

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



YAGEO Phicomp

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

<u>SCOPE</u>

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 $2\sim4$ 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. IK2, not IK20.

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	10R = 10 Ω				
(10 to 97.6 Ω)	97R6 = 97.6 Ω				
XXXR (100 to 976 Ω)	100R = 100 Ω				
XKXX	K = 1,000 Ω				
(Ι to 9.76 K Ω)	9K76 = 9760 Ω				
XMXX (Ι ΜΩ)	$IM = I,000,000 \Omega$				

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

YAGEO	Phicomp					Product specification
	Chip Resistor Surface Mou	III RE	SERIES	0201 to 1206		
MARKING						
RE0805 / REI	206					
1	Either resista	nce in E-	24 or E-9	96: 4 digits		
Fig. I Valu	First three difference of the second secon	gits for s	ignificant	figure and 4th	digit for number	of zeros
RE0603						
Fig. 2 Valu	YNDC007	% E24 ex	ception v	values 10/11/13	8/15/20/75 of E24	series
	I%, 0.5%, 0.1	% E96 re	fer to El <i>i</i>	A-96 marking r	nethod, including	values
Fig. 3 Valu	$I = 12.4 \text{ k}\Omega$ I0/11/13/15/2	0/75 of I	E24 serie	S		

RE0201/0402



For further marking information, please see special data sheet "Chip resistors marking".

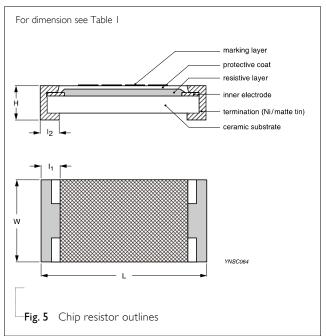
CONSTRUCTION

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)	l₁ (mm)	l ₂ (mm)		
RE0201	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		
RE1206	3.10 ±0.10	1.60 ±0.10	0.55 ±0.10	0.45 ±0.20	0.40 ±0.20		

OUTLINES



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ELECTRICAL CHARACTERISTICS

Table 2	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 ℃ to +155 ℃	1/20W	25 V	50 V	50 V	±50 ppm/°C
RE0402	10 Ω to 1 M Ω	−55 °C to +155 °C	1/16 W	50 V	100 V	100 V	±50 ppm/°C
RE0603	10 Ω to 1 M Ω	−55 °C to +155 °C	1/10 W	75 V	150 V	150 V	±50 ppm/°C
RE0805	10 Ω to 1 M Ω	–55 ℃ to +155 ℃	1/8 W	150 V	300 V	300 V	±50 ppm/°C
RE1206	10 Ω to 1 M Ω	−55 °C to +155 °C	1/4 W	200 V	500 V	400 V	±50 ppm/°C

ΝΟΤΕ

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:

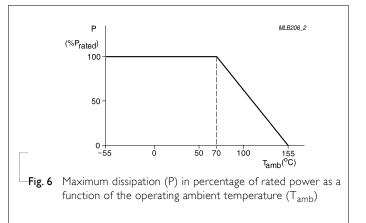
 $V=\sqrt{(P \times R)}$ or max. working voltage whichever is less

Where

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

P=Rated power (W)

R=Resistance value (Ω)



YAGEO Phicomp

Chip Resistor Surface Mount RE SERIES 0201 to 1206

TESTS AND REQUIREMENTS

Table 4 Test conditio .

TECT	TEST METHOD		
TEST	TEST METHOD	PROCEDURE	REQUIREMENTS
Life/Endurance	IEC 60115-1 4.25.1	At 70±2 °C for I,000 hours, RCWV applied for	±(3%+0.05 Ω)
	MIL-STD-202 Method 108A	1.5 hours on, 0.5 hour off, still air required	
High	IEC 60068-2-2	1,000 hours at 155±5 °C, unpowered	±(3%+0.05 Ω)
Temperature Exposure	MIL-STD-202 Method 108A		
Moisture Resistance	MIL-STD-202 Method 106G	Each temperature / humidity cycle is defined at 8 hours, 3 cycles / 24 hours for 10d. with 25 °C / 65 °C 95% R.H, without steps 7a & 7b,	±(3%+0.05 Ω)
		unpowered Parts mounted on test-boards, without	
		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.	±(1%+0.05 Ω)
		Devices mounted	
		Maximum transfer time is 20 seconds. Dwell time is 15 minutes. Air – Air	
Short Time	IEC60115-1 4.13	2.5 times of rated voltage or maximum overload	±(1%+0.05 Ω)
Overload		voltage whichever is less for 5 sec at room temperature	No visible damage
Board Flex/	IEC 60115-1 4.33	Chips mounted on a 90mm glass epoxy resin	±(1%+0.05 Ω)
Bending		PCB (FR4)	No visible damage

Bending: see table 5 for each size Bending time: 60±5 seconds

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	Chip Resistor Surface Mount	R	-	SERIES	0201 to 1206

6 7 Product specification

TEST	TEST METHOD	PROCEDURE	REQUIREMENTS
Humidity	IEC 60115-1 4.24.2	Steady state for 1000 hours at 40 °C / 95% R.H. RCWV applied for 1.5 hours on and 0. hour off	±(3%+0.05 Ω)
Solderability - Wetting	J-STD-002 test B	Electrical Test not required	Well tinned (≥95% covered)
- vvetting	J-51 D-002 test D	Magnification 50X	No visible damage
		SMD conditions:	
		I st step: method B, aging 4 hours at 155°C dry heat	
		2 nd 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 immersion time	No visible damage
- Resistance to	IEC 60115-1 4.18	Condition B, no pre-heat of samples.	±(1%+0.05 Ω)
Soldering Heat		Leadfree solder, 260 °C, 10 seconds immersion time Procedure 2 for SMD: devices fluxed and	No visible damage

Table 5	Bending for sizes 0201 to 1206				
TYPE	RE0201	RE0402	RE0603	RE0805	RE1206
Specification	(mm) 5	5	3	3	2



YAGEO	Phicom	0		Product specification 7
	Chip Resi	stor Surface Mount RE	SERIES 0201 to 1206	7
<u>revision</u>	<u>I HISTORY</u>			
REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION	
Version 6	May 31, 2017	-	-Add 10" packing	
Version 5	Feb 24, 2017	-	-Delete 125°C in derating curve	
Version 4	May 03, 2016	-	-Update 0201 resistor value	
Version 3	Jan. 26, 2015	-	- Update Working Voltage	
Version 2	May 11, 2015	-	- Update test and requirements	
	·		·	

- Add RE0201

- Update TEST AND REQUIREMENTS, add Humidity test

- New datasheet for thick film ultra precision chip resistors sizes of

0402/0603/0805/1206, 0.5%, 1%, TC50 with lead-free terminations

- Add 0.1%

"Yageo reserves all the rights for revising the content of this datasheet without further notification, as long as the products itself are unchanged. Any product change will be announced by PCN."

Jan 23, 2014

Dec 10, 2010

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Version I

Version 0

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