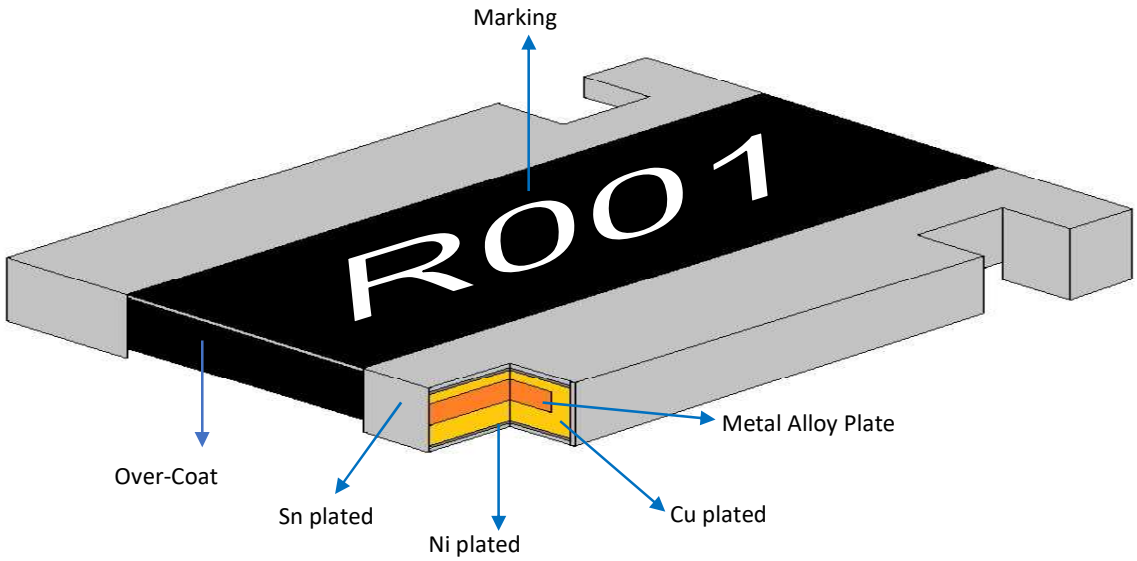
■ Metal Alloy Low Resistance Chip Resistor — MAF 4-Terminals Series



■ Application

- — Entertainment product
- — Power supply
- — Measuring instrument
- — Industrial product
- — Battery management system

■ Features

- — Low Resistance / Low TCR.
- — Excellent long term stability.
- — RoHs compliant and halogen free.
- — Lead free.
- — High precision current sensing and voltage division.
- — 4-terminal design allows for 0.5% resistance tolerance down to 0.001Ω.
- — Low thermal EMF (< 3 μV/°C).
- — Very low inductance, 0.5 nH to 5 nH.

■ Parts Number Explanation

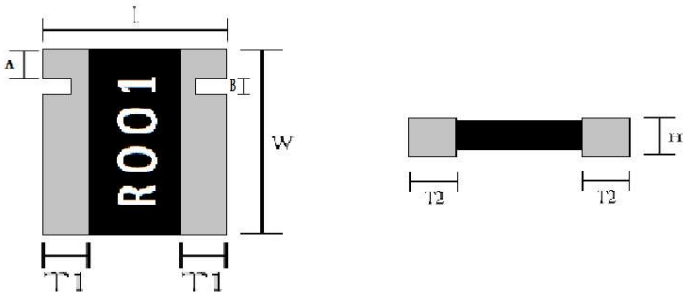
■ Example:

MAF	3637	30	F	R001	M	Z
Product Type	Size (Inch)	Rated Power	Tolerance	Resistance	Material	Optional
	3637	30=3.00W	D : ±0.5% F : ±1.0% G : ±2.0% J : ±5.0%	0m50=0.5mR R001=1 mR R002=2 mR R003=3 mR	S: MnCuSn M: MnCu	Z : Default code

Standard Electrical Specifications

TYPE	Rating Power at 70℃	T.C.R. (ppm/℃)	Element TCR (ppm/℃)	Max. Rating Current	Max. Overload Current	Resistance Range (mΩ)		Material	Operating Temperature Range (℃)
						0.5% (D)	1.0% (F) 2.0% (G) 5.0% (J)		
MAF3637	3W	≦±50	<20	77.46	173.21	1~3	0.5~3	R0005：MnCuSn R001~R003：MnCu	-55~+170°C

Type Dimension



FOR MAF3637

Dimension

Unit：mm

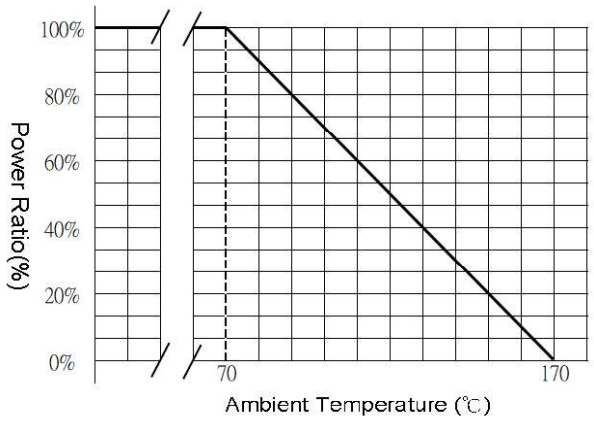
Type	Power Rating	Resistance Range	L	W	A	B	H	T1	T2
MAF3637	3W	0.5mΩ~3mΩ	9.140±0.254	9.600±0.254	1.50±0.254	1.20±0.254	0.73±0.254	2.30±0.254	2.30±0.254

■ Performance Characteristics

Power Derating Curve

The Operating Temperature Range: -55°C ~+170°C.

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



■ Rating Current

The following equation may be used to determine the DC (Direct Current) or AC (Alternating Current) (RMS, root mean square value) of normal rated power. However, if the result value exceeds the highest current of regulated standards (paragraph 5), the highest normal rated power is to be used.

$$I = \sqrt{P/R}$$

I = Rating current (A)
P= Rating Power (W)
R= Resistance(Ω)

■ Marking Format:

- All the other products marking are 4 digits.
- “R” designates the decimal location in ohms
- “m” designates the decimal location in milli-ohms

e.g. 0.5mΩ the product marking is 0m50.

1mΩ the product marking is R001.

- The criteria to distinguishing the mark on the surface of products are that characters can be identified.

■ Reliability test and requirement

Test Item	Test Method	Procedure	Requirements
Temperature Coefficient of Resistance (T.C.R)	JIS-C-5201-1 4.8 IEC-60115-1 4.8	At 25℃ /+150℃, 25℃ is the reference temperature	As Spec
Short Time Overload	JIS-C-5201-1 4.13 IEC-60115-1 4.13	The number of rated power are as follows: • MA3637-3W: 5 times of rated power for 5 seconds.	ΔR/R1≦±(0.5%+0.0005Ω)
High Temperature Exposure	JIS-C5201-1 4.25 IEC 60068-2-2	At 170℃ for 1000 hours.	ΔR/R1≦±(1.0%+0.0005Ω)
Resistance to Soldering Heat	JIS-C-5201-1 4.18 IEC-60115-1 4.18	260±5℃ for 10 seconds.	ΔR/R1≦±(0.5%+0.0005Ω)
Temperature Cycling	JESD22 Method JA-104	1000 Cycles (-55°C to +155°C) Measurement at 24±4 hours after test conclusion. 30min maximum dwell time at each temperature extreme.	ΔR/R1≦±(0.5%+0.0005Ω)
Biased Humidity	MIL-STD-202 Method 103	1,000 hours; 85°C / 85% RH, 10% of operating power. Measurement at 24±4 hours after test conclusion.	ΔR/R1≦±(0.5%+0.0005Ω)
Load Life (Endurance)	JIS-C-5201-1 4.25 IEC-60115-1 4.25.1	70±2℃, RCWV or Max. working voltage whichever is less for 1000 hrs with 1.5 hrs〝ON〞and 0.5 hr〝OFF〞.	ΔR/R1≦±(1.0%+0.0005Ω)
Solderability	JIS-C-5201-1 4.17 IEC-60115-1 4.17	245±5℃ for 3 seconds.	>95% coverage
Dielectric Withstanding Voltage	JIS-C5201-1 4.7	Applied 500VAC for 1 minute.	No broken
Core Body Strength	JIS-C5201-1 4.15	Central part pressurizing force：5N , 10 seconds	ΔR/R1≦±(0.5%+0.0005Ω) No broken
Terminal Strength (SMD)	AEC Q200-006	Pressurizing force 17.7N for 60 seconds	ΔR/R1≦±(0.5%+0.0005Ω)
Bending Strength	JIS-C-5201-1 4.33 IEC-60115-1 4.33	Bending once 2mm for 10 seconds	ΔR/R1≦±(0.5%+0.0005Ω)
Moisture Resistance	MIL-STD 202 Method 106	T=24 hours / Cycle ,10Cycles . Steps 7a& 7b not required. Unpowered . (Figure 1)	ΔR/R1≦±(0.5%+0.0005Ω)

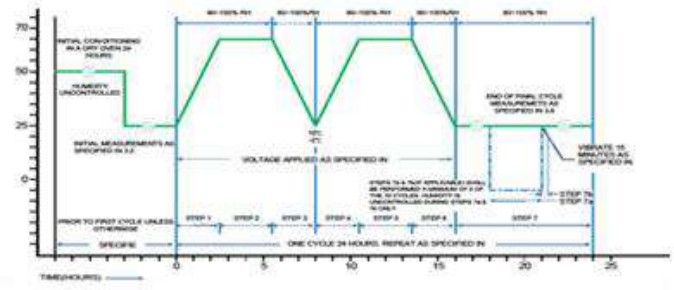
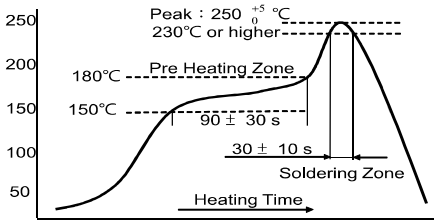
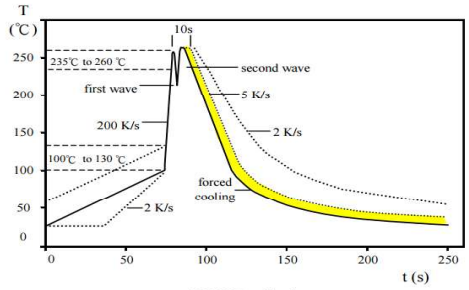


Figure 1

Soldering Profile

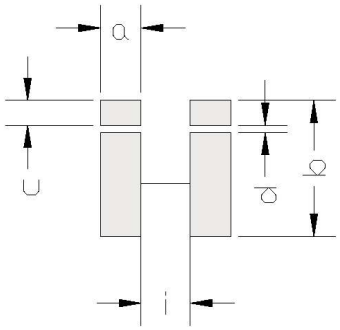


Reflow Soldering



WAVE soldering

Recommend Land Pattern Design



Dimenson

Unit: mm

TYPE	Resistance Range	a	b	c	d	i
MAF3637 - 3W	0.5mΩ~3mΩ	3.30	10.50	1.98	0.60	4.00

Packing Quantity

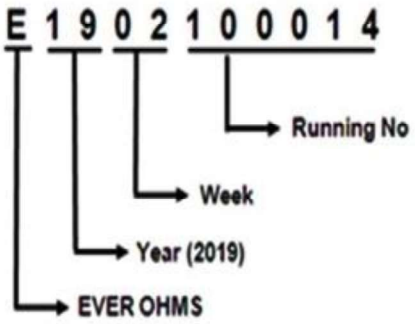
TYPE	PCS /Reel
MAF3637	1000

Plating Thickness:

Ni:≧ 2 μm

Sn(Tin):≧ 3 μm

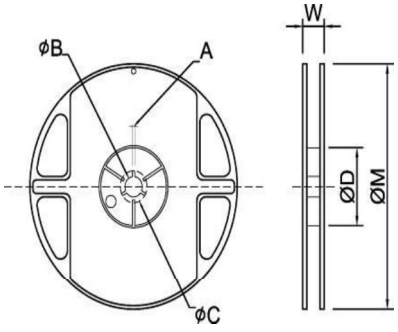
■ Lable :



■ Appendix For SMD Chip Resistor

● Packaging Information

■ Reel Dimensions

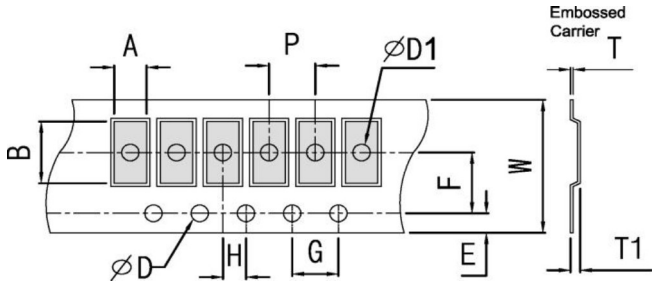


■ Dimension

Unit: mm

Reel Type / Tape	A	ϕ B	ϕ C	ϕ D	W	ϕ M
7” reel for 16 mm embossed	13.2 ± 0.5	13.5±0.5	17.7±0.5	60.0±1.0	17.4 ± 1.0	178 ± 2.0

■ Embossed Dimensions



■ Dimension

Unit: mm

Item	Resistance Range (mΩ)	W	P	E	F	ØD	ØD1	G	H	A	B	T1	T
MAF3637	0.5mΩ~3mΩ	16.0±0.2	12.0±0.1	1.75±0.1	7.5±0.1	$1.50^{+0.1}_{-0}$	1.5±0.1	4.0±0.1	2.0±0.1	9.6±0.1	10.0±0.1	1.3±0.1	0.25±0.05

■ Storage Temperature

Temperature：25±5℃, Humidity：60±20%