

Automotive ESD Protection for High-Speed Ethernet

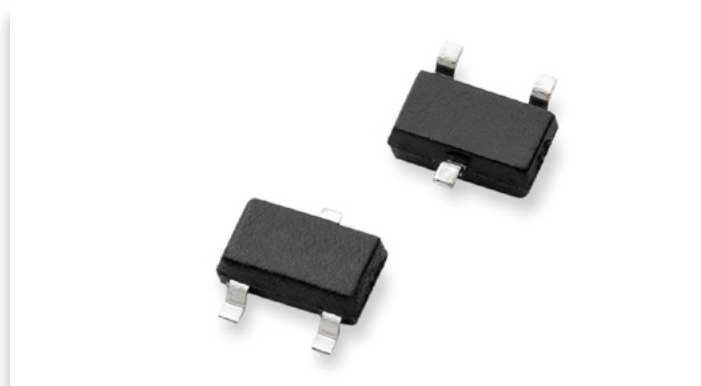
OPEN Alliance

Overview

The AQ24ETH-02HTG bidirectional TVS diode array utilizes a proprietary silicon avalanche technology to protect sensitive automotive electronics against electrostatic discharge (ESD) for compliance with OPEN Alliance 100/1000 BASE-T1 Ethernet and other high-speed data network applications. It safely absorbs repetitive ESD strikes 1000 times (OPEN Alliance specification) with ± 30 kV contact discharge, defined in ISO10605, without any performance degradation.

Features

- Surge tolerance: IEC 61000-4-5, 2nd edition, 3 A (tP= 8/20 μ s)
- ESD, ISO 10605, 150 pF 330 Ω , ± 15 kV contact at 1000 times (OPEN Alliance specification)
- ESD, ISO10605 330 pF 330 Ω , ± 30 kV contact/air
- Low leakage current of 0.1 μ A (Max) at 24 V
- High trigger voltage of 100 V (Min) at Vt1
- Very low dynamic resistance @ 0.5 Ω



Benefits

- Compliant with IEC standards for ESD suppression and lightning surge protection
- AEC-Q101-qualified and PPAP-capable
- Open Alliance 1000Base-T1 compliance
- Safely dissipates high surge events

Conclusion of Test Results

- Safely dissipates high surge events There is no Pass / Fail evaluation done for those tests because of the required class for the ESD protection device depends on customer requirements for ESD robustness of the complete 1000BASE-T1 interface and the ESD robustness of 1000BASE-T1 transceiver to be protected from ESD damage.
- Result is Pass because of the maximum defined limit class is fulfilled by the ESD suppression device.
- The result is according to OPEN Alliance: IEEE 1000BASE-T1 EMC Test Specification for ESD suppression devices, version 1.0, October 30, 2020

Table 1. Test Results

Single test	Result	Comment / Resulting class
S-Parameter	Pass	
Damage ESD	Pass	
ESD Discharge Current Measurement / CMC Saturation class I	Pass)2	± 3 kV: class III ± 5 kV: class III ± 6 kV: class III ± 7 kV: class III ± 15 kV: class III
RF Clamping	Pass)2	Class III

Applications

- OPEN Alliance 100/1000 BASE-T1 ethernet
- High-speed data networks
- Low-Voltage Differential Signaling (LVDS) automotive



Figure 1. Application Diagram

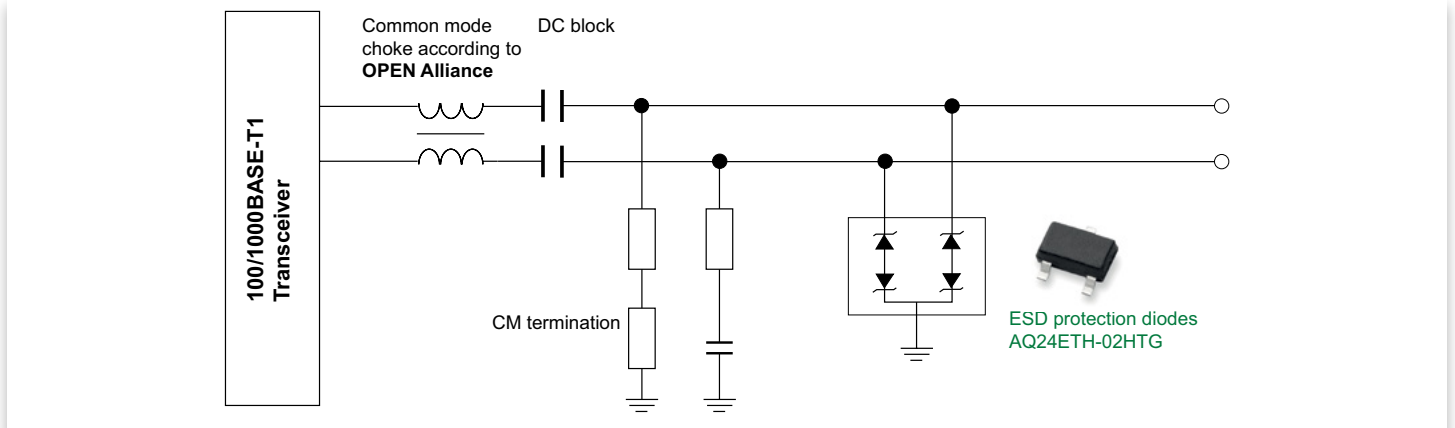


Figure 2. Low Capacitance

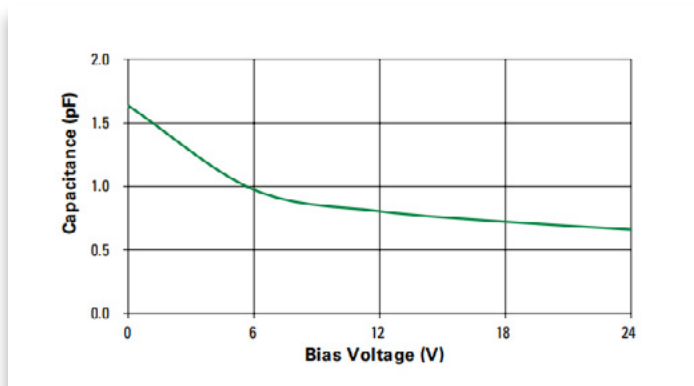
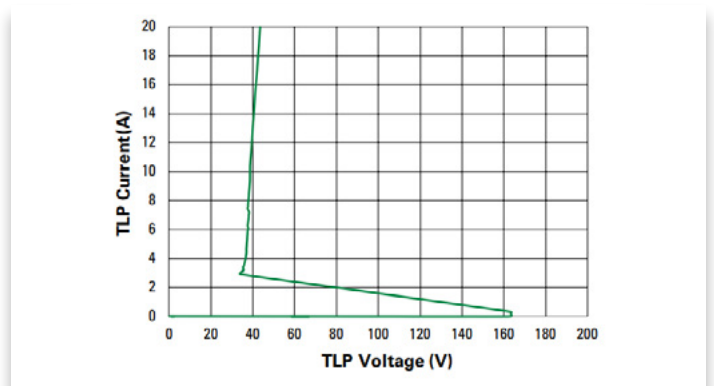


Figure 3. Positive TLP Plot



For more information about [AQ24ETH-02HTG diode arrays](#), please look for its product datasheet on [Littelfuse.com](http://www.littelfuse.com).



For more information about [Automotive application](#), please look for the ecatalog on [Littelfuse.com](http://www.littelfuse.com)