

Product Summary

| VBR (Min) | IPP (Max) | VCL Typ @ IPP Max |
|-----------|-----------|-------------------|
| 35V | 180A | 37V |

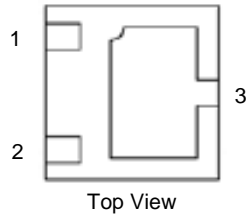
Description

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: IPP 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](mailto:contact@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

Mechanical Data

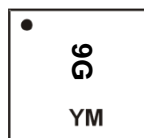
- Package: U-DFN2020-3
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208 ^(e4)
- Weight: 0.004 grams (Approximate)

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 μs (Note 6) |
| Peak Pulse Current | I_{PP} | 180 | A | 8/20 μs , per Figure 3 |
| 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 $T_A = +25^\circ\text{C}$ | $R_{\theta JA}$ | 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 | μA | $V_R = V_{RWM}$ |
| 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 μs 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.

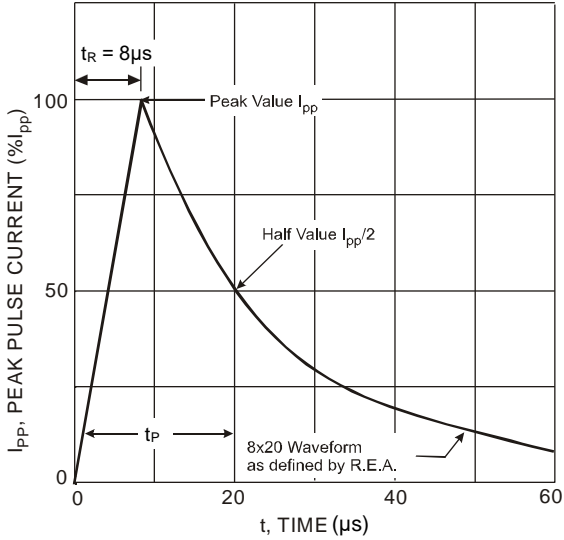


Figure 1 Typical 8x20µs Pulse Waveform

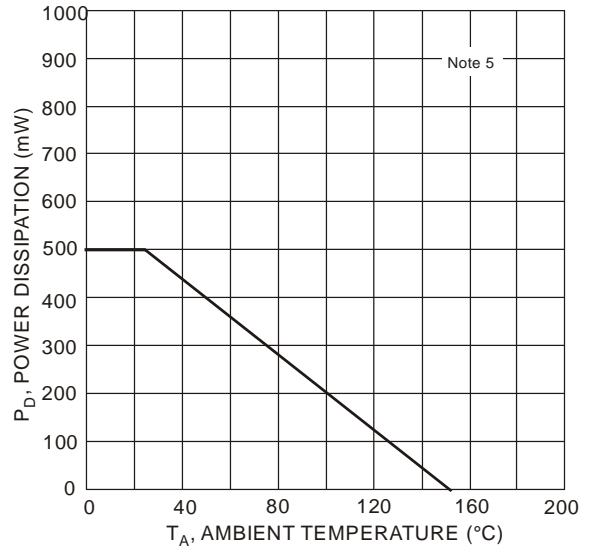


Figure 2 Power Derating Curve

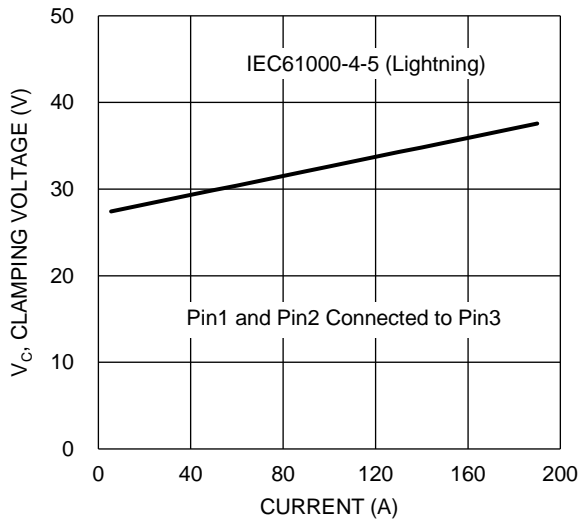


Figure 3 Clamping Voltage Characteristic ($t_p = 8/20\mu s$)

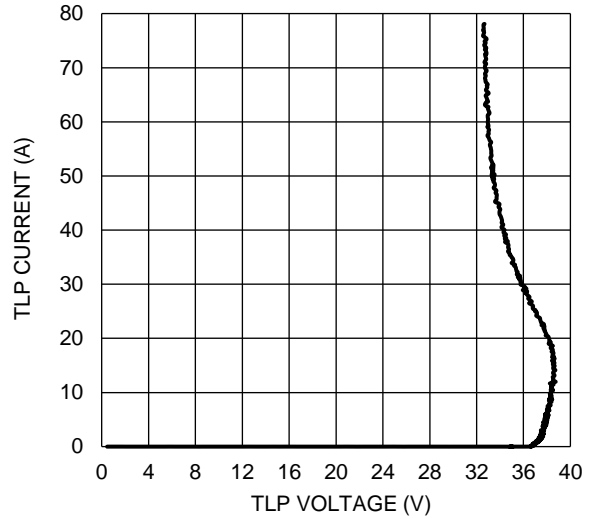


Figure 4 TLP Curve, Pin1 or Pin2 to Pin3 ($t_p = 100ns$)

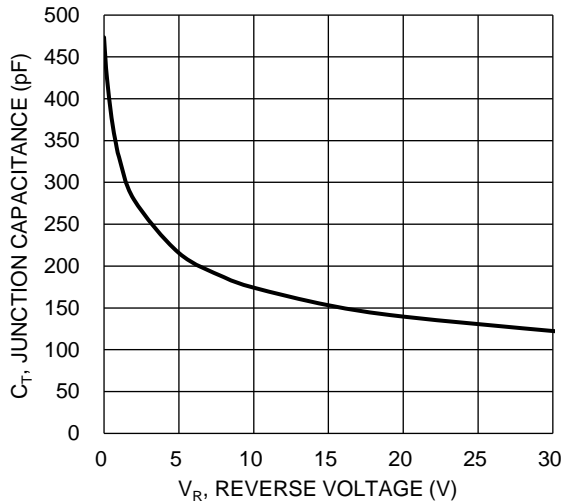
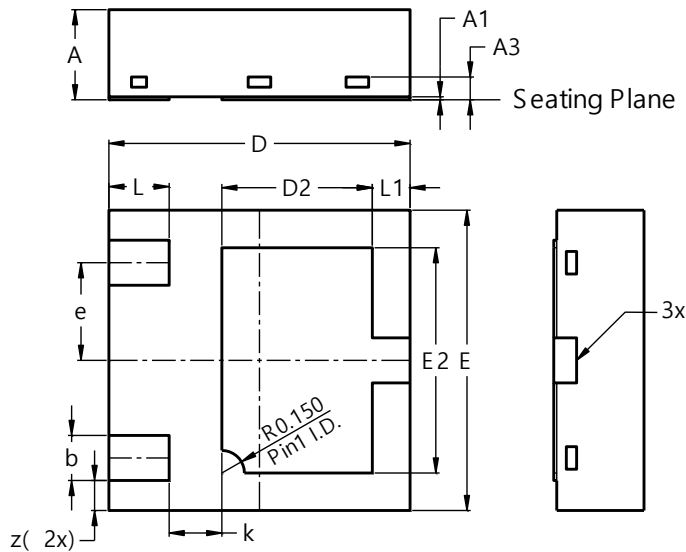


Figure 5 Typical Capacitance, Pin1 or Pin2 to Pin3

Package Outline Dimensions

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

U-DFN2020-3 (Type C)

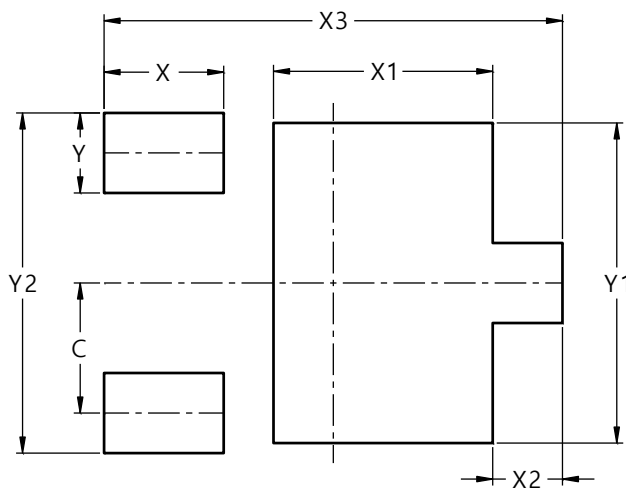


| U-DFN2020-3 (Type C) | | | |
|-------------------------|---------|------|-------|
| Dim | Min | Max | Typ |
| A | 0.55 | 0.65 | 0.60 |
| A1 | 0.00 | 0.05 | 0.02 |
| A3 | -- | -- | 0.152 |
| b | 0.25 | 0.35 | 0.30 |
| D | 1.95 | 2.05 | 2.00 |
| D2 | 0.90 | 1.10 | 1.00 |
| E | 1.95 | 2.05 | 2.00 |
| 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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