Innovative Service Around the Globe YAGEO

DATA SHEET

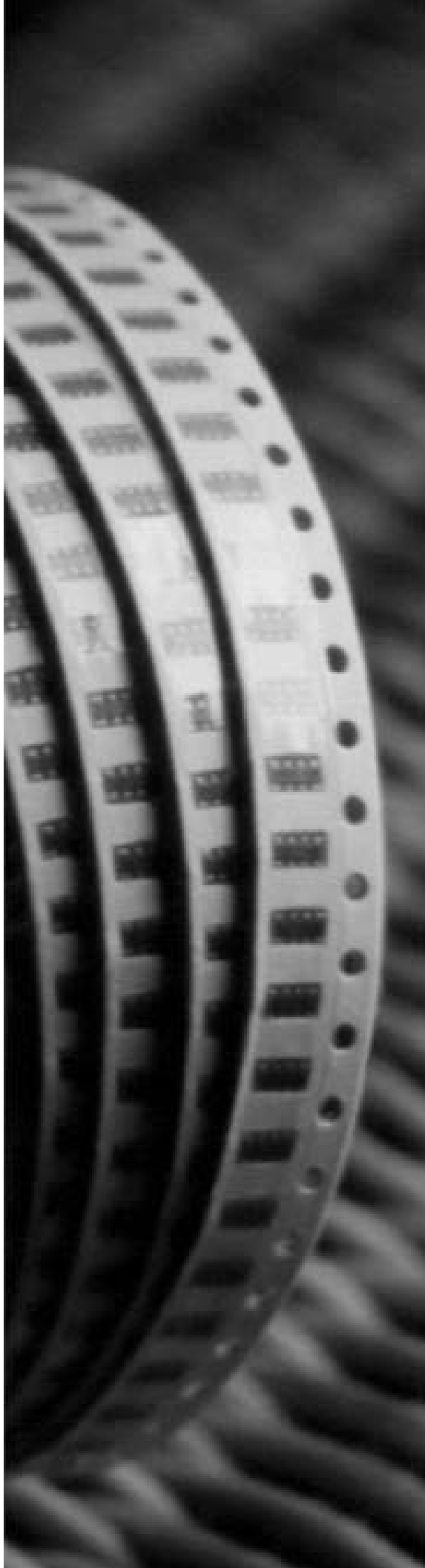
CHIP RESISTORS

RC0201 (Pb Free)

5%; 1%

YAGEO

Product Specification – Apr. 20, 2004 V.1 Supersedes Date of Mar. 23, 2004



SCOPE

This specification describes RC 0201 series chip resistors with lead-free terminations made by thick film process.

ORDERING INFORMATION

Part number is identified by the series, size, tolerance, packing style, temperature coefficient, taping reel and resistance value.

RC0201	X	X	X	XX	XXXX	L
	(1)	(2)	(3)	(4)	(5)	(6)

(1) TOLERANCE

F = ±1%

J = ±5%

(2) PACKAGING STYLE

R = Paper taping reel

(3) TEMPERATURE CHARACTERISTIC OF RESISTANCE

– = Base on spec

(4) TAPING REEL

07 = 7 inch dia. Reel

13 = 13 inch dia. Reel

(5) RESISTANCE VALUE

56R, 560R, 5K6, 56K, 1M.

(6) RESISTOR TERMINATIONS

L = Lead free terminations (pure Tin)

MARKING

RC0201 no marking.

CONSTRUCTION

The resistors are constructed out of a high-grade ceramic body. Internal metal electrodes are added at each end and connected by a resistive paste. The composition of the paste is adjusted to give the approximate required resistance and laser cutting of this resistive layer that achieves tolerance trims the value. The resistive layer is covered with a protective coat. Finally, the two external terminations are added. See fig.1

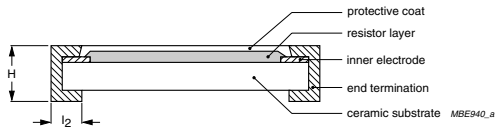


Fig. 1 Chip resistor construction

DIMENSION

For dimension see Table 1

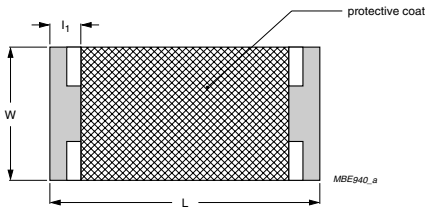


Fig. 2 Chip resistor dimension

Table 1

TYPE	RC0201
L (mm)	0.60±0.03
W (mm)	0.30±0.03
H (mm)	0.23±0.03
l_1 (mm)	0.13±0.08
l_2 (mm)	0.15±0.08

POWER RATING

RATED POWER AT 70°C, RC0201 1/20W

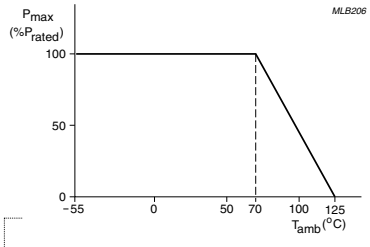


Fig. 3 Maximum dissipation (P_{max}) in percentage of rated power as a function of the operating ambient temperature (T_{amb})

RATED VOLTAGE:

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

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

Where

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

P=Rated power (W)

R=Resistance value (Ω)

ELECTRICAL CHARACTERISTICS

Table 2

CHARACTERISTICS		RC0201 1/20 W
Operating Temperature Range		–55 °C to +125 °C
Maximum Working Voltage		15 V
Maximum Overload Voltage		50 V
Dielectric Withstanding Voltage		50 V
Resistance Range		1 Ω to 1 MΩ (E24/E96)
		Zero Ohm Jumper <0.05 Ω
Temperature Coefficient	10 Ω< R ≤1 MΩ	±250 ppm/°C
	1 Ω≤ R ≤10 Ω	–100/+600 ppm/°C
Jumper Criteria	Rated Current	0.5 A
	Maximum Current	1.0 A

TAPING REEL

Table 3

DIMENSION	RC0201
Tape Width	8mm
ØA (mm)	180+0/–3
ØB (mm)	60+1/–0
ØC (mm)	13.0±0.2
W (mm)	9.0±0.3
T (mm)	11.4±1

For dimension see Table 3

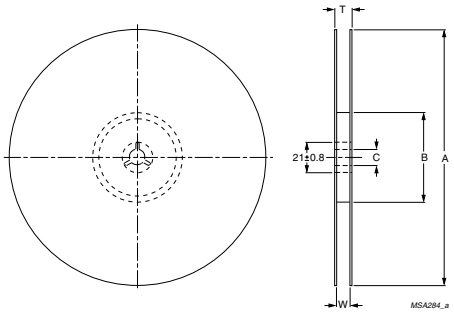


Fig. 4 Reel dimension

PAPER TAPE SPECIFICATION

Table 4

DIMENSION	RC0201
A (mm)	0.45±0.1
B (mm)	0.75±0.1
W (mm)	8.0±0.2
E (mm)	1.75±0.1
F (mm)	3.5±0.05
P_0 (mm)	4.0±0.1
P_1 (mm)	2.0±0.05
P_2 (mm)	2.0±0.05
ØD_0 (mm)	1.5+0.1/–0
T (mm)	0.35±0.10

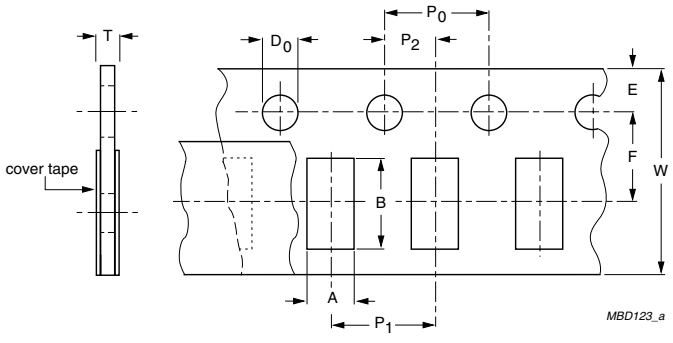


Fig. 5 Paper tape dimension

For dimension see Table 4

PACKING METHOD

LEADER/TRAILER TAPE SPECIFICATION

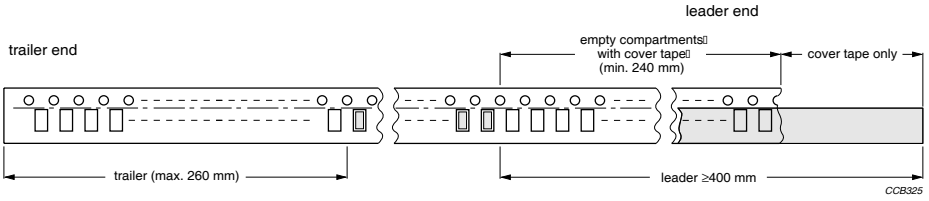


Fig. 6 Leader and trailer tape dimension

Table 5 Packing style and packaging quantity.

PACKING STYLE	REEL DIMENSION	RC0201
Paper Taping Reel (R)	7" (178 mm)	10,000
	13" (330 mm)	50,000

TESTS AND REQUIREMENTS

Table 6 Test condition, method and requirements

TEST	PROCEDURE		REQUIREMENTS
Temperature Coefficient of Resistance (T.C.R.)	At +25/–55 °C and +25/+125 °C	Formula $T.C.R = \frac{R_2 - R_1}{R_1(t_2 - t_1)} \times 10^6$ (ppm/°C) Where t_1=+25 °C or specified room temperature t_2=–55 °C or +125 °C test temperature R_1=resistance at reference temperature in ohms R_2=resistance at test temperature in ohms	Refer to table 2
Thermal Shock	At –65 (+0/–10) °C for 2 minutes and at +125 (+10/–0) °C for 2 minutes; 25 cycles		±(0.5%+0.05 Ω) for 1% tol. ±(1.0%+0.05 Ω) for 5% tol.
Low Temperature Operation	At –65 (+0/–5) °C for 1 hour; RCWV applied for 45 (+5/–0) minutes		±(0.5%+0.05 Ω) for 1% tol . ±(1.0%+0.05 Ω) for 5% tol. No visible damage
Short Time Overload	2.5 × RCWV applied for 5 seconds at room temperature		±(1.0%+0.05 Ω) for 1% tol. ±(2.0%+0.05 Ω) for 5% tol. No visible damage
Insulation Resistance	RCOV for 1 minute	Type: RC0201 Voltage (DC): 50 V	≥10 GΩ
Dielectric Withstand Voltage	Maximun voltage (Vrms) applied for 1 minute	Type: RC0201 Voltage (AC): 50 Vrms	No breakdown or flashover
Resistance to Soldering Heat	Unmounted chips; 260 ±5 °C for 10 ±1 seconds		±(0.5%+0.05 Ω) for 1% tol. ±(1.0%+0.05 Ω) for 5% tol. No visible damage
Life	At 70±2 °C for 1,000 hours; RCWV applied for 1.5 hours on and 0.5 hour off		±(1%+0.05 Ω) for 1% tol. ±(3%+0.05 Ω) for 5% tol.
Solderability	Solder bath at 245±3 °C Dipping time: 2±0.5 seconds		Well tinned (≥95% covered) No visible damage

TEST	PROCEDURE	REQUIREMENTS
Bending Strength	Resistors mounted on a 90 mm glass epoxy resin PCB (FR4) Bending: 5 mm	±(1.0%+0.05 Ω) for 1% tol. ±(1.0%+0.05 Ω) for 5% tol. No visible damage
Resistance to Solvent	Isopropylalcohol (C_3H_7OH) or dichloromethane (CH_2Cl_2) followed by brushing	No smeared
Noise	Maximun voltage (Vrms) applied.	Resistors range / Value: R < 100 Ω — 10 dB 100 Ω ≤ R < 1 KΩ — 20 dB 1 KΩ ≤ R <10 KΩ — 30 dB 10 KΩ ≤ R <100 KΩ — 40 dB 100 KΩ ≤ R <1 MΩ — 46 dB R ≥ 1 MΩ — 48 dB
Humidity (steady state)	1,000 hours; 40±2 °C; 93+2/–3% RH RCWV applied for 1.5 hours on and 0.5 hour off	±(0.5%+0.05 Ω) for 1% tol. ±(2.0%+0.05 Ω) for 5% tol.
Leaching	Solder bath at 260±5 °C Dipping time: 30±1 seconds	No visible damage
Intermittent Overload	At room temperature; 2.5 × RCWV applied for 1 second on and 25 seconds off; total 10,000 cycles	±(1.0%+0.05 Ω) for 1% tol. ±(2.0%+0.05 Ω) for 5% tol.
Moisture Resistance	42 cycles; total 1,000 hours Shown as figure 8	±(0.5%+0.05Ω) for 1% tol. ±(2.0%+0.05Ω) for 5% tol. No visible damage

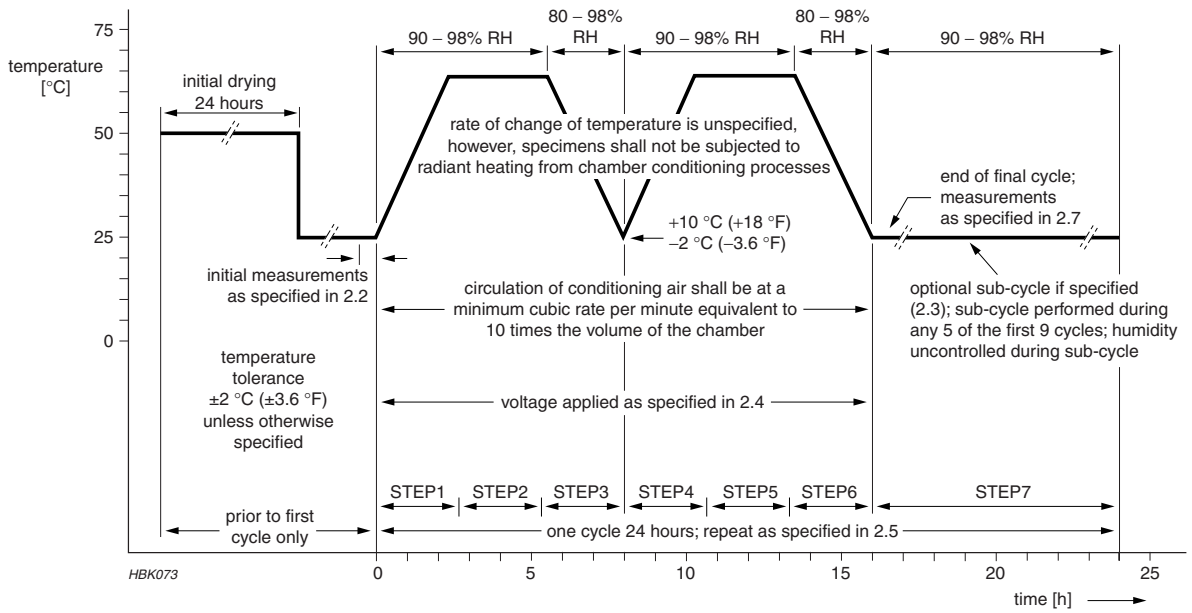


Fig. 8 Conditions by change of temperature