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Kind regards,

Team Nexperia
1. Product profile

1.1 General description

Low capacitance unidirectional double ElectroStatic Discharge (ESD) protection array designed to protect up to two signal lines from the damage caused by ESD and other transients. The device is housed in a leadless ultra small SOT883B Surface-Mounted Device (SMD) plastic package.

1.2 Features and benefits

- ESD protection of up to two lines
- Low diode capacitance $C_d = 16 \, \text{pF}$
- Low clamping voltage $V_{CL} = 10 \, \text{V}$
- Ultra low leakage current $I_{RM} = 5 \, \text{nA}$
- ESD protection up to 15 kV
- IEC 61000-4-2; level 4 (ESD)
- IEC 61000-4-5 (surge); $I_{PPM} = 2.5 \, \text{A}$
- Ultra low leakage current $I_{RM} = 5 \, \text{nA}$
- AEC-Q101 qualified

1.3 Applications

- Computers and peripherals
- Audio and video equipment
- Cellular handsets and accessories
- Portable electronics
- SIM card protection
- Communication systems

1.4 Quick reference data

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_{RWM}$</td>
<td>reverse standoff voltage</td>
<td></td>
<td>-</td>
<td>-</td>
<td>5</td>
<td>V</td>
</tr>
<tr>
<td>$C_d$</td>
<td>diode capacitance</td>
<td>$f = 1 , \text{MHz}; , V_R = 0 , \text{V}$</td>
<td>-</td>
<td>16</td>
<td>19</td>
<td>pF</td>
</tr>
</tbody>
</table>
2. Pinning information

Table 2. Pinning

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
<th>Simplified outline</th>
<th>Graphic symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>cathode</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>cathode</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>common anode</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Ordering information

Table 3. Ordering information

<table>
<thead>
<tr>
<th>Type number</th>
<th>Package</th>
<th>Name</th>
<th>Description</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>PESD5V0L2UMB</td>
<td>-</td>
<td>leadless ultra small plastic package; 3 solder lands; body 1.0 × 0.6 × 0.37 mm</td>
<td>SOT883B</td>
<td></td>
</tr>
</tbody>
</table>

4. Marking

Table 4. Marking codes

<table>
<thead>
<tr>
<th>Type number</th>
<th>Marking code[1]</th>
</tr>
</thead>
<tbody>
<tr>
<td>PESD5V0L2UMB</td>
<td>0001 1011</td>
</tr>
</tbody>
</table>

[1] For SOT883B binary marking code description, see Figure 1.

4.1 Binary marking code description

Fig 1. SOT883B binary marking code description
5. Limiting values

Table 5. Limiting values
In accordance with the Absolute Maximum Rating System (IEC 60134).

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Per diode</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$I_{PM}$</td>
<td>rated peak pulse current</td>
<td>$t_p = 8/20\ \mu s$</td>
<td>[1][2]</td>
<td>2.5</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Per device</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$T_j$</td>
<td>junction temperature</td>
<td></td>
<td>-</td>
<td>150</td>
<td>°C</td>
</tr>
<tr>
<td>$T_{amb}$</td>
<td>ambient temperature</td>
<td></td>
<td>-55</td>
<td>+150</td>
<td>°C</td>
</tr>
<tr>
<td>$T_{stg}$</td>
<td>storage temperature</td>
<td></td>
<td>-65</td>
<td>+150</td>
<td>°C</td>
</tr>
</tbody>
</table>

[1] Device stressed with ten non-repetitive current pulses (8/20 \(\mu s\) exponential decay waveform according to IEC 61000-4-5 and IEC 61643-321).

[2] Measured from pin 1 or 2 to 3.

Table 6. ESD maximum ratings
$T_{amb} = 25\ \degree C$ unless otherwise specified.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Per diode</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$V_{ESD}$</td>
<td>electrostatic</td>
<td>IEC 61000-4-2 (contact discharge)</td>
<td>[1][2]</td>
<td>15</td>
<td>kV</td>
</tr>
<tr>
<td></td>
<td>discharge voltage</td>
<td>machine model</td>
<td></td>
<td>400</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MIL-STD-883 (human body model)</td>
<td>-</td>
<td>10</td>
<td>kV</td>
</tr>
</tbody>
</table>


[2] Measured from pin 1 or 2 to 3.

Table 7. ESD standards compliance

<table>
<thead>
<tr>
<th>Standard</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per diode</td>
<td></td>
</tr>
<tr>
<td>IEC 61000-4-2; level 4 (ESD)</td>
<td>&gt; 15 kV (air); &gt; 8 kV (contact)</td>
</tr>
<tr>
<td>MIL-STD-883; class 3B (human body model)</td>
<td>&gt; 8 kV</td>
</tr>
</tbody>
</table>
6. Characteristics

Table 8. Characteristics  
$T_{amb} = 25 ^\circ C$ unless otherwise specified.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_{RWM}$</td>
<td>reverse standoff voltage</td>
<td>$V_{RWM} = 5 \text{ V}$</td>
<td>-</td>
<td>-</td>
<td>5</td>
<td>V</td>
</tr>
<tr>
<td>$I_{RM}$</td>
<td>reverse leakage current</td>
<td>$V_{RWM} = 5 \text{ V}$</td>
<td>-</td>
<td>5</td>
<td>25</td>
<td>nA</td>
</tr>
<tr>
<td>$V_{BR}$</td>
<td>breakdown voltage</td>
<td>$I_R = 1 \text{ mA}$</td>
<td>6.46</td>
<td>6.80</td>
<td>7.14</td>
<td>V</td>
</tr>
<tr>
<td>$C_d$</td>
<td>diode capacitance</td>
<td>$f = 1 \text{ MHz}; V_R = 0 \text{ V}$</td>
<td>-</td>
<td>16</td>
<td>19</td>
<td>pF</td>
</tr>
<tr>
<td>&amp;</td>
<td></td>
<td>$f = 1 \text{ MHz}; V_R = 5 \text{ V}$</td>
<td>-</td>
<td>8</td>
<td>11</td>
<td>pF</td>
</tr>
<tr>
<td>$V_{CL}$</td>
<td>clamping voltage</td>
<td>$I_{PP} = 1 \text{ A}$</td>
<td>-</td>
<td>-</td>
<td>10</td>
<td>V</td>
</tr>
<tr>
<td>&amp;</td>
<td></td>
<td>$I_{PP} = 2.5 \text{ A}$</td>
<td>-</td>
<td>-</td>
<td>13</td>
<td>V</td>
</tr>
<tr>
<td>$r_{dyn}$</td>
<td>dynamic resistance</td>
<td>$I_R = 10 \text{ A}$</td>
<td>-</td>
<td>0.9</td>
<td>-</td>
<td>$\Omega$</td>
</tr>
</tbody>
</table>

[1] Device stressed with 8/20 $\mu$s exponential decay waveform according to IEC 61000-4-5 and IEC 61643-321.
[2] Measured from pin 1 or 2 to 3.
NXP Semiconductors

PESD5V0L2UMB

Low capacitance unidirectional double ESD protection array

Fig 4. Diode capacitance as a function of reverse voltage; typical values

\[ f = 1 \text{ MHz}; \ T_{\text{amb}} = 25 \^\circ \text{C} \]

Fig 5. V-I characteristics for a unidirectional ESD protection diode
Fig 6. ESD clamping test setup and waveforms
7. Application information

The device is designed for the protection of up to two unidirectional data or signal lines from the damage caused by ESD and surge pulses. The device may be used on lines where the signal polarities are either positive or negative with respect to ground.

Circuit board layout and protection device placement

Circuit board layout is critical for the suppression of ESD, Electrical Fast Transient (EFT) and surge transients. The following guidelines are recommended:

1. Place the device as close to the input terminal or connector as possible.
2. Minimize the path length between the device and the protected line.
3. Keep parallel signal paths to a minimum.
4. Avoid running protected conductors in parallel with unprotected conductors.
5. Minimize all Printed-Circuit Board (PCB) conductive loops including power and ground loops.
6. Minimize the length of the transient return path to ground.
7. Avoid using shared transient return paths to a common ground point.
8. Use ground planes whenever possible. For multilayer PCBs, use ground vias.

8. Test information

8.1 Quality information

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard Q101 - Stress test qualification for discrete semiconductors, and is suitable for use in automotive applications.
9. Package outline

Fig 8. Package outline SOT883B

10. Packing information

Table 9. Packing methods
The indicated -xxx are the last three digits of the 12NC ordering code.[1]

<table>
<thead>
<tr>
<th>Type number</th>
<th>Package</th>
<th>Description</th>
<th>Packing quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>PESD5V0L2UMB</td>
<td>SOT883B</td>
<td>2 mm pitch, 8 mm tape and reel</td>
<td>10000</td>
</tr>
</tbody>
</table>

[1] For further information and the availability of packing methods, see Section 14.
11. Soldering

Reflow soldering is the only recommended soldering method.

Fig 9. Reflow soldering footprint SOT883B
## 12. Revision history

<table>
<thead>
<tr>
<th>Document ID</th>
<th>Release date</th>
<th>Data sheet status</th>
<th>Change notice</th>
<th>Supersedes</th>
</tr>
</thead>
<tbody>
<tr>
<td>PESD5V0L2UMB v.1</td>
<td>20120221</td>
<td>Product data sheet</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
13. Legal information

13.1 Data sheet status

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Preliminary [short] data sheet</td>
<td>Development</td>
<td>This document contains data from the objective specification for product development.</td>
</tr>
<tr>
<td>Product [short] data sheet</td>
<td>Qualification</td>
<td>This document contains data from the preliminary specification.</td>
</tr>
<tr>
<td></td>
<td>Production</td>
<td>This document contains the product specification.</td>
</tr>
</tbody>
</table>

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2. The term ‘short data sheet’ is explained in section “Definitions”.
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