



SR Series Metal Alloy Shunt Two Terminal Low-Resistance Resistor Product Specifications

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■ Metal Alloy Shunt Two Terminal Low-Resistance Chip Resistor— SR Series



■ Application

- Power modules
- High current Power Supply
- Motor Driver
- Industrial
- Battery management system
- Automotive

■ Features

- Low Resistance / TCR
- Excellent long-term stability
- RoHs compliant and halogen free.
- Lead free.
- High precision current sensing and voltage division.
- Excellent Anti-Surge ability .
- AEC-Q200 compliant

■ Parts Number Explanation

■ Example:

| | | | | | | |
|---------------------|------------------------------|--|-------------------------------|--------------------------------------|--|-----------------|
| SR | 2512 | 20 | F | R004 | M | Z |
| Product Type | Size (Inch) | Rated Power | Tolerance | Resistance | Material | Optional |
| | 1206 2512 3920 5930 | 20=2.00W 25=2.50W 30=3.00W 50=5.00W T0=10.0W T2=12.0W | F : ±1% G : ±2% J : ±5% | 0m50=0.5mR R001=1.0mR R005=5mR | S : MnCuSn M : MnCu F : FeCrAl R : NiCrAl | |



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■ Standard Electrical Specifications

| Type | Power Rating at 70°C | T.C.R. (ppm/°C) | Max. Rating Current(A) | Max. Overload Current(A) | Resistance Range (mΩ) | Material | Operating Temperature Range (°C) |
|--------|----------------------|-----------------|------------------------|--------------------------|----------------------------------|----------|----------------------------------|
| | | | | | 1.0% (F) 2.0% (G) 5.0% (J) | | |
| SR1206 | 2W | ≤±300 | 81.6 | 182.57 | 0.3 | MnCuSn | - 65 ~ + 170 |
| | 2W | ≤±200 | 63.24 | 141.42 | 0.5 | MnCuSn | |
| | 2W | ≤±150 | 44.72 | 100 | 1 | MnCu | |
| SR2512 | 6W | ≤±200 | 154.92 | 346.41 | 0.25 | MnCuSn | |
| | 6W | ≤±150 | 141.42 | 316.22 | 0.3 | MnCuSn | |
| | 6W | ≤±115 | 109.54 | 244.94 | 0.5 | MnCu | |
| | 5W | ≤±115 | 81.65 | 182.57 | 0.75 | MnCu | |
| | 5W | ≤±100 | 70.71 | 158.11 | 1 | MnCu | |
| | 5W | ≤±50 | 50 | 111.80 | 2 | FeCrAl | |
| | 4W | ≤±50 | 36.51 | 81.65 | 3 | FeCrAl | |
| | 3W | ≤±50 | 27.38 | 61.23 | 4 | FeCrAl | |
| | 3W | ≤±50 | 27.38 | 61.23 | 4 | NiCrAl | |
| | 2.5W | ≤±50 | 22.36 | 50 | 5 | FeCrAl | |
| SR3920 | 12W | ≤±200 | 244.94 | 547.72 | 0.2 | MnCuSn | |
| | 10W | ≤±150 | 182.57 | 408.24 | 0.3 | MnCu | |
| | 9W | ≤±75 | 134.16 | 300 | 0.5 | MnCu | |
| | 8W | ≤±50 | 89.44 | 200 | 1 | FeCrAl | |
| | 7W | ≤±50 | 83.66 | 187.08 | 1 | MnCu | |
| | 7W | ≤±50 | 68.31 | 152.75 | 1.5 | FeCrAl | |
| | 6W | ≤±50 | 54.77 | 122.47 | 2 | FeCrAl | |
| | 5W | ≤±50 | 40.82 | 91.28 | 3 | FeCrAl | |
| | 4W | ≤±50 | 31.62 | 70.71 | 4 | FeCrAl | |
| SR5930 | 3W | ≤±50 | 24.49 | 54.77 | 5 | FeCrAl | |
| | 15W | ≤±100 | 273.86 | 612.37 | 0.2 | MnCu | |
| | 10W | ≤±100 | 182.57 | 408.24 | 0.3 | MnCu | |
| | 8W | ≤±75 | 126.49 | 282.84 | 0.5 | MnCu | |
| | 8W | ≤±50 | 89.44 | 200 | 1 | FeCrAl | |
| | 7W | ≤±50 | 59.16 | 132.28 | 2 | FeCrAl | |
| 5W | ≤±50 | 40.82 | 91.28 | 3 | FeCrAl | | |

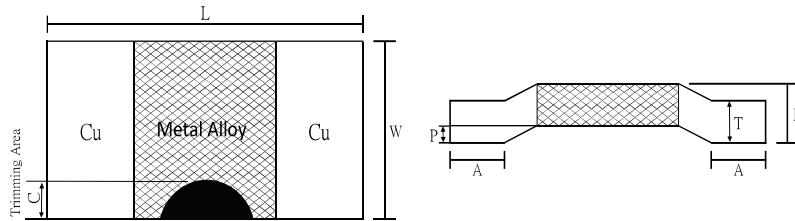
- For non-standard parts, please contact our sales dept.
- Power rating is guaranteed when terminal temperature of resistor is below 70°C



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■ Type Dimension



■ Dimension

Unit : mm

| TYPE | Resistance | L | W | H | T | A | C (Max.) | p | Material |
|--------|--------------|-----------|----------|-----------|-----------|----------|----------|----------|----------------|
| SR1206 | 0.3mR | 3.2±0.3 | 1.65±0.3 | 1.20±0.15 | - | 0.80±0.2 | - | - | MnCuSn |
| | 0.5mR 1mR | 3.2±0.3 | 1.65±0.3 | 0.90±0.15 | - | 0.80±0.2 | - | - | MnCuSn MnCu |
| SR2512 | 0.25mR | 6.5±0.3 | 3.25±0.3 | 1.35±0.15 | 1.00±0.15 | 0.90±0.2 | 0.4 | 0.35±0.1 | MnCuSn |
| | 0.3mR | | | 1.17±0.15 | 0.82±0.15 | | | | MnCuSn |
| | 0.5mR | | | 1.07±0.15 | 0.72±0.15 | | | | MnCu |
| | 0.75mR | | | 0.95±0.15 | 0.6±0.15 | | | | MnCu |
| | 1mR | | | 0.73±0.15 | 0.38±0.15 | | | | MnCu |
| | 2mR | | | 0.96±0.15 | 0.61±0.15 | | | | FeCrAl |
| | 3mR | | | 0.76±0.15 | 0.41±0.15 | | | | FeCrAl |
| | 4mR | | | 0.66±0.15 | 0.31±0.15 | | | | FeCrAl/NiCrAl |
| 5mR | 0.66±0.15 | 0.31±0.15 | FeCrAl | | | | | | |
| SR3920 | 0.2mR | 10.2±0.30 | 5.20±0.3 | 1.98±0.15 | 1.48±0.15 | 1.8±0.3 | 0.6 | 0.50±0.1 | MnCuSn |
| | 0.3mR | | | 1.92±0.15 | 1.42±0.15 | | | | MnCu |
| | 0.5mR | | | 1.36±0.15 | 0.86±0.15 | | | | MnCu |
| | 1mR | | | 0.92±0.15 | 0.42±0.15 | | | | MnCu |
| | 1mR | | | 1.87±0.15 | 1.37±0.15 | | | | FeCrAl |
| | 1.5mR | | | 1.46±0.15 | 0.96±0.15 | | | | FeCrAl |
| | 2mR | | | 1.19±0.15 | 0.69±0.15 | | | | FeCrAl |
| | 3mR | | | 0.94±0.15 | 0.44±0.15 | | | | FeCrAl |
| | 4mR | | | 0.85±0.15 | 0.35±0.15 | | | | FeCrAl |
| | 5mR | | | 0.85±0.15 | 0.35±0.15 | | | | FeCrAl |
| SR5930 | 0.2mR | 15±0.3 | 7.75±0.3 | 1.92±0.15 | 1.42±0.15 | 4.2±0.2 | 1.0 | 0.50±0.1 | MnCu |
| | 0.3mR | | | 1.44±0.15 | 0.94±0.15 | | | | MnCu |
| | 0.5mR | | | 1.08±0.15 | 0.58±0.15 | | | | MnCu |
| | 1mR | | | 1.37±0.15 | 0.87±0.15 | | | | FeCrAl |
| | 2mR | | | 0.95±0.15 | 0.46±0.15 | | | | FeCrAl |
| | 3mR | | | 0.90±0.15 | 0.40±0.15 | | | | FeCrAl |



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■ Performance Characteristics

Power Derating Curve

The Operating Temperature Range: -65°C ~+170°C.

Terminal temperatures above 70°C, power rating must be derated in accordance with the curve as below :



■ Rating Current

The following equation may be used to determine the DC (Direct Current) or AC (Alternating Current) (RMS, root mean square value) of normal rated power. However, if the result value exceeds the highest current of regulated standards, the highest normal rated power is to be used

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

I = Rating current (A)
P= Rating Power (W)
R= Resistance(Ω)

■ Marking Format:

- 1206 no marking.
- 2512/3920/5930 marking are 3 digits.
- “L” designates the decimal location in milliohm
e.g. 3mΩ the product marking is 3L0.
0.3mΩ the product marking is L30.
- The criteria to distinguishing the mark on the surface of products are that characters can be identified.



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■ Reliability Test and Requirement

| Test Item | Test Method | Procedure | Requirements |
|---|---------------------------------------|---|--|
| Temperature Coefficient of Resistance (T.C.R) | JIS-C-5201-1 4.8 IEC-60115-1 4.8 | At 25°C /+125°C, 25°C is the reference temperature | As Spec |
| Short Time Overload | JIS-C-5201-1 4.13 IEC-60115-1 4.13 | The number of rated power are as follows: <ul style="list-style-type: none"> ● SR1206: 5 times of rated power ● SR2512: 5 times of rated power ● SR3920: 5 times of rated power ● SR5930: 5 times of rated power for 5 seconds. | $\Delta R/R1 \leq \pm(1.0\%+0.0005\Omega)$ |
| High Temperature Exposure (Storage) | MIL-STD-202 Method 108 | 1000 hrs. @ T=170°C. Unpowered. Measurement at 24±4 hours after test conclusion. | $\Delta R/R1 \leq \pm(1.0\%+0.0005\Omega)$ |
| Temperature Cycling | JESD22 Method JA-104 | 1000 Cycles (-55°C to +155°C) Measurement at 24±4 hours after test conclusion. 30min maximum dwell time at each temperature extreme. | $\Delta R/R1 \leq \pm(1.0\%+0.0005\Omega)$ |
| Biased Humidity | MIL-STD-202 Method 103 | 1,000 hours; 85°C / 85% RH, 10% of operating power. Measurement at 24±4 hours after test conclusion. | $\Delta R/R1 \leq \pm(1.0\%+0.0005\Omega)$ |
| Operation Life | MIL-STD-202 Method 108 | Condition D Steady State TA=125°C at derated power. Measurement at 24±4 hours after test conclusion. | $\Delta R/R1 \leq \pm(1.0\%+0.0005\Omega)$ |
| Moisture Resistance | MIL-STD-202, Method 106 | Humidity of 90~98% and a temperature of 25°C / 65°C ,10 cycles | $\Delta R/R1 \leq \pm(1.0\%+0.0005\Omega)$ |
| Mechanical Shock | MIL-STD-202 Method 213 |)Test ½ Sine Pulse, Peak value: 100g, normal duration: 6ms, Velocity change:12.3ft/sec. | $\Delta R/R1 \leq \pm(0.5\%+0.0005\Omega)$ |
| Vibration | MIL-STD-202 Method 204 | 5 g's for 20 min., 12 cycles each of 3 orientations. Note: Test from 10-2000Hz | $\Delta R/R1 \leq \pm(0.5\%+0.0005\Omega)$ |
| Board Flex | AEC Q200-005 | Beading once for 60 seconds ,2mm | $\Delta R/R1 \leq \pm(1.0\%+0.0005\Omega)$ |
| Solderability | J-STD-002 | (1) 4 hrs 155°C dry heat (2) 245±5°C 3 sec. | >95% coverage(electrode area) |

● Note : All Reliability test should follow De-rating curve , terminal temperature of component should be below 70°C.

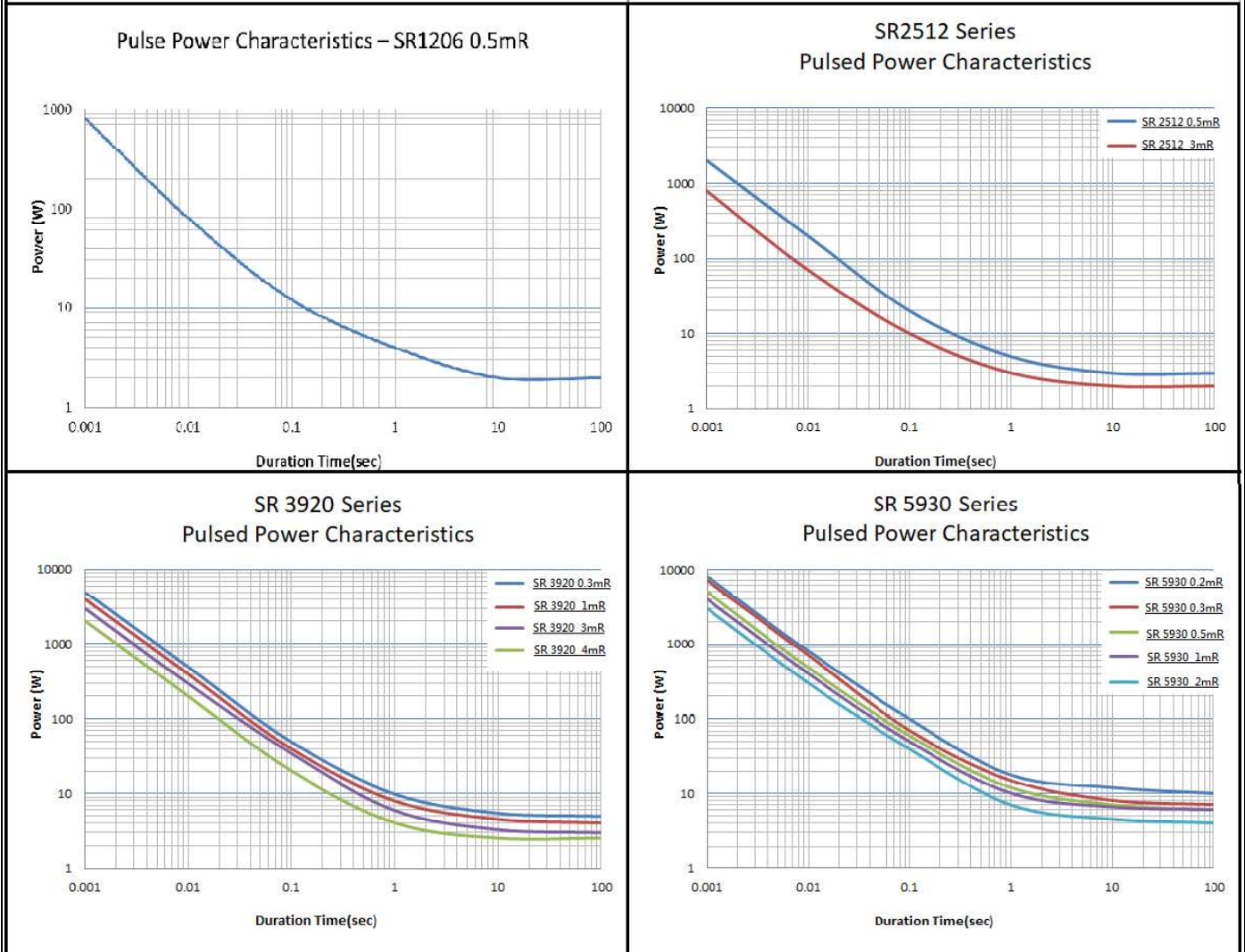
● Note : Footprint size, solder insufficient, excessive solder, solder void and component shifted will affect the resistance accuracy after IR reflow. Circuit calibration is a must to be done by functional test.



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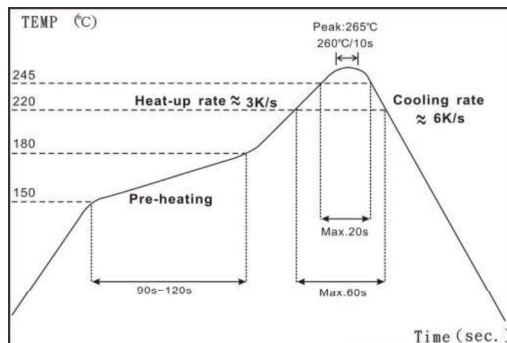
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■ Anti-Surge Ability:



■ Recommended Customer Soldering Parameters:

■ Solder reflow Temperature condition

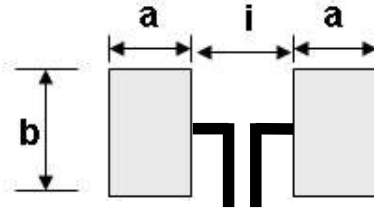




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■ **Recommend Land Pattern Design**



■ **Dimension**

Unit: mm

| TYPE | Resistance Range | a | b | i |
|--------|------------------|------|------|------|
| SR1206 | 0.3mΩ~1mΩ | 2.10 | 1.80 | 1.40 |
| SR2512 | 0.25mΩ~5mΩ | 1.80 | 3.40 | 3.80 |
| SR3920 | 0.2mΩ~5mΩ | 2.70 | 6.20 | 5.60 |
| SR5930 | 0.2mΩ~3mΩ | 5.20 | 8.75 | 5.60 |

■ **Packing Quantity**

| TYPE | PCS /Reel |
|--------|-----------|
| SR1206 | 2,000 |
| SR2512 | 4,000 |
| SR3920 | 3,000 |
| SR5930 | 2,000 |

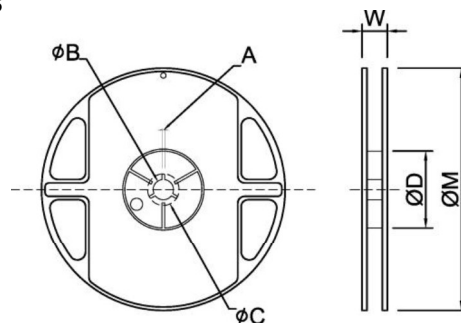
■ **Storage Temperature**

Temperature : 25±5°C, Humidity : 60±20%

■ **Appendix For SMD Chip Resistor**

● **Packaging Information**

■ **Reel Dimensions**





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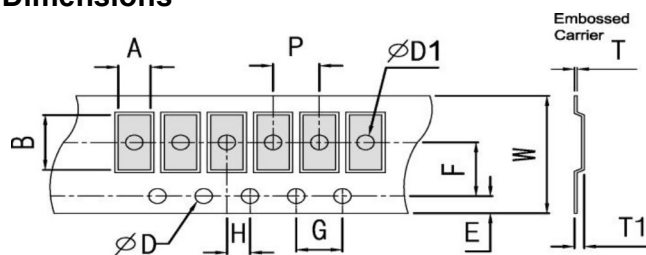
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Dimension

Unit: mm

| Reel Type / Tape | A | ϕB | ϕC | ϕD | W | ϕM |
|-----------------------------|---------|----------|----------|----------|----------|----------|
| 7" reel for 8 mm embossed | 2±0.5 | 13.0±0.5 | 17.7±0.5 | 60.0±0.5 | 12.0±0.5 | 178±1.0 |
| 10" reel for 12 mm embossed | 2±0.5 | 13.0±0.5 | 17.7±0.5 | 62.0±0.5 | 16.5±0.5 | 250±1.0 |
| 13" reel for 16 mm embossed | 2.5±0.5 | 13.5±0.5 | 17.7±0.5 | 99.0±0.5 | 20.7±0.5 | 330±1.0 |
| 13" reel for 24 mm embossed | 2.5±0.5 | 13.5±0.5 | 17.7±0.5 | 99.0±0.5 | 29.4±0.5 | 330±1.0 |

Embossed Dimensions



Dimension

Unit: mm

| Item | Resistance (Ω) | W | P | E | F | ϕD | G | H | A | B | T1 |
|--------|---|-----------|-----------|-----------|-----------|------------------------------------|----------|----------|-----------|-----------|-----------|
| SR1206 | 0.3m,0.5m,1m | 8.0±0.30 | 4.0±0.10 | 1.75±0.10 | 3.5±0.10 | 1.50 ^{+0.1} ₋₀ | 4.0±0.10 | 2.0±0.10 | 1.88±0.10 | 3.56±0.10 | 1.40±0.10 |
| SR2512 | 0.25m 0.3m,0.5m, 0.75m,2m | 12.0±0.30 | 4.0±0.10 | 1.75±0.10 | 5.5±0.10 | 1.50 ^{+0.1} ₋₀ | 4.0±0.10 | 2.0±0.10 | 3.55±0.10 | 6.75±0.10 | 1.40±0.10 |
| | 1m,3m | 12.0±0.30 | 4.0±0.10 | 1.75±0.10 | 5.5±0.10 | 1.50 ^{+0.1} ₋₀ | 4.0±0.10 | 2.0±0.10 | 3.55±0.10 | 6.75±0.10 | 1.10±0.10 |
| | 4m,5m | 12.0±0.30 | 4.0±0.10 | 1.75±0.10 | 5.5±0.10 | 1.50 ^{+0.1} ₋₀ | 4.0±0.10 | 2.0±0.10 | 3.55±0.10 | 6.75±0.10 | 0.80±0.10 |
| | 0.2m,0.3m, 0.5m,2m, 1mR(8W), 1.5mR | 16.0±0.30 | 8.0±0.10 | 1.75±0.10 | 7.5±0.10 | 1.50 ^{+0.1} ₋₀ | 4.0±0.10 | 2.0±0.10 | 5.5±0.10 | 10.8±0.10 | 1.97±0.10 |
| SR3920 | 1m(7W), 3m,4m, 5m | 16.0±0.30 | 8.0±0.10 | 1.75±0.10 | 7.5±0.10 | 1.50 ^{+0.1} ₋₀ | 4.0±0.10 | 2.0±0.10 | 5.5±0.10 | 10.8±0.10 | 1.25±0.10 |
| | 0.2m,0.3m, 1m | 24.0±0.30 | 12.0±0.10 | 1.75±0.10 | 11.5±0.10 | 1.50 ^{+0.1} ₋₀ | 4.0±0.10 | 2.0±0.10 | 8.3±0.10 | 15.4±0.10 | 2.30±0.10 |
| SR5930 | 0.5m,2m,3m | 24.0±0.30 | 12.0±0.10 | 1.75±0.10 | 11.5±0.10 | 1.50 ^{+0.1} ₋₀ | 4.0±0.10 | 2.0±0.10 | 8.3±0.10 | 15.4±0.10 | 1.40±0.10 |

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