

Product Summary

V_{BR} (MIN)	PPP (MAX)	I_R (MAX)
8.33V to 53.1V	4000W	1000nA

Description

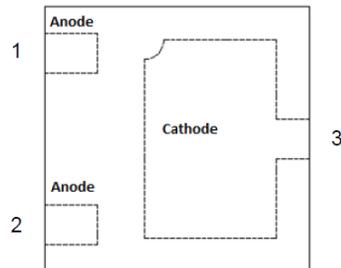
These new generation TVS Dx(x)VxS1U3LP20 are a series of unidirectional high surge transient voltage suppressors designed to protect power rails such as batteries and VBUS from ESD or surge events. The VRWM range is from 7.5V to 48V. This component contains a unidirectional TVS diode in a single package.

The Dx(x)VxS1U3LP20 offers low clamping voltage and high current rating, making it ideal for power rail protection in mobile and computing devices.

Applications

- Mobile phones
- VBUS
- Portable electronics
- Computing and peripherals

U-DFN2020-3 (Type C)



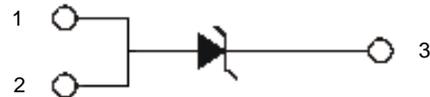
Top View

Features

- Provides ESD Protection per IEC 61000-4-2 Standard: Air ± 30 kV, Contact ± 30 kV
- One 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-Q100/101/104/200, 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: U-DFN2020-3
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208 **(e4)**
- Weight: 0.004 grams (Approximate)



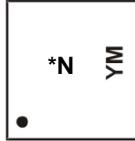
1 and 2 must be electrically connected at the PCB

Ordering Information (Note 4)

Part Number	Package	Marking Code	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
D7V5S1U3LP20-7	U-DFN2020-3 (Type C)	75N	7	8	3,000	Tape & Reel
D10V0S1U3LP20-7	U-DFN2020-3 (Type C)	10N	7	8	3,000	Tape & Reel
D12V0S1U3LP20-7	U-DFN2020-3 (Type C)	12N	7	8	3,000	Tape & Reel
D15V0S1U3LP20-7	U-DFN2020-3 (Type C)	2N	7	8	3,000	Tape & Reel
D18V0S1U3LP20-7	U-DFN2020-3 (Type C)	3N	7	8	3,000	Tape & Reel
D20V0S1U3LP20-7	U-DFN2020-3 (Type C)	4N	7	8	3,000	Tape & Reel
D22V0S1U3LP20-7	U-DFN2020-3 (Type C)	5N	7	8	3,000	Tape & Reel
D24V0S1U3LP20-7	U-DFN2020-3 (Type C)	7N	7	8	3,000	Tape & Reel
D26V0S1U3LP20-7	U-DFN2020-3 (Type C)	6N	7	8	3,000	Tape & Reel
D30V0S1U3LP20-7	U-DFN2020-3 (Type C)	9N	7	8	3,000	Tape & Reel
D36V0S1U3LP20-7	U-DFN2020-3 (Type C)	11N	7	8	3,000	Tape & Reel
D48V0S1U3LP20-7	U-DFN2020-3 (Type C)	13N	7	8	3,000	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



*N = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: L = 2024)
 M = Month (ex: 9 = September)

Date Code Key

Year	2018	-	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Code	F	-	L	M	N	P	R	S	T	U	V	W
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

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

Characteristic	Symbol	Value	Unit	Conditions
Peak Pulse Power Dissipation	P _{PP}	4000	W	8/20µs (Note 6)
Peak Pulse Power Dissipation	P _{PP}	320	W	10/1000µs
ESD Protection – Contact Discharge	V _{ESD_CONTACT}	±30	kV	Standard IEC 61000-4-2
ESD Protection – Air Discharge	V _{ESD_AIR}	±30	kV	Standard IEC 61000-4-2

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P _D	500	mW
Thermal Resistance, Junction to Ambient T _A = +25°C	R _{θJA}	250	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

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

Part Number	Reverse Standoff Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) I _R = 1mA		Reverse Leakage Current I _{RM} (nA) at V _{RWM}	Rated Peak Pulse Current I _{PPM} (A) 8/20µs	Rated Peak Pulse Current I _{PPM} (A) 10/1000µs	Clamping Voltage V _{CL} (V) at I _{PPM} 8/20µs	Clamping Voltage V _{CL} (V) at I _{PPM} 10/1000µs	Capacitance C _T (pF) V _R = 0V f = 1MHz	
		Min	Typ							Max
D7V5S1U3LP20-7	7.5	8.33	—	9.21	1000	250	27	18.5	12.4	2235
D10V0S1U3LP20-7	10.0	11.1	—	12.8	500	200	18	23.2	18.1	1430
D12V0S1U3LP20-7	12	13.3	—	14.7	200	145	13.5	27.5	23.7	1242
D15V0S1U3LP20-7	15	16.7	—	18.5	200	140	13	30.5	24.6	1054
D18V0S1U3LP20-7	18	20.0	—	22.1	200	120	11	33.3	29.1	880
D20V0S1U3LP20-7	20	22.2	—	24.5	200	110	10	36.4	32.0	785
D22V0S1U3LP20-7	22	24.4	—	26.9	200	98	9	40.8	35.6	727
D24V0S1U3LP20-7	24	26.7	—	29.5	200	90	8	44.4	40.0	667
D26V0S1U3LP20-7	26	28.9	—	31.9	200	80	7	50.0	45.7	625
D30V0S1U3LP20-7	30	32.0	—	42.0	200	62	6	64.5	52.0	387
D36V0S1U3LP20-7	36	40.2	—	44.4	200	47	4.3	69.2	59.5	505
D48V0S1U3LP20-7	48	53.1	—	59.1	200	43	3	85.0	73.8	420

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. Clamping voltage value is based on an 8x20µs peak pulse current (I_{PP}) waveform, measured from Pin1 and Pin2 to Pin3.

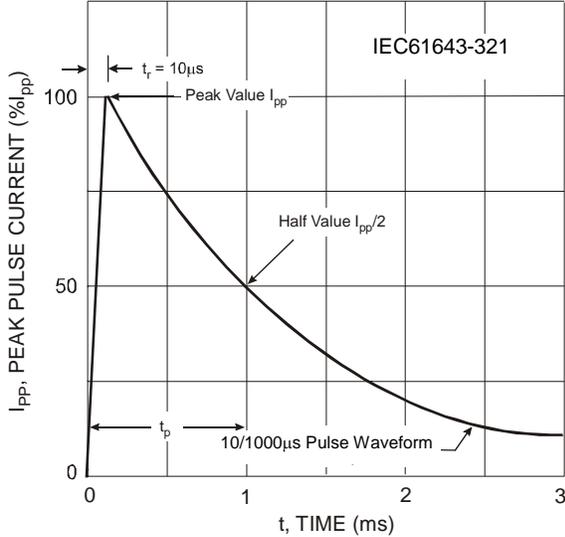


Figure 1 Pulse Waveform

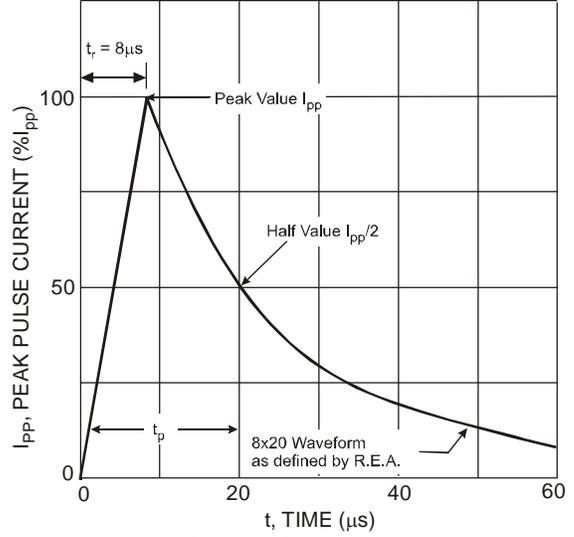


Figure 2 Typical 8 x 20μs Pulse Waveform

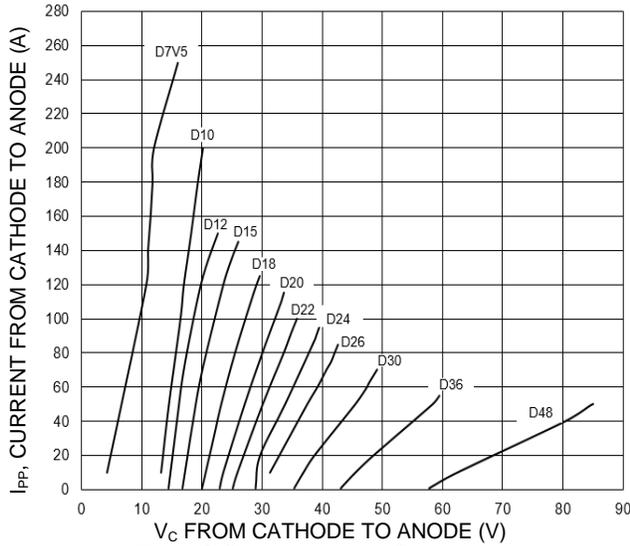


Figure 3 Clamping Voltage Characteristic

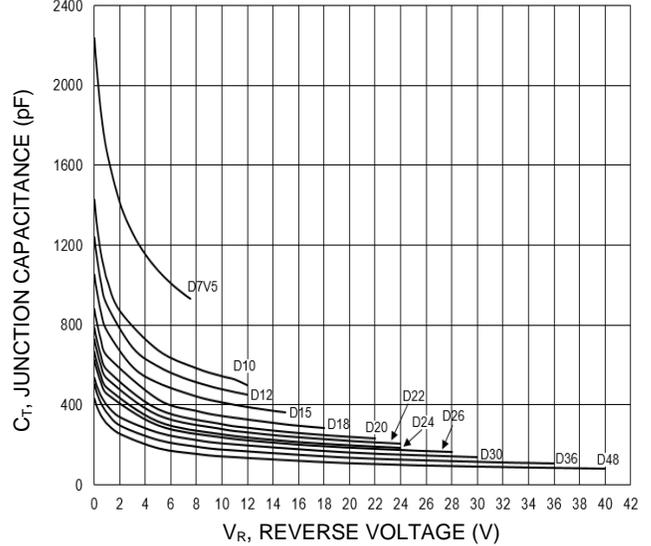


Figure 4 Typical Capacitance

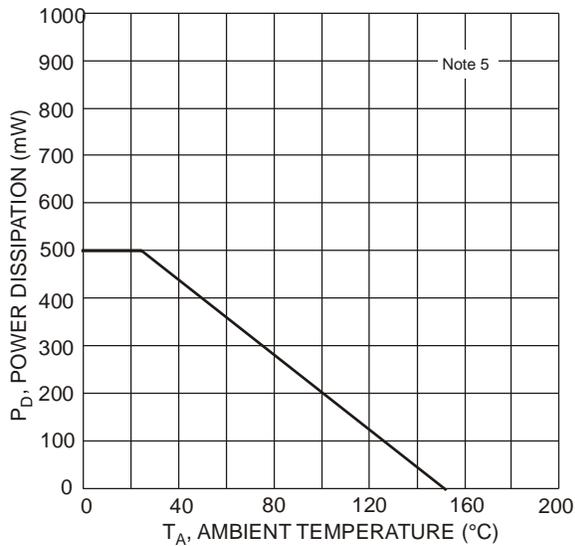
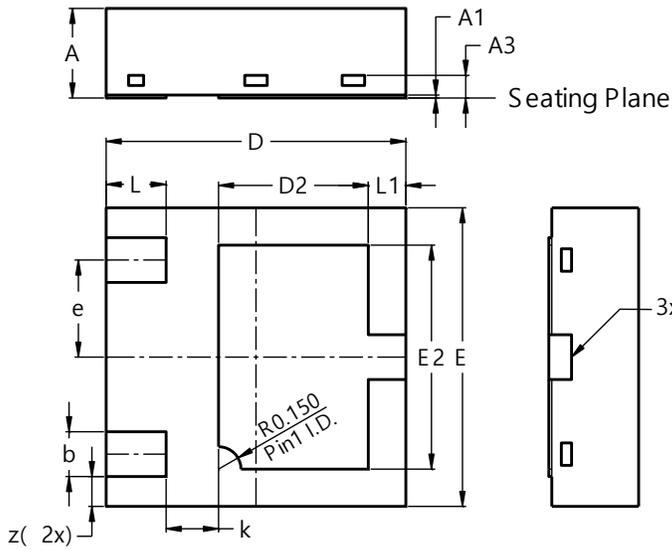


Figure 5 Power Derating Curve

Package Outline Dimensions

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

U-DFN2020-3 (Type C)

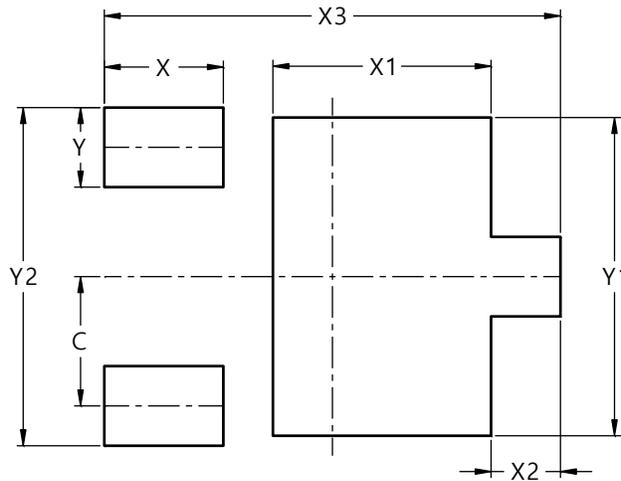


U-DFN2020-3 (Type C)			
Dim	Min	Max	Typ
A	0.55	0.65	0.60
A1	0.00	0.05	0.02
A3	--	--	0.152
b	0.25	0.35	0.30
D	1.95	2.05	2.00
D2	0.90	1.10	1.00
E	1.95	2.05	2.00
E2	1.40	1.60	1.50
e	0.65BSC		
k	--	--	0.35
L	0.35	0.45	0.40
L1	0.20	0.30	0.25
z	--	--	0.20
All Dimensions in mm			

Suggested Pad Layout

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

U-DFN2020-3 (Type C)



Dimensions	Value (in mm)
C	0.650
X	0.600
X1	1.100
X2	0.350
X3	2.300
Y	0.400
Y1	1.600
Y2	1.700

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.
All other trademarks are the property of their respective owners.
© 2024 Diodes Incorporated. All Rights Reserved.

www.diodes.com