

# DATA SHEET

ARRAY CHIP RESISTORS

YC/TC 124 (8Pin/4R)

5%, 1%

sizes 4 × 0402

RoHS compliant



**SCOPE**

This specification describes YC124 (convex) and TC124 (concave) series chip resistor arrays with lead-free terminations made by thick film process.

**APPLICATIONS**

- Terminal for SDRAM and DDRAM
- Computer applications: laptop computer, desktop computer
- Consume electronic equipment: PDAs, PNDs
- Mobile phone, telecom...

**FEATURES**

- RoHS compliant
  - Products with lead free terminations meet RoHS requirements
  - Pb-glass contained in electrodes
  - Resistor element and glass are exempted by RoHS
- Reduce environmentally hazardous wastes
- High component and equipment reliability
- Save of PCB space
- None forbidden-materials used in products/production
- Halogen Free Epoxy

**ORDERING INFORMATION - GLOBAL PART NUMBER & I2NC**

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)**

**YC** 124 - X X X XX XXXX L  
**TC** (1) (2) (3) (4) (5) (6)

**(1) TOLERANCE**

F = ±1%  
 J = ±5% (for Jumper ordering, use code of J)

**(2) PACKAGING TYPE**

R = Paper taping reel

**(3) TEMPERATURE COEFFICIENT OF RESISTANCE**

- = Based on spec

**(4) TAPING REEL**

07 = 7 inch dia. Reel  
 10 = 10 inch dia. Reel  
 13 = 13 inch dia. Reel

**(5) RESISTANCE VALUE**

There are 2~4 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.1K2, not 1K20.  
 Detailed resistance rules show in table of "Resistance rule of global part number".

**(6) DEFAULT CODE**

Letter L is the system default code for ordering only. (Note)

**Resistance rule of global part number**

Resistance code rule	Example
OR	OR = Jumper
XRXX (1 to 9.76 Ω)	1R = 1 Ω 1R5 = 1.5 Ω 9R76 = 9.76 Ω
XXRX (10 to 97.6 Ω)	10R = 10 Ω 97R6 = 97.6 Ω
XXXR (100 to 976 Ω)	100R = 100 Ω
XKXX (1 to 9.76 KΩ)	1K = 1,000 Ω 9K76 = 9760 Ω
XMXX (1 to 9.76 MΩ)	1M = 1,000,000 Ω 9M76 = 9,760,000 Ω

**ORDERING EXAMPLE**

The ordering code of a YC124 convex chip resistor array, value 1,000 Ω with ±5% tolerance, supplied in 7-inch tape reel is: YC124-JR-071KL.

**NOTE**

1. All our RSMD products meet RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"
2. On customized label, "LFP" or specific symbol printed and the optional "L" at the end of GLOBAL PART NUMBER / I2NC can be added (both are on customer request)

**PHYCOMP BRAND ordering codes**

Both GLOBAL PART NUMBER (preferred) and I2NC (traditional) codes are acceptable to order Phycomp brand products.

**GLOBAL PART NUMBER (PREFERRED)**

For detailed information of GLOBAL PART NUMBER and ordering example, please refer to page 2. TC124 series is supplied and ordered by global part number only.

**I2NC CODE**

TYPE/ 4×0402	2350	XXX XXXXX L				PAPER / PE TAPE ON REEL (units) <sup>(2)</sup>	
	(1)	(2)	(3)	(4)	10,000	40,000	
ARV341	2350	±5%	1 to 1 MΩ		033 11xxx	033 13xxx	
ARV342	2350	±1%	1 to 1 MΩ		023 2xxxx	023 8xxxx	
Jumper	2350	-	0 Ω		033 91001	-	

Resistance decade <sup>(3)</sup>	Last digit
0.01 to 0.0976 Ω	0
0.1 to 0.976 Ω	7
1 to 9.76 Ω	8
10 to 97.6 Ω	9
100 to 976 Ω	1
1 to 9.76 KΩ	2
10 to 97.6 KΩ	3
100 to 976 KΩ	4
1 to 9.76 MΩ	5
10 to 97.6 MΩ	6

- (1) The resistors have a 12-digit ordering code starting with 2350.
- (2) The subsequent 4 or 5 digits indicate the resistor tolerance and packaging.
- (3) The remaining 4 or 3 digits represent the resistance value with the last digit indicating the multiplier as shown in the table of "Last digit of I2NC".
- (4) "L" is optional symbol <sup>(Note)</sup>.

Example:

0.02 Ω	=	0200 or 200
0.3 Ω	=	3007 or 307
1 Ω	=	1008 or 108
33 KΩ	=	3303 or 333
10 MΩ	=	1006 or 106

**ORDERING EXAMPLE**

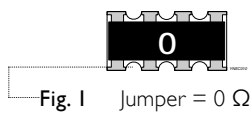
The ordering code of a ARV341 resistor, value 1,000 Ω with ±5% tolerance, supplied in tape of 10,000 units per reel is: 235003311102 (L) or YC124-JR-071K(L).

**NOTE**

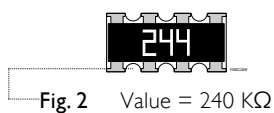
- 1. All our RSMD products are RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"
- 2. On customized label, "LFP" or specific symbol printed and the optional "L" at the end of GLOBAL PART NUMBER / I2NC can be added (both are on customer request)

**MARKING**

**YCI24**

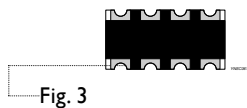


I-Digit marking



E-24 series: 3 digits  
First two digits for significant figure and 3rd digit for number of zeros

**TCI24**



No marking

For further marking information, please refer to data sheet “Chip resistors 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 second glass 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, as shown in Fig 4.

**OUTLINES**

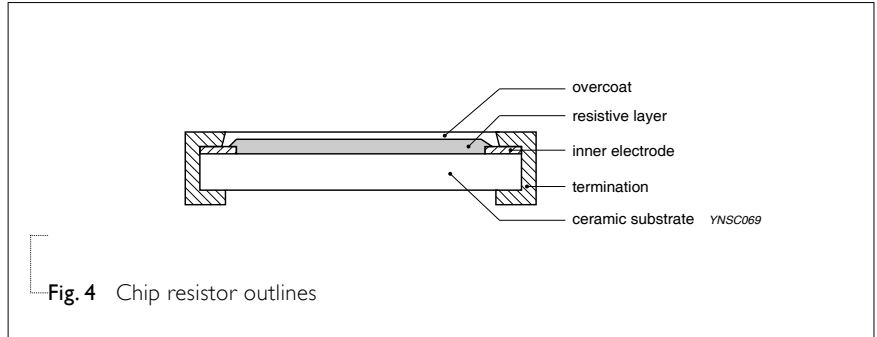


Fig. 4 Chip resistor outlines

**DIMENSIONS**

Table I

TYPE	YC124	TC124
B (mm)	0.20 ±0.15	0.20 ±0.10
H (mm)	0.45 ±0.05	0.30 ±0.10
H <sub>1</sub> (mm)	0.30 ±0.05	---
P (mm)	0.50 ±0.05	0.50 ±0.05
L (mm)	2.00 ±0.10	2.00 ±0.10
T (mm)	0.45 ±0.10	0.40 ±0.10
W <sub>1</sub> (mm)	0.30 ±0.15	0.25 ±0.10
W <sub>2</sub> (mm)	1.00 ±0.10	1.00 ±0.10

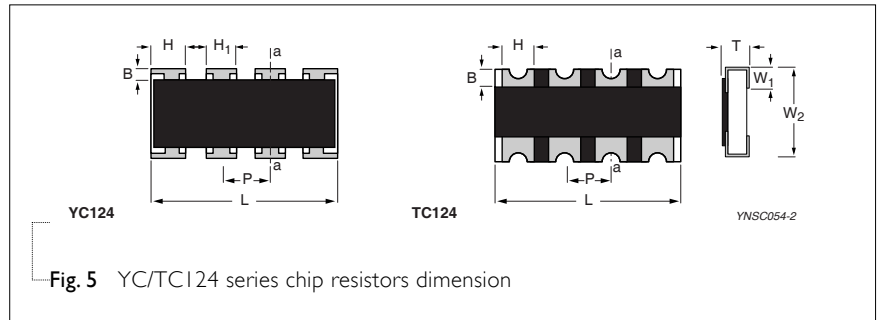


Fig. 5 YC/TC124 series chip resistors dimension

**SCHEMATIC**

For dimension, please refer to Fig. 5 and Table I

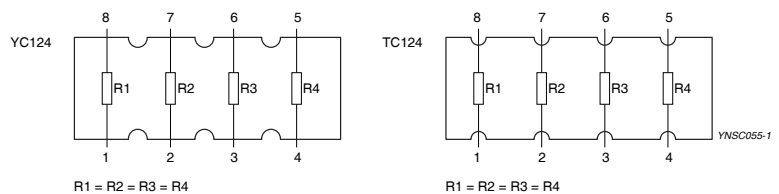


Fig. 6 Equivalent circuit diagram

**ELECTRICAL CHARACTERISTICS**

Table 2

CHARACTERISTICS	YC124	TC124
Operating Temperature Range	-55 °C to +155 °C	-55 °C to +125 °C
Rated Power	1/16 W	1/16 W
Maximum Working Voltage	25 V	50 V
Maximum Overload Voltage	50 V	100 V
Dielectric Withstanding Voltage	100 V	100 V
Resistance Range	5% (E24)	10 Ω to 1 MΩ
	1% (E24/E96)	
	Zero Ohm Jumper < 0.05 Ω	
Temperature Coefficient	1 Ω ≤ R < 10 Ω ±250 ppm/°C	±200 ppm/°C
	10 Ω ≤ R ≤ 1 MΩ ±200 ppm/°C	
Jumper Criteria	Rated Current	1.0 A
	Maximum Current	2.0 A

**FOOTPRINT AND SOLDERING PROFILES**

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

PRODUCT TYPE	PACKING STYLE	REEL DIMENSION	QUANTITY PER REEL
YC/TC124	Paper Taping Reel (R)	7" (178 mm)	10,000 units
		10" (254 mm)	20,000 units
		13" (330 mm)	40,000 units

**NOTE**

I. For paper tape and reel specification/dimensions, please refer to data sheet “Chip resistors packing”.

**FUNCTIONAL DESCRIPTION**

**OPERATING TEMPERATURE RANGE**

- YC124: -55 °C to +155 °C
- TC124: -55 °C to +125 °C

**POWER RATING**

YC/TC 124 rated power at 70 °C is 1/16 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)

R=Resistance value (Ω)

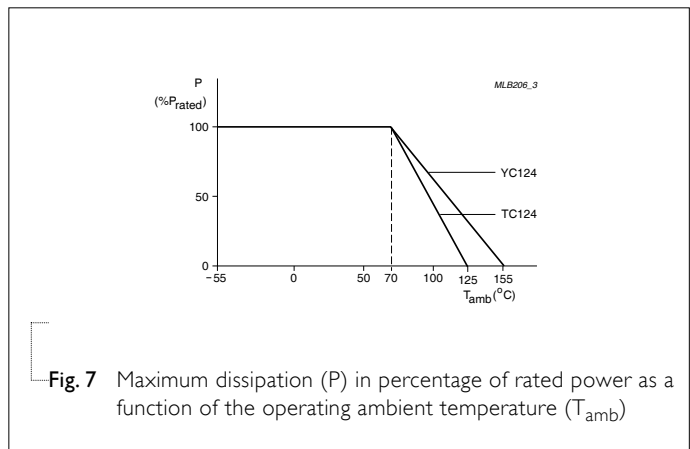


Fig. 7 Maximum dissipation (P) in percentage of rated power as a function of the operating ambient temperature (T<sub>amb</sub>)

**TESTS AND REQUIREMENTS**
**Table 4** Test condition, procedure and requirements

TEST	TEST METHOD	PROCEDURE	REQUIREMENTS
Life/ Operational Life/ Endurance	MIL-STD-202G-method 108A	1,000 hours at 70±5 °C applied RCWV	±(2%+0.05 Ω)
	IEC 60115-1 4.25.1	1.5 hours on, 0.5 hour off, still air required	<100 mΩ for Jumper
	JIS C 5202-7.10		
High Temperature Exposure/ Endurance at upper category temperature	MIL-STD-202G-method 108A	1,000 hours at maximum operating temperature depending on specification, unpowered	±(1%+0.05 Ω) <50 mΩ for Jumper
	IEC 60115-1 4.25.3	No direct impingement of forced air to the parts	
	JIS C 5202-7.11	Tolerances: 155±3 °C	
Moisture Resistance	MIL-STD-202G-method 106F	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	±(2%+0.05 Ω) <100 mΩ for Jumper
	IEC 60115-1 4.24.2	Parts mounted on test-boards, without condensation on parts	
		Measurement at 24±2 hours after test conclusion	
Thermal Shock	MIL-STD-202G-method 107G	YC124: -55/+155 °C	±(0.5%+0.05 Ω) for 10 KΩ to 10 MΩ
		TC124: -55/+125 °C	±(1%+0.05 Ω) for others
		Note: Number of cycles required is 300. Devices unmounted Maximum transfer time is 20 seconds. Dwell time is 15 minutes. Air – Air	<50 mΩ for Jumper
Short time overload	MIL-R-55342D-para 4.7.5	2.5 times RCWV or maximum overload voltage whichever is less for 5 sec at room temperature	±(2%+0.05 Ω) <50 mΩ for Jumper No visible damage
	IEC60115-1 4.13		
Board Flex/ Bending	IEC60115-1 4.33	Device mounted on PCB test board as described, only 1 board bending required	±(1%+0.05 Ω) <50 mΩ for Jumper
		3 mm bending	No visible damage
		Bending time: 60±5 seconds Ohmic value checked during bending	

TEST	TEST METHOD	PROCEDURE	REQUIREMENTS
Solderability - Wetting	IPC/JEDECJ-STD-002B test B	Electrical Test not required	Well tinned ( $\geq 95\%$ covered) No visible damage
	IEC 60068-2-58	Magnification 50X SMD conditions: 1 <sup>st</sup> step: method B, aging 4 hours at 155 °C dry heat 2 <sup>nd</sup> step: leadfree solder bath at $245 \pm 3$ °C Dipping time: $3 \pm 0.5$ seconds	
- Leaching	IPC/JEDECJ-STD-002B 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	Condition B, no pre-heat of samples	$\pm(1\%+0.05 \Omega)$
	IEC 60068-2-58	Leadfree solder, 270 °C, 10 seconds immersion time Procedure 2 for SMD: devices fluxed and cleaned with isopropanol	<50 m $\Omega$ for Jumper No visible damage



**REVISION HISTORY**

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version 3	Mar 09, 2011	-	- YC124 resistance range extended
Version 2	Oct 29, 2008	-	- Change to dual brand datasheet that describes YC/TC124 with RoHS compliant - Range extended to size TC124 (concave) - Description of "Halogen Free Epoxy" added - Define global part number
Version 1	Feb 04, 2005	-	- New datasheet for 4 × 0402 chip resistor arrays 1% and 5% with lead-free terminations - Replace the 4 × 0402 part of pdf files: ARV341_5_PbFree_L_0.pdf and ARV342_1_PbFree_L_0.pdf - Test method and procedure updated
Version 0	Dec 05, 2003	-	-

*“ Yageo reserves all the rights for revising the content of this datasheet without further notification, as long as the products itself are unchanged. Any product change will be announced by PCN.”*