

DATA SHEET SURGE CHIP RESISTORS

SR series

sizes 0402/0603/0805/1206/1210/1218/2010/2512 RoHS compliant & Halogen free



YAGEO Phícomp



SCOPE

This specification describes SR0402 to SR2512 chip resistors with lead-free terminations made by thick film process.

APPLICATIONS

- Telecommunications
- Power supplies
- Car electronics

FEATURES

- AEC-Q200 qualified
- Superior to SR series in pulse withstanding voltage and surge withstanding voltage.
- MSL class: MSL I
- Halogen free epoxy
- RoHS compliant
 - Products with lead-free terminations meet RoHS requirements
 - Pb-glass contained in electrodes, resistor element and glass are exempted by RoHS
- Reduce environmentally hazardous waste
- High component and equipment reliability

ORDERING INFORMATION - GLOBAL PART NUMBER

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

GLOBAL PART NUMBER

SR XXXX X X X XX XXXX L

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

(I) SIZE

0402 / 0603 / 0805 / 1206 / 1210 / 1218 / 2010 / 2512

(2) TOLERANCE

 $| = \pm 5\%$

 $K = \pm 10\%$

 $M = \pm 20\%$

(3) PACKAGING TYPE

R = Paper taping reel

K = Embossed taping reel

(4) TEMPERATURE COEFFICIENT OF RESISTANCE

- = Based on spec.

(5) TAPING REEL & POWER

07 = 7 inch dia. Reel 7W = 7 inch dia. Reel & $2 \times$ standard power

13 = 13 inch dia. Reel 3×3 standard power

47 = 7 inch dia. Reel & 4xstandard power

(6) RESISTANCE VALUE

$I \Omega \leq R \leq IM \Omega$

There are 2~4 digits indicated the resistance 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 coding rules of resistance are shown in the table of "Resistance rule of global part number".

(7) DEFAULT CODE

Letter L is the system default code for ordering only. (Note)

number Resistance coding rule	Example
XRXX (1 to 9.76 Ω)	IR = I Ω IR5 = I.5 Ω
XXRX	$9R76 = 9.76 \Omega$ $10R = 10 \Omega$
(10 to 97.6 Ω)	97R6 = 97.6 Ω
XXXR (100 to 976 Ω)	100R = 100 Ω
XKXX	$IK = 1,000 \Omega$
<u>(</u> 1 to 9.76 KΩ)	9K76 = 9760 Ω
XXKX	$10K = 10,000 \Omega$
(10 to 97.6 K Ω)	97Κ6= 976,000 Ω
XXXK (100 KΩ)	100Κ = 100,000 Ω

Resistance rule of global part

ORDERING EXAMPLE

The ordering code for an SR0805 chip resistor, value 10 K Ω with $\pm 5\%$ tolerance, supplied in 7-inch tape reel is: SR0805JR-0710KL.

MARKING

SR0402



No Marking

Fig. I

SR1218



E-24 series: 3 digits

First two digits for significant figure and 3rd digit for number of zeros

SR0603 / SR0805 / SR1206 / SR1210 / SR2010 / SR2512



E-24 series: 3 digits

First two digits for significant figure and 3rd digit for number of zeros

NOTE

For further marking information, please refer to data sheet "Chip resistors marking".

TAPING REEL & POWER

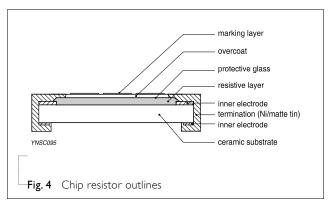
Table I

		P	OWER, W (P70)		
TYPE			CODING		
	07	7W	7T	47	
0402	1/16	1/8	1/5	-	
0603	1/10	1/5	1/4	-	
0805	1/8	1/4	1/3	1/2	
1206	1/4	1/2	3/4	1	
1210	1/2	I	-	-	
1218	1	1.5	-	-	
2010	3/4	1.25	-	-	
2512	1	2	-	-	

CONSTRUCTION

The resistor is constructed on top of a high-grade ceramic body. Internal metal electrodes are added at each end and connected by a resistive glaze. The resistive glaze is covered by a lead-free glass. The composition of the glaze is adjusted to give the approximately required resistance value. The whole element is covered by a protective overcoat. The top of overcoat is marked with the resistance value. Finally, the two external terminations (Ni/matte tin) are added, as shown in Fig.4.

OUTLINES



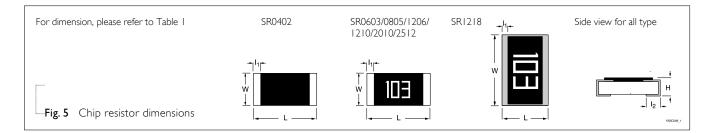


<u>4</u> 8

DIMENSIONS

Table 2

TYPE	L (mm)	W (mm)	H (mm)	I _I (mm)	I_2 (mm)
SR0402	1.00±0.05	0.50±0.05	0.35±0.05	0.20±0.10	0.25±0.10
SR0603	1.60±0.10	0.80±0.10	0.45±0.10	0.25±0.15	0.25±0.15
SR0805	2.00±0.10	1,25±0.10	0.50±0.10	0.35±0.20	0.35±0.20
SR1206	3.10±0.10	1.60±0.10	0.55±0.10	0.45±0.20	0.40±0.20
SR1210	3.10±0.10	2.60±0.15	0.55±0.10	0.45±0.15	0.50±0.20
SR1218	3.10±0.10	4.60±0.10	0.55±0.10	0.45±0.20	0.40±0.20
SR2010	5.00±0.10	2.50±0.15	0.55±0.10	0.55±0.15	0.50±0.20
SR2512	6.35±0.10	3.10±0.15	0.55±0.10	0.60±0.20	0.50±0.20



ELECTRICAL CHARACTERISTICS

Table 3

			CHARACTERISTICS				
TYPE	POWER	resistance range	Operating Temperature Range	Max. Working Voltage	Max. Overload Voltage	Dielectric Withstanding Voltage	Temperature Coefficient of Resistance
SR0402	1/16W 1/8W 1/5W			50 V	100 V	100 V	
SR0603	1/10W 1/5W 1/4W			75V	150V	150V	
SR0805	1/8 W 1/4W 1/3W 1/2W			150V	300V	300V	$10\Omega < R \le 1M\Omega$
SR1206	1/4 W 1/2W 3/4W	E24 5%, 10%, 20% I Ω ≤ R ≤ IM Ω	–55 °C to +155 °C	200 V	400 V	500 ∨	$\pm 100 \text{ ppm/°C}$ $I\Omega \leq R \leq 10\Omega$ $\pm 200 \text{ ppm/°C}$
SR1210	1/2W			200 V	400 V	500 V	
SR1218	IW_			200 V	400 V	500 V	
SR2010	3/4W 1.25W			200 V	400 V	500 V	
SR2512	I W			200 V	400 V	500 V	

8

FOOTPRINT AND SOLDERING PROFILES

Recommended footprint and soldering profiles, please refer to data sheet "Chip resistors mounting".

PACKING STYLE AND PACKAGING QUANTITY

Table 4 Packing style and packaging quantity

PACKING STYLE	REEL DIMENSION	SR0402	SR0603/0805/1206	SR1210	SR1218/2010/2512
Paper taping reel (R)	7" (178 mm)	10,000	5,000	5,000	
	13" (330 mm)	50,000	20,000	20,000	
Embossed taping reel (K)	7" (178 mm)				4,000

NOTE

I. For paper/embossed tape and reel specification/dimensions, please refer to data sheet "Chip resistors packing".

FUNCTIONAL DESCRIPTION

OPERATING TEMPERATURE RANGE

Range: -55 °C to +155 °C

POWER RATING

Each type rated power at 70 °C: SR0402: I/16W, I/8W, I/5W SR0603: I/10W, I/5W, I/4W SR0805: I/8W, I/4W, I/3W, I/2W SR1206: I/4W, I/2W, 3/4W, IW

SR1210: 1/2W, 1W SR1218: 1W, 1.5W SR2010: 3/4W, 1.25W

SR2512: IW, 2W



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

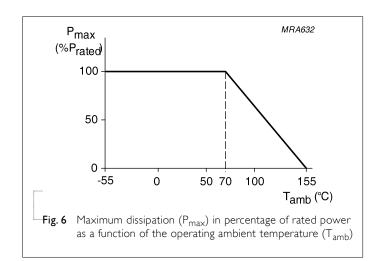
$$V = \sqrt{(P \times R)}$$

Where

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

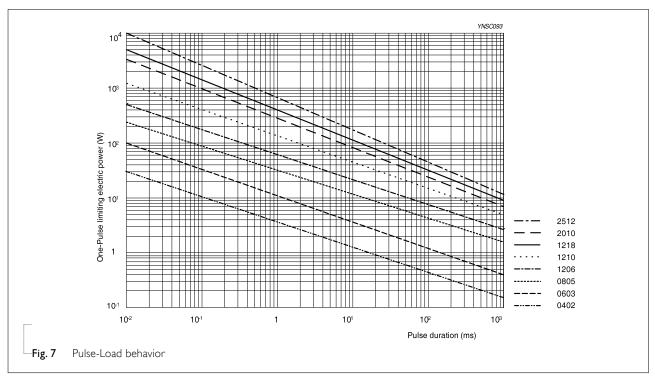
P = Rated power (W)

 $R = Resistance value (\Omega)$



8

PULSE LOAD BEHAVIOR



TESTS AND REQUIREMENTS

Table 5 Test condition, procedure and requirements

TEST	TEST METHOD	PROCEDURE	REQUIREMENTS
Temperature Coefficient of	MIL-STD-202 Method 304	At +25/-55 °C and +25/+125 °C	Refer to table 2
Resistance (T.C.R.)		Formula:	
		T.C.R= $\frac{R_2-R_1}{R_1(t_2-t_1)} \times 10^6 \text{ (ppm/°C)}$	
		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	
Short Time Overload	IEC60115-1 4.13	2. Extract of metad college and many firm on a college	L (2.09/ L0.0F, O)
Short Time Overload	IEC00113-1 4.13	2.5 times of rated voltage or maximum overload voltage whichever is less for 5 sec	$\pm (2.0\% + 0.05 \Omega)$
		at room temperature	
High Temperature Exposure	IEC 60068-2-2	1,000 hours at T_A = 155 °C ±5 °C, unpowered	±(3.0%+0.05 Ω)
Humidity	IEC 60115-1 4.24.2	Steady state for 1,000 hours at 40 °C / 95% R.H.	±(3.0%+0.05 Ω)
		RCWV applied for 1.5 hours on and 0.5 hour off	

 Chip Resistor Surface Mount
 SR
 SERIES
 0402/0603/0805/1206/1210/1218/2010/2512

TEST	TEST METHOD	PROCEDURE	REQUIREMENTS
Life	IEC 60115-1 4.25.1	1,000 hours at 70±2 °C, RCWV applied for 1.5	±(3.0%+0.05 Ω)
	MIL-STD-202 Method 108	hours on, 0.5 hour off, still-air required	
Resistance to	IEC 60115-1 4.18	Condition B, no pre-heat of samples	$\pm (1.0\% + 0.05 \Omega)$
Soldering Heat	MIL-STD- 202 Method 210	Lead-free solder, 260 \pm 5 °C, 10 \pm 1 seconds immersion time	No visible damage
		Procedure 2 for SMD: devices fluxed and cleaned with isopropanol	
Temperature Cycling	JESD22-A104C	-55/+125 °C for I cycle per hour, with 1,000 cycles.	±(1.0%+0.05 Ω)
		Devices mounted	
Solderability			
- Wetting	J-STD-002	Electrical Test not required Magnification 50X	Well tinned (≥95% covered)
		SMD conditions:	No visible damage
		Immerse the specimen into the solder pot at 245 ± 3 °C for 2 ± 0.5 seconds.	
Board Flex	IEC 60115-1 4.33	Chips mounted on a 90mm glass epoxy resin	+(1.0%+0.05 Ω)
Board Flex	IEC 60115-1 4.33	Chips mounted on a 90mm glass epoxy resin PCB (FR4) Bending for 0402: 5mm 0603 & 0805: 3mm 1206 and above: 2mm	±(1.0%+0.05 Ω)

8

8

Chip Resistor Surface Mount

SR SERIES

0402/0603/0805/1206/1210/1218/2010/2512

REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version 8	Jul. 22, 2019	-	- Update power rating
			- Extend resistance range of 0402 ~ 2512 to IMohm,
Version 7	Sep. 27, 2018	-	- Tighten TCR of all sizes for $10\Omega < R \leq IM\Omega$ from $\pm~200$ ppm/°C to $\pm~100$ ppm/°C
			- Add SRI210, SRI218, SR2010 7W (double power)
Version 6	Oct. 02, 2017	-	- Add SR0402 7T (triple power), SR0805 47 (quadruple power), SR2512 7W (double power)
Version 5	Nov.11, 2016	-	- Update 7T power for 1206
	6 01 2015	2015	- Update SR0603 Dielectric Withstanding Voltage to 150V
Version 4	Sep. 01, 2015	-	- Update 7T power for 0603/0805 & 7W for 1210
Version 3	Jul. 31, 2015	-	- Comply with AEC-Q200 standard
	2		- Add SR0402/0603/1210
Version 2	Jan. 06, 2014	-	- Update electrical characteristic
Version I	Mar 18, 2011	-	- Change to dual brand datasheet that describes SR0805 to SR2512 with RoHS compliant
			- Define global part number
Version 0	Oct 19, 2004	-	-

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

[&]quot;The reimbursement is limited to the value of the products."

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Thick Film Resistors - SMD category:

Click to view products by Yageo manufacturer:

Other Similar products are found below:

CR-05FL7--19K6 CR-05FL7--243R CR-05FL7--40K2 CR-12FP4--324R CR-12JP4--680R CRCW06036K80FKEE M55342K06B309DRS3

M55342K06B6E81RS3 M55342K08B100DRWB M55342M05B200DRWB M55342M06B26E7RS3 MC0603-511-JTW 742C083750JTR

MCR01MZPF1202 MCR01MZPF1601 MCR01MZPF1800 MCR01MZPF6201 MCR01MZPF9102 MCR01MZPJ113 MCR01MZPJ121

MCR01MZPJ125 MCR01MZPJ203 MCR01MZPJ751 MCR01MZPJ822 MCR03EZHJ103 MCR03EZPFX1272 MCR03EZPFX2004

MCR03EZPJ123 MCR03EZPJ270 MCR03EZPJ821 MCR10EZPF1102 MCR10EZPF2003 MCR10EZPF2700 MCR18EZPJ330

RC0603F1473CS RC0603F150CS RC1005F1152CS RC1005F1182CS RC1005F1372CS RC1005F183CS RC1005F1911CS

RC1005F1912CS RC1005F203CS RC1005F2052CS RC1005F241CS RC1005F2431CS RC1005F3011CS RC1005F303CS

RC1005F4321CS RC1005F4642CS