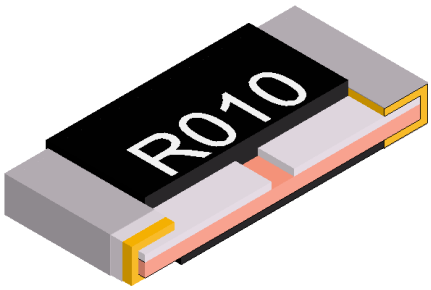
FEATURE

- Halogen free and lead free, RoHS compliant
- Low Resistance / Low TCR/ Low Inductance
- Excellent reliability and stability
- High precision current sensing and voltage division
- AEC-Q200 Compliant
- Applications:
  - Power supply
  - Measuring instrument
  - Industrial equipment
  - Battery management system
  - AC/DC Converter, Battery pack, Charger, Adaptor
  - Voltage Regulation Module (VRM)
  - Automotive electronics



MANUFACTURER PART NO.

For example: LS0603F0R02T5150-LS0603 ±1% 0R02 1W 50PPM/℃ T/R-5000

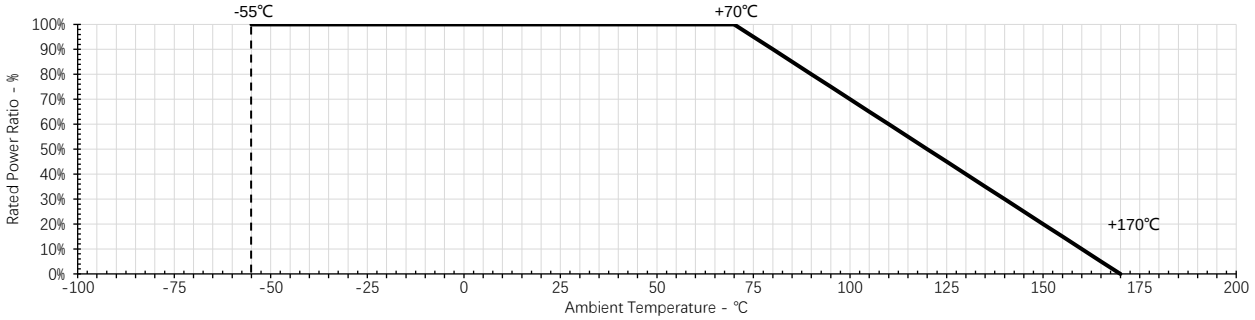
Series	Size	Tol.	Value	PKG	SPQ	Power	TCR
2 codes	4 codes	1 code	2~5 codes	1 code	1 code	1 code	2 codes
LS	0603	F	0R02	T	5	1	50
Low Resistance Metal Strip Current Sensing Chip Resistors	0603 0805 1206 2512 2818	F=±1% G=±2% J=±5%	0U5[1]=0R0005, 0.5mΩ 0R001[2]=0.001Ω, 1mΩ 0R05=0.05Ω, 50mΩ	T=T/R[3]	4=4000 5=5000	K=1/4w N=1/2W P=3/4W 1=1W Q=1.5W 2=2W 3=3W	50=50PPM/℃ 00=Refer to table as below.

Note: ① U=Milli, 10^{-3}, mΩ ② R=Radix, 10^{0}, Ω ③ T/R=Taping in Reel Package type

CHARACTERISTIC

Type	Rated power	Tolerance	Value Range	TCR (PPM/℃)	Working Temp.
LS0603	1/2W	±1% / ±2% / ±5%	1≤R < 20mΩ	±50, ±200	-55℃ ~ +170℃
LS0805	3/4W	±1% / ±2% / ±5%	1≤R < 25mΩ	±50, ±200	
LS1206	1W	±1% / ±2% / ±5%	1≤R < 50mΩ	±50, ±200	
LS2512	3W	±1% / ±2% / ±5%	0.5≤R < 500mΩ	±50, ±200	
LS2818	5W	±1% / ±2% / ±5%	1≤R < 20mΩ	±50, ±200	

POWER DERATING CURVE



RATED CURRENT

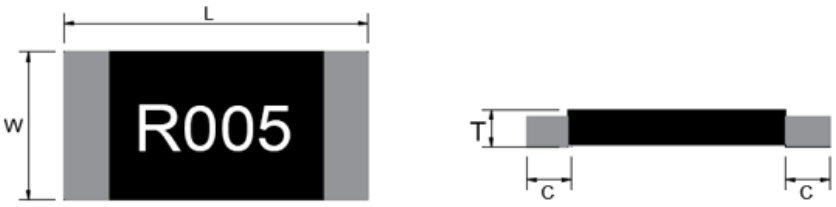
The resistor shall have a Rated Current which would be DC or AC corresponding to the Rated Power, and it can be calculated by formula as below.

The Rated Current of certain resistance value should be the calculated result or Max. Working Current of product series whichever less.

$$I = \sqrt{P/R}$$

I=Rated current (A)
P=Rated power (W)
R=Nominal resistance (Ω)

DIMENSIONS



Unit: mm

Type	Size	L	W	C	T
LS0603	0603	1.60±0.2	0.80±0.2	0.4±0.2	0.6±0.2
LS0805	0805	2.00±0.10	1.25±0.10	0.65±0.20 (R < 2mΩ) 0.40±0.20 (R≥2mΩ)	0.60±0.20
LS1206	1206	3.20±0.20	1.60±0.20	1.10±0.30 (R=1mΩ) 0.50±0.30 (R≥2mΩ)	0.70±0.20 (R=1mΩ) 0.60±0.20 (R≥2mΩ)
LS2512	2512	6.40±0.20	3.20±0.20	2.60±0.20 (R=0.50mΩ) 2.00±0.20 (1≤R≤4mΩ) 0.90±0.20 (R > 4mΩ)	0.70±0.20
LS2818	2818	7.10±0.20	4.20±0.20	0.90±0.20	0.80±0.20

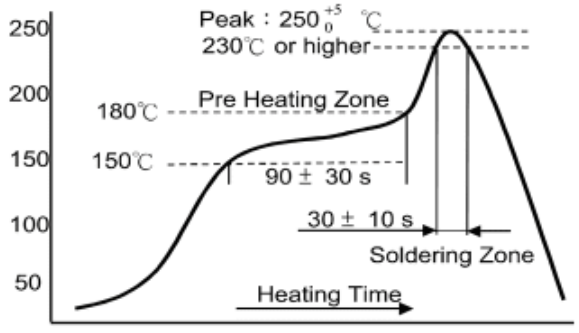
RELIABILITY

Item	Test Method	Acceptable Criterion
Temperature Coefficient of Resistance	$TCR(PPM/℃) = \frac{(R_2 - R_1)}{R_1(T_2 - T_1)} \times 10^6$ R_1: Resistance value tested at room temperature (Ω) R_2: Resistance value tested at -55℃ or +125℃ T_1: Temperature at room temperature (℃) T_2: Temperature at -55℃ or +125℃ Reference: AEC-Q200 Test 19, IEC 60115-1 6.2	R≥1mΩ: ±50PPM/℃ R < 1mΩ: ±200PPM/℃
High Temperature Exposure (Storage)	T=155℃, 1000hrs., unpowered, then take the specimens out to stabilized to room temperature, and measure the resistance value change rate. Reference: AEC-Q200 Test 3, MIL-STD-202 Method 108	△R/R=±1%
Temperature Cycling	1000 Cycles with testing temperature is from -55℃ to 125℃which slope with 10~20℃ per min, then dwelling time is 15 min. Then take specimens out to stabilized at room temperature more than 24 hrs., and measure the resistance value change rate. Reference: JESD22 Method JA-104	△R/R=±1%
Resistance to Solvents	Put specimens in isopropanol solvent at room temperature (23±5) for 5min, wipe 10 times with a hard toothbrush, repeat 3 times, take them out and blow dry, then measure the resistance value change rate. Reference: AEC-Q200 Test 12, MIL-STD-202 Method 215	△R/R=±1%
Short time overload	5 times of rated power for 5sec Reference: IEC60115-1 4.13	△R/R=±0.5%
Biased Humidity	Load 10% of Rated Power at 85℃, 85%RH, 1000 hrs., then take them out to stabilized to room temperature more than 24 hrs. And measure the resistance value change rate. Reference: AEC-Q200 TEST 7, MIL-STD-202 Method 103	△R/R=±1%

Item	Test Method	Acceptable Criterion
Operational life	1000 h at +70 °C, 1.5 hrs. ON, 0.5 hr. OFF Reference: AEC-Q200 Test 8, MIL-STD -202 Method 108	△R/R=±1%
Thermal Shock	-55°C/+155°C. 300 Cycles, 20sec. Max. time, Dwell time-15 minutes. Air-Air. Reference: AEC-Q200-REV D-Test 16, MIL-STD-202 Method 107	△R/R=±1%
Resistance to Soldering Heat	Soak in a tin furnace at 260^{+5}_{0}℃ for 10^{+1}_{0} sec., take out and stand for more than 60 minutes, then measure the change rate of resistance value. Reference: AEC-Q200 TEST 15, MIL-STD-202 Method 210	△R/R=±0.5%
Solderability	Pretreatment: dry heat 155℃, 4 hrs. or PCT aging for 4 hrs. (equivalent), then take them out to stand at room temperature for 2 hrs. Test method: 1. Dip specimens in a tin furnace at 245±3℃ for 3 seconds, then take them out and observe the soldering area by microscope; 2. Reflow soldering test, Peak Temperature: 235℃, T=40 ± 5 sec. Reference: AEC-Q200 Test 18	Coverage must be 95% minimum.
Mechanical Shock	Half sine wave, acceleration as 100g's, each three times in X, Y and Z directions, pulse width 6ms Reference: AEC-Q200 Test 13, MIL-STD -202 Method 213	△R/R=±1%
Resistance to vibration	Frequency is 10 ~ 2000HZ with acceleration 5g's in X, Y and Z directions, 12 cycles in each direction, totally 36 cycles, a single cycle test for 20min. Reference: AEC-Q200 Test 14, MIL-STD -202 Method 204	△R/R=±1%
ESD	Testing voltage setup as 500V Reference: AEC-Q200-REV D-Test 17, AEC-Q200-002, ISO/DIS10605	△R/R=±1%
Board Flex	Min 2mm deflection ,60sec. Reference: AEC-Q200-005	< ±0.5%
Flammability	V-0 or V-1 is acceptable, electrical test not required Reference: AEC-Q200-REV D-Test 20 UL-94	/
Terminal Strength (SMD)	Force of 1.8kg for 60 seconds Reference: AEC-Q200-REV D-Test 22， AEC-Q200-006	△R/R=±1%

SOLDERING TEMPERATURE

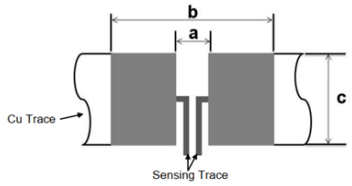
- Recommendation about soldering temperature as below. Please adjust soldering temperature according to the actual condition.



Reflow Soldering

SOLDERING PAD

Resistance value would be higher than nominal value because of joint with soldering material, so designing circuit should adjust the pad size.



Unit: mm

Type	Resistance	a	b	c
LS0603	1~20 mΩ	0.6	2.80	1.0
LS0805	1~2 mΩ	0.7	3.1	1.4
	3~25 mΩ	1.2	3.6	1.4
LS1206	1 mΩ	1.0	5.6	1.8
	2~50 mΩ	1.6	5	1.8
LS2512	0.5~4 mΩ	1.3	7.5	4.0
	5~500 mΩ	4.1	8.3	4.0
LS2818	1~20 mΩ	0.6	7.2	5.3

WORKING ENVIRONMENT

If user intends to use products in special environments or states (including but not limited to the following), it is necessary to approve special characteristics and reliability for the following or other application environments.

A. High temperature, high moisture.
B. Near the sea, or corrosive gas, such as Cl_2, H_2S, NH_3, SO_2 and NO_2, etc.
C. Unverified liquids, such as water, oil, chemical or organic solvent.
D. Unverified resin or paint to cover products.
E. Products should be washed with water soluble cleaner even if non cleaning flux.

STORAGE/CARRY CONDITION

A. Temperature: 20±15℃
B. Humidity: 60±15%RH
C. Storage life: 2 years, FIFO
D. Please hold box correct orientation when storing and carrying. It is strictly prohibited to fall or squeeze the box, otherwise the product electrode or body may be damaged.

LEGAL DISCLAIMER

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The information provided above is only to explain the product specifications. If the product is not changed, GiantOhm has all the rights to modify the above contents without prior notice, and the product change will be notified to the customer by ECN.

VERSION HISTORY

Version	Date	Change Item(s)	Description
A	2022/06/22	-	First version
B	2022/11/22	Reliability	Update test items, test method and acceptable criterion.