

## Product Summary

$V_{BR}$ (min)	$I_{PP}$ (max)	$I_R$ (max)
28V & 6V	9.5A & 3.5A	50nA

## 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 cellular phones, digital cameras, and MP3 players.

## Applications

- Cellular Handsets
- Portable Electronics
- Computers and Peripheral

## Features

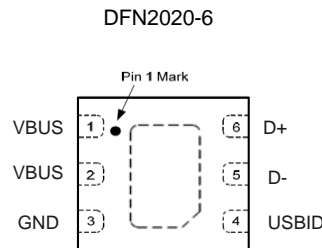
- Low Profile Package (0.605mm max) and Ultra-small PCB Footprint Area (2.05 \* 2.05mm max) Suitable for Compact Portable Electronics
- 3 Bi-directional Channels and 1 VBUS of ESD protection
- Typically Used at High Speed Ports such as USB 2.0 OTG
- Low Channel Input Capacitance of 0.4pF Typical for I/Os
- High Surge Ipp up to 9.5A(10x1000  $\mu$ s) for VBUS
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**

## Mechanical Data

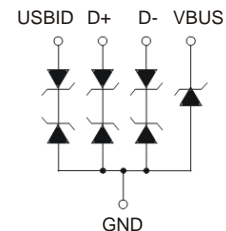
- Case: U-DFN2020-6
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: NiPdAu over Copper Leadframe; Solderable per MIL-STD-202, Method 208 <sup>(e4)</sup>
- Weight: 0.0065 grams (Approximate)

Pin #	Description
1, 2	VBUS
4, 5, 6	I/Os
3	Ground
Center Tab	Ground

Pin Description



Top View



Schematic

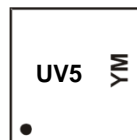
## Ordering Information (Note 4)

Product	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
D5V0F3B6LP20-7	Standard	UV5	7	12	3,000/Tape & Reel

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  - See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) 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 <http://www.diodes.com/products/packages.html>.

## Marking Information

DFN2020-6



UV5 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: B = 2014)  
 M = Month (ex: 9 = September)

**Maximum Ratings - VBUS** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit	Conditions
Peak Pulse Current, VBUS Pin	I <sub>PP1</sub>	9.5	A	10/1000μs
ESD Protection – Contact Discharge, VBUS Pin	V <sub>ESD_Contact</sub>	±30	kV	Standard IEC 61000-4-2
ESD Protection – Air Discharge, VBUS Pin	V <sub>ESD_Air</sub>	±30	kV	Standard IEC 61000-4-2

**Maximum Ratings – I/Os** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit	Conditions
Peak Pulse Current, I/O Pins	I <sub>PP</sub>	3.5	A	8/20μs
ESD Protection – Contact Discharge, I/O Pins	V <sub>ESD_Contact</sub>	±8	kV	Standard IEC 61000-4-2
ESD Protection – Air Discharge, I/O Pins	V <sub>ESD_Air</sub>	±15	kV	Standard IEC 61000-4-2

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P <sub>D</sub>	500	mW
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	250	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-65 to +150	°C

**Electrical Characteristics - VBUS** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
Reverse Standoff Voltage	V <sub>RWM</sub>	—	—	26	V	—
Channel Leakage Current (Note 6)	I <sub>RM</sub>	—	—	50	nA	V <sub>RWM</sub> = 26V
Forward Voltage	V <sub>F</sub>	0.6	0.8	1.2	V	I <sub>R</sub> = 10mA
Clamping Voltage	V <sub>CL</sub>	—	—	40	V	I <sub>PP</sub> = 9.5A, t <sub>p</sub> = 10/1000μs
Breakdown Voltage	V <sub>BR</sub>	28	—	31.9	V	I <sub>R</sub> = 1mA
Channel Input Capacitance	C <sub>T</sub>	—	630	—	pF	V <sub>R</sub> = 0V, f = 1MHz

**Electrical Characteristics – I/Os** (@T<sub>A</sub> = +25°C unless otherwise specified)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
Reverse Working Voltage	V <sub>RWM</sub>	—	—	5.5	V	—
Reverse Current (Note 6)	I <sub>R</sub>	—	—	50	nA	V <sub>R</sub> = 5.5V
Reverse Breakdown Voltage	V <sub>BR</sub>	6.0	—	9.95	V	I <sub>R</sub> = 1mA
Reverse Clamping Voltage, Positive Transients (Note 7)	V <sub>CL</sub>	—	12	14	V	I <sub>PP</sub> = 1A, t <sub>p</sub> = 8/20μs
Dynamic Resistance	R <sub>DYN</sub>	—	1.0	—	Ω	I <sub>R</sub> = 1A, t <sub>p</sub> = 8/20μs
Capacitance (Note 8)	C <sub>T</sub>	—	0.4	0.5	pF	V <sub>R</sub> = 0V, f = 1MHz, VBUS = 26V

- Notes:
- Device mounted on FR-4 PCB pad layout (2oz copper) as shown on Diodes, Inc. suggested pad layout AP02001, which can be found on our website at <http://www.diodes.com>.
  - Short duration pulse test used to minimize self-heating effect.
  - Clamping voltage value is based on an 8x20μs peak pulse current (I<sub>pp</sub>) waveform.
  - Measured from any I/O to GND.
  - For information on the impact of Diodes' USB 2.0 compatible ESD protectors on signal integrity including eye diagram plots, please refer to AN77 at the following URL: [http://www.diodes.com/destdools/appnote\\_dnote.html](http://www.diodes.com/destdools/appnote_dnote.html).

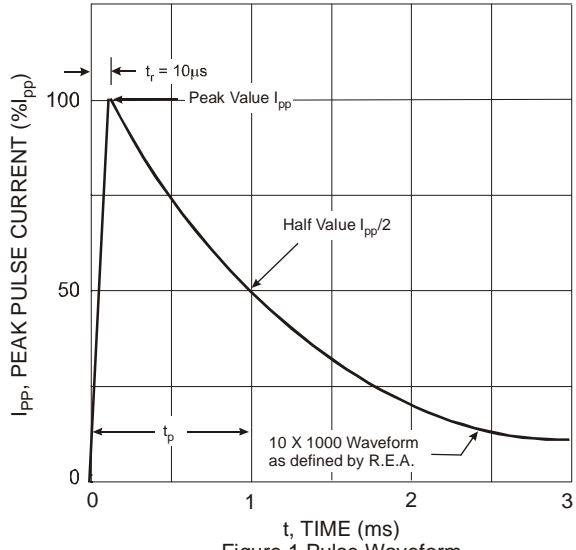


Figure 1 Pulse Waveform

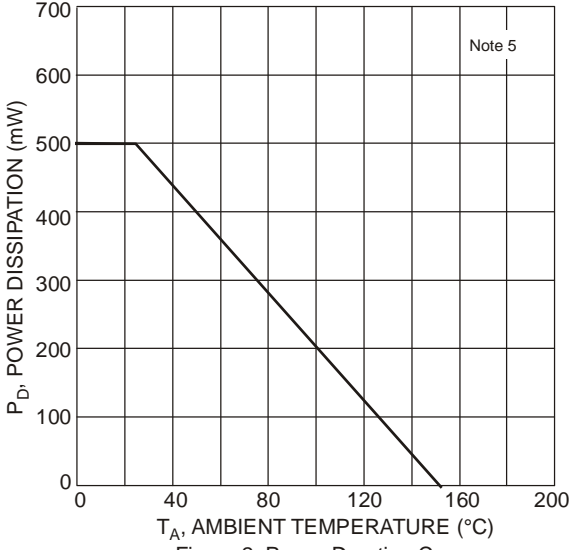


Figure 2 Power Derating Curve

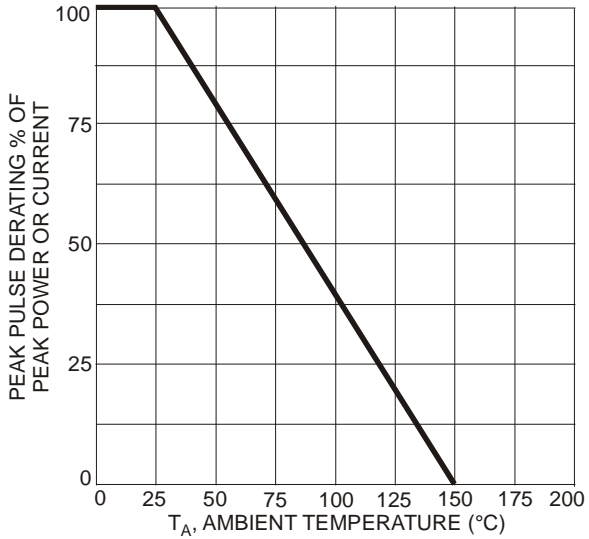


Figure 3 Power Dissipation vs. Ambient Temperature

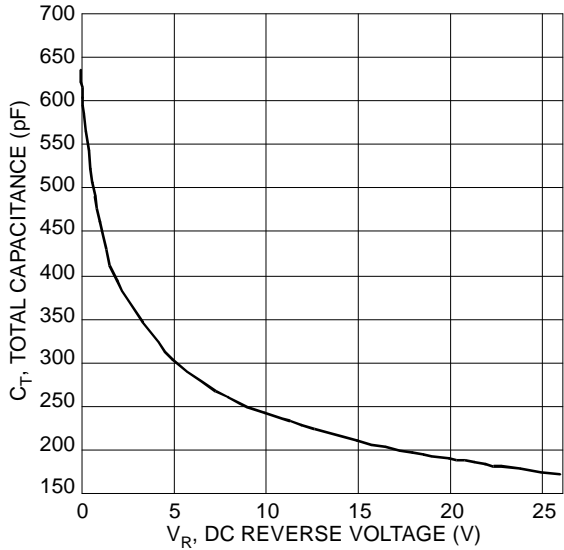


Figure 4 Typical Total Capacitance, VBUS

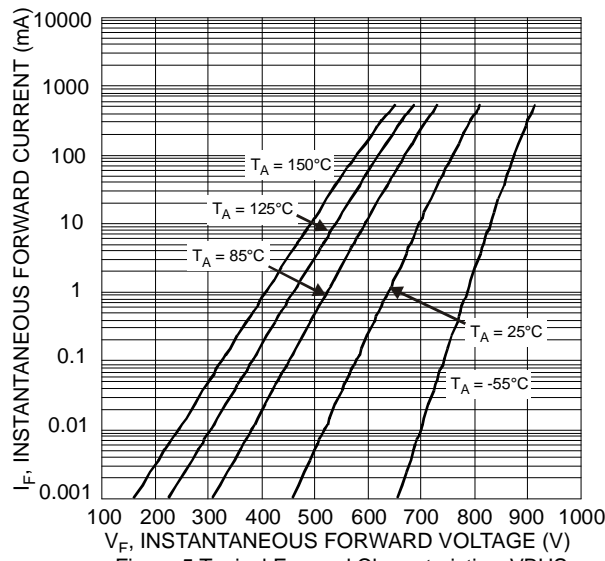


Figure 5 Typical Forward Characteristics, VBUS

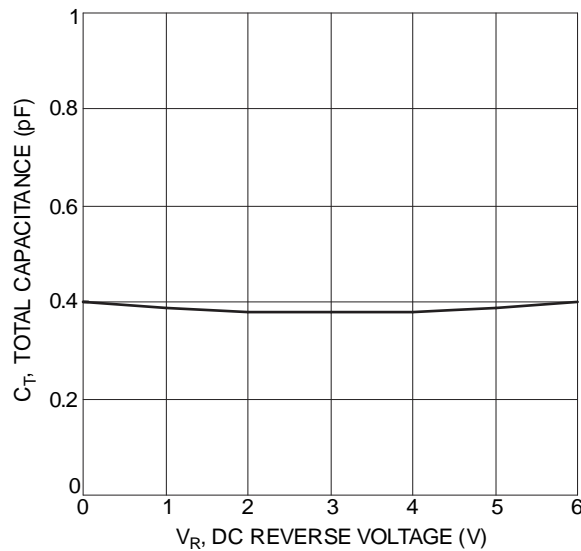
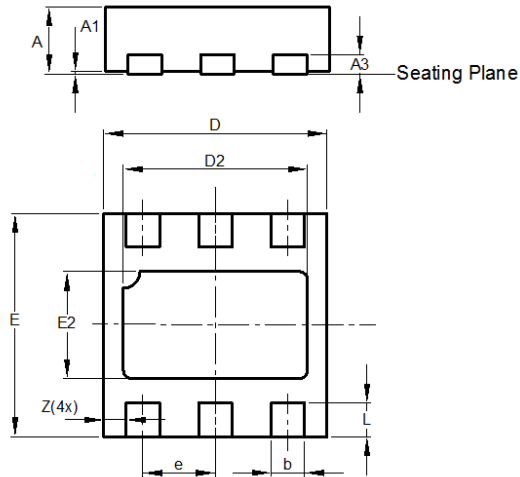


Figure 6 Typical Total Capacitance, I/Os

## Package Outline Dimensions

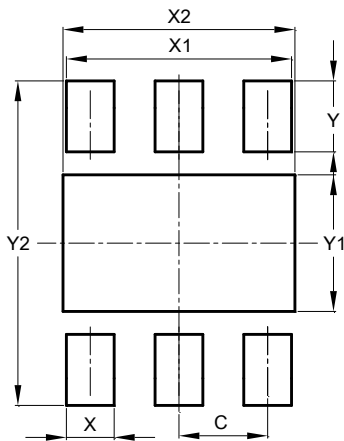
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



U-DFN2020-6 (TYPE C)			
Dim	Min	Max	Typ
A	0.57	0.63	0.60
A1	0.00	0.05	0.02
A3	—	—	0.15
b	0.25	0.35	0.30
D	1.95	2.075	2.00
D2	1.55	1.75	1.65
E	1.95	2.075	2.00
E2	0.86	1.06	0.96
e	—	—	0.65
L	0.25	0.35	0.30
Z	—	—	0.20
All Dimensions in mm			

## Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
C	0.650
X	0.350
X1	1.650
X2	1.700
Y	0.525
Y1	1.010
Y2	2.400

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