ESD Protection - In-Vehicle Networks

Automotive Qualified Low Capacitance High Speed Data Network Protection

SZESD9901

The SZESD9901 protects sensitive automotive electronics from ESD, Surge, and other harmful transient events. This device is designed for compliance to OPEN Alliance 100/1000 BASE−T1 Ethernet, and other high speed data networks. Device is suitable for ESD protection on the connector side of the transceiver PHY.

Features

- High Trigger Voltage ≥ 100 V
- X2DFN 1.0 x 0.6 mm Package
- Wettable Flank Package for Optimal Automated Optical Inspection (AOI)
- SZ Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q101 Qualified and PPAP Capable
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

Typical Applications

- Open Alliance 100/1000 BASE−T1 Ethernet
- In Vehicle Networking (IVN)
- High Speed Data Networks

MAXIMUM RATINGS (T_J = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Operating Junction Temperature Range	T_J	−55 to +150	°C
Storage Temperature Range	T_{stg}	−55 to +150	°C
Lead Solder Temperature − Maximum (10 Seconds)	T_L	260	°C
IEC 61000−4−2 Contact (ESD) IEC 61000−4−2 Air (ESD) ISO 10605 150 pF / 330 Ω Contact* ISO 10605 330 pF / 330 Ω Contact ISO 10605 330 pF / 2 kΩ Contact ISO 10605 150 pF / 2 kΩ Contact * minimum number of discharges > 1000	ESD	±30 ±30 ±30 ±30 ±30 ±30	kV
Maximum Peak Pulse Current 8/20 μs	I_{pp}	2.2	A

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

Complies with the Following Standards:

- ISO7637−2, Jumpstart, Load Dump
- Open Alliance 100/1000 BASE−T1 Ethernet
- ISO7637−3, Pulse 2a 85 V, 3a 3b 150 V

ON Semiconductor®

www.onsemi.com

MARKING DIAGRAM

X2DFNW2
CASE 711BG

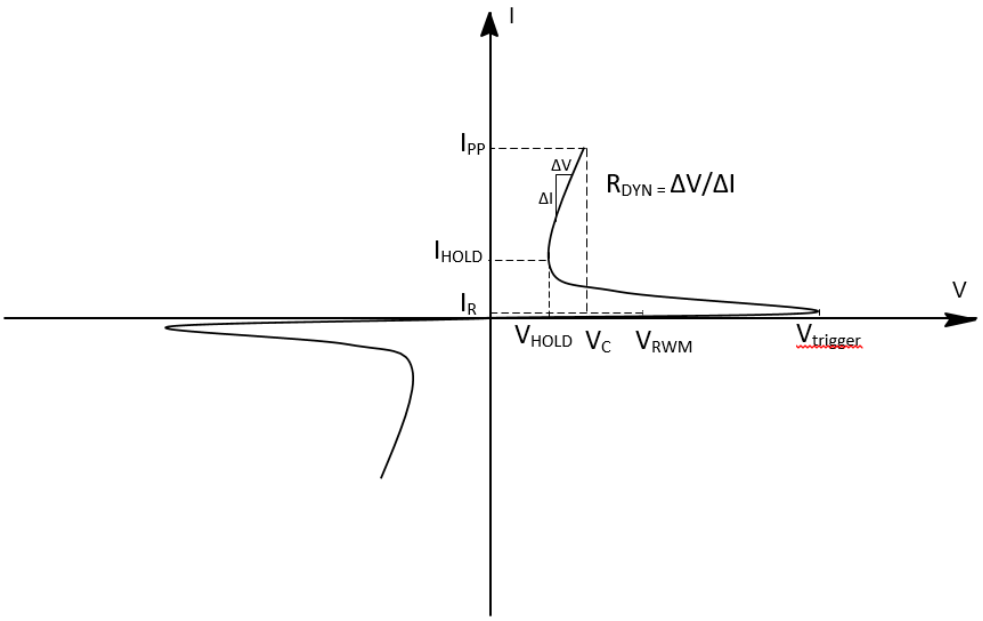
DA = Specific Device Code
M = Date Code

PIN CONNECTIONS

ORDERING INFORMATION

Device	Package	Shipping†
SZESD9901MX2WT5G	X2DFNW2 (Pb−Free)	8,000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.



ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reverse Working Voltage	V_{RWM}	I/O Pin to GND			25	V
Reverse Leakage Current	I_R	V_{RWM} = 25 V		1	200	nA
Reverse Holding Voltage	V_{HOLD}	I/O Pin to GND	25			V
ESD Trigger Voltage (Note 2)	$V_{trigger}$		100			V
Reverse Peak Pulse Current	I_{PP}	per IEC61000−4−5 (8x20 μs)			2.2	A
Channel Capacitance	$C_{Jio-gnd}$	V_R = 0 V, f = 1 MHz		2.3	2.6	pF
Dynamic Resistance (Note 2)	R_{DYN}	I/O to GND, GND to I/O		0.4		Ω

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

1. For test procedure see Figure 6 and application note AND8307/D.
2. ANSI/ESD STM5.5.1 − Electrostatic Discharge Sensitivity Testing using Transmission Line Pulse (TLP) Model.
   TLP conditions: Z_0 = 50 Ω, t_p = 100 ns, t_r = 1 ns, averaging window: t_1 = 70 ns to t_2 = 90 ns.

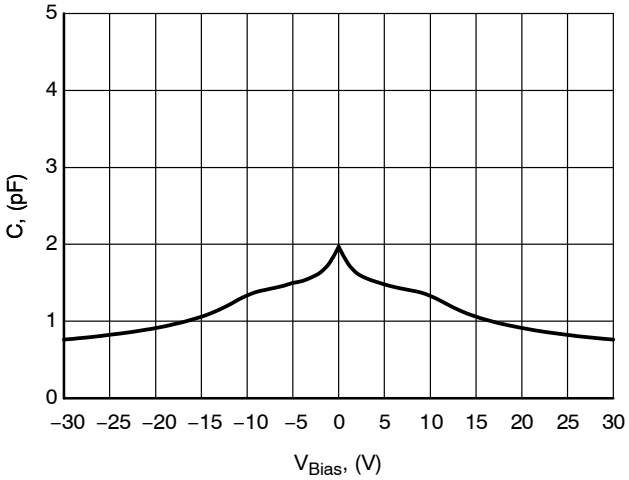


Figure 2. CV Characteristics

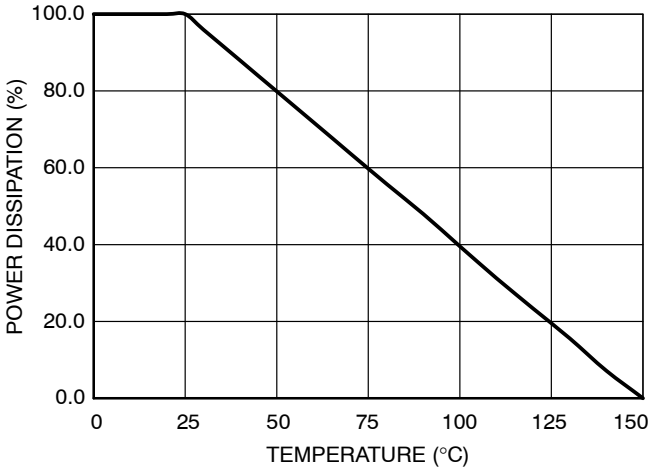


Figure 3. Steady State Power Derating

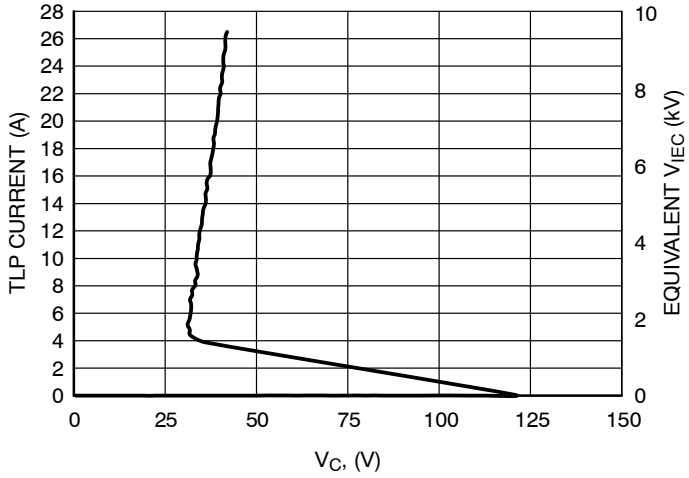


Figure 4. Positive TLP IV Curve

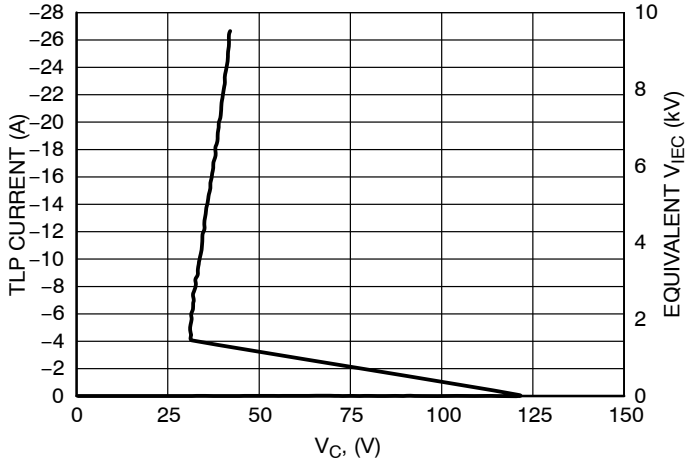


Figure 5. Negative TLP IV Curve

IEC 61000−4−2 Spec.

Level	Test Voltage (kV)	First Peak Current (A)	Current at 30 ns (A)	Current at 60 ns (A)
1	2	7.5	4	2
2	4	15	8	4
3	6	22.5	12	6
4	8	30	16	8

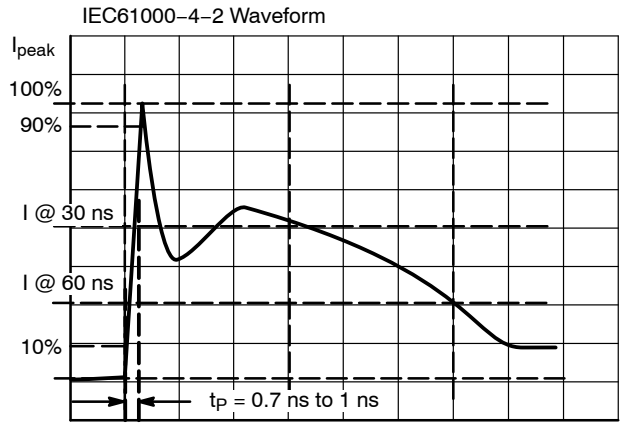


Figure 6. IEC61000−4−2 Spec

Transmission Line Pulse (TLP) Measurement

Transmission Line Pulse (TLP) provides current versus voltage (I−V) curves in which each data point is obtained from a 100 ns long rectangular pulse from a charged transmission line. A simplified schematic of a typical TLP system is shown in Figure 7. TLP I−V curves of ESD protection devices accurately demonstrate the product's ESD capability because the 10s of amps current levels and under 100 ns time scale match those of an ESD event. This is illustrated in Figure 8 where an 8 kV IEC 61000−4−2 current waveform is compared with TLP current pulses at 8 A and 16 A. A TLP I−V curve shows the voltage at which the device turns on as well as how well the device clamps voltage over a range of current levels.

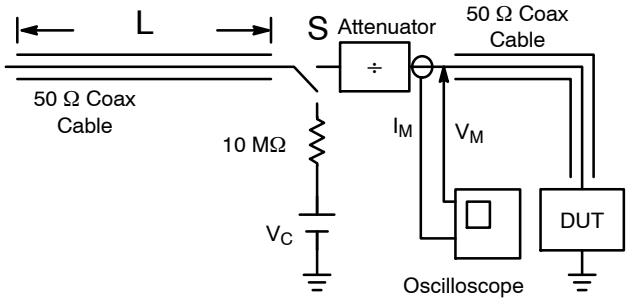


Figure 7. Simplified Schematic of a Typical TLP System

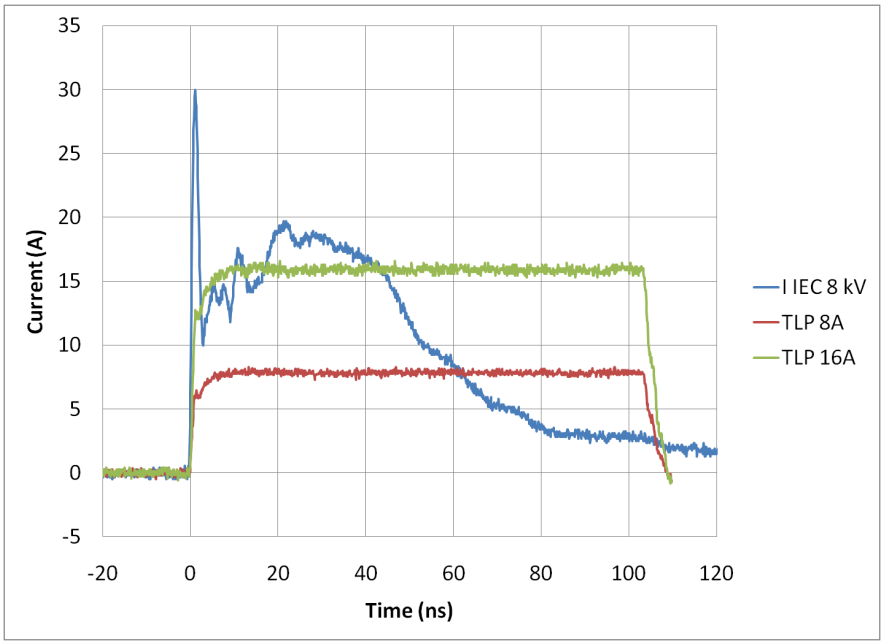


Figure 8. Comparison Between 8 kV IEC 61000−4−2 and 8 A and 16 A TLP Waveforms

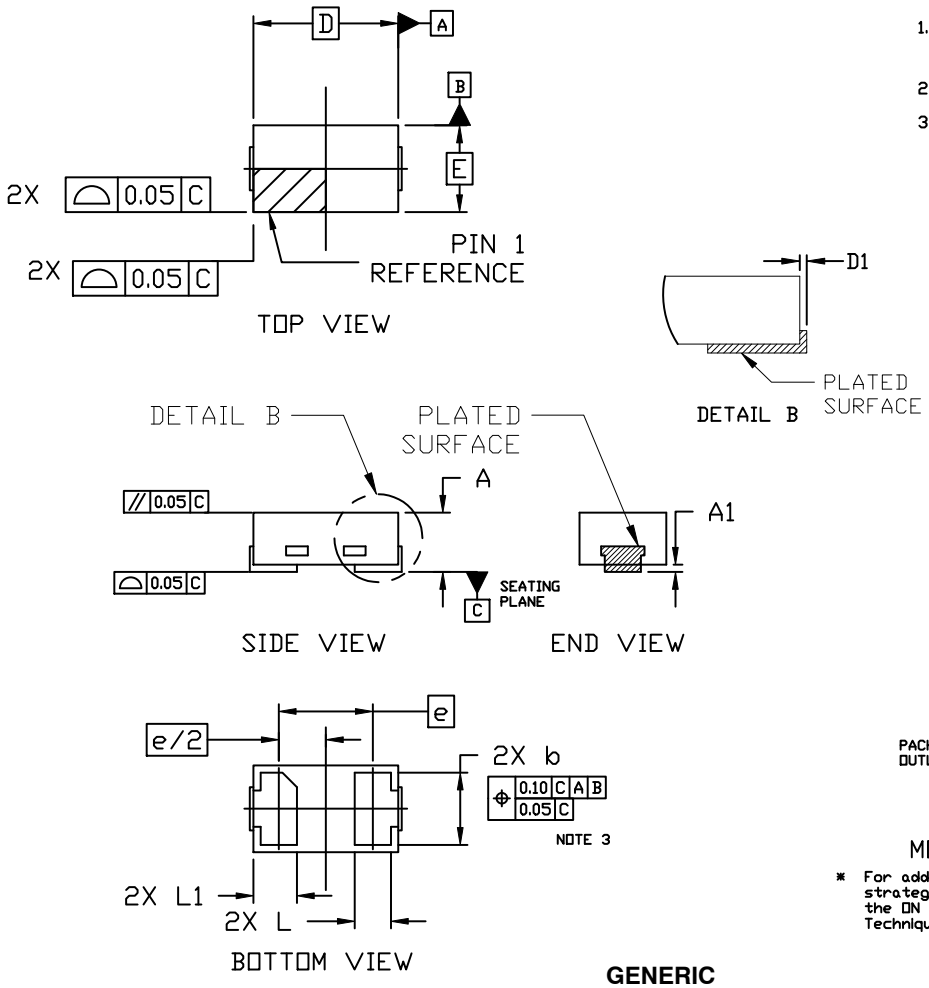
MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

ON Semiconductor®

X2DFNW2 1.0x0.6, 0.65P
CASE 711BG
ISSUE C

SCALE 8:1

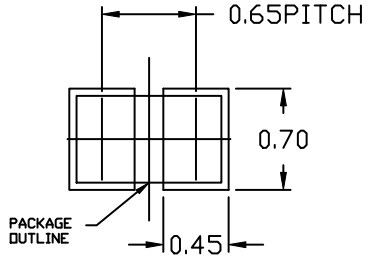
DATE 13 SEP 2019



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSION b APPLIES TO THE PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 FROM THE TERMINAL TIP.

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.34	0.37	0.40
A1	---	---	0.05
b	0.45	0.50	0.55
D	0.90	1.00	1.10
D1	---	---	0.05
E	0.50	0.60	0.70
e	0.65 BSC		
L	0.22 REF		
L1	0.24	0.285	0.34



RECOMMENDED
MOUNTING FOOTPRINT

* For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

GENERIC MARKING DIAGRAM*

XX = Specific Device Code
M = Date Code

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G”, may or not be present. Some products may not follow the Generic Marking.

DOCUMENT NUMBER:	**98AON15241G**	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped “CONTROLLED COPY” in red.
DESCRIPTION:	**X2DFNW2 1.0X0.6, 0.65P**	**PAGE 1 OF 1**

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Email Requests to: orderlit@onsemi.com

onsemi Website: www.onsemi.com

TECHNICAL SUPPORT
North American Technical Support:
Voice Mail: 1 800−282−9855 Toll Free USA/Canada
Phone: 011 421 33 790 2910

Europe, Middle East and Africa Technical Support:
Phone: 00421 33 790 2910
For additional information, please contact your local Sales Representative

◊

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for ESD Suppressors / TVS Diodes ***category:***

Click to view products by ON Semiconductor ***manufacturer:***

Other Similar products are found below :

60KS200C D18V0L1B2LP-7B D5V0F4U5P5-7 NTE4902 P4KE27CA P6KE11CA P6KE8.2A SA60CA SA64CA SMBJ12CATR SMBJ33CATR SMBJ6.5A SMBJ8.0A ESD101-B1-02ELS E6327 ESD112-B1-02EL E6327 ESD7451N2T5G 19180-510 CPDT-5V0USP-HF 3.0SMCJ33CA-F 3.0SMCJ36A-F HSPC16701B02TP JANTX1N6126A D3V3Q1B2DLP3-7 D55V0M1B2WS-7 SCM1293A-04SO ESD200-B1-CSP0201 E6327 SM12-7 CEN955 W/DATA VESD12A1A-HD1-GS08 CPDQC5V0-HF D1213A-01LP4-7B ESD101-B1-02EL E6327 AOZ8808DI-03 5KP15A 5KP48A 5KP90A ESD3V3D7-TP 15KPA36A-LF P4KE56CA P4KE68A P4KE91CATR P6KE120A P6KE13CA P6KE43CA P6KE6.8CA P6KE8.2 P6SMBJ20CA JANTX1N6072A SR2835ESKG SA90CA