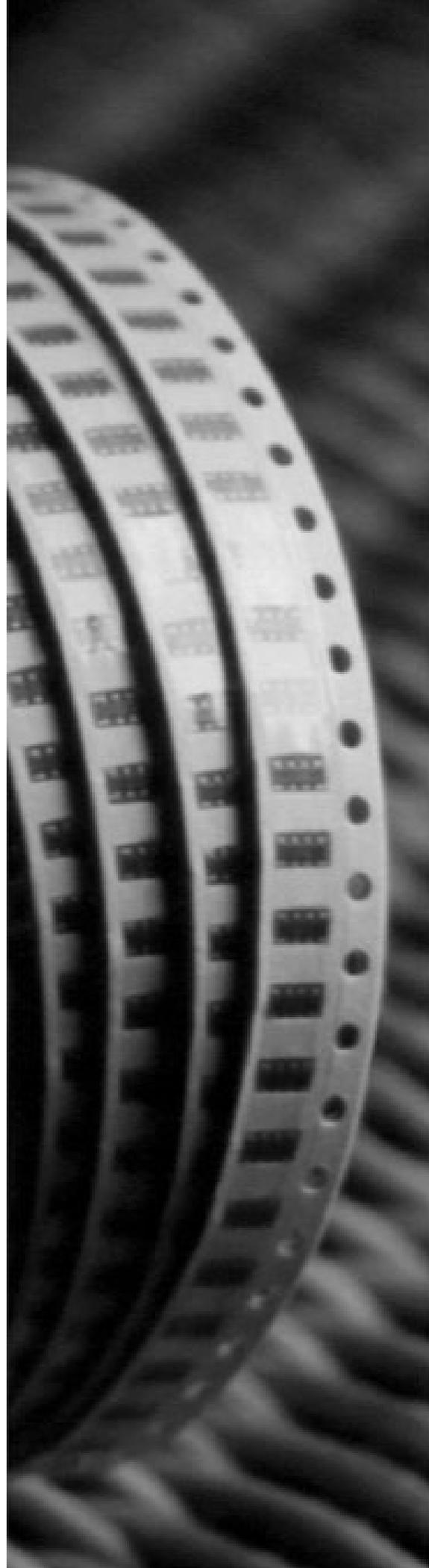


DATA SHEET

CHIP RESISTORS

RC0402

5%; 1%



SCOPE

This specification describes RC 0402 series chip resistors made by thick film process.

ORDERING INFORMATION

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

RC0402 X X X XX XXXX
 (1) (2) (3) (4) (5)

MARKING

RC0402 no marking.

(1) TOLERANCE

F = ±1%
 J = ±5%

(2) PACKAGING TYPE

R = Paper taping reel

(3) TEMPERATURE CHARACTERISTIC OF RESISTANCE

F = ±100ppm/°C
 G = ±200ppm/°C
 I = ±300ppm/°C
 - = Base on spec

(4) SPECIAL TYPE

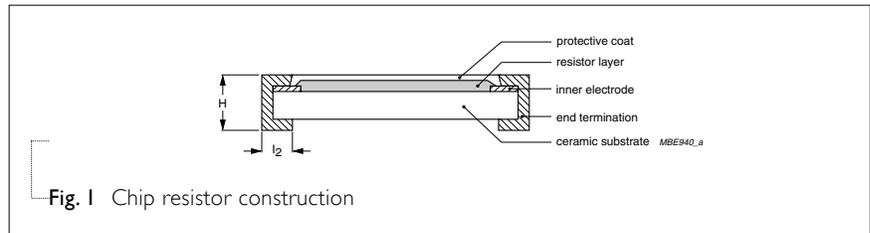
07 = 7 inch dia. Reel
 10 = 10 inch dia. Reel
 13 = 13 inch dia. Reel

(5) RESISTANCE VALUE:

5R6, 56R, 560R, 5K6, 56K, 10M.

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 and printed with the resistance value. Finally, the two external terminations are added. See fig. 1



DIMENSION

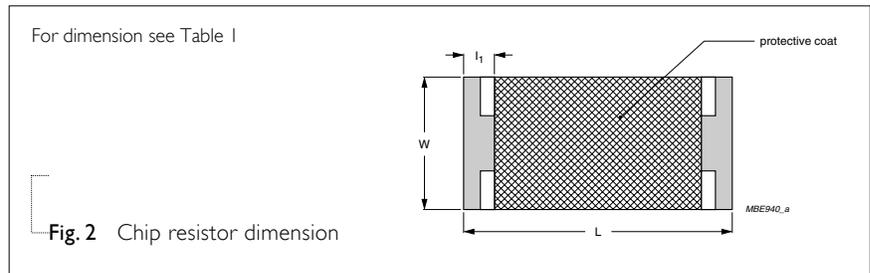


Table I

TYPE	RC0402
L (mm)	1.00±0.05
W (mm)	0.50±0.05
H (mm)	0.35±0.05
l ₁ (mm)	0.20±0.10
l ₂ (mm)	0.25±0.10

POWER RATING

**RATED POWER AT 70°C,
RC0402 1/16W**

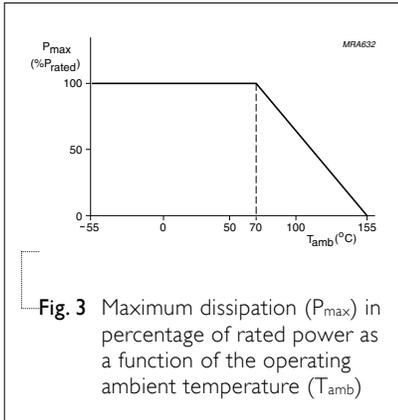


Fig. 3 Maximum dissipation (P_{max}) in percentage of rated power as a function of the operating ambient temperature (T_{amb})

RATED VOLTAGE:

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

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

Where

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

P=Rated power (W)

R=Resistance value (Ω)

ELECTRICAL CHARACTERISTICS

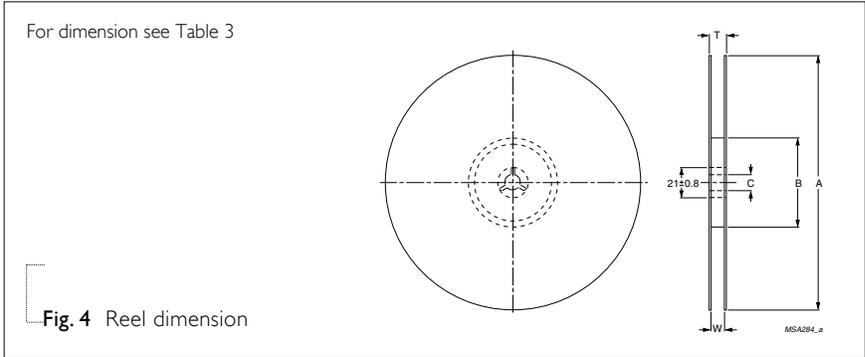
Table 2

CHARACTERISTICS	RC0402 1/16 W
Operating Temperature Range	-55°C to +155°C
Maximum Working Voltage	50V
Maximum Overload Voltage	100V
Dielectric Withstanding Voltage	100V
Resistance Range	1Ω to 10MΩ (E24)
	1Ω to 10MΩ (E96)
Temperature Coefficient	Zero Ohm Jumper <0.05Ω
	10Ω < R ≤ 10MΩ ±100ppm/°C
	1Ω ≤ R ≤ 10Ω ±200ppm/°C
Jumper Criteria	Rated Current 1.0A
	Maximum Current 2.0A

TAPING REEL

Table 3

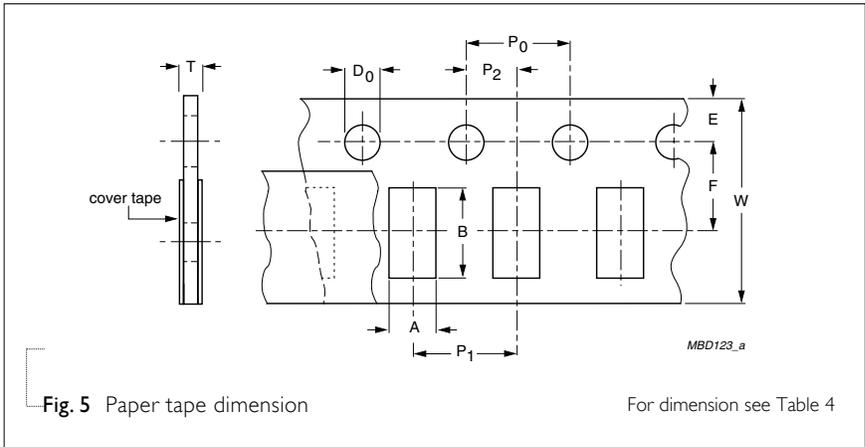
DIMENSION	RC0402
Tape Width	8mm
ØA (mm)	180+0/-3
ØB (mm)	60+1/-0
ØC (mm)	13.0±0.2
W (mm)	9.0±0.3
T (mm)	11.4±1



PAPER TAPE SPECIFICATION

Table 4

DIMENSION	RC0402
A (mm)	0.65±0.1
B (mm)	1.15±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)	0.53±0.10



PACKING METHOD

LEADER/TRAILER TAPE SPECIFICATION

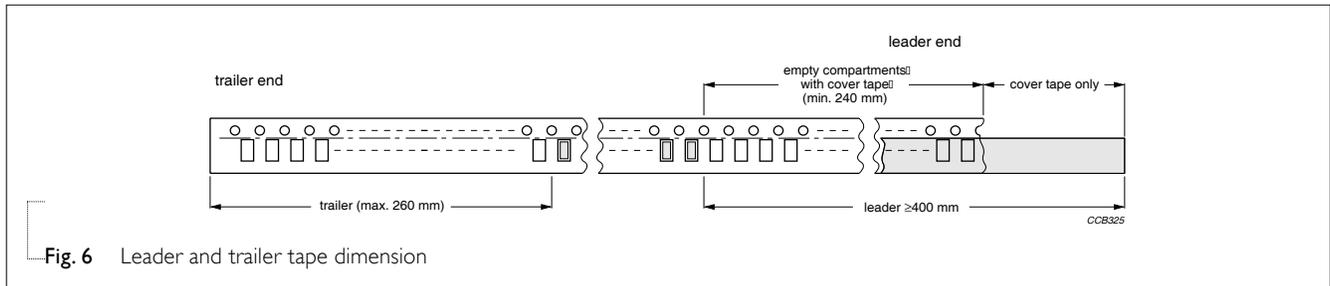


Table 5 Packing style and packaging quantity.

PACKING STYLE	REEL DIMENSION	RC0402
Paper Taping Reel (R)	7" (178 mm)	10,000
	10" (254 mm)	20,000
	13" (330 mm)	50,000

TYPE	TEST METHOD	ACCEPTANCE STANDARD				
Temperature Coefficient of Resistance (T.C.R.)	<p>Measure resistance at +25°C or specified room temperature as R₁, then measure at -55°C or +155°C respectively as R₂</p> <p>Determine the temperature coefficient of resistance from the following formula:</p>	<p>Formula</p> <hr/> $T.C.R = \frac{R_2 - R_1}{R_1(t_2 - t_1)} \times 10^6 \text{ (ppm/°C)}$ <p>Where t₁=+25°C or specified room temperature t₂=-55°C or +155°C test temperature R₁=resistance at reference temperature in ohms R₂=resistance at test temperature in ohms</p>	Refer to table 2			
Thermal Shock	<p>At -55±3°C for 2 minutes and at +155±2°C for 2 minutes as one cycle. After 5 cycles, the specimen shall be stabilized at room temp.</p> <p>Measure the resistance to determine ΔR/R(%) after one more hour.</p>	<p>±(0.5%+0.05Ω) for 1% tol. ±(1%+0.05Ω) for 5% tol.</p>				
Low Temperature Operation	<p>Place the specimen in a test chamber maintained at -65 (+0/-5)°C. After one hour stabilization at this temperature, full rated working voltage shall be applied for 45 (+5/-0) minutes. Have 15 (+5/-0) minutes after remove the voltage, the specimen shall be removed from the chamber and stabilized at room temperature for 24 hrs.</p> <p>Measure the resistance to determine ΔR/R(%).</p>	<p>±(0.5%+0.05Ω) for 1% tol. ±(1.0%+0.05Ω) for 5% tol. No visible damage</p>				
Short Time Overload	<p>Apply 2.5 times of rated voltage but not exceeding the maximum overload voltage for 5 seconds. Have the specimen stabilized at room temperature for 30 minutes minimum.</p> <p>Measure the resistance to determine ΔR/R(%).</p>	<p>±(1.0%+0.05Ω) for 1% tol. ±(2.0%+0.05Ω) for 5% tol. No visible damage</p>				
Insulation Resistance	<p>Place the specimen in the jig and apply a rated continues overload voltage (R.C.O.V) for one minute as shown.</p> <p>Measure the insulation resistance.</p>	<table border="1"> <tr> <td>Type</td> <td>RC0402</td> </tr> <tr> <td>Voltage (DC)</td> <td>100V</td> </tr> </table> <p>≥10,000MΩ</p>	Type	RC0402	Voltage (DC)	100V
Type	RC0402					
Voltage (DC)	100V					
Dielectric Withstand Voltage	<p>Place the specimen in the jig and apply a specified value continuous overload voltage as shown for one minute.</p>	<table border="1"> <tr> <td>Type</td> <td>RC0402</td> </tr> <tr> <td>Voltage (AC)</td> <td>100Vrms</td> </tr> </table> <p>Breakdown voltage> specification and without open/short</p>	Type	RC0402	Voltage (AC)	100Vrms
Type	RC0402					
Voltage (AC)	100Vrms					
Resistance To Soldering Heat	<p>Immerse the specimen in the solder pot at 260±5°C. for 10±1 seconds. Have the specimen stabilized at room temperature for 30 minutes minimum.</p> <p>Measure the resistance to determine ΔR/R(%).</p>	<p>±(0.5%+0.05Ω) for 1% tol. ±(1.0%+0.05Ω) for 5% tol. No visible damage</p>				

TYPE	TEST METHOD	ACCEPTANCE STANDARD
Moisture Resistance	Place the specimen in the test chamber and subject to 42 damp heat cycles. Each one of which consists of the steps 1 to 7 as figure 8. The total length of test is 1,000 hours. Have the specimen stabilized at room temperature for 24 hours after testing. Measure the resistance to determine $\Delta R/R(\%)$.	$\pm(0.5\%+0.05\Omega)$ for 1% tol. $\pm(2.0\%+0.05\Omega)$ for 5% tol. No visible damage
Life	Place the specimen in the oven at $70\pm 2^\circ\text{C}$. Apply the rated voltage to the specimen at the 1.5 hours on and 0.5 hour off cycle. The total length of test is 1,000 hours. Have the specimen stabilized at room temperature for one hour minimum after testing. Measure the $\Delta R/R(\%)$.	$\pm(1\%+0.05\Omega)$ for 1% tol. $\pm(3\%+0.05\Omega)$ for 5% tol. No visible damage
Solderability	Immerse the specimen in the solder pot at $235\pm 5^\circ\text{C}$ for 5 sec.	At least 95% solder coverage on the termination

Bending Strength Mount the specimen on a test board as shown in the figure 7. Slowly apply the force till the board is bent for 5 ± 1 sec. Measure the $\Delta R/R(\%)$ at this position.

Type	RC0402
Bent Distance (d)	5mm

$\pm(1.0\%+0.05\Omega)$ for 1% tol.
 $\pm(1.0\%+0.05\Omega)$ for 5% tol.
No visible damage

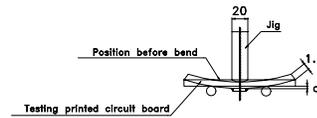


Fig. 7 Principle of the bending test

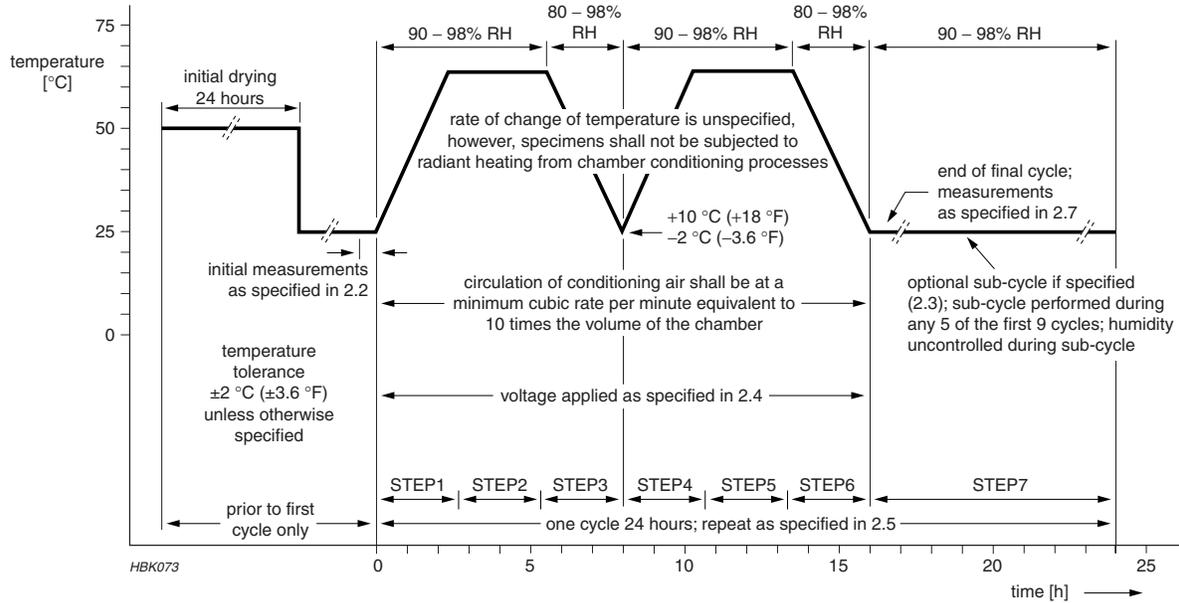


Fig. 8 Conditions by change of temperature