

## Data Sheet

Customer:

Product: Automotive Grade Current Sensing Chip Resistor – CS..A Series

Size: 0402/0603/0805/1206/1210/2010/2512/1225/3720/7520

Issued Date: 10-Mar-21

Edition: REV.A9



VIKING TECH CORPORATION

光頡科技股份有限公司

No.70 Guangfu N. Rd., Hukou  
Township, Hsinchu County 303,  
Taiwan

TEL:886-3-5972931

FAX:886-3-5972935•886-3-5973494

E-mail:sales@viking.com.tw

VIKING TECH CORPORATION KAOHSIUNG BRANCH

光頡科技股份有限公司高雄分公司

No.248-3, Sin-Sheng Rd., Cian-Jhen Dist., Kaohsiung,  
806, Taiwan

TEL:886-7-8217999

FAX:886-7-8228229

E-mail:sales@viking.com.tw

VIKING ELECTRONICS (WUXI) CO., LTD.

光頡電子(無錫)有限公司

No.22 Xixia Road, Machinery & Industry Park,  
National Hi-Tech Industrial Development Zone  
of Wuxi, Wuxi, Jiangsu Province, China  
Zip Code:214028

TEL:86-510-85203339

FAX:86-510-85203667•86-510-85203977

E-mail:china@viking.com.tw

| Produced by<br>(QC) | Checked<br>(QC) | Approved by<br>(QC) | Prepared by<br>(Sales) | Accepted by<br>(Customer) |
|---------------------|-----------------|---------------------|------------------------|---------------------------|
| 10-Mar-21           | 10-Mar-21       | 10-Mar-21           |                        |                           |
| <b>Susan Huang</b>  | <b>J.C. Liu</b> | <b>J.C. Liu</b>     |                        |                           |

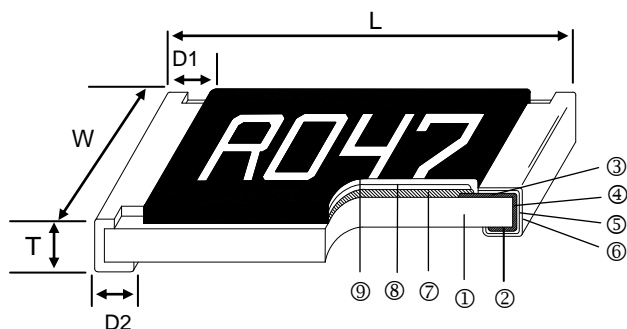
**Automotive Grade Current Sensing Chip Resistor**



**■ Features**

- AEC-Q200 Compliance
- Highly reliable multilayer electrode construction
- Reduced size of final equipment reliability
- 3 Watts power rating in 1 Watt size, 1225 package
- Low TCR of  $\pm 100$  PPM/ $^{\circ}$ C
- Resistance values from 1m to 1 ohm
- High purity alumina substrate for high power dissipation
- Long side terminations with higher power rating
- Special construction to prevent sulfuration in a sulfur containing environment
- RoHS Compliance
- 100% CCD inspection

**■ Construction**



**■ Applications**

- Automotive Industry
- Power Management Applications
- Switching Power Supply
- Over Current Protection in Audio Applications
- Voltage Regulation Module (VRM)
- DC-DC Converter, Battery Pack, Charger, Adaptor
- Automotive Engine Control
- Disk Driver

|                     |                      |                      |
|---------------------|----------------------|----------------------|
| ① Alumina Substrate | ④ Edge Electrode     | ⑦ Resistor Layer     |
| ② Bottom Electrode  | ⑤ Barrier Layer      | ⑧ Primary Overcoat   |
| ③ Top Electrode     | ⑥ External Electrode | ⑨ Secondary Overcoat |

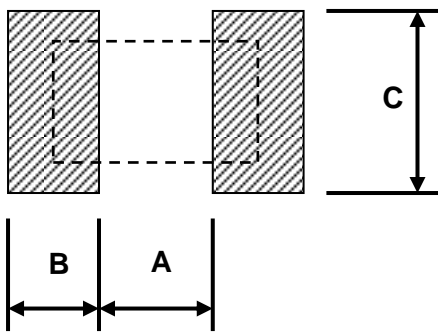
**■ Dimensions**

| Type      | Size (Inch)                  | L (mm)          | W (mm)          | T (mm)          | D1 (mm)         | D2 (mm)         | Weight (g) (1000pcs) |
|-----------|------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------------|
| CS02      | 0402                         | 1.00 $\pm$ 0.05 | 0.50 $\pm$ 0.05 | 0.32 $\pm$ 0.10 | 0.25 $\pm$ 0.10 | 0.20 $\pm$ 0.10 | 0.7                  |
| CS03      | 0603                         | 1.60 $\pm$ 0.10 | 0.80 $\pm$ 0.10 | 0.45 $\pm$ 0.10 | 0.30 $\pm$ 0.20 | 0.30 $\pm$ 0.20 | 1.99                 |
| CS05      | 0805                         | 2.00 $\pm$ 0.10 | 1.25 $\pm$ 0.10 | 0.55 $\pm$ 0.10 | 0.30 $\pm$ 0.20 | 0.40 $\pm$ 0.25 | 5.3                  |
| CS06      | 1206                         | 3.10 $\pm$ 0.10 | 1.55 $\pm$ 0.10 | 0.55 $\pm$ 0.10 | 0.50 $\pm$ 0.30 | 0.40 $\pm$ 0.25 | 8.82                 |
| CS13      | 1210                         | 3.10 $\pm$ 0.10 | 2.60 $\pm$ 0.15 | 0.55 $\pm$ 0.10 | 0.50 $\pm$ 0.30 | 0.50 $\pm$ 0.25 | 15.5                 |
| CS10      | 2010                         | 5.00 $\pm$ 0.10 | 2.50 $\pm$ 0.15 | 0.60 $\pm$ 0.15 | 0.60 $\pm$ 0.30 | 0.50 $\pm$ 0.25 | 27.03                |
| CS12      | 2512                         | 6.35 $\pm$ 0.10 | 3.10 $\pm$ 0.15 | 0.60 $\pm$ 0.10 | 0.60 $\pm$ 0.30 | 0.55 $\pm$ 0.25 | 43.08                |
| CS12 (2W) | 2512 (10 - 99m $\Omega$ )    | 6.35 $\pm$ 0.20 | 3.15 $\pm$ 0.15 | 0.74 $\pm$ 0.10 | 0.60 $\pm$ 0.30 | 0.55 $\pm$ 0.25 | 53.08                |
| CS12 (2W) | 2512 (100 - 1000m $\Omega$ ) | 6.35 $\pm$ 0.20 | 3.15 $\pm$ 0.15 | 0.74 $\pm$ 0.10 | 0.60 $\pm$ 0.30 | 2.10 $\pm$ 0.10 | 53.08                |
| CS25      | 1225                         | 3.20 $\pm$ 0.15 | 6.45 $\pm$ 0.15 | 0.90 $\pm$ 0.15 | 0.60 $\pm$ 0.30 | 0.80 $\pm$ 0.25 | 64.88                |
| CS37      | 3720                         | 2.00 $\pm$ 0.20 | 3.75 $\pm$ 0.20 | 0.60 $\pm$ 0.10 | 0.40 $\pm$ 0.20 | 0.40 $\pm$ 0.20 | 19.96                |
| CS75      | 7520                         | 2.00 $\pm$ 0.20 | 7.50 $\pm$ 0.30 | 0.60 $\pm$ 0.10 | 0.40 $\pm$ 0.20 | 0.40 $\pm$ 0.20 | 35.71                |

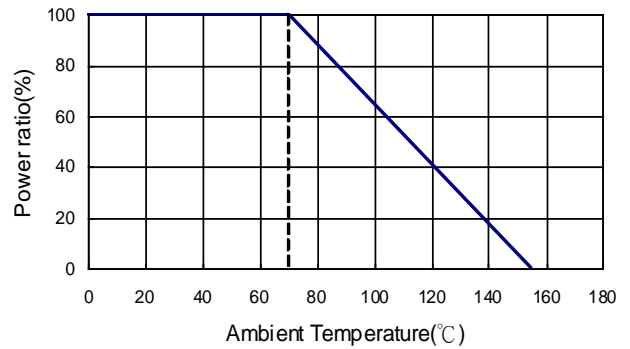
**Part Numbering**

|              |  |                            |                |  |  |                                       |                                       |
|--------------|--|----------------------------|----------------|--|--|---------------------------------------|---------------------------------------|
| <b>CS</b>    | <b>06</b>  | <b>F</b>                   | <b>T</b>       | <b>G</b>   | <b>U</b>   | <b>R100</b>                           | <b>A</b>                              |
| Product Type | Dimensions (LxW)   | Resistance Tolerance       | Packaging Code | TCR (PPM/°C)   | Power Rating   | Resistance                            | Marking                               |
|              | 02: 0402<br>03: 0603<br>05: 0805<br>06: 1206<br>13: 1210<br>10: 2010<br>12: 2512<br>25: 1225<br>37: 3720<br>75: 7520 | F: ±1%<br>G: ±2%<br>J: ±5% | T: Taping Reel | E: ±100<br>F: ±200<br>G: ±300<br>H: ±400<br>J: ±600<br>K: ±150 | : Standard<br>S: 2W<br>A: 1.5W<br>T: 1W<br>Q: 3/4W<br>U: 1/2W<br>V: 1/4W<br>P: 1/5W<br>W: 1/8W | R010: 0.01Ω<br>R100: 0.1Ω<br>1R00: 1Ω | NA: No Marking<br>A: Automotive Grade |

**Recommend Land Pattern**



**Derating Curve**



Pad Layout (Except For CS12:High Power Rating Series)

| Type | A (mm) | B (mm) | C (mm)   |
|------|--------|--------|----------|
| CS02 | 0.50   | 0.50   | 0.60±0.2 |
| CS03 | 0.80   | 1.00   | 0.90±0.2 |
| CS05 | 1.00   | 1.00   | 1.35±0.2 |
| CS06 | 2.00   | 1.15   | 1.70±0.2 |
| CS13 | 2.00   | 1.15   | 2.50±0.2 |
| CS10 | 3.60   | 1.40   | 2.50±0.2 |
| CS12 | 4.90   | 1.60   | 3.20±0.2 |
| CS25 | 1.20   | 2.00   | 7.00±0.2 |
| CS37 | 1.00   | 1.80   | 3.90±0.2 |
| CS75 | 1.00   | 1.80   | 7.60±0.2 |

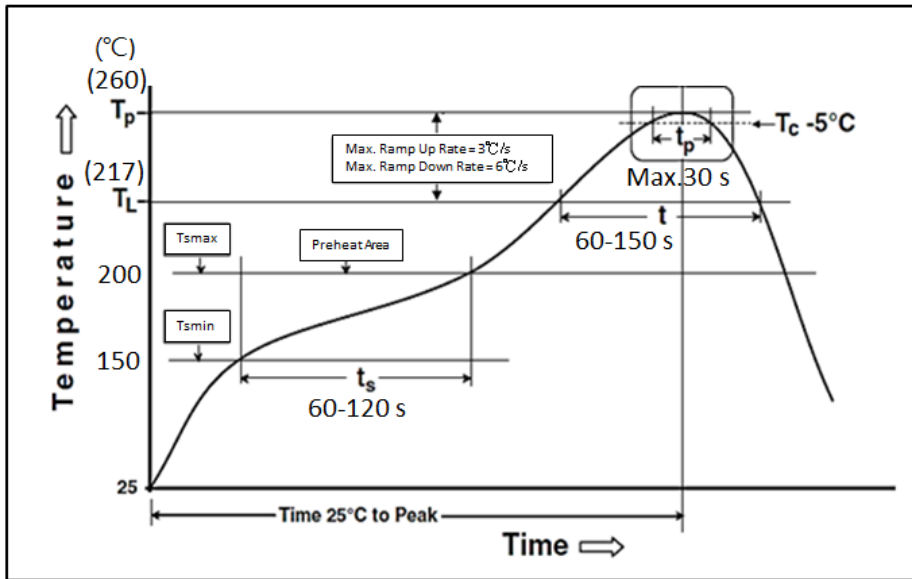
**Marking for 0603**

| Type       | Code   |
|------------|--------|
| 1R0        | 1.000Ω |
| R10        | 0.100Ω |
| R01        | 0.010Ω |
| <u>102</u> | 0.102Ω |
| <u>024</u> | 0.024Ω |

Pad Layout ( For CS12:High Power Rating Series)

| Type | Resistance Range | A (mm) | B (mm) | C (mm)  |
|------|------------------|--------|--------|---------|
| CS12 | 10~99 mΩ         | 4.9    | 1.6    | 3.2±0.2 |
| CS12 | 100~1000mΩ       | 1.0    | 3.55   | 3.2±0.2 |

**■ Soldering Condition (IPC/JEDEC J-STD-020)**



**■ Standard Electrical Specifications**

| Type        | Item | Power Rating at 70°C | Operating Temp. Range | Max. Operating Current | Resistance Range (mΩ)                          |       |     | TCR (PPM/°C)                 |
|-------------|------|----------------------|-----------------------|------------------------|--|-------|-----|------------------------------|
|             |      |                      |                       |                        | ±1%  | ±2%   | ±5% |                              |
| CS02 (0402) |      | 1/16W                | -55 ~ +155°C          | 1.11A                  | 50 - 100<br>102 - 500<br>510 - 1000            |       |     | ±400<br>±300<br>±200         |
| CS03 (0603) |      | 1/10W                |                       | 2.23A                  | 20 - 50<br>51 - 100<br>102 - 300<br>301 - 1000 |       |     | ±600<br>±400<br>±300<br>±200 |
| CS05 (0805) |      | 1/8W                 |                       | 2.50A                  | 20 - 50<br>51 - 100<br>102 - 196<br>200 - 1000 |       |     | ±600<br>±400<br>±300<br>±200 |
| CS06 (1206) |      | 1/4W                 |                       | 5.00A                  | 10 - 20<br>21 - 50<br>51 - 91<br>100 - 1000    |       |     | ±600<br>±400<br>±300<br>±200 |
| CS13 (1210) |      | 1/2W                 |                       | 7.07A                  |  |       |     |                              |
| CS10 (2010) |      | 3/4W                 |                       | 8.66A                  |  |       |     |                              |
| CS12 (2512) |      | 1W                   |                       | 10.0A                  |  |       |     |                              |
| CS25 (1225) |      | 3W                   |                       | 31.6A                  | 3 - 5<br>6 - 20<br>21 - 30<br>33 - 8000        |       |     | ±300<br>±200<br>±150<br>±100 |
| CS37 (3720) |      | 1W                   |                       | 10.0A                  | 10 - 18<br>20 - 500                            |       |     | ±300<br>±150                 |
| CS75 (7520) |      | 2W                   |                       | 44.7A                  | —  | 1 - 4 |     | ±300                         |
|             |      |                      | 5 - 10<br>11 - 350    |                        | ±200<br>±150                                   |       |     |                              |

**High Power & Ultra High Rating Electrical Specifications**

| Type \ Item | Power Rating at 70°C | Operating Temp. Range | Max. Operating Current | Resistance Range (mΩ) |     |     | TCR (PPM/°C)         |
|-------------|----------------------|-----------------------|------------------------|-----------------------|-----|-----|----------------------|
|             |                      |                       |                        | ±1%                   | ±2% | ±5% |                      |
| CS02 (0402) | 1/8W                 | -55 ~ +155°C          | 1.58A                  | 50 - 100              |     |     | ±400<br>±300<br>±200 |
| CS03 (0603) | 1/8W<br>1/5W         |                       | 1.58A                  | 102 - 500             |     |     |                      |
| CS05 (0805) | 1/4W                 |                       | 2.23A                  | 510 - 1000            |     |     |                      |
| CS06 (1206) | 1/2W                 |                       | 3.16A                  | 50 - 91<br>100 - 1000 |     |     | ±300<br>±200         |
| CS13 (1210) | 3/4W                 |                       | 3.87A                  |                       |     |     |                      |
| CS10 (2010) | 1W                   |                       | 4.47A                  |                       |     |     |                      |
| CS12 (2512) | 1.5W                 |                       | 5.47A                  |                       |     |     |                      |
| CS12 (2512) | *2W                  |                       | 6.32A                  |                       |     |     |                      |

\*: Ultra High Power

**Low TCR Electrical Specifications**

| Type \ Item | Power Rating at 70°C | Operating Temp. Range | Max. Operating Current | Resistance Range (mΩ) |     |     | TCR (PPM/°C) |
|-------------|----------------------|-----------------------|------------------------|-----------------------|-----|-----|--------------|
|             |                      |                       |                        | ±1%                   | ±2% | ±5% |              |
| CS05 (0805) | 1/8W                 | -55 ~ +155°C          | 1.11A                  | 100 - 1000            |     |     | ±100         |
| CS06 (1206) | 1/4W                 |                       | 1.58A                  | 100 - 1000            |     |     | ±100         |
| CS13 (1210) | 1/2W                 |                       | 2.58A                  | 75 - 1000             |     |     | ±100         |
| CS10 (2010) | 3/4W                 |                       | 3.87A                  | 50 - 1000             |     |     | ±100         |
| CS12 (2512) | 1W                   |                       | 4.47A                  | 50 - 1000             |     |     | ±100         |
| CS12 (2512) | 2W                   |                       | 6.32A                  | 50 - 1000             |     |     | ±100         |
| CS37 (3720) | 1W                   |                       | 3.16A                  | 100 - 500             |     |     | ±100         |
| CS75 (7520) | 2W                   |                       | 6.32A                  | 50 - 350              |     |     | ±100         |

Operating Voltage= $\sqrt{P \cdot R}$  ; Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$  ; Operating Current= $\sqrt{P/R}$

■ Viking is capable of manufacturing the optional spec based on customer's requirement.

**■ Environmental Characteristics**

| Item   | Requirement  | Test Method  |
|--|--|--|
| Temperature Coefficient of Resistance (T.C.R.) | As Spec.   | <b>JIS C 5201-1 4.8</b><br><b>IEC 60115-1 4.8</b><br>At 25°C/-55°C and 25°C/+125°C, 25°C is the reference temperature  |
| Short Time Overload                            | ±(0.5%+0.05Ω)  | <b>JIS C 5201-1 4.13</b><br><b>IEC 60115-1 4.13</b><br>RCWV*2.5 or Max. Overload Voltage whichever is lower for 5 seconds  |
|  | ±(1.0%+0.05Ω)<br>for high power rating                   |  |
| Insulation Resistance                          | ≥ 10G  | <b>JIS C 5201-1 4.6</b><br><b>IEC 60115-1 4.6</b><br>Max. Overload Voltage for 1 minute  |
| Operational Life                               | ±(1.0%+0.05Ω)  | <b>MIL-STD-202 Method 108</b><br>Condition D Steady State TA=125°C at derated power.<br>Measurement at 24±4 hours after test conclusion.   |
| Biased Humidity                                | ±(1.0%+0.05Ω)  | <b>MIL-STD-202 Method 103</b><br>1000 hrs 85°C/85%RH 10% of operating power.   |
| High Temperature Exposure                      | ±(0.5%+0.05Ω)  | <b>MIL-STD-202 Method 108</b><br>at +155°C for 1000 hrs  |
| Board Flex                                     | ±(1.0%+0.05Ω)  | <b>AEC-Q200-005</b><br>Bending once for 60 seconds<br>2010, 2512 sizes: 2mm Other sizes: 3mm   |
| Solderability                                  | 95% min. coverage  | <b>JIS C 5201-1 4.17</b><br><b>IEC 60115-1 4.17</b><br><b>J-STD-002</b><br>245±5°C for 3 seconds   |
| Resistance to Soldering Heat                   | ±(0.5%+0.05Ω)  | <b>MIL-STD-202 Method 210</b><br>260±5°C for 10 seconds  |
| Voltage Proof                                  | No breakdown or flashover                                | <b>JIS C 5201-1 4.7</b><br><b>IEC 60115-1 4.7</b><br>1.42 times Max. Operating Voltage for 1 minute<br>CS01:50V; CS02:100V; CS03:150V; CS05:300V<br>CS06/13/10/25/37/75/62:400V; CS12:500V |
| Leaching                                       | Individual leaching area ≤5%<br>Total leaching area ≤10% | <b>JIS C 5201-1 4.18</b><br><b>IEC 60068-2-58 8.2.1</b><br>260±5°C for 30 seconds  |
| Temperature Cycling                            | ±(0.5%+0.05Ω)  | <b>JESD22 Method JA-104</b><br>-55°C to +125°C, 1000 cycles  |
| Mechanical Shock                               | ±(0.25%+0.05Ω)   | <b>MIL-STD-202 Method 213</b><br>Wave Form: Tolerance for half sine shock pulse.<br>Peak value is 100g's. Normal duration (D) is 6.  |
| Vibration                                      | ±(0.5%+0.05Ω)  | <b>MIL-STD-202 Method 204</b><br>5 g's for 20 min., 12 cycles each of 3 orientations,<br>10-2000 Hz  |
| ESD  | ±(1%+0.05Ω)  | <b>AEC-Q200-002</b><br>Human body, 2KV   |
| Resistance to Solvents                         | No visible damage on appearance and marking.             | <b>MIL-STD-202 Method 215</b><br>Add Aqueous wash chemical - OKEM Clean or equivalent. Do not use banned solvents.   |

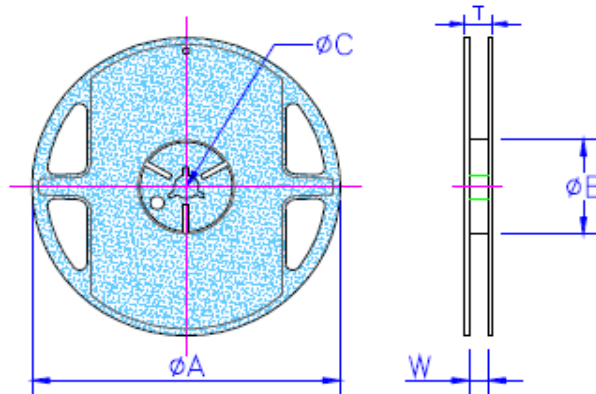
| Item              | Requirement  | Test Method  |
|-------------------|--|--|
| Terminal Strength | No broken  | <b>AEC-Q200-006</b><br>Force of 1.8kg for 60 seconds.                      |
| Flammability      | No ignition of the tissue paper or scorching or the pinewood board | <b>UL-94</b><br>V-0 or V-1 are acceptable. Electrical test not required.   |
| Sulfur Test       | $\pm(0.5\%+0.05\Omega)$  | <b>EIA-977 (Condition A)</b><br>60 $\pm$ 2°C, no power rating for 500 hrs. |

RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$  or Max. Operating Voltage whichever is lower.

■ **Storage Temperature: 15~28°C; Humidity < 80%RH**

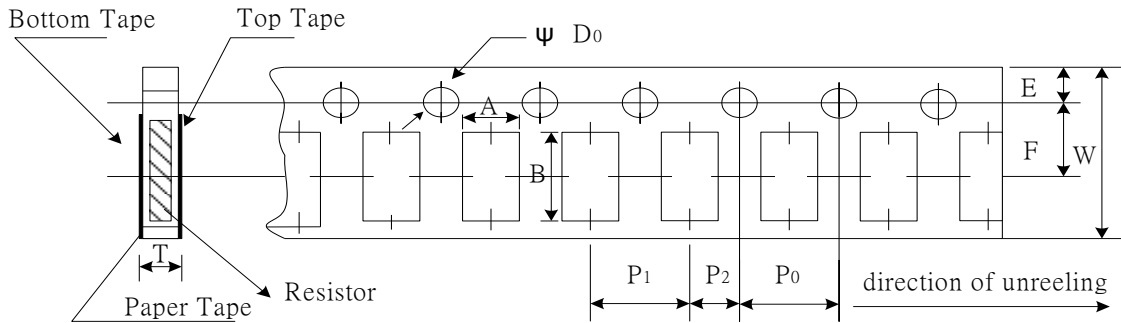
■ **Packaging**

Packaging Quantity & Reel Specifications



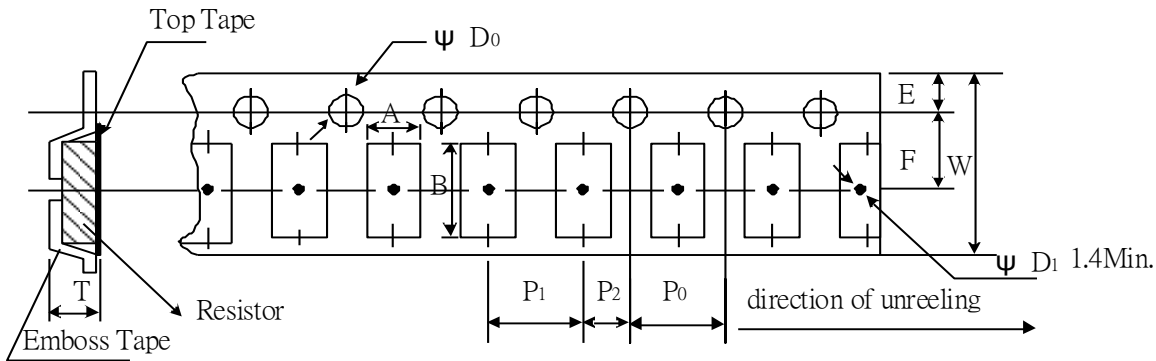
| Type      | ΦA (mm)         | ΦB (mm)  | ΦC (mm)        | W (mm)         | T (mm)         | Paper Tape (EA) | Emboss Plastic Tape (EA) |
|-----------|-----------------|----------|----------------|----------------|----------------|-----------------|--------------------------|
| CS02      | 178.0 $\pm$ 1.0 | 60.0+1.0 | 13.5 $\pm$ 0.7 | 9.5 $\pm$ 0.1  | 11.5 $\pm$ 1.0 | 10,000          | -                        |
| CS03      | 178.0 $\pm$ 1.0 | 60.0+1.0 | 13.5 $\pm$ 0.7 | 9.5 $\pm$ 0.1  | 11.5 $\pm$ 1.0 | 5,000           | -                        |
| CS05      | 178.0 $\pm$ 1.0 | 60.0+1.0 | 13.5 $\pm$ 0.7 | 9.5 $\pm$ 0.1  | 11.5 $\pm$ 1.0 | 5,000           | -                        |
| CS06      | 178.0 $\pm$ 1.0 | 60.0+1.0 | 13.5 $\pm$ 0.7 | 9.5 $\pm$ 0.1  | 11.5 $\pm$ 1.0 | 5,000           | -                        |
| CS13      | 178.0 $\pm$ 1.0 | 60.0+1.0 | 13.5 $\pm$ 0.7 | 9.5 $\pm$ 0.1  | 11.5 $\pm$ 1.0 | 5,000           | -                        |
| CS10      | 178.0 $\pm$ 1.0 | 60.0+1.0 | 13.5 $\pm$ 0.7 | 13.5 $\pm$ 1.0 | 15.5 $\pm$ 1.0 | -               | 4,000                    |
| CS12      | 178.0 $\pm$ 1.0 | 60.0+1.0 | 13.5 $\pm$ 0.7 | 13.5 $\pm$ 1.0 | 15.5 $\pm$ 1.0 | -               | 4,000                    |
| CS12 (2W) | 178.0 $\pm$ 1.0 | 60.0+1.0 | 13.5 $\pm$ 0.7 | 13.5 $\pm$ 1.0 | 15.5 $\pm$ 1.0 | -               | 2,000                    |
| CS25      | 178.0 $\pm$ 1.0 | 60.0+1.0 | 13.5 $\pm$ 0.7 | 13.5 $\pm$ 1.0 | 15.5 $\pm$ 1.0 | -               | 2,000                    |
| CS37      | 178.0 $\pm$ 1.0 | 60.0+1.0 | 13.5 $\pm$ 0.7 | 13.5 $\pm$ 1.0 | 15.5 $\pm$ 1.0 | -               | 2,000                    |
| CS75      | 178.0 $\pm$ 1.0 | 60.0+1.0 | 13.5 $\pm$ 0.7 | 17.5 $\pm$ 1.0 | 19.5 $\pm$ 1.0 | -               | 2,000                    |

Paper Tape Specifications



| Type | A (mm)    | B (mm)    | W (mm)   | E (mm)    | F (mm)    | P0 (mm)   | P1 (mm)   | P2 (mm)   | ΦD <sub>0</sub> (mm) | T (mm)    |
|------|-----------|-----------|----------|-----------|-----------|-----------|-----------|-----------|----------------------|-----------|
| CS02 | 0.65±0.10 | 1.15±0.10 | 8.0±0.20 | 1.75±0.10 | 3.50±0.05 | 4.00±0.10 | 2.00±0.05 | 2.00±0.05 | 1.50+0.1,-0          | 0.45±0.10 |
| CS03 | 1.10±0.10 | 1.90±0.10 | 8.0±0.20 | 1.75±0.10 | 3.50±0.05 | 4.00±0.10 | 4.00±0.05 | 2.00±0.05 | 1.50+0.1,-0          | 0.70±0.10 |
| CS05 | 1.60±0.10 | 2.40±0.20 | 8.0±0.20 | 1.75±0.10 | 3.50±0.05 | 4.00±0.10 | 4.00±0.05 | 2.00±0.05 | 1.50+0.1,-0          | 0.85±0.10 |
| CS06 | 1.90±0.10 | 3.50±0.20 | 8.0±0.20 | 1.75±0.10 | 3.50±0.05 | 4.00±0.10 | 4.00±0.05 | 2.00±0.05 | 1.50+0.1,-0          | 0.85±0.10 |
| CS13 | 2.90±0.10 | 3.50±0.20 | 8.0±0.20 | 1.75±0.10 | 3.50±0.05 | 4.00±0.10 | 4.00±0.05 | 2.00±0.05 | 1.50+0.1,-0          | 0.85±0.10 |

Emboss Plastic Tape Specifications



| Type      | A (mm)    | B (mm)    | W (mm)    | E (mm)    | F (mm)   | P <sub>0</sub> (mm) | P <sub>1</sub> (mm) | P <sub>2</sub> (mm) | ΦD <sub>0</sub> (mm) | T (mm)    |
|-----------|-----------|-----------|-----------|-----------|----------|---------------------|---------------------|---------------------|----------------------|-----------|
| CS10      | 2.80±0.10 | 5.40±0.20 | 12.0±0.30 | 1.75±0.10 | 5.5±0.05 | 4.00±0.05           | 4.00±0.10           | 2.00±0.05           | 1.50+0.10            | 1.00±0.20 |
| CS12      | 3.50±0.10 | 6.70±0.10 | 12.0±0.30 | 1.75±0.10 | 5.5±0.05 | 4.00±0.05           | 4.00±0.10           | 2.00±0.05           | 1.50+0.10            | 1.00±0.20 |
| CS12 (2W) | 3.38±0.10 | 6.68±0.10 | 12.0±0.30 | 1.75±0.10 | 5.5±0.10 | 4.00±0.10           | 4.00±0.10           | 2.00±0.05           | 1.55+0.05            | 1.45±0.20 |
| CS25      | 3.38±0.10 | 6.68±0.10 | 12.0±0.30 | 1.75±0.10 | 5.5±0.10 | 4.00±0.10           | 4.00±0.10           | 2.00±0.05           | 1.55+0.05            | 1.45±0.20 |
| CS37      | 2.50±0.20 | 4.45±0.20 | 12.0±0.30 | 1.75±0.10 | 5.5±0.05 | 4.00±0.05           | 4.00±0.10           | 2.00±0.05           | 1.50+0.10            | 1.20±0.20 |
| CS75      | 2.50±0.20 | 8.30±0.20 | 16.0±0.30 | 1.75±0.10 | 7.8±0.05 | 4.00±0.05           | 4.00±0.10           | 2.00±0.05           | 1.50+0.10            | 1.20±0.20 |



**■ Marking**

No Marking for 0402

1%, 5% for 0805/1206/1210/2010/2512/1225/3720/7520: 4 digits marking

Example:

|            |      |      |      |       |       |
|------------|------|------|------|-------|-------|
| Resistance | 47mΩ | 75mΩ | 15mΩ | 750mΩ | 820mΩ |
| Marking    | R047 | R075 | R015 | R750  | R820  |

5% for 0603: 3 digits marking in E24

1% for 0603: 3 digits marking with under-line in E96 (non-including E24 series)



3 digits marking for E24 or R value suffix is zero in E96: R10=100mΩ; R28=280mΩ



3 digits marking for E96: 243=243mΩ; 511=511mΩ

**REVISION HISTORY**

| <b>REVISION</b> | <b>DATE</b>  | <b>CHANGE NOTIFICATION</b> | <b>DESCRIPTION</b>   |
|-----------------|--------------|----------------------------|--|
| Version A3      | Jun 03, 2014 | -                          | - Electrical Specifications updated<br>- CS25 Pad Layout updated   |
| Version A4      | Apr 30, 2015 | -                          | - Environmental Characteristics updated  |
| Version A5      | Jul 15, 2016 | -                          | - Remove Material Description<br>- Modify Storage Temperature<br>- CS12 Pad Layout updated                   |
| Version A6      | Jan 12, 2018 | -                          | - Modify 1225 Dimension L, W<br>- Environmental Characteristics updated                                      |
| Version A7      | May 20, 2019 | -                          | - Modify TCR Test description<br>- Features added 100% CCD inspection<br>- Electrical Specifications updated |
| Version A8      | Mar 23, 2020 | -                          | - Environmental Characteristics : Added test voltage for Voltage Proof                                       |
| Version A9      | Mar 10, 2021 | -                          | - Modify 2010 Embossed Plastic Tape B Specification<br>- Modify Soldering Condition (IPC/JEDEC J-STD-020)    |