

DATA SHEET

ANTI-SULFURATED CHIP RESISTORS AUTOMOTIVE GRADE

AA102 (4Pin/2R) / AA104 (8Pin/4R) / AA122 (4Pin/2R) / AA124 (8Pin/4R) 5%, 1%

sizes 2 x 0201 ,4 x 0201, 2 x 0402, 4 x 0402 RoHS compliant



YAGEO Phícomp



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SCOPE

This specification describes AA102/ AA104/ AA122/ AA124 (convex)series chip resistor arrays with lead-free terminations made by thick film process.

<u>APPLICATIONS</u>

- Terminal for SDRAM and DDRAM
- High-end Computer & Multimedia Electronics in high sulfur environment
- Consume electronic equipments: PDAs, PNDs
- Mobile phone, telecom...

FEATURES

- AEC-Q200 qualified
- RoHS compliant
- Reducing environmentally hazardous wastes
- Superior resistance against sulfur containing atmosphere
- Saving of PCB space
- None forbidden-materials used in products/production
- Halogen Free Epoxy
- Moisture sensitivity level: MSL I

ORDERING INFORMATION - GLOBAL PART NUMBER & 12NC

Both part numbers are identified by the series, size, tolerance, packing type, temperature coefficient, taping reel and resistance value.

YAGEO BRAND ordering code

GLOBAL PART NUMBER (PREFERRED)

SERIES

AA XX X - X X X XX XXXX L

(1) (2) (3) (4) (5) (6) (7

(I) SIZE

10 = 0201 size

12 = 0402 size

(2) NUMBER OF RESISTORS

2 = 2 resistors

4 = 4 resistors

(3) TOLERANCE

 $F = \pm 1\%$

 $| = \pm 5\%$ (for jumper ordering, use code of |)

(4) PACKAGING TYPE

R = Paper taping reel

(5) TEMPERATURE COEFFICIENT OF RESISTANCE

— = Base on spec

(6) TAPING REEL

07 = 7 inch dia. Reel

13 = 13 inch dia, Reel

(7) RESISTANCE VALUE

There are $2\sim4$ digits indicated the resistor value. Letter R/K/M is decimal point, no need to mention the last zero after R/K/M, e.g. I K2, not I K20.

Detailed resistance rules show in table of "Resistance rule of global part number".

(8) DEFAULT CODE

number	
Resistance code rule	Example
0R	OR = Jumper
XRXX (Ι to 9.76 Ω)	IR = I Ω IR5 = I.5 Ω 9R76 = 9.76 Ω
XXRX (10 to 97.6 Ω)	$10R = 10 \Omega$ $97R6 = 97.6 \Omega$
XXXR (100 to 976 Ω)	100R = 100 Ω
XKXX (Ι to 9.76 ΚΩ)	IK = I,000 Ω 9K76 = 9760 Ω
×Μ (Ι ΜΩ)	IM = 1,000,000 Ω

Resistance rule of global part

ORDERING EXAMPLE

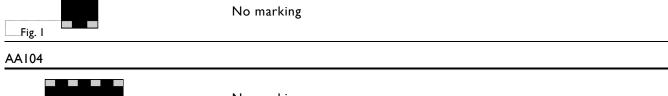
The ordering code of a AA122 convex chip resistor array, value $1,000\Omega$ with $\pm 5\%$ tolerance, supplied in 7-inch tape reel is: AA122-JR-071KL.

NOTE

- All our R-Chip products meet RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"
- On customized label, "LFP" or specific symbol printed and the optional "L" at the end of GLOBAL PART NUMBER

MARKING

AA102



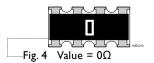


No marking

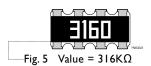
AA124

Fig. 3

AAI22

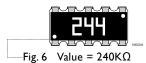


I-Digit marking



1% E-24/E-96: R≧ 100Ω 4digits

First three digits for significant figure and 4th digit for number of zeros



5% E-24: R≧ 10Ω

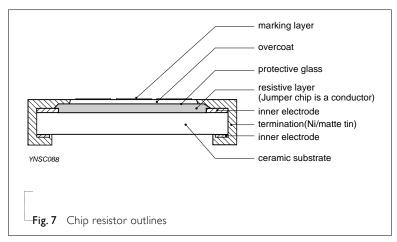
First two digits for significant figure and 3rd digit for number of zeros

For further marking information, please refer to data sheet "Chip resistors marking".

CONSTRUCTION

The resistors are constructed on top of an automotive grade ceramic body. Special sulfur-resistant internal metal electrodes are added at each end and connected by a resistive glaze. The composition of the resistive element is a noble metal embedded into a glass and covered by a glass. The resistor is laser trimmed to the rated resistance value. The resistor is covered with a protective epoxy coat, finally the external terminations (matte tin on Ni-barrier) are added as shown in Fig.7.

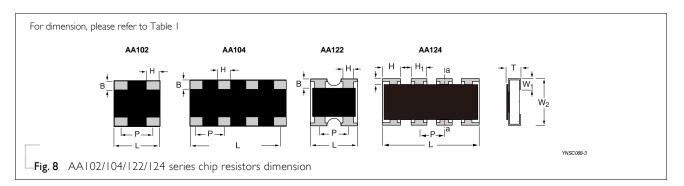
OUTLINES



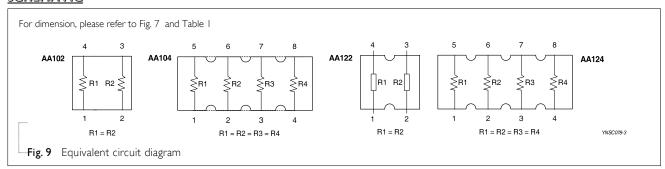
DIMENSIONS

Table I

TYPE	AA102	AA104	AA122	AA 124
B (mm)	0.15± 0.10	0.15± 0.10	0.24± 0.10	0.25± 0.15
H (mm)	0.30± 0.10	0.25± 0.10	0.30+0.10/-0.05	0.45± 0.05
H _I (mm)				0.30± 0.05
P (mm)	$0.50\pm\ 0.05$	0.40± 0.10	0.67± 0.05	0.50± 0.05
L (mm)	$0.80\pm\ 0.10$	1.40± 0.10	1.00± 0.10	2.00± 0.10
T (mm)	0.35 ± 0.10	0.35± 0.10	0.30± 0.10	0.45± 0.10
W _I (mm)	0.15 ± 0.10	0.15± 0.10	0.25± 0.10	0.30± 0.15
W_2 (mm)	0.60± 0.10	0.60± 0.10	1.00± 0.10	1.00± 0.10



<u>SCHEMATIC</u>



ELECTRICAL CHARACTERISTICS

Table 2

CHARACTERISTICS	AA102	AA104	AA122	AA124
Operating Temperature	−55 °C to +125 °C	- 55 °C to +125 °C	−55 °C to +155 °C	−55 °C to +155 °C
Rated Power	1/32 W	1/32W	1/16 W	1/16 W
Maximum Working Voltage	15 V	15V	50 V	25 V
Maximum Overload Voltage	30 V	30V	100 V	50 V
Dielectric Withstanding	30 V	30V	100 V	100 V
Resistance Range	5% (E24) I Ω to I M Ω 1% (E24/E96) I 0 Ω to I M Ω Jumper < 50 m Ω	5% (E24) Ω to M Ω 1% (E24/E96) 10 Ω to M Ω Jumper < 50 m Ω	, ,	% (E24/E96) Ω to MΩ
Temperature Coefficient	± 200 ppm/°C	± 200 ppm/°C	$I\Omega \le R \le I0\Omega \pm 250 \text{ ppm/°C}$ $I0\Omega \le R \le IM\Omega \pm 200 \text{ ppm/°C}$	
Jumper Criteria	Rated Current 0.5 A Maximum Current 1.0 A	Rated Current 0.5 A Maximum Current 1.0 A	Rated Current I.0 A Maximum Current 2.0 A	

SERIES

FOOTPRINT AND SOLDERING PROFILES

For recommended footprint and soldering profiles, please refer to data sheet "Chip resistors mounting".

PACKING STYLE AND PACKAGING QUANTITY

Table 3 Packing style and packaging quantity

PACKING STYLE	REEL DIMENSION	AA102/104	AFI22	AA124
Paper Taping Reel (R)	7" (178 mm)	10,000 units	10,000 units	10,000 units
	13" (330 mm)		50,000 units	40,000 units

NOTE

1. For paper tape and reel specification/dimensions, please refer to data sheet "Chip resistors packing".

FUNCTIONAL DESCRIPTION

POWER RATING

Each type rated power at 70°C AA102 / AA104 = 1/32 WAA122 / AA124 = I/I6 W

RATED VOLTAGE

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

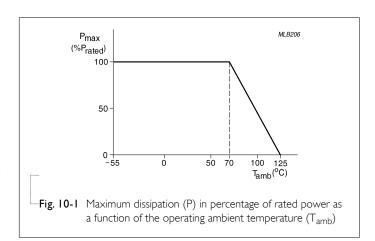
$$V = \sqrt{(P \times R)}$$

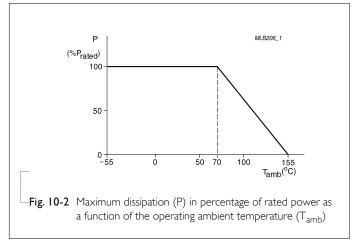
or max. working voltage whichever is less

Where

V=Continuous rated DC or AC (rms) working voltage (V)

P=Rated power (W)







Chip Resistor Surface Mount AA

SERIES 102/ 104 / 122/ 124 (RoHS Compliant)

TESTS AND REQUIREMENTS

Table 4 Test condition, procedure and requirements

TEST	TEST METHOD	PROCEDURE	REQUIREMENTS
Life/	,		±(2%+0.05 Ω)
Endurance	IEC 60115-1 4.25	1.5 hours on, 0.5 hour off, still air required	<100 m Ω for Jumper
High Temperature Exposure	MIL-STD-202-method 108	I,000 hours at maximum operating temperature depending on specification, unpowered	\pm (1%+0.05 Ω) <50 m Ω for Jumper
		Tolerances: I55±3 °C	
Moisture	MIL-STD-202-method 106	Each temperature / humidity cycle is defined at	±(2%+0.05 Ω)
Resistance		8 hours (method 106G), 3 cycles / 24 hours for 10d with 25 °C / 65 °C 95% R.H, without steps 7a & 7b, unpowered	<100 m Ω for Jumper
		Parts mounted on test-boards, without condensation on parts	
		Measurement at 24±2 hours after test conclusion	
Thermal Shock	MIL-STD-202-method 107	-55/+125 °C	±(1%+0.05 Ω)
		Note: Number of cycles required is 300. Devices mounted	$<$ 50 m Ω for Jumper
		Maximum transfer time is 20 seconds. Dwell time is 15 minutes. Air – Air	
Short Time Overload	IEC60115-1 4.13	2.5 times RCWV or maximum overload voltage whichever is less for 5 sec at room temperature	±(2%+0.05 Ω)
			$<$ 50 m Ω for Jumper
			No visible damage
Board Flex/ Bending	IEC60115-1 4.33	Device mounted on PCB test board as	±(1%+0.05 Ω)
		described, only 1 board bending required	$<$ 50 m Ω for Jumper
		3 mm bending Bending time: 60±5 seconds	No visible damage
		Ohmic value checked during bending	
		3	



Chip Resistor Surface Mount AA SERIES 102/ 104 / 122/ 124 (RoHS Compliant)

TEST	TEST METHOD	PROCEDURE	REQUIREMENTS
Solderability			
- Wetting	J-STD-002 test B	Electrical Test not required	Well tinned (≥95% covered)
		Magnification 50X	No visible damage
		SMD conditions:	
		I st step: method B, aging 4 hours at 155 °C dry heat	
		2^{nd} step: leadfree solder bath at 245 $\pm 3^{\circ}\text{C}$	
		Dipping time: 3±0.5 seconds	
- Leaching	J-STD-002 test D	Leadfree solder, 260 °C, 30 seconds immersion time	No visible damage
- Resistance to	IEC 60115-1 4.18	Condition B, no pre-heat of samples	±(1%+0.05Ω)
Soldering Heat	MIL-STD-202 Method 215	Leadfree solder, 260 °C, 10 seconds immersion time	$<$ 50 m Ω for Jumper
			No visible damage
		Procedure 2 for SMD: devices fluxed and cleaned with isopropanol	
FOS	ASTM-B-809-95	Sulfur (saturated vapor) 1000 hours, 90± 2°C, Rating with no power	±(1%+0.05Ω)
		Sulfur 750 hours, 105°C, unpowered	±(4.0%+0.05Ω)
			$<$ 100m Ω for Jumper



SERIES 102/104 / 122/124 (RoHS Compliant)

Product specification

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REVISION HISTORY

REVISION DATE CHANGE NOTIFICATION DESCRIPTION

Version 0 Feb. 01, 2018 - - First issue of this specification

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Chip Resistor Surface Mount

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