

# SC2200-01UTG

## 22 V, 100 A, DFN2020-6L, Unidirectional Discrete TVS Diode, Lightning Surge Protection

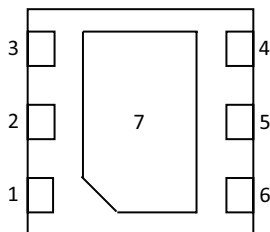
HF RoHS Pb



### Description

The SC2200-01UTG uni-directional TVS is fabricated in a proprietary silicon avalanche technology. TVS Diode designed to provide protection against ESD (electrostatic discharge) and lightning induced surges.

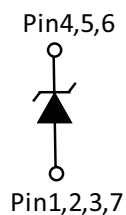
This robust device can safely absorb repetitive ESD strikes at the maximum level specified in the IEC 61000-4-2 international standard (Level 4,  $\pm 8$  kV contact discharge) without performance degradation and safely dissipate 100 A of 8/20  $\mu$ s surge current (IEC61000-4-5 2<sup>nd</sup> edition).

**Pinout**

### Feature and benefits

- ESD, IEC 61000-4-2,  $\pm 30$  kV contact/air
- EFT, IEC 61000-4-4, 40 A (5/50 ns)
- Maximum surge tolerance, IEC 61000-4-5, 2<sup>nd</sup> edition, 100 A (8/20  $\mu$ s)
- Low leakage current of 10 nA (max) at 22 V
- Low clamping voltage
- Halogen-free, lead-free and RoHS compliant
- Moisture sensitivity level (MSL -1)

### Functional Block Diagram



### Applications

- $V_{BUS}$  protection for fast charging USB circuits

**Life Support Note:**

Not Intended for Use in Life Support or Life Saving Applications

The products shown herein are not designed for use in life sustaining or life saving applications unless otherwise expressly indicated.

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### Absolute Maximum Ratings

| Symbol     | Parameter                           | Value      | Units |
|------------|-------------------------------------|------------|-------|
| $I_{PP}$   | Peak Current ( $t_p = 8/20 \mu s$ ) | 100        | A     |
| $T_{OP}$   | Operating Temperature               | -40 to 125 | °C    |
| $T_{STOR}$ | Storage Temperature                 | -55 to 150 | °C    |

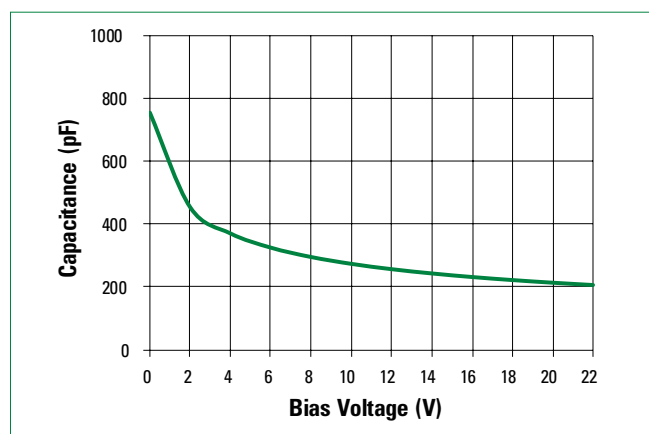
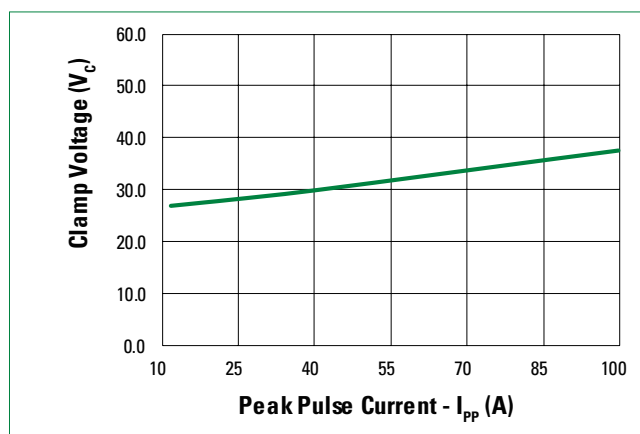
**Caution:** Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the component. This is a stress only rating and operation of the component at these or any other conditions above those indicated in the operational sections of this specification is not implied.

### Electrical Characteristics ( $T_{OP} = 25^\circ C$ )

| Parameter                            | Symbol       | Test Conditions  | Min | Typ | Max | Units |
|--------------------------------------|--------------|--|-----|-----|-----|-------|
| Reverse Standoff Voltage             | $V_{RWM}$    |  |     |     | 22  | V     |
| Breakdown Voltage                    | $V_{BR}$     | $I_R = 1 \text{ mA}$   |     | 25  |     | V     |
| Forward Voltage Drop                 | $V_F$        | $I_F = 1 \text{ mA}$   |     | 0.9 |     | V     |
| Reverse Leakage Current              | $I_{LEAK}$   | $V_R = 22 \text{ V}$   |     | 1   | 10  | nA    |
| Clamp Voltage <sup>1</sup>           | $V_C$        | $I_{PP} = 25 \text{ A}, t_p = 8/20 \mu s, I/O \text{ to GND}$  |     | 26  |     | V     |
|                                      |              | $I_{PP} = 40 \text{ A}, t_p = 8/20 \mu s, I/O \text{ to GND}$  |     | 28  |     | V     |
|                                      |              | $I_{PP} = 100 \text{ A}, t_p = 8/20 \mu s, I/O \text{ to GND}$ |     | 33  |     | V     |
| Dynamic Resistance <sup>1</sup>      | $R_{DYN}$    | $(V_{C2} - V_{C1}) / (I_{PP2} - I_{PP1}), I/O \text{ to GND}$  |     | 90  |     | mΩ    |
| ESD Withstand Voltage <sup>1,3</sup> | $V_{ESD}$    | IEC 61000-4-2 (Contact Discharge)                              | ±30 |     |     | kV    |
|                                      |              | IEC 61000-4-2 (Air Discharge)                                  | ±30 |     |     | kV    |
| Diode Capacitance <sup>1</sup>       | $C_{IO-GND}$ | Reverse Bias = 22 V, $f = 1 \text{ MHz}, I/O \text{ to GND}$   |     | 210 |     | pF    |

**Notes:**

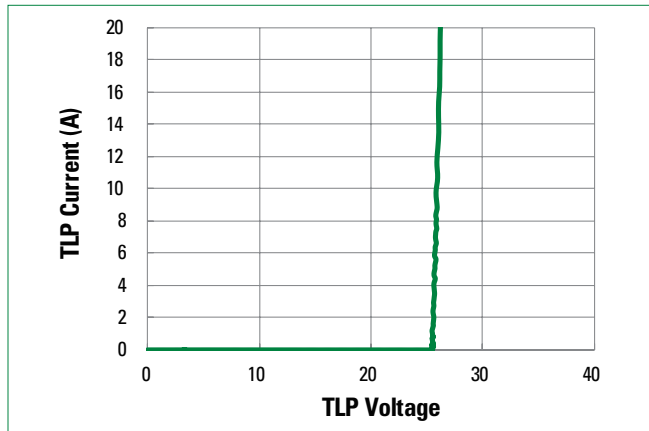
- Parameter is guaranteed by design and/or component characterization.
- Transmission Line Pulse (TLP) with 100 ns width, 0.2 ns rise time, and average window  $t_1 = 70 \text{ ns}$  to  $t_2 = 90 \text{ ns}$ .
- Device stressed with ten non-repetitive ESD pulses according to IEC61000-4-2 ( $R = 330 \Omega, C = 150 \text{ pF}$ ).

**Capacitance vs Reverse Bias****Clamping Voltage vs  $I_{PP}$** 

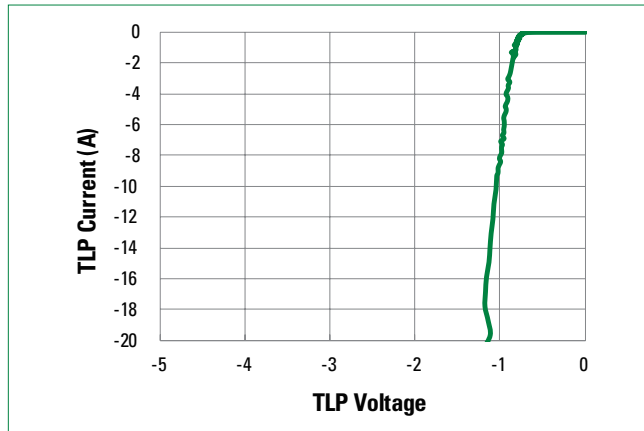
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Positive Transmission Line Pulsing (TLP) Plot



Negative Transmission Line Pulsing (TLP) Plot



IEC 61000-4-2 +8 kV Contact ESD Clamping Voltage



IEC 61000-4-2 -8 kV Contact ESD Clamping Voltage

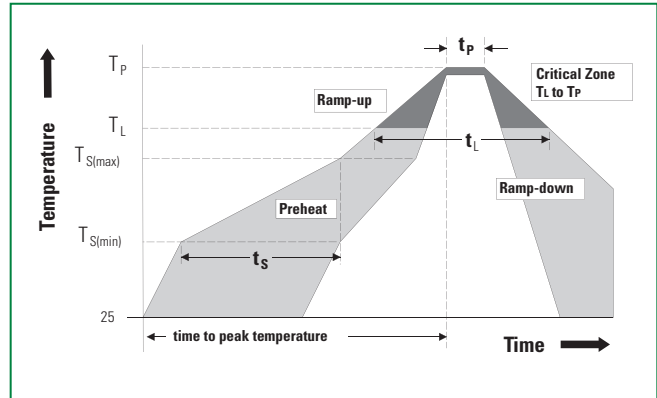


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## Soldering Parameters

|  |                                    |                         |
|--|------------------------------------|-------------------------|
| <b>Reflow Condition</b>  |                                    | Pb – free assembly      |
| <b>Pre Heat</b>  | - Temperature Min ( $T_{s(min)}$ ) | 150 °C                  |
|  | - Temperature Max ( $T_{s(max)}$ ) | 200 °C                  |
|  | - Time (min to max) ( $t_s$ )      | 60 – 120 secs           |
| <b>Average Ramp Up Rate (Liquidus) Temp (<math>T_L</math>) to Peak</b> |                                    | 3 °C/second max         |
| <b><math>T_{s(max)}</math> to <math>T_L</math> - Ramp-up Rate</b>      |                                    | 3 °C/second max         |
| <b>Reflow</b>  | - Temperature ( $T_L$ ) (Liquidus) | 217 °C                  |
|  | - Temperature ( $t_l$ )            | 60 – 150 seconds        |
| <b>Peak Temperature (<math>T_p</math>)</b>                             |                                    | 260 <sup>+0/-5</sup> °C |
| <b>Time Within 5°C of Actual Peak Temperature (<math>t_p</math>)</b>   |                                    | 30 seconds              |
| <b>Ramp-down Rate</b>  |                                    | 6 °C/second max         |
| <b>Time 25°C to Peak Temperature (<math>T_p</math>)</b>                |                                    | 8 minutes max           |
| <b>Do Not Exceed</b>   |                                    | 260 °C                  |



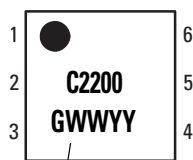
## Product Characteristics

|                      |  |
|----------------------|--|
| <b>Lead Plating</b>  | Matte tin  |
| <b>Lead Material</b> | Copper alloy   |
| <b>Body Material</b> | Molded compound  |
| <b>Flammability</b>  | UL recognized compound meeting flammability rating V-0 |

## Ordering Information

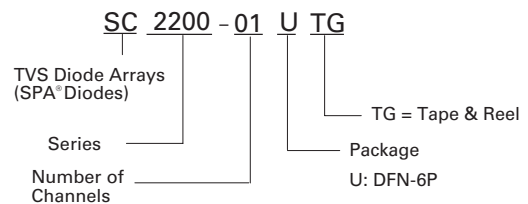
| Part Number  | Package | Min. Order Qty |
|--------------|---------|----------------|
| SC2200-01UTG | DFN-6P  | 3000           |

## Part Marking System



C2200 = Part code  
 G = Assembly code  
 WW = Work week  
 YY = Last two digits of the year

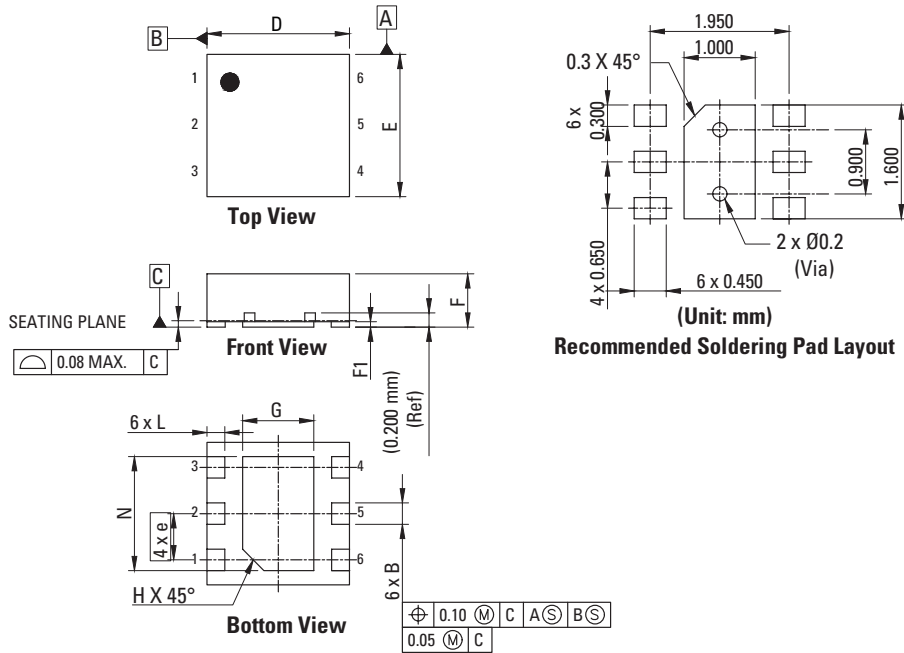
## Part Numbering System



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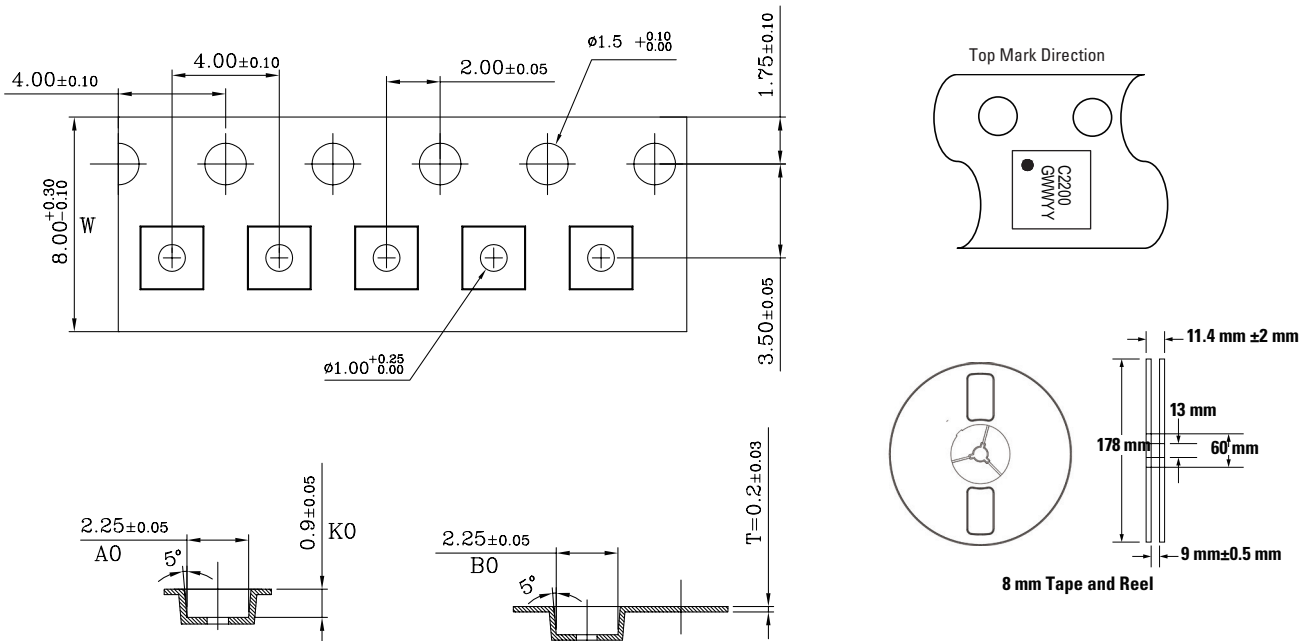
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## Package Dimensions – DFN-6P



| Symbol | Millimeters |       |
|--------|-------------|-------|
|        | Min         | Max   |
| F      | 0.700       | 0.800 |
| F1     | 0.000       | 0.050 |
| B      | 0.250       | 0.350 |
| D      | 1.900       | 2.100 |
| E      | 1.900       | 2.100 |
| L      | 0.200       | 0.300 |
| G      | 0.900       | 1.100 |
| N      | 1.500       | 1.700 |
| H      | 0.250       | 0.350 |
| e      | 0.650 BSC   |       |

## Embossed Carrier Tape & Reel Specification – DFN-6P



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