

DATA SHEET

SURGE CHIP RESISTORS

SR series

20%, 10%, 5%

sizes 0805/1206/1218/2010/2512

RoHS compliant & Halogen free



SCOPE

This specification describes SR0805 to SR2512 chip resistors with lead-free terminations made by thick film process.

APPLICATIONS

- Telecommunications
- Power supplies

FEATURES

- Superior to SR series in pulse withstanding voltage and surge withstanding voltage.
- MSL class: MSL 1
- 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)

(1) SIZE

0805 / 1206 / 1218 / 2010 / 2512

(2) TOLERANCE

J = $\pm 5\%$
 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

07 = 7 inch dia. Reel

10 = 10 inch dia. Reel

13 = 13 inch dia. Reel

(6) RESISTANCE VALUE

$1\ \Omega \leq R \leq 100\ \text{K}\Omega$

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. 1K2, not 1K20.

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

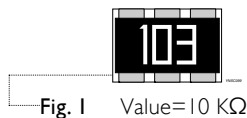
Resistance coding rule	Example
XXXX (1 to 9.76 Ω)	1R = 1 Ω 1R5 = 1.5 Ω 9R76 = 9.76 Ω
XXRX (10 to 97.6 Ω)	10R = 10 Ω 97R6 = 97.6 Ω
XXXXR (100 to 976 Ω)	100R = 100 Ω
XKXX (1 to 9.76 $\text{K}\Omega$)	1K = 1,000 Ω 9K76 = 9760 Ω
XXKX (10 to 97.6 $\text{K}\Omega$)	10K = 10,000 Ω 97K6 = 976,000 Ω
XXXXK (100 $\text{K}\Omega$)	100K = 100,000 Ω

ORDERING EXAMPLE

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

MARKING

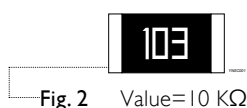
SR1218



E-24 series: 3 digits

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

SR0805 / SR1206 / SR2010 / SR2512



E-24 series: 3 digits

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

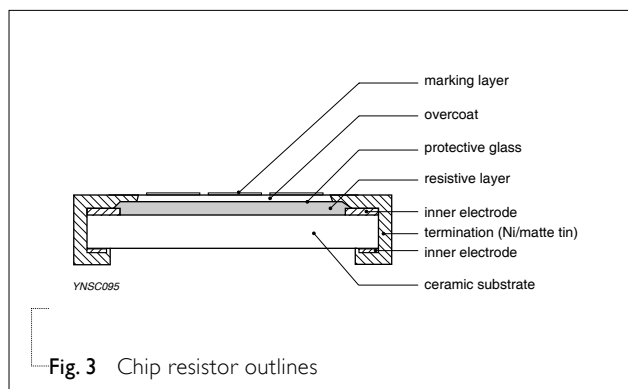
NOTE

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

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.3.

OUTLINES



DIMENSIONS

Table I

TYPE	L (mm)	W (mm)	H (mm)	l_1 (mm)	l_2 (mm)
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
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

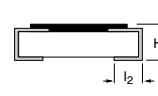
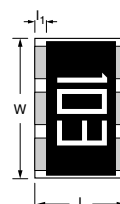
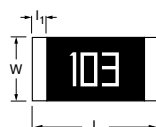
For dimension, please refer to Table I

SR0805/1206/2010/2512

SR1218

Side view for all type

Fig. 4 Chip resistor dimensions



ELECTRICAL CHARACTERISTICS

Table 2

TYPE	POWER	RESISTANCE RANGE	CHARACTERISTICS				
			Operating Temperature Range	Max. Working Voltage	Max. Overload Voltage	Dielectric Withstanding Voltage	Temperature Coefficient of Resistance
SR0805	1/8 W	E24 5%, 10%, 20% 1 Ω $\leq$ R $\leq$ 100 k Ω	-55 °C to +155 °C	150 V	300 V	300 V	$\pm$ 200 ppm/°C
SR1206	1/4 W			150 V	400 V	500 V	
SR1218	1 W			200 V	400 V	500 V	
SR2010	3/4 W			200 V	400 V	500 V	
SR2512	1 W			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

Table 3 Packing style and packaging quantity

PACKING STYLE	REEL DIMENSION	SR0805	SR1206	SR1218	SR2010	SR2512
Paper taping reel (R)	7" (178 mm)	5,000	5,000	---	---	---
	10" (254 mm)	10,000	10,000	---	---	---
	13" (330 mm)	20,000	20,000	---	---	---
Embossed taping reel (K)	7" (178 mm)	---	---	4,000	4,000	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:

SR0805 = 1/8 W (0.125W)

SR1206 = 1/4 W (0.25W)

SR1218 = 1 W

SR2010 = 3/4W (0.75W)

SR2512 = 1 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)

PULSE LOAD BEHAVIOR

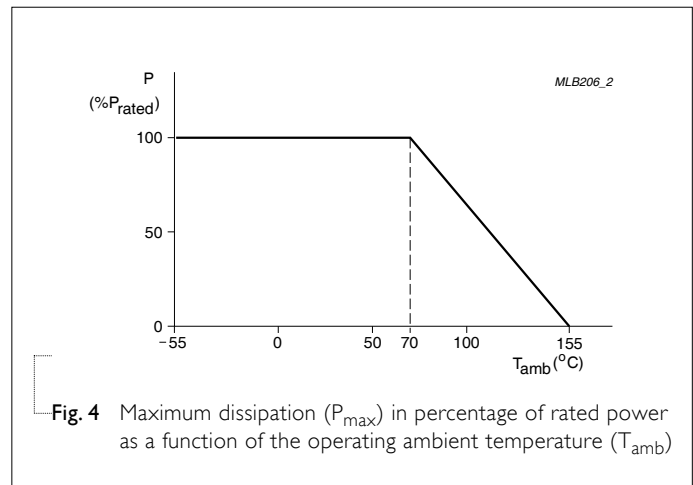


Fig. 4 Maximum dissipation (P_{max}) in percentage of rated power as a function of the operating ambient temperature (T_{amb})

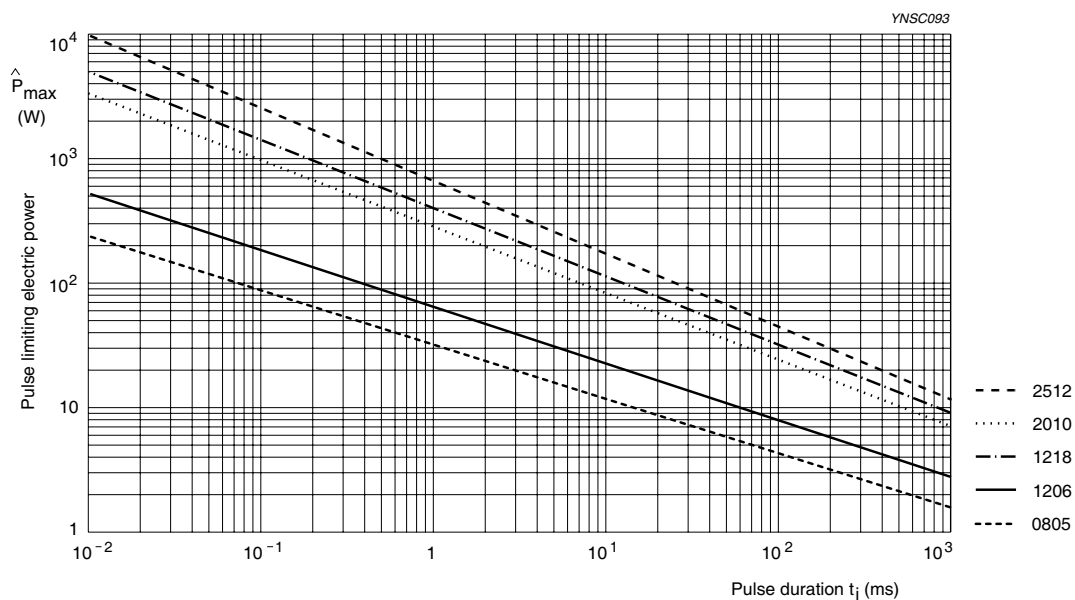


Fig. 5 Pulse-Load behavior

TESTS AND REQUIREMENTS**Table 4** Test condition, procedure and requirements

TEST	TEST METHOD	PROCEDURE	REQUIREMENTS
Temperature Coefficient of Resistance (T.C.R.)	MIL-STD-202 Method 304	At +25/-55 °C and +25/+125 °C 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	Refer to table 2
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	±(2.0%+0.05 Ω)
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 4.24.8	Steady state for 1,000 hours at 40 °C / 95% R.H. RCWV applied for 1.5 hours on and 0.5 hour off	±(3.0%+0.05 Ω)
Life	IEC 60115-1 4.25.1	1,000 hours at 70±2 °C, derated voltage applied for 1.5 hours on, 0.5 hour off, still-air required	±(3.0%+0.05 Ω)
Resistance to Soldering Heat	IEC 60068-2-58	Condition B, no pre-heat of samples Lead-free solder, 260±5 °C, 10±1 seconds immersion time Procedure 2 for SMD: devices fluxed and cleaned with isopropanol	±(1.0%+0.05 Ω) No visible damage
Temperature Cycling	JESD22-A104C	-55/+125 °C for 1 cycle per hour, with 5 cycles. Devices mounted	±(1.0%+0.05 Ω)

TEST	TEST METHOD	PROCEDURE	REQUIREMENTS
Solderability - Wetting	J-STD-002	Electrical Test not required Magnification 50X SMD conditions: Immerse the specimen into the solder pot at 235±3°C for 2±0.5 seconds.	Well tinned (≥95% covered) No visible damage
Board Flex	IEC 60068-2-21 IEC 60115-1 4.33	Chips mounted on a 90mm glass epoxy resin PCB (FR4) Bending for 0805: 3 mm 1206 and above: 2 mm Holding time: minimum 60 seconds	±(1.0%+0.05 Ω)

REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version 1	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	-	-

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