance	125°C, 3,000 hrs at rated voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Damp Heat (Steady State)	60°C, 90 to 95% RH, 1,000 hrs, No-applied Voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Resistance to soldering heat	VPS (230°C, 75s)	
	Appearance	No significant damage
	Capacitance change	Within±10% of the initial value
	Tangent of loss angle (tanδ)	≤130% of the initial specified value
	ESR(mΩ)	≤130% of the initial specified value
	Leakage current	≤The initial specified value

*In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 125°C

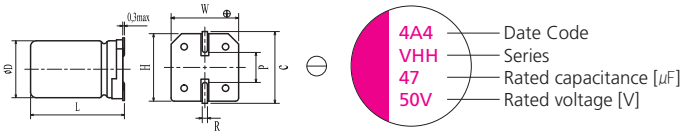
Size List

(unit: mm)

μF \ RV (SV)	16 (18.4)	20 (23)	25 (28.7)	35 (40.2)	50 (57.5)
5.6					6.3×5.9
10				6.3×5.9	8×6.9
18				8×6.9	
22			6.3×5.9		
27					8×11.9
33		6.3×5.9			
39			8×6.9		
47	6.3×5.9				10×12.6
56		8×6.9		8×6.9	
82	8×6.9				
100				10×12.6	
120			10×12.6		
150		8×11.9			
180			10×12.6		
220	8×11.9				
270		10×12.6			
330			10×12.6		
390	10×12.6				

RV: Rated Voltage [V] SV: Surge Voltage [V] (at room temperature)

Marking and Dimensions

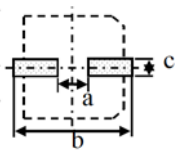


(unit: mm)

Size	ØD±0.5	L +0.1 -0.4	W±0.2	H±0.2	C±0.2	R	P±0.2
6.3×5.9	6.3	5.9	6.6	6.6	7.3	0.6 to 0.8	2.1
8×6.9	8.0	6.9	8.3	8.3	9.0	0.6 to 0.8	3.2
8×11.9	8.0	11.9	8.3	8.3	9.0	0.8 to 1.1	3.2
10×12.6	10.0	12.6	10.3	10.3	11.0	0.8 to 1.1	4.6

Recommended Land Pattern Dimension of PCB

(unit: mm)



Size	a	b	c
6.3×5.9	2.1	9.1	1.6
8×6.9	2.8	11.1	1.9
8×11.9	2.8	11.1	1.9
10×12.6	4.3	13.1	1.9

• Standard Ratings

Rated Voltage [Vdc]	Rated Capacitance [μF]	Size ØD x L [mm]	ESR (20°C, 100kHz) [mΩ] [max.]	Rated Ripple Current (100kHz)[mArms]		Tangent of Loss Angel [max]	Leakage Current [μA, max]	Part Number
				-55 to +105°C	+105 to +125°C			
16	47	6.3 x 5.9	50	1620	512	0.12	150	16VHH47MC6
	82	8 x 6.9	40	2120	670	0.12	262	16VHH82MD7
	220	8 x 11.9	20	3640	1151	0.12	704	16VHH220MD12
	390	10 x 12.6	16	4720	1493	0.12	1248	16VHH390ME12
20	33	6.3 x 5.9	60	1450	459	0.12	132	20VHH33MC6
	56	8 x 6.9	50	1890	598	0.12	224	20VHH56MD7
	150	8 x 11.9	28	3320	1050	0.12	600	20VHH150MD12
	270	10 x 12.6	25	4320	1367	0.12	1080	20VHH270ME12
25	22	6.3 x 5.9	60	1500	474	0.12	110	25VHH22MC6
	39	8 x 6.9	50	1835	580	0.12	195	25VHH39MD7
	120	8 x 11.9	28	2980	943	0.12	600	25VHH120MD12
	180	10 x 12.6	25	3800	1202	0.12	900	25VHH180ME12
	330	10 x 12.6	25	3800	1210	0.12	1650	25VHH330ME12
35	10	6.3 x 5.9	70	1100	340	0.12	70	35VHH10MC6
	18	8 x 6.9	60	1300	400	0.12	126	35VHH18MD7
	56	8 x 11.9	30	2300	700	0.12	392	35VHH56MD12
	100	10 x 12.6	28	3650	1150	0.12	700	35VHH100ME12
50	5.6	6.3 x 5.9	70	1000	310	0.12	56	50VHH5R6MC6
	10	8 x 6.9	60	1200	371	0.12	100	50VHH10MD7
	27	8 x 11.9	35	2100	665	0.12	270	50VHH27MD12
	47	10 x 12.6	30	2600	825	0.12	470	50VHH47ME12

VHR

Surface mount type

series

- Super low ESR, High ripple current
- Large capacitance, Small size
- Load life of 10,000h at 105°C

Specifications

Items	Characteristics	
Temperature range	-55 to +105°C	
Rated voltage range	2.5 to 16Vdc	
Capacitance range	39 to 2,700μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Tangent of loss angle	Less than or equal to the value of Standard Ratings (at 20°C, 120Hz)	
Leakage current	Less than or equal to the value of Standard Ratings (at 20°C, after 2 minutes)	
ESR	Less than or equal to the value of Standard Ratings	
Characteristics of impedance	$Z_{+105°C}/Z_{+20°C} \leq 1.25$, $Z_{-55°C}/Z_{+20°C} \leq 1.25$ at 100kHz	
Endurance	105°C, 10,000 hrs at rated voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Damp Heat (Steady State)	60°C, 90 to 95% RH, 1,000 hrs, No-applied Voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Resistance to soldering heat	VPS (230°C, 75s)	
	Appearance	No significant damage
	Capacitance change	Within±10% of the initial value
	Tangent of loss angle (tanδ)	≤130% of the initial specified value
	ESR(mΩ)	≤130% of the initial specified value
	Leakage current	≤The initial specified value

*In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C

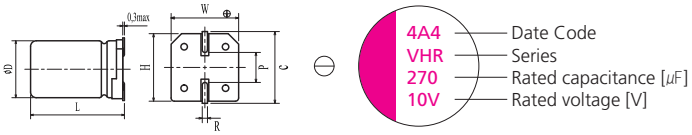
Size List

(unit: mm)

μF \ RV (SV)	2.5 (3.3)	4 (5.2)	6.3 (8.2)	10 (11.5)	16 (18.4)
39					5×5.9
68				5×5.9	6.3×5.9
82					6.3×5.9
100			5×5.9		6.3×5.9
120			5×5.9	6.3×5.9	8×6.9
150		5×5.9		6.3×5.9	8×6.9
180	5×5.9				
220			6.3×5.9		
270				8×6.9	8×11.9
330		6.3×5.9	6.3×5.9		8×11.9
390	6.3×5.9		8×6.9		
560	6.3×5.9	8×6.9 8×11.9			
680	8×6.9				
820	8×11.9		8×11.9		
1000	8×11.9				
1200		8×11.9			
1500	8×11.9	8×11.9			
2700	10×12.6				

RV: Rated Voltage [V] SV: Surge Voltage [V] (at room temperature)

Marking and Dimensions

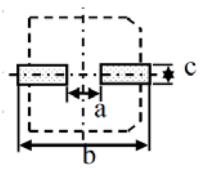


(unit: mm)

Size	ØD±0.5	L +0.1 -0.4	W±0.2	H±0.2	C±0.2	R	P±0.2
5×5.9	5.0	5.9	5.3	5.3	6.0	0.6~0.8	1.4
6.3×5.9	6.3	5.9	6.6	6.6	7.3	0.6~0.8	2.1
8×6.9	8.0	6.9	8.3	8.3	9.0	0.6~0.8	3.2
8×11.9	8.0	11.9	8.3	8.3	9.0	0.8~1.1	3.2
10×12.6	10.0	12.6	10.3	10.3	11.0	0.8~1.1	4.6

Recommended Land Pattern Dimension of PCB

(unit: mm)



Size	a	b	c
5×5.9	1.4	7.4	1.6
6.3×5.9	2.1	9.1	1.6
8×6.9	2.8	11.1	1.9
8×11.9	2.8	11.1	1.9
10×12.6	4.3	13.1	1.9

• Standard Ratings

Rated Voltage [Vdc]	Rated Capacitance [μF]	Size ØD x L [mm]	ESR (20°C, 100kHz) [mΩ] [max.]	Rated Ripple Current (105°C, 100kHz) [mArms]	Tangent of Loss Angel [max]	Leakage Current [μA, max]	Part Number
2.5	180	5 x 5.9	19	2800	0.1	300	2VHR180MB6
	390	6.3 x 5.9	15	3160	0.1	300	2VHR390MC6
	560	6.3 x 5.9	16	3500	0.1	300	2VHR560MC6
	680	8 x 6.9	20	3370	0.1	500	2VHR680MD7
	820	8 x 11.9	9	5380	0.1	500	2VHR820MD12
	1000	8 x 11.9	10	5380	0.1	500	2VHR1000MD12
	1500	8 x 11.9	10	5150	0.1	750	2VHR1500MD12
	2700	10 x 12.6	12	5070	0.1	1350	2VHR2700ME12
4	150	5 x 5.9	20	2730	0.1	300	4VHR150MB6
	330	6.3 x 5.9	15	3160	0.1	300	4VHR330MC6
	560	8 x 6.9	22	3220	0.1	500	4VHR560MD7
	560	8 x 11.9	9	5380	0.1	500	4VHR560MD12
	1200	8 x 11.9	12	4700	0.1	960	4VHR1200MD12
	1500	8 x 11.9	12	4700	0.1	1200	4VHR1500MD12
6.3	100	5 x 5.9	25	2150	0.1	300	6VHR100MB6
	120	5 x 5.9	21	2660	0.1	300	6VHR120MB6
	220	6.3 x 5.9	15	3160	0.1	300	6VHR220MC6
	330	6.3 x 5.9	17	3390	0.1	415	6VHR330MC6
	390	8 x 6.9	22	3220	0.1	491	6VHR390MD7
	820	8 x 11.9	12	4700	0.1	1033	6VHR820MD12
10	68	5 x 5.9	23	2540	0.1	300	10VHR68MB6
	120	6.3 x 5.9	22	2600	0.1	300	10VHR120MC6
	150	6.3 x 5.9	22	2600	0.1	300	10VHR150MC6
	270	8 x 6.9	22	3220	0.1	500	10VHR270MD7
16	39	5 x 5.9	27	2350	0.1	300	16VHR39MB6
	68	6.3 x 5.9	25	2440	0.1	300	16VHR68MC6
	82	6.3 x 5.9	25	2490	0.1	300	16VHR82MC6
	100	6.3 x 5.9	24	2490	0.1	300	16VHR100MC6
	120	8 x 6.9	27	2900	0.1	500	16VHR120MD7
	150	8 x 6.9	22	3220	0.1	500	16VHR150MD7
	270	8 x 11.9	16	4070	0.1	864	16VHR270MD12
	330	8 x 11.9	16	4070	0.1	1056	16VHR330MD12

VHVL

Surface mount type

series

- High Rated Voltage, High Capacitance
- Low ESR, High ripple current
- Load life of 10,000h at 105°C

Specifications

Items	Characteristics	
Temperature range	-55 to +105°C	
Rated voltage range	16 to 50Vdc	
Capacitance range	10 to 1,500μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Tangent of loss angle	Less than or equal to the value of Standard Ratings (at 20°C, 120Hz)	
Leakage current	Less than or equal to the value of Standard Ratings (at 20°C, after 2 minutes)	
ESR	Less than or equal to the value of Standard Ratings	
Characteristics of impedance	$Z_{+105°C}/Z_{+20°C} \leq 1.25$, $Z_{-55°C}/Z_{+20°C} \leq 1.25$ at 100kHz	
Endurance	105°C, 10,000 hrs at rated voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Damp Heat (Steady State)	60°C, 90 to 95% RH, 1,000 hrs, No-applied Voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Resistance to soldering heat	VPS (230°C, 75s)	
	Appearance	No significant damage
	Capacitance change	Within±10% of the initial value
	Tangent of loss angle (tanδ)	≤130% of the initial specified value
	ESR(mΩ)	≤130% of the initial specified value
	Leakage current	≤The initial specified value

*In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C

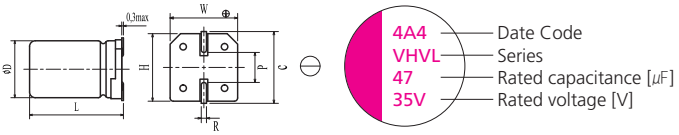
Size List

(unit: mm)

μF \ RV (SV)	16 (18.4)	20 (23)	25 (28.7)	32 (36.8)	35 (40.2)	50 (57.5)
10						6.3×5.9
18						8×6.9
22				6.3×5.9	6.3×5.9	8×6.9
27			5×5.9			
39					8×6.9	8×11.9
47			6.3×5.9		8×6.9	8×11.9
56		5×5.9	6.3×5.9			8×11.9
68				8×6.9		10×12.6
82	5×5.9		8×6.9		8×11.9	
100			8×6.9			10×12.6
120		6.3×5.9		8×11.9	10×12.6	
150					10×12.6	
180	6.3×5.9	8×6.9	8×11.9		10×12.6	
220				10×12.6		
270	8×6.9					
330			10×12.6			
390		8×11.9				
560	8×11.9	10×12.6				
1000	10×12.6					
1500	10×12.6					

RV: Rated Voltage [V] SV: Surge Voltage [V] (at room temperature)

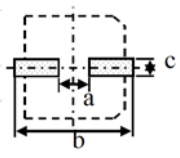
Marking and Dimensions



(unit: mm)

Size	ØD±0.5	L +0.1 -0.4	W±0.2	H±0.2	C±0.2	R	P±0.2
5×5.9	5.0	5.9	5.3	5.3	6.0	0.6~0.8	1.4
6.3×5.9	6.3	5.9	6.6	6.6	7.3	0.6~0.8	2.1
8×6.9	8.0	6.9	8.3	8.3	9.0	0.6~0.8	3.2
8×11.9	8.0	11.9	8.3	8.3	9.0	0.8~1.1	3.2
10×12.6	10.0	12.6	10.3	10.3	11.0	0.8~1.1	4.6

Recommended Land Pattern Dimension of PCB



(unit: mm)

Size	a	b	c
5×5.9	1.4	7.4	1.6
6.3×5.9	2.1	9.1	1.6
8×6.9	2.8	11.1	1.9
8×11.9	2.8	11.1	1.9
10×12.6	4.3	13.1	1.9

• Standard Ratings

Rated Voltage [Vdc]	Rated Capacitance [μF]	Size ØD x L [mm]	ESR (20°C, 100kHz) [mΩ] [max.]	Rated Ripple Current (105°C, 100kHz) [mArms]	Tangent of Loss Angel [max]	Leakage Current [μA, max]	Part Number
16	82	5 x 5.9	27	3000	0.12	262	16VHVL82MB6
	180	6.3 x 5.9	22	3300	0.12	576	16VHVL180MC6
	270	8 x 6.9	22	3300	0.12	864	16VHVL270MD7
	560	8 x 11.9	14	4950	0.12	1792	16VHVL560MD12
	1000	10 x 12.6	12	5400	0.12	3200	16VHVL1000ME12
	1500	10 x 12.6	12	5400	0.12	4800	16VHVL1500ME12
20	56	5 x 5.9	30	2800	0.12	224	20VHVL56MB6
	120	6.3 x 5.9	25	3200	0.12	480	20VHVL120MC6
	180	8 x 6.9	25	3200	0.12	720	20VHVL180MD7
	390	8 x 11.9	14	4950	0.12	1560	20VHVL390MD12
	560	10 x 12.6	12	5400	0.12	2240	20VHVL560ME12
25	27	5 x 5.9	40	2450	0.12	135	25VHVL27MB6
	47	6.3 x 5.9	30	2800	0.12	235	25VHVL47MC6
	56	6.3 x 5.9	30	2800	0.12	280	25VHVL56MC6
	82	8 x 6.9	28	3000	0.12	410	25VHVL82MD7
	100	8 x 6.9	25	3200	0.12	500	25VHVL100MD7
	180	8 x 11.9	16	4650	0.12	900	25VHVL180MD12
	330	10 x 12.6	14	5000	0.12	1650	25VHVL330ME12
32	22	6.3 x 5.9	35	2700	0.12	141	32VHVL22MC6
	68	8 x 6.9	25	3200	0.12	435	32VHVL68MD7
	120	8 x 11.9	20	4000	0.12	768	32VHVL120MD12
	220	10 x 12.6	18	4650	0.12	1408	32VHVL220ME12
35	22	6.3 x 5.9	35	2600	0.12	154	35VHVL22MC6
	39	8 x 6.9	30	2800	0.12	273	35VHVL39MD7
	47	8 x 6.9	30	2800	0.12	329	35VHVL47MD7
	82	8 x 11.9	20	4000	0.12	574	35VHVL82MD12
	120	10 x 12.6	18	4400	0.12	840	35VHVL120ME12
	150	10 x 12.6	18	4400	0.12	1050	35VHVL150ME12
	180	10 x 12.6	18	4400	0.12	1260	35VHVL180ME12
50	10	6.3 x 5.9	40	2500	0.12	100	50VHVL10MC6
	18	8 x 6.9	35	2700	0.12	180	50VHVL18MD7
	22	8 x 6.9	35	2700	0.12	220	50VHVL22MD7
	39	8 x 11.9	25	3800	0.12	390	50VHVL39MD12
	47	8 x 11.9	25	3800	0.12	470	50VHVL47MD12
	56	8 x 11.9	25	3800	0.12	560	50VHVL56MD12
	68	10 x 12.6	20	4300	0.12	680	50VHVL68ME12
	100	10 x 12.6	20	4300	0.12	1000	50VHVL100ME12

VSC

Surface mount type

series

- Super low ESR, High ripple current
- Load life of 20,000h at 105°C

Specifications

Items	Characteristics	
Temperature range	-55 to +105°C	
Rated voltage range	2.5 to 50Vdc	
Capacitance range	18 to 2,700μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Tangent of loss angle	Less than or equal to the value of Standard Ratings (at 20°C, 120Hz)	
Leakage current	Less than or equal to the value of Standard Ratings (at 20°C, after 2 minutes)	
ESR	Less than or equal to the value of Standard Ratings	
Characteristics of impedance	$Z_{+105°C}/Z_{+20°C} \leq 1.25$, $Z_{-55°C}/Z_{+20°C} \leq 1.25$ at 100kHz	
Endurance	105°C, 20,000 hrs at rated voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Damp Heat (Steady State)	60°C, 90 to 95% RH, 1,000 hrs, No-applied Voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Resistance to soldering heat	VPS (230°C, 75s)	
	Appearance	No significant damage
	Capacitance change	Within±10% of the initial value
	Tangent of loss angle (tanδ)	≤130% of the initial specified value
	ESR(mΩ)	≤130% of the initial specified value
	Leakage current	≤The initial specified value

*In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C

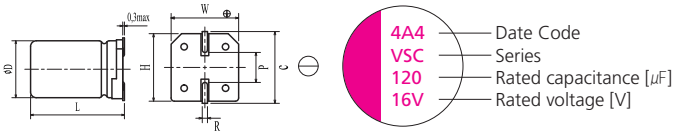
Size List

(unit: mm)

RV (SV) / μF	2.5 (2.9)	4 (4.6)	6.3 (7.2)	16 (18.4)	20 (23.0)	25 (28.7)	35 (40.2)	50 (57.5)
18								8×6.9
22				5×5.9				
39				6.3×5.9			8×6.9	8×11.9
47			5×5.9					
68								10×12.6
82				8×6.9			8×11.9	
100			5×5.9	6.3×5.9		8×6.9		
120				8×6.9			10×12.6	
180					8×6.9	8×11.9		
220			6.3×5.9					
270				8×6.9				
330			6.3×5.9			10×12.6		
390			8×6.9		8×11.9			
470					10×12.6			
560	6.3×5.9	8×6.9		8×11.9	10×12.6			
680	8×6.9							
820			8×11.9					
100				10×12.6				
1500	8×11.9	8×11.9						
2700	10×12.6							

RV: Rated Voltage [V] SV: Surge Voltage [V] (at room temperature)

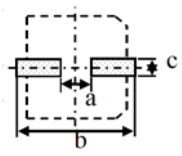
Marking and Dimensions



(unit: mm)

Size	ØD±0.5	L +0.1 -0.4	W±0.2	H±0.2	C±0.2	R	P±0.2
5×5.9	5.0	5.9	5.3	5.3	6.0	0.6~0.8	1.4
6.3×5.9	6.3	5.9	6.6	6.6	7.3	0.6~0.8	2.1
8×6.9	8.0	6.9	8.3	8.3	9.0	0.6~0.8	3.2
8×11.9	8.0	11.9	8.3	8.3	9.0	0.8~1.1	3.2
10×12.6	10.0	12.6	10.3	10.3	11.0	0.8~1.1	4.6

Recommended Land Pattern Dimension of PCB



(unit: mm)

Size	a	b	c
5×5.9	1.4	7.4	1.6
6.3×5.9	2.1	9.1	1.6
8×6.9	2.8	11.1	1.9
8×11.9	2.8	11.1	1.9
10×12.6	4.3	13.1	1.9

• Standard Ratings

Rated Voltage [Vdc]	Rated Capacitance [μF]	Size ØD x L [mm]	ESR (20°C, 100kHz) [mΩ] [max.]	Rated Ripple Current (105°C, 100kHz) [mArms]	Tangent of Loss Angel [max]	Leakage Current [μA, max]	Part Number
2.5	560	6.3 x 5.9	16	3500	0.12	300	2VSC560MC6
	680	8 x 6.9	20	3370	0.12	500	2VSC820MD7
	1500	8 x 11.9	10	5150	0.12	750	2VSC1500MD12
	2700	10 x 12.6	12	5070	0.12	1350	2VSC2700ME12
4	560	8 x 6.9	22	3220	0.12	500	4VSC560MD7
	1500	8 x 11.9	12	4700	0.12	1200	4VSC1500MD12
6.3	47	5 x 5.9	30	1970	0.12	300	6VSC47MB6
	100	5 x 5.9	25	2150	0.12	300	6VSC100MB6
	220	6.3 x 5.9	22	2570	0.12	300	6VSC220MC6
	330	6.3 x 5.9	15	3390	0.12	415	6VSC330MC6
	390	8 x 6.9	22	3220	0.12	491	6VSC390MD7
	820	8 x 11.9	12	4700	0.12	1033	6VSC820MD12
16	22	5 x 5.9	50	1060	0.12	300	16VSC22MB6
	39	6.3 x 5.9	37	2050	0.12	300	16VSC39MC6
	82	8 x 6.9	30	2760	0.12	300	16VSC82MD7
	100	6.3 x 5.9	24	2490	0.12	320	16VSC100MC6
	120	8 x 6.9	27	2900	0.12	500	16VSC120MD7
	270	8 x 6.9	22	3300	0.12	864	16VSC270MD7
	560	8 x 11.9	14	4950	0.12	1792	16VSC560MD12
	1000	10 x 12.6	12	5400	0.12	3200	16VSC1000ME12
20	180	8 x 6.9	25	3200	0.12	720	20VSC180MD7
	390	8 x 11.9	14	4950	0.12	1560	20VSC390MD12
	470	10 x 12.6	15	5000	0.12	1880	20VSC470ME12
	560	10 x 12.6	12	5400	0.12	2240	20VSC560ME12
25	100	8 x 6.9	24	3200	0.12	410	25VSC82MD7
	180	8 x 11.9	16	4650	0.12	900	25VSC180MD12
	330	10 x 12.6	14	5000	0.12	1650	25VSC330ME12
35	39	8 x 6.9	30	2800	0.12	273	35VSC39MD7
	82	8 x 11.9	20	4000	0.12	574	35VSC82MD12
	120	10 x 12.6	18	4400	0.12	840	35VSC120ME12
50	18	8 x 6.9	35	2700	0.12	180	50VSC18MD7
	39	8 x 11.9	25	3800	0.12	390	50VSC39MD12
	68	10 x 12.6	15	4300	0.12	680	50VSC68ME12

VHHL series

Surface mount type

- High Reliability, High Voltage, High Temperature
- Low ESR, High ripple current
- Load life of 4,000h at 125°C
- Compliance with AEC-Q20

LEAD FREE

Halogen Less

RoHS COMPLIANT

• Specifications

Items	Characteristics	
Temperature range	-55 to +125°C	
Rated voltage range	16 to 80Vdc	
Capacitance range	22 to 1,000μF	
Capacitance tolerance	±20% [M] (at 20°C, 120Hz)	
Tangent of loss angle	Less than or equal to the value of Standard Ratings (at 20°C, 120Hz)	
Leakage current	Less than or equal to the value of Standard Ratings (at 20°C, after 2 minutes)	
ESR	Less than or equal to the value of Standard Ratings	
Characteristics of impedance	$Z_{+125°C}/Z_{+20°C} \leq 1.25$, $Z_{-55°C}/Z_{+20°C} \leq 1.25$ at 100kHz	
Endurance	125°C, 4,000 hrs at rated voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Damp Heat (Steady State)	60°C, 90 to 95% RH, 1,000 hrs, No-applied Voltage	
	Appearance	No significant damage
	Capacitance change	Within±20% of the initial value
	Tangent of loss angle (tanδ)	≤150% of the initial specified value
	ESR(mΩ)	≤150% of the initial specified value
	Leakage current	≤The initial specified value
Resistance to soldering heat	VPS (230°C, 75s)	
	Appearance	No significant damage
	Capacitance change	Within±10% of the initial value
	Tangent of loss angle (tanδ)	≤130% of the initial specified value
	ESR(mΩ)	≤130% of the initial specified value
	Leakage current	≤The initial specified value

*In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 125°C

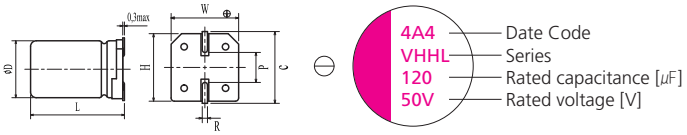
• Size List

(unit: mm)

μF \ RV (SV)	16 (18.4)	25 (28.7)	35 (40.2)	50 (57.5)	63 (78.8)	80 (100.0)
10						6.3×5.9
18						8×6.9
22				6.3×5.9	6.3×5.9	8×6.9
27			5×5.9			
39					8×6.9	8×11.9
47			6.3×5.9		8×6.9	8×11.9
56		5×5.9	6.3×5.9			8×11.9
68				8×6.9		10×12.6
82	5×5.9		8×6.9		8×11.9	
100			8×6.9			10×12.6
120		6.3×5.9		8×11.9	10×12.6	
150					10×12.6	
180	6.3×5.9	8×6.9	8×11.9		10×12.6	
220				10×12.6		
270	8×6.9					
330			10×12.6			
390		8×11.9				
560	8×11.9	10×12.6				
1000	10×12.6					
1500						

RV: Rated Voltage [V] SV: Surge Voltage [V] (at room temperature)

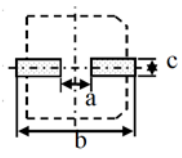
• Marking and Dimensions



(unit: mm)

Size	ØD±0.5	L +0.1 -0.4	W±0.2	H±0.2	C±0.2	R	P±0.2
8×6.9	8.0	6.9	8.3	8.3	9.0	0.6~0.8	3.2
8×11.9	8.0	11.9	8.3	8.3	9.0	0.8~1.1	3.2
10×12.6	10.0	12.6	10.3	10.3	11.0	0.8~1.1	4.6

• Recommended Land Pattern Dimension of PCB



(unit: mm)

Size	a	b	c
5×5.9	1.4	7.4	1.6
6.3×5.9	2.1	9.1	1.6
8×6.9	2.8	11.1	1.9
8×11.9	2.8	11.1	1.9
10×12.6	4.3	13.1	1.9

• Standard Ratings

Rated Voltage [Vdc]	Rated Capacitance [μF]	Size ØD x L [mm]	ESR (20°C, 100kHz) [mΩ] [max.]	Rated Ripple Current (105°C, 100kHz) [mArms]	Tangent of Loss Angel [max]	Leakage Current [μA, max]	Part Number
16	220	8 x 6.9	30	1500	0.1	105	16VHHL220MD7
	560	8 x 11.9	16	3800	0.1	268	16VHHL560MD12
	1000	10 x 12.6	13	4300	0.1	480	16VHHL1000ME12
25	100	8 x 6.9	41	1200	0.1	75	25VHHL100MD7
	270	8 x 11.9	19	3300	0.1	202	25VHHL270MD12
	470	10 x 12.6	15	4100	0.1	352	25VHHL470ME12
35	68	8 x 6.9	44	1200	0.1	71	35VHHL68MD7
	220	8 x 11.9	21	3300	0.1	231	35VHHL220MD12
	330	10 x 12.6	16	3900	0.1	346	35VHHL330ME12
50	39	8 x 6.9	45	1300	0.1	58	50VHHL39MD7
	120	8 x 11.9	25	2900	0.1	180	50VHHL120MD12
	180	10 x 12.6	19	3500	0.1	270	50VHHL180ME12
63	22	8 x 6.9	48	1100	0.1	42	63VHHL22MD7
	56	8 x 11.9	27	2900	0.1	105	63VHHL56MD12
	100	10 x 12.6	24	3000	0.1	189	63VHHL100ME12
80	39	8 x 11.9	35	1600	0.1	93	80VHHL39MD12
	68	10 x 12.6	28	2100	0.1	163	80VHHL68ME12

Vision for Nature

VINA ENESOL

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