

## MFF Series

### Metal Foil Low Resistance Chip Resistor

- Low Resistance / TCR / EMF / Inductance
- Excellent long term stability
- RoHS compliant and halogen free.
- Lead free.
- High precision current sensing and voltage division.
- Application : Entertainment, Power supply, Measuring instrument,  
 Industrial, Battery management system



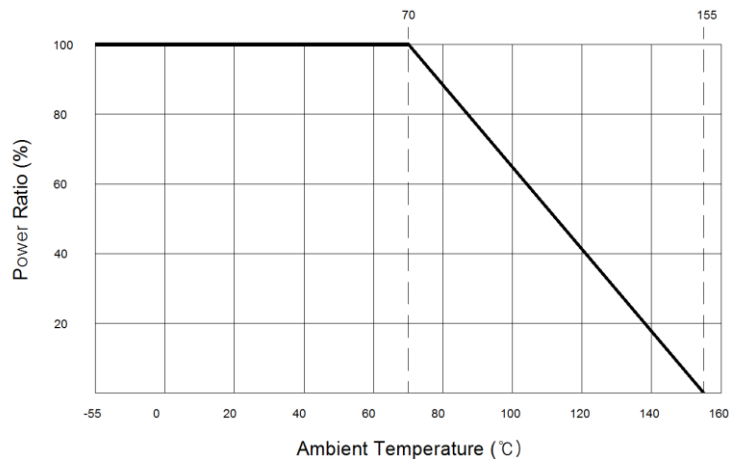
#### GENERAL SPECIFICATIONS

Model	Rating Power at 70°C	TCR [PPM/°C]	Max. Rating Current	Max. Overload Current	Resistance Range (mΩ)			Material	Operating Temp. Range
					0.3% (C)	0.5% (D)	1.0% (F)		
MFF0306	0.33W	±100	18.16A	28.72A	-		1~4	MnCu	-55°C ~155°C
		±50	8.12A	12.84A	-		5~25		
MFF0612	1W	±150	44.72A	70.71A	-		0.5~0.75		
		±100	31.62A	50A	-		1~4		
MFF1225	2W	±50	14.14A	22.36A	-	5~25			
		±100	44.72A	70.71A	-		1~4		
MFF2139	4W	±50	20A	31.62A	-	5~25			
		±100	63.24A	100A	-		1~4		
MFF1206	0.5W	±50	28.28A	44.72A	-	5~25			
		±100	31.62A	50A	-		0.5		
		±75	22.36A	35.35A	-	1~5			
		±50	9.12A	14.43A	-	6~9			
		±30	7.07A	11.18A	10~100		-		

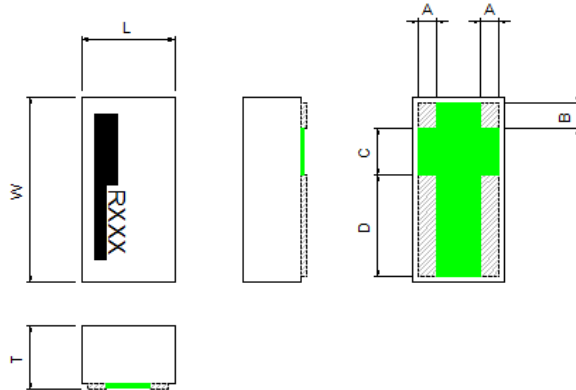
#### CHARACTERISTICS

Temperature Coefficient of Resistance	Refer to Ratings	JIS C 5201 4.8 Method $TCR(ppm/°C) = \{(R2-R1)/R1(T2-T1)\} \times 10^6$ R1 : Resistance of room temp.(T1), R2 : Resistance of 125°C(T2)
Short Time Overload	±1.0%+0.5mΩ	JIS C 5201-1 4.13 Method The number of rated power are as follows : 2.5 times of rated power, Rating power duration : 5 seconds
High Temperature Exposure	±1.0%+0.5mΩ	JIS C 5201-1 4.23.2 Method 1,000hrs at +155°C±2°C
Low Temperature Storage	±1.0%+0.5mΩ	JIS C 5201-1 4.23.4 Method 1,000hrs at -55°C±2°C
Soldering Heat	±1.0%+0.5mΩ	JIS C 5201-1 4.18 Method 260°C±5°C for 10±1 seconds.
Moisture Load Life	±2.0%+0.5mΩ	JIS C 5201-1 4.24 Method T=40°C±2°C, RH=90~95%, Load with Rated Current 1.5hrs "ON", 0.5hrs "OFF", 1,000hrs.
Temperature Cycling	±1.0%+0.5mΩ	JIS C 5201-1 4.19 Method -55°C to +155°C, 100 cycles.
Load Life	±2.0%+0.5mΩ	JIS C 5201-1 4.25 Method T=70°C±2°C, Load with Rated Current 1.5hrs "ON", 0.5hrs "OFF", 1,000hrs.
Solderability	The covered area > 95%	JIS C 5201-1 4.17 Method 245°C±5°C for 3±0.5 seconds
Mechanical Shock	±1.0%+0.5mΩ	JIS C 5202 6.7 Method A = 100G, t=11ms, 5 times shock.
Substrate Bending	±1.0%+0.5mΩ	JIS C 5201-1 4.33 Method Span between fulcrums : 90mm, Bend Width : 2mm

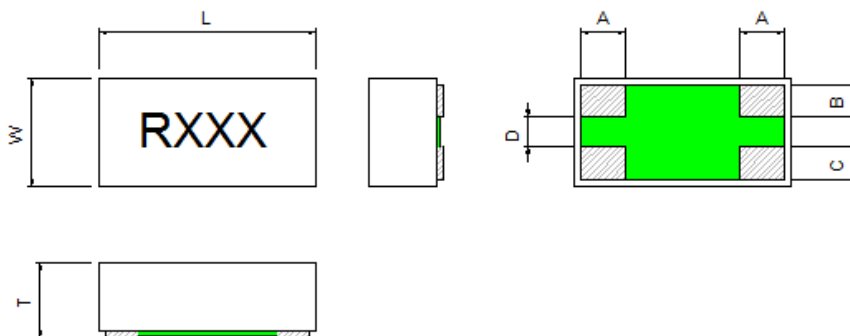
■ DERATING CURVE



■ DIMENSIONS [mm]

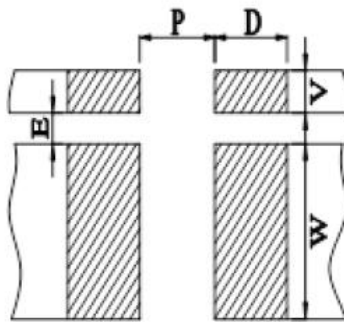


MODEL	Power Rating	Resistance Range [mΩ]	DIMENSIONS (millimetres)						
			W	L	A	B	C	D	T
MFF0306	0.33W	1~25	1.60±0.20	0.80±0.15	0.18±0.10	0.23±0.10	0.40±0.10	0.93±0.20	0.55±0.10
MFF0612	1W	0.5~25	3.20±0.20	1.60±0.20	0.41±0.20	0.46±0.20	0.50±0.20	2.16±0.20	0.50±0.20
MFF1225	2W	1~25	6.40±0.20	3.20±0.20	0.50±0.20	0.62±0.20	0.50±0.20	5.12±0.20	0.60±0.20
MFF2139	4W	1~25	11.0±0.30	5.00±0.30	0.70±0.20	1.40±0.20	1.05±0.20	8.50±0.30	0.60±0.20

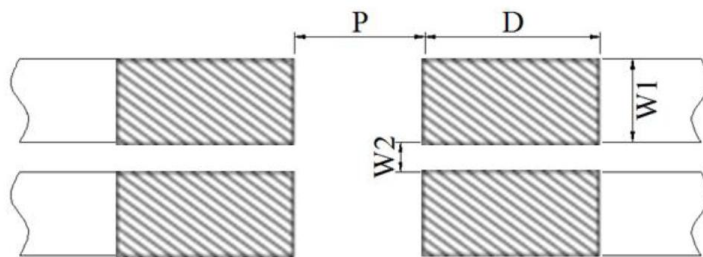


MODEL	Power Rating	Resistance Range [mΩ]	DIMENSIONS (millimetres)						
			W	L	A	B	C	D	T
MFF1206	0.5W	0.5~100	1.60±0.20	3.20±0.20	0.60±0.20	0.55±0.20	0.55±0.20	0.50±0.20	0.60±0.20

**Recommend Land Pattern Design**

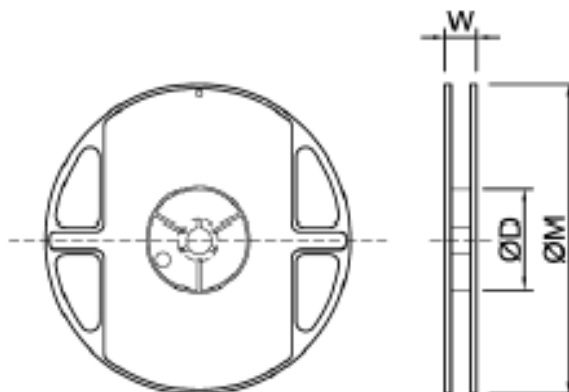


MODEL	Resistance Range [mΩ]	SOLDER PAD Dimension (millimetres)				
		P	W	D	V	E
MFF0306	1~25	0.35	1.30	0.40	0.40	0.20
MFF0612	0.5~25	0.762	2.29	1.014	0.762	0.381
MFF1225	1~25	2.00	5.10	1.00	0.70	0.50
MFF2139	1~25	3.30	8.90	1.50	1.70	0.80

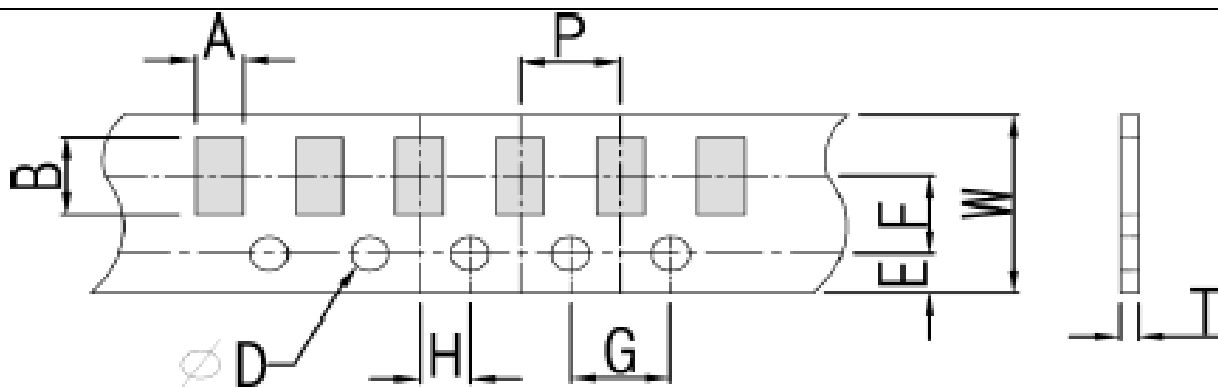


MODEL	Resistance Range [mΩ]	SOLDER PAD Dimension (millimetres)			
		P	D	W1	W1
MFF1206	0.5~100	1.20	1.80	1.10	0.30

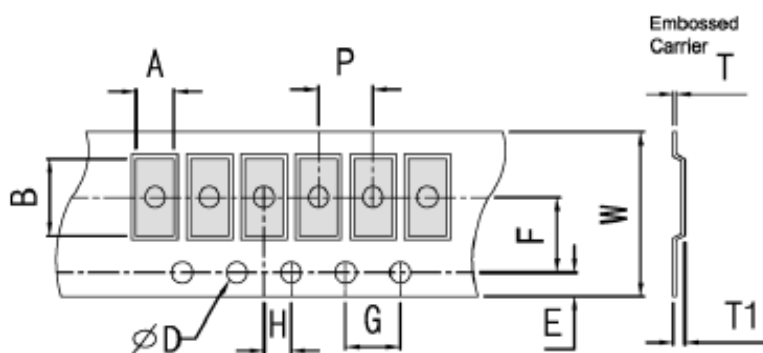
**PACKAGING**



Packaging	Model	ØD	W	ØM
Reel Dimensions	MFF0306/ MFF0612/ MFF1206	60±2	9.0±1	178±5
	MFF1225		13±1	
	MFF2139		24.5±1	



Packaging	Model	Dimensions [mm]									
		W	P	E	F	ØD	G	H	A	B	T
Paper tape Dimensions	MFF0306	8.0±0.3	4.0±0.1	1.75±0.1	3.5±0.1	1.5 (+0.1 -0.0)	4.0±0.1	2.0±0.1	1.18±0.2	1.98±0.2	0.75±0.2



Packaging	Model	Dimensions [mm]										
		W	P	E	F	ØD	G	H	A	B	T1	T
Embossed Dimensions	MFF0612 / MFF1206	8.0±0.3	4.0±0.1	1.75±0.1	3.50±0.1	1.5 (+0.1 -0.0)	4.0±0.1	2.0±0.1	2.05 ±0.2	3.65 ±0.2	0.85 ±0.2	0.20 ±0.1
	MFF1225	12.0±0.3	4.0±0.1		5.5±0.1				3.40 ±0.2	6.75 ±0.2	1.00 ±0.2	0.25 ±0.1
	MFF2139	24.0±0.3	8.0±0.1		11.5±0.1				5.50 ±0.2	11.50 ±0.2	0.90 ±0.2	0.30 ±0.1

**\*Packaging Quantity**

Type	PCS/Reel
MFF0306 / MFF0612 / MFF1206	5,000
MFF1225	4,000
MFF2139	2,000

■ Product structure

<p>For 0306/0612 Type</p> <p>For 0306</p>	<p>For 1225/2139 Type</p>	<p>(1) Substrate : Alumina Ceramic                  (2) Adhesive : Epoxy                  (3) Resistive element : MnCu-alloy                  (4) Terminal electrode : Sn, Ni, Cu                  (5) Protective coating : Flame-retardant epoxy, meets UL-94-V0 requirement (green)                  (6) Marking coating : Flame-retardant epoxy, meets UL-94-V0 requirement (black)                  (7) Marking coating : Flame-retardant epoxy, meets UL-94-V0 requirement (white)</p>
<p>For 1206 Type</p>		

■ MARKING FORMAT

<p><b>0306/0612 type products no marking.</b></p>	<p>*Other requirements can be contact with the business staff.</p>
<p><b>1225/2139/1206 type products marking are 4 digits.</b></p>	<p>*"R" designates the decimal location in ohms                  1mΩ the product marking is R001.                  20mΩ the product marking is R020.                  *"M" designates the decimal location in milli-ohms                  0.5mΩ the product marking is 0M50.</p>

■ ORDERING PROCEDURE EXAMPLE

MFF	1225	20	F	R005	M
Product Type	Size (inch)	Rated Power	Tolerance	Resistance	Material
	0306 0612 1225 2139 1206	03=0.3W 05=0.5W 10=1.00W 20=2.00W 40=4.00W	C : ±0.3% D : ±0.5% F : ±1.0%	0M50=0.5mR R001=1.0mR R025=25mR R100=100mR	M : MnCu