

DATA SHEET

LOW OHMIC HIGH POWER CHIP RESISTORS

RL-High power series (Pb Free)

5%, 1%

sizes 0805/1206



SCOPE

This specification describes RL0805/1206 low ohmic high power chip resistors with lead-free terminations made by thick film process.

ORDERING INFORMATION

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

YAGEO ORDERING CODE

CTC CODE

RL XXXX X X X XX XXXX L
 (1) (2) (3) (4) (5)(6) (7) (8)

(1) SIZE

0805
1206

(2) TOLERANCE

F = ±1%
J = ±5%

(3) PACKAGING TYPE

R = Paper/PE taping reel

(4) TEMPERATURE COEFFICIENT OF RESISTANCE

– = Base on spec

(5) TAPING REEL

7 = 7 inch dia. Reel

(6) POWER RATING

W = 2 x standard power ^(d)

(7) RESISTANCE VALUE

0R01, 0R056, 0R56, 0R91 of E24 series (E48/96 on request).

(8) RESISTOR TERMINATIONS

L = Lead free terminations (matte tin) ^(a)

ORDERING EXAMPLE

The ordering code of a RL0805 chip resistor, value 0.56 Ω, 1/4 W with ±1% tolerance, supplied in 7-inch tape reel is: RL0805FR-7W0R56RL.

NOTE

- a. The “L” at the end of the code is only for ordering. On the reel label, the standard CTC will be mentioned an additional stamp “LFP”= lead free production.
- b. Products with lead in terminations fulfil the same requirements as mentioned in this datasheet.
- c. Products with lead in terminations will be phased out in the coming months (before July 1st, 2006).
- d. Standard power for size 0805 is 1/8 Watt, and size 1206 is 1/4 Watt.

MARKING

RL0805 / RL1206, R = 10/20/30/40/50/60 mΩ



Fig. 1 Value = 20 mΩ

E-24 series: 4 digits

The “R” is used as a decimal point; the other 3 digits are significant.

SPECIALITY EXCEPT 10/20/30/40/50/60 mΩ



Fig. 2 Value = 22 mΩ

No marking

For marking codes, please see EIA-marking code rules in data sheet “Chip resistors marking”.

CONSTRUCTION

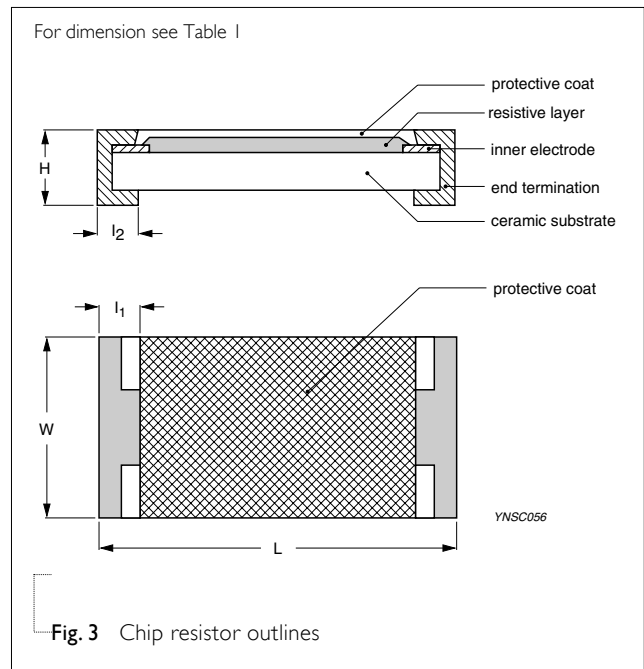
The resistors are constructed out of a high-grade ceramic body. Internal metal electrodes are added at each end and connected by a resistive paste. The composition of the paste is adjusted to give the approximate required resistance and laser cutting of this resistive layer that achieves tolerance trims the value. The resistive layer is covered with a protective coat and printed with the resistance value. Finally, the two external terminations (matte tin) are added. See fig. 3.

DIMENSION

Table I For outlines see fig. 3

TYPE	L (mm)	W (mm)	H (mm)	l ₁ (mm)	l ₂ (mm)
RL0805	2.00 ±0.10	1.25 ±0.10	0.50 ±0.10	0.35 ±0.20	0.35 ±0.20
RL1206	3.10 ±0.10	1.60 ±0.10	0.55 ±0.10	0.45 ±0.20	0.40 ±0.20

OUTLINES



ELECTRICAL CHARACTERISTICS

Table 2

TYPE / RESISTANCE RANGE	TEMPERATURE COEFFICIENT OF RESISTANCE					
	10mΩ≤R≤18mΩ	18mΩ<R≤47mΩ	47mΩ<R≤91mΩ	91mΩ<R≤360mΩ	360mΩ<R≤500mΩ	500mΩ<R<1Ω
RL0805	±1,500 ppm/°C	±1,200 ppm/°C	±1,000 ppm/°C	±600 ppm/°C	±300 ppm/°C	±200 ppm/°C
RL1206	±1,500 ppm/°C	±1,200 ppm/°C	±1,000 ppm/°C	±600 ppm/°C	±300 ppm/°C	±200 ppm/°C

FOOTPRINT AND SOLDERING PROFILES

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

ENVIRONMENTAL DATA

For material declaration information (IMDS-data) of the products, please see the separated info “Environmental data” conformed to EU RoHS.

PACKING STYLE AND PACKAGING QUANTITY

Table 3 Packing style and packaging quantity

PACKING STYLE	REEL DIMENSION	RL0805	RL1206
Paper/PE taping reel (R)	7" (178 mm)	5,000	5,000

NOTE

- For Paper/PE/Embossed tape and reel specification/dimensions, please see the special data sheet “Packing” document.

FUNCTIONAL DESCRIPTION

OPERATING TEMPERATURE RANGE

Range: -55°C to +125°C

POWER RATING

Each type rated power at 70°C:
RL0805=1/4 W; RL1206=1/2 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)

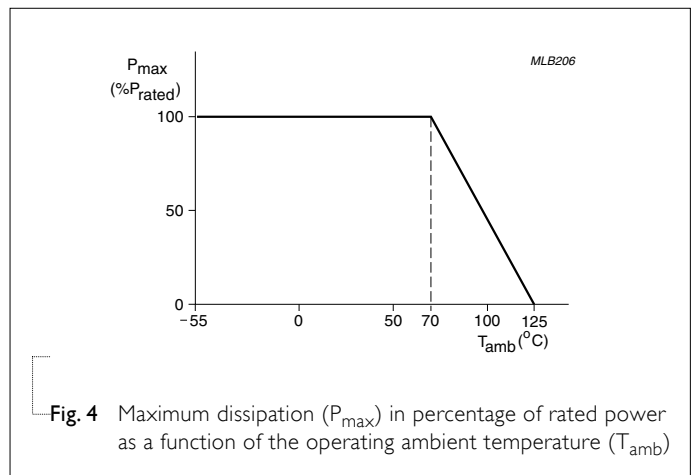


Fig. 4 Maximum dissipation (P_{max}) in percentage of rated power as a function of the operating ambient temperature (T_{amb})

TESTS AND REQUIREMENTS

Table 4 Test condition, procedure and requirements

TEST	TEST METHOD	PROCEDURE	REQUIREMENTS
Temperature Coefficient of Resistance (T.C.R.)	MIL-STD-202F-method 304;	At +25/-55 °C and +25/+125 °C	Refer to table 2
	JIS C 5202-4.8	<p>Formula:</p> $T.C.R = \frac{R_2 - R_1}{R_1(t_2 - t_1)} \times 10^6 \text{ (ppm/°C)}$ <p>Where $t_1 = +25 \text{ °C}$ or specified room temperature $t_2 = -55 \text{ °C}$ or +125 °C test temperature $R_1 =$resistance at reference temperature in ohms $R_2 =$resistance at test temperature in ohms</p>	
Thermal Shock	MIL-STD-202F-method 107G; IEC 60115-1 4.19	At -65 (+0/-10) °C for 2 minutes and at +125 (+10/-0) °C for 2 minutes; 25 cycles	±1.0%
Low Temperature Operation	MIL-R-55342D-Para 4.7.4	At -65 (+0/-5) °C for 1 hour; RCWV applied for 45 (+5/-0) minutes	±1.0% No visible damage
Short Time Overload	MIL-R-55342D-Para 4.7.5; IEC 60115-1 4.13	2.5 × RCWV applied for 5 seconds at room temperature	±1.0% for 1% tol. ±2.0% for 5% tol. No visible damage
Insulation Resistance	MIL-STD-202F-method 302; IEC 60115-1 4.6.1.1	One DC voltage (V) applied for 1 minute Details see below table 5	≥10 GΩ
Dielectric Withstand Voltage	MIL-STD-202F-method 301; IEC 60115-1 4.6.1.1	One AC voltage (V _{rms}) applied for 1 minute Details see below table 5	No breakdown or flashover
Resistance to Soldering Heat	MIL-STD-202F-method 210C; IEC 60115-1 4.18	Unmounted chips; 260 ±5 °C for 10 ±1 seconds	±1.0% No visible damage
Life	MIL-STD-202F-method 108A; IEC 60115-1 4.25.1	At 70±2 °C for 1,000 hours; RCWV applied for 1.5 hours on and 0.5 hour off	±2% for 1% tol. ±3% for 5% tol.

Table 4 Test condition, procedure and requirements (continued)

TEST	TEST METHOD	PROCEDURE	REQUIREMENTS
Solderability	MIL-STD-202F-method 208A;	Solder bath at 245±3 °C	Well tinned (≥95% covered)
	IEC 60115-1 4.17	Dipping time: 2±0.5 seconds	No visible damage
Resistance to Solvent	MIL-STD-202F-method 215;	Isopropylalcohol (C ₃ H ₇ OH) or dichloromethane (CH ₂ Cl ₂) followed by brushing	No smeared
	IEC 60115-1 4.29		
Humidity (steady state)	JIS C 5202 7.5;	1,000 hours; 40±2 °C; 93(+2/-3)% RH	±2.0%
	IEC 60115-8 4.24.8	RCWV applied for 1.5 hours on and 0.5 hour off	
Leaching	EIA/IS 4.13B;	Solder bath at 260±5 °C	No visible damage
	IEC 60115-8 4.18	Dipping time: 30±1 seconds	

Table 5 Criteria of rated continued working voltage and overload voltage

TYPE	RL0805	RL1206
Voltage (DC/unit: V) / (AC/ unit: V _{rms})	300	500

REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
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Version 0	May 30, 2005	-	- First issue of this specification
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