

Product Summary

V _{BR_MIN}	I _{PP_MAX}	C _{T_Typ}
5V	10.5A	0.3pF

Description

The DIODES™ D3V3Z1BD2CSP is an extremely low capacitance of 0.3 pF ESD protection device designed specifically to protect high-speed differential lines. These devices can also be used for EOS protection due to their high peak pulse current capability (10.5A, t_P = 8/20μs). It has excellent ESD protection features, highlighted by low peak ESD clamping voltage and high ESD withstand voltage (+/-20kV contacts per IEC 61000-4-2). The small package DSN 0.60 x 0.30 x 0.30 gives designers the flexibility to protect a single line in applications.

Applications

- USB3.0, USB3.1 and USB3.2 Gen 2 x 2
- USB type-C
- HDMI 1.4, HDMI 2.0 and HDMI 2.1
- Thunderbolt 2, thunderbolt 3
- 10G Ethernet
- WiFi-6 AnT

Features

- Provides ESD Protection per IEC 61000-4-2 Standard: Air ±20kV, Contact ±20V
- Bidirectional ESD Protection of One Line
- Extremely Low Capacitance Cd = 0.3pF
- Extremely Low Clamping Voltage to Protect Sensitive I/Os
- Low Reverse Leakage Current: 50nA Max at V_R = 3.3V
- 10.5A Maximum 8/20μs Peak Pulse Current
- **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/>

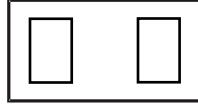
Mechanical Data

- Package: 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

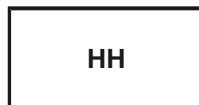
Ordering Information (Note 4)

Part Number	Package	Marking Code	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
D3V3Z1BD2CSP-7	X2-DSN0603-2	HH	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



HH = Product Type Marking Code

Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Unit	Condition
Peak Pulse Power Dissipation	P_{PP}	55	W	8/20 μs , per Figure 3
Peak Pulse Current	I_{PP}	10.5	A	8/20 μs , per Figure 3
ESD Protection – Air Discharge	V_{ESD_AIR}	± 20	kV	IEC61000-4-2 Standard
ESD Protection – Contact Discharge	$V_{ESD_CONTACT}$	± 20	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)	$R_{\theta JA}$	500	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ.	Max	Unit	Test Conditions
Reverse Standoff Voltage	V_{RWM}	—	—	3.3	V	—
Channel Leakage Current (Note 6)	I_{RM}	—	—	50	nA	$V_{RWM} = 3.3\text{V}$
Clamping Voltage	V_{CL}	—	5.3	—	V	$I_{PP} = 10.5\text{A}, t_P = 8/20\mu\text{s}$
		—	5	—		$I_{PP} = 16\text{A}, TLP, t_P = 100\text{ns}$
Breakdown Voltage	V_{BR}	5	—	9	V	$I_R = 1\text{mA}$
Differential Resistance	R_{DYN}	—	0.14	—	Ω	$TLP = 4\text{A to } 16\text{A}, t_P = 100\text{ns}$
Channel Input Capacitance	C_T	—	0.3	0.34	pF	$V_R = 0\text{V}, f = 1\text{MHz}$

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.

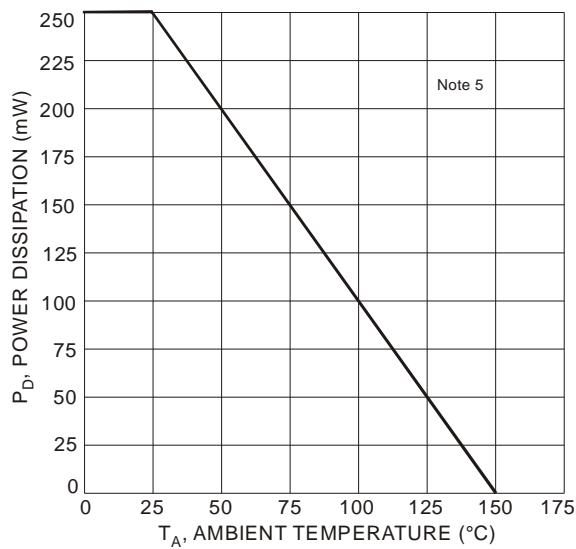


Figure 1 Power Derating Curve

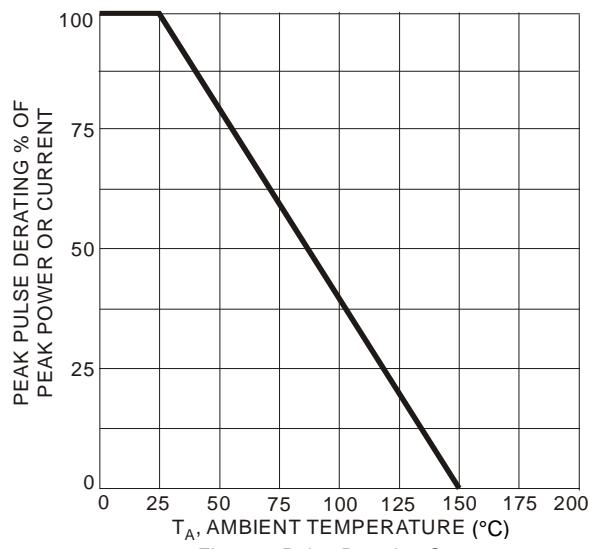


Figure 2 Pulse Derating Curve

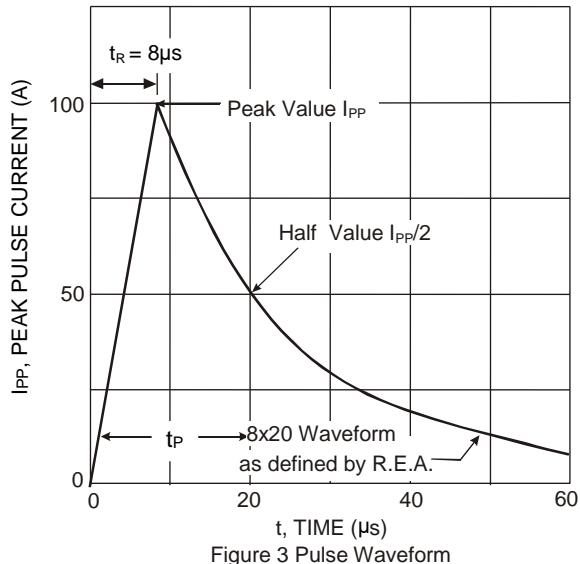


Figure 3 Pulse Waveform

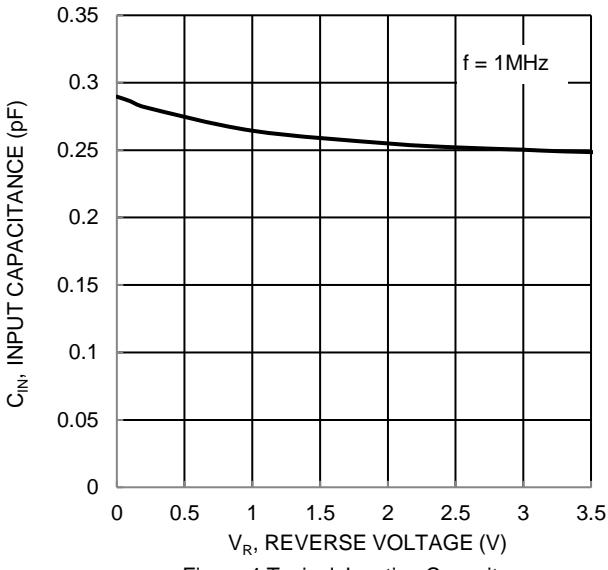


Figure 4 Typical Junction Capacitance

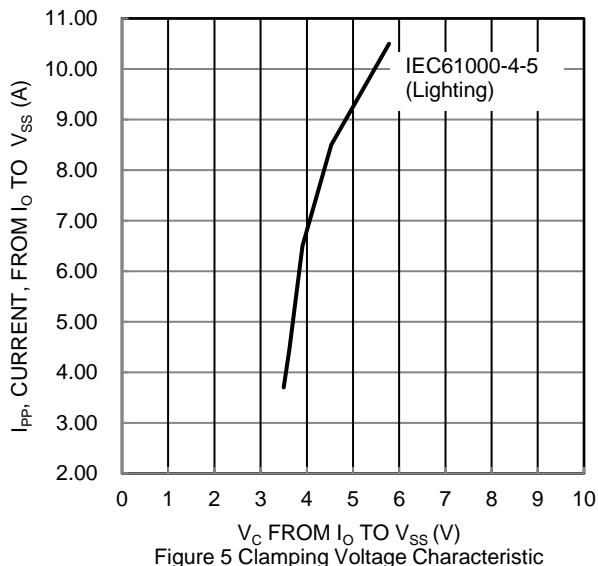


Figure 5 Clamping Voltage Characteristic

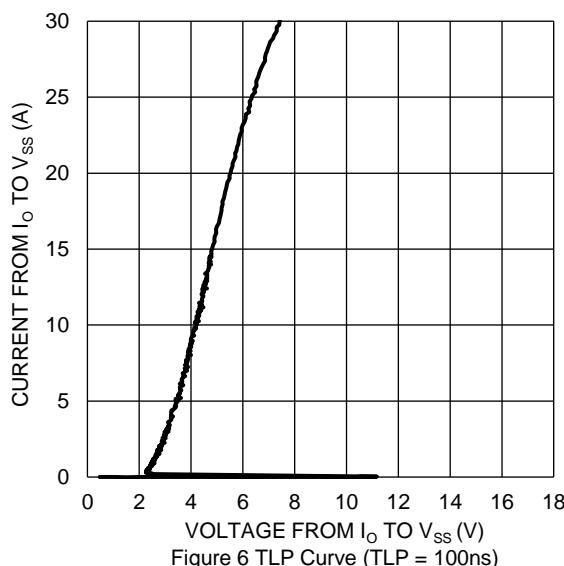
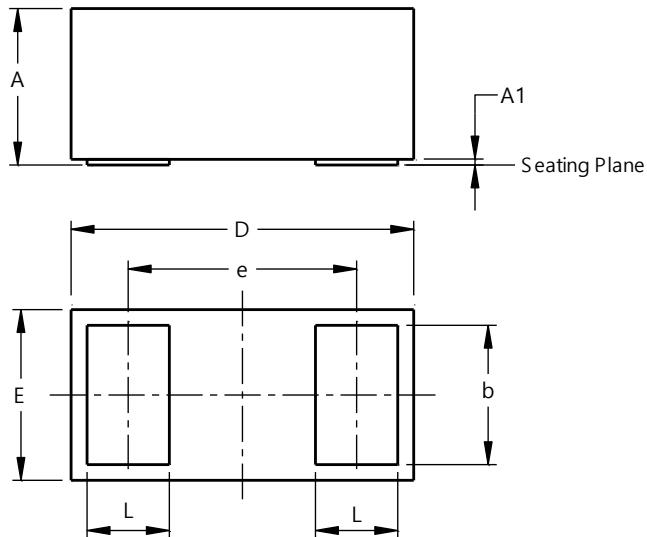


Figure 6 TLP Curve (TLP = 100ns)

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

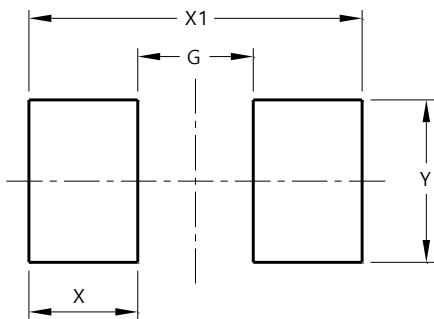
All Dimensions in mm

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

IMPORTANT NOTICE

1. DIODES INCORPORATED (Diodes) AND ITS SUBSIDIARIES MAKE NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO ANY INFORMATION CONTAINED IN THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

2. The Information contained herein is for informational purpose only and is provided only to illustrate the operation of Diodes' products described herein and application examples. Diodes does not assume any liability arising out of the application or use of this document or any product described herein. This document is intended for skilled and technically trained engineering customers and users who design with Diodes' products. Diodes' products may be used to facilitate safety-related applications; however, in all instances customers and users are responsible for (a) selecting the appropriate Diodes products for their applications, (b) evaluating the suitability of Diodes' products for their intended applications, (c) ensuring their applications, which incorporate Diodes' products, comply the applicable legal and regulatory requirements as well as safety and functional-safety related standards, and (d) ensuring they design with appropriate safeguards (including testing, validation, quality control techniques, redundancy, malfunction prevention, and appropriate treatment for aging degradation) to minimize the risks associated with their applications.

3. Diodes assumes no liability for any application-related information, support, assistance or feedback that may be provided by Diodes from time to time. Any customer or user of this document or products described herein will assume all risks and liabilities associated with such use, and will hold Diodes and all companies whose products are represented herein or on Diodes' websites, harmless against all damages and liabilities.

4. Products described herein may be covered by one or more United States, international or foreign patents and pending patent applications. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks and trademark applications. Diodes does not convey any license under any of its intellectual property rights or the rights of any third parties (including third parties whose products and services may be described in this document or on Diodes' website) under this document.

5. Diodes' products are provided subject to Diodes' Standard Terms and Conditions of Sale (<https://www.diodes.com/about/company/terms-and-conditions/terms-and-conditions-of-sales>) or other applicable terms. This document does not alter or expand the applicable warranties provided by Diodes. Diodes does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel.

6. Diodes' products and technology may not be used for or incorporated into any products or systems whose manufacture, use or sale is prohibited under any applicable laws and regulations. Should customers or users use Diodes' products in contravention of any applicable laws or regulations, or for any unintended or unauthorized application, customers and users will (a) be solely responsible for any damages, losses or penalties arising in connection therewith or as a result thereof, and (b) indemnify and hold Diodes and its representatives and agents harmless against any and all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim relating to any noncompliance with the applicable laws and regulations, as well as any unintended or unauthorized application.

7. While efforts have been made to ensure the information contained in this document is accurate, complete and current, it may contain technical inaccuracies, omissions and typographical errors. Diodes does not warrant that information contained in this document is error-free and Diodes is under no obligation to update or otherwise correct this information. Notwithstanding the foregoing, Diodes reserves the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. This document is written in English but may be translated into multiple languages for reference. Only the English version of this document is the final and determinative format released by Diodes.

8. Any unauthorized copying, modification, distribution, transmission, display or other use of this document (or any portion hereof) is prohibited. Diodes assumes no responsibility for any losses incurred by the customers or users or any third parties arising from any such unauthorized use.

9. This Notice may be periodically updated with the most recent version available at <https://www.diodes.com/about/company/terms-and-conditions/important-notice>

The Diodes logo is a registered trademark of Diodes Incorporated in the United States and other countries.
DIODES is a trademark of Diodes Incorporated in the United States and other countries.

All other trademarks are the property of their respective owners.
© 2022 Diodes Incorporated. All Rights Reserved.

www.diodes.com