

## Product Summary

V <sub>BR</sub> (Min)	I <sub>PP</sub> (Max)	V <sub>CL</sub> Typ @ I <sub>PP</sub> Max
35V	180A	37V

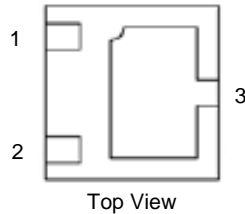
## Description

This new generation TVS is designed to protect sensitive electronics from the damage due to ESD and Surge. The combination of small size and high ESD surge capability makes it ideal for use in portable applications such as cellular phones, battery and notebook computers. It provides low clamping voltage, making it ideally suited for power rail protection in computing and mobile devices.

## Applications

- Battery protections
- USB VBUS
- Cellular handsets
- Portable electronics
- Notebook computers

U-DFN2020-3 (Type C)



1 and 2 must Be Electrically Connected at the PCB

## Features

- Low Profile Package (0.60mm typical) and Ultra-Small PCB Footprint Area (2.3mm × 1.7mm max) Suitable for Compact Portable Electronics
- Provides ESD Protection per IEC 61000-4-2 Standard: Air ±30kV, Contact ±30kV
- Provides Surge and Lightning Protection per IEC 61000-4-5 Standard: I<sub>PP</sub> max 180A
- One Channel of ESD and Surge Protection
- 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](https://www.diodes.com/quality/product-definitions/) or your local Diodes representative.**

## Mechanical Data

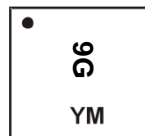
- Package: U-DFN2020-3
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208 <sup>(e4)</sup>
- Weight: 0.004 grams (Approximate)

## Ordering Information (Note 4)

Part Number	Package	Marking Code	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
D33V0S1UG3LP20-7	U-DFN2020-3 (Type C)	9G	7	8	3,000	Tape & Reel

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

## Marking Information



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

### Date Code Key

Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Code	L	M	N	P	R	S	T	U	V	W	X	Y

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

Characteristic	Symbol	Value	Unit	Conditions
Peak Pulse Power Dissipation	$P_{PP}$	6660	W	8/20 $\mu\text{s}$ (Note 6)
Peak Pulse Current	$I_{PP}$	180	A	8/20 $\mu\text{s}$ , per Figure 3
ESD Protection – Contact Discharge	$V_{ESD\_CONTACT}$	$\pm 30$	kV	Standard IEC 61000-4-2
ESD Protection – Air Discharge	$V_{ESD\_AIR}$	$\pm 30$	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 $T_A = +25^\circ\text{C}$	$R_{\theta JA}$	250	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
Reverse Working Voltage	$V_{RWM}$	—	—	33	V	—
Reverse Current	$I_R$	—	—	0.5	$\mu\text{A}$	$V_R = V_{RWM}$
Reverse Breakdown Voltage	$V_{BR}$	35	—	42	V	$I_R = 1\text{mA}$
Reverse Clamping Voltage (Note 6)	$V_{CL}$	—	34	37	V	$I_{PP} = 130\text{A}, t_P = 8/20\mu\text{s}$
		—	37	40		$I_{PP} = 180\text{A}, t_P = 8/20\mu\text{s}$
ESD Clamping Voltage (Note 7)	$V_C$	—	38.5	—	V	$I_{PP} = 16\text{A}, t_P = 100\text{ns}$
		—	35.5	—		$I_{PP} = 32\text{A}, t_P = 100\text{ns}$
		—	33	—		$I_{PP} = 70\text{A}, t_P = 100\text{ns}$
Capacitance	$C_T$	—	474	—	pF	$V_R = 0\text{V}, f = 1\text{MHz}$
		—	116	—		$V_R = 33\text{V}, f = 1\text{MHz}$

- 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 <http://www.diodes.com/package-outlines.html>.
  - Clamping voltage value is based on an 8x20 $\mu\text{s}$  peak pulse current ( $I_{PP}$ ) waveform, Measured from Pin1 and Pin2 to Pin3.
  - Transmission Line Pulse Test (TLP) settings:  $t_P = 100\text{ns}$ ,  $t_R = 10\text{ns}$ ,  $I_{TLP}$  and  $V_{TLP}$  averaging window is from 70ns to 90ns.

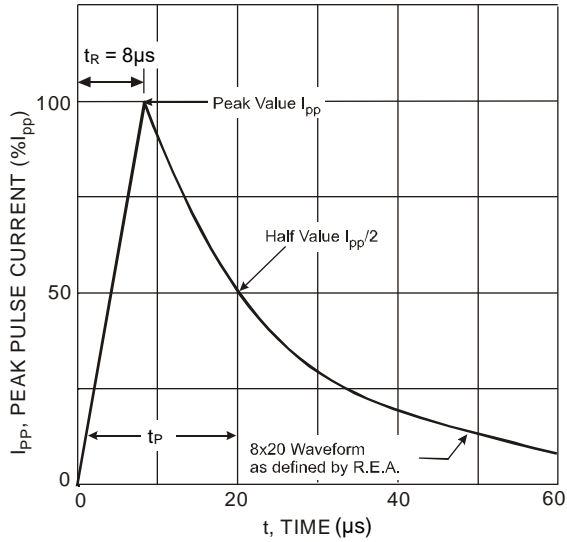


Figure 1 Typical 8x20µs Pulse Waveform

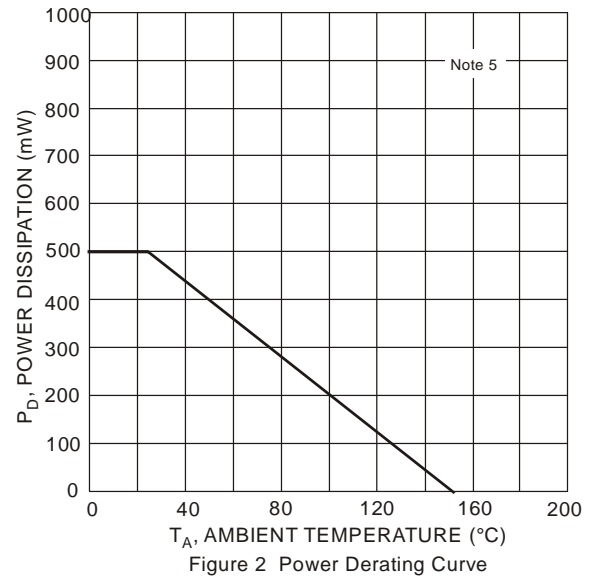


Figure 2 Power Derating Curve

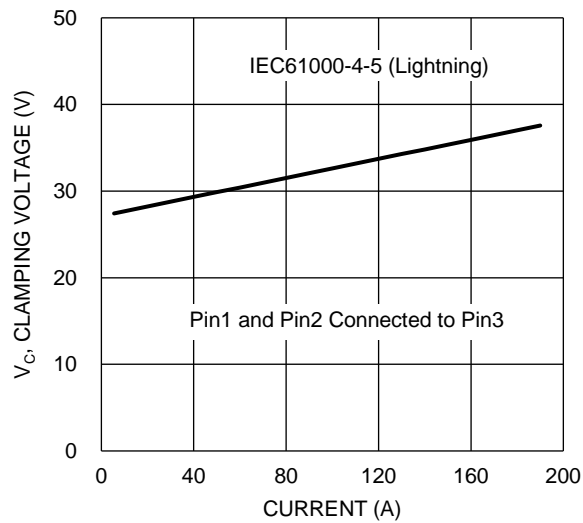


Figure 3 Clamping Voltage Characteristic ( $t_P = 8/20\mu s$ )

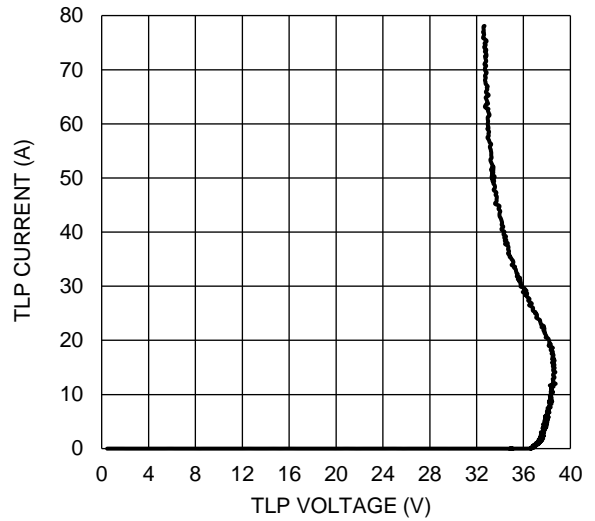


Figure 4 TLP Curve, Pin1 or Pin2 to Pin3 ( $t_P = 100ns$ )

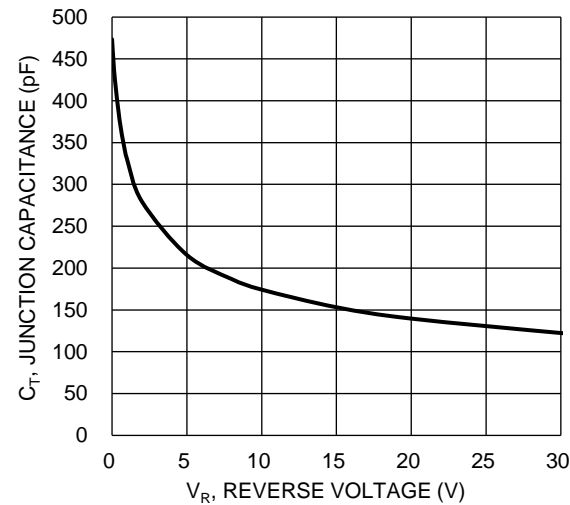
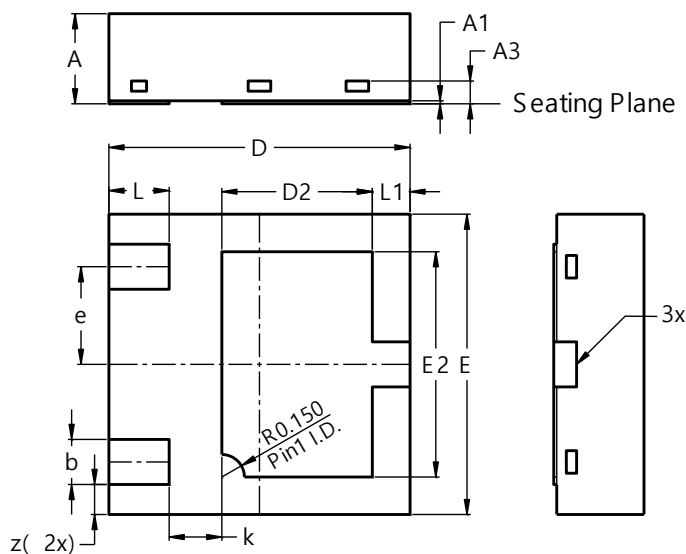


Figure 5 Typical Capacitance, Pin1 or Pin2 to Pin3

## Package Outline Dimensions

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

### U-DFN2020-3 (Type C)

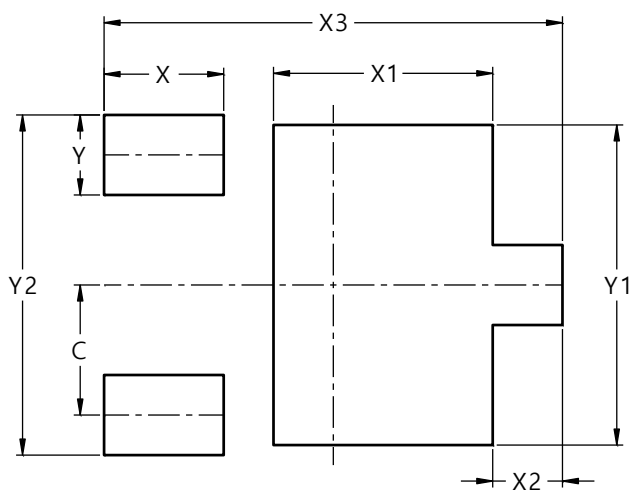


U-DFN2020-3 (Type C)			
Dim	Min	Max	Typ
A	0.55	0.65	0.60
A1	0.00	0.05	0.02
A3	--	--	0.152
b	0.25	0.35	0.30
D	1.95	2.05	2.00
D2	0.90	1.10	1.00
E	1.95	2.05	2.00
E2	1.40	1.60	1.50
e	0.65BSC		
k	--	--	0.35
L	0.35	0.45	0.40
L1	0.20	0.30	0.25
z	--	--	0.20
All Dimensions in mm			

## 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

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