

DATA SHEET

ARRAY CHIP RESISTORS

YC/TC

5%, 1%

sizes

YC:102/104/122/124/162/164/248/324/158T/358L/358T

TC: 122/124/164

RoHS compliant



YAGEO

Product Specification – February 21, 2019 V.9



MARKING**YC102**

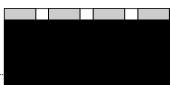
No marking

Fig. 1

YC122

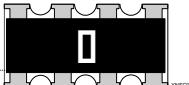
No marking

Fig. 2

YC104

No marking

Fig. 3

YC124 / 162 / 164 / 324

1-Digit marking

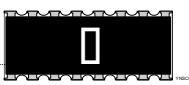
Fig. 4 Jumper=0Ω



E-24 series: 3 digits, 5%

Fig. 4-1 Value=240KΩ

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

YC248

1-Digit marking

Fig. 5 Jumper=0Ω



E-24 series: 3 digits, 5%

Fig. 5-1 Value=240KΩ

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

YC158T/358L/358T

Fig. 6 Value=24Ω

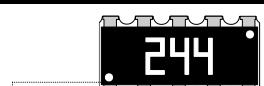
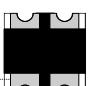


Fig. 6-1 Value=240KΩ

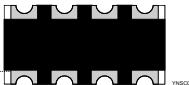
E-24 series: 3 digits

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

TC122

No marking

Fig. 7

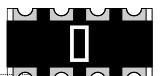
TC124

No marking

Fig. 8



TC164



1-Digit marking

Fig. 9 Jumper=0Ω



E-24 series: 3 digits, 5%

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

Fig. 9-1 Value=240KΩ

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.10.

OUTLINES

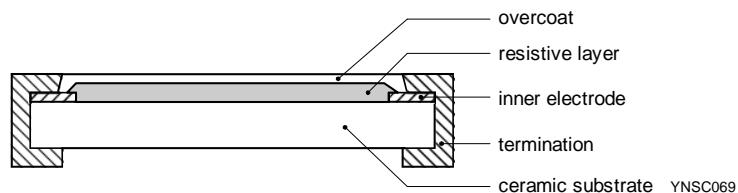


Fig. 10 Chip resistor outlines

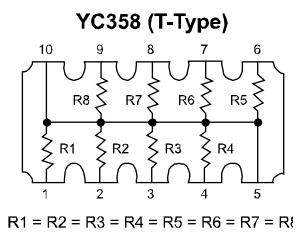
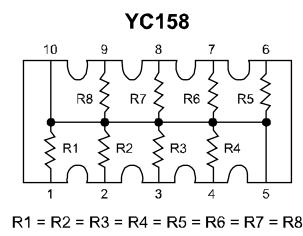
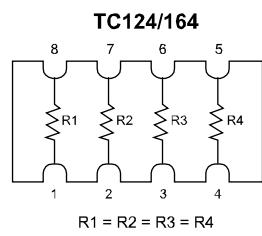
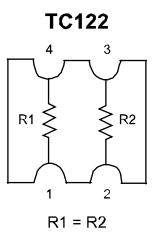
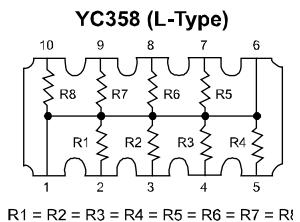
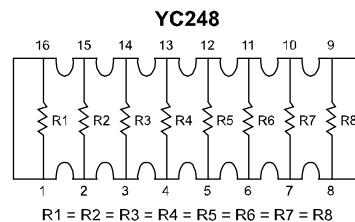
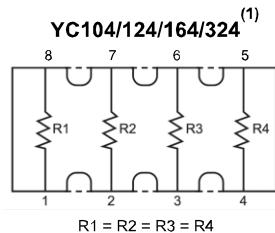
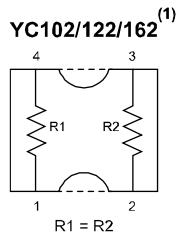
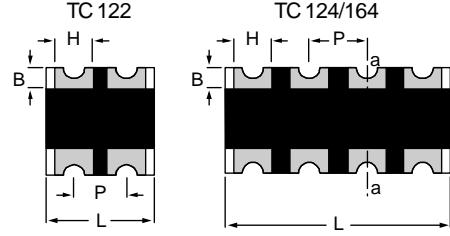
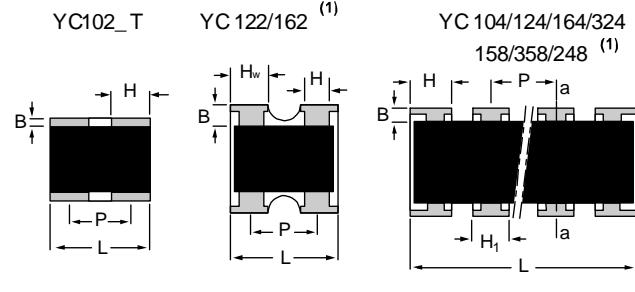
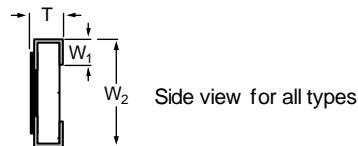
SCHEMATIC

Fig. 11 Equivalent circuit diagram
Note: 1. YC102/104 is flat type

For dimension, please refer to Table 1



unit: mm

Fig. 12 YC/TC122 series chip resistors dimension
Note: (1) YC102/104 is flat type

DIMENSIONS

Table I

TYPE	H / H _I / H _W	B	P	L	T	W _I	W ₂
YC102	H: 0.25±0.10	0.15±0.10	0.55±0.10	0.80±0.10	0.35±0.10	0.15±0.10	0.60±0.10
YC104	H: 0.20±0.10	0.15±0.05	0.40±0.10	1.40±0.10	0.35±0.10	0.15±0.10	0.60±0.10
YC122	H: 0.21±0.10 / -0.05 H _W : 0.35±0.10	0.20±0.10	0.67±0.05	1.00±0.10	0.30±0.10	0.25±0.10	1.00±0.10
YC124	H: 0.40±0.15 H _I : 0.30±0.05	0.20±0.15	0.50±0.05	2.00±0.10	0.45±0.10	0.30±0.15	1.00±0.10
YC162	H: 0.30±0.10 H _W : 0.65±0.15	0.30±0.10	0.80±0.05	1.60±0.10	0.40±0.10	0.30±0.10	1.60±0.10
YC164	H: 0.65±0.05 H _I : 0.50±0.15	0.30±0.15	0.80±0.05	3.20±0.15	0.60±0.10	0.30±0.15	1.60±0.15
YC248	H: 0.45±0.05 H _I : 0.30±0.05	0.30±0.15	0.50±0.05	4.00±0.20	0.45±0.10	0.40±0.15	1.60±0.15
YC324	H: 1.10±0.15 H _I : 0.90±0.15	0.50±0.20	1.27±0.05	5.08±0.20	0.60±0.10	0.50±0.15	3.20±0.20
TC122	H: 0.30±0.05	0.25±0.15	0.50±0.05	1.00±0.10	0.30±0.10	0.25±0.15	1.00±0.10
TC124	H: 0.30±0.10	0.20±0.10	0.50±0.05	2.00±0.10	0.40±0.10	0.25±0.10	1.00±0.10
TC164	H: 0.50±0.15	0.30±0.15	0.80±0.05	3.20±0.15	0.60±0.10	0.30±0.15	1.60±0.15
YC158T	H: 0.45±0.05 H _I : 0.32±0.05	0.30±0.15	0.64±0.05	3.20±0.20	0.60±0.10	0.35±0.15	1.60±0.15
YC358L	H: 1.10±0.15 H _I : 0.90±0.15	0.50±0.15	1.27±0.05	6.40±0.20	0.60±0.10	0.50±0.15	3.20±0.20
YC358T							



ELECTRICAL CHARACTERISTICS

Table 2

TYPE	POWER P_{70}	OPERATING TEMP. RANGE	MWV	RCOV	DWV	RESISTANCE RANGE & TOLERANCE	T. C. R.	Jumper criteria (unit: A)
YC102	1/32W	-55°C to +125°C	15V	30V	30V	E24 ±5% 10Ω ≤ R ≤ 1MΩ E24/E96 ±1% 10Ω ≤ R ≤ 1MΩ Jumper < 0.05Ω	±200 ppm/°C	Rated current Max. current 0.5 1.0
YC104	1/32W	-55°C to +125°C	12.5V	25V	25V	E24 ±5% 10Ω ≤ R ≤ 1MΩ E24/E96 ±1% 10Ω ≤ R ≤ 1MΩ Jumper < 0.05Ω		Rated current Max. current 0.5 1.0
YC122	1/16W	-55°C to +155°C	50V	100V	100V	E24 ±5% 1Ω ≤ R ≤ 1MΩ E24/E96 ±1% 1Ω ≤ R ≤ 1MΩ Jumper < 0.05Ω		Rated current Max. current 0.5 1.0
YC124	1/16W	-55°C to +155°C	25V	50V	100V	E24 ±5% 1Ω ≤ R ≤ 1MΩ E24/E96 ±1% 1Ω ≤ R ≤ 1MΩ Jumper < 0.05Ω	1Ω ≤ R ≤ 10Ω ±250 ppm/°C 10Ω < R ≤ 1MΩ ±200 ppm/°C	Rated current Max. current 1.0 2.0
YC162	1/16W	-55°C to +155°C	50V	100V	100V	E24 ±5% 1Ω ≤ R ≤ 1MΩ E24/E96 ±1% 1Ω ≤ R ≤ 1MΩ Jumper < 0.05Ω		Rated current Max. current 1.0 2.0
YC164	1/16W	-55°C to +155°C	50V	100V	100V	E24 ±5% 1Ω ≤ R ≤ 1MΩ E24/E96 ±1% 1Ω ≤ R ≤ 1MΩ Jumper < 0.05Ω		Rated current Max. current 1.0 2.0
YC248	1/16W	-55°C to +155°C	50V	100V	100V	E24 ±5% 10Ω ≤ R ≤ 1MΩ E24/E96 ±1% 10Ω ≤ R ≤ 1MΩ Jumper < 0.05Ω		Rated current Max. current 2.0 10.0
YC324	1/8W	-55°C to +155°C	200V	500V	500V	E24 ±5% 10Ω ≤ R ≤ 1MΩ E24/E96 ±1% 10Ω ≤ R ≤ 1MΩ		--- ---
TC122	1/16W	-55°C to +125°C	50V	100V	100V	E24 ±5% 10Ω ≤ R ≤ 1MΩ E24/E96 ±1% 10Ω ≤ R ≤ 1MΩ Jumper < 0.05Ω	±200 ppm/°C	Rated current Max. current 1.0 1.5
TC124	1/16W	-55°C to +125°C	50V	100V	100V	E24 ±5% 10Ω ≤ R ≤ 1MΩ E24/E96 ±1% 10Ω ≤ R ≤ 1MΩ Jumper < 0.05Ω		Rated current Max. current 1.0 1.5
TC164	1/16W	-55°C to +155°C	50V	100V	100V	E24 ±5% 10Ω ≤ R ≤ 1MΩ E24/E96 ±1% 10Ω ≤ R ≤ 1MΩ Jumper < 0.05Ω		Rated current Max. current 1.0 2.0
YC158T	1/16W	-55°C to +155°C	25V	50V	50V	E24 ±5% 10Ω ≤ R ≤ 100KΩ		--- ---
YC358L YC358T	1/16W	-55°C to +155°C	50V	100V	100V	E24 ±5% 10Ω ≤ R ≤ 330KΩ		--- ---

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	PACKING STYLE	YC102/ 104	YC/TC 122	YC/TC 124	YC162	YC/TC 164	YC248	YC324	YC158T	YC358L YC358T
Paper taping reel (R)	7" (178mm) 13" (254mm)	10,000 50,000	10,000 50,000	10,000 40,000	5,000 ---	5,000 20,000	5,000 ---	--- ---	5,000 20,000	--- ---
Embossed taping reel (K)	7" (178mm)	---	---	---	---	---	4,000	4,000	---	4,000

NOTE

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



FUNCTIONAL DESCRIPTION**OPERATING TEMPERATURE RANGE**

YC102/104, TC122/124 Range:

-55°C to +125°C (Fig.13)

YC122/124/162/164/248/324/158T/358L/358T, TC164

Range:

-55°C to +155°C (Fig.14)

POWER RATING

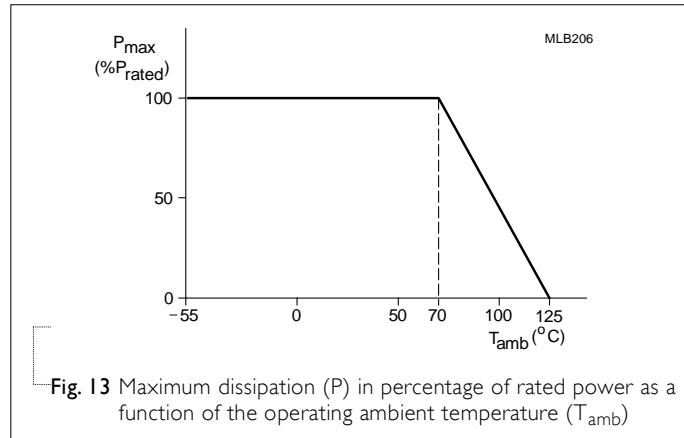
Each type rated power at 70°C

YC102/104 = 1/32 W

YC122/124/162/164/248/158T/358L/358T = 1/16 W

YC324 = 1/8 W

TC122/124/164 = 1/16 W

**RATED VOLTAGE**

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

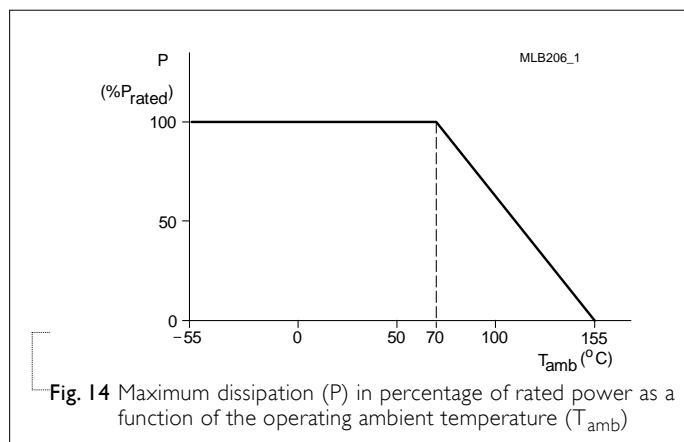
$$V = \sqrt{(P \times R)}$$

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)

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

TEST	TEST METHOD	PROCEDURE	REQUIREMENTS
Life/ Operational Life/ Endurance	MIL-STD-202-method 108 IEC 60115-1 7.1	1,000 hours at 70 ± 5 °C applied RCWV 1.5 hours on, 0.5 hour off, still air required	$\pm(2\%+0.05 \Omega)$ $<100 \text{ m}\Omega$ for Jumper
High Temperature Exposure/ Endurance at Upper Category Temperature	MIL-STD-202-method 108	1,000 hours at maximum operating temperature depending on specification, unpowered	$\pm(1\%+0.05 \Omega)$ $<50 \text{ m}\Omega$ for Jumper
Moisture Resistance	MIL-STD-202-method 106 IEC 60115-1 4.24.2	Each temperature / humidity cycle is defined at 8 hours, 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	$\pm(2\%+0.05 \Omega)$ $<100 \text{ m}\Omega$ for Jumper
Thermal Shock	MIL-STD-202-method 107	-55/+125 °C Note: Number of cycles required is 300. Devices mounted Maximum transfer time is 20 seconds. Dwell time is 15 minutes. Air – Air	$\pm(1\%+0.05 \Omega)$ $<50 \text{ m}\Omega$ for Jumper
Short Time Overload	IEC60115-1 8.1	2.5 times RCWV or maximum overload voltage whichever is less for 5 sec at room temperature	$\pm(2\%+0.05 \Omega)$ $<50 \text{ m}\Omega$ for Jumper No visible damage
Board Flex/ Bending	IEC60115-1 9.8	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	$\pm(1\%+0.05 \Omega)$ $<50 \text{ m}\Omega$ for Jumper No visible damage



TEST	TEST METHOD	PROCEDURE	REQUIREMENTS
Solderability - Wetting	J-STD-002 test	<p>Electrical Test not required</p> <p>Magnification 50X</p> <p>SMD conditions:</p> <p>1st step: aging 4 hours at 155 °C dry heat</p> <p>2nd step: method B1, leadfree solder bath at 245±3 °C</p> <p>Dipping time: 3±0.5 seconds</p>	<p>Well tinned (≥95% covered)</p> <p>No visible damage</p>
- Leaching	J-STD-002 test	Leadfree solder, 260 °C, 30 seconds immersion time	No visible damage
- Resistance to Soldering Heat	MIL-STD-202-method 210	<p>Condition B, no pre-heat of samples</p> <p>Leadfree solder, 260 °C, 10 seconds immersion time</p> <p>Procedure 2 for SMD: devices fluxed and cleaned with isopropanol</p>	<p>±(1%+0.05 Ω)</p> <p><50 mΩ for Jumper</p> <p>No visible damage</p>
Biased Humidity	<p>AEC-Q200 Test 7</p> <p>MIL-STD-202-Method 103</p>	<p>1,000 hours; 85 °C / 85% RH</p> <p>10% of operating power</p> <p>Measurement at 24± 4 hours after test conclusion.</p>	± (5.0%+0.05 Ω)



REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version 9	Feb.19, 2019	-	- Update H dimension for YC124
Version 8	Dec. 24. 2018	-	- Update AEC-Q200 qualified
Version 7	Aug. 22, 2017	-	- Correct the typo for YC158T/358L/358T, Marking, "240" is 24ohm
Version 6	Jun. 1, 2017	-	- Update ordering information for networks YC158T/YC358L/YC358T
Version 5	Feb. 14, 2017	-	- Update YC158 and 358 part number to YC158T , YC358L and YC358T
Version 4	Dec. 22, 2016	-	- Delete YC102 default code L type
Version 3	Apr. 29, 2016	-	- Update YC series and TC164 dimension
Version 2	Dec. 11, 2015	-	- Update Operating Temperature
Version 1	Feb. 04, 2015	-	- Update YC102 to flat type
Version 0	Nov. 14, 2014	-	- First issue of this specification



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