



SSCTXXX22D2 Series

3.3V~24V Ultra Low Capacitance bi-directional TVS Diode

● Description

The SSCTXXX22D2 is a bi-directional TVS diode, utilizing leading monolithic silicon technology to provide fast response time and low ESD clamping voltage, making this device an ideal solution for protecting voltage sensitive high-speed data lines. The SSCTXXX22D2 complies with the IEC 61000-4-2 (ESD) standard with $\pm 30\text{kV}$ air and $\pm 30\text{kV}$ contact discharge. It is assembled into a leadfree SOD-323 package. The small size, low capacitance and high ESD surge protection make SSCTXXX22D2 an ideal choice to protect cell phone, wireless systems, and communication equipment.

● Feature

- ◇ 350W peak pulse power ($t_P = 8/20\mu\text{s}$)
- ◇ SOD-323 Package
- ◇ Working voltage: 3.3V,5V,12V,15V,24V,36V
- ◇ Low clamping voltage
- ◇ Low capacitance
- ◇ Complies with following standards:
 - IEC 61000-4-2 (ESD) immunity test
Air discharge: $\pm 30\text{kV}$
Contact discharge: $\pm 30\text{kV}$
 - IEC61000-4-4 (EFT) 40A (5/50ns)

● Electronic Parameter

| Symbol | Parameter |
|-----------|-------------------------------------|
| V_{RWM} | Peak Reverse Working Voltage |
| I_R | Reverse Leakage Current @ V_{RWM} |
| V_{BR} | Breakdown Voltage @ I_T |
| I_T | Test Current |
| I_{PP} | Maximum Reverse Peak Pulse Current |
| V_C | Clamping Voltage @ I_{PP} |
| P_{PP} | Peak Pulse Power |
| C | Junction Capacitance |

● PIN configuration



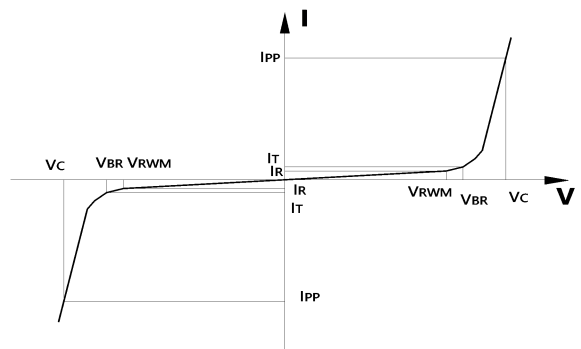
Top view

● Applications

- ◇ Cell Phone Handsets and Accessories
- ◇ Microprocessor based equipment
- ◇ Personal Digital Assistants (PDA's)
- ◇ Notebooks, Desktops, and Servers
- ◇ Portable Instrumentation
- ◇ Networking and Telecom
- ◇ Serial and Parallel Ports.
- ◇ Peripherals

● Mechanical data

- ◇ Case Material: "Green" Molding Compound.
- ◇ UL Flammability Classification Rating 94V-0
- ◇ Qualified max reflow temperature:260°C
- ◇ Device meets MSL 3 requirements
- ◇ Moisture Sensitivity: Level 3 per J-STD-020





● Absolute maximum rating @TA=25°C

| SSCT3V322D2 | | | |
|---|------------------|-----------|------|
| Parameter | Symbol | Value | Unit |
| Peak Pulse Power (tp=8/20μs waveform) | P _{PPP} | 350 | W |
| Peak Pulse Current (tp=8/20μs waveform) | I _{PP} | 20 | A |
| ESD Rating per IEC61000-4-2: | Contact | 30 | KV |
| | Air | 30 | |
| Operating Temperature Range | T _J | -55 ~ 125 | °C |
| Storage Temperature Range | T _{STG} | -55 ~ 150 | °C |
| SSCT5V022D2 | | | |
| Parameter | Symbol | Value | Unit |
| Peak Pulse Power (tp=8/20μs waveform) | P _{PPP} | 350 | W |
| Peak Pulse Current (tp=8/20μs waveform) | I _{PP} | 17 | A |
| ESD Rating per IEC61000-4-2: | Contact | 30 | KV |
| | Air | 30 | |
| Operating Temperature Range | T _J | -55 ~ 125 | °C |
| Storage Temperature Range | T _{STG} | -55 ~ 150 | °C |
| SSCT12V22D2 | | | |
| Parameter | Symbol | Value | Unit |
| Peak Pulse Power (tp=8/20μs waveform) | P _{PPP} | 350 | W |
| Peak Pulse Current (tp=8/20μs waveform) | I _{PP} | 11 | A |
| ESD Rating per IEC61000-4-2: | Contact | 30 | KV |
| | Air | 30 | |
| Operating Temperature Range | T _J | -55 ~ 125 | °C |
| Storage Temperature Range | T _{STG} | -55 ~ 150 | °C |
| SSCT15V22D2 | | | |
| Parameter | Symbol | Value | Unit |
| Peak Pulse Power (tp=8/20μs waveform) | P _{PPP} | 350 | W |
| Peak Pulse Current (tp=8/20μs waveform) | I _{PP} | 10 | A |
| ESD Rating per IEC61000-4-2: | Contact | 30 | KV |
| | Air | 30 | |
| Operating Temperature Range | T _J | -55 ~ 125 | °C |
| Storage Temperature Range | T _{STG} | -55 ~ 150 | °C |
| SSCT24V22D2 | | | |
| Parameter | Symbol | Value | Unit |
| Peak Pulse Power (tp=8/20μs waveform) | P _{PPP} | 350 | W |
| Peak Pulse Current (tp=8/20μs waveform) | I _{PP} | 7 | A |
| ESD Rating per IEC61000-4-2: | Contact | 30 | KV |
| | Air | 30 | |
| Operating Temperature Range | T _J | -55 ~ 125 | °C |
| Storage Temperature Range | T _{STG} | -55 ~ 150 | °C |



| SSCT36V22D2 | | | |
|---|------------------|-----------|------|
| Parameter | Symbol | Value | Unit |
| Peak Pulse Power (tp=8/20μs waveform) | P _{PPP} | 350 | W |
| Peak Pulse Current (tp=8/20μs waveform) | I _{PP} | 5 | A |
| ESD Rating per IEC61000-4-2: | Contact Air | 30 | KV |
| | | 30 | |
| Operating Temperature Range | T _J | -55 ~ 125 | °C |
| Storage Temperature Range | T _{STG} | -55 ~ 150 | °C |

● **Electrical Characteristics @TA=25°C**

| SSCT3V322D2 | | | | | | |
|-------------------------|------------------|------|-----|-----|------|--|
| Parameter | Symbol | Min | Typ | Max | Unit | Test Condition |
| Reverse Working Voltage | V _{RWM} | | | 3.3 | V | |
| Breakdown Voltage | V _{BR} | 4.0 | | | V | I _T = 1mA |
| Reverse Leakage Current | I _R | | | 40 | uA | V _{RWM} = 3.3V |
| Clamping Voltage | V _C | | 7 | | V | I _{PP} = 1A (8 x 20uS pulse) |
| Clamping Voltage | V _C | | | 19 | V | I _{PP} = 20A (8 x 20uS pulse) |
| Junction Capacitance | C _J | | 450 | | pF | V _R = 0V, f = 1MHz |
| SSCT5V022D2 | | | | | | |
| Parameter | Symbol | Min | Typ | Max | Unit | Test Condition |
| Reverse Working Voltage | V _{RWM} | | | 5 | V | |
| Breakdown Voltage | V _{BR} | 6.2 | | | V | I _T = 1mA |
| Reverse Leakage Current | I _R | | | 10 | uA | V _{RWM} = 5V |
| Clamping Voltage | V _C | | 9.8 | | V | I _{PP} = 1A (8 x 20us pulse) |
| Clamping Voltage | V _C | | | 21 | V | I _{PP} = 17A (8 x 20us pulse) |
| Junction Capacitance | C _J | | 200 | | pF | V _R = 0V, f = 1MHz |
| SSCT12V22D2 | | | | | | |
| Parameter | Symbol | Min | Typ | Max | Unit | Test Condition |
| Reverse Working Voltage | V _{RWM} | | | 12 | V | |
| Breakdown Voltage | V _{BR} | 13.3 | | | V | I _T = 1mA |
| Reverse Leakage Current | I _R | | | 1 | uA | V _{RWM} = 12V |
| Clamping Voltage | V _C | | 19 | | V | I _{PP} = 1A (8 x 20us pulse) |
| Clamping Voltage | V _C | | | 32 | V | I _{PP} = 11A (8 x 20us pulse) |
| Junction Capacitance | C _J | | 75 | | pF | V _R = 0V, f = 1MHz |

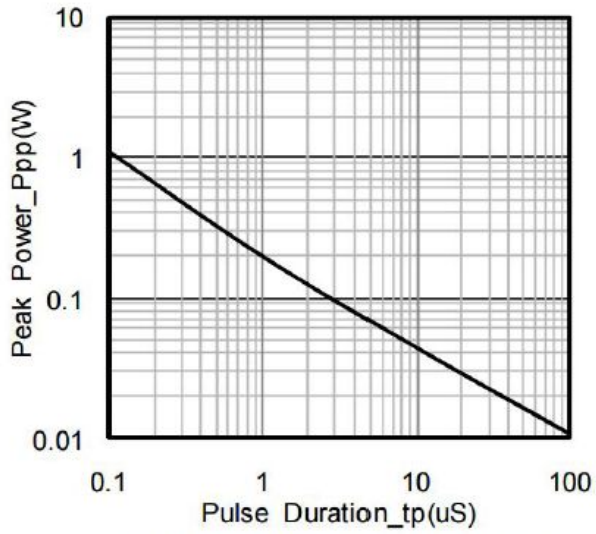


SSCTXXX22D2

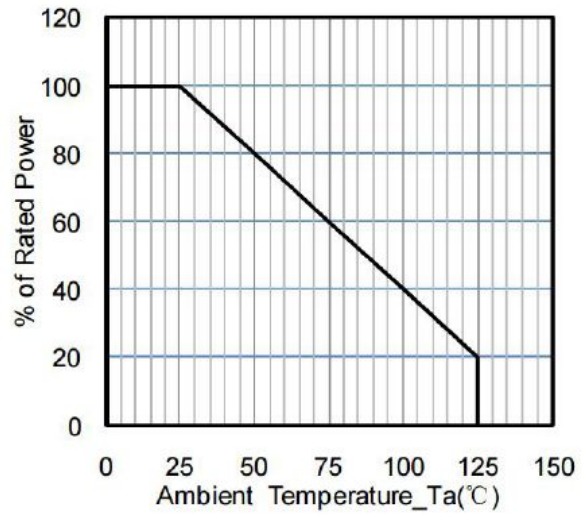
| SSCT15V22D2 | | | | | | |
|-------------------------|-----------|------|-----|-----|---------|---|
| Parameter | Symbol | Min | Typ | Max | Unit | Test Condition |
| Reverse Working Voltage | V_{RWM} | | | 15 | V | |
| Breakdown Voltage | V_{BR} | 16.7 | | | V | $I_T = 1mA$ |
| Reverse Leakage Current | I_R | | | 1 | μA | $V_{RWM} = 15V$ |
| Clamping Voltage | V_C | | 24 | | V | $I_{PP} = 1A (8 \times 20\mu s \text{ pulse})$ |
| Clamping Voltage | V_C | | | 38 | V | $I_{PP} = 10A (8 \times 20\mu s \text{ pulse})$ |
| Junction Capacitance | C_J | | 68 | | pF | $V_R = 0V, f = 1MHz$ |
| SSCT24V22D2 | | | | | | |
| Parameter | Symbol | Min | Typ | Max | Unit | Test Condition |
| Reverse Working Voltage | V_{RWM} | | | 24 | V | |
| Breakdown Voltage | V_{BR} | 26.7 | | | V | $I_T = 1mA$ |
| Reverse Leakage Current | I_R | | | 1 | μA | $V_{RWM} = 24V$ |
| Clamping Voltage | V_C | | 43 | | V | $I_{PP} = 1A (8 \times 20\mu s \text{ pulse})$ |
| Clamping Voltage | V_C | | | 52 | V | $I_{PP} = 7A (8 \times 20\mu s \text{ pulse})$ |
| Junction Capacitance | C_J | | 57 | | pF | $V_R = 0V, f = 1MHz$ |
| SSCT36V22D2 | | | | | | |
| Parameter | Symbol | Min | Typ | Max | Unit | Test Condition |
| Reverse Working Voltage | V_{RWM} | | | 36 | V | |
| Breakdown Voltage | V_{BR} | 40 | | | V | $I_T = 1mA$ |
| Reverse Leakage Current | I_R | | | 1 | μA | $V_{RWM} = 36V$ |
| Clamping Voltage | V_C | | 63 | | V | $I_{PP} = 1A (8 \times 20\mu s \text{ pulse})$ |
| Clamping Voltage | V_C | | | 80 | V | $I_{PP} = 5A (8 \times 20\mu s \text{ pulse})$ |
| Junction Capacitance | C_J | | 35 | | pF | $V_R = 0V, f = 1MHz$ |



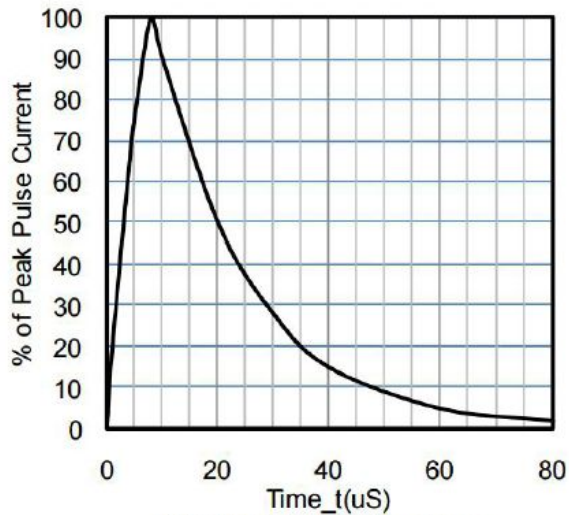
- Typical Performance Characteristics



Peak Pulse Power vs. Pulse Time



Power Derating Curve

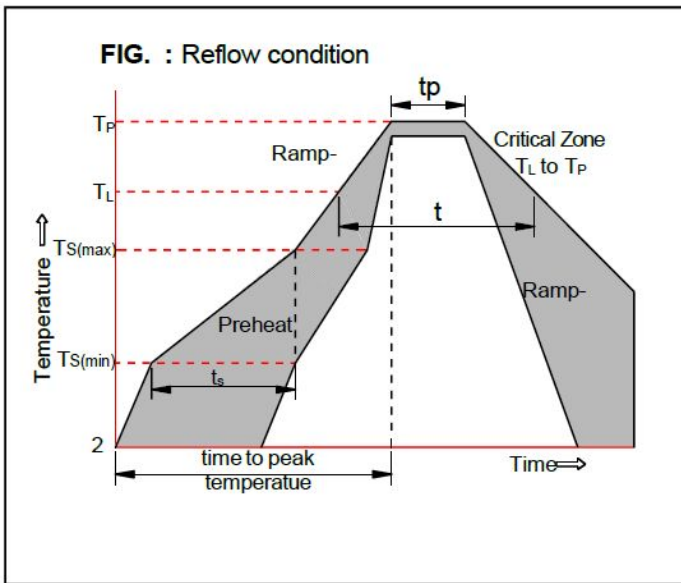


8 X 20uS Pulse Waveform



● Soldering Parameters

| Reflow Condition | | Pb-Free assembly (see as bellow) |
|--|-----------------------------|-------------------------------------|
| Pre Heat | -Temperature Min (Ts(min)) | +150°C |
| | -Temperature Max(Ts(max)) | +200°C |
| | -Time (Min to Max) (ts) | 60-180 secs. |
| Average ramp up rate (Liquid us Temp (TL) to peak) | | 3°C/sec. Max |
| Ts(max) to TL - Ramp-up Rate | | 3°C/sec. Max |
| Reflow | -Temperature(TL)(Liquid us) | +217°C |
| | -Temperature(tL) | 60-150 secs. |
| Peak Temp (Tp) | | +260(+0/-5)°C |
| Time within 5°C of actual Peak Temp (tp) | | 30 secs. Max |
| Ramp-down Rate | | 6°C/sec. Max |
| Time 25°C to Peak Temp (TP) | | 8 min. Max |
| Do not exceed | | +260°C |





● Package Information

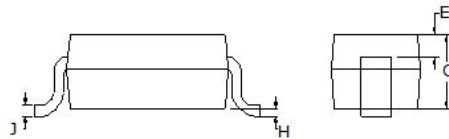
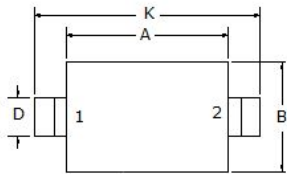
Ordering Information

| Device | Package | Qty per Reel | Reel Size |
|-------------|---------|--------------|-----------|
| SSCT3V322D2 | SOD-323 | 3000 | 7 Inch |
| SSCT5V022D2 | SOD-323 | 3000 | 7 Inch |
| SSCT12V22D2 | SOD-323 | 3000 | 7 Inch |
| SSCT15V22D2 | SOD-323 | 3000 | 7 Inch |
| SSCT24V22D2 | SOD-323 | 3000 | 7 Inch |
| SSCT36V22D2 | SOD-323 | 3000 | 7 Inch |

Mechanical Data

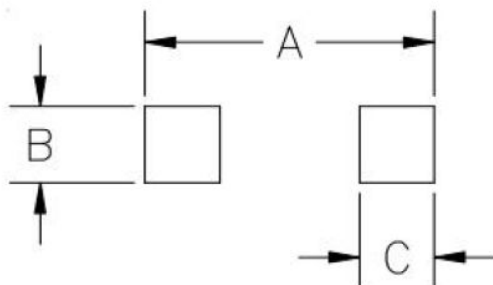
Case: SOD-323

Case Material: Molded Plastic. UL Flammability



| Dim | Dimensions | | | |
|-----|-------------|------|--------|-------|
| | Millimeters | | Inches | |
| | Min | Max | Min | Max |
| A | 1.50 | 1.80 | 0.060 | 0.071 |
| B | 1.2 | 1.40 | 0.045 | 0.054 |
| C | - | 1.10 | - | 0.043 |
| D | 0.30 | 0.40 | 0.012 | 0.016 |
| H | - | 0.10 | - | 0.004 |
| J | 0.10 | 0.25 | 0.004 | 0.010 |
| K | 2.30 | 2.70 | 0.090 | 0.107 |

Recommended Pad outline



| Dim | Dimensions | |
|-----|-------------|--------|
| | Millimeters | Inches |
| A | 3.15 | 0.120 |
| B | 0.80 | 0.031 |
| C | 0.80 | 0.031 |



- **History Version**

| | | |
|------|----------------------------|------------|
| V1.1 | First edition | 2021-08-19 |
| V1.2 | Correct MSL 3 requirements | 2022-07-05 |

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