



SR series 1%, 0.5% sizes 0402/0603/0805/1206/1210/1218/2010/2512 RoHS compliant & Halogen free

Product specification – July 22, 2019 V.4







Chin Resistor Surface Mount SR SERIES

<u>SCOPE</u>

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

 $D = \pm 0.5\%$

 $F = \pm 1\%$

(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 × standard power			
13 = 13 inch dia. Reel	7T = 7 inch dia. Reel & 3 x standard power			
47 = 7 inch dia. Reel & 4 × standard power				

(6) RESISTANCE VALUE

$| \Omega \leq R \leq |M \Omega|$

There are $2\sim4$ 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. IK2, not IK20.

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)

Resistance rule of global part number Resistance coding

rule	Example
XRXX (Ι to 9.76 Ω)	R = Ω R5 = .5 Ω 9R76 = 9.76 Ω
XXRX (10 to 97.6 Ω)	IOR = 10 Ω 97R6 = 97.6 Ω
XXXR (100 to 976 Ω)	100R = 100 Ω
XKXX (Ι to 9.76 K Ω)	IK = 1,000 Ω 9K76 = 9760 Ω
XXKX (10 to 97.6 KΩ)	10K = 10,000 Ω 97K6= 976,000 Ω
XXXK (100 KΩ)	100K = 100,000 Ω

ORDERING EXAMPLE

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

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<u>YAGEO</u>	Phicomp					Product specification 3
	Chip Resisto	r Surface Mount	SR	SERIES	0402/0603/0805/1206/1210/	1218/2010/2512 9
MARKING						
SR0402						
		No Marking				
Fig. I	parents,					
SR1218						
	103	E-24 series: 3 dig First two digits f		nificant fi	gure and 3rd digit for num	ber of zeros
Fig. 2 ∨	alue=10 KΩ	-	•			
SR0603 / SR	.0805 / SR I 206 / SR	1210 / SR2010 / SR25	12			
	103 ////////////////////////////////////	E-24 series: 3 dig First two digits f		nificant fi	gure and 3rd digit for num	ber of zeros

ΝΟΤΕ

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

Table I

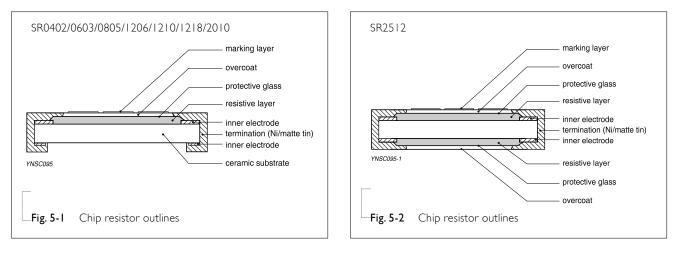
TAPING REEL & POWER

		F	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	I	
1210	1/2	I	-	-	
1218	I	1.5	-	-	
2010	3/4	1.25	-	-	
2512	I	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.5.

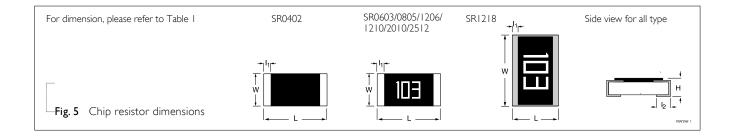
OUTLINES



DIMENSIONS

Table 2

ТҮРЕ	L (mm)	W (mm)	H (mm)	l _ı (mm)	l 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





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ELECTRICAL CHARACTERISTICS

Table 3

				CHA	RACTERISTI	CS	
TYPE	POWER	RESISTANCE RANGE	Operating Temperature Range	Max. Working Voltage	Max. Overload Voltage	Dielectric Withstanding Voltage	Temperature Coefficient of Resistance
	1/16W						
SR0402	1/8W			50 V	100 V	100 V	
	1/5W		_				
	1/10W						
SR0603	1/5W			75V	150V	150V	
	1/4W		-				
	1/8 W			150V	300V	300V	
SR0805	1/4W						
5110005	1/3W						
	1/2W		_				10Ω < R≤ IMΩ ±100 ppm/°C
	1/4 W	E24/E96 0.5%, 1%	–55 ℃ to +155 ℃				
SR1206	1/2W	$ \Omega \leq R \leq M \Omega $		200 V	400 V	500 V	$ \Omega \leq R \leq 0\Omega $
51(1200	3/4W						$\pm 200 \text{ ppm/°C}$
	IW		_				±200 ppm/ C
SR1210	1/2W			200.14	400.14	F00.)/	
381210	IW		_	200 V	400 V	500 V	
SR1218	IW			200 V	400 V	500 V	
381210	1.5W		_	200 V	400 V	500 V	
SR2010	3/4W			200 V	400 V	500 V	
312010	1.25W			200 V	400 V	500 V	
SR2512	I W			200 V	400 V	500 V	
SK2512	2W			200 V	400 V	500 V	

FOOTPRINT AND SOLDERING PROFILES

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

PACKING STYLE AND PACKAGING QUANTITY

lable 4 Packing style a	nd 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

Table 4 Packing style and packaging quantity

ΝΟΤΕ

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



Chip Resistor Surface Mount SR SERIES

FUNCTIONAL DESCRIPTION

OPERATING TEMPERATURE RANGE

Range: -55 °C to +155 °C

POWER RATING

Each type rated power at 70 °C: SR0402: 1/16W, 1/8W, 1/5W SR0603: 1/10W, 1/5W, 1/4W SR0805: 1/8W, 1/4W, 1/3W, 1/2W SR1206: 1/4W, 1/2W, 3/4W, 1W SR1210: 1/2W, 1W SR1218: 1W, 1.5W SR2010: 3/4W, 1.25W SR2512: 1W, 2W

RATED VOLTAGE

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

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

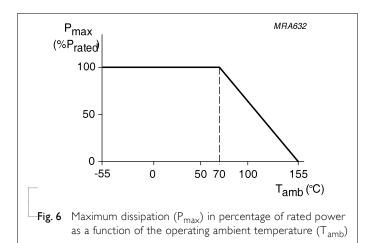
Where

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

P = Rated power (W)

 $R = Resistance value (\Omega)$

ynsc151 10000 Pulse Limiting Electric power (W) 00 00 00 00 00 00 - SR2512 - SR1218 - SR2010 · · SR1210 -SR1206 SR0805 — SR0603 1 SR0402 0.1 0.01 0.1 1 10 100 1000 Pulse duration (ms) -Fig. 7 Pulse-Load behavior



PULSE LOAD BEHAVIOR



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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	IEC60115-14.13	2.5 times of rated voltage or maximum overload voltage whichever is less for 5 sec at room temperature	±(2.0%+0.05 Ω)	
High Temperature Exposure	IEC 60068-2-2	1,000 hours at T _A = 155 °C \pm 5 °C, unpowered	±(2.0%+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		
Life	IEC 60115-1 4.25.1	1,000 hours at 70±2 °C, RCWV applied for 1.5	±(2.0%+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	±(1.0%+0.05 Ω)	
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 1 cycle per hour, with 1,000 cycles.	±(1.0%+0.05 Ω)	

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TEST	TEST METHOD	PROCEDURE	REQUIREMENTS
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)
		PCB (FR4) Bending for 0402: 5mm 0603 & 0805: 3mm 1206 and above: 2mm	
		Holding time: minimum 60 seconds	

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REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version 4	Jul. 22, 2019	-	- Update power rating
			- Extend resistance range of 0402 ~ 2512 to 1Mohm
Version 3	Version 3 Sep. 27, 2018	-	- Tighten TCR of all sizes for for 10 Ω $<$ R \leq 1M Ω from \pm 200 ppm/°C to \pm 100 ppm/°C
			- Add SR1210, SR1218, SR2010 7W (double power)
Version 2	Oct. 02, 2017	-	- Add SR0402 7T (triple power), SR0805 47 (quadruple power), SR2512 7W (double power)
Version I	Nov. 11, 2016	-	- Update 7T power for 1206
Version 0	Dec. 01, 2015	-	- New product datasheet

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