

DATA SHEET

THICK FILM CHIP RESISTORS
Precision grade

RE series

0.1%, 0.5%, 1%, TC 50 sizes 0201/0402/0603/0805/1206

RoHS compliant & Halogen Free



YAGEO Phícomp



SCOPE

This specification describes RE0201 to RE1206 ultra precision chip resistors with lead-free terminations made by thick film process.

APPLICATIONS

- Converters
- Printer equipment
- Server board
- Telecom
- Consumer

FEATURES

- Halogen Free Epoxy
- RoHS compliant
- Reducing environmentally hazardous wastes
- High component and equipment reliability
- Non-forbidden material used in products/production
- Moisture sensitivity level: MSL I

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)

RE XXXX X X X XX XXXX L

(1) (2) (3) (4) (5) (6) (7)

(I) SIZE

0201 / 0402 / 0603 / 0805 / 1206

(2) TOLERANCE

 $B = \pm 0.1\%$

 $D = \pm 0.5\%$

 $F = \pm 1\%$

(3) PACKAGING TYPE

R = Paper/PE taping reel

(4) TEMPERATURE COEFFICIENT OF RESISTANCE

 $E = \pm 50 \text{ ppm/°C}$

(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 R/K/M is decimal point, no need to mention the last zero after R/K/M, e.g. I K2, not I K20.

Detailed resistance rules show in table of "Resistance rule of global part number".

(7) DEFAULT CODE

Letter L is system default code for order only (Note)

Resistance rule of global part number

Resistance code rule	Example
XXRX	IOR = 10 Ω
(10 to 97.6 Ω)	97R6 = 97.6 Ω
XXXR (100 to 976 Ω)	100R = 100 Ω
XKXX	IK = 1,000 Ω
<u>(</u> 1 to 9.76 KΩ)	$9K76 = 9760 \Omega$
XMXX	$IM = 1,000,000 \Omega$
(Ι MΩ)	

ORDERING EXAMPLE

The ordering code of a RE0603 chip resistor, TC 50 value 56Ω with $\pm 0.5\%$ tolerance, supplied in 7-inch tape reel is: RE0603DRE0756RL.

NOTE

- All our R-Chip products meet RoHS compliant and Halogen Free. "LFP" of the internal 2D reel label mentions "Lead Free Process"
- On customized label, "LFP" or specific symbol can be printed



Chip Resistor Surface Mount

SERIES

0201 to 1206

<u>MARKING</u>

RE0805 / RE1206



Either resistance in E-24 or E-96: 4 digits

RE

First three digits for significant figure and 4th digit for number of zeros

RE0603



1%, 0.5%, 0.1% E24 exception values 10/11/13/15/20/75 of E24 series



1%, 0.5%, 0.1% E96 refer to EIA-96 marking method, including values 10/11/13/15/20/75 of E24 series

RE0201/0402



No marking

For further marking information, please see special 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 layer. The resistive layer 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. 5.

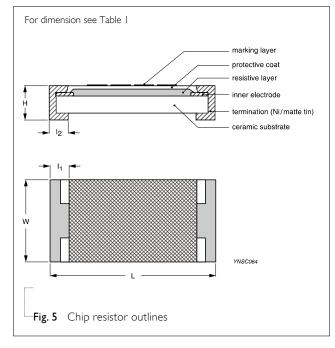
DIMENSION

Table I For outlines see fig. 5

TYPE	L (mm)	W (mm)	H (mm)	I _I (mm)	I ₂ (mm)
RE020 I	0.60 ±0.03	0.30 ±0.03	0.23 ±0.03	0.10 ±0.05	0.15 ±0.05
RE0402	1.00 ±0.05	0.50 ±0.05	0.32 ±0.05	0.20 ±0.10	0.25 ±0.10
RE0603	1.60 ±0.10	0.80 ±0.10	0.45 ±0.10	0.25 ±0.15	0.25 ±0.15
RE0805	2.00 ±0.10	1.25 ±0.10	0.50 ±0.10	0.35 ±0.20	0.35 ±0.20

REI206 3.10 ±0.10 1.60 ±0.10 0.55 ±0.10 0.45 ±0.20 0.40 ±0.20

OUTLINES



RE

ELECTRICAL CHARACTERISTICS

Table 2

TYPE	RESISTANCE RANGE (E24/E96)	OPERATING TEMPERATURE RANGE	POWER RATING	MAXIMUM WORKING VOLTAGE	DIELECTRIC WITHSTAND VOLTAGE	MAXIMUM OVERLOAD VOLTAGE	TEMPERATURE COEFFICIENT OF RESISTANCE
RE0201	100 Ω to 1 M Ω	-55 °C to +155 °C	1/20W	25 V	50 V	50 V	±50 ppm/°C
RE0402	10 Ω to 1 $M\Omega$	-55 °C to +155 °C	1/16 W	50 V	100 V	100 V	±50 ppm/°C
RE0603	10 Ω to 1 $M\Omega$	-55 °C to +155 °C	1/10 W	75 V	150 V	150 V	±50 ppm/°C
RE0805	10 Ω to 1 $M\Omega$	-55 °C to +155 °C	1/8 W	150 V	300 V	300 V	±50 ppm/°C
RE1206	10 Ω to 1 $M\Omega$	-55 °C to +155 °C	1/4 W	200 V	500 V	400 V	±50 ppm/°C

NOTE

The maximum working voltage that may be continuously applied to the resistor element, see "IEC publication 60115-8"

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	RE0201	RE0402	RE0603	RE0805	RE1206
Paper/PE taping reel (R)	7" (178 mm)	10,000	10,000	5,000	5,000	5,000
	10" (254 mm)	20,000	20,000	10,000	10,000	10,000
	13" (330 mm)	50,000	50,000	20,000	20,000	20,000

NOTE

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

FUNCTIONAL DESCRIPTION

POWER RATING

Each type rated power at 70°C: RE0201=1/20W, RE0402=1/16W, RE0603=1/10W, RE0805=1/8 W, RE1206=1/4W

RATED VOLTAGE

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

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

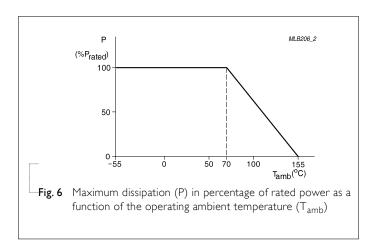
or max. working voltage whichever is less

Where

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

P=Rated power (W)

R=Resistance value (Ω)



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TESTS AND REQUIREMENTS

Table 4 Test condition, procedure and requirements

TEST	TEST METHOD	PROCEDURE	REQUIREMENTS
Life/Endurance	IEC 60115-1 4.25.1 MIL-STD-202 Method 108A	At 70±2 °C for 1,000 hours, RCWV applied for 1.5 hours on, 0.5 hour off, still air required	±(3%+0.05 Ω)
High Temperature Exposure	IEC 60068-2-2 MIL-STD-202 Method 108A	1,000 hours at 155±5 °C, unpowered	±(3%+0.05 Ω)
Moisture Resistance	MIL-STD-202 Method 106G	Each temperature / humidity cycle is defined at 8 hours, 3 cycles / 24 hours for IOd. with 25 °C / 65 °C 95% R.H, without steps 7a & 7b, unpowered Parts mounted on test-boards, without	±(3%+0.05 Ω)
		condensation on parts Measurement at 24±2 hours after test conclusion	
Thermal Shock	MIL-STD-202 Method 107G	-55/+125 °C Number of cycles required is 300. Devices mounted	±(1%+0.05 Ω)
		Maximum transfer time is 20 seconds. Dwell time is 15 minutes. Air – Air	
Short Time Overload	IEC60115-1 4.13	2.5 times of rated voltage or maximum overload voltage whichever is less for 5 sec at room temperature	±(1%+0.05 Ω) No visible damage
Board Flex/ Bending	IEC 60115-1 4.33	Chips mounted on a 90mm glass epoxy resin PCB (FR4)	\pm (1%+0.05 Ω) No visible damage
		Bending: see table 5 for each size Bending time: 60±5 seconds	

Chip Resistor Surface Mount RE SERIES

TEST TEST METHOD PROCEDURE REQUIREMENTS IEC 60115-1 4.24.2 Humidity Steady state for 1000 hours at 40 °C / 95% $\pm (3\% + 0.05 \Omega)$ R.H. RCWV applied for 1.5 hours on and 0.5 hour off Solderability J-STD-002 test B Electrical Test not required Well tinned (≥95% covered) - Wetting No visible damage Magnification 50X SMD conditions: Ist 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 - Leaching J-STD-002 test D Leadfree solder, 260 °C, 30 seconds No visible damage immersion time - Resistance to IEC 60115-1 4.18 Condition B, no pre-heat of samples. $\pm (1\% + 0.05 \Omega)$ Soldering Heat Leadfree solder, 260 °C, 10 seconds No visible damage immersion time Procedure 2 for SMD: devices fluxed and cleaned with isopropanol

0201 to 1206

Table 5 Bending for sizes 0201 to 1206

TYPE	RE0201	RE0402	RE0603	RE0805	RE1206
Specification (mm)	5	5	3	3	2

Chip Resistor Surface Mount | RE | SERIES | 0201 to 1206

REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version 6	May 31, 2017	-	-Add 10" packing
\/	F-1- 24 2017		D. 1. 10522 1 1 1 1
Version 5	Feb 24, 2017	-	-Delete 125° C in derating curve
Version 4	May 03, 2016	-	-Update 0201 resistor value
Varian 2	lan 27 2015		Lladata Madiga Valtaga
Version 3	Jan. 26, 2015	-	- Update Working Voltage
Version 2	May 11, 2015	-	- Update test and requirements
\/a	Jan 22 2014		V 11 DE0201
Version I	Jan 23, 2014	-	- Add RE0201
			- Add 0.1%
			- Update TEST AND REQUIREMENTS, add Humidity test
Version 0	Dec 10, 2010	-	- New datasheet for thick film ultra precision chip resistors sizes of
			0402/0603/0805/1206, 0.5%, 1%, TC50 with lead-free terminations

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IGMF1R20C ERJ-1GMF2R55C ERJ-1GMF8R66C 25121WF1003T4E 25.501.3653.0 290-1.0M-RC 292-1.0M-RC 292-2.2K-RC 292
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RCWP11002K00FKS3 RCWP12061K00FKS2 3520510RJT 352075KJT M55342K11B9E53RUL RMC16-102JT RMC1JPTE TR0603MR
075K1L 5-2176094-4 35202K7JT WF06Q1000FTL ERJ-S03J1R0V ERJ-S14J4R7U CHP2512L4R30GNT CPCC10270R0JE32

RCWP11001K00FKS3 RCWP110035R7FKS3