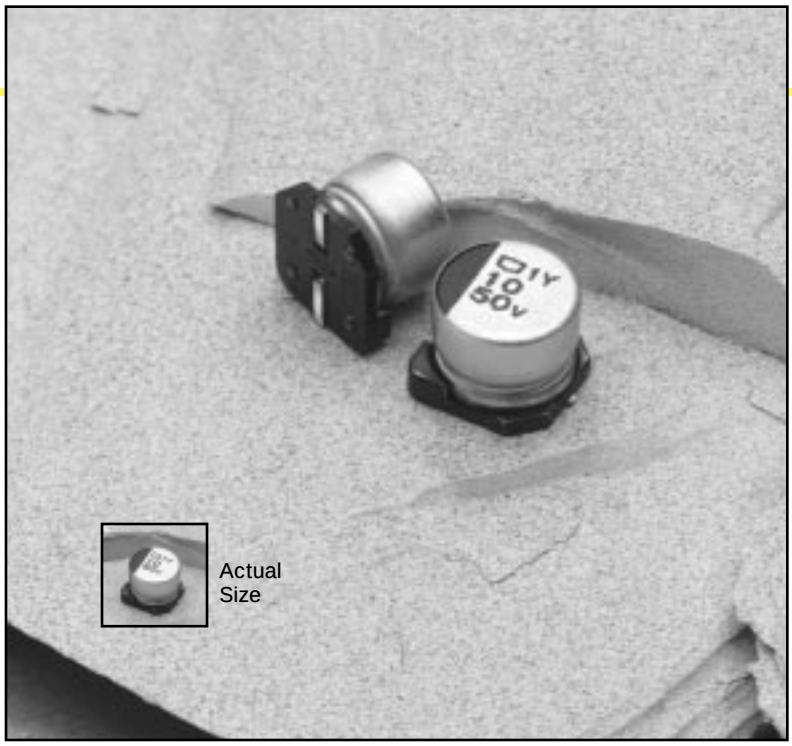
MV Series

UNITED CHEMI-CON

- Surface Mount
- Low Profile Vertical Chip
- Solvent Proof
- +85°C Maximum Temperature



The MV series capacitors are the standard vertical chip capacitors designed for reflow soldering. The maximum height for most of these capacitors is 5.5mm, making them ideal for use in low profile situations.

The MV series capacitors were developed to withstand HCFC cleaning agents for five minutes by ultrasonic, vapor or immersion. This solvent proof design allows all circuit board components to be cleaned together, at the same time, without resorting to more expensive epoxy end-sealed capacitors. Refer to the Mini-Glossary for recommended cleaning conditions.

Summary of Specifications

- **Surface mount lead terminals.**
- **Capacitance range: 0.1 to 1,000µF.**
- **Voltage range: 4 to 50VDC.**
- **Operating temperature range: −40°C to +85°C.**
- **Leakage current: 0.01CV or 3µA, whichever is greater, after 2 minutes at +20°C.**
- **Standard capacitance tolerance: ±20%**
- **Nominal case size (D×L): 3×5.2mm to 10×10mm.**
- **Rated lifetime: 1,000 to 2,000 hours at +85°C depending on case size.**

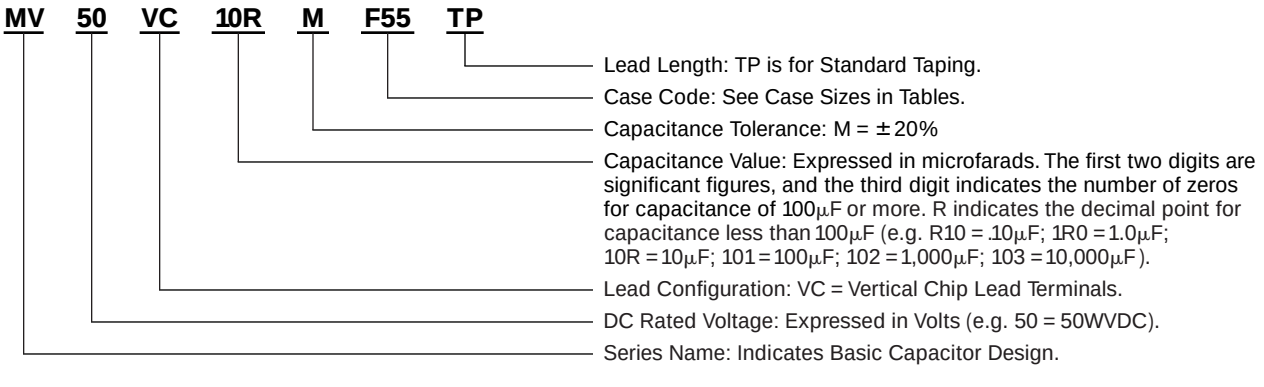
MV Series

MV Specifications

<table>
<tr><th>Item</th><th>Characteristics</th></tr>
<tr><td>Operating Temperature Range</td><td>−40 to +85°C</td></tr>
<tr><td>Rated Voltage Range</td><td>4 to 50VDC</td></tr>
<tr><td>Capacitance Range</td><td>0.1 to 1,000μF</td></tr>
<tr><td>Capacitance Tolerance</td><td>±20% (M) at +20°C, 120Hz</td></tr>
<tr><td>Leakage Current</td><td>I = 0.01CV or 3μA, whichever is greater, after 2 minutes at +20°C.
Where I = Leakage current (μA), C = Nominal capacitance (μF) and V = Rated voltage (V)</td></tr>
<tr><td>Dissipation Factor (Tan δ)</td><td>At +20°C, 120Hz
<table>
<tr><td>Rated Voltage (V)</td><td>4</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr>
<tr><td>Size ø3</td><td>0.42</td><td>0.27</td><td>0.23</td><td>0.19</td><td>0.16</td><td>0.14</td><td>0.12</td></tr>
<tr><td>Size ø4-ø6.3</td><td>0.42</td><td>0.24</td><td>0.20</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.10</td></tr>
<tr><td>Size ø8-ø10</td><td>–</td><td>0.40</td><td>0.30</td><td>0.26</td><td>0.16</td><td>0.14</td><td>0.12</td></tr>
</table></td></tr>
<tr><td>Low Temperature Characteristics</td><td>At 120Hz, impedance (Z) ratio between the −25°C or −40°C value and +20°C value shall not exceed the values given below.
<table>
<tr><td colspan="2">Rated Voltage (V)</td><td>4</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr>
<tr><td>Z(−25°C)/Z(+20°C)</td><td>Size ø3-ø10</td><td>7</td><td>4</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td></tr>
<tr><td rowspan="2">Z(−40°C)/Z(+20°C)</td><td>Size ø3</td><td>17</td><td>10</td><td>8</td><td>6</td><td>4</td><td>3</td><td>3</td></tr>
<tr><td>Size ø4-ø10</td><td>15</td><td>10</td><td>8</td><td>6</td><td>4</td><td>3</td><td>3</td></tr>
</table></td></tr>
<tr><td>Load Life</td><td>The following specifications shall be satisfied when the capacitors are restored to +20°C after subjecting them to the DC rated voltage for the specified test time at +85°C. The sum of DC voltage and peak AC voltage must not exceed the full rated voltage of the capacitors.
Size ø3: 1,000 hours Size ø4-ø10: 2,000 hours
Capacitance change: ≤ ±20% of the initial measured value
Tan δ (DF) : ≤ 200% of the initial specified value
Leakage current : ≤ initial specified value</td></tr>
<tr><td>Shelf Life</td><td>The following specifications shall be satisfied when the capacitors are restored to +20°C after exposing them for 500 hours at +85°C without voltage applied. The rated voltage shall be applied to the capacitors for a minimum of 30 minutes, at least 24 hours and not more than 48 hours before the measurements.
Capacitance change:
Size ø3 : ≤ ±20% of the initial measured value
Size ø4-ø10 : ≤ ±15% of the initial measured value
Tan δ (DF):
Size ø3 : ≤ 200% of the initial specified value
Size ø4-ø10 : ≤ 150% of the initial specified value
Leakage current : ≤ initial specified value</td></tr>
<tr><td>Others</td><td>Satisfies characteristic W of JIS C5141</td></tr>
</table>

Part Numbering System for MV Series

When ordering, always specify complete catalog number for MV Series.



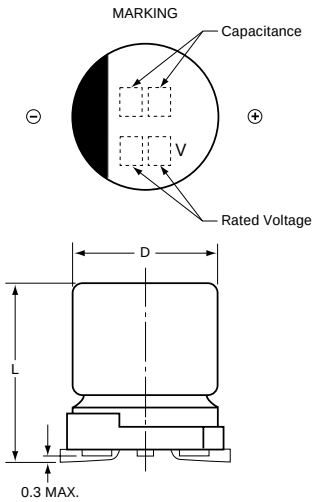
MV Series

Diagram of Dimensions

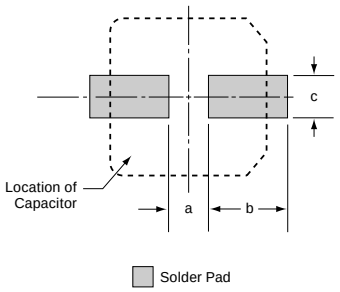
Vertical Chip Lead Terminals

Unit: mm

VC Type



Recommended Solder Pad on PC Board



Note: For case size 8×10 and 10×10 the markings are on the side of the PVC case.

For tape and reel packaging and reflow soldering conditions, refer to the beginning of the Surface Mount section.

Case and Solder Pad Dimensions

Case Code	øD ±0.5	L	A ±0.2	B ±0.2	C ±0.2	W	P	a	b	c
B55	ø3	5.2±0.3	3.3	3.3	3.7	0.45-0.7	0.8	0.8	2.2	1.6
D55	ø4	5.2±0.3	4.3	4.3	5.1	0.5-0.8	1.0	1.0	2.6	1.6
E55	ø5	5.2±0.3	5.3	5.3	5.9	0.5-0.8	1.4	1.4	3.0	1.6
F55	ø6.3	5.2±0.3	6.6	6.6	7.2	0.5-0.8	1.9	1.9	3.5	1.6
F60	ø6.3	5.7±0.3	6.6	6.6	7.2	0.5-0.8	1.9	1.9	3.5	1.6
8X6	ø8	6.3±0.5	8.3	8.3	9.0	0.5-0.8	2.3	2.3	4.5	1.6
8X10	ø8	10±0.5	8.3	8.3	9.0	0.7-1.1	3.1	3.1	4.2	2.2
10X10	ø10	10±0.5	10.3	10.3	11.0	0.7-1.1	4.5	4.5	4.4	2.2

Standard Voltage Ratings - Surface Mount

Rated Voltage (WVDC)	Capacitance (µF)	Catalog Part Number	Nominal Case Size* D×L (mm)	Case Code	Maximum ESR (Ω) at +20°C, 120Hz	Maximum Ripple Current (mA rms) at +85°C, 120Hz
4 Volts **5 Volts Surge**	22	MV4VC22RMB55TP	3 × 5.2	B55	31.643	14
	33	MV4VC33RMD55TP	4 × 5.2	D55	21.095	23
	47	MV4VC47RMD55TP	4 × 5.2	D55	14.812	27
	68	MV4VC68RME55TP	5 × 5.2	E55	10.238	38
	100	MV4VC101ME55TP	5 × 5.2	E55	6.962	46
	220	MV4VC221MF55TP	6.3 × 5.2	F55	3.164	74
6.3 Volts **8 Volts Surge**	15	MV6.3VC15RMB55TP	3 × 5.2	B55	29.835	14.5
	22	MV6.3VC22RMD55TP	4 × 5.2	D55	18.082	23
	47	MV6.3VC47RME55TP	5 × 5.2	E55	8.464	38
	100	MV6.3VC101MF55TP	6.3 × 5.2	F55	3.978	60
	330	MV6.3VC331M8X6TP	8 × 6.3	8X6	2.009	190
	470	MV6.3VC471M8X10TP	8 × 10	8X10	1.411	265
	1,000	MV6.3VC102M10X10TP	10 × 10	10X10	0.663	400
10 Volts **13 Volts Surge**	10	MV10VC10RMB55TP	3 × 5.2	B55	38.123	12.8
	15	MV10VC15RMD55TP	4 × 5.2	D55	22.100	20
	33	MV10VC33RME55TP	5 × 5.2	E55	10.045	35
	68	MV10VC68RMF55TP	6.3 × 5.2	F55	4.875	54
	100	MV10VC101MF60TP	6.3 × 5.7	F60	3.315	70
	220	MV10VC221M8X6TP	8 × 6.3	8X6	2.260	175

***Refer to diagrams for detailed case size dimensions.**

MV Series

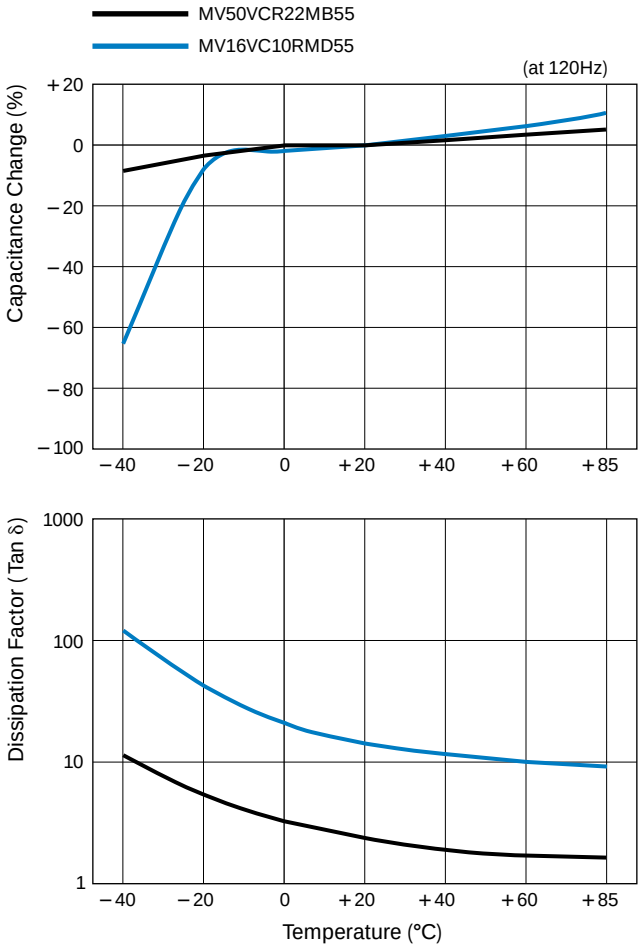
Standard Voltage Ratings - Surface Mount

Rated Voltage (WVDC)	Capacitance (μF)	Catalog Part Number	Nominal Case Size* D×L (mm)	Case Code	Maximum ESR (Ω) at +20°C, 120Hz	Maximum Ripple Current (mA rms) at +85°C, 120Hz
16 Volts 20 Volts Surge	6.8	MV16VC6R8MB55TP	3 × 5.2	B55	46.313	11.6
	10	MV16VC10RMD55TP	4 × 5.2	D55	26.520	17
	15	MV16VC15RME55TP	5 × 5.2	E55	17.680	26
	22	MV16VC22RME55TP	5 × 5.2	E55	12.055	32
	47	MV16VC47RMF55TP	6.3 × 5.2	F55	5.643	50
	68	MV16VC68RMF60TP	6.3 × 5.7	F60	3.900	78
	220	MV16VC221M8X10TP	8 × 10	8X10	1.959	215
	330	MV16VC331M8X10TP	8 × 10	8X10	1.005	270
	470	MV16VC471M10X10TP	10 × 10	10X10	0.917	330
25 Volts 32 Volts Surge	4.7	MV25VC4R7MB55TP	3 × 5.2	B55	56.426	10.5
	6.8	MV25VC6R8MD55TP	4 × 5.2	D55	34.125	16
	33	MV25VC33RMF55TP	6.3 × 5.2	F55	7.032	45
	47	MV25VC47RMF60TP	6.3 × 5.7	F60	4.937	65
	68	MV25VC68RM8X6TP	8 × 6.3	8X6	3.900	115
	100	MV25VC101M8X6TP	8 × 6.3	8X6	2.652	145
	330	MV25VC331M10X10TP	10 × 10	10X10	0.804	305
35 Volts 44 Volts Surge	2.2	MV35VC2R2MB55TP	3 × 5.2	B55	105.477	7.7
	3.3	MV35VC3R3MB55TP	3 × 5.2	B55	70.318	9.4
	4.7	MV35VC4R7MD55TP	4 × 5.2	D55	42.319	15
	6.8	MV35VC6R8ME55TP	5 × 5.2	E55	29.250	20
	10	MV35VC10RME55TP	5 × 5.2	E55	19.890	25
	15	MV35VC15RMF55TP	6.3 × 5.2	F55	13.260	33
	22	MV35VC22RMF55TP	6.3 × 5.2	F55	9.041	40
	33	MV35VC33RMF60TP	6.3 × 5.7	F60	6.027	55
	47	MV35VC47RM8X6TP	8 × 6.3	8X6	4.937	105
	68	MV35VC68RM8X10TP	8 × 10	8X10	3.413	157
	100	MV35VC101M8X10TP	8 × 10	8X10	2.321	175
	220	MV35VC221M10X10TP	10 × 10	10X10	1.055	265
50 Volts 63 Volts Surge	0.1	MV50VCR10MB55TP	3 × 5.2	B55	1,989.0	1.0
	0.1	MV50VCR10MD55TP	4 × 5.2	D55	1,657.5	1.3
	0.15	MV50VCR15MB55TP	3 × 5.2	B55	1,326.0	2.0
	0.15	MV50VCR15MD55TP	4 × 5.2	D55	1,105.0	2.0
	0.22	MV50VCR22MB55TP	3 × 5.2	B55	904.091	2.0
	0.22	MV50VCR22MD55TP	4 × 5.2	D55	753.409	2.9
	0.33	MV50VCR33MB55TP	3 × 5.2	B55	602.727	3.0
	0.33	MV50VCR33MD55TP	4 × 5.2	D55	502.273	3.5
	0.47	MV50VCR47MB55TP	3 × 5.2	B55	423.191	3.8
	0.47	MV50VCR47MD55TP	4 × 5.2	D55	352.66	4.2
	0.68	MV50VCR68MB55TP	3 × 5.2	B55	292.50	4.6
	0.68	MV50VCR68MD55TP	4 × 5.2	D55	243.75	5.1
	1.0	MV50VC1R0MB55TP	3 × 5.2	B55	198.90	5.6
	1.0	MV50VC1R0MD55TP	4 × 5.2	D55	165.75	6.2
	1.5	MV50VC1R5MB55TP	3 × 5.2	B55	132.60	6.9
	1.5	MV50VC1R5MD55TP	4 × 5.2	D55	110.50	7.5
	2.2	MV50VC2R2MD55TP	4 × 5.2	D55	75.341	10
	3.3	MV50VC3R3MD55TP	4 × 5.2	D55	50.227	14
	4.7	MV50VC4R7ME55TP	5 × 5.2	E55	35.266	19
	6.8	MV50VC6R8MF55TP	6.3 × 5.2	F55	24.375	24
	10	MV50VC10RMF55TP	6.3 × 5.2	F55	16.575	29
	15	MV50VC15RMF60TP	6.3 × 5.7	F60	11.050	32
	22	MV50VC22RMF60TP	6.3 × 5.7	F60	7.534	45
	33	MV50VC33RM8X6TP	8 × 6.3	8X6	6.027	95
	47	MV50VC47RM8X10TP	8 × 10	8X10	4.232	140
	68	MV50VC68RM10X10TP	10 × 10	10X10	2.925	170
	100	MV50VC101M10X10TP	10 × 10	10X10	1.989	195

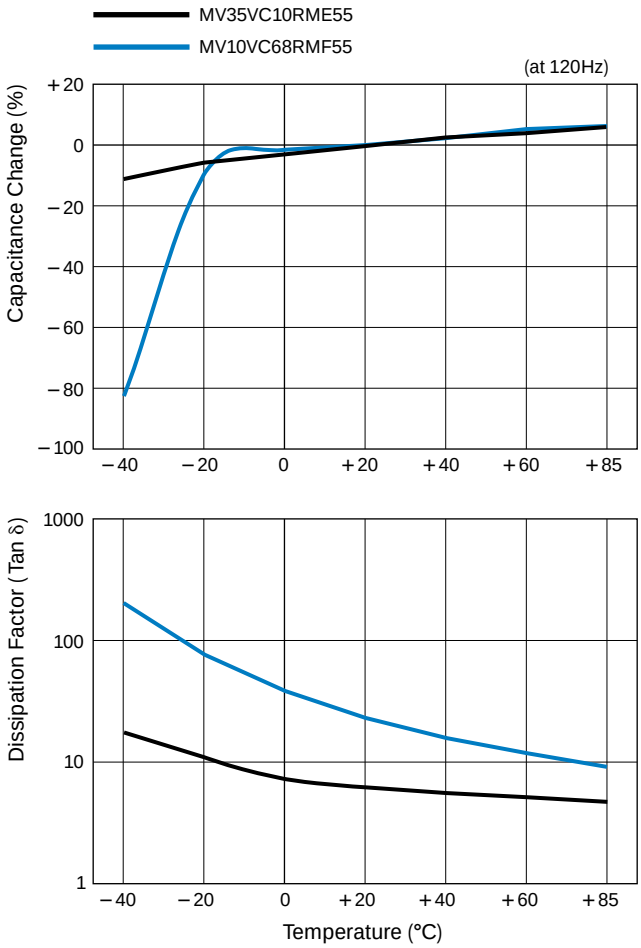
***Refer to diagrams for detailed case size dimensions.**

MV Series

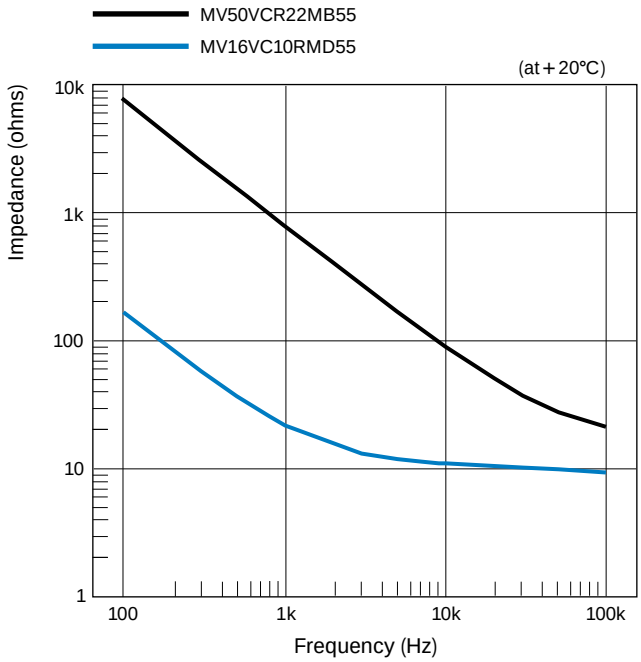
Temperature Characteristics



Temperature Characteristics



Impedance – Frequency Characteristics



Impedance – Frequency Characteristics