

## Electrostatic Discharged Protection Devices (ESD) Data Sheet

### Description

The SJD12A(C)XXL01 series are designed to protect voltage sensitive components from high voltage, high energy transients. Excellent clamping capability, high surge capability, low zener impedance and fast response time. Because of its small size, it is ideal for use in cellular phones, portable device, business machines, power supplies and many other industrial/consumer applications.



Contact : ±30kV  
Air : ±30kV

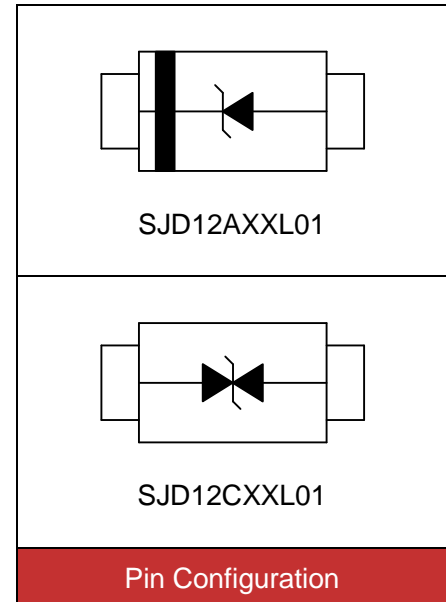


### Features

- IEC61000-4-2 ESD 30KV Air,30KV contact compliance
- SOD-123S surface mount package
- Protects one I/O line
- Peak power dissipation of 1000W under 8/20µs waveform
- Working voltage: 5V~170V
- Low leakage current
- Solid-state silicon avalanche technology
- Lead Free/RoHS compliant
- Solder reflow temperature: Pure Tin-Sn, 260~270°C
- Flammability rating UL 94V-0
- Meets MSL level 1, per J-STD-020

### Applications

- Personal digital assistants (PDA)
- Cellular handsets & Accessories
- Portable devices
- Portable instrumentation
- Handhelds and notebooks
- Digital cameras



### Maximum Ratings

| Rating                                   | Symbol                            | Value    | Unit |
|--|-----------------------------------|----------|------|
| Peak pulse power (tp=10/1000µs waveform) | P <sub>PP</sub>                   | 200      | W    |
| Peak pulse power (tp=8/20µs waveform)    | P <sub>PP</sub>                   | 1000     | W    |
| ESD voltage (Contact discharge)          | V <sub>ESD</sub>                  | ±30      | kV   |
| ESD voltage (Air discharge)              |                                   | ±30      |      |
| Storage & operating temperature range    | T <sub>STG</sub> , T <sub>J</sub> | -55~+150 | °C   |

**Electrical Characteristics ( $T_J=25^{\circ}\text{C}$ )**

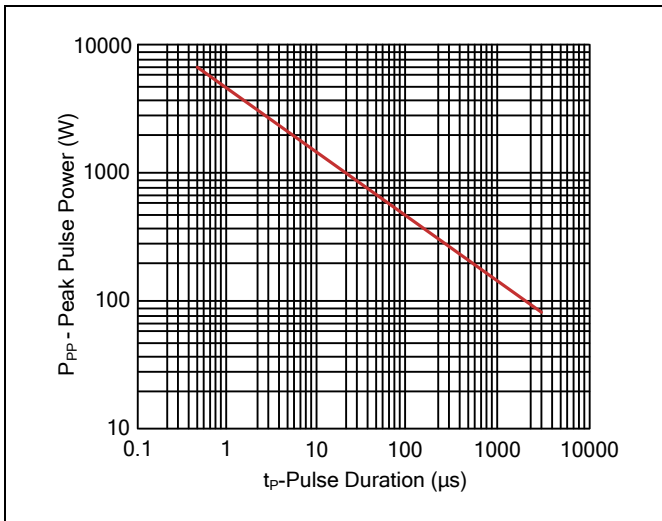
| Part Number     | Device Marking Code |    | Reverse Stand-Off Voltage | Breakdown Voltage @ $I_T$ |                   | Test Current | Maximum Clamping Voltage @ $I_{PP}$ | Peak Pulse Current | Reverse Leakage @ $V_{RWM}$ |
|-----------------|---------------------|----|---------------------------|---------------------------|-------------------|--------------|-------------------------------------|--------------------|-----------------------------|
|                 | UNI                 | BI | $V_{RWM}(V)$              | $V_{BR\ MIN.}(V)$         | $V_{BR\ MAX.}(V)$ | $I_T(mA)$    | $V_C(V)$                            | $I_{PP}(A)$        | $I_R(\mu A)$                |
| SJD12A(C)05L01  | KE                  | AE | 5.0                       | 6.40                      | 7.00              | 10           | 9.2                                 | 21.8               | 800                         |
| SJD12A(C)06L01  | KG                  | AG | 6.0                       | 6.67                      | 7.37              | 10           | 10.3                                | 19.4               | 800                         |
| SJD12A(C)6.5L01 | KK                  | AK | 6.5                       | 7.22                      | 7.98              | 10           | 11.2                                | 17.9               | 500                         |
| SJD12A(C)07L01  | KM                  | AM | 7.0                       | 7.78                      | 8.60              | 10           | 12.0                                | 16.7               | 200                         |
| SJD12A(C)7.5L01 | KP                  | AP | 7.5                       | 8.33                      | 9.21              | 1            | 12.9                                | 15.5               | 100                         |
| SJD12A(C)08L01  | KR                  | AR | 8.0                       | 8.89                      | 9.83              | 1            | 13.6                                | 14.7               | 50                          |
| SJD12A(C)8.5L01 | KT                  | AT | 8.5                       | 9.44                      | 10.40             | 1            | 14.4                                | 13.9               | 20                          |
| SJD12A(C)09L01  | KV                  | AV | 9.0                       | 10.00                     | 11.10             | 1            | 15.4                                | 13.0               | 10                          |
| SJD12A(C)10L01  | KX                  | AX | 10.0                      | 11.10                     | 12.30             | 1            | 17.0                                | 11.8               | 5                           |
| SJD12A(C)11L01  | KZ                  | AZ | 11.0                      | 12.20                     | 13.50             | 1            | 18.2                                | 11.0               | 3                           |
| SJD12A(C)12L01  | LE                  | BE | 12.0                      | 13.30                     | 14.70             | 1            | 19.9                                | 10.1               | 1                           |
| SJD12A(C)13L01  | LG                  | BG | 13.0                      | 14.40                     | 15.90             | 1            | 21.5                                | 9.3                | 1                           |
| SJD12A(C)14L01  | LK                  | BK | 14.0                      | 15.60                     | 17.20             | 1            | 23.2                                | 8.6                | 1                           |
| SJD12A(C)15L01  | LM                  | BM | 15.0                      | 16.70                     | 18.50             | 1            | 24.4                                | 8.2                | 1                           |
| SJD12A(C)16L01  | LP                  | BP | 16.0                      | 17.80                     | 19.70             | 1            | 26.0                                | 7.7                | 1                           |
| SJD12A(C)17L01  | LR                  | BR | 17.0                      | 18.90                     | 20.90             | 1            | 27.6                                | 7.3                | 1                           |
| SJD12A(C)18L01  | LT                  | BT | 18.0                      | 20.00                     | 22.10             | 1            | 29.2                                | 6.9                | 1                           |
| SJD12A(C)20L01  | LV                  | BV | 20.0                      | 22.20                     | 24.50             | 1            | 32.4                                | 6.2                | 1                           |
| SJD12A(C)22L01  | LX                  | BX | 22.0                      | 24.40                     | 26.90             | 1            | 35.5                                | 5.7                | 1                           |
| SJD12A(C)24L01  | LZ                  | BZ | 24.0                      | 26.70                     | 29.50             | 1            | 38.9                                | 5.2                | 1                           |
| SJD12A(C)26L01  | ME                  | CE | 26.0                      | 28.90                     | 31.90             | 1            | 42.1                                | 4.8                | 1                           |
| SJD12A(C)28L01  | MG                  | CG | 28.0                      | 31.10                     | 34.40             | 1            | 45.4                                | 4.4                | 1                           |
| SJD12A(C)30L01  | MK                  | CK | 30.0                      | 33.30                     | 36.80             | 1            | 48.4                                | 4.2                | 1                           |
| SJD12A(C)33L01  | MM                  | CM | 33.0                      | 36.70                     | 40.60             | 1            | 53.3                                | 3.8                | 1                           |
| SJD12A(C)36L01  | MP                  | CP | 36.0                      | 40.00                     | 44.20             | 1            | 58.1                                | 3.5                | 1                           |
| SJD12A(C)40L01  | MR                  | CR | 40.0                      | 44.40                     | 49.10             | 1            | 64.5                                | 3.1                | 1                           |
| SJD12A(C)43L01  | MT                  | CT | 43.0                      | 47.80                     | 52.80             | 1            | 69.4                                | 2.9                | 1                           |

**Electrical Characteristics ( $T_J=25^{\circ}\text{C}$ )**

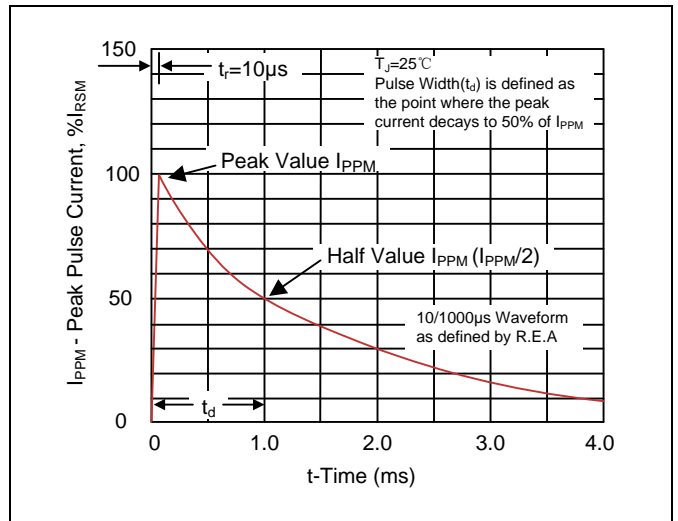
| Part Number     | Device Marking Code |    | Reverse Stand-Off Voltage | Breakdown Voltage @ $I_T$ |                   | Test Current | Maximum Clamping Voltage @ $I_{PP}$ | Peak Pulse Current | Reverse Leakage @ $V_{RWM}$ |
|-----------------|---------------------|----|---------------------------|---------------------------|-------------------|--------------|-------------------------------------|--------------------|-----------------------------|
|                 | UNI                 | BI | $V_{RWM}(V)$              | $V_{BR\ MIN.}(V)$         | $V_{BR\ MAX.}(V)$ | $I_T(mA)$    | $V_C(V)$                            | $I_{PP}(A)$        | $I_R(\mu A)$                |
| SJD12A(C)45L01  | MV                  | CV | 45.0                      | 50.00                     | 55.30             | 1            | 72.7                                | 2.8                | 1                           |
| SJD12A(C)48L01  | MX                  | CX | 48.0                      | 53.30                     | 58.90             | 1            | 77.4                                | 2.6                | 1                           |
| SJD12A(C)51L01  | MZ                  | CZ | 51.0                      | 56.70                     | 62.70             | 1            | 82.4                                | 2.5                | 1                           |
| SJD12A(C)54L01  | NE                  | DE | 54.0                      | 60.00                     | 66.30             | 1            | 87.1                                | 2.3                | 1                           |
| SJD12A(C)58L01  | NG                  | DG | 58.0                      | 64.40                     | 71.20             | 1            | 93.6                                | 2.3                | 1                           |
| SJD12A(C)60L01  | NK                  | DK | 60.0                      | 66.70                     | 73.70             | 1            | 96.8                                | 2.1                | 1                           |
| SJD12A(C)64L01  | NM                  | DM | 64.0                      | 71.10                     | 78.60             | 1            | 103.0                               | 2.0                | 1                           |
| SJD12A(C)70L01  | NP                  | DP | 70.0                      | 77.80                     | 86.00             | 1            | 113.0                               | 1.8                | 1                           |
| SJD12A(C)75L01  | NR                  | DR | 75.0                      | 83.30                     | 92.10             | 1            | 121.0                               | 1.7                | 1                           |
| SJD12A(C)78L01  | NT                  | DT | 78.0                      | 86.70                     | 95.80             | 1            | 126.0                               | 1.6                | 1                           |
| SJD12A(C)85L01  | NV                  | DV | 85.0                      | 94.40                     | 104.00            | 1            | 137.0                               | 1.5                | 1                           |
| SJD12A(C)90L01  | NX                  | DX | 90.0                      | 100.00                    | 111.00            | 1            | 146.0                               | 1.4                | 1                           |
| SJD12A(C)100L01 | NZ                  | DZ | 100.0                     | 111.00                    | 123.00            | 1            | 162.0                               | 1.3                | 1                           |
| SJD12A(C)110L01 | PE                  | EE | 110.0                     | 122.00                    | 135.00            | 1            | 177.0                               | 1.2                | 1                           |
| SJD12A(C)120L01 | PG                  | EG | 120.0                     | 133.00                    | 147.00            | 1            | 193.0                               | 1.1                | 1                           |
| SJD12A(C)130L01 | PK                  | EK | 130.0                     | 144.00                    | 159.00            | 1            | 209.0                               | 1.0                | 1                           |
| SJD12A(C)150L01 | PM                  | EM | 150.0                     | 167.00                    | 185.00            | 1            | 243.0                               | 0.8                | 1                           |
| SJD12A(C)160L01 | PP                  | EP | 160.0                     | 178.00                    | 197.00            | 1            | 259.0                               | 0.8                | 1                           |
| SJD12A(C)170L01 | PR                  | ER | 170.0                     | 189.00                    | 209.00            | 1            | 275.0                               | 0.8                | 1                           |

**Typical Characteristics Curves**

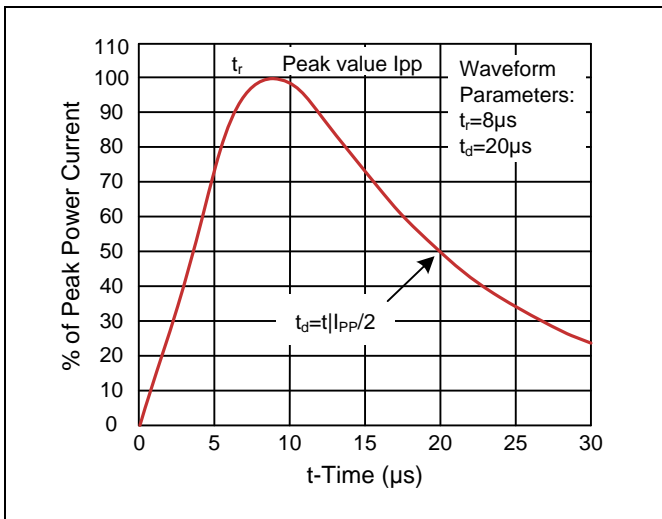
**Figure 1. Peak Pulse Power Rating Curve**



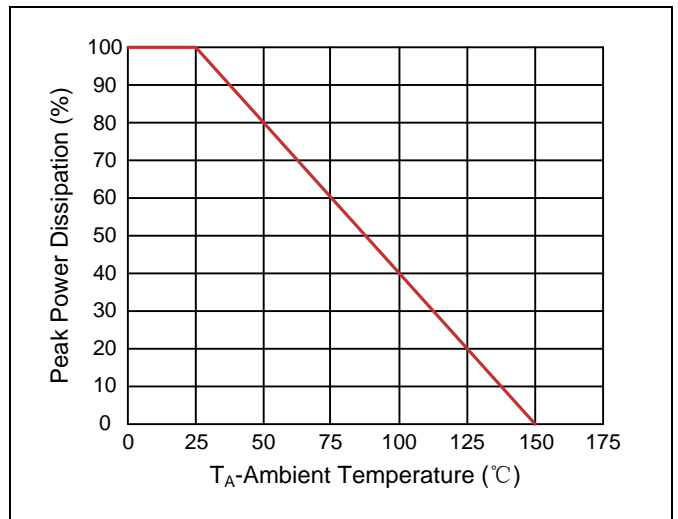
**Figure 2. 10/1000 $\mu s$  Pulse Waveforms**



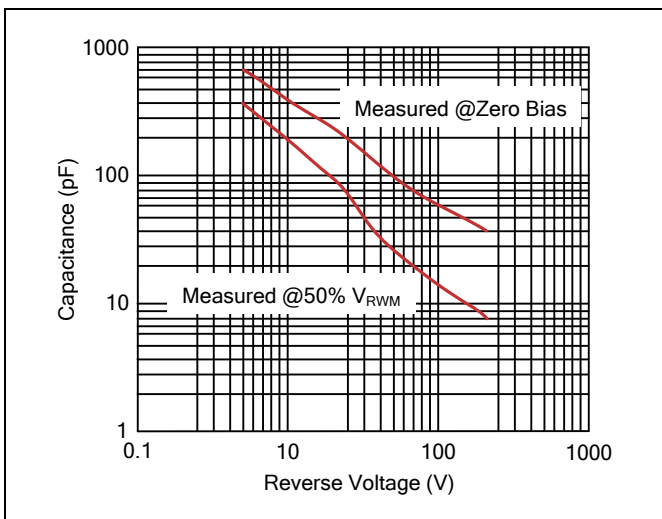
**Figure 3. 8/20 $\mu s$  Pulse Waveforms**



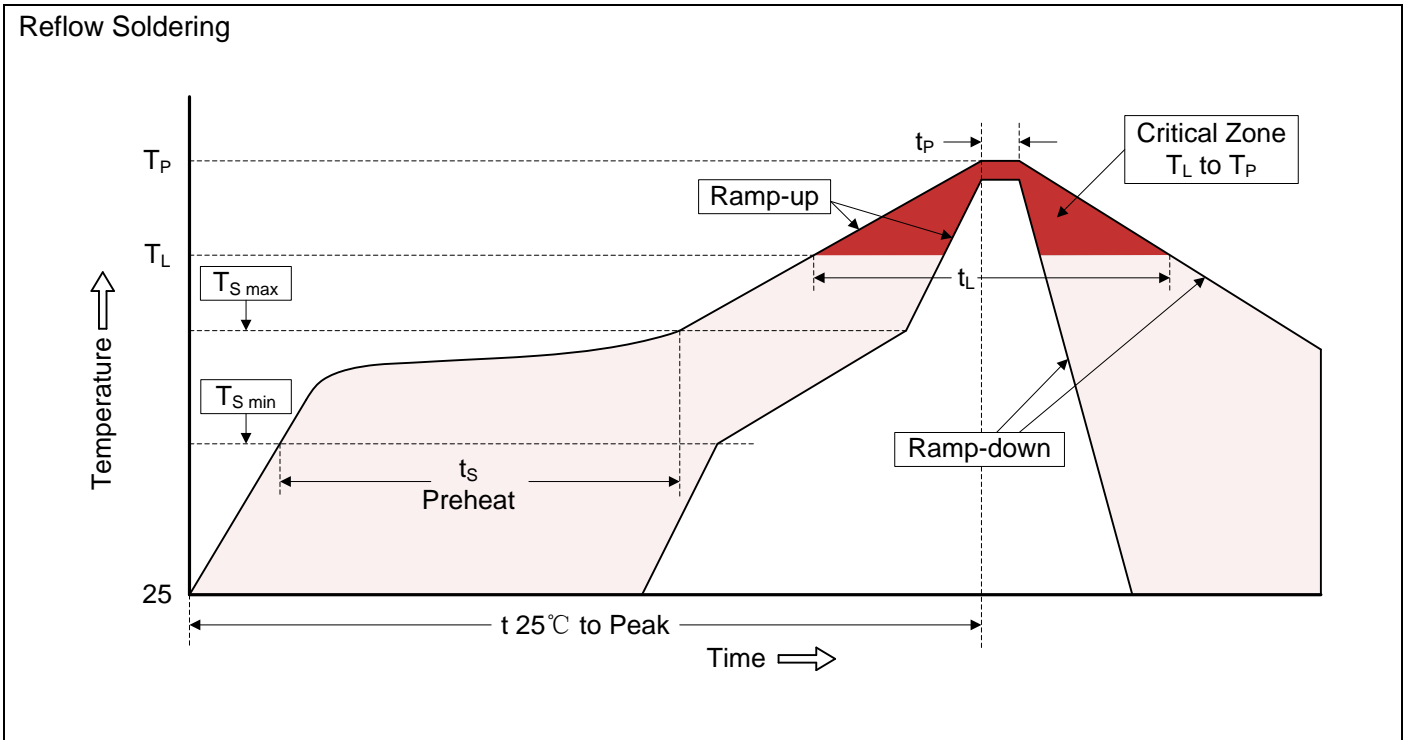
**Figure 4. Power Derating Curve**



**Figure 5. Capacitance vs. Reverse Voltage**



**Recommended Soldering Conditions**



**Recommended Conditions**

| Profile Feature   | Pb-Free Assembly                 |
|---|----------------------------------|
| Average ramp-up rate ( $T_L$ to $T_P$ )   | 3°C/second max.                  |
| Preheat<br>-Temperature Min ( $T_{S\ min}$ )<br>-Temperature Max ( $T_{S\ max}$ )<br>-Time (min to max) ( $t_s$ ) | 150°C<br>200°C<br>60-180 seconds |
| $T_{S\ max}$ to $T_L$<br>-Ramp-up Rate  | 3°C/second max.                  |
| Time maintained above:<br>-Temperature ( $T_L$ )<br>-Time ( $t_L$ )   | 217°C<br>60-150 seconds          |
| Peak Temperature ( $T_P$ )  | 260°C                            |
| Time within 5°C of actual Peak Temperature ( $t_P$ )  | 20-40 seconds                    |
| Ramp-down Rate  | 6°C/second max.                  |
| Time 25°C to Peak Temperature   | 8 minutes max.                   |

**Dimensions (SOD-123S)**

| Symbol | Dimension   |      |           |       |
|--------|-------------|------|-----------|-------|
|        | Millimeters |      | Inches    |       |
|        | Min.        | Max. | Min.      | Max.  |
| A      | 3.50        | 3.90 | 0.138     | 0.154 |
| B      | 2.60        | 3.00 | 0.102     | 0.118 |
| C      | 0.75        | 1.10 | 0.030     | 0.043 |
| D      | 1.60        | 2.00 | 0.063     | 0.079 |
| E      | 0.80Typ.    |      | 0.031Typ. |       |
| F      | 0.90        | 1.40 | 0.035     | 0.055 |
| G      | 0.18        | 0.22 | 0.007     | 0.009 |

**Packaging**

| Tape |  | Symbol            | Dimension (mm) |
|------|--|-------------------|----------------|
|      |  | W                 | 8.00±0.30      |
|      |  | P0                | 4.00±0.10      |
|      |  | P1                | 4.00±0.10      |
|      |  | P2                | 2.00±0.10      |
|      |  | D0                | Φ1.50±0.10     |
|      |  | D1                | Φ1.00±0.05     |
|      |  | E                 | 1.75±0.10      |
|      |  | F                 | 3.50±0.10      |
|      |  | A                 | 2.00±0.10      |
|      |  | B                 | 3.95±0.10      |
|      |  | K                 | 1.40±0.12      |
|      |  | t                 | 0.23±0.10      |
|      |  | Reel              |                |
|      |  | D2                | Φ13.0          |
|      |  | W1                | 9.5            |
|      |  | Quantity: 3000PCS |                |

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