

## Product Summary

BV <sub>DSS</sub>	R <sub>DS(ON)</sub> Max	I <sub>D</sub> Max T <sub>A</sub> = +25°C
-40V	25mΩ @ V <sub>GS</sub> = -10V	- 7.2A
	45mΩ @ V <sub>GS</sub> = -4.5V	- 5.4A

## Description and Applications

This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:


- Motor Control
- Backlighting
- DC-DC Converters
- Printer Equipment

## Features and Benefits

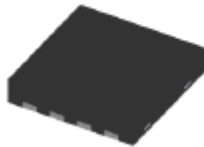
- Low R<sub>DS(ON)</sub> – Minimizes Conduction Losses
- Fast Switching Speed – Minimizes Switching Losses
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DMP4025SFGQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**

<https://www.diodes.com/quality/product-definitions/>

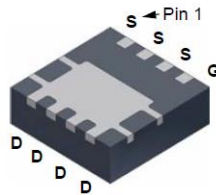
## Mechanical Data

- Package: PowerDI<sup>®</sup>3333-8
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram Below
- Terminals: Finish - Matte Tin Annealed over Copper Lead Frame. Solderable per MIL-STD-202, Method 208 
- Weight: 0.0172 grams (Approximate)

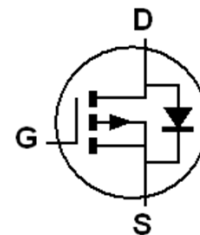
PowerDI3333-8



Top View



Bottom View



Device Symbol

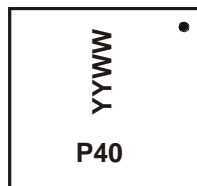
## Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMP4025SFGQ-7	PowerDI3333-8	2,000	Reel
DMP4025SFGQ-13	PowerDI3333-8	3,000	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/>.

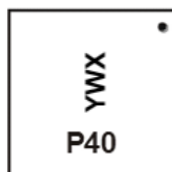
## Marking Information

Site 1



P40 = Product Marking Code  
 YYWW = Date Code Marking  
 YY = Year (ex: 21 = 2021)  
 WW = Week (01 to 53)

Site 2



P40 = Product Type Marking Code  
 YWX = Date Code Marking  
 Y = Year (ex: 1 = 2021)  
 W = Week (ex: a = Week 27; z Represents Week 52 and 53)  
 X = Internal Code (ex: U = Monday)

Date Code Key

Year	2014	...	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Code	4	...	1	2	3	4	5	6	7	8	9	0

Week	1-26	27-52	53
Code	A-Z	a-z	z

Internal Code	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Code	T	U	V	W	X	Y	Z

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

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DSS</sub>	-40	V
Gate-Source Voltage	V <sub>GSS</sub>	±20	
Continuous Drain Current, V <sub>GS</sub> = -10V	(Note 6)	-7.2	A
	T <sub>A</sub> = +70°C (Note 6)	-5.77	
	(Note 5)	-4.65	
Maximum Body Diode Forward Current	I <sub>S</sub>	-7.2	
Pulsed Drain Current	I <sub>DM</sub>	-80	
Pulsed Source Current	I <sub>SM</sub>	-80	

## Thermal Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	0.81	W
Linear Derating Factor		1.95	
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	155	°C/W
		64	
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.  
 6. For a device surface mounted on 25mm x 25mm FR-4 PCB with 2oz copper, in still air conditions.  
 7. Same as note (6), except the device is pulsed with D= 0.02 and pulse width 300μs.

## Thermal Characteristics

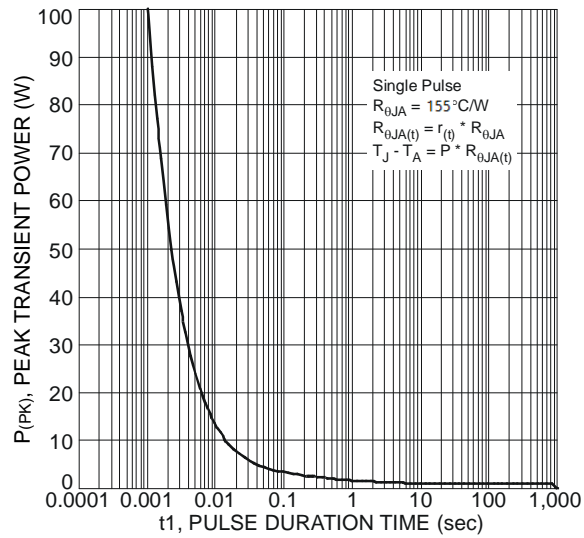


Figure 1 Single Pulse Maximum Power Dissipation

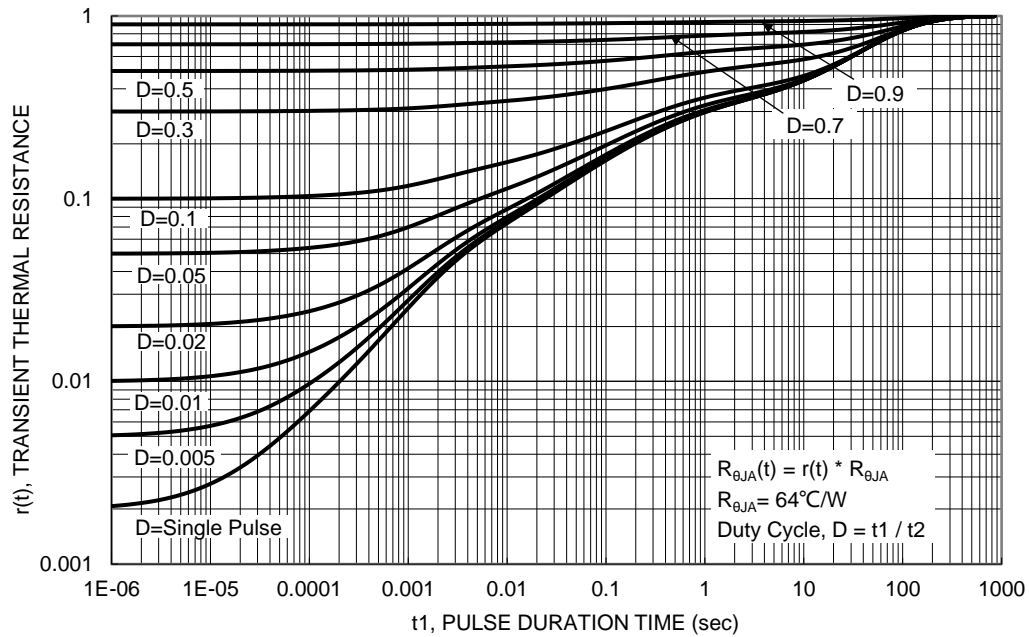


Figure 2. Transient Thermal Resistance

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-40	—	—	V	I <sub>D</sub> = -250μA, V <sub>GS</sub> = 0V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	-1.0	μA	V <sub>DS</sub> = -40V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	-0.8	-1.3	-1.8	V	I <sub>D</sub> = -250μA, V <sub>DS</sub> = V <sub>GS</sub>
Static Drain-Source On-Resistance (Note 8)	R <sub>DS(ON)</sub>	—	18	25	mΩ	V <sub>GS</sub> = -10V, I <sub>D</sub> = -3A
			30	45		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -3A
Forward Transconductance (Notes 8 & 9)	g <sub>fs</sub>	—	16.6	—	S	V <sub>DS</sub> = -5V, I <sub>D</sub> = -3A
Diode Forward Voltage (Note 8)	V <sub>SD</sub>	—	-0.7	-1.0	V	I <sub>S</sub> = -1A, V <sub>GS</sub> = 0V
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>iss</sub>	—	1643	—	pF	V <sub>DS</sub> = -20V, V <sub>GS</sub> = 0V f = 1MHz
Output Capacitance	C <sub>oss</sub>	—	179	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	128	—		
Gate Resistance	R <sub>g</sub>	—	6.43	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge (Note 10)	Q <sub>g</sub>	—	14.0	—	nC	V <sub>GS</sub> = -4.5V V <sub>DS</sub> = -20V I <sub>D</sub> = -3A
Total Gate Charge (Note 10)	Q <sub>g</sub>	—	33.7	—		
Gate-Source Charge (Note 10)	Q <sub>gs</sub>	—	5.5	—		
Gate-Drain Charge (Note 10)	Q <sub>gd</sub>	—	7.3	—		
Turn-On Delay Time (Note 10)	t <sub>d(ON)</sub>	—	6.9	—	ns	V <sub>DD</sub> = -20V, V <sub>GS</sub> = -10V I <sub>D</sub> = -3A
Turn-On Rise Time (Note 10)	t <sub>r</sub>	—	14.7	—		
Turn-Off Delay Time (Note 10)	t <sub>d(OFF)</sub>	—	53.7	—		
Turn-Off Fall Time (Note 10)	t <sub>f</sub>	—	30.9	—		

Notes: 8. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%.  
9. For design aid only, not subject to production testing.  
10. Switching characteristics are independent of operating junction temperatures.

## Typical Characteristics

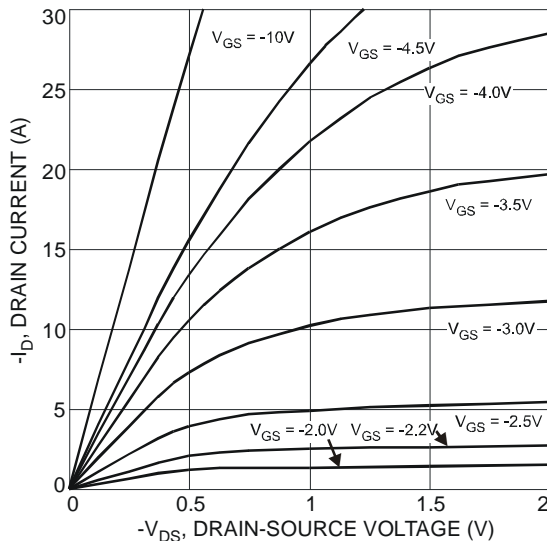


Figure 3 Typical Output Characteristic

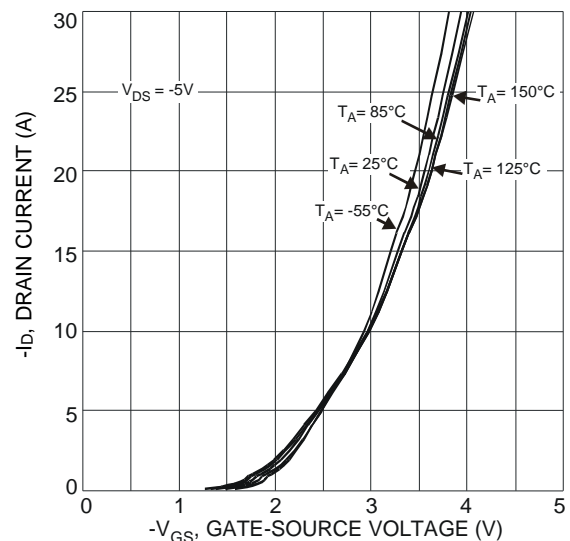


Figure 4 Typical Transfer Characteristic

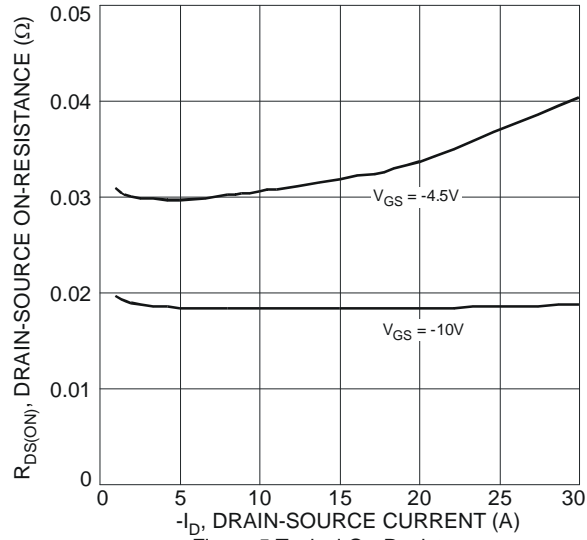


Figure 5 Typical On-Resistance vs. Drain Current and Gate Voltage

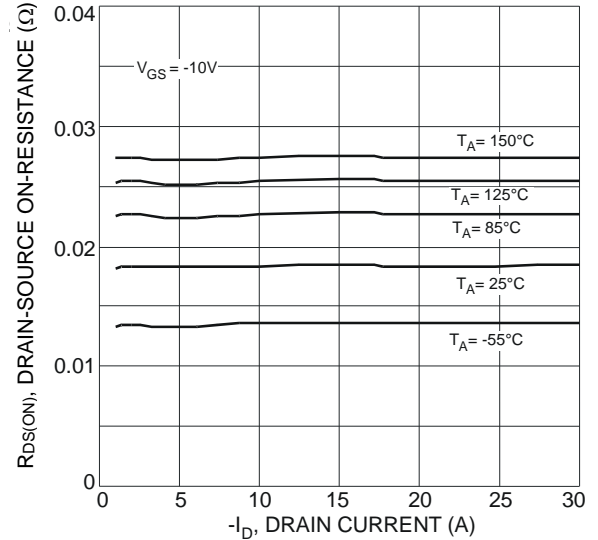


Figure 6 Typical On-Resistance vs. Drain Current and Temperature

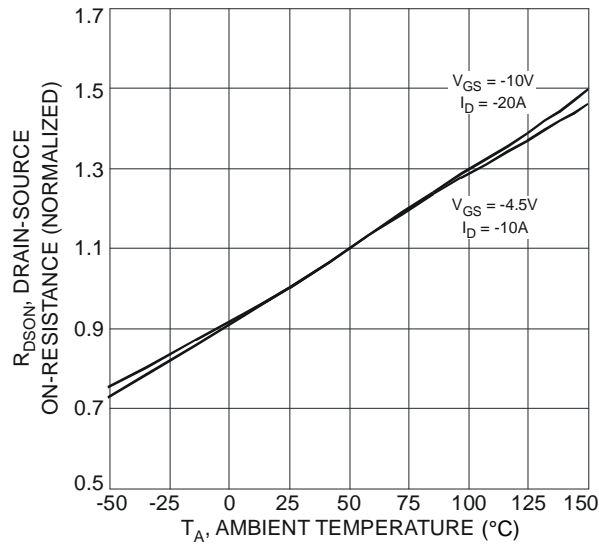


Figure 7 On-Resistance Variation with Temperature

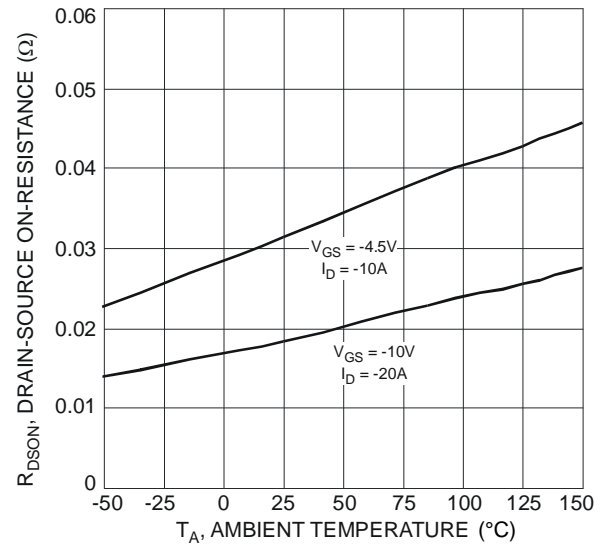


Figure 8 On-Resistance Variation with Temperature

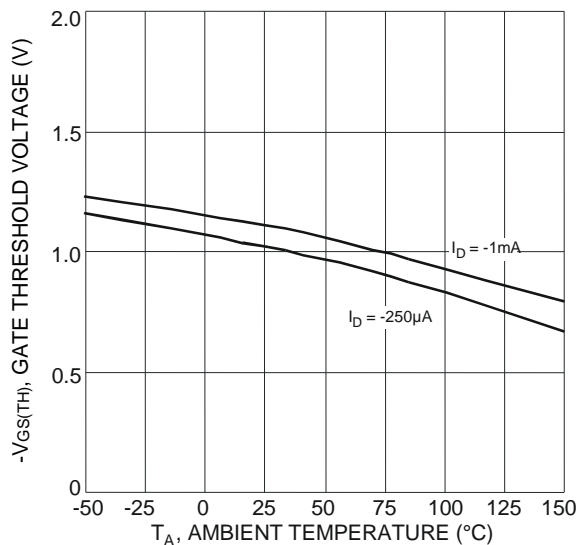


Figure 9 Gate Threshold Variation vs. Ambient Temperature

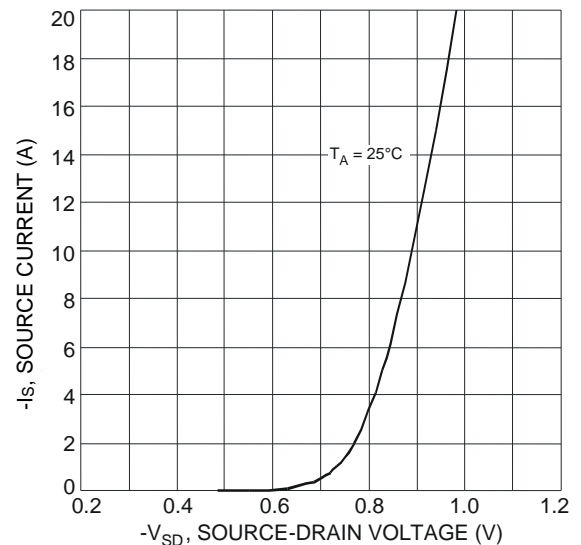
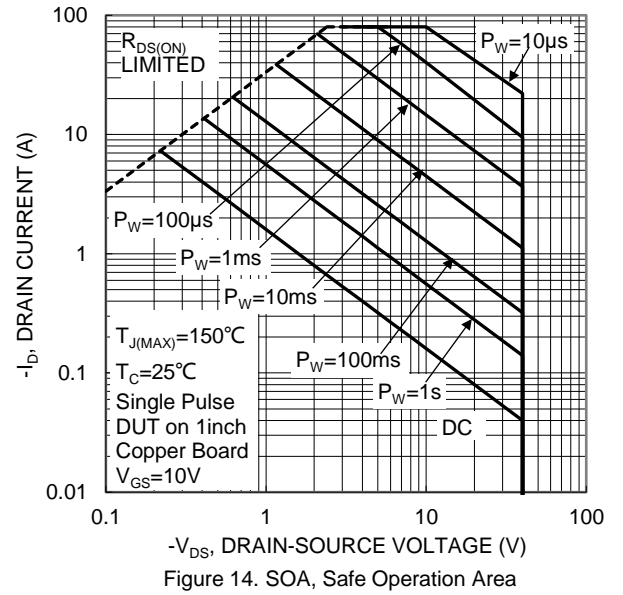
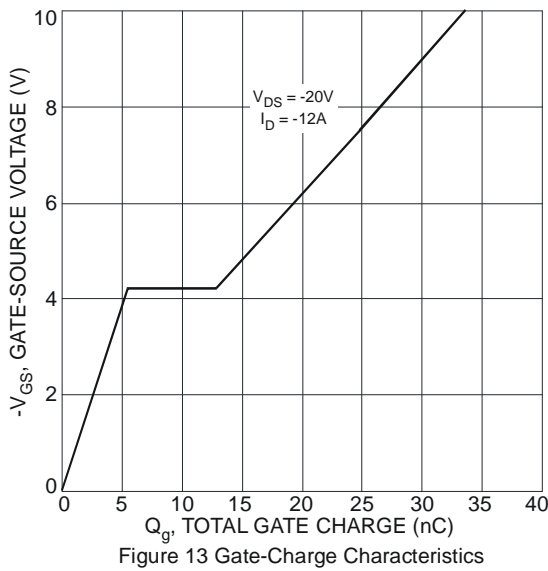
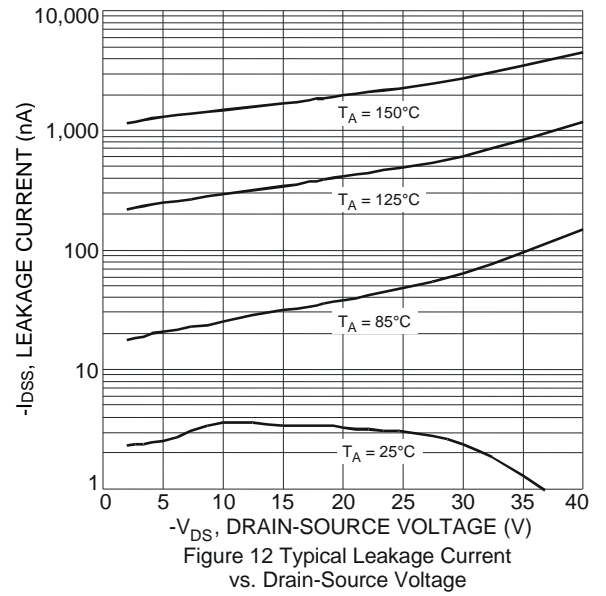
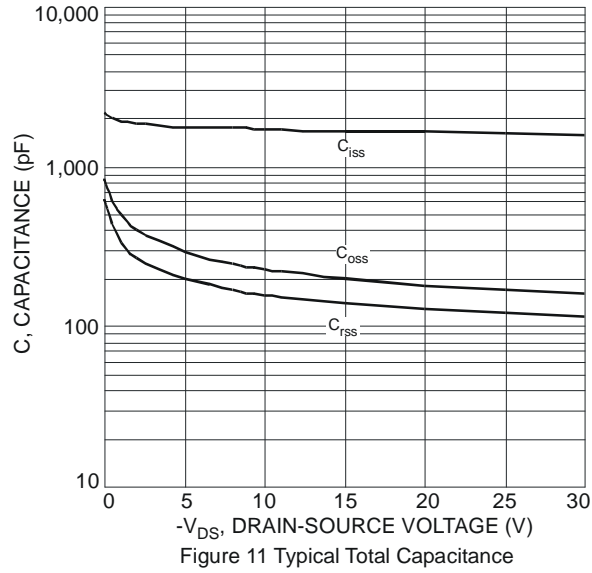


Figure 10 Diode Forward Voltage vs. Current



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

The technical drawing consists of two views of a multi-layer PCB:

- Top View (Upper):** Shows a rectangular board with a central horizontal slot. Dimensions include:
  - $A$ : Distance from the top edge to the top of the slot.
  - $A1$ : Distance from the top edge of the slot to the top of the board.
  - $A3$ : Distance from the top edge of the slot to the top of the board (labeled on the right).
  - Seating Plane**: Indicated by a horizontal line with arrows pointing to the top and bottom surfaces of the board.
- Bottom View (Lower):** Shows the underside of the board with various features and dimensions:
  - $D$ : Total width of the board.
  - $D2$ : Width of the central horizontal slot.
  - $L(4x)$ : Distance from the top edge of the board to the top of the slot.
  - $E4$ : Distance from the top edge of the board to the top of the slot.
  - $E2$ : Distance from the top edge of the board to the top of the slot.
  - $E3$ : Distance from the top edge of the board to the top of the slot.
  - $L1(3x)$ : Distance from the top edge of the board to the top of the slot.
  - $z(4x)$ : Distance from the top edge of the board to the top of the slot.
  - $b$ : Distance from the top edge of the board to the top of the slot.
  - $e$ : Distance from the top edge of the board to the top of the slot.
  - $8$ : Distance from the top edge of the board to the top of the slot.
  - Pin #1 ID**: A label pointing to a specific feature on the board.
  - $b2(4x)$ : Distance from the top edge of the board to the top of the slot.

PowerDI3333-8			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	—	—	0.203
b	0.27	0.37	0.32
b2	0.15	0.25	0.20
D	3.25	3.35	3.30
D2	2.22	2.32	2.27
E	3.25	3.35	3.30
E2	1.56	1.66	1.61
E3	0.79	0.89	0.84
E4	1.60	1.70	1.65
e	—	—	0.65
L	0.35	0.45	0.40
L1	—	—	0.39
z	—	—	0.515
All Dimensions in mm			

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The figure consists of two parts. The top part is a cross-sectional view of a periodic structure. It shows a central rectangular region with a width of  $X_1$  and a height of  $Y_1$ . This central region is surrounded by a material with a width of  $X_2$  and a height of  $Y_2$ . The total width of the structure is  $X_3$ , and the total height is  $Y_3$ . The distance from the top surface to the top of the central region is  $Y_4$ . The bottom part is a top-down view of the periodic structure. It shows a central rectangular region with a width of  $X$  and a height of  $Y$ . This central region is surrounded by a material with a width of  $C$ . The total width of the structure is  $X$ , and the total height is  $Y$ .

Dimensions	Value (in mm)
C	0.650
X	0.420
X1	0.420
X2	0.230
X3	2.370
Y	0.700
Y1	1.850
Y2	2.250
Y3	3.700
Y4	0.540

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