



## SSCE12V12L1

1-Line Ultra Low Capacitance Bi-directional TVS Diode

### ● Description

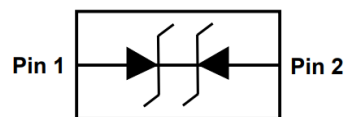
The SSCE12V12L1 is a bi-directional TVS diode, utilizing leading monolithic silicon technology to provide fast response time and low ESD clamping voltage, making this device an ideal solution for protecting voltage sensitive high-speed data lines.

The SSCE12V12L1 has an ultra-low capacitance with a typical value at 0.3pF, and complies with the IEC 61000-4-2 (ESD) standard with  $\pm 25\text{kV}$  air and  $\pm 22\text{kV}$  contact discharge. It is assembled into an ultra-small 0.6x0.3x0.3mm lead-free DFN package. The small size, ultra-low capacitance and high ESD surge protection make SSCE12V12L1 an ideal choice to protect cell phone, digital video interfaces, HDMI, DVI, USB2.0, USB3.0, and other high-speed ports.

### ● Feature

- ✧ 100W peak pulse power ( $t_P = 8/20\mu\text{s}$ )
- ✧ DFN0603-2L Package
- ✧ Working voltage: 12V
- ✧ Low clamping voltage
- ✧ Low capacitance: 0.3pF typical
- ✧ Low leakage current
- ✧ RoHS compliant
- ✧ Complies with following standards:
  - IEC 61000-4-2 (ESD) immunity test
    - Air discharge:  $\pm 25\text{kV}$
    - Contact discharge:  $\pm 22\text{kV}$
  - IEC61000-4-5 (Lightning) 3A (8/20 $\mu\text{s}$ )

### ● PIN configuration



Top View



Marking

### ● Applications

- ✧ DVI & HDMI Port Protection
- ✧ USB Ports
- ✧ SATA and eSATA
- ✧ Serial and Parallel Ports
- ✧ Display Ports
- ✧ MDDI Ports
- ✧ Notebooks, Desktops, Servers

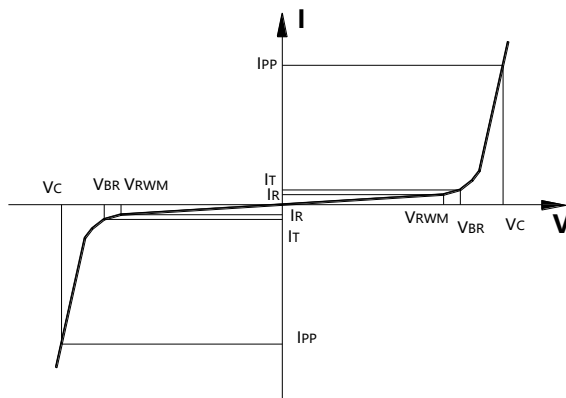
### ● Mechanical data

- ✧ Lead finish: 100% matte Sn (Tin)
- ✧ Mounting position: Any
- ✧ Qualified max reflow temperature:  $260^{\circ}\text{C}$
- ✧ Device meets MSL 3 requirements
- ✧ Pure tin plating: 7 ~ 17  $\mu\text{m}$
- ✧ Pin flatness:  $\leq 3\text{mil}$



## ● 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                    |
| $C_J$     | Junction Capacitance                |



## ● Absolute maximum rating ( $T_A=25^{\circ}\text{C}$ unless otherwise noted)

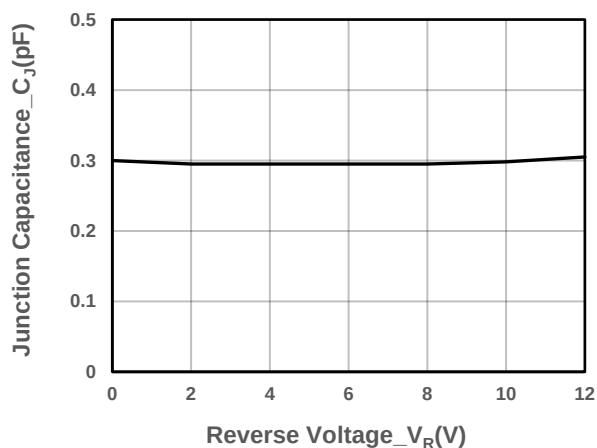
| Parameter                                      | Symbol    | Value    | Unit               |
|------------------------------------------------|-----------|----------|--------------------|
| Peak Pulse Power (8/20 $\mu\text{s}$ )         | $P_{PP}$  | 100      | W                  |
| Peak Pulse Current (8/20 $\mu\text{s}$ )       | $I_{PP}$  | 3        | A                  |
| ESD Rating per IEC61000-4-2:<br>Contact<br>Air | $V_{ESD}$ | 22<br>25 | kV                 |
| Storage Temperature                            | $T_{STG}$ | -55/+150 | $^{\circ}\text{C}$ |
| Operating Temperature                          | $T_J$     | -55/+125 | $^{\circ}\text{C}$ |

## ● Electrical Characteristics ( $T_A=25^{\circ}\text{C}$ unless otherwise noted)

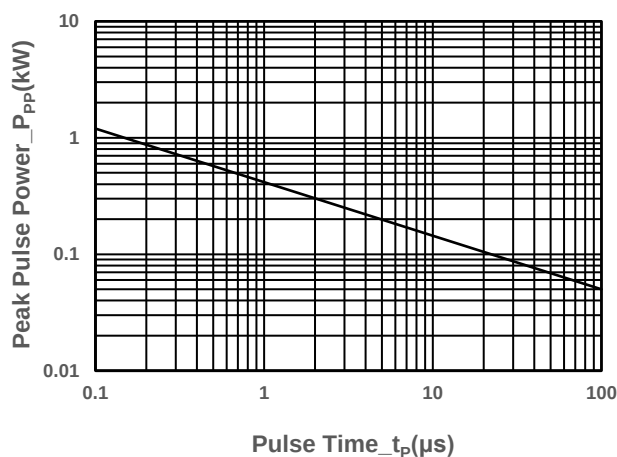
| Parameter                    | Symbol    | Conditions                                     | Min. | Typ. | Max. | Unit          |
|------------------------------|-----------|------------------------------------------------|------|------|------|---------------|
| Peak Reverse Working Voltage | $V_{RWM}$ |                                                |      |      | 12   | V             |
| Breakdown Voltage            | $V_{BR}$  | $I_T = 1\text{mA}$                             | 13.3 |      |      | V             |
| Reverse Leakage Current      | $I_R$     | $V_{RWM} = 12\text{V}$                         |      |      | 0.2  | $\mu\text{A}$ |
| Clamping Voltage             | $V_C$     | $I_{PP} = 1\text{A}$ , $t_P = 8/20\mu\text{s}$ |      |      | 21   | V             |
| Clamping Voltage             | $V_C$     | $I_{PP} = 3\text{A}$ , $t_P = 8/20\mu\text{s}$ |      |      | 33   | V             |
| Junction Capacitance         | $C_J$     | $V_R = 0\text{V}$ , $f = 1\text{MHz}$          |      | 0.3  | 0.5  | pF            |



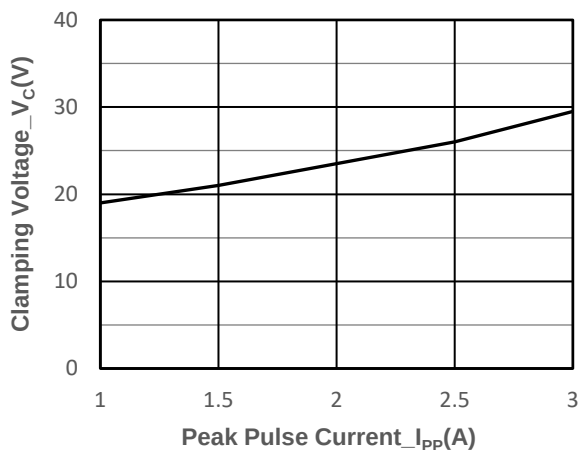
● Typical Performance Characteristics ( $T_A=25^{\circ}\text{C}$  unless otherwise noted)



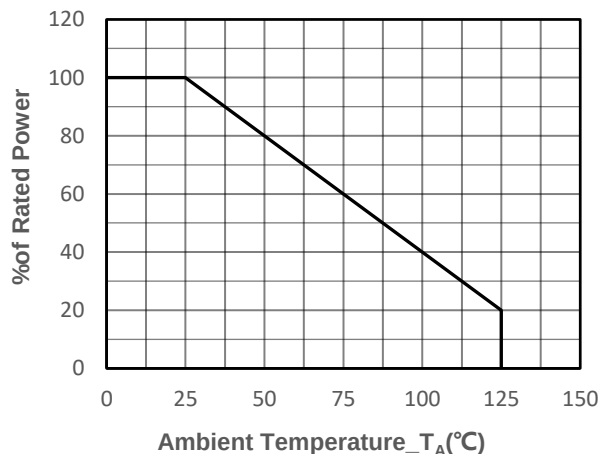
Junction Capacitance vs. Reverse Voltage



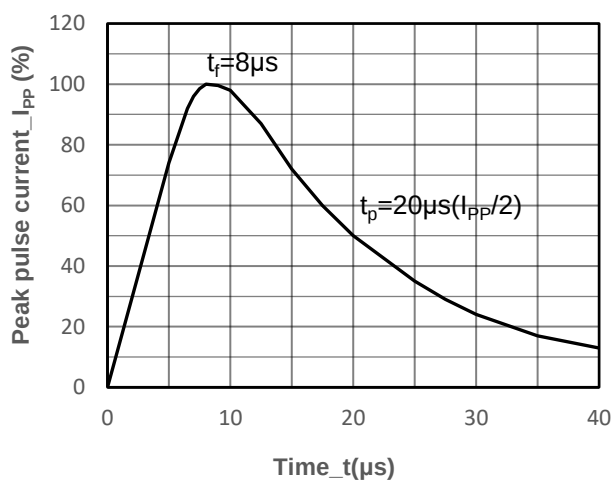
Peak Pulse Power vs. Pulse Time



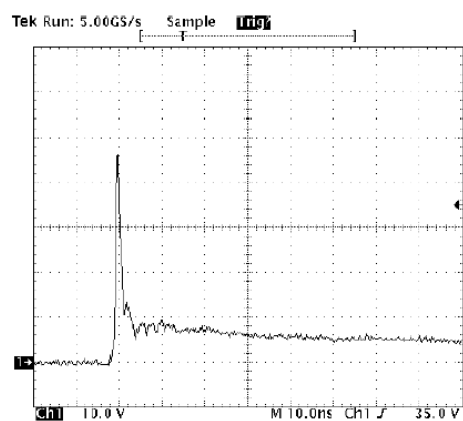
Clamping Voltage vs. Peak Pulse Current



Power derating vs. Ambient temperature



8/20 $\mu\text{s}$  Pulse Waveform



ESD Clamping Voltage

8 kV Contact per IEC61000-4-2



## ● Package Information

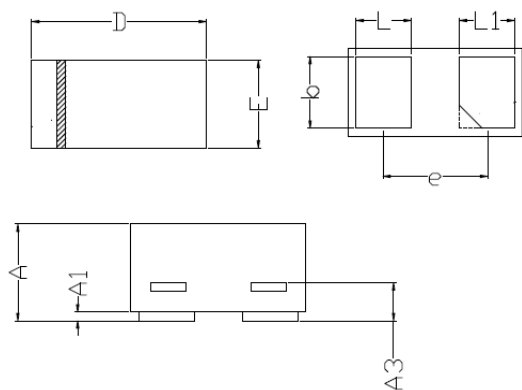
### Ordering Information

| Device      | Package    | Qty per Reel | Reel Size |
|-------------|------------|--------------|-----------|
| SSCE12V12L1 | DFN0603-2L | 15000        | 7 Inch    |

### Mechanical Data

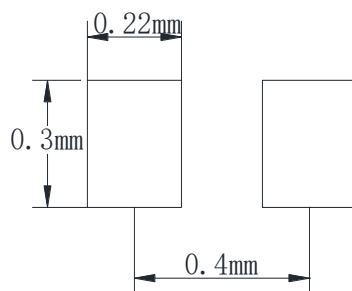
Case: DFN0603-2L

Case Material: Molded Plastic. UL Flammability



| DIM | Millimeters |       |
|-----|-------------|-------|
|     | Min         | Max   |
| A   | 0.230       | 0.330 |
| A1  | 0.000       | 0.050 |
| A3  | 0.102REF    |       |
| D   | 0.550       | 0.650 |
| E   | 0.250       | 0.350 |
| b   | 0.215       | 0.275 |
| L   | 0.12        | 0.23  |
| L1  | 0.12        | 0.23  |
| e   | 0.40BSC     |       |

### Recommended Pad outline





## DISCLAIMER

SSCSEMI RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. SSCSEMI DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENCE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

THE GRAPHS PROVIDED IN THIS DOCUMENT ARE STATISTICAL SUMMARIES BASED ON A LIMITED NUMBER OF SAMPLES AND ARE PROVIDED FOR INFORMATIONAL PURPOSE ONLY. THE PERFORMANCE CHARACTERISTICS LISTED IN THEM ARE NOT TESTED OR GUARANTEED. IN SOME GRAPHS, THE DATA PRESENTED MAY BE OUTSIDE THE SPECIFIED OPERATING RANGE (E.G. OUTSIDE SPECIFIED POWER SUPPLY RANGE) AND THEREFORE OUTSIDE THE WARRANTED RANGE.

OUR PRODUCT SPECIFICATIONS ARE ONLY VALID IF OBTAINED THROUGH THE COMPANY'S OFFICIAL WEBSITE, CRM SYSTEM, OR OUR SALES PERSONNEL CHANNELS. IF CHANGES OR SPECIAL VERSIONS ARE INVOLVED, THEY MUST BE STAMPED WITH A QUALITY SEAL AND MARKED WITH A SPECIAL VERSION NUMBER TO BE VALID.