ESD protection for LIN nodes

Designed for ESD protection of LIN bus nodes in automotive applications

Automaker requirements to ESD robustness on module level for data lines are far above the capability of today’s data transceivers, covering only the ESD human body model. STMicroelectronics’ ESDLIN1524BJ is designed to protect LIN transceivers from hazardous electrostatic energy, providing an instantaneous response to transient over-voltages.

The asymmetric clamping structure prevents in case of electromagnetic radiation into the bus line a parasitic rectification, pulling the output DC level to an unrequested dominant status. This results in conjunction with an LC filter to a proper EMC performance. The transil diode is housed inside the popular SOD323 package and allows space saving on high density printed circuit boards.

Key features
- Electrostatic discharge capability up to 23kV
- Exceeding ESD standards
- Asymmetrical bidirectional configuration
- Ultra low leakage current
- Low clamping factor ($V_{cl}/V_{BR}$)
- Tiny SOD323 package
- RoHS compliant
- AEC-Q101 qualified

Key benefits
- Asymmetrical configuration ensures optimized electromagnetic immunity of the application
- Instantaneous response to transient over-voltages increases overall reliability
- PCB space saving due to integration of bidirectional structure in a tiny package
- Protection concept recommended by major car manufacturers
**Principal configuration of the protection circuit**

- **PCB**
- **ESDlin1524BJ**
- **GND**
- **RxD**
- **TxD**
- **LIN transceiver**
- **Vbatt**
- **LIN BUS**

**ESD test setup**

- **± 1kV ESD air discharge**

**Clamping test results**

- **Remaining voltage after +1kV ESD voltage waveform (IEC 61000-4-2 conditions)**
- **Remaining voltage after -1kV ESD voltage waveform (IEC 61000-4-2 conditions)**

**Key electrical characteristics**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESD capability</td>
<td>23kV</td>
</tr>
<tr>
<td></td>
<td>10kV</td>
</tr>
<tr>
<td>Peak pulse current</td>
<td>3A</td>
</tr>
<tr>
<td>Peak pulse power</td>
<td>160W</td>
</tr>
<tr>
<td>Leakage current</td>
<td>&lt;1nA</td>
</tr>
<tr>
<td>Stand-off voltage</td>
<td>15V/24V</td>
</tr>
<tr>
<td>Breakdown voltage</td>
<td>18.9V/27.8V</td>
</tr>
<tr>
<td>Clamp voltage</td>
<td>25V/40V</td>
</tr>
<tr>
<td>Operating junction temperature</td>
<td>-40 to +150°C</td>
</tr>
</tbody>
</table>

IEC 61000-4-2 level 4
(>8kV, contact discharge, 150pF/330Ω)
MIL STD 833 class 3 (>4kV, human body model)

**ECO PACK®**

The SOD323 package is an ECOPACK® version, compliant with the European Directive 2002/95/EC relating to restrictions on hazardous substances (RoHS).

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Full product information at www.st.com

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