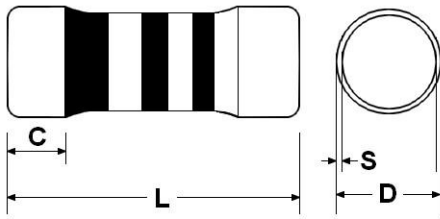


Melf Resistor

Melf Carbon Film Resistor — MMC Series



Coating color: Beige

Features

- Tolerance up to $\pm 2\%$.
- Wide resistance range: 1Ω to $10M\Omega$.

Type Dimension

Dimension

Unit: mm

TYPE	L	D	C	S
0102	2.00 ± 0.10	1.30 ± 0.10	0.55 ± 0.10	0.10 ± 0.05
0204	3.50 ± 0.20	1.45 ± 0.10	0.70 ± 0.10	0.15 ± 0.10
0207	5.70 ± 0.20	2.20 ± 0.10	0.80 ± 0.20	0.20 ± 0.10
0309	8.50 ± 0.30	3.00 ± 0.30	1.70 ± 0.20	0.30 ± 0.10
0411	10.50 ± 0.30	4.00 ± 0.30	2.30 ± 0.20	0.30 ± 0.10
0515	14.50 ± 0.30	4.50 ± 0.30	2.30 ± 0.20	0.30 ± 0.10

Electrical Specifications

Size	Power Rating	Max. Working Voltage	Max. Overload Voltage	T.C.R.	Resistance Range	Operating Temperature Range
					G (2%) ; J (5%)	
0204	1/8W	200V	400V	+350~-450	1Ω~47K	-55℃
				0~-700	51K~220K	
				0~-1000	240K~470K	
				0~-1300	510K~1M	
	1/4Ws	250V	500V	+350~-450	1Ω~47K	
				0~-700	51K~220K	
				0~-1000	240K~470K	
				0~-1300	510K~1M	
0207	1/4W	250V	500V	+350~-450	1Ω~100K	~
	1/2Ws	300V	600V	0~-700	110K~330K	
				0~-1000	360K~1M	
	1Ws	400V	600V	0~-1300	1M1~2M2	
0309	1Ws	500V	1000V	+350~-450	1Ω~100K	
0411	2Ws			0~-700	110K~330K	
0515	3Ws			0~-1000	360K~1M	
				0~-1300	1M1~2M2	

● For non-standard parts, please contact our sales dept.

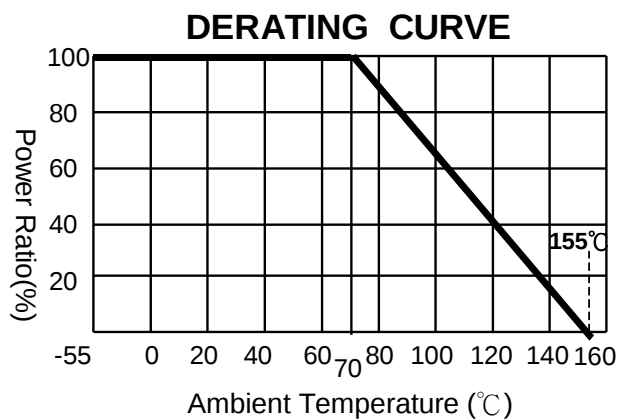
Rated Voltage = $\sqrt{P(W) \times R(\Omega)}$ or Max.working voltage, whichever lower.

Parts Number Explanation

Example:

MMC	0204	1/4Ws	F	174R	P03
Product Type	Size	Power	Resistor Tolerance	Resistors Value	Packing Quantity
MELF Carbom film	0204 0207 0309 0411 0515		G: $\pm 2\%$ J: $\pm 5\%$		W05: 500 pcs W15: 1500 pcs P01: 1000 pcs P02: 2000 pcs P03: 3000 pcs

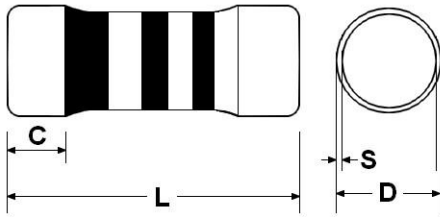
Power Derating Curve



Test Procedures and Requirements

Test Item	Test Method	Requirements
Temperature Coefficient of Resistance	JIS-C-5202; 5.2	
Short Time Overload	Rating voltage x 2.5 or Max. overload voltage for 5 sec. whichever less	$\pm 1\%$
Pulse Overload	Rating voltage x 4 or Max. pulse overload voltage whichever less for 10,000 cycles (1 sec. "ON" 25 sec. "OFF") Whichever less	$\pm 2\%$
Temperature Cycling	-55°C (30 min.)/+85°C (30 min.) for 5 cycles	$\pm 1\%$
Load Life in Humidity	40°C $\pm 2^\circ\text{C}$, 90%~95% RH, 1000h, 1.5h "ON"/0.5h "OFF" cycle	$\pm 5\%$
Load Life	70°C $\pm 2^\circ\text{C}$, 1000h, 1.5h "ON"/0.5h "OFF" cycle	$\pm 5\%$
Resistance to Soldering Heat	260°C $\pm 5^\circ\text{C}$, 5 sec ± 1 sec	$\pm 2\%$
Solderability	235°C $\pm 5^\circ\text{C}$, 2 sec ± 0.5 sec	$\geq 90\%$ coverage/Min
Bending Test	Holding point width 90mm, Bending 5mm, 1 time	$\pm 1\%$
High Temp. exposure	155°C $\pm 5^\circ\text{C}$, 2hours	$\pm 2\%$
Non-Combustibility	The resistor shall withstand Overload test in accordance with Article UL-94, V-0 without producing a fire hazard.	

■ Melf Metal Film Resistor — MMF Series



Coating color: Blue

■ Features

- Low TCR $\pm 15\text{ppm}/^\circ\text{C}$.
- Tolerance up to $\pm 0.1\%$.
- Wide resistance range: 0.1Ω to $5\text{M}\Omega$.

■ Type Dimension

■ Dimension

Unit: mm

TYPE	L	D	C	S
0102	2.00 ± 0.10	1.30 ± 0.10	0.55 ± 0.10	0.10 ± 0.05
0204	3.50 ± 0.20	1.45 ± 0.10	0.70 ± 0.10	0.15 ± 0.10
0207	5.70 ± 0.20	2.20 ± 0.10	0.80 ± 0.20	0.20 ± 0.10
0309	8.50 ± 0.30	3.00 ± 0.30	1.70 ± 0.20	0.30 ± 0.10
0411	10.50 ± 0.30	4.00 ± 0.30	2.30 ± 0.20	0.30 ± 0.10
0515	14.50 ± 0.30	4.50 ± 0.30	2.30 ± 0.20	0.30 ± 0.10

■ Electrical Specifications

Size	Power Rating	Max. Working Voltage	Max. Overload Voltage	T.C.R.	Resistance Range				Operating Temperature Range
					B (0.1%) C (0.25%)	D (0.5%)	F (1%)	J (5%)	
0102	1/8Ws	150V	300V	$\pm 15\text{ppm}$	50 Ω -56K	50 Ω -100K	1 Ω -1M	0 Ω 22-2M	-55 $^\circ\text{C}$ ~ +155 $^\circ\text{C}$
0204	1/8W	150V	300V		50 Ω -56K	100 Ω -100K	1 Ω -1M	0 Ω 22-2M	
	1/4Ws	200V	400V	$\pm 25\text{ppm}$	50 Ω -56K	100 Ω -100K	1 Ω -1M	0 Ω 5-2M	
0207	1/4W	200V	400V	$\pm 50\text{ppm}$	50 Ω -56K	10 Ω -560K	1 Ω -5M	0 Ω 22-5M	
	1/2Ws	300V	600V	$\pm 100\text{ppm}$	50 Ω -56K	10 Ω -560K	1 Ω -5M	0 Ω 22-5M	
	1Wss	400V	700V		50 Ω -56K	10 Ω -560K	1 Ω -5M	0 Ω 5-5M	
0309	1Ws	500V	1000V	$\pm 50\text{ppm}$ $\pm 100\text{ppm}$		10 Ω -100K	1 Ω -1M	0 Ω 1-1M	
0411	2Ws					10 Ω -100K	1 Ω -1M	0 Ω 1-1M	
0515	3Ws					10 Ω -100K	1 Ω -1M	0 Ω 1-1M	

● For non-standard parts, please contact our sales dept.

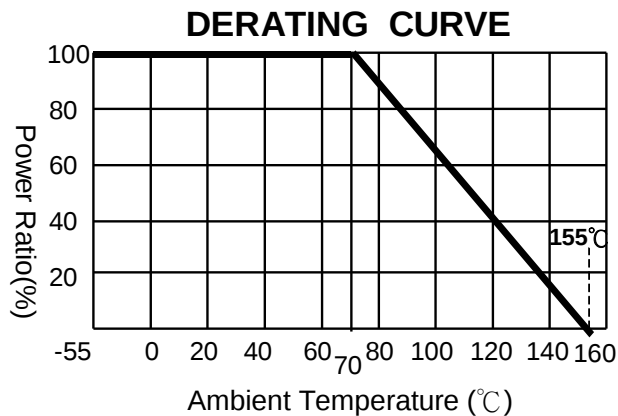
Rated Voltage = $\sqrt{P(W) \times R(\Omega)}$ or Max.working voltage, whichever lower.

Parts Number Explanation

Example:

MMF	0204	1/4Ws	F	174R	P03
Product Type	Size	Power	Resistor Tolerance	Resistors Value	Packing Quantity
MELF Metal film	0102 0204 0207 0309 0411 0515		B: $\pm 0.1\%$ C: $\pm 0.25\%$ D: $\pm 0.5\%$ F: $\pm 1\%$ J: $\pm 5\%$		W05: 500 pcs W15: 1500 pcs P01: 1000 pcs P02: 2000 pcs P03: 3000 pcs

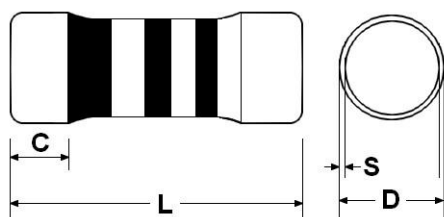
Power Derating Curve



Test Procedures and Requirements

Test Item	Test Method	Requirements
Temperature Coefficient of Resistance	JIS-C-5202; 5.2	$\pm 100\text{ppm}/^{\circ}\text{C}$; $\pm 50\text{ppm}/^{\circ}\text{C}$ $\pm 25\text{ppm}/^{\circ}\text{C}$; $\pm 15\text{ppm}/^{\circ}\text{C}$
Short Time Overload	Rating voltage x 2.5 or Max. overload voltage for 5 sec. whichever less	$\pm(0.5\%+0.05\Omega)$
Pulse Overload	Rating voltage x 3 or Max. pulse overload voltage whichever less for 10,000 cycles (1 sec. "ON" 25 sec. "OFF")	$\pm(0.5\%+0.05\Omega)$
Temperature Cycling	-55°C (30 min.)/ $+85^{\circ}\text{C}$ (30 min.) for 5 cycles	$\pm(0.5\%+0.05\Omega)$
Load Life in Humidity	$40^{\circ}\text{C} \pm 2^{\circ}\text{C}$, 90%~95% RH, 1000h, 1.5h "ON"/0.5h "OFF" cycle	$\pm(1\%+0.05\Omega)$
Load Life	$70^{\circ}\text{C} \pm 2^{\circ}\text{C}$, 1000h, 1.5h "ON"/0.5h "OFF" cycle	$\pm(1\%+0.05\Omega)$
Resistance to Soldering Heat	$260^{\circ}\text{C} \pm 5^{\circ}\text{C}$, 5 sec ± 1 sec	$\pm(0.5\%+0.05\Omega)$
Solderability	$235^{\circ}\text{C} \pm 5^{\circ}\text{C}$, 5 sec ± 0.5 sec	$\geq 90\%$ coverage
Bending Test	Holding point width 90mm, Bending 5mm, 1 time	$\pm(0.5\%+0.05\Omega)$
Non-Combustibility	The resistor shall withstand Overload test in accordance with Article UL-94, V-0 without producing a fire hazard.	

■ Melf Metal Oxide Resistor — MMO Series



Coating color: Grey

■ Features

- Tolerance up to $\pm 2\%$.
- Wide resistance range: 0.5Ω to $120K\Omega$.

■ Type Dimension

■ Dimension

Unit: mm

TYPE	L	D	C	S
0207	5.70 ± 0.20	2.20 ± 0.10	0.80 ± 0.20	0.20 ± 0.10
0309	8.50 ± 0.30	3.00 ± 0.30	1.70 ± 0.20	0.30 ± 0.10
0411	10.50 ± 0.30	4.00 ± 0.30	2.30 ± 0.20	0.30 ± 0.10
0515	14.50 ± 0.30	4.50 ± 0.30	2.30 ± 0.20	0.30 ± 0.10

■ Electrical Specifications

Size	Power Rating	Max. Working Voltage	Max. Overload Voltage	T.C.R.	Resistance Range		Operating Temperature Range
					G (2%)	J (5%)	
0207	1/4W	250V	500V	±350ppm	0Ω5-56K	0Ω5-56K	-55℃ ~ +155℃
	1/2Ws	300V	500V				
0309	1/2W	350V	600V		0Ω5-82K	0Ω5-82K	
	1Ws	350V	600V				
0411	1W	400V	700V		0Ω5-100K	0Ω5-100K	
	2Ws	400V	700V				
0515	3Ws	500V	800V		0Ω5-120K	0Ω5-120K	

● For non-standard parts, please contact our sales dept.

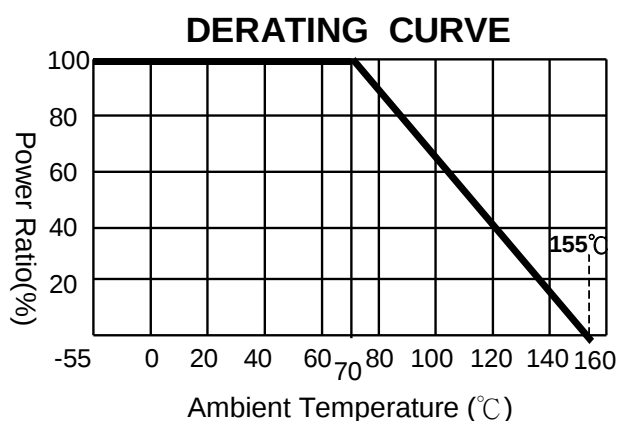
Rated Voltage = $\sqrt{P(W) \times R(\Omega)}$ or Max.working voltage, whichever lower.

Parts Number Explanation

Example:

MMO	0204	1/4Ws	F	174R	P03
Product Type	Size	Power	Resistor Tolerance	Resistors Value	Packing Quantity
MELF Metal Oxide	0207 0309 0411 0515		G: $\pm 2\%$ J: $\pm 5\%$		W05: 500pcs W15: 1500pcs P01: 1000 pcs P02: 2000 pcs

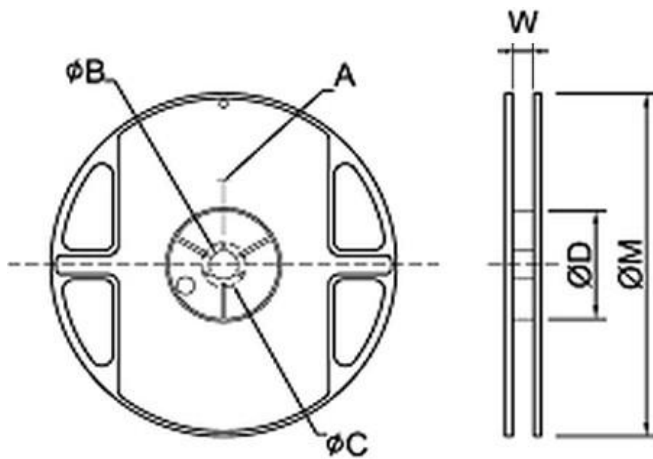
Power Derating Curve



Test Procedures and Requirements

Test Item	Test Method	Requirements
Temperature Coefficient of Resistance	JIS-C-5202; 5.2	$\pm 350 \text{ ppm}/^\circ\text{C}$
Short Time Overload	Rating voltage x 2.5 or Max. overload voltage for 5 sec.	$\pm 1\%$
Pulse Overload	Rating voltage x 4 or Max. pulse overload voltage for 10,000 cycles (1 sec. "ON" 25 sec. "OFF")	$\pm 2\%$
Temperature Cycling	-55°C (30 min.)/ $+85^\circ\text{C}$ (30 min.) for 5 cycles	$\pm 1\%$
Load Life in Humidity	$40^\circ\text{C} \pm 2^\circ\text{C}$, 90%~95% RH, 1000h, 1.5h "ON"/0.5h "OFF" cycle	$\pm 5\%$
Load Life	$70^\circ\text{C} \pm 2^\circ\text{C}$, 1000h, 1.5h "ON"/0.5h "OFF" cycle	$\pm 5\%$
Resistance to Soldering Heat	$260^\circ\text{C} \pm 5^\circ\text{C}$, 5 sec $\pm$ 1 sec	$\pm 2\%$
Solderability	$235^\circ\text{C} \pm 5^\circ\text{C}$, 5 sec $\pm$ 0.5 sec	$\geq 90\%$ coverage/Min
Bending Test	Holding point width 90mm, Bending 5mm, 1 time	$\pm 1\%$
Non-Combustibility	The resistor shall withstand Overload test in accordance with Article UL-94, V-0 without producing a fire hazard.	

● Packaging Information

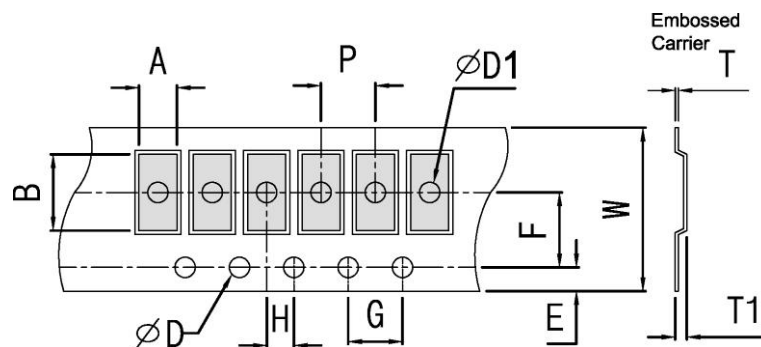


■ Dimension

Unit: mm

TYPE	Q'ty/reel	A	φ B	φ C	φ D	W	φ M
0102	3000 pcs	2.0±0.5	13.0±0.5	20.5±0.5	60.0±1.0	8.0±0.5	178.0±2.0
0204	3000 pcs	2.0±0.5	13.0±0.5	20.5±0.5	60.0±1.0	8.0±0.5	178.0±2.0
0207	2000 pcs	2.0±0.5	13.0±0.5	20.5±0.5	60.0±1.0	12.0±0.5	178.0±2.0
0309	2000 pcs		R10.5	13.5±0.5		16.0±0.5	330.0±2.0
0411	1500 pcs		R10.5	13.5±0.5		24.0±0.5	330.0±2.0

■ Tapping Specification



■ Dimension

Unit: mm

Size	A	B	W	E	F	G	H	T	φD	φD1	T1	P
0102	1.50±0.10	2.20±0.10	8.00±0.10	1.75±0.10	3.50±0.05	4.00±0.10	2.00±0.05	0.22±0.05	1.50±0.10	1.50±0.10	1.50±0.10	4.00±0.10
0204	1.60±0.10	3.70±0.10	8.00±0.10	1.75±0.10	3.50±0.05	4.00±0.10	2.00±0.05	0.22±0.05	1.50±0.10	1.50±0.10	1.65±0.10	4.00±0.10
0207	2.40±0.10	6.05±0.10	12.00±0.10	1.75±0.10	5.50±0.05	4.00±0.10	2.00±0.05	0.30±0.05	1.50±0.10	1.50±0.10	2.50±0.10	4.00±0.10
0309	3.30±0.10	8.15±0.10	16.00±0.30	1.75±0.10	7.50±0.10	4.00±0.10	2.00±0.10	0.35±0.05	1.50±0.10	1.50±0.10	3.35±0.10	8.00±0.10
0411	4.20±0.10	10.00±0.10	24.00±0.30	1.75±0.10	11.50±0.10	4.00±0.10	2.00±0.10	0.35±0.05	1.50±0.10	1.50±0.10	4.20±0.10	8.00±0.10