



Power Metal Film MELF Resistors (lead-free)

1. Scope

These drawings for approval shall be applied to the Power Metal Film MELF resistors (PMM series) of lead-free manufactured.

2. Part Number

Part number of the Power Metal Film MELF Resistors is indentified by the series, size, power rating, tolerance, temperature coefficient, packing, special code and resistance value. The resistors are coated with layers of blue color lacquer.

Ex:

P M M	C	1SS	F	C 2	R	-	100K
Series Code	Size Code	Power Rating	Resistance Tolerance	T.C.R. (ppm/°C)	Packaging Code	Special Code	Resistance Value
PMM	C = 0207 D = 0309	1SS = 1WSS 1WS = 1WS 2SS = 2WSS	F = ±1% G = ±2% J = ±5%	C1 = ±100 C2 = ±50 C3 = ±25	R=Tape/Reel B=Bulk	Base on Spec.	100R = 100 10K = 10,000 1M = 1,000,000

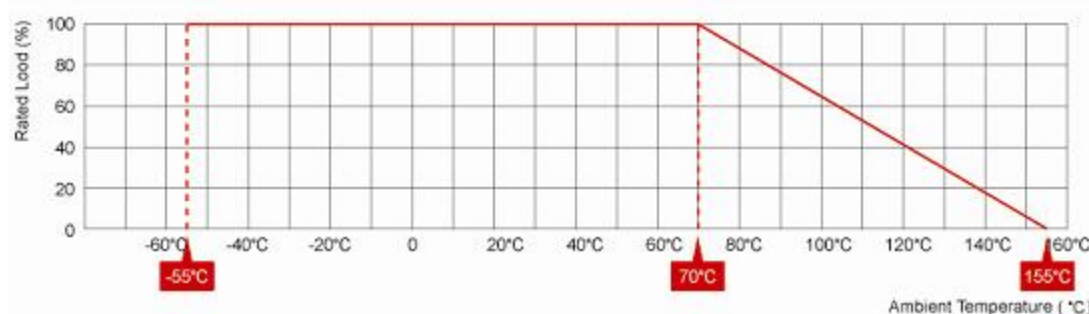
3. Specification

Series	Size Code	Power Rating	T.C.R (x10 ⁻⁶ /K)	Resistance Tol. & Range			Max.Working Voltage	Max.Overload Voltage
				F(±1%)	G(±2%)	J(±5%)		
PMMC1SS	0207	1W	±100	5M11-10M 0.1R-0.99R	-	0.1R-0.99R	350V	700V
			±50	1R-5M1	1R-5M1	-		
			±25	100R-560K	-	-		
PMMD1WS	0309	1W	±100	5M11-10M	-	0.1R-0.99R		
			±50	1R-5M1	1R-5M1	-		
			±25	100R-560K	-	-		
PMMD2SS		2W	±100	5M11-10M	-	0.1R-0.99R		
			±50	1R-5M1	1R-5M1	-		
			±25	100R-560K	-	-		

Note : Below or over this resistance on request.

4. Termination surface material is tin plating.

5. Derating Curve

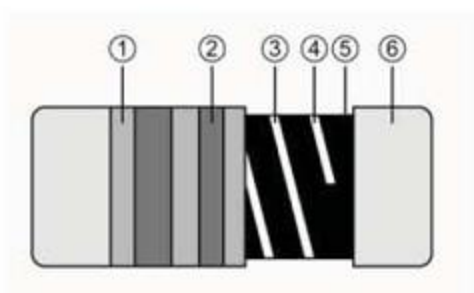


For resistors operated in ambient temperatures above 70°C, power rating must be derated in accordance with the above curve.



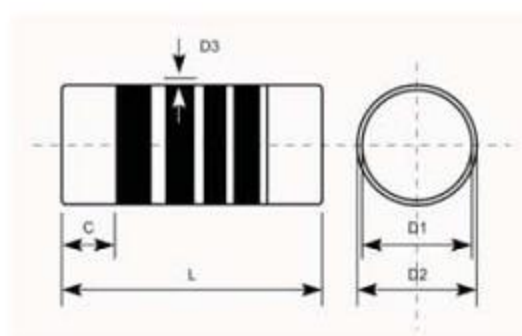
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6. Construction




Item	Material
① Insulation Coating	Epoxy Insulation (Color: Tan)
② Marking	Epoxy Resin
③ Cutting Line	-
④ Ceramic Core	Aluminum Material
⑤ Resistive Film	Metal Film
⑥ Terminal	Terminal Material : Fe/Cu/Sn

7. Dimension



Size code	尺寸 (毫米) Dimension (mm)				
	L	D1	D2 Max	D3 Max	C Min
C (0207)	5.9±0.2	2.20±0.1	2.40	0.15	0.5
D (0309)	8.5±0.2	3.20±0.2	3.40	0.30	0.5

8. Color Band



COLOR	1st BAND	2nd BAND	3rd BAND	MULTIPLIER
BLACK	0	0	0	1Ω
BROWN	1	1	1	10Ω
RED	2	2	2	100Ω
ORANGE	3	3	3	1KΩ
YELLOW	4	4	4	10KΩ
GREEN	5	5	5	100KΩ
BLUE	6	6	6	1MΩ
VIOLET	7	7	7	10MΩ
GREY	8	8	8	
WHITE	9	9	9	
GOLD				0.1Ω
SILVER				0.01Ω

Note :

The tolerance 1% with 4 bands for E96 & E24 series, the tolerance 5% with 3 bands for E24 series.



9. Environmental characteristics

No.	Test Item	Performance Requirements	Test Methods (JIS-C-5201-1)									
1	T.C.R	Within specified T.C.R	+25°C/-55°C and +25°C/+125°C									
2	Solderability	More than 95% of the total area of the electrode part shall be covered with new solder	Temperature of solder: 235±5°C Dipping time: 3±0.5 sec									
3	Resistance to solvent	Epoxy Insulation coating can not be peeled	There are 3 circles, each circle takes 1 min.									
4.	Resistance to soldering heat	Based on the Iron cap loose standard , the change of the resistance value shall be within ±(0.5%+0.05Ω)	Temperature: 260±5°C Dipping time:10±1 sec									
5.	Short time overload	The change of the resistance valueshall be within ±(0.5%+0.05Ω)	V=√R×P×2.5 , 5 sec. V= Rated Voltage R=Resistance Value P=Power Rating <table><tr><td>Size code</td><td>0207</td><td>0309</td></tr><tr><td>Power Rating</td><td>1/2W</td><td>1/2W</td></tr><tr><td>Votage Max</td><td>500V</td><td>700V</td></tr></table>	Size code	0207	0309	Power Rating	1/2W	1/2W	Votage Max	500V	700V
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Power Rating	1/2W	1/2W										
Votage Max	500V	700V										
6	Overload	Within specified tolerance	V=√R×P×3 , 2.5 sec. V= Rated Voltage R=Resistance Value P=Power Rating <table><tr><td>Size code</td><td>0207</td><td>0309</td></tr><tr><td>Power Rating</td><td>1/2W</td><td>1/2W</td></tr><tr><td>Votage Max</td><td>500V</td><td>700V</td></tr></table>	Size code	0207	0309	Power Rating	1/2W	1/2W	Votage Max	500V	700V
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Power Rating	1/2W	1/2W										
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7.	Humidity resistance	The change of the resistance value shall be within ±(1%+0.05Ω)	40°C±2°C, 90%~95% RH, 1.5hr ON / 0.5hr OFF cycle, total test 1000hr.									
8.	Load Life test	The change of the resistance value shall be within ±(3%+0.05Ω)	Constant temperature chamber of 70°C±2°C,DC 1.5hr ON / 0.5hr OFF cycle, applied continuously for 1,000±48hr.									



10. Standard Packing Quantity

Size code	Tape/Reel Q'ty (pcs)			Bulk Q'ty (pcs)	Weight (g)	
	Reel	Case	Carton	Bag	Reel	Net/Kpcs
C (0207)	2,000	8,000	96,000	5,000	383.5	155
D (0309)	2,500	2,500	15,000	5,000	2,505	160

11. Embossed Taping & Tape/Reel dimension

▼ Embossed taping dimension

Type	W	P	E	F	D	D ₁	P ₀	P ₂	A ₀	B ₀	K ₀	t
0207	12±0.1	4±0.1	1.75±0.1	5.5±0.05	1.5±0.1	1.5±0.1	4±0.1	2±0.1	2.4±0.1	6.05±0.1	2.50±0.1	0.30±0.05
0309	16±0.1	8±0.1	1.75±0.1	7.5±0.10	1.5±0.1	1.5±0.1	4±0.1	2±0.1	3.5±0.1	8.85±0.1	3.50±0.1	0.35±0.05

▼ Tape/Reel dimension

Type	ØA	ØB	ØC	W	T
0207	178±1	60.0±0.5	13.0±0.5	13.2±0.5	16.0±0.20
0309	330±1	100±1.0	13.0±0.5	17.0±0.5	21.5±0.20



12. Caution

12-1 Storage and usage method

12-2 Humidity gives damage to cap solderability, therefore, please keep environment.

Temperature : +5°C~+40°C

Humidity : 55%~75%RH

Storage limited : 12 months

12-3 Please follow the instruction to keep the material when it is unpacked.

12-4 When ambient temperature exceeds a rated ambient temperature, the resistance shall be applied on the derating curve by derating the load power.

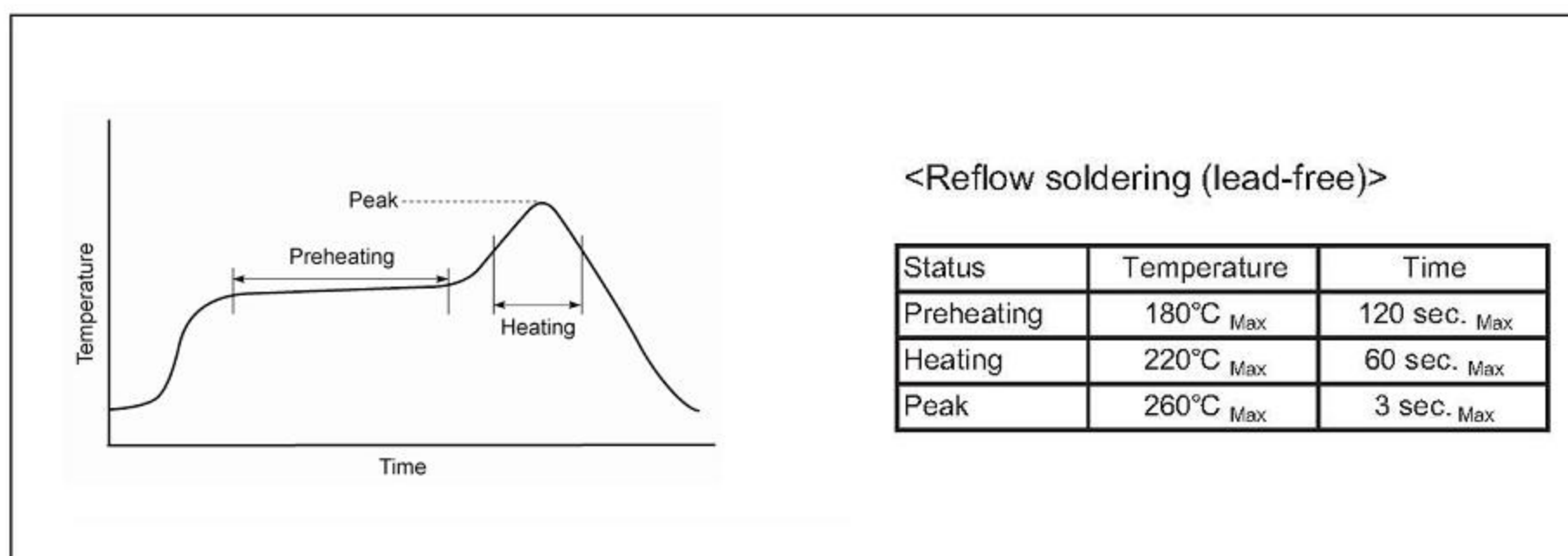
12-5 Please avoid join many resistors in series or parallel when apply high voltage or high electric current.

12-6 Molding products by using resin might bring out resistance value change. Please keep away from Molding.

12-7 This products meet the RoHS Compliant.

13. Soldering : We recommend the following condition to keep products performance.

13-1 Conditions for reflow



13-2 Flow soldering (lead-free)

Temperature : 260°C_{Max}

Time : 10 sec. Max