

# **DATA SHEET**

**SURGE CHIP RESISTORS** 

SR series

20%, 10%, 5% sizes 0805/1206/1218/2010/2512

RoHS compliant & Halogen free



YAGEO Phicomp



#### SCOPE

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

#### **APPLICATIONS**

- Telecommunications
- Power supplies

### <u>FEATURES</u>

- Superior to SR series in pulse withstanding voltage and surge withanding 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

0805 / 1206 / 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

07 = 7 inch dia. Reel

10 = 10 inch dia. Reel

13 = 13 inch dia. Reel

# (6) RESISTANCE VALUE

# $I \Omega \le R \le 100 K\Omega$

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. 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

**XXXK** 

 $(100 \text{ K}\Omega)$ 

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

 $100K = 100,000 \Omega$ 

#### number Resistance coding Example rule $IR = I \Omega$ XRXX $IR5 = 1.5 \Omega$ (1 to 9.76 $\Omega$ ) $9R76 = 9.76 \Omega$ **XXRX** $IOR = IO \Omega$ (10 to 97.6 $\Omega$ ) $97R6 = 97.6 \Omega$ **XXXR** $100R = 100 \Omega$ (100 to 976 $\Omega$ ) XKXX $IK = 1,000 \Omega$ (1 to 9.76 K $\Omega$ ) $9K76 = 9760 \Omega$ $10K = 10,000 \Omega$ **XXKX** 97K6= 976,000 Ω(10 to 97.6 K $\Omega$ )

Resistance rule of global part

# **ORDERING EXAMPLE**

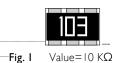
The ordering code for an SR0805 chip resistor, value  $10~\text{K}\Omega$  with  $\pm 5\%$  tolerance, supplied in 7-inch tape reel is: SR0805JR-0710KL.



SR

# <u>MARKING</u>

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

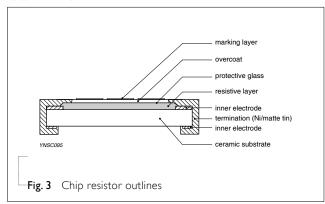
#### NOTE

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.

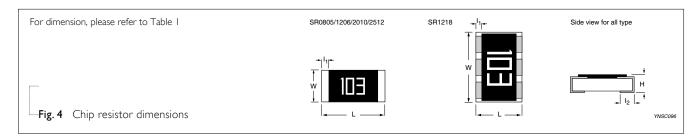
#### **OUTLINES**



# DIMENSIONS

#### Table I

Table 1					
TYPE	L (mm)	W (mm)	H (mm)	I <sub>I</sub> (mm)	l <sub>2</sub> (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



# Chip Resistor Surface Mount

SERIES 0805/1206/1218/2010/2512

# **ELECTRICAL CHARACTERISTICS**

Table 2

			CHARACTERISTICS					
TYPE	POWER	RESISTANCE RANGE	Operating Temperature Range	Max. Working Voltage	Max. Overload Voltage	Dielectric Withstanding Voltage	Temperature Coefficient of Resistance	
SR0805	1/8 W			150 V	300 V	300 V		
SR1206	1/4 W		_	150 V	400 V	500 V		
SR1218	IW	E24 5%, 10%, 20% I Ω ≤ R ≤ 100 KΩ	_55 °C to +155 °C _	200 V	400 V	500 V	±200 ppm/°C	
SR2010	3/4 W	. 22 2112 100 132		200 V	400 V	500 V		
SR2512	ΙW		_	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:

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

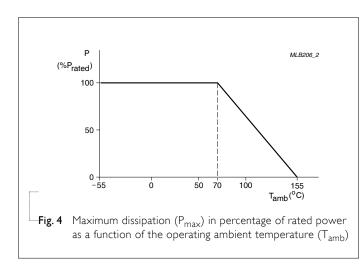
Where

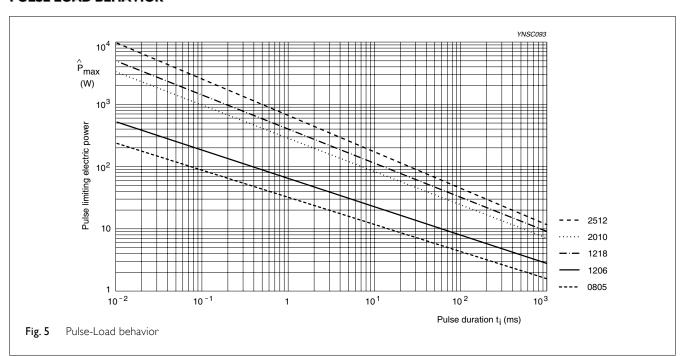
V = Continuous rated DC or AC (rms) working voltage (V)

P = Rated power (W)

 $R = Resistance value (\Omega)$ 

# **PULSE LOAD BEHAVIOR**





# Chip Resistor Surface Mount SR SERIES 0805/1206/1218/2010/2512

# TESTS AND REQUIREMENTS

Table 4 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 <sub>2</sub> =-55 °C or +125 °C test temperature	
		R <sub>I</sub> =resistance at reference temperature in ohms	
		R <sub>2</sub> =resistance at test temperature in ohms	
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.	±(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, derated voltage applied for 1.5 hours on, 0.5 hour off, still-air required	±(3.0%+0.05 Ω)
Resistance to	IEC 60068-2-58	Condition B, no pre-heat of samples	±(1.0%+0.05 Ω)
Soldering Heat		Lead-free solder, 260±5 °C, 10±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 5 cycles.  Devices mounted	±(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 $235\pm3^{\circ}$ C for $2\pm0.5$ seconds.	
Board Flex	IEC 60068-2-21	Chips mounted on a 90mm glass epoxy resin	±(1.0%+0.05 Ω)
	IEC 60115-1 4.33	PCB (FR4)	
		Bending for 0805: 3 mm 1206 and above: 2 mm	
		Holding time: minimum 60 seconds	

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#### **Chip Resistor Surface Mount** SR SERIES 0805/1206/1218/2010/2512

REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
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	-	-

<sup>&</sup>quot;The reimbursement is limited to the value of the products."



<sup>&</sup>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."