Innovative Service Around the Globe YAGEO

DATA SHEET

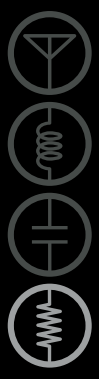
HIGH OHMIC CHIP RESISTORS

RC high ohmic series

20%, 10%, 5%

sizes 0805/1206

RoHS compliant



YAGEO Phicomp

Product specification – Dec 31, 2008 V.0

SCOPE

This specification describes RC0805/1206 high ohmic chip resistors with lead-free terminations made by thick film process.

APPLICATIONS

- All general purpose application

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)

RC	XXXX	X	X	X	XX	XXXX	L
	(1)	(2)	(3)	(4)	(5)	(6)	(7)

(1) SIZE

0805
1206

(2) TOLERANCE

J = ±5%
K = ±10%
M= ±20%

(3) PACKAGING TYPE

R = Paper taping reel

(4) TEMPERATURE COEFFICIENT OF RESISTANCE

– = Base on spec

(5) TAPING REEL

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

(6) RESISTANCE VALUE

There are 2~4 digits indicated the resistor value. Letter M is decimal point, no need to mention the last zero after M, e.g. 24M not 24M0.

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
XXMX (10 to 97.6 MΩ)	10M = 10×10^6 Ω 97M6 = 97.6×10^6 Ω
XXXM (100 to 220 MΩ)	100M = 100×10^6 Ω 220M = 220×10^6 Ω

ORDERING EXAMPLE

The ordering code of a RC0805 chip resistor, value 100 MΩ with ±5% tolerance, supplied in 7-inch tape reel is: RC0805JR-07100M(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) 5,000
0805	HRC11	2350	±5%	24 MΩ ≦ R < 99 MΩ	521 10xxx
		2350	±5%	R=100 MΩ	521 91001
1206	HRC01	2350	±5%	24 MΩ ≦ R < 99 MΩ	520 10xxx
		2350	±5%	R=100 MΩ	520 91001

(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. (In 12NC code, only 07" tape reel code is supplied. Supply of 10"/13" tape reel is requested in Global part number ordering code.)

(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 RC0805 chip resistor, value 30 MΩ with ±5% tolerance, supplied in tape of 5,000 units per reel is: 23505211030 6(L) or RC0805JR-0730M(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

RC0805/1206

Fig. 1 Value=100 MΩ

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. 2.

DIMENSIONS

Table 1 For outlines see fig. 2

TYPE	L (mm)	W (mm)	H (mm)	I_1 (mm)	I_2 (mm)
RC0805	2.00 ±0.10	1.25 ±0.10	0.50 ±0.10	0.35 ±0.20	0.35 ±0.20
RC1206	3.10 ±0.10	1.60 ±0.10	0.55 ±0.10	0.45 ±0.20	0.40 ±0.20

OUTLINES

For dimension see Table 1

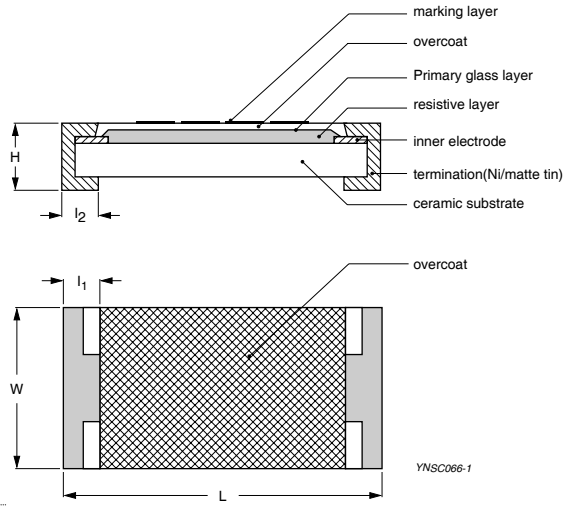


Fig. 2 Chip resistor outlines

ELECTRICAL CHARACTERISTICS

Table 2

TYPE	Resistance Range	Operating Temperature Range	Power Rating	Max. Working Vol.	Dielectric Withstand Vol.	Max. Overload Vol.	Temperature Coefficient of Resistance
RC0805	24MΩ ≤ R ≤ 100MΩ	–55 °C to +155 °C	1/8 W	150 V	300 V	300 V	±300 ppm/°C
RC1206	24MΩ ≤ R ≤ 100MΩ	–55 °C to +155 °C	1/4 W	200 V	400 V	500 V	±300 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

PRODUCT TYPE	PACKING STYLE	REEL DIMENSION	QUANTITY PER REEL
RC0805/1206	Paper Taping Reel (R)	7" (178 mm)	5,000 units
		10" (254 mm)	10,000 units
		13" (330 mm)	20,000 units

NOTE

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

FUNCTIONAL DESCRIPTION

OPERATING TEMPERATURE RANGE

Range: –55 °C to +155 °C

POWER RATING

Each type rated power at 70 °C:
RC0805=1/8 W; RC1206=1/4 W

RATED VOLTAGE

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

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

Where

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

P = Rated power (W)

R = Resistance value (Ω)

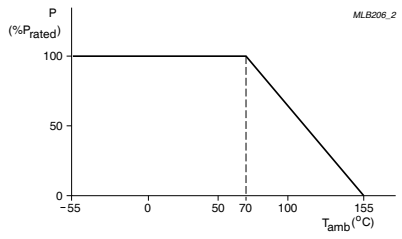


Fig. 3 Maximum dissipation (P) in percentage of rated power as a function of the operating ambient temperature (T_{amb})

TESTS AND REQUIREMENTS

Table 4 Test condition, procedure and requirements

TEST	TEST METHOD	PROCEDURE	REQUIREMENTS
Life/ Operational Life/ Endurance	MIL-STD-202G-method 108A 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%+0.05 Ω)
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 Tolerances: 155±3 °C	±(1%+0.05 Ω)
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%+0.05 Ω)
Thermal Shock	MIL-STD-202G-method 107G	-55/+155 °C Note: Number of cycles required is 300. Devices unmounted Maximum transfer time is 20 seconds. Dwell time is 15 minutes. Air – Air	±(1%+0.05 Ω)
Short time overload	MIL-R-55342D-para 4.7.5 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) 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%+0.05 Ω) No visible damage

TEST	TEST METHOD	PROCEDURE	REQUIREMENTS
Solderability - Wetting	IPC/JEDECJ-STD-002B 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-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 IEC 60068-2-58	Condition B, no pre-heat of samples Leadfree solder, 270 °C, 10 seconds immersion time Procedure 2 for SMD: devices fluxed and cleaned with isopropanol	±(1%+0.05 Ω) No visible damage

REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version 0	Dec 31, 2008	-	- New datasheet for high ohmic chip resistors sizes of 0805/1206, 20%, 10% and 5% with RoHS compliant - Description of "Halogen Free Epoxy" added - Define global part number

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