



## General

- Chip size from 3921 to 5931
- Resistance value from 0.2mΩ to 4mΩ
- Low thermal EMF.
- Low TCR.
- Lead free, RoHS compliant for global.
- Applications and halogen free.

## Application

- Switching model power supply.
- Battery pack.
- Notebook, personal computer.
- Test Instrument.
- Power Amplifier.

## Electrical Specifications

| Type | Power Rating at 70°C(W) | Resistance Range (mΩ) | TCR (ppm/°C) | Resistance tolerance       | Operation Temp. Range |
|------|-------------------------|-----------------------|--------------|----------------------------|-----------------------|
| 3921 | 5                       | 0.2、0.3、0.5           | ±150         | ±1%(F)<br>±2%(G)<br>±5%(J) | -55°C~+170°C          |
|      |                         | 1、2、3、4               | ±75          |                            |                       |
| 5931 | 7                       | 0.2、0.3、0.5           | ±150         |                            |                       |
|      |                         | 1、2、3                 | ±75          |                            |                       |

## Part Number information

**SMS 39 F 5 F R002 I**

**【1】 【2】 【3】 【4】 【5】 【6】 【7】**

- 【1】 Series Name: SART Shunt Type  
 【2】 Chip size: 39:3921 59:5931  
 【3】 Material Code: M:MnCu F:FeCr  
 【4】 Power Code: 5:5W 7:7W  
 【5】 Resistance Tolerance: F:±1% G:±2% J:±5%  
 【6】 Resistance Code:0L20=0.2mΩ R002=2mΩ  
 【7】 Packaging Code: T: Tape& Reel B:Bulk Pack

## Dimensions



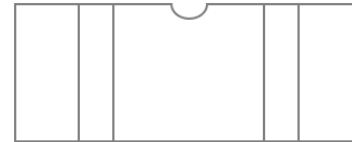
By laser trimming ( Front view )



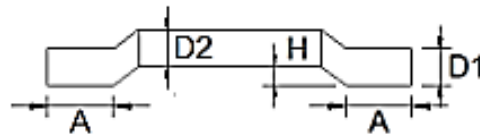
By laser trimming ( Back view )



By mechanical trimming ( Front view )

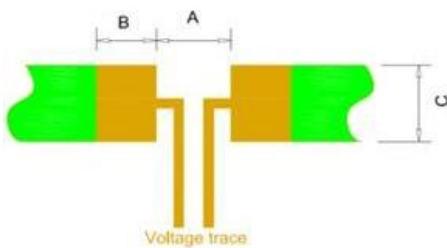


By mechanical trimming ( Back view )



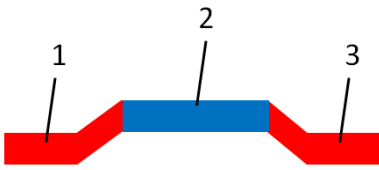
| Type | Resistance (mΩ) | L (mm)     | W (mm)    | A (mm)    | H (mm)    |
|------|-----------------|------------|-----------|-----------|-----------|
| 3921 | 0.2             | 10.00±0.30 | 5.20±0.30 | 2.00±0.30 | 0.50±0.10 |
|      | 0.3             |            |           |           |           |
|      | 0.5             |            |           |           |           |
|      | 1               |            |           |           |           |
|      | 2               |            |           |           |           |
|      | 3               |            |           |           |           |
| 5931 | 0.2             | 15.00±0.30 | 7.70±0.30 | 4.20±0.30 | 0.50±0.10 |
|      | 0.3             |            |           |           |           |
|      | 0.5             |            |           |           |           |
|      | 1               |            |           |           |           |
|      | 2               |            |           |           |           |
|      | 3               |            |           |           |           |

## Recommended Land Patterns



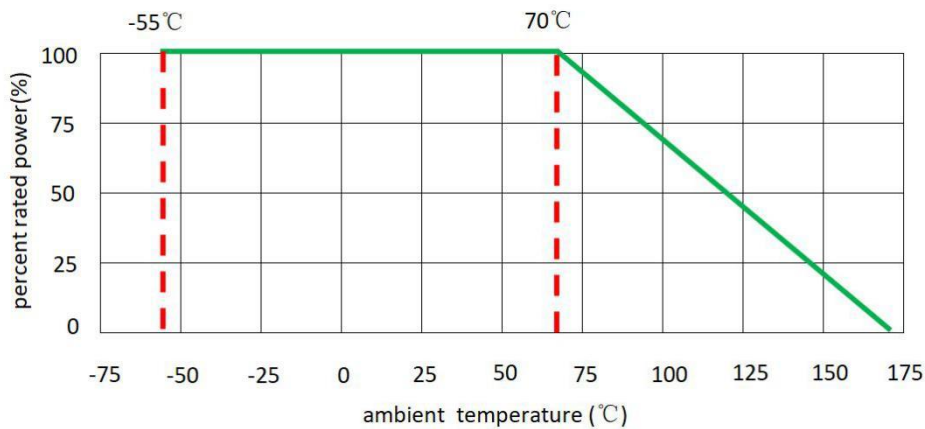
| Type | A (mm) | B (mm) | C (mm) |
|------|--------|--------|--------|
| 3921 | 5.60   | 2.70   | 6.20   |
| 5931 | 5.60   | 5.20   | 8.75   |

## Materials



| No. | Materials        |
|-----|------------------|
| 1   | Copper electrode |
| 2   | MnCuSn/MnCu/FeCr |
| 3   | Copper electrode |

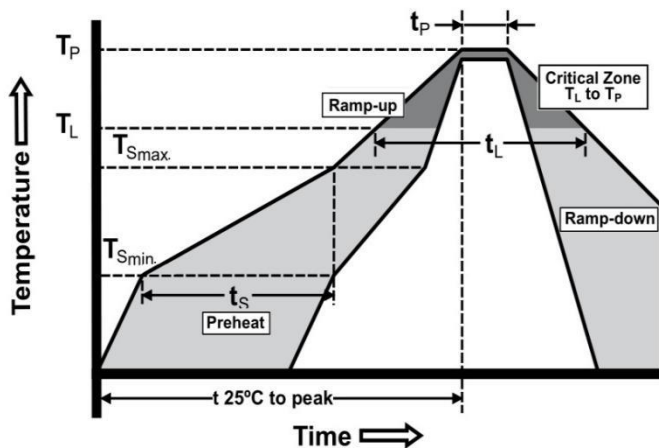
## Power Derating Curve



## Recommended Solder Curve

### 1. Infrared Reflow

- Temperature: 260°C
- Time: 5sec Max.
- Recommend Reflow profile:



| Profile Feature  | Pb-Free Assembly               |
|--|--------------------------------|
| Average Ramp-up Rate (Ts <sub>max</sub> to Tp)   | 3°C/sec Max.                   |
| Preheat<br>Temperature Min.(Ts <sub>min</sub> )<br>Temperature Max.(Ts <sub>max</sub> )<br>Time(Ts <sub>min</sub> to Ts <sub>max</sub> )(ts) | 150°C<br>200°C<br>60sec~120sec |
| Peak Temperature(Tp)   | 260°C                          |
| Time(tp) within 5°C of actual Peak Temperature(Tp)   | 5sec                           |
| Melting tin time(tL)   | 20sec~30sec                    |
| Ramp-down Rate   | 6°C/sec Max.                   |
| Time 25°C to peak Temperature  | 8 min Max.                     |

### 2. Hand Soldering

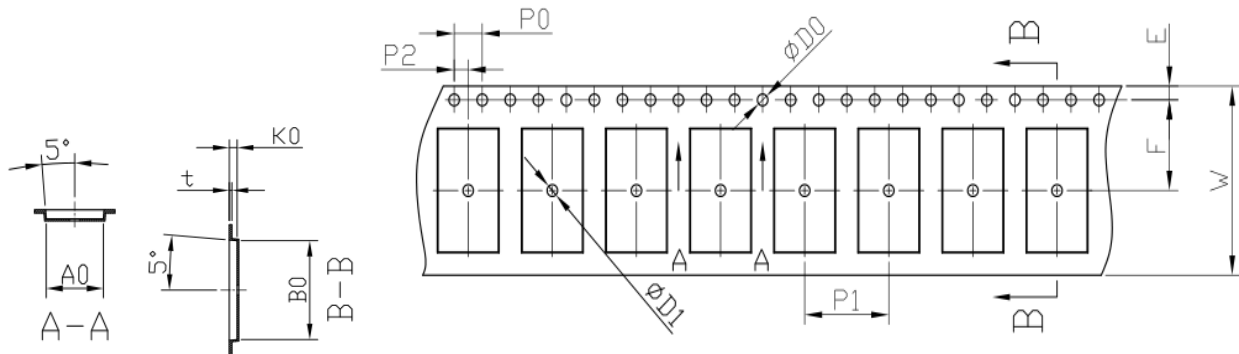
- Temperature: 350°C
- Time: 5sec Max

## Product Characteristics

| Item                                  | Test condition/ Methods   | Performance                 | Standard                  |
|---------------------------------------|---|-----------------------------|---------------------------|
| Resistance                            | Measuring resistance value at room temperature<br>25°C±5°C                                    | Refer to SART Spec          | IEC60115-1 4.5            |
| Temperature coefficient of resistance | $TCR = \frac{R-R_0}{R_0} \frac{(T_2-T_1)}{T_1} \times 10^6$<br>Test temperature: +25°C~+125°C | Refer to SART Spec          | MIL-STD-202<br>Method 304 |
| Short time Overload                   | 5 times the rated power for 5 seconds   | $ \Delta R  \leq \pm 1\%$   | IEC 60115-1 4.13          |
| Resistance to Soldering Heat          | 260°C±5°C time: 10sec±0.5sec  | $ \Delta R  \leq \pm 1\%$   | MIL-STD-202<br>Method 210 |
| Thermal shock                         | -55°C (15min)/+150°C(15min), 1000 cycles  | $ \Delta R  \leq \pm 1\%$   | MIL-STD-202<br>Method107G |
| Low temperature operation             | Rating power at -65°C for 45 min  | $ \Delta R  \leq \pm 1\%$   | MIL-STD-26E               |
| High Temperature Storage              | 170°C for 1000hours, No power   | $ \Delta R  \leq \pm 1\%$   | IEC6011501-4.25           |
| Temperature Humidity Bias Test        | +85°C, 85% RH, 10%bias, 1000hours   | $ \Delta R  \leq \pm 0.5\%$ | MIL-STD-202<br>Method103  |
| Mechanical shock                      | 100 g's ,6 msec, 5pulses  | $ \Delta R  \leq \pm 0.5\%$ | MIL-STD-202<br>Method 213 |
| Vibration                             | The frequency varies from 10HZ to 2000HZ, 1 min,<br>3 directions, and 12 hours                | $ \Delta R  \leq \pm 0.5\%$ | MIL-STD-202<br>Method 204 |
| Load life                             | 70°C±2°C, 1000 hours, at rated power 1.5 hours<br>"ON", 0.5 hours "OFF"                       | $ \Delta R  \leq \pm 1\%$   | MIL-STD-202<br>Method 108 |
| Moisture resistance                   | MIL-STD-202,method 106, No power, 7b not<br>required  | $ \Delta R  \leq \pm 1\%$   | MIL-STD-202<br>Method 106 |

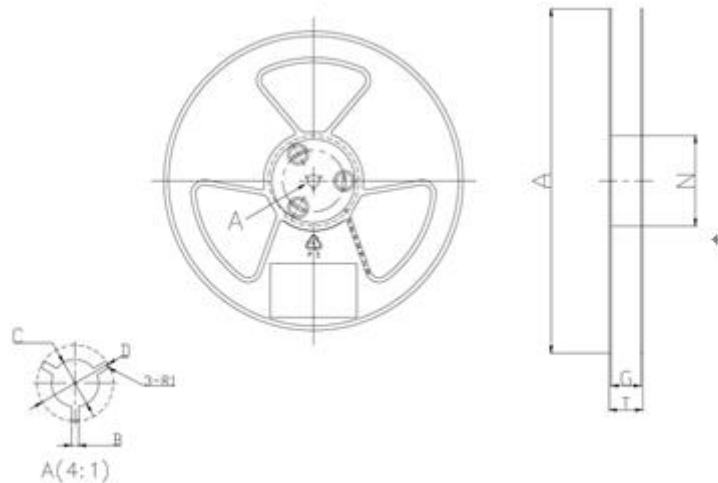
## Packaging

### 1. Embossed Tape Dimensions



| Type | A (mm)    | B (mm)     | E (mm)    | F (mm)     | W (mm)     | t (mm)              |
|------|-----------|------------|-----------|------------|------------|---------------------|
| 3921 | 6.00±0.20 | 10.60±0.20 | 1.75±0.10 | 11.50±0.10 | 24.00±0.30 | 0.40±0.05           |
| 5931 | 8.60±0.20 | 15.60±0.20 | 1.75±0.10 | 11.50±0.10 | 24.00±0.30 | 0.40±0.05           |
| Type | P0 (mm)   | P1 (mm)    | P2 (mm)   | D0 (mm)    | D1 (mm)    | K0 (mm)             |
| 3921 | 4.00±0.10 | 8.00±0.10  | 2.00±0.05 | 1.50±0.10  | 1.50±0.10  | 1.20±0.10/2.50±0.10 |
| 5931 | 4.00±0.10 | 12.00±0.10 | 2.00±0.05 | 1.50±0.10  | 1.50±0.10  | 1.20±0.10/2.35±0.10 |

### 2. Reel Dimensions

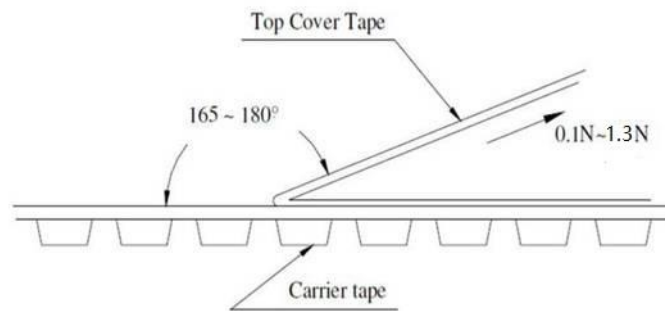


| Type | A (mm)    | N (mm)    | C (mm)   | D (mm)   | B (mm)  | G (mm)   | T (mm)   |
|------|-----------|-----------|----------|----------|---------|----------|----------|
| 3921 | 330.0±2.0 | 100.0±1.5 | 13.0±0.5 | 21.0±0.5 | 2.3±0.5 | 24.5±1.5 | 28.5±2.0 |
| 5931 | 330.0±2.0 | 100.0±1.5 | 13.0±0.5 | 21.0±0.5 | 2.3±0.5 | 24.5±1.5 | 28.5±2.0 |

### 3. Quantity of Package

| Type | Resistance (mΩ) | Quantity (pcs) |
|------|-----------------|----------------|
| 3921 | 2,3,4           | 2500           |
|      | 0.2,0.3,0.5,1   | 1500           |
| 5931 | 0.5,2,3         | 2000           |
|      | 0.2,0.3,1       | 1000           |

### 4. Peeling Test



## Storage

- The ambient temperature shall be between 5°C~30°C.
- The relative humidity recommended for storage is between 25%RH~60%RH.
- Sealed plastic bags with desiccant shall be used to reduce the oxidation of the termination and shall only be opened prior to use.
- The products shall not be stored in areas where harmful gases containing sulfur or chlorine are present.

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