

Product Summary

V_{BR} (Min)	I_{PP} (Max)	C_T (Typ)
4V	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 Type-C with 20Gbps.

Applications

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

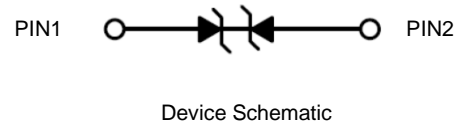
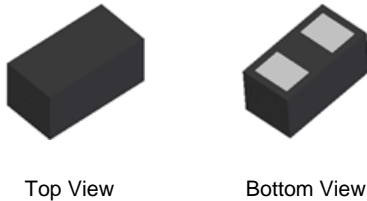
Features

- Ultra-Small, Low Profile Leadless Surface-Mount Package (0.6mm × 0.3mm × 0.3mm)
- Provides ESD Protection per IEC 61000-4-2 Standard: Air ±16kV, 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](mailto:contact@diodes.com) 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



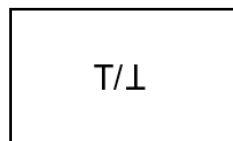
Ordering Information (Note 4)

Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
DESD1V5ZS1BLP3-7	X3-DFN0603-2	T/⊥	7	8	10,000	Tape & 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

X3-DFN0603-2



T/⊥ = 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}	±16	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 _{θJA}	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}	-1.5	—	1.5	V	—
Channel Leakage Current (Note 6)	I _{RM}	—	—	100	nA	V _{RWM} = ±1.5V
Breakdown Voltage	V _{BR}	4.0	—	8.0	V	I _T = 250μA
Clamping Voltage (IEC 61000-4-5)	V _C	—	4.5	—	V	I _{PP} = 4A, t _p = 8/20μs
ESD Clamping Voltage (Note 7)	V _{CL}	—	4.6	—	V	I _{PP} = 8A, TLP, t _p = 100ns
		—	6.7	—		I _{PP} = 16A, TLP, t _p = 100ns
Dynamic Resistance	R _{DYN}	—	0.34	—	Ω	TLP, 5A to 16A, t _p = 100ns
Channel Input Capacitance	C _T	—	0.15	—	pF	V _R = 1V, f = 1MHz
		—	0.13	—		V _R = 1V, f = 1GHz

- Notes:
- 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.
 - Short duration pulse test used to minimize self-heating effect.
 - Transmission Line Pulse Test (TLP) settings: t_p = 100ns, t_r = 1ns, ITLP and VTLP averaging window is from 70ns to 90ns.

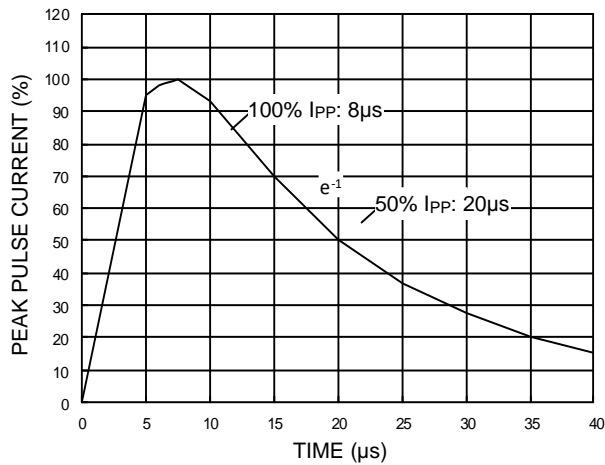


Figure 1. 8/20µs Pulse Waveform According to IEC 61000-4-5

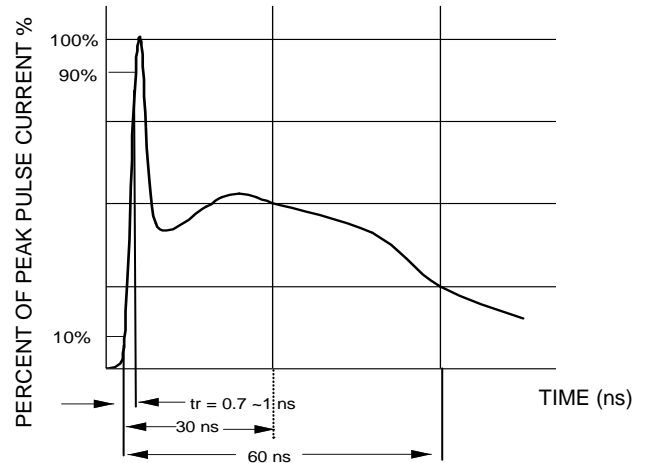


Figure 2. ESD Pulse Waveform According to IEC 61000-4-2

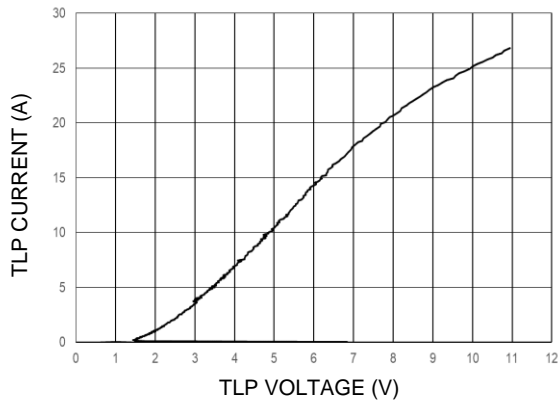


Figure 3. TLP Curve (tp = 100ns)

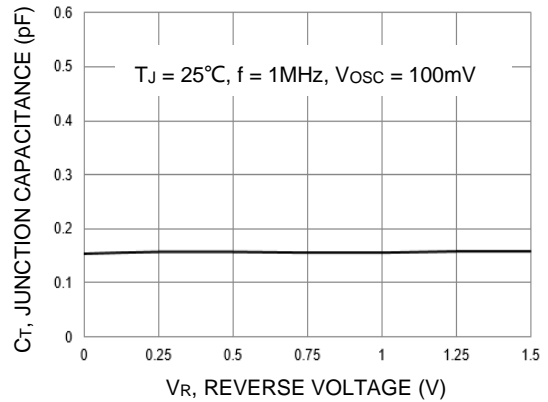


Figure 4. Typical Junction Capacitance

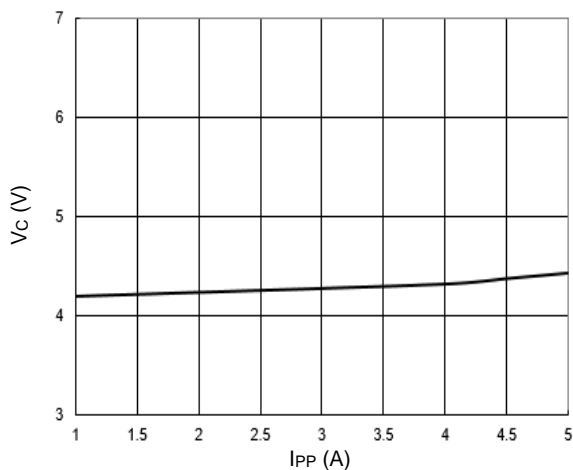


Figure 5. Typical Peak Clamping Voltage V_c vs. Peak Pulse Current I_{PP}

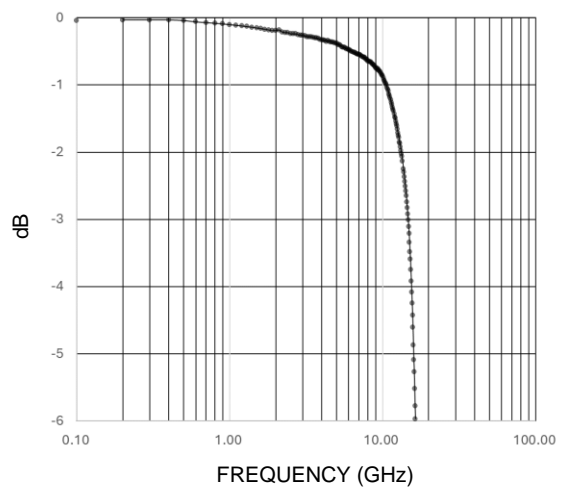
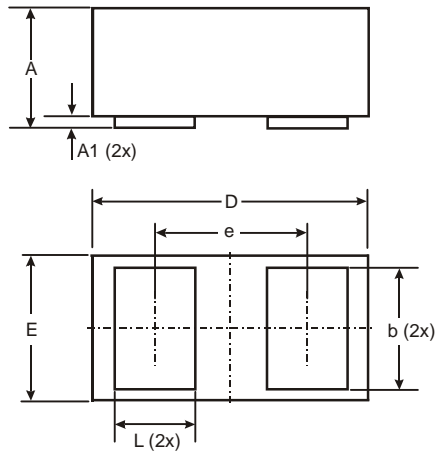


Figure 6. Insertion Loss (Hz)

Package Outline Dimensions

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

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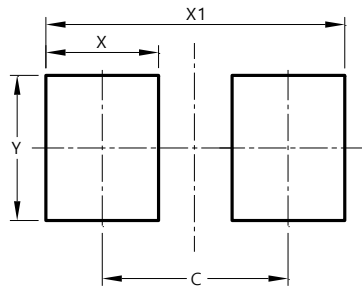


X3-DFN0603-2			
Dim	Min	Max	Typ
A	0.27	0.35	0.30
A1	0.00	0.03	0.02
b	0.19	0.29	0.24
D	0.595	0.645	0.62
E	0.295	0.345	0.32
e	-	-	0.355
L	0.14	0.24	0.19
All Dimensions in mm			

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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