

Product Summary

V _{BR_MIN}	I _{PP_MAX}	C _{IN_Max}
13V	3A	0.5pF

Description

This new generation TVS is designed to protect sensitive electronics from the damage due to ESD. The combination of small size and high ESD surge capability makes it ideal for use in portable applications such as USB3.1 and Thunderbolt 3.

Applications

- USB3.1
- Thunderbolt 3
- Computers and Peripheral

Features

- Provides ESD Protection per IEC 61000-4-2 Standard: Air ±14kV, Contact ±14kV
- 1 Channel of ESD Protection
- 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-Q100/101/200, 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/>**

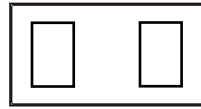
Mechanical Data

- Package: X2-DSN0603-2
- Package Material: Chip Scale Package
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: NiAu Bump. Solderable per MIL-STD-202, Method 208^(e4)
- Weight: 0.0002 grams (Approximate)

X2-DSN0603-2



Top View



Bottom View



Device Schematic

Ordering Information (Note 4)

Part Number	Compliance	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
						Qty.	Carrier
D12V0X1B2CSP-7	Standard	X2-DSN0603-2	NN	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 http://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



NN = Product Type Marking Code
Bar = Pin1 Direction

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

Characteristic	Symbol	Value	Unit	Condition
Peak Pulse Power Dissipation	PPP	78	W	8/20μs, per Figure 3
Peak Pulse Current	I _{PP}	3	A	8/20μs, per Figure 3
ESD Protection – Air Discharge	V _{ESD_AIR}	±14	kV	IEC61000-4-2 Standard
ESD Protection – Contact Discharge	V _{ESD_CONTACT}	±14	kV	IEC61000-4-2 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}	-65 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}	—	—	12	V	—
Channel Leakage Current (Note 6)	I _{RM}	—	0.01	1	μA	V _{RWM} = 12V
Clamping Voltage	V _{CL}	—	—	20	V	I _{PP} = 1A, t _P = 8/20μs
		—	—	26		I _{PP} = 3A, t _P = 8/20μs
		—	34	—		I _{TLP} = 16A, t _P = 100ns
Dynamic Resistance	R _{DYN}	—	1	—	Ω	I _{TLP} = 4A to 16A, t _P = 100ns
Breakdown Voltage	V _{BR}	13	15	18	V	I _R = 1mA
Channel Input Capacitance	C _{IN}	—	—	0.5	pF	V _R = 0V, f = 1MHz

- 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.

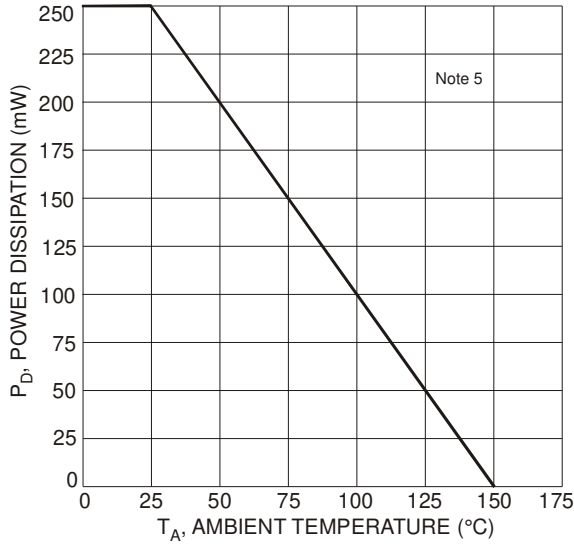


Figure 1 Power Derating Curve

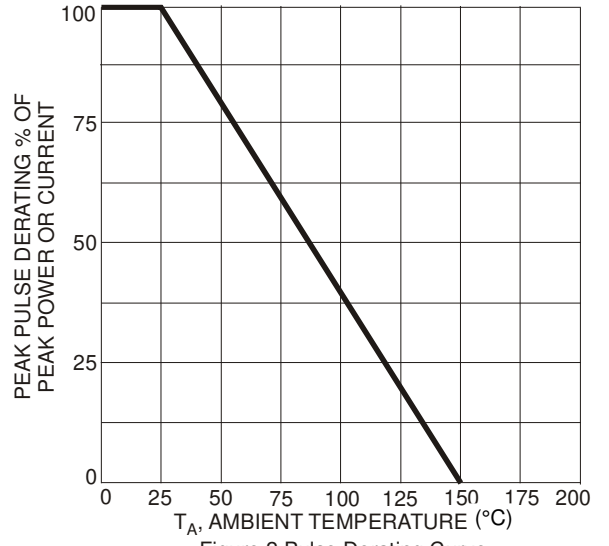


Figure 2 Pulse Derating Curve

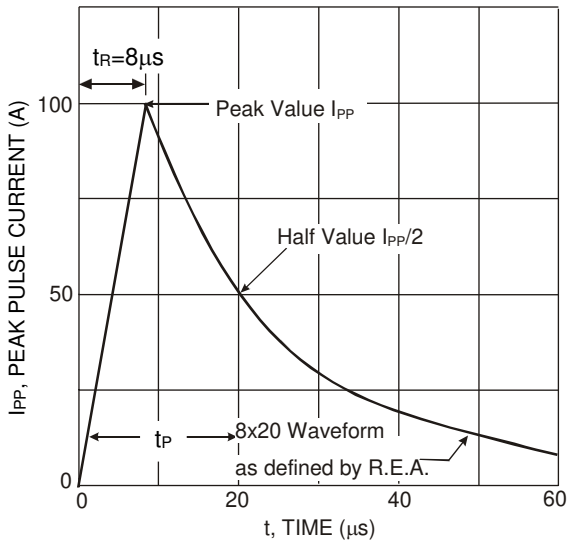


Figure 3 Pulse Waveform

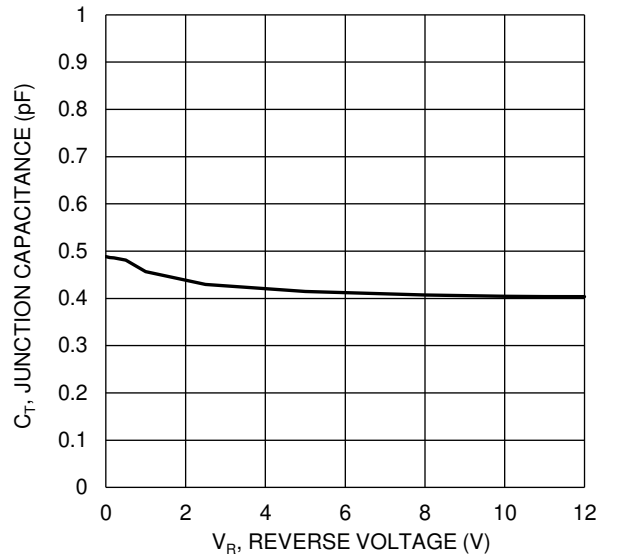


Figure 4 Typical Total Capacitance

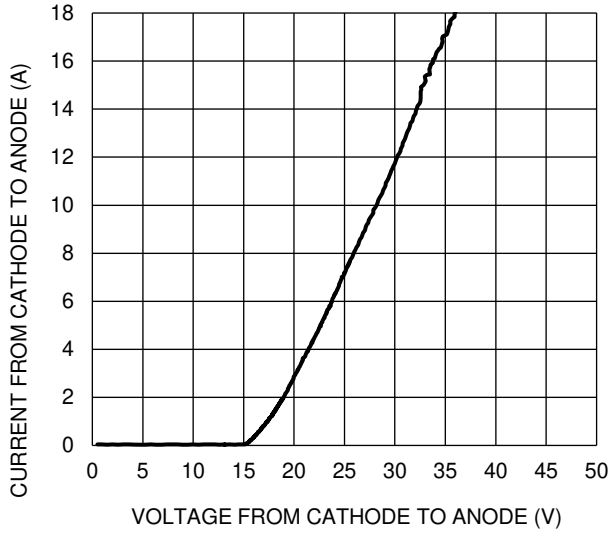


Figure 5 TLP Curve (tp=100ns)

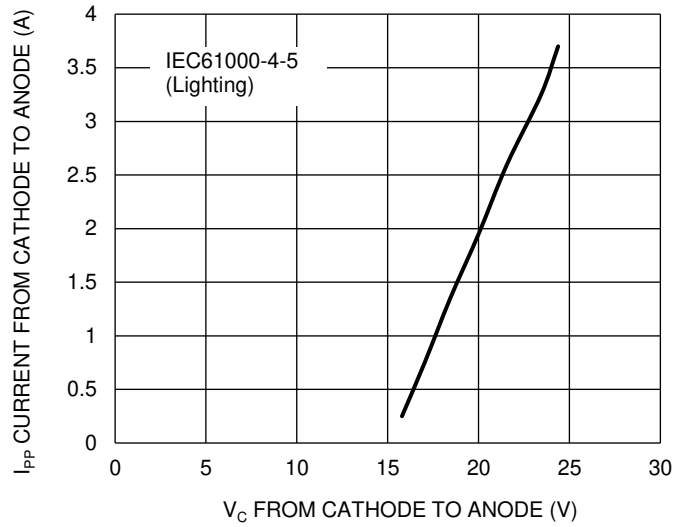


Figure 6 Clamping Voltage Characteristic (Surge)

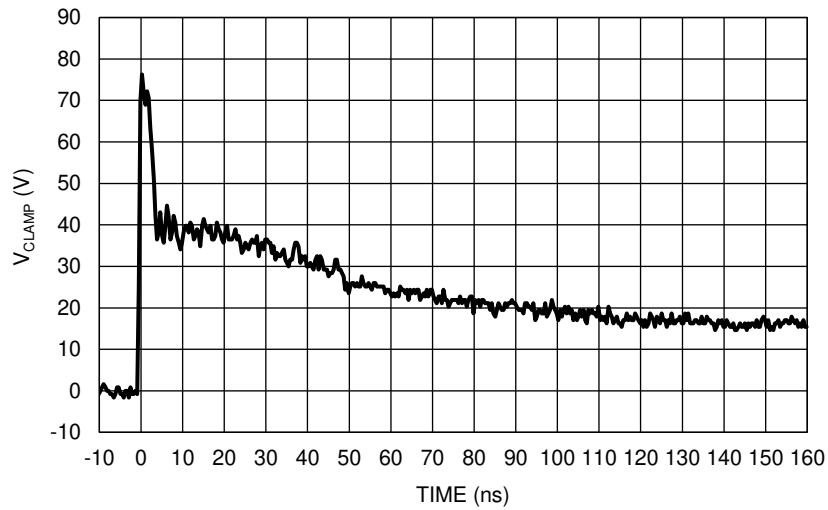


Figure 7 ESD Clamping Voltage of IEC61000-4-2 8kV Contact Mode

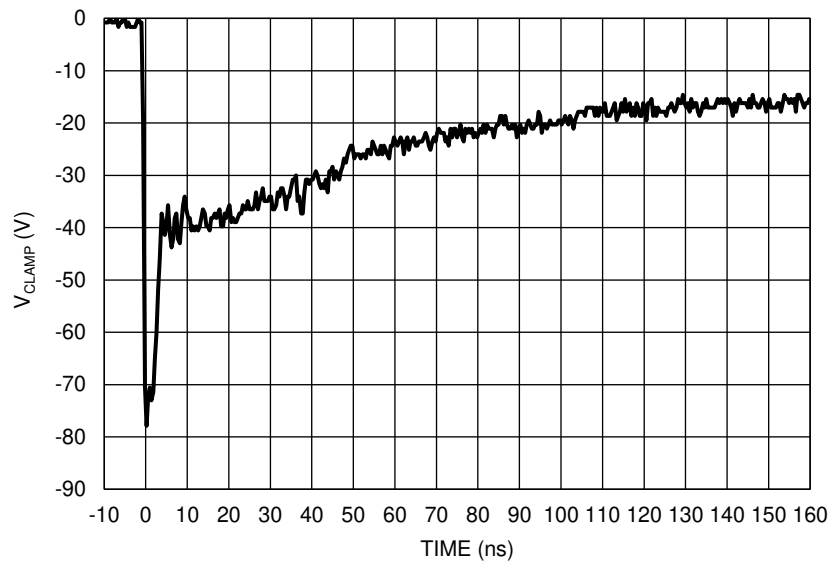
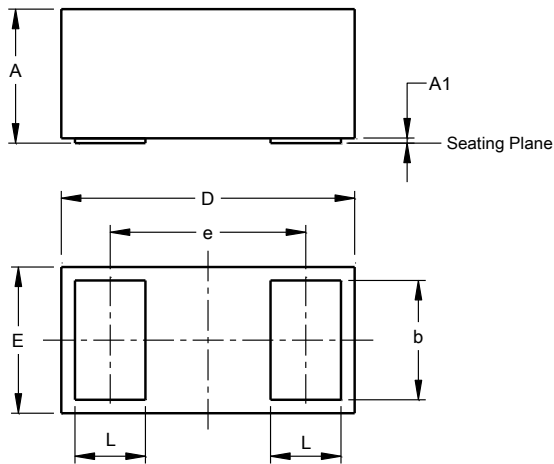


Figure 8 ESD Clamping Voltage of IEC61000-4-2 8kV Contact Mode

Package Outline Dimensions (Note 7)

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

X2-DSN0603-2



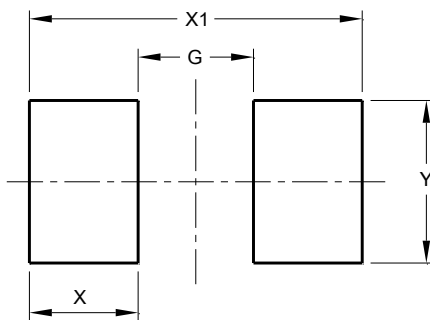
X2-DSN0603-2			
Dim	Min	Max	Typ
A	0.280	0.320	0.300
A1	0.00	0.020	0.010
b	0.220	0.260	0.240
D	0.575	0.625	0.600
E	0.275	0.325	0.300
e	-	-	0.400
L	0.120	0.160	0.140
All Dimensions in mm			

Note 7: Device side walls are electrically active bare silicon. Avoid contact of solder or flux on the side walls during the PCB assembly process.

Suggested Pad Layout

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

X2-DSN0603-2



Dimensions	Value (in mm)
G	0.206
X	0.194
Y	0.291
X1	0.594

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