

**VD series**

STANDARD RATINGS

VDC (SV)	Cap (μF)	Size ΦDxL(mm)	ESR (mΩ, 20°C, 100kHz) (max.)	Rated ripple current (mA rms/105°C, 100kHz)	Leakage Current (μA)(max.)	Part Number
35 (41)	22	5×10	60	1000	500	SVD1VM220D10E00RAXXX
	33	5×10	60	1100	500	SVD1VM330D10E00RAXXX
		6.3×8	60	1100	500	SVD1VM330E08E00RAXXX
	47	6.3×8	50	1500	500	SVD1VM470E08E00RAXXX
		6.3×6	80	1100	500	SVD1VM470E06E00RAXXX
	100	6.3×11	60	2000	700	SVD1VM101E11E00RAXXX
		8×9	60	2000	700	SVD1VM101F09E00RAXXX
	120	8×9	50	2100	840	SVD1VM121F09E00RAXXX
	220	8×11	50	2400	1540	SVD1VM221F11E00RAXXX
		10×10	80	2100	1540	SVD1VM221G10E00RAXXX
	330	10×12	50	2700	2310	SVD1VM331G12E00RAXXX
	470	10×13	50	3000	3290	SVD1VM471G13E00RAXXX
560	10×14	50	3200	3920	SVD1VM561G14E00RAXXX	
50 (58)	22	6.3×6	80	800	500	SVD1HM220E06E00RAXXX
	33	6.3×8	80	850	500	SVD1HM330E08E00RAXXX
	47	6.3×9	80	1400	500	SVD1HM470E09E00RAXXX
	100	8×9	60	1800	1000	SVD1HM101F09E00RAXXX
		8×11	50	2000	1000	SVD1HM101F11E00RAXXX
	120	8×11	50	2000	1200	SVD1HM121F11E00RAXXX
220	10×12	50	2300	2200	SVD1HM221G12E00RAXXX	
63 (73)	10	6.3×6	100	450	500	SVD1JM100E06E00RAXXX
	22	6.3×6	100	450	500	SVD1JM220E06E00RAXXX
	47	8×11	60	1300	592	SVD1JM470F11E00RAXXX
	56	8×11	60	1400	706	SVD1JM560F11E00RAXXX
	100	10×12	60	1600	1260	SVD1JM101G12E00RAXXX

※ Specifications subject to change without notice.

**MK series**

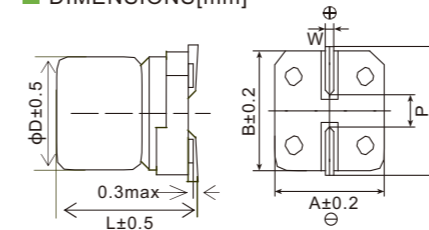
- Endurance: +105°C 2,000 ~ 3,000 hours
- Designed for surface mounting on high density PC board
- RoHS Compliant



SPECIFICATIONS

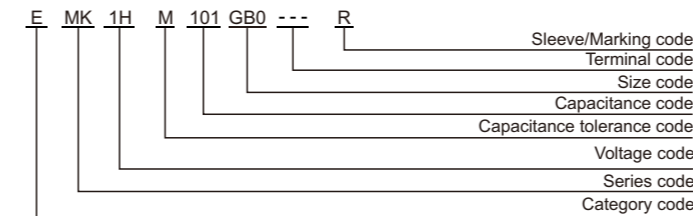
Items	Characteristics	
Category Temperature Range	-40~+105°C(6.3~450 V <sub>dc</sub> )	
Rated Voltage Range	6.3~450 V <sub>dc</sub>	
Capacitance Tolerance	±20%(M) (at 20°C, 120Hz)	
Leakage Current	6.3~100 V <sub>dc</sub>	160~450 V <sub>dc</sub>
	I ≤ 0.01CV or 3μA, whichever is greater. (2 minutes) I ≤ 0.04CV + 100μA (1 minute)	
Where, I: Max. leakage current (μA), C: Nominal capacitance (μF), V: Rated voltage (V) (at 20°C)		
Dissipation Factor (tanδ)	Rated Voltage(V <sub>dc</sub> )	6.3 10 16 25 35 50 63 80 100 160~250 400~450
	tanδ (max.)	D80~E80 0.30 0.24 0.20 0.16 0.14 0.12 0.12 0.12 0.12 - 0.20 E80~M80 0.40 0.30 0.26 0.16 0.14 0.12 0.12 0.12 0.12 0.15 0.20 (at 20°C, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(V <sub>dc</sub> )	6.3 10 16 25 35 50 63 80 100 160~250 400~450
	Z(-25°C)/Z(+20°C)	4 3 2 2 2 2 2 2 2 6 6
	Z(-40°C)/Z(+20°C)	10 8 6 4 3 3 3 3 3 10 18 (at 120Hz)
Endurance	The specifications listed below shall be met when the capacitors are restored to 20°C after rated voltage is applied for a specified period of time at 105°C.	
	Load Life	2,000 hours( 160~450V <sub>dc</sub> : 3,000 hours)
	Capacitance Change	≤±20% of the initial value
	Dissipation Factor (tanδ)	≤200% of the initial specified value
	Leakage Current	≤The initial specified value
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 1,000 hours (6.3~100V <sub>dc</sub> : 500 hours).	
	Capacitance Change	≤±20% of the initial value
	Dissipation Factor (tanδ)	≤200% of the initial specified value
	Leakage Current	≤200% of the initial specified value

DIMENSIONS[mm]



Size code	D	L	A	B	C	W	P
D80	5	7.7	5.3	5.3	5.9	0.5~0.8	1.4
E80	6.3	7.7	6.6	6.6	7.2	0.5~0.8	1.9
E80	6.3	10.5	6.6	6.6	7.2	0.5~0.8	1.9
FB0	8	10.5	8.3	8.3	9.0	0.7~1.1	3.1
FD0	8	12.5	8.3	8.3	9.0	0.7~1.1	3.1
FE0	8	13.5	8.3	8.3	9.0	0.7~1.1	3.1
FG0	8	15.5	8.3	8.3	9.0	0.7~1.1	3.1
GB0	10	10.5	10.3	10.3	11.0	0.7~1.1	4.5
GD0	10	12.5	10.3	10.3	11.0	0.7~1.1	4.5
GE0	10	13.5	10.3	10.3	11.0	0.7~1.1	4.5
GH0	10	16.5	10.3	10.3	11.0	0.7~1.1	4.5
WE0	12.5	13.5	13.0	13.0	13.7	1.0~1.3	4.5
WG5	12.5	16.0	13.0	13.0	13.7	1.0~1.3	4.5
WM5	12.5	21.0	13.0	13.0	13.7	1.0~1.3	4.5
LH0	16	16.5	17.0	17.0	18.0	1.0~1.3	6.5
LN0	16	21.5	17.0	17.0	18.0	1.0~1.3	6.5
MH0	18	16.5	19.0	19.0	20.0	1.0~1.3	6.5
MN0	18	21.5	19.0	19.0	20.0	1.0~1.3	6.5

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Rated voltage(V <sub>dc</sub> )	Freq.(Hz)			
	120	1k	10k	100k
6.3~450	0.50	0.80	0.90	1.00

**MK series**

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size code	tanδ	Rated ripple current (mArms/105°C,100kHz)	Part Number
6.3(0J)	100	D80	0.30	105	EMK0JM101D80D00*
	220	E80	0.30	160	EMK0JM221E80D00*
	330	FB0	0.40	340	EMK0JM331FB0D00*
	1000	GB0	0.40	860	EMK0JM102GB0D00*
10(1A)	33	D80	0.24	105	EMK1AM330D80D00*
	100	E80	0.24	175	EMK1AM101E80D00*
	220	E80	0.24	180	EMK1AM221E80D00*
	330	FB0	0.30	340	EMK1AM331FB0D00*
	470	FB0	0.30	360	EMK1AM471FB0D00*
16(1C)	820	GB0	0.30	860	EMK1AM821GB0D00*
	47	D80	0.20	105	EMK1CM470D80D00*
	100	E80	0.20	175	EMK1CM101E80D00*
	150	E80	0.20	190	EMK1CM151E80D00*
	220	FB0	0.26	500	EMK1CM221FB0D00*
25(1E)	330	FB0	0.26	545	EMK1CM331FB0D00*
	470	GB0	0.26	800	EMK1CM471GB0D00*
	33	D80	0.16	105	EMK1EM330D80D00*
	47	E80	0.16	180	EMK1EM470E80D00*
35(1V)	100	E80	0.16	205	EMK1EM101E80D00*
	220	FB0	0.16	550	EMK1EM221FB0D00*
	330	GB0	0.16	780	EMK1EM331GB0D00*
	470	GD0	0.16	875	EMK1EM471GD0D00*
	50(1H)	10	D80	0.14	105
22		D80	0.14	110	EMK1VM220D80D00*
47		E80	0.14	210	EMK1VM470E80D00*
100		FB0	0.14	575	EMK1VM101FB0D00*
220		GB0	0.14	835	EMK1VM221GB0D00*
63(1J)	330	GD0	0.14	900	EMK1VM331GD0D00*
	10	D80	0.12	90	EMK1HM100D80D00*
	22	E80	0.12	175	EMK1HM220E80D00*
	33	E80	0.12	180	EMK1HM330E80D00*
	47	FB0	0.12	540	EMK1HM470FB0D00*
80(1B)	100	GB0	0.12	700	EMK1HM101GB0D00*
	220	WE0	0.12	900	EMK1HM221WE0D00*
	330	WG5	0.12	1180	EMK1HM331WG5D00*
	10	D80	0.12	85	EMK1JM100D80D00*
	22	E80	0.12	150	EMK1JM220E80D00*
100(1K)	33	FB0	0.12	375	EMK1JM330FB0D00*
	47	FB0	0.12	450	EMK1JM470FB0D00*
	100	GB0	0.12	575	EMK1JM101GB0D00*
	220	WE0	0.12	890	EMK1JM221WE0D00*
	16(1C)	10	E80	0.12	140
22		FB0	0.12	375	EMK1BM220FB0D00*
33		FB0	0.12	450	EMK1BM330FB0D00*
47		GB0	0.12	575	EMK1BM470GB0D00*
100		GD0	0.12	600	EMK1BM101GD0D00*
25(1E)	150	WE0	0.12	800	EMK1BM151WE0D00*
	220	WG5	0.12	960	EMK1BM221WG5D00*
	4.7	D80	0.12	70	EMK1KM470D80D00*
	10	E80	0.12	135	EMK1KM100E80D00*
	22	FB0	0.12	345	EMK1KM220FB0D00*
35(1V)	33	GB0	0.12	560	EMK1KM330GB0D00*
	47	GB0	0.12	575	EMK1KM470GB0D00*
	100	WE0	0.12	680	EMK1KM101WE0D00*

**MK series**

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size code	tanδ	Rated ripple current (mArms/105°C,100kHz)	Part Number
6.3(0J)	10	GB0	0.15	90	EMK2CM100GB0D00*
	15	GB0	0.15	136	EMK2CM150GB0D00*
	22	GE0	0.15	180	EMK2CM220GE0D00*
		WE0	0.15	200	EMK2CM220WE0D00*
	33	GH0	0.15	240	EMK2CM330GH0D00*
		WE0	0.15	310	EMK2CM330WE0D00*
	47	WG5	0.15	420	EMK2CM470WG5D00*
		LH0	0.15	520	EMK2CM470LH0D00*
	68	LN0	0.15	660	EMK2CM680LN0D00*
		MH0	0.15	660	EMK2CM680MH0D00*
LN0		0.15	780	EMK2CM101LN0D00*	
100	MN0	0.15	780	EMK2CM101MN0D00*	
10(1A)	10	GB0	0.15	120	EMK2DM100GB0D00*
	15	GB0	0.15	164	EMK2DM150GB0D00*
	22	GE0	0.15	200	EMK2DM220GE0D00*
		WG5	0.15	236	EMK2DM220WG5D00*
	33	GH0	0.15	260	EMK2DM330GH0D00*
		WG5	0.15	300	EMK2DM330WG5D00*
	47	WM5	0.15	440	EMK2DM470WM5D00*
		LN0	0.15	556	EMK2DM470LN0D00*
	68	LN0	0.15	680	EMK2DM680LN0D00*
	16(1C)	2.2	EB0	0.15	56
3.3		EB0	0.15	68	EMK2EM3R3EB0D00*
4.7		FB0	0.15	96	EMK2EM4R7FB0D00*
		GB0	0.15	104	EMK2EM4R7GB0D00*
10		WE0	0.15	184	EMK2EM100WE0D00*
22		LH0	0.15	364	EMK2EM220LH0D00*
		LN0	0.15	470	EMK2EM330LN0D00*
33		MH0	0.15	470	EMK2EM330MH0D00*
		MN0	0.15	580	EMK2EM470MN0D00*
25(1E)		1	E80	0.20	28
	1.5	EB0	0.20	36	EMK2GM1R5EB0D00*
	2.2	EB0	0.20	44	EMK2GM2R2EB0D00*
		FB0	0.20	52	EMK2GM2R2FB0D00*
	3.3	FB0	0.20	64	EMK2GM3R3FB0D00*
		GB0	0.20	72	EMK2GM3R3GB0D00*
	3.9	FE0	0.20	72	EMK2GM3R9FE0D00*
		GB0	0.20	76	EMK2GM3R9GB0D00*
	4.7	FB0	0.20	78	EMK2GM4R7FB0D00*
		FD0	0.20	80	EMK2GM4R7FD0D00*
35(1V)	GB0	0.20	84	EMK2GM4R7GB0D00*	
	5.6	FD0	0.20	96	EMK2GM5R6FD0D00*
	6.8	FE0	0.20	108	EMK2GM6R8FE0D00*
	8.2	FG0	0.20	130	EMK2GM8R2FG0D00*
		GH0	0.20	156	EMK2GM100GH0D00*
	10	LH0	0.20	176	EMK2GM100LH0D00*
		WG5	0.20	184	EMK2GM150WG5D00*
	15	LH0	0.20	210	EMK2GM150LH0D00*
		LN0	0.20	260	EMK2GM220LN0D00*
	33	MN0	0.20	280	EMK2GM330MN0D00*
50(1H)	2.2	GB0	0.20	50	EMK2WM2R2GB0D00*
	3.3	WE0	0.20	80	EMK2WM3R3WE0D00*
	4.7	WE0	0.20	96	EMK2WM4R7WE0D00*
	10	LH0	0.20	170	EMK2WM100LH0D00*
	15	LN0	0.20	200	EMK2WM150LN0D00*
	22	LN0	0.20	240	EMK2WM220LN0D00*

Note: "\*" may be "R" or "T".  
 "R": Capacitors with red marking  
 "T": Capacitors with PET sleeve

**MK series**

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size code	tanδ	Rated ripple current (mArms/105°C,100kHz)	Part Number	
6.3(0J)	100	D80	0.30	105	EMK0JM101D80D00*	
	220	E80	0.30	160	EMK0JM221E80D00*	
	330	FB0	0.40	340	EMK0JM331FB0D00*	
	1000	GB0	0.40	860	EMK0JM102GB0D00*	
10(1A)	33	D80	0.24	105	EMK1AM330D80D00*	
	100	E80	0.24	175	EMK1AM101E80D00*	
	220	E80	0.24	180	EMK1AM221E80D00*	
	330	FB0	0.30	340	EMK1AM331FB0D00*	
	470	FB0	0.30	360	EMK1AM471FB0D00*	
16(1C)	820	GB0	0.30	860	EMK1AM821GB0D00*	
	47	D80	0.20	105	EMK1CM470D80D00*	
	100	E80	0.20	175	EMK1CM101E80D00*	
	150	E80	0.20	190	EMK1CM151E80D00*	
	220	FB0	0.26	500	EMK1CM221FB0D00*	
25(1E)	330	FB0	0.26	545	EMK1CM331FB0D00*	
	470	GB0	0.26	800	EMK1CM471GB0D00*	
	33	D80	0.16	105	EMK1EM330D80D00*	
	47	E80	0.16	180	EMK1EM470E80D00*	
35(1V)	100	E80	0.16	205	EMK1EM101E80D00*	
	220	FB0	0.16	550	EMK1EM221FB0D00*	
	330	GB0	0.16	780	EMK1EM331GB0D00*	
	470	GD0	0.16	875	EMK1EM471GD0D00*	
	10	D80	0.14	105	EMK1VM100D80D00*	
50(1H)	22	D80	0.14	110	EMK1VM220D80D00*	
	47	E80	0.14	210	EMK1VM470E80D00*	
	100	FB0	0.14	575	EMK1VM101FB0D00*	
	220	GB0	0.14	835	EMK1VM221GB0D00*	
	330	GD0	0.14	900	EMK1VM331GD0D00*	
63(1J)	10	D80	0.12	90	EMK1HM100D80D00*	
	22	E80	0.12	175	EMK1HM220E80D00*	
	33	E80	0.12	180	EMK1HM330E80D00*	
	47	FB0	0.12	540	EMK1HM470FB0D00*	
	100	GB0	0.12	700	EMK1HM101GB0D00*	
	220	WE0	0.12	900	EMK1HM221WE0D00*	
80(1B)	330	WG5	0.12	1180	EMK1HM331WG5D00*	
	10	D80	0.12	85	EMK1JM100D80D00*	
	22	E80	0.12	150	EMK1JM220E80D00*	
	33	FB0	0.12	375	EMK1JM330FB0D00*	
	47	FB0	0.12	450	EMK1JM470FB0D00*	
	100	GB0	0.12	575	EMK1JM101GB0D00*	
100(1K)	220	WE0	0.12	890	EMK1JM221WE0D00*	
	10	E80	0.12	140	EMK1BM100E80D00*	
	22	FB0	0.12	375	EMK1BM220FB0D00*	
	33	FB0	0.12	450	EMK1BM330FB0D00*	
	47	GB0	0.12	575	EMK1BM470GB0D00*	
	100	GD0	0.12	600	EMK1BM101GD0D00*	
160(2C)	150	WE0	0.12	800	EMK1BM151WE0D00*	
	220	WG5	0.12	960	EMK1BM221WG5D00*	
	4.7	D80	0.12	70	EMK1KM47D80D00*	
	10	E80	0.12	135	EMK1KM100E80D00*	
	22	FB0	0.12	345	EMK1KM220FB0D00*	
200(2D)	33	GB0	0.12	560	EMK1KM330GB0D00*	
	47	GB0	0.12	575	EMK1KM470GB0D00*	
	100	WE0	0.12	680	EMK1KM101WE0D00*	
	2.2	E80	0.20	28	EMK2GM010E80D00*	
250(2E)	3.3	E80	0.20	36	EMK2GM1R5E80D00*	
	4.7	E80	0.20	44	EMK2GM2R2E80D00*	
	10	FB0	0.20	52	EMK2GM2R2FB0D00*	
	22	FB0	0.20	64	EMK2GM3R3FB0D00*	
	33	FB0	0.20	72	EMK2GM3R3GB0D00*	
	47	FB0	0.20	72	EMK2GM3R9FE0D00*	
	68	GB0	0.20	76	EMK2GM3R9GB0D00*	
	100	FB0	0.20	78	EMK2GM4R7FB0D00*	
	150	FD0	0.20	80	EMK2GM4R7FD0D00*	
	220	GB0	0.20	84	EMK2GM4R7GB0D00*	
	330	FD0	0.20	96	EMK2GM5R6FD0D00*	
	470	FE0	0.20	108	EMK2GM6R8FE0D00*	
	680	FG0	0.20	130	EMK2GM8R2FG0D00*	
	875	GH0	0.20	156	EMK2GM100GH0D00*	
	1180	LH0	0.20	176	EMK2GM100LH0D00*	
	1580	WG5	0.20	184	EMK2GM150WG5D00*	
	2000	LH0	0.20	210	EMK2GM150LH0D00*	
	2600	LN0	0.20	260	EMK2GM220LN0D00*	
	3300	MN0	0.20	280	EMK2GM330MN0D00*	
	400(2G)	2.2	GB0	0.20	50	EMK2WM2R2GB0D00*
		3.3	WE0	0.20	80	EMK2WM3R3WE0D00*
		4.7	WE0	0.20	96	EMK2WM4R7WE0D00*
10		LH0	0.20	170	EMK2WM100LH0D00*	
15		LN0	0.20	200	EMK2WM150LN0D00*	
22		LN0	0.20	240	EMK2WM220LN0D00*	
450(2W)	2.2	GB0	0.20	50	EMK2WM2R2GB0D00*	
	3.3	WE0	0.20	80	EMK2WM3R3WE0D00*	
	4.7	WE0	0.20	96	EMK2WM4R7WE0D00*	
	10	LH0	0.20	170	EMK2WM100LH0D00*	
	15	LN0	0.20	200	EMK2WM150LN0D00*	
	22	LN0	0.20	240	EMK2WM220LN0D00*	

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 "R": Capacitors with red marking  
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**MK series**

■ STANDARD RATINGS

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[MAL213967339E3](#) [ZSC00AF2211EARL](#) [VB1E100MB054000CE0](#) [VD4.7UF400V90RV0094](#) [FZ470UF25V90RV0113](#)  
[GVT1H476M0608CNVC](#) [GVE1V226M0506CNVC](#) [GVT1H226M0606CNVC](#) [ATB106M050D058](#) [ATB476M050F065](#) [ATB476M035E058](#)  
[ATB107M016E058](#) [ATB107M035E077](#) [EMHL250ARA221MHA0G](#) [ATB477M016F102](#) [EMK1EM331FB0D00R](#) [EMF1CM221FB0D00R](#)  
[EMF1CM331FB0D00R](#) [EMF1CM471FB0D00R](#) [EMK1JM101GB0D00R](#) [EMK1AM102GB0D00R](#) [EMK1HM221GB0D00R](#)  
[DV221M6R3E055ETR](#) [DV221M025E077ETR](#) [RV331M025F105ETR](#) [HV100M035B055ETR](#) [VH1J101MG105000CE0](#)  
[VD1H221MG105000CE0](#) [VD1C100MB054000CE0](#) [VD2A100ME077000CE0](#) [RVT1A101M0505](#) [VP1C221M0605](#)