## MB Chip type, Low ESR, Higher Capacitance Series

- Low ESR, Higher Capacitance, High ripple current.
- Load life of 2000 hours at 105℃.
- SMD type:Lead free reflow soldering condition at 260 <sup>o</sup>C peak correspondence.
- RoHS Compliance(2011/65/EU)

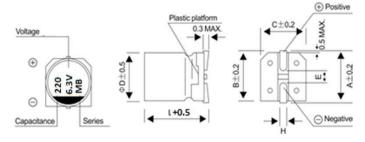
#### **■ SPECIFICATIONS**



Endurance   met when the capacitors are restored to 20 °C after the rated voltage is applied for 2000 hours at 105 °C   ESR(※1)   150% or less than the initial specified value   ESR(※1)   Leakage current(※2)   Less than or equal to the initial specified value   ESR(※1)   Leakage current(※2)   Less than or equal to the initial specified value   ESR(※1)   Ess than or equal to the initial specif	Items	Performance Characteristics								
Rated Capacitance Range   Capacitance Tolerance   ± 20 % (at 120Hz , 20°C)	Category Temperature Range	-55 ~ +105°C								
Capacitance Tolerance       ± 20 % (at 120Hz , 20 °C)         Tangent of Loss Angle (tan δ)       Less than or equal to the specified value at 120Hz, 20 °C         ESR(※1)       Less than or equal to the specified value at 100KHz, 20 °C         Leakage Current(※2)       Less than or equal to the specified value. After 2 minutes' application of rated voltage at 20 °C         Temperature Characteristics (Max. Impedance Ratio)       Z+105 °C / Z+20 °C ≤ 1.25 (100kHz)         Endurance       Z+105 °C / Z+20 °C ≤ 1.25 (100kHz)         The specifications listed at right shall be met when the capacitors are restored to 20 °C after the rated voltage is applied for 2000 hours at 105 °C       Capacitance change (within ±20% of the initial specified value (± tan δ)	Rated Voltage Range	2.5 ~ 16V								
Tangent of Loss Angle (tan δ)  Less than or equal to the specified value at 120Hz, 20°C  ESR(※1)  Less than or equal to the specified value at 100KHz, 20°C  Less than or equal to the specified value. After 2 minutes' application of rated voltage at 20°C  Temperature Characteristics (Max. Impedance Ratio)  Endurance  The specifications listed at right shall be met when the capacitors are restored to 20°C after the rated voltage is applied for 2000 hours at 105°C  Damp Heat (Steady State)  Damp Heat (Steady State)  The specifications listed at right shall be met when the capacitors are restored to 20°C after the rated voltage is applied for 1000 hours at 60°C, 90% RH.  After soldering the capacitor shall meet the specifications listed at right.  Pre-heating shall be done at 150 to 200  C and for 60 to 180 sec.  The duration for over +230 °C at capacitors change within ±10% of the initial specified value  ESR(※1)  Less than or equal to the specified value at 100KHz, 20°C  C apacitance change within ±20% of the initial specified value (ESR(※1))  Leakage current(※2)  Less than or equal to the specified value at 100KHz, 20°C  Capacitance change within ±20% of the initial specified value (ESR(※1))  ESR(※1)  Less than or equal to the initial specified value (ESR(※1))  The specifications listed at right shall be met when the capacitors are restored to 20°C γ0% RH.  After soldering the capacitor shall meet the specifications listed at right.  Pre-heating shall be done at 150 to 200 °C and for 60 to 180 sec.  The duration for over +230 °C at capacitors change within ±10% of the initial specified value (ESR(※1))  Leakage current(※2)  Less than or equal to the initial specified value (ESR(※1))  Leakage current(※2)  Less than or equal to the initial specified value (ESR(※1))  Leakage current(※2)  Less than or equal to the initial specified value (ESR(※1))  ESR(※1)  Leakage current(※2)  Less than or equal to the initial specified value (ESR(※1))  ESR(※1)  Leakage current(※2)  Less than or equal to the initial specified valu	Rated Capacitance Range	1								
ESR(※1)  Less than or equal to the specified value at 100KHz, 20°C  Leakage Current(※2)  Temperature Characteristics (Max. Impedance Ratio)  Endurance  Endurance  Less than or equal to the specified value. After 2 minutes' application of rated voltage at 20°C  Z+105°C /Z+20°C ≤1.25 (100kHz)  Z-55°C /Z+20°C ≤1.25 (100kHz)  Z-50°C or less than the initial specified value (100kHz)  Z-50°C or less than the initial specified value (100kHz)  Z-50°C or less than the										
Leakage Current(※2)         Less than or equal to the specified value. After 2 minutes' application of rated voltage at 20 °C           Temperature Characteristics (Max. Impedance Ratio)         Z+105° C / Z+20° € 1.25 (100kHz)         Z-55° / Z+20° € 1.25           Endurance         The specifications listed at right shall be met when the capacitors are restored to 20 °C after the rated voltage is applied for 2000 hours at 105 °C         Capacitance change         Within ±20% of the initial capacitance value(※ tan δ         Less than or equal to the initial specified value           Damp Heat (Steady State)         The specifications listed at right shall be met when the capacitors are restored to 20 °C after the rated voltage is applied for 1000 hours at 60 °C, 90% RH.         Capacitance change Within ±20% of the initial specified value         Within ±20% of the initial specified value           ESR(※1)         150% or less than the initial specified value         Capacitance change Within ±20% of the initial specified value         Value (ERRICH)         Value (ERRI	0 \ /									
Temperature Characteristics (Max. Impedance Ratio)  Endurance  Endurance  The specifications listed at right shall be met when the capacitors are restored to 20 ℃ after the rated voltage is applied for 2000 hours at 105 ℃  Damp Heat (Steady State)  The specifications listed at right shall be met when the capacitors are restored to 20 ℃ after the rated voltage is applied for 2000 hours at 105 ℃  The specifications listed at right shall be met when the capacitors are restored to 20 ℃ after the rated voltage is applied for 1000 hours at 60 ℃, 90% RH.  After soldering the capacitor shall meet the specifications listed at right.  Pre-heating shall be done at 150 to 200 ℃ and for 60 to 180 sec.  The duration for over +230 ℃ at capacitor surface shall not exceed 60 seconds.  In case peak temperature is 250 ℃ or less than or equal to the initial specified value  ESR(※1) 150% or less than the initial specified value  ESR(※1) 150% or less than the initial specified value  ESR(※1) 150% or less than the initial specified value  Capacitance change Within ±20% of the initial capacitance value(※ tan δ 150% or less than the initial specified value  ESR(※1) 150% or less than the initial specified value  ESR(※1) 150% or less than the initial specified value  ESR(※1) 130% or less than the initial specified value  ESR(※1) 130% or less than the initial specified value  ESR(※1) 130% or less than the initial specified value  ESR(※1) 130% or less than the initial specified value  ESR(※1) 130% or less than the initial specified value  ESR(※1) 130% or less than the initial specified value  ESR(※1) 130% or less than the initial specified value  ESR(※1) 130% or less than the initial specified value  ESR(※1) 130% or less than the initial specified value  ESR(※1) 130% or less than the initial specified value  ESR(※1) 130% or less than the initial specified value  ESR(※1) 130% or less than the initial specified value  ESR(※1) 130% or less than the initial specified value  ESR(※1) 130% or less than the initial specified value  ESR(※1) 130%										
Capacitance Ratio   Z-55° / Z+20° € 1.25   The specifications listed at right shall be met when the capacitors are restored to 20 °C after the rated voltage is applied for 1000 hours at 105° C   The specifications listed at right shall be met when the capacitors are restored to 20 °C after the rated voltage is applied for 1000 hours at 60° C, 90% RH.   Leakage current(%2)   Leas than or equal to the initial specified value   ESR(※1)   150% or less than the initial specified value   ESR(※1)   150% or less than the initial specified value   ESR(※1)   150% or less than the initial specified value   ESR(※1)   150% or less than the initial specified value   ESR(※1)   150% or less than the initial specified value   ESR(※1)   150% or less than the initial specified value   ESR(※1)   150% or less than the initial specified value   ESR(※1)   150% or less than the initial specified value   ESR(※1)   150% or less than the initial specified value   ESR(※1)   130% or less than the initial specified value   ESR(※1)   130% or less than the initial specified value   ESR(※1)   130% or less than the initial specified value   ESR(※1)   130% or less than the initial specified value   ESR(※1)   130% or less than the initial specified value   ESR(※1)   130% or less than the initial specified value   ESR(※1)   130% or less than the initial specified value   ESR(※1)   130% or less than the initial specified value   ESR(※1)   ESR(*1)   ESR(*1)   ESR(*1)   ESR(*1)										
The specifications listed at right shall be met when the capacitors are restored to 20 °C after the rated voltage is applied for 2000 hours at 105 °C  Damp Heat (Steady State)  The specifications listed at right shall be met when the capacitors are restored to 20 °C after the rated voltage is applied for 1000 hours at 60 °C, 90% RH.  After soldering the capacitor shall meet the specifications listed at right. Pre-heating shall be done at 150 to 200 °C and for 60 to 180 sec.  The duration for over +230 °C at capacitor surface shall not exceed 60 seconds.  In case peak temperature is 250 °C or less, reflow soldering shall be two times maximum.  Capacitance change within ±20% of the initial specified value Leakage current(%2) Less than or equal to the initial specified value Within ±10% of the initial specified value (% tan δ 130% or less than the initial specified value (% tan δ 130% or less than the initial specified value (% tan δ 130% or less than the initial specified value (% tan δ 130% or less than the initial specified value (% tan δ 130% or less than the initial specified value (% tan δ 130% or less than the initial specified value (% tan δ 130% or less than the initial specified value (% tan δ 130% or less than the initial specified value (% tan δ 130% or less than the initial specified value (% tan δ 130% or less than the initial specified value (% tan δ 130% or less than the initial specified value (% tan δ 130% or less than the initial specified value (% tan δ 130% or less than or equal to the initial specified value (% tan δ 130% or less than the initial specified value (% tan δ 130% or less than or equal to the initial specified value (% tan δ 130% or less than or equal to the initial specified value (% tan δ 130% or less than or equal to the initial specified value (% tan δ 130% or less than the initial specified value (% tan δ 130% or less than the initial specified value (% tan δ 130% or less		Z+105℃ / Z+20℃ ≤1.25 (100kHz)								
Endurance   met when the capacitors are restored to 20 °C after the rated voltage is applied for 2000 hours at 105 °C   ESR(※1)   150% or less than the initial specified value   ESR(※1)   Leakage current(※2)   Less than or equal to the initial specified value   ESR(※1)   Leakage current(※2)   Less than or equal to the initial specified value   ESR(※1)   Ess than or equal to the initial specified value   ESR(※1)   Leakage current(※2)   Less than or equal to the initial specified value   ESR(※1)   Ess	(Max. Impedance Ratio)									
Damp Heat (Steady State)   20 °C after the rated voltage is applied for 2000 hours at 105 °C   Leakage current(%2)   Less than or equal to the initial specified value				Within ±20% of the initial capacitance value(※3)						
Damp Heat (Steady State)  Damp Heat (Steady	Endurance	met when the capacitors are restored to	tan δ							
The specifications listed at right shall be met when the capacitors are restored to 20 °C after the rated voltage is applied for 1000 hours at 60 °C, 90% RH.  After soldering the capacitor shall meet the specifications listed at right. Pre-heating shall be done at 150 to 200 °C and for 60 to 180 sec. The duration for over +230 °C at capacitor surface shall not exceed 60 seconds.  Resistance to Soldering Heat  The specifications listed at right shall be met when the capacitors are restored to 20 °C after the rated voltage is applied for 150% or less than the initial specified value ESR(※1) 150% or less than the initial specified value Ucapacitance change within ±10% of the initial specified value Ucapacitance chan	Endaranos	, , , , , , , , , , , , , , , , , , , ,		·						
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20 °C after the rated voltage is applied for 1000 hours at 60 °C, 90% RH.  After soldering the capacitor shall meet the specifications listed at right. Pre-heating shall be done at 150 to 200 °C and for 60 to 180 sec. The duration for over +230 °C at capacitor surface shall not exceed 60 seconds.  Resistance to Soldering Heat    20 °C after the rated voltage is applied for 1000 hours at 60 °C, 90% RH.   Leakage current(%2)   Less than or equal to the initial specified value			tan δ							
After soldering the capacitor shall meet the specifications listed at right.  Pre-heating shall be done at 150 to 200 °C and for 60 to 180 sec.  The duration for over +230 °C at capacitor surface shall not exceed 60 seconds.  In case peak temperature is 250 °C or less, reflow soldering shall be two times maximum.  Capacitance change Within ±10% of the initial capacitance value(※ tan ō 130% or less than the initial specified value ESR(※1) 130% or less than the initial specified value Leakage current(※2) Less than or equal to the initial specified value Leakage current(※2) Less than or equal to the initial specified value Leakage current(※2) Less than or equal to the initial specified value Leakage current(※2) Less than or equal to the initial specified value Leakage current(※2) Less than or equal to the initial specified value Leakage current(※2) Less than or equal to the initial specified value Leakage current(※2) Less than or equal to the initial specified value Leakage current(※2) Less than or equal to the initial specified value Leakage current(※2) Less than or equal to the initial specified value Leakage current(※2) Less than or equal to the initial specified value Leakage current(※2) Less than or equal to the initial specified value Leakage current(※2) Less than or equal to the initial specified value Leakage current(※2) Less than or equal to the initial specified value Leakage current(※2) Less than or equal to the initial specified value Leakage current(※2) Leakage current(※2) Less than or equal to the initial specified value Leakage current(※2) Leakage current(※2) Leakage current(※3) Leakage current(※4) Leakage		20 ℃ after the rated voltage is applied	ESR(※1)							
the specifications listed at right.  Pre-heating shall be done at 150 to 200  ℂ and for 60 to 180 sec.  The duration for over +230 ℂ at capacitor surface shall not exceed 60 seconds.  Resistance to Soldering Heat  the specifications listed at right.  Pre-heating shall be done at 150 to 200  ℂ and for 60 to 180 sec.  The duration for over +230 ℂ at capacitor surface shall not exceed 60 seconds.  In case peak temperature is 250 ℂ or less, reflow soldering shall be two times maximum.				Less than or equal to the initial specified value						
Pre-heating shall be done at 150 to 200 °C and for 60 to 180 sec.  The duration for over +230 °C at capacitor surface shall not exceed 60 seconds.  Resistance to Soldering Heat  Pre-heating shall be done at 150 to 200 °C and for 60 to 180 sec.  The duration for over +230 °C at capacitor surface shall not exceed 60 seconds.  In case peak temperature is 250 °C or less, reflow soldering shall be two times maximum.			Capacitance change	Within ±10% of the initial capacitance value(※3)						
Resistance to Soldering Heat  C and for 60 to 180 sec.  The duration for over +230 °C at capacitor surface shall not exceed 60 seconds.  In case peak temperature is 250 °C or less, reflow soldering shall be two times maximum.		, ,	tan δ	130% or less than the initial specified value						
The duration for over +230 °C at capacitor surface shall not exceed 60 seconds.  Resistance to Soldering Heat  The duration for over +230 °C at capacitor surface shall not exceed 60 seconds.  In case peak temperature is 250 °C or less, reflow soldering shall be two times maximum.  Leakage current(※2)  Less than or equal to the initial specified value			ESR(%1)	•						
Resistance to Soldering Heat  capacitor surface shall not exceed 60 seconds.  In case peak temperature is 250 °C or less, reflow soldering shall be two times maximum.			Leakage current(%2)	Less than or equal to the initial specified value						
Soldering Heat  In case peak temperature is 250 °C or less, reflow soldering shall be two times maximum.		•								
less, reflow soldering shall be two times maximum.		In case peak temperature is 250 ℃ or								
In case peak temperature is 260 °C or										
I III case pear temperature is 200 C or		In case peak temperature is 260 °C or								
less, reflow soldering shall be once.		less, reflow soldering shall be once.								
Measurement for solder temperature										
profiles shall be made at the capacitor										
top and the terminal.										
Marking Red print on the case top	Marking	Red print on the case top								

- \*1 ESR should be measured at both of the terminal ends closest where the terminals protrude through the plastic platform
- %2 Conditioning: If any doubt arises, measure the leakage current after the voltage treatment of applying DC rated voltage continuously to the capacitor for 120 minutes at 105 ℃
- X3 Initial value: The value before test of examination of resistance to soldering.

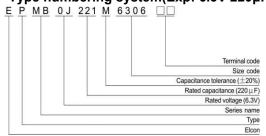
#### ■ Dimensions



ΦxL(mm)

			(,					
Size	5x5.8/8	6.3x5.8/6.5	6.3x7.7	6.3x9	8x6.7	8x7.7	10x12	
ФD	5.0	6.3	6.3	6.3	8.0	8.0	10.0	
L	5.8/8	5.8/6.5	7.7	9	6.7	7.7	12	
Α	6.0	7.3	7.3	7.3	9.0	9.0	11.0	
В	5.3	6.6	6.6	6.6	8.3	8.3	10.3	
С	5.3	6.6	6.6	6.6	8.3	8.3	10.3	
Е	1.6	2.1	2.1	2.1	3.2	3.2	4.6	
Н	0.5-0.8	0.5-0.8	0.5-0.8	0.5-0.8	0.8-1.1	0.8-1.1	0.8-1.1	

#### Type numbering system(Exp: 6.3V 220µF)



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	V	2.5	4	6.3	10	16
	Code	0E	0G	0J	1A	1C

# MB Series

### **■ STANDARD RATINGS**

Rated voltage (V)(code)	Surge Voltage (V)	Rated Capacitance (µF)	Case Size ФD x L(mm)	tan δ	Leakage Current (µA)	ESR(mΩ) (at 100kHz 20°C)	Rated Ripple (mArms)	Part Number
(V)(Code)	(V)		55.0	0.40		40	2000	EDMDOE004MOSSOTE
		330	5x5.8	0.12	165	10	3900	EPMB0E331M0558TR
		390	5x5.8	0.12	196	10	3900	EPMB0E391M0558TF
		390	6.3x5.8	0.12	196	10	3900	EPMB0E391M6358TF
2.5	- 0	470	6.3x7.7	0.12	236	9	4200	EPMB0E471M6377TF
(0E)	2.8	560	6.3x5.8	0.12	280 280	10	3900	EPMB0E561M6358TF
( )		560	6.3x7.7	0.12		9	4200	EPMB0E561M6377TF
		560	6.3x7	0.12	280	10	4500	EPMB0E561M6307TF
		680	6.3x7	0.12	340 500	10	4500	EPMB0E681M6307TF
		1000	8x7.7	0.12		9	4500	EPMB0E102M0877TF EPMB0G331M6358TF
		330	6.3x5.8	0.12	132	10	3900	
		390	6.3x7.7	0.12	234	9	4200	EPMB0G391M6377TF
		470	6x6.7	0.12	282		4500	EPMB0G471M0667TI
		560	6x6.7	0.12	336	10	4500	EPMB0G561M0667TI
		680	8x7.7	0.12	408	9	4500	EPMB0G681M0877TF
		150	5x5.8	0.12	60	12	3500	EPMB0J151M0558TF
4		220	5x5.8	0.12	88	12	3500	EPMB0J221M0558TF
(0G)	4.6	220	6.3x5.8	0.12	88	10	3900	EPMB0J221M6358TF
()		270	6.3x7.7	0.12	108	9	4200	EPMB0J271M6377TF
		330	6.3x5.8	0.12	132	10	3900	EPMB0J331M6358TF
		330	6.3x7.7	0.12	132	9	4200	EPMB0J331M6377TF
		330	6.3x7	0.12	132	10	4500	EPMB0J331M6307TF
		390	6.3x7	0.12	156	10	4500	EPMB0J391M6307TF
		470	8x7.7	0.12	188	9	4500	EPMB0J471M0877TF
		560	8x7.7	0.12	224	9	4500	EPMB0J561M0877TF
		100	5x5.5	0.12	126	25	2200	EPMB0J101M0555TF
		220	6.3x4.2	0.12	278	18	3200	EPMB0J221M6342TF
		220	6.3x5	0.12	278	16	3400	EPMB0J221M6305TF
6.3	7.2	220	6.3x6	0.12	278	16	3400	EPMB0J221M6306TF
(OJ)	1.2	270	5x8	0.12	340	16	3000	EPMB0J271M0508TF
		270	5x9	0.12	340	16	3000	EPMB0J271M0509TF
		330	6.3x6.5	0.12	416	12	3950	EPMB0J331M6365TF
		470	6.3x7.7	0.12	592	12	3950	EPMB0J331M6365TF
		470	6.3x9	0.12	592	12	3450	
								EPMB0J471M6309TF
		560	6.3x6	0.12	706	10	4500	EPMB0J561M6309TF
		560	6.3x9	0.12	706	10	4500	EPMB0J561M6309TF
		1000	8x12	0.12	1260	10	5100	EPMB0J102M0812TR
		1500	10x10	0.12	1890	9	5600	EPMB0J152M1010TR
		2200	10x13	0.12	2772	10	6100	EPMB0J222M1013TR
		56	6.3x6	0.12	112	28	2550	EPMB1A680M6306TF
10		100	6.3x5.5	0.12	200	25	2600	EPMB1A101M6355TI
10	11.5	120	5x5.8	0.12	240	22	2600	EPMB1A121M0558TF
(1A)		150	6.3x6.5	0.12	300	20	2800	EPMB1A151M6365TF
		220	6.3x6.5	0.12	440	20	2900	EPMB1A221M6365TI
		220	6.3x7.7	0.12	440	20	2800	
								EPMB1A221M6377TF
		270	6.3x5.8	0.12	540	20	2800	EPMB1A271M6358TF
		100	6.3x6	0.12	160	24	2500	EPMB1C101M6306T
		100	6.3x6.5	0.12	160	24	2500	EPMB1C101M6365T
40		100	6.3x8	0.12	160	22	2600	EPPB1C101M6308TI
16	18.4	180	6.3x5.8	0.12	288	22	3300	EPMB1C181M6358T
(1C)		220	6.3x7.7	0.12	352	22	3300	EPMB1C221M6377T
		220	6.3x9	0.12	352	20	3500	EPMB1C221M6309TI
		270	8x6.7	0.12	432	22	3300	EPMB1C271M0867T
		270	8x9	0.12	432	20	3800	EPMB1C271M0809TF
		330	8x7.7	0.12	525	21	3400	EPMB1C331M0877TI
		470	10x12	0.12	752	11	5200	EPMB1C471M1012TI
		1000	10x12	0.12	1600	10	5800	EPMB1C102M1012T