Innovative Service Around the Globe YAGEO

# DATA SHEET

## ARRAY CHIP RESISTORS

YC 158/358 (10Pin/8R)

5%

**sizes 0612/1225**

**RoHS compliant**


YAGEO Phycomp

Product specification – Nov 14, 2008 V.3

## SCOPE

This specification describes YC158/358 series chip resistor network 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
- Reducing environmentally hazardous wastes
- High component and equipment reliability
- Saving of PCB space
- None forbidden-materials used in products/production
- Halogen Free Epoxy

## 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)

| YC 158/358 | X | X | X | X | XX | XXXX | L |
|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |

#### (1) SCHEMATIC

L = L-type (for YC358)

T = T-type (for YC158/358)

#### (2) TOLERANCE

J = ±5%

#### (3) PACKAGING TYPE

R = Paper taping reel (YC158)

K = Embossed taping reel (YC358)

#### (4) TEMPERATURE COEFFICIENT OF RESISTANCE

– = Base on spec

#### (5) TAPING REEL

07 = 7 inch dia. Reel

13 = 13 inch dia. Reel

#### (6) 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".

#### (7) OPTIONAL CODE

L = optional symbol (Note)

Resistance rule of global part number

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

### ORDERING EXAMPLE

The ordering code of a YC158/358T T-type chip resistor network, value 1,000 Ω with ±5% tolerance, supplied in 7-inch tape reel is: YC158/358TJR-071K(L).

**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 / 12NC can be added (both are on customer request)

**PHYCOMP BRAND ordering codes**

Both GLOBAL PART NUMBER (preferred) and 12NC (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.

## 12NC CODE----

**2350 XXX XXXXX L**
(1) (2) (3) (4)

| SIZE | TYPE | START IN [1] | TOL. (%) | RESISTANCE RANGE | PAPER / PE TAPE ON REEL (units) [2] | | EMBOSSED TAPE ON REEL(units) [2] |
|---|---|---|---|---|---|---|---|
| | | | | | 5,000 | 20,000 | 4,000 |
| 0612 | RNA310 | 2350 | ±5% | 10 to 100 KΩ | 230 10xxx | 230 12xxx | |
| 1225 | YC358L | 2350 | ±5% | 10 to 330 KΩ | | | 200 10xxx |
| 1225 | YC358T | 2350 | ±5% | 10 to 330 KΩ | | | 201 10xxx |

(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 12NC".

(4) "L" is optional symbol [Note].

Last digit of 12NC

| Resistance decade [3] | 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 |

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 RNA310/YC358T T-type chip resistor network, value 1,000 Ω with ±5% tolerance, supplied in tape of 10,000 units per reel is: 235023010102(L) / 235020110102(L) or YC158/358TJR-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 / 12NC can be added (both are on customer request)

## MARKING

YC158 YC358


Fig. 1 Value = 24 KΩ


Fig. 2 Value = 240 KΩ

E-24 series: 3 digits

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

For further marking information, please see special 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. See fig.3

## OUTLINES

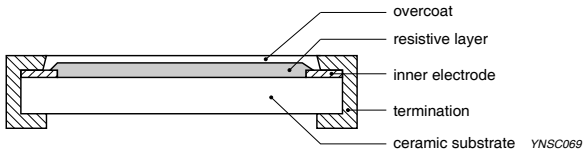


Fig. 3 Chip resistor outlines

## DIMENSIONS

Table 1

| TYPE | YC158 | YC358 |
|---|---|---|
| B (mm) | 0.30 ±0.15 | 0.50 ±0.15 |
| H (mm) | 0.45 ±0.05 | 1.10 ±0.15 |
| P (mm) | 0.64 ±0.05 | 1.27 ±0.05 |
| L (mm) | 3.20 ±0.20 | 6.40 ±0.20 |
| T (mm) | 0.60 ±0.10 | 0.60 ±0.10 |
| $W_1$ (mm) | 0.35 ±0.15 | 0.50 ±0.15 |
| $W_2$ (mm) | 1.60 ±0.15 | 3.20 ±0.20 |

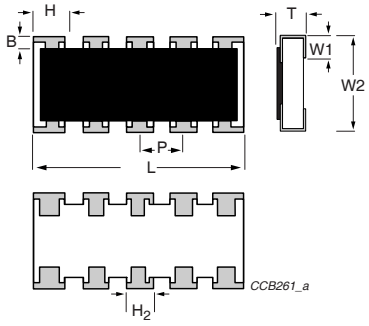


Fig. 4 YC124 series chip resistors dimension

For dimension see Table 1

## SCHEMATIC

For dimension see Fig. 4 and Table 1

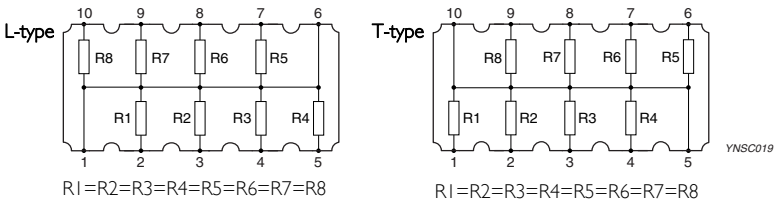


Fig. 5 Equivalent circuit diagram

R1=R2=R3=R4=R5=R6=R7=R8

R1=R2=R3=R4=R5=R6=R7=R8

## ELECTRICAL CHARACTERISTICS

Table 2

| CHARACTERISTICS | | YC158 1/16 W | YC358 1/16 W |
|---|---|---|---|
| Operating Temperature Range | | –55 °C to +155 °C | –55 °C to +155 °C |
| Maximum Working Voltage | | 25 V | 50 V |
| Maximum Overload Voltage | | 50 V | 100 V |
| Dielectric Withstanding Voltage | | 50 V | 100 V |
| Resistance Range | 5% (E24) | 10 Ω to 100 KΩ | 10 Ω to 330 KΩ |
| Temperature Coefficient | | ±200 ppm/°C | ±200 ppm/°C |

## FOOTPRINT AND SOLDERING PROFILES

For recommended footprint and soldering profiles, please see the special data sheet "Chip resistors mounting".

## PACKING STYLE AND PACKAGING QUANTITY

Table 3 Packing style and packaging quantity

| PACKING STYLE | REEL DIMENSION | YC158 | YC358 |
|---|---|---|---|
| Paper/PE taping reel (R) | 7" (178 mm) | 5,000 | --- |
| | 13" (330 mm) | 20,000 | --- |
| Embossed taping reel (K) | 7" (178 mm) | --- | 4,000 |

**NOTE**

1. For Paper/Embossed tape and reel specification/dimensions, please see the special data sheet "Chip resistors packing".

## FUNCTIONAL DESCRIPTION

### POWER RATING

YC158/358 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)

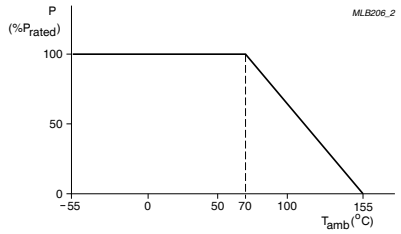


Fig. 6 Maximum dissipation (P) in percentage of rated power as a function of the operating ambient temperature ($T_{amb}$)

## TESTS AND REQUIREMENTS

Table 4 Test condition, procedure and requirements

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

| TEST | TEST METHOD | PROCEDURE | REQUIREMENTS |
|---|---|---|---|
| Solderability<br>- Wetting | IPC/JEDECJ-STD-002B test B<br>IEC 60068-2-58 | Electrical Test not required<br>Magnification 50X<br>SMD conditions:<br>1st step: method B, aging 4 hours at 155 °C dry heat<br>2nd step: leadfree solder bath at 245±3 °C<br>Dipping time: 3±0.5 seconds | Well tinned (≥95% covered)<br>No visible damage |
| - Leaching | IPC/JEDECJ-STD-002B test D<br>IEC 60068-2-58 | Leadfree solder, 260 °C, 30 seconds immersion time | No visible damage |
| - Resistance to Soldering Heat | MIL-STD-202G-method 210F<br>IEC 60068-2-58 | Condition B, no pre-heat of samples<br>Leadfree solder, 270 °C, 10 seconds immersion time<br>Procedure 2 for SMD: devices fluxed and cleaned with isopropanol | ±(1%+0.05 Ω)<br>No visible damage |

## REVISION HISTORY

| REVISION | DATE | CHANGE NOTIFICATION | DESCRIPTION |
|---|---|---|---|
| Version 3 | Nov 14, 2008 | - | - New datasheet for YC158 and YC358 thick film 5% with lead-free terminations<br>- Replace the YC158 and YC358 part of pdf files: Pu-YC158_5_PbFree_L_2.pdf, Yu-YC158_5_PbFree_L_2.pdf, Pu-YC358_5_PbFree_L_0.pdf and Yu-YC358_5_PbFree_L_0.pdf<br>- Description of "Halogen Free Epoxy" added<br>- Define global part number |
| Version 2 | Feb 22, 2005 | - | - Test method and procedure updated |
| Version 1 | Apr. 22, 2004 | - | - Added 13" taping and Jumper, deleted G in ordering code, and test & requirement (Pb free) update |
| Version 0 | Nov. 10, 2003 | - | - First issue of this specification |