ULTRA-LOW CAPACITANCE BIDIRECTIONAL TVS DIODE

Product Summary

V_{BR} (Min)	I_{PP} (Max)	C_T (Typ)
5V	4A	0.15pF

Description

This new generation TVS is designed to protect high-speed data lines and voltage sensitive electronics from high transient conditions and ESD. The combination of small size and high ESD surge capability makes it ideal for use in NB/PC/Server such as Thunderbolt™ 3/4 and USB Type-C® with 20Gbps.

Applications

- Thunderbolt 3 and 4
- USB-C
- USB 20Gbps
- Computers and peripherals

Features

- Ultra-Small, Low Profile Leadless Surface-Mount Package (0.6mm × 0.3mm × 0.3mm)
- Provides ESD Protection per IEC 61000-4-2 Standard: Air ±15kV, Contact ±14kV
- 1 Channel of ESD Protection
- Ultra-Low Channel Input Capacitance
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative. https://www.diodes.com/quality/product-definitions/**

Mechanical Data

- Package: X3-DFN0603-2
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish Au over NiAu Leadframe, Solderable per MIL-STD-202, Method 208 e4
- Weight: 0.0002 grams (Approximate)

X3-DFN0603-2

Top View Bottom View

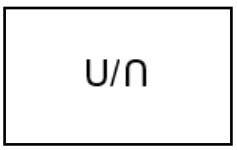
Device Schematic

Ordering Information (Note 4)

Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
DESD3V3ZS1BLP3-7	X3-DFN0603-2	U/∩	7	8	10,000	Reel

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See https://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information



U/∩ = Product Type Marking Code

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit	Conditions
Peak Pulse Current	I_{PP}	4.0	A	8/20µs
ESD Protection – Contact Discharge	$V_{ESD\_CONTACT}$	±14	kV	IEC 61000-4-2 Standard
ESD Protection – Air Discharge	V_{ESD_AIR}	±15	kV	IEC 61000-4-2 Standard

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Package Power Dissipation (Note 5)	P_D	250	mW
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	500	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
Reverse Standoff Voltage	V_{RWM}	-3.3	—	3.3	V	—
Channel Leakage Current (Note 6)	I_{RM}	—	—	100	nA	V_{RWM} = ±3.3V
Breakdown Voltage	V_{BR}	5.0	—	9.0	V	I_R = 250µA
Clamping Voltage (IEC 61000-4-5)	V_C	—	4.5	—	V	I_{PP} = 4A, tp = 8/20µs
ESD Clamping Voltage (Note 7)	V_{CL}	—	4.6	—	V	I_{PP} = 8A, TLP, tp = 100ns
		—	6.7	—		I_{PP} = 16A, TLP, tp = 100ns
Dynamic Resistance	R_{DYN}	—	0.34	—	Ω	TLP, 5A to 16A, tp = 100ns
Channel Input Capacitance	C_T	—	0.15	—	pF	V_R = 1V, f = 1MHz
		—	0.13	—		V_R = 1V, f = 1GHz

Notes:
5. Device mounted on FR-4 PCB pad layout (2oz copper) as shown on Diodes Incorporated's suggested pad layout, which can be found on our website at http://www.diodes.com/package-outlines.html.
6. Short duration pulse test used to minimize self-heating effect.
7. Transmission Line Pulse Test (TLP) settings: tp = 100ns, tr = 1ns, ITLP and VTLP averaging window is from 70ns to 90ns.

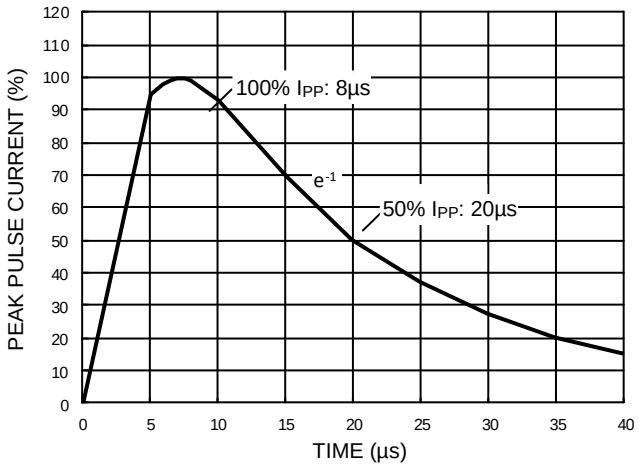


Figure 1. 8/20µs Pulse Waveform According to IEC 61000-4-5

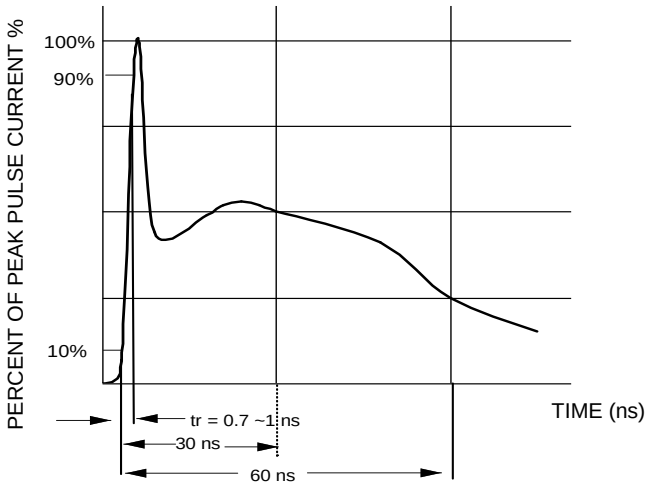


Figure 2. ESD Pulse Waveform According to IEC 61000-4-2

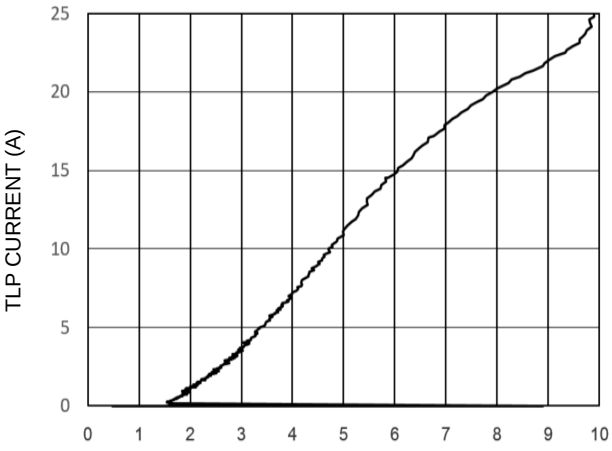


Figure 3. TLP Curve (tp = 100ns)

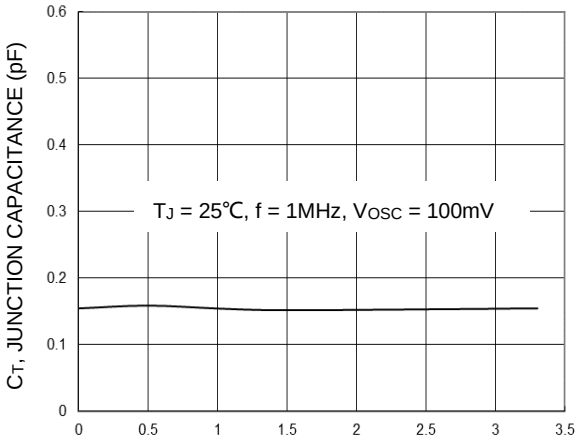


Figure 4. Typical Junction Capacitance

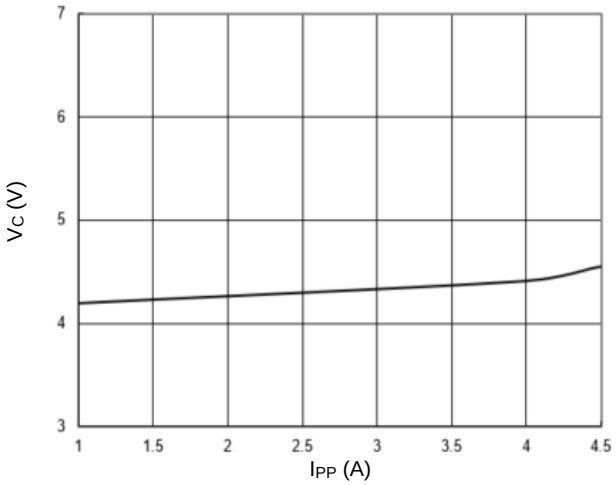


Figure 5. Typical Peak Clamping Voltage V_C vs. Peak Pulse Current I_{PP}

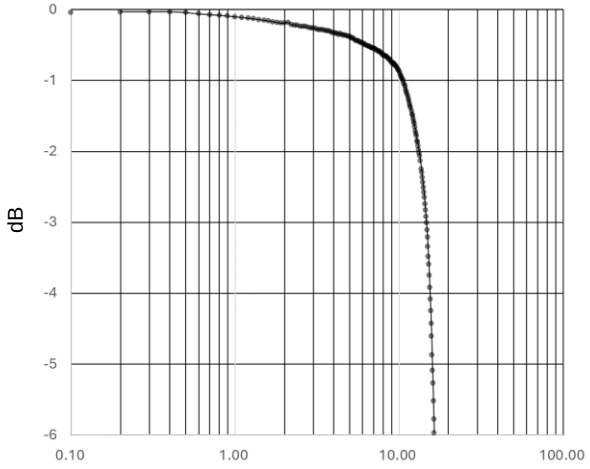
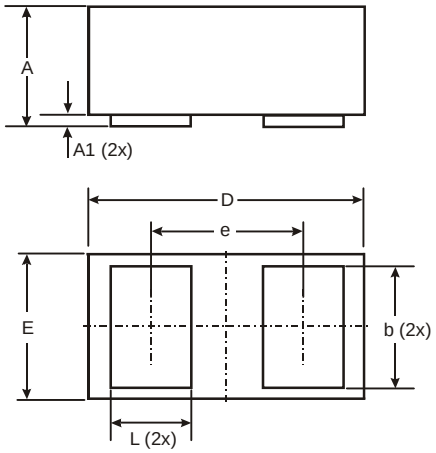


Figure 6. Insertion Loss (Hz)

Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

X3-DFN0603-2

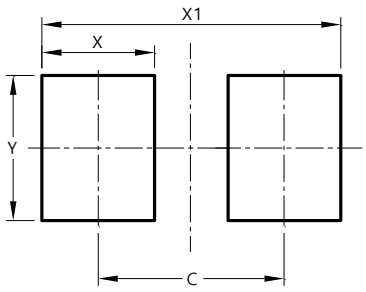


X3-DFN0603-2			
Dim	**Min**	**Max**	**Typ**
A	0.27	0.35	0.30
A1	0.00	0.03	0.02
b	0.19	0.29	0.24
D	0.595	0.645	0.62
E	0.295	0.345	0.32
e	-	-	0.355
L	0.14	0.24	0.19
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

X3-DFN0603-2



Dimensions	Value (in mm)
C	0.380
X	0.230
X1	0.610
Y	0.300

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