

MA series

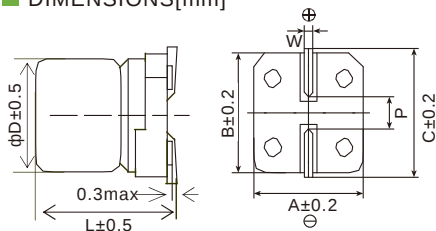
- Endurance: +105°C 10,000 hours
- Designed for surface mounting on high density PC board
- RoHS Compliant



SPECIFICATIONS

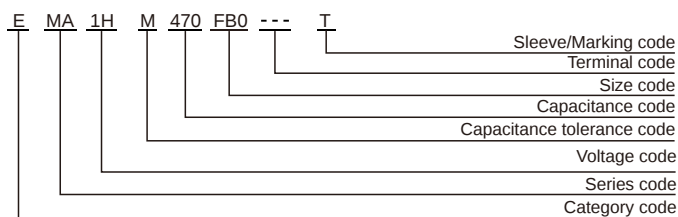
Items	Characteristics											
Category Temperature Range	-40~+105°C(16~450 V _{dc})											
Rated Voltage Range	16~450 V _{dc}											
Capacitance Tolerance	±20%(M) (at 20°C,120Hz)											
Leakage Current	16~100 V _{dc}						160~450 V _{dc}					
	I≤0.03CV or 4μA, whichever is greater. (2 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 _{dc})	16	25	35	50	63	80	100	160~250	400~450	(at 20°C,120Hz)	
	tanδ (max.)	0.26	0.16	0.14	0.14	0.20	0.20	0.20	0.20	0.24		
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(V _{dc})	16	25	35	50	63	80	100	160~250	400~450	(at 120Hz)	
	Z(-25°C)/Z(+20°C)	2	2	2	2	2	2	2	6	6		
	Z(-40°C)/Z(+20°C)	6	4	3	3	3	3	3	10	18		
Endurance	The specifications listed below shall be met when the capacitors are restored to 20°C after rated voltage is applied for 10,000 hours at 105°C.											
	Rated Voltage(V _{dc})	16~100						160~450				
	Capacitance Change	≤±30% of the initial value						≤±20% of the initial value				
	Dissipation Factor (tanδ)	≤300% of the initial specified value						≤200% of the initial specified value				
	Leakage Current	≤The initial specified value						≤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.											
	Rated Voltage(V _{dc})	16~100						160~450				
	Capacitance Change	≤±30% of the initial value						≤±20% of the initial value				
	Dissipation Factor (tanδ)	≤300% of the initial specified value						≤200% of the initial specified value				
	Leakage Current	≤300% of the initial specified value						≤200% of the initial specified value				

DIMENSIONS[mm]



Size code	D	L	A	B	C	W	P
E80	6.3	7.7	6.6	6.6	7.2	0.5~0.8	1.9
E83	6.3	8.0	6.6	6.6	7.2	0.5~0.8	1.9
EB0	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

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz)	120	1k	10k	100k
Rated voltage(V _{dc})				
16~450	0.50	0.80	0.90	1.00

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■ STANDARD RATINGS (Rated ripple current:mArms/105°C 100kHz)

WV (Vdc)	Cap (μF)	Size code	Rated ripple current	Part Number
16(1C)	47	E83	125	EMA1CM470E83D00T
	100	E83	245	EMA1CM101E83D00T
	220	FB0	260	EMA1CM221FB0D00T
	330	GB0	450	EMA1CM331GB0D00T
	470	GD0	480	EMA1CM471GD0D00T
	680	WE0	820	EMA1CM681WE0D00T
	1000	WG5	860	EMA1CM102WG5D00T
25(1E)	47	E83	125	EMA1EM470E83D00T
	100	FB0	245	EMA1EM101FB0D00T
	220	GB0	440	EMA1EM221GB0D00T
	330	GB0	460	EMA1EM331GB0D00T
	470	WE0	820	EMA1EM471WE0D00T
	680	WG5	860	EMA1EM681WG0D00T
35(1V)	33	E83	125	EMA1VM330E83D00T
	47	E83	140	EMA1VM470E83D00T
	100	FB0	245	EMA1VM101FB0D00T
	220	GB0	440	EMA1VM221GB0D00T
	330	WE0	820	EMA1VM331WE0D00T
	470	WG5	860	EMA1VM471WG5D00T
50(1H)	10	E83	100	EMA1HM100E83D00T
	22	E83	105	EMA1HM220E83D00T
	33	E83	110	EMA1HM330E83D00T
	47	FB0	260	EMA1HM470FB0D00T
	100	GB0	400	EMA1HM101GB0D00T
	220	WE0	800	EMA1HM221WE0D00T
	330	WG5	845	EMA1HM331WG5D00T
63(1J)	22	E83	95	EMA1JM220E83D00T
	33	FB0	180	EMA1JM330FB0D00T
	47	FB0	210	EMA1JM470FB0D00T
	100	GD0	420	EMA1JM101GD0D00T
	220	WG5	820	EMA1JM221WG5D00T
80(1B)	10	FB0	165	EMA1BM100FB0D00T
	22	FB0	180	EMA1BM220FB0D00T
	33	GB0	305	EMA1BM220GB0D00T
	33	FB0	190	EMA1BM330FB0D00T
	47	GB0	350	EMA1BM470GB0D00T
	100	WE0	760	EMA1BM101WE0D00T
100(1K)	10	E83	150	EMA1KM100E83D00T
	22	FB0	165	EMA1KM220FB0D00T
	33	GB0	280	EMA1KM330GB0D00T
	47	GB0	320	EMA1KM470GB0D00T
	68	GD0	350	EMA1KM680GD0D00T
	82	WE0	530	EMA1KM820WE0D00T
	100	WE0	555	EMA1KM101WE0D00T

WV (Vdc)	Cap (μF)	Size code	Rated ripple current	Part Number
160(2C)	10	GB0	190	EMA2CM100GB0D00T
	15	FD0	220	EMA2CM150FD0D00T
	22	GD0	340	EMA2CM220GD0D00T
	33	GE0	420	EMA2CM330GE0D00T
	47	GH0	530	EMA2CM470GH0D00T
	68	WM5	640	EMA2CM680WM5D00T
	100	WM5	840	EMA2CM101WM5D00T
200(2D)	10	FD0	180	EMA2DM100FD0D00T
	15	GB0	198	EMA2DM100GB0D00T
	22	GD0	240	EMA2DM150GD0D00T
	33	GE0	350	EMA2DM220GE0D00T
	47	GH0	440	EMA2DM330GH0D00T
	68	WM5	576	EMA2DM470WM5D00T
	100	WM5	670	EMA2DM680WM5D00T
250(2E)	4.7	FB0	120	EMA2EM47FB0D00T
	10	FE0	180	EMA2EM100FE0D00T
	22	GB0	200	EMA2EM100GB0D00T
	33	GH0	360	EMA2EM220GH0D00T
	47	WM5	435	EMA2EM330WM5D00T
	100	WM5	600	EMA2EM470WM5D00T
400(2G)	2.2	FB0	60	EMA2GM2R2FB0D00T
	3.3	FB0	76	EMA2GM3R3FB0D00T
	4.7	FE0	124	EMA2GM4R7FE0D00T
	5.6	GB0	124	EMA2GM4R7GB0D00T
	6.8	GE0	160	EMA2GM5R6GE0D00T
	10	GH0	176	EMA2GM6R8GE0D00T
	15	WG5	250	EMA2GM100GH0D00T
	22	WM5	300	EMA2GM150WG5D00T
	33	WM5	380	EMA2GM220WM5D00T
	47	WM5	380	EMA2GM220WM5D00T
450(2W)	2.2	GB0	70	EMA2WM2R2GB0D00T
	3.3	GB0	80	EMA2WM3R3GB0D00T
	4.7	GE0	130	EMA2WM4R7GE0D00T
	10	GH0	265	EMA2WM100GH0D00T
	15	WM5	310	EMA2WM150WM5D00T
	22	WM5	390	EMA2WM220WM5D00T