



Lead-Free Current Sensing Resistors AMF Series (Halogen-Free)

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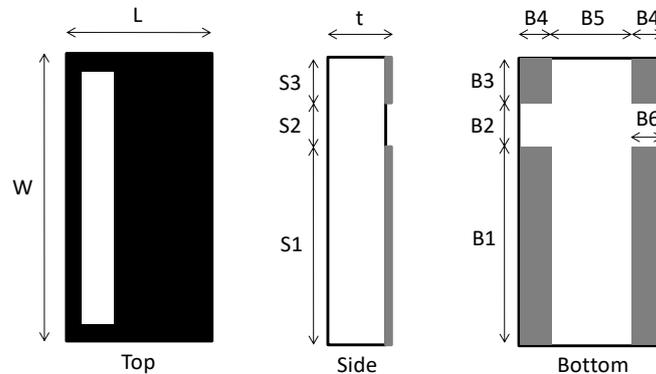
1. Scope

This specification applied to the products of Lead-Free current sensing resistor of metal foil for Lead-Free AMF series manufactured by TA-I TECHNOLOGY CO, LTD.

2. Type Designation

AMF03	F	T	T	R001
Series No.	Tolerance	Packaging	Power	Resistance
F : 4-wire 06 : 0612 05 : 0508 03 : 0306	F= ±1% G= ±2% J= ±5%	T= Paper	B= 1/8W A= 1/4W T=1/3W I= 3/4W S= 1/2W C= 1W	e.g. R020= 20mΩ R001= 1mΩ

3. Dimension



	Dimension	L	W	t	S1	S2	S3
AMF 0612	SPEC (mm)	1.60±0.20	3.20±0.20	0.70±0.20	2.20±0.20	0.50±0.20	0.50±0.20
	Dimension	B1	B2	B3	B4	B5	B6
	SPEC (mm)	2.20±0.20	0.50±0.20	0.50±0.20	0.45±0.20	0.70±0.20	0.45±0.20
AMF 0508	Dimension	L	W	t	S1	S2	S3
	SPEC (mm)	1.25±0.20	2.0±0.20	0.60±0.20	1.26±0.20	0.40±0.20	0.35±0.20
	Dimension	B1	B2	B3	B4	B5	B6
	SPEC (mm)	1.25±0.20	0.40±0.20	0.35±0.20	0.30±0.20	0.65±0.20	0.25±0.20
AMF 0306	Dimension	L	W	t	S1	S2	S3
	SPEC (mm)	0.80±0.20	1.70±0.20	0.50±0.20	1.00±0.20	0.40±0.20	0.35±0.20
	Dimension	B1	B2	B3	B4	B5	B6
	SPEC (mm)	1.00±0.20	0.35±0.20	0.35±0.20	0.25±0.20	0.30±0.20	0.25±0.20

Unit: mm



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4. Features

Series	Size	Resistance Value (Max.)	Power (W)	Operation Temperature Range	TCR	Tolerance
AMF06	0612	1~20 mΩ	1	-55°C~+150°C	±100ppm/°C	±1% ±2% ±5%
AMF05	0508	1~15mΩ	3/4			
AMF03	0306	1~15 mΩ	1/2			

5. Reliability Tests

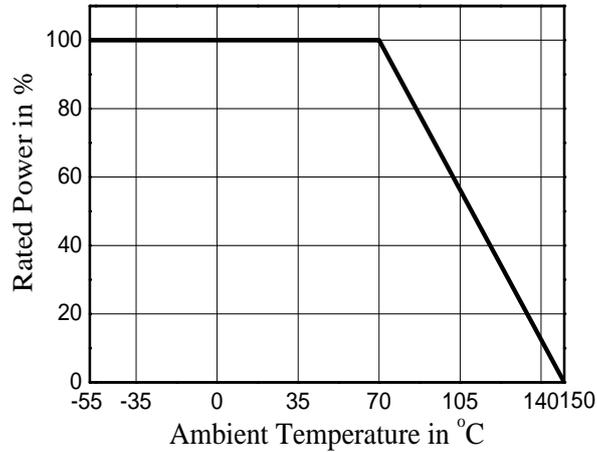
Test Items	Reference standard	Condition of Test	Test Limits
Temperature Coefficient of Resistance	IEC60115-1 4.8 JIS C 5201-1 4.8	+25°C ~ +125°C	Refer 4.0
Load Life	IEC60115-1 4.25.1 JIS C 5201-1 4.25.1	1000hours at rated power, 70°C, 1.5hours "ON", 0.5hour "OFF"	< ±2%
Short Time Overload	IEC60115-1 4.13 JIS C 5201-1 4.13	5 X rated power for 5s	< ±1%
Moisture no Load	IEC60115-1 4.24.2.1a) JIS C 5201-1 4.24.2.1a)	85°C, 85%RH, 1000hrs	< ±1%
Temperature cycle	IEC60115-1 4.19 JIS C 5201-1 4.19	-55°C & +125°C, 100cycle, 15min per extreme condition	< ±1%
Resistance to Soldering Heat	IEC60115-1 4.18 JIS C 5201-1 4.18	260±5°C for 10±1 sec	< ±1%
Solderability	IEC60115-1 4.17 JIS C 5201-1 4.17	245±5°C, 2±0.5sec	At least 95% of surface area of electrode shall be covered with new solder
High Temperature Exposure	IEC60115-1 4.23.2 JIS C 5201-1 4.23.2	155°C, 1000hrs	< ±1%
Low Temperature Storage	IEC60115-1 4.23.4 JIS C 5201-1 4.23.4	-55°C, 1000hrs	< ±1%
Substrate Bending	IEC60115-1 4.33 JIS C 5201-1 4.33	Bending width 2mm	< ±1%
Insulation Resistance	IEC60115-1 4.6 JIS C 5201-1 4.6	100V DC for 1 minute	>100 MΩ



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5.1 Derating Curve



5.2 Rated Current & Voltage

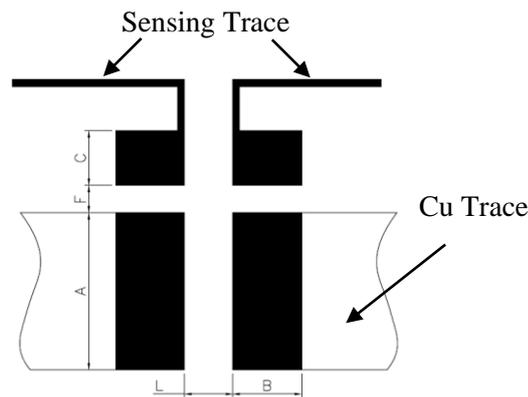
The rated current is calculated by the following formula

$$I = \sqrt{P \div R} \quad V = \sqrt{P \times R}$$

I : Rated Current (I) V : Rated Voltage (V)

P : Rated Power (W) R : Resistance Value (Ω)

6. Recommended Solder Pad Dimension



Series	Resistance Range (mΩ)	A	B	C	L	F
AMF06	1 ≤ R ≤ 20	2.50	1.00	0.80	0.70	0.50
AMF05	1 ≤ R ≤ 15	1.55	0.90	0.65	0.60	0.40
AMF03	1 ≤ R ≤ 15	1.30	0.80	0.65	0.35	0.40

*1 The copper foil minimum thickness of PCB needs 3 oz

*2. PCB Dimension Tolerance is +/-0.1mm.

Unit: mm



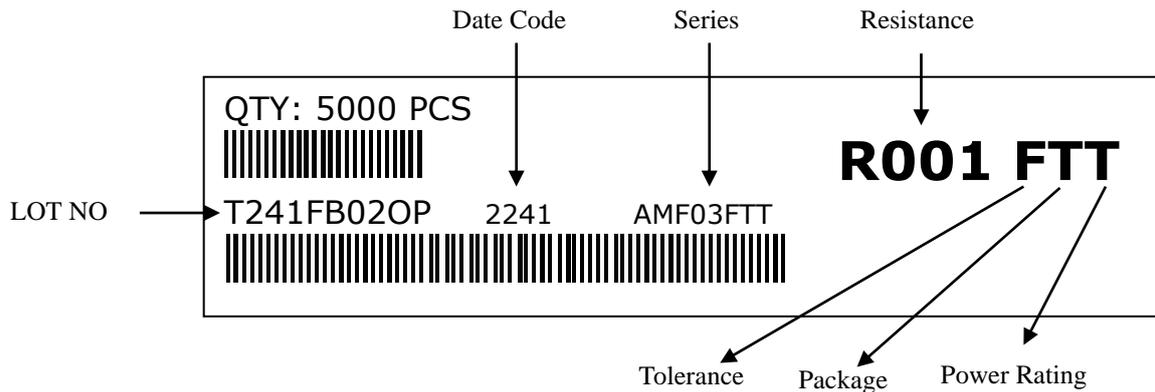
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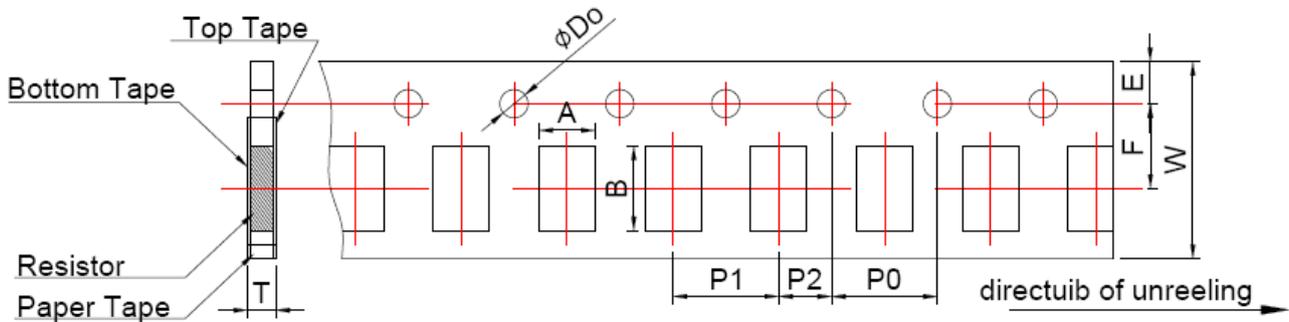
7. Number of Package

	AMF06	AMF05	AMF03
Pieces	4000	4000	5000

8. Label



9. Packaging



Packing	Type	A	B	W	F	E	P1	P2	P0	ϕD_0	T
Paper Tape	AMF06	2.00	3.60	8.00	3.50	1.75	4.00	2.00	4.00	1.55	0.95
	AMF05	1.60	2.40	8.00	3.50	1.75	4.00	2.00	4.00	1.55	0.95
	AMf03	1.10	1.90	8.00	3.50	1.75	2.00	2.00	4.00	1.55	0.60
Tolerance		± 0.15	± 0.20	± 0.20	± 0.05	± 0.10					

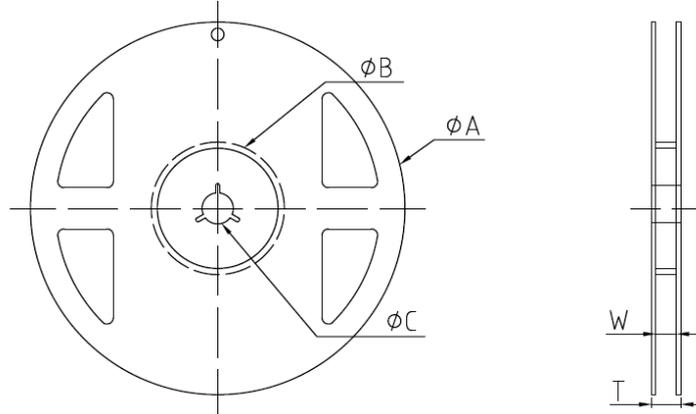
Unit: mm



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10. Reel Specification

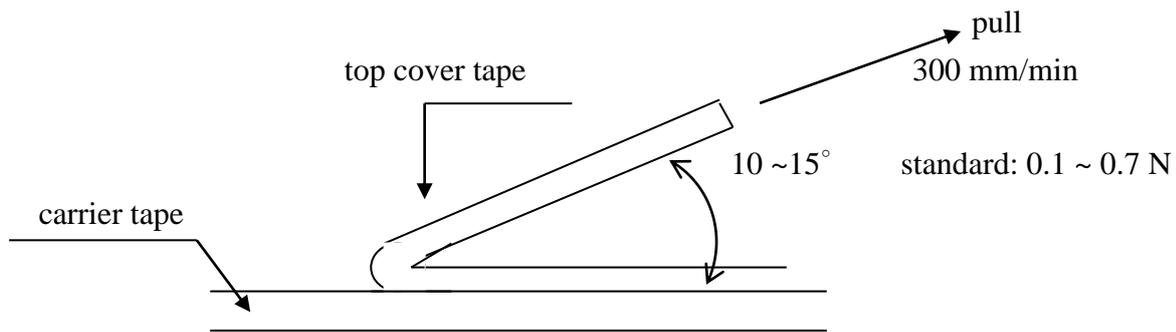


Series	ϕA	ϕB	ϕC	W	T
AMF 06	178.0 ±2.0	60.0 ±1.0	13.0 ±1.0	9.0 ±1.0	11.4 ±1.0
AMF 05					
AMF 03					

Unit: mm

11. Peeling Strength of Top Cover Tape

Test Condition: 0.1 to 0.7 N at a peel-off speed of 300 mm / minute.



12. Storage Conditions

Temperature: 5°C~35°C, Humidity:40%~75%

13. Shelf Life

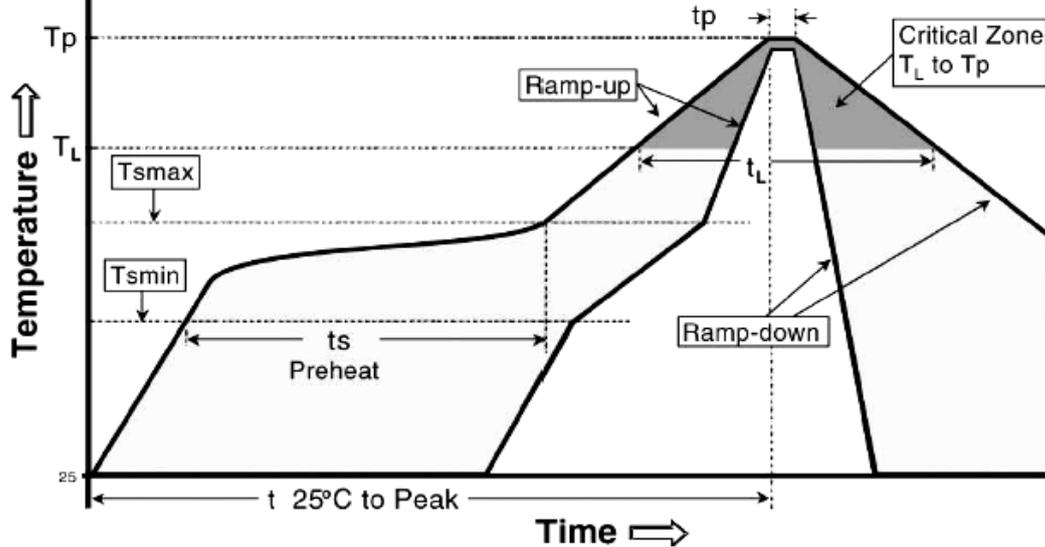
2 years from manufacturing date.



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14. Recommend IR – Reflow profile (solder: Sn96.5 / Ag3 / Cu0.5)



Allowed Re-flow times: 3 times

Remark: To avoid discoloration phenomena of chip on terminal electrodes, please use N2 Re-flow furnace.

Iron Solder: 350±10°C, 3+1/-0 sec, 1time

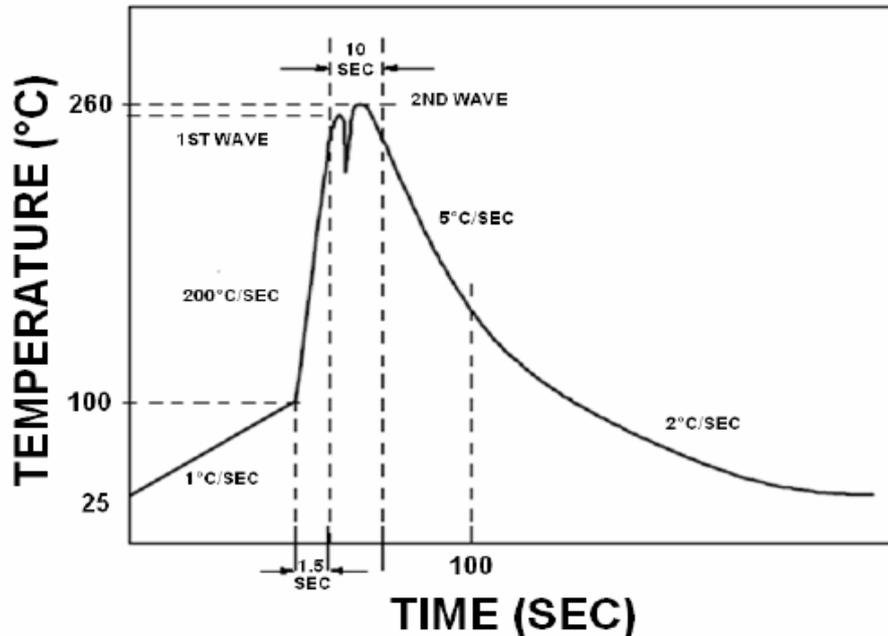
Profile Feature	Lead (Pb)-Free Assembly
Average ramp-up rate (T _{smax} to T _p)	3°C / second max.
Preheat - Temperature Min (T _{smin}) - Temperature Max (T _{smax}) - Time (T _{smin} to T _{smax}) (ts)	150°C 200°C 60 -120 seconds
Time maintained above: - Temperature (T _L) - Time (T _L)	217°C 60-150 seconds
Peak Temperature (T _p)	260°C
Time within $\begin{matrix} +0 \\ -5 \end{matrix}$ °C of actual Peak Temperature (t _p) ²	10 seconds
Ramp-down Rate	6°C/second max.
Time 25°C to Peak Temperature	8minutes max.



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15. Recommend Wave-Solder profile (solder: Sn96.5 / Ag3 / Cu0.5)



16. ECN

Engineering Change Notice: The customer will be informed with ECN if there is significant modification on the characteristics and materials described in Approval Sheet.

17. Manufacturing Country & City:

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