Nexperia’s new TrEOS protection devices provide the most compact method to suppress ESD in USB3.2, HDMI2.1 and other high-speed data lines. They combine two TrEOS protection diodes in one miniature DFN0603-3 package – effectively delivering two diodes in the footprint of one. Providing best-in-class ESD protection and system robustness by combining high RF performance with very low clamping and very high surge capability.

Product Features

- Bidirectional ESD protection of two lines
- Very low diode capacitance down to $C_d = 0.21 \, \text{pF}$
- Extremely low clamping to protect sensitive I/Os
- Extremely low-inductance protection path to ground
- Extremely symmetrical layout
- ESD protection up to ±25 kV acc. to IEC 61000-4-2;
- Surge robustness up to 11.0 A 8/20
- Ultra small SMD package
- Placed on one differential line pair, almost no extra PCB space demand for protection

Target Applications

- Thunderbolt, USB and HDMI 2.1 data lines
- Cellular handsets and accessories
- Portable electronics
- Communication systems
- Computers and peripherals

TrEOS Protection in DFN0603-3

Optimizing the three pillars of ESD protection

1. **Low capacitance**
   - for highest signal integrity down to 0.2 pF
2. **Low clamping & trigger**
   - for enhanced system protection down to 0.19 Ω (Ddyn)
3. **High robustness**
   - against ESD up to 30 kV & surge up to 11 A at 8/20 µs
## Product overview - Low capacitance ESD protection for high-speed interfaces in DFN0603-3

<table>
<thead>
<tr>
<th>Unidirectional</th>
<th>Bidirectional</th>
<th>$C_{pF}$</th>
<th>$V_{BRM}$ (V)</th>
<th>$V_{TRM}$ (kV)</th>
<th>$V_{Cl}$ 8 A TLP (V)</th>
<th>$V_{Cl}$ 16 A TLP (V)</th>
<th>$I_{PDM}$ 8/20 µs (A)</th>
<th>Configuration</th>
<th>Type</th>
</tr>
</thead>
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<tr>
<td>0</td>
<td>2</td>
<td>0.26</td>
<td>4</td>
<td>20</td>
<td>4.5</td>
<td>6.2</td>
<td>8</td>
<td>5.3 V @ 8 A</td>
<td>PUSB3BBZDF</td>
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<tr>
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<td>2</td>
<td>0.21</td>
<td>5</td>
<td>20</td>
<td>4.5</td>
<td>6.5</td>
<td>8.5</td>
<td>5.4 V @ 8 A</td>
<td>PESD5V0C2BDF</td>
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<tr>
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<td>2</td>
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<td>4</td>
<td>25</td>
<td>4.4</td>
<td>5.7</td>
<td>11</td>
<td>5.8 V @ 11 A</td>
<td>PESD4V0Z2BCDF</td>
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</tbody>
</table>

### AN90013 Recommendations for Printed Circuit Board assembly of DFN0603-3 (SOT8013)

This application note provides guidelines for board assembly of the ultra-small DFN0603-3 (0.63 x 0.33 mm²) leadless fully encapsulated package. The main focus is on recommendations for reflow soldering.

### Parametric search

Choose the optimal device in DFN0603-3 for your system configuration.

### TrEOS - ESD protection for USB

Check out the video on Nexperia’s TrEOS Protection technology and learn how to protect your design.

### ESD application handbook

Sharing technical insights & offering protection concepts, testing and simulation for modern interfaces.

For further information visit: nexperia.com/esdprotection

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