

Metal Film Precision MELF Resistors **multicomp** PRO

**RoHS
Compliant**

Features

- AEC-Q200 Compliance
- Sn termination on Ni barrier layer
- Excellent overall stability
- High power rating

Applications

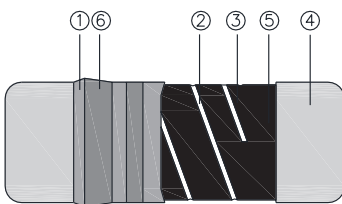
- Automotive
- Telecommunication
- Medical Equipment
- Measurement / Testing Equipment



Specifications

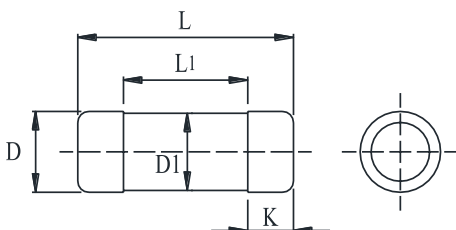
Resistance Range	0 ohm; 8.2 ohm to 1Mohm		
Resistance Tolerance	±5%; ±1%; ±0.1%		
Temperature Coefficient	±50ppm/°C; ±15ppm/°C		
Operation Mode	Standard Power	High power	
Power Rating P ₇₀	1/8W	1/5W	0.3W
Operating Voltage U _{max.}	150V	200V	200V
Operating Temperature Range	-55°C to +155°C		
Max. Resistance Change at P70 for resistance range, ΔR/R max., after 1000 h	≤0.5%		

Construction



①	Insulation Coating	④	Electrode Cap
②	Trimming Line	⑤	Resistor Layer
③	Ceramic Rod	⑥	Marking

Dimensions

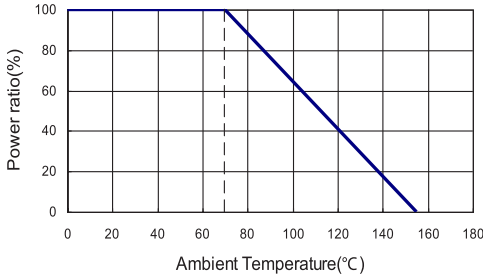


Case Style	L (mm)	L 1min. (mm)	ΦD (mm)	ΦD1 (mm)	K (mm)	Weight (g) (1,000 EA)
0102	2.2±0.1	1.1	1.1±0.1	D +0/-0.15	0.45±0.05	7.7

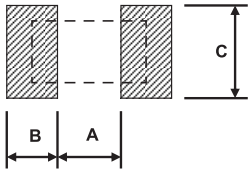
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Derating Curve



Recommend Land Pattern



Case Style	A	B	C
0102	1mm	0.8mm	1.5mm

Standard Electrical Specifications

Case Style	Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range			TCR (PPM/°C)
					± 0.1%	±1%	±5%	
0102	1/8W Jumper: 2A	-55°C to +155°C	150V	300V	100Ω-56KΩ		-	±15
					-	8.2Ω-1MΩ		±50
					-		0Ω (<15mΩ)	-

High Power (HP) Rating Electrical Specification

Case Style	Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range			TCR (PPM/°C)
					± 0.1%	±1%	±5%	
0102	1/5W	-55°C to +155°C	200V	400V	100Ω-56KΩ		-	±15
	0.3W				-	8.2Ω-1MΩ		±50

Operating Voltage= $\sqrt{P \cdot R}$ or Max. Operating Voltage listed above, whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$ or Max. Overload Voltage listed above, whichever is lower.

RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$ or Max. Operating Voltage whichever is lower.

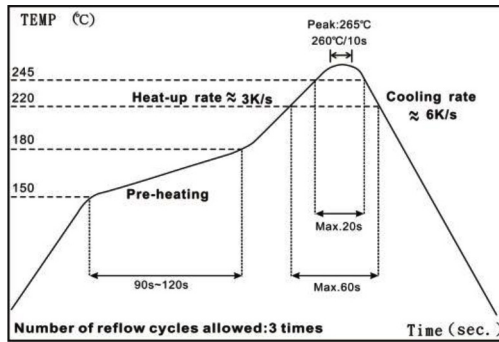
Environmental Characteristics

Item	Requirement		Test Method
	5% and Below	Jumper	
Temperature Coefficient of Resistance (T.C.R.)	As Spec.		JIS-C-5201-1 4.8 IEC-60115-1 4.8 -55°C to +125°C, 25°C is the reference temperature
Short Time Overload	10Ω-270KΩ: ±(0.1%+0.05Ω) <10Ω & >270KΩ: ±(0.15%+0.05Ω) 0102: ±(0.15%+0.05Ω)	<15mΩ	JIS-C-5201-1 4.13 IEC-60115-1 4.13 RCWV*2.5 or Max. Overload Voltage whichever is lower for 5 seconds
Insulation Resistance	≥10G		JIS-C-5201-1 4.6 IEC-60115-1 4.6 Max. Overload Voltage for 1 minute
Operational Life	10Ω-270KΩ: ±(0.25%+0.05Ω) <10Ω & >270KΩ: ±(0.5%+0.05Ω) 0102: ±(0.5%+0.05Ω)	<15mΩ	MIL-STD-202 Method 108 Condition D Steady State TA=125°C at derated power. Measurement at 24±4 hours after test conclusion.
Biased Humidity	10Ω-270KΩ: ±(0.5%+0.05Ω) <10Ω & >270KΩ: ±(1%+0.05Ω) 0102: ±(2%+0.05Ω)	<15mΩ	MIL-STD-202 Method 103 1000 hrs 85°C/85%RH 10% of operating power.
High Temperature Exposure	10Ω-270KΩ: ±(0.25%+0.05Ω) <10Ω & >270KΩ: ±(1%+0.05Ω) 0102: ±(1%+0.05Ω)	<15mΩ	MIL-STD-202 Method 108 at +155°C for 1000 hrs
Board Flex	10Ω-270KΩ: ±(0.1%+0.05Ω) <10Ω & >270KΩ: ±(0.5%+0.05Ω) 0102: ±(0.5%+0.05Ω)	<15mΩ	AEC-Q200-005 Bending once for 60 seconds with 2mm
Solderability	95% min. coverage		JIS-C-5201-1 4.17 IEC-60115-1 4.17 J-STD-002 245 ±5°C for 3 seconds
Resistance to Soldering Heat	10Ω-270KΩ: ±(0.1%+0.05Ω) <10Ω & >270KΩ: ±(0.25%+0.05Ω) 0102: ±(0.25%+0.05Ω)	<15mΩ	MIL-STD-202 Method 210 260±5°C for 10 seconds
Voltage Proof	No breakdown or flashover		JIS-C-5201-1 4.7 IEC-60115-1 4.7 1.42 times Max. Operating Voltage for 1 minute
Leaching	Individual leaching area ≤5% Total leaching area ≤10%		JIS-C-5201-1 4.18 IEC-60068-2-58 8.2.1 260±5°C for 30 seconds
Temperature Cycling	10Ω-270KΩ: ±(0.25%+0.05Ω) <10Ω & >270KΩ: ±(0.5%+0.05Ω) 0102: ±(1%+0.05Ω)	<15mΩ	JESD22 Method JA-104 -55°C to +125°C, 1000 cycles
Mechanical Shock	±(0.25%+0.05Ω)	<15mΩ	MIL-STD-202 Method 213 Wave Form: Tolerance for half sine shock pulse. Peak value is 100g's. Normal duration (D) is 6.

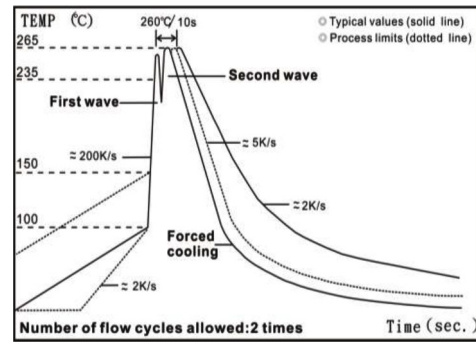
Item	Requirement		Test Method
	5% and Below	Jumper	
Vibration	$\pm(0.5\%+0.05\Omega)$	<15m Ω	MIL-STD-202 Method 204 5 g's for 20 min., 12 cycles each of 3 orientations, 10-2000 Hz
ESD	$\pm(0.5\%+0.05\Omega)$	<15m Ω	AEC-Q200-002 Human body, 2KV
Resistance to Solvents	No visible damage on appearance and marking.		MIL-STD-202 Method 215 Add Aqueous wash chemical - OKEM Clean or equivalent. Do not use banned solvents.
Terminal Strength	No broken		AEC-Q200-006 Force of 1.8kg for 60 seconds.
Flammability	No ignition of the tissue paper or scorching or the pinewood board		UL-94 V-0 or V-1 are acceptable. Electrical test not required.

RCWV(Rated Continuous Working Voltage)= $\sqrt{(P*R)}$ or Max. Operating Voltage whichever is lower

Soldering Condition



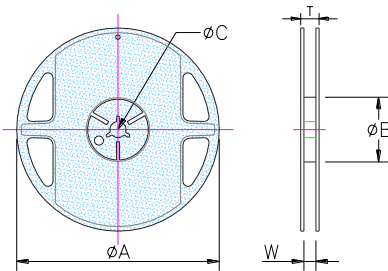
IR Reflow Soldering



Wave Soldering (For R>10 Ω)

- (1) Time of IR reflow soldering at maximum temperature point 260°C: 10s
- (2) Time of wave soldering at maximum temperature point 260°C: 10s
- (3) Time of soldering iron at maximum temperature point 410°C: 5s

Packing

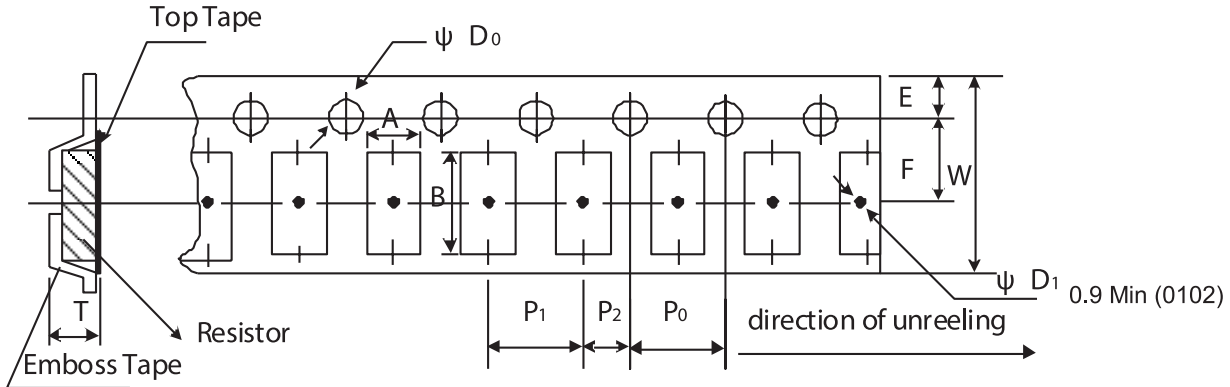


Packing Quantity & Real Specifications

Case Style	Reel Diameter	ΦA (mm)	ΦB (mm)	ΦC (mm)	W (mm)	T (mm)	Emboss Plastic Tape (EA)
0102	7 inch	178.5 ±1.5	60 +1	13 ±0.2	9 ±0.5	12.5 ±0.5	3,000

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Emboss Plastic Tape Specifications



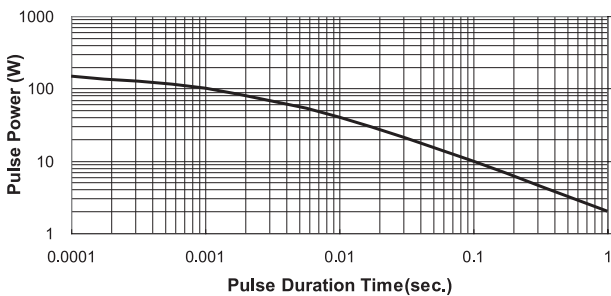
Case Style	A	B	w	E	F	P ₀	p ₁	p ₂	ΦD ₀	T
0102	1.3 ±0.1	2.4 ±0.1	8 ±0.1	1.75 ±0.1	3.5 ±0.05	4 ±0.1	4 ±0.1	2 ±0.05	1.5 +0.1	1.5 ±0.1

Dimensions : Millimetres

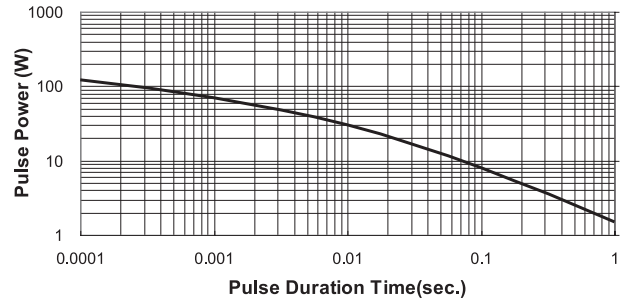
Pulse withstanding capacity

The single impulse graph is the result of 50 impulses of rectangular shape applied at one-minute intervals. The limit of acceptance was a shift in resistance of less than 1% from the initial value. The power applied was subject to the restrictions of the maximum permissible impulse voltage graph shown.

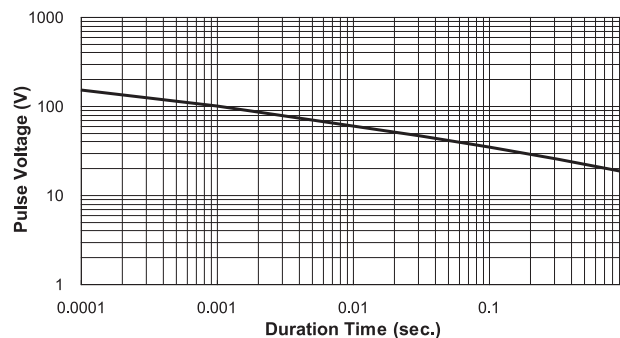
Series Single Pulse



Series Continuous Pulse



Series Pulse Voltage(100 Ohm)

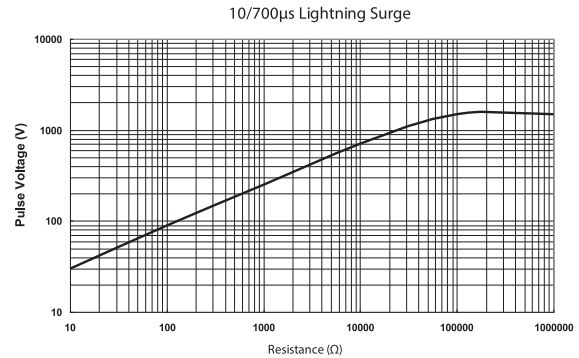
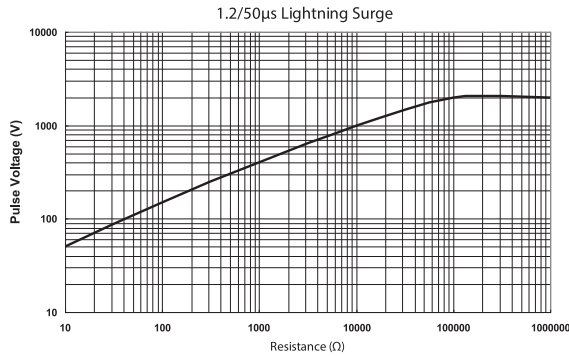


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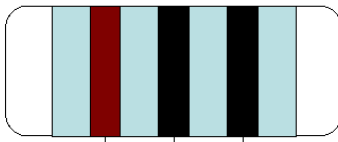
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Lightning Surge

Resistors are tested in accordance with IEC 60115-1 using both 1.2/50us and 10/700us pulse shapes. The limit of acceptance is a shift in resistance of less than 0.5% from the initial value.



Marking & Resistance Tolerance



1st digit 2nd digit Multiplier

±5%	E-24	1	1.1	1.2	1.3	1.5	1.6	1.8	2	2.2	2.4	2.7	3	3.3	3.6	3.9	4.3	4.7	5.1	5.6	6.2	6.8	7.5	8.2	9.1
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1st digit 2nd digit 3rd digit Multiplier

±1%	E-96	1	1.02	1.05	1.07	1.1	1.13	1.15	1.18	1.21	1.24	1.27	1.30	1.33	1.37	1.4	1.43	1.47	1.50	1.54	1.58	1.62	1.65	1.69	1.74
		1.78	1.82	1.87	1.91	1.96	2	2.05	2.1	2.15	2.21	2.26	2.32	2.37	2.43	2.49	2.55	2.61	2.67	2.74	2.8	2.87	2.94	3.01	3.09
		3.16	3.24	3.32	3.4	3.48	3.57	3.65	3.74	3.83	3.92	4.02	4.12	4.22	4.32	4.42	4.53	4.64	4.75	4.87	4.99	5.11	5.23	5.36	5.49
		5.62	5.76	5.9	6.04	6.19	6.34	6.49	6.65	6.81	6.98	7.15	7.32	7.5	7.68	7.87	8.06	8.25	8.45	8.66	8.87	9.09	9.31	9.53	9.76
±0.1%	E-192	10	10.1	10.2	10.4	10.5	10.6	10.7	10.9	11	11.1	11.3	11.4	11.5	11.7	11.8	12	12.1	12.3	12.4	12.6	12.7	12.9	13	13.2
		13.3	13.5	13.7	13.8	14	14.2	14.3	14.5	14.7	14.9	15	15.2	15.4	15.6	15.8	16.0	16.2	16.4	16.5	16.7	16.9	17.2	17.4	17.6
		17.8	18	18.2	18.4	18.7	18.9	19.1	19.3	19.6	19.8	20	20.3	20.5	20.8	21	21.3	21.5	21.8	22.1	22.3	22.6	22.9	23.2	23.4
		23.7	24	24.3	24.6	24.9	25.2	25.5	25.8	26.1	26.4	26.7	27.1	27.4	27.7	28	28.4	28.7	29.1	29.4	29.8	30.1	30.5	30.9	31.2
		31.6	32	32.4	32.8	33.2	33.6	34	34.4	34.8	35.2	35.7	36.1	36.5	37	37.4	37.9	38.3	38.8	39.2	39.7	40.2	40.7	41.2	41.7
		42.2	42.7	43.2	43.7	44.2	44.8	45.3	45.9	46.4	47	47.5	48.1	48.7	49.3	49.9	50.5	51.1	51.7	52.3	53	53.6	54.2	54.9	55.6
		56.2	56.9	57.6	58.3	59.0	59.7	60.4	61.2	61.9	62.6	63.4	64.2	64.9	65.7	66.5	67.3	68.1	69.0	69.8	70.6	71.5	72.3	73.2	74.1
		75	75.9	76.8	77.7	78.7	79.6	80.6	81.6	82.5	83.5	84.5	85.6	86.6	87.6	88.7	89.8	90.9	92	93.1	94.2	95.3	96.5	97.6	98.8

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Colour	Digit	Multiplier
Silver	-	10 ⁻²
Gold	-	10 ⁻¹
Black	0	10 ⁰
Brown	1	10 ¹
Red	2	10 ²
Orange	3	10 ³
Yellow	4	10 ⁴
Green	5	10 ⁵
Blue	6	10 ⁶
Violet	7	10 ⁷
Grey	8	10 ⁸
White	9	10 ⁹

Resistance more than two significant figures(<1R) or more than three significant figures(>1R) will not provide colour code.

Part Number Table

Description	Part Number	Description	Part Number
MELF Resistor, Metal Film, ±1%, 10R, 0.3W HP, ±50ppm/°C, 0102	MP000617	MELF Resistor, Metal Film, ±1%, 12K, 0.3W HP, ±50ppm/°C, 0102	MP000631
MELF Resistor, Metal Film, ±1%, 22R, 0.3W HP, ±50ppm/°C, 0102	MP000618	MELF Resistor, Metal Film, ±1%, 1K5, 0.3W HP, ±50ppm/°C, 0102	MP000632
MELF Resistor, Metal Film, ±1%, 27R, 0.3W HP, ±50ppm/°C, 0102	MP000619	MELF Resistor, Metal Film, ±0.1%, 15K, 0.3W HP, ±15ppm/°C, 0102	MP000614
MELF Resistor, Metal Film, ±1%, 33R, 0.3W HP, ±50ppm/°C, 0102	MP000620	MELF Resistor, Metal Film, ±1%, 15K, 0.3W HP, ±50ppm/°C, 0102	MP000633
MELF Resistor, Metal Film, ±1%, 39R, 0.3W HP, ±50ppm/°C, 0102	MP000621	MELF Resistor, Metal Film, ±1%, 15K, 1/5W HP, ±50ppm/°C, 0102	MP000669
MELF Resistor, Metal Film, ±1%, 47R, 0.3W HP, ±50ppm/°C, 0102	MP000622	MELF Resistor, Metal Film, ±1%, 150K, 0.3W HP, ±50ppm/°C, 0102	MP000634
MELF Resistor, Metal Film, ±1%, 47R, 1/5W HP, ±50ppm/°C, 0102	MP000661	MELF Resistor, Metal Film, ±1%, 150K, 1/5W HP, ±50ppm/°C, 0102	MP000670
MELF Resistor, Metal Film, ±1%, 56R, 0.3W HP, ±50ppm/°C, 0102	MP000623	MELF Resistor, Metal Film, ±1%, 18K, 0.3W HP, ±50ppm/°C, 0102	MP000635
MELF Resistor, Metal Film, ±1%, 100R, 0.3W HP, ±50ppm/°C, 0102	MP000624	MELF Resistor, Metal Film, ±1%, 180K, 0.3W HP, ±50ppm/°C, 0102	MP000636
MELF Resistor, Metal Film, ±1%, 100R, 1/5W HP, ±50ppm/°C, 0102	MP000662	MELF Resistor, Metal Film, ±1%, 200R, 1/5W HP, ±50ppm/°C, 0102	MP000671
MELF Resistor, Metal Film, ±0.1%, 1K, 0.3W HP, ±15ppm/°C, 0102	MP000612	MELF Resistor, Metal Film, ±1%, 2K, 0.3W HP, ±50ppm/°C, 0102	MP000637
MELF Resistor, Metal Film, ±1%, 1K, 0.3W HP, ±50ppm/°C, 0102	MP000625	MELF Resistor, Metal Film, ±1%, 2K, 1/5W HP, ±50ppm/°C, 0102	MP000672
MELF Resistor, Metal Film, ±1%, 1K, 1/5W HP, ±50ppm/°C, 0102	MP000663	MELF Resistor, Metal Film, ±1%, 20K, 0.3W HP, ±50ppm/°C, 0102	MP000638
MELF Resistor, Metal Film, ±0.1%, 10K, 0.3W HP, ±15ppm/°C, 0102	MP000613	MELF Resistor, Metal Film, ±1%, 20K, 1/5W HP, ±50ppm/°C, 0102	MP000673
MELF Resistor, Metal Film, ±1%, 10K, 0.3W HP, ±50ppm/°C, 0102	MP000626	MELF Resistor, Metal Film, ±1%, 200K, 1/5W HP, ±50ppm/°C, 0102	MP000674
MELF Resistor, Metal Film, ±1%, 10K, 1/5W HP, ±50ppm/°C, 0102	MP000664	MELF Resistor, Metal Film, ±1%, 220R, 0.3W HP, ±50ppm/°C, 0102	MP000639
MELF Resistor, Metal Film, ±1%, 100K, 0.3W HP, ±50ppm/°C, 0102	MP000627	MELF Resistor, Metal Film, ±1%, 220R, 1/5W HP, ±50ppm/°C, 0102	MP000675
MELF Resistor, Metal Film, ±1%, 100K, 1/5W HP, ±50ppm/°C, 0102	MP000665	MELF Resistor, Metal Film, ±1%, 2K2, 0.3W HP, ±50ppm/°C, 0102	MP000640
MELF Resistor, Metal Film, ±1%, 1M, 0.3W HP, ±50ppm/°C, 0102	MP000628	MELF Resistor, Metal Film, ±0.1%, 22K, 0.3W HP, ±15ppm/°C, 0102	MP000615
MELF Resistor, Metal Film, ±1%, 1M, 1/5W HP, ±50ppm/°C, 0102	MP000666	MELF Resistor, Metal Film, ±1%, 22K, 0.3W HP, ±50ppm/°C, 0102	MP000641
MELF Resistor, Metal Film, ±1%, 120R, 0.3W HP, ±50ppm/°C, 0102	MP000629	MELF Resistor, Metal Film, ±1%, 22K, 1/5W HP, ±50ppm/°C, 0102	MP000676
MELF Resistor, Metal Film, ±1%, 120R, 1/5W HP, ±50ppm/°C, 0102	MP000667	MELF Resistor, Metal Film, ±1%, 220K, 0.3W HP, ±50ppm/°C, 0102	MP000642
MELF Resistor, Metal Film, ±1%, 1K2, 0.3W HP, ±50ppm/°C, 0102	MP000630	MELF Resistor, Metal Film, ±1%, 220K, 1/5W HP, ±50ppm/°C, 0102	MP000677
MELF Resistor, Metal Film, ±1%, 1K2, 1/5W HP, ±50ppm/°C, 0102	MP000668	MELF Resistor, Metal Film, ±1%, 2K7, 0.3W HP, ±50ppm/°C, 0102	MP000643

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Description	Part Number	Description	Part Number
MELF Resistor, Metal Film, $\pm 1\%$, 2K7, 1/5W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000678	MELF Resistor, Metal Film, $\pm 1\%$, 470K, 1/5W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000686
MELF Resistor, Metal Film, $\pm 1\%$, 27K, 0.3W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000644	MELF Resistor, Metal Film, $\pm 1\%$, 4K75, 1/5W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000687
MELF Resistor, Metal Film, $\pm 1\%$, 27K, 1/5W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000679	MELF Resistor, Metal Film, $\pm 1\%$, 510R, 1/5W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000688
MELF Resistor, Metal Film, $\pm 1\%$, 330R, 0.3W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000645	MELF Resistor, Metal Film, $\pm 1\%$, 560R, 0.3W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000654
MELF Resistor, Metal Film, $\pm 1\%$, 3K3, 0.3W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000646	MELF Resistor, Metal Film, $\pm 1\%$, 560R, 1/5W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000689
MELF Resistor, Metal Film, $\pm 1\%$, 3K3, 1/5W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000680	MELF Resistor, Metal Film, $\pm 1\%$, 5K6, 0.3W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000655
MELF Resistor, Metal Film, $\pm 1\%$, 33K, 0.3W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000647	MELF Resistor, Metal Film, $\pm 0.1\%$, 56K, 0.3W HP, $\pm 15\text{ppm}/^\circ\text{C}$, 0102	MP000616
MELF Resistor, Metal Film, $\pm 1\%$, 33K, 1/5W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000681	MELF Resistor, Metal Film, $\pm 1\%$, 56K, 0.3W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000656
MELF Resistor, Metal Film, $\pm 1\%$, 330K, 0.3W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000648	MELF Resistor, Metal Film, $\pm 1\%$, 680R, 0.3W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000657
MELF Resistor, Metal Film, $\pm 1\%$, 3K9, 0.3W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000649	MELF Resistor, Metal Film, $\pm 1\%$, 680R, 1/5W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000690
MELF Resistor, Metal Film, $\pm 1\%$, 3K9, 1/5W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000682	MELF Resistor, Metal Film, $\pm 1\%$, 6K8, 1/5W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000691
MELF Resistor, Metal Film, $\pm 1\%$, 470R, 0.3W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000650	MELF Resistor, Metal Film, $\pm 1\%$, 68K, 0.3W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000658
MELF Resistor, Metal Film, $\pm 1\%$, 470R, 1/5W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000683	MELF Resistor, Metal Film, $\pm 1\%$, 68K, 1/5W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000692
MELF Resistor, Metal Film, $\pm 1\%$, 4K7, 0.3W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000651	MELF Resistor, Metal Film, $\pm 1\%$, 680K, 0.3W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000659
MELF Resistor, Metal Film, $\pm 1\%$, 4K7, 1/5W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000684	MELF Resistor, Metal Film, $\pm 1\%$, 7K5, 1/5W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000693
MELF Resistor, Metal Film, $\pm 1\%$, 47K, 0.3W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000652	MELF Resistor, Metal Film, $\pm 1\%$, 820R, 1/5W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000694
MELF Resistor, Metal Film, $\pm 1\%$, 47K, 1/5W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000685	MELF Resistor, Metal Film, $\pm 1\%$, 8K2, 0.3W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000660
MELF Resistor, Metal Film, $\pm 1\%$, 470K, 0.3W HP, $\pm 50\text{ppm}/^\circ\text{C}$, 0102	MP000653	MELF Resistor, Metal Film, $\pm 5\%$, Jumper, 1/8W, 0102	MP000695

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