Innovative Service Around the Globe YAGEO

DATA SHEET

Anti-Sulfurated Thick Film Array Chip Resistors (Flat Type, Reversed)

AF102M / AF104M

1%, 5%

RoHS Compliant & Halogen Free

YAGEO

Product specification – December 30, 2020 V.0



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SCOPE

This specification describes AF102M and AF104M series flat type reversed chip resistor arrays with lead-free terminations made by thick film process.

APPLICATIONS

- DDR SDRAM
- Computer applications: laptop computer, desktop computer
- Consumer electronic equipment: PDAs, PNDs
- Mobile phone, telecom…

FEATURES

- RoHS compliant
- Halogen Free Epoxy
- Non-forbidden materials used in products/production
- Reduce environmentally hazardous wastes
- High component and equipment reliability
- Moisture sensitivity level: MSL 1

ORDERING INFORMATION - GLOBAL PART NUMBER

Part number is identified by the series name, size, tolerance, packaging type, temperature coefficient of resistance, taping reel, resistance value.

AF	10	X	X	X	X	X	XX	XXX	L
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

(1) SIZE CODE

10 = 0201

(2) NUMBER OF RESISTORS

2 = 2 resistors

4 = 4 resistors

(3) TERMINATION TYPE

M = Reversed type

(4) TOLERANCE

F = ±1%

J = ±5%

(5) PACKAGING STYLE

R = Paper taping reel

(6) TEMPERATURE COEFFICIENT OF RESISTANCE

– = Based on spec

(7) TAPING REEL

07 = 7 inch dia. Reel

(8) RESISTANCE VALUE

10Ω to 1MΩ

(9) DEFAULT CODE

Letter L is system default code for order only

ORDERING EXAMPLE

The ordering code of a AF102M convex flat type reversed chip resistor array, value 36Ωwith ±5% tolerance, supplied in 7-inch tape reel is: AF102MJR-0736RL

NOTE

1. All our R-Chip products meet RoHS compliant and Halogen Free. "LFP" of the internal 2D reel label mentions "Lead Free Process".
2. On customized label, "LFP" or specific symbol can be printed.

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MARKING

AF102M

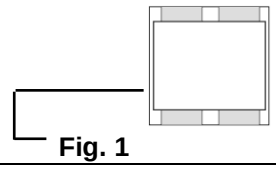


Fig. 1

No marking

AF104M

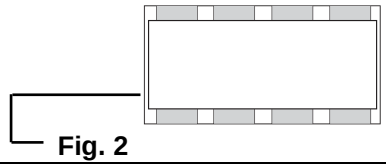


Fig. 2

No marking

CONSTRUCTION

The resistor is constructed on top of a high-grade ceramic body. Internal metal electrodes are added on each end to make the contacts to the thick film resistive element. The composition of the resistive element is a noble metal imbedded into a glass and covered by a glass layer to prevent environment influences. The resistor is laser trimmed to the rated resistance value. The resistor is covered with a protective epoxy coat, finally the two external terminations (matte tin on Ni-barrier) are added. See fig.3

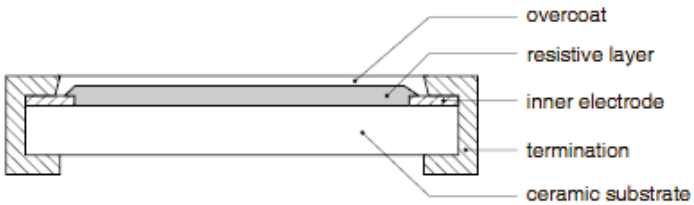


Fig. 3 Chip Resistor Outlines

DIMENSIONS

Table 1

TYPE	AF102M	AF104M
L (mm)	0.80±0.05	1.40±0.05
H (mm)	0.20±0.10	0.20±0.10
P (mm)	0.50±0.05	0.40±0.05
B (mm)	0.20±0.10	0.20±0.10
W_1 (mm)	0.60±0.05	0.60±0.05
W_2(mm)	0.20±0.10	0.20±0.10
T (mm)	0.23±0.10	0.23±0.10

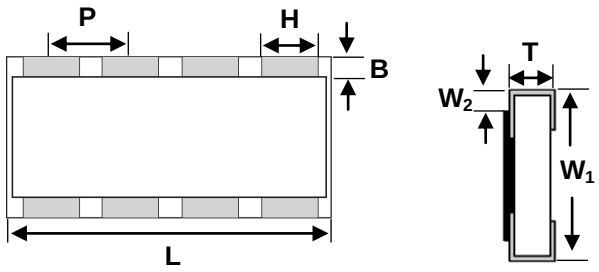


Fig. 4 Chip Resistors Dimension

SCHEMATIC

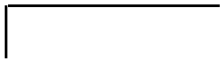
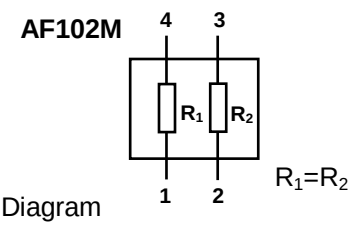
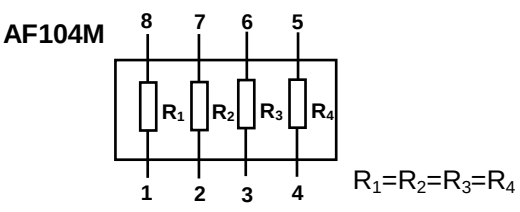


Fig. 5 Equivalent Circuit Diagram





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ELECTRICAL CHARACTERISTICS

Table 2

CHARACTERISTICS	AF102M 1/32 W	AF104M 1/32 W
Operating Temperature Range	–55°C to +125°C	–55°C to +125°C
Maximum Working Voltage	15V	12.5V
Maximum Overload Voltage	30V	25V
Dielectric Withstanding Voltage	30V	25V
Number of Resistors	2	4
Resistance Range	1%, 5%(E24) 10Ω to 1MΩ	1%, 5%(E24) 10Ω to 1MΩ
Temperature Coefficient	±200 ppm/°C	±200 ppm/°C

PACKING STYLE AND PACKAGING QUANTITY

Table 3

PRODUCT TYPE	PACKING STYLE	REEL DIMENSION	QUANTITY PER REEL
AF102M / AF104M	Paper Taping Reel (R)	7" (178 mm)	10,000 Units

NOTE: For paper tape and reel specification/dimensions, please see the special datasheet ''Packing'' document.

FUNCTIONAL DESCRIPTION

RATED POWER AT 70°C

AF102M is 1/32W

AF104M is 1/32W

RATED VOLTAGE

The DC or AC (rms) continuous working voltage corresponding to the rated power is determined by the following formula:

$U=\sqrt{(P*R)}$

Where

U=Continuous rated DC or AC (rms) working voltage (v)

P=Rated power

R=Resistance value (Ω)

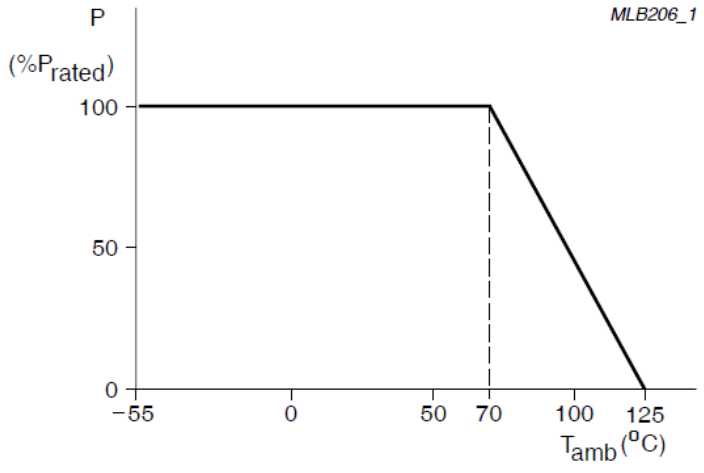


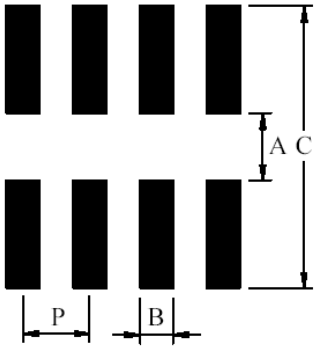
Fig. 6 Maximum dissipation (P) in percentage of rated power as a function of the operating ambient temperature (Tamb)

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RECOMMENDED FOOTPRINT DIMENSIONS

Table 4

Size Footprint	Dimensions Code		unit :mm	
	A	B	C	P
AF102M	0.3±0.1	0.3±0.05	0.9±0.2	0.5±0.05
AF104M	0.3±0.1	0.2±0.05	0.9±0.2	0.4±0.05



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TESTS AND REQUIREMENTS

TEST	TEST METHOD	PROCEDURE	REQUIREMENT
Life/ Operational Life/ Endurance	MIL-STD-202G-method 108A IEC 60115-1 4.25.1 JIS C 5202-7.10	1,000 hours at 70±5 °C applied RCWV 1.5 hours on, 0.5 hour off, still air required	±(2%+0.05Ω) <100mΩ for Jumper
High Temperature Exposure/ Endurance at upper category temperature	MIL-STD-202G-method 108A IEC 60115-1 4.25.3 JIS C 5202-7.11	1,000 hours at maximum operating temperature depending on specification, unpowered No direct impingement of forced air to the parts	±(1%+0.05Ω) <50mΩ for Jumper
Moisture Resistance	MIL-STD-202G-method 106F IEC 60115-1 4.24.2	Each temperature / humidity cycle is defined at 8 hours (method 106F), 3 cycles / 24 hours for 10d with 25 °C / 65 °C 95% R.H, without steps 7a & 7b, unpowered Parts mounted on test-boards, without condensation on parts Measurement at 24±2 hours after test conclusion	±(2%+0.05Ω) <100mΩ for Jumper
Thermal Shock	MIL-STD-202G-method 107G	-55/+125 °C Note: Number of cycles required is 300. Maximum transfer time is 20 seconds. Dwell time is 15 minutes. Air – Air	±(1%+0.05Ω) <50mΩ for Jumper
Short time overload	MIL-R-55342D-para 4.7.5 IEC60115-1 4.13	2.5 times of rated voltage or maximum overload voltage, the less of the above, for 5 sec at room temperature	±(2%+0.05Ω) <50mΩ for Jumper No visible damage
Board Flex/ Bending	IEC60115-1 4.33	Device mounted on PCB test board as described, only 1 board bending required 3 mm bending Bending time: 60±5 seconds Ohmic value checked during bending	±(1%+0.05Ω) <50mΩ for Jumper No visible damage
Solderability - Wetting	IPC/JEDECJ-STD-002 B test B IEC 60068-2-58	Electrical Test not required Magnification 50X SMD conditions: 1st step: method B, aging 4 hours at 155 °C dry heat 2nd step: leadfree solder bath at 245±3 °C Dipping time: 3±0.5 seconds	Well tinned (≥95% covered) No visible damage
- Leaching	IPC/JEDECJ-STD-002 B test D IEC 60068-2-58	Leadfree solder, 260 °C, 30 seconds immersion time	No visible damage
- Resistance to Soldering Heat	MIL-STD-202G-method 210F IEC 60068-2-58	Condition B, no pre-heat of samples Leadfree solder, 260 °C, 10 seconds immersion time Procedure 2 for SMD: devices fluxed and cleaned with isopropanol	±(1%+0.05Ω) <50mΩ for Jumper No visible damage

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TEST	TEST METHOD	PROCEDURE	REQUIREMENT
Biased Humidity	AEC-Q200 Test 7 MIL-STD-202-Method 103	1,000 hours; 85 °C / 85% RH 10% of operating power Measurement at 24± 4 hours after test conclusion.	± (5.0%+0.05 Ω)
FOS	ASTM-B-809-95* * Modified	Sulfur 750 hours, 105°C, unpowered	±(4%+0.05Ω)

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REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION
Version 0	2020/12/29	- First issue of this specification

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