

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ Max	$I_D$ Max $T_C = +25^\circ\text{C}$
30V	5.5m $\Omega$ @ $V_{GS} = 10\text{V}$	45A
	9m $\Omega$ @ $V_{GS} = 4.5\text{V}$	30A

## Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

## Description and Applications

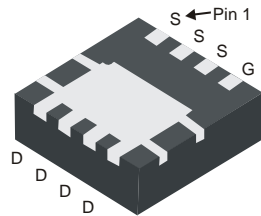
This MOSFET is designed to minimize the on-state resistance ( $R_{DS(ON)}$ ), yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- Power Management Functions
- DC-DC Converters
- Battery

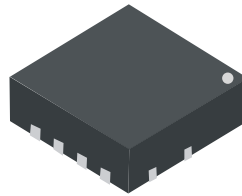
## Mechanical Data

- Case: PowerDI® 3333-8
- Case Material: Molded Plastic, "Green" Molding Compound.  
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Diagram
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe.  
Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.072 grams (Approximate)

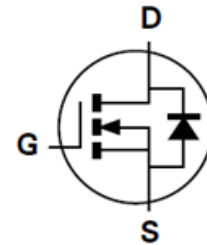
### PowerDI3333-8



Bottom View



Top View



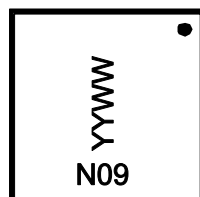
Equivalent Circuit

## Ordering Information (Note 4)

Part Number	Case	Packaging
DMN3009SFG-7	PowerDI3333-8	2,000/Tape & Reel
DMN3009SFG-13	PowerDI3333-8	3,000/Tape & Reel

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
  2. 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.
  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 <http://www.diodes.com/products/packages.html>.

## Marking Information



N09= Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Last Digit of Year (ex: 15 = 2015)  
 WW = Week Code (01 to 53)

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

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DSS</sub>	30	V
Gate-Source Voltage	V <sub>GSS</sub>	±20	V
Continuous Drain Current, V <sub>GS</sub> = 10V (Note 6)	I <sub>D</sub>	T <sub>A</sub> = +25°C	16
		T <sub>A</sub> = +70°C	13
	I <sub>D</sub>	T <sub>C</sub> = +25°C	45
		T <sub>C</sub> = +70°C	35
Pulsed Drain Current (380µs Pulse, Duty Cycle = 1%)	I <sub>DM</sub>	80	A
Maximum Continuous Body Diode Forward Current (Note 6)	I <sub>S</sub>	20	A
Avalanche Current, L = 0.1mH	I <sub>AS</sub>	33	A
Avalanche Energy, L = 0.1mH	E <sub>AS</sub>	55	mJ

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P <sub>D</sub>	T <sub>A</sub> = +25°C	0.9
		T <sub>A</sub> = +70°C	0.6
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	137	°C/W
Total Power Dissipation (Note 6)	P <sub>D</sub>	T <sub>A</sub> = +25°C	2.1
		T <sub>A</sub> = +70°C	1.4
Thermal Resistance, Junction to Ambient (Note 6)	R <sub>θJA</sub>	59	°C/W
Thermal Resistance, Junction to Case (Note 6)	R <sub>θJC</sub>	7.8	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b> (Note 6)						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	30	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250µA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1	µA	V <sub>DS</sub> = 24V, 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> (Note 6)						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	1	—	2.5	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	—	5.5	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A
		—	—	9		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 16A
Diode Forward Voltage	V <sub>SD</sub>	—	—	1	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A
<b>DYNAMIC CHARACTERISTICS</b> (Note 7)						
Input Capacitance	C <sub>iss</sub>	—	2,000	—	pF	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V, f = 1MHz
Output Capacitance	C <sub>oss</sub>	—	315	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	248	—	pF	
Gate Resistance	R <sub>g</sub>	—	2.2	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Q <sub>g</sub>	—	20	—	nC	V <sub>DS</sub> = 15V, I <sub>D</sub> = 15A
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>g</sub>	—	42	—	nC	
Gate-Source Charge	Q <sub>gs</sub>	—	4.7	—	nC	
Gate-Drain Charge	Q <sub>gd</sub>	—	7.4	—	nC	
Turn-On Delay Time	t <sub>D(ON)</sub>	—	3.9	—	nS	V <sub>DD</sub> = 15V, V <sub>GS</sub> = 10V, R <sub>G</sub> = 3.3Ω, I <sub>D</sub> = 15A
Turn-On Rise Time	t <sub>R</sub>	—	4.1	—	nS	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	31	—	nS	
Turn-Off Fall Time	t <sub>F</sub>	—	14.6	—	nS	
Reverse Recovery Time	t <sub>RR</sub>	—	15	—	nS	I <sub>F</sub> = 15A, di/dt = 100A/µs
Reverse Recovery Charge	Q <sub>RR</sub>	—	6	—	nC	

- Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.  
6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.  
7. Short duration pulse test used to minimize self-heating effect.

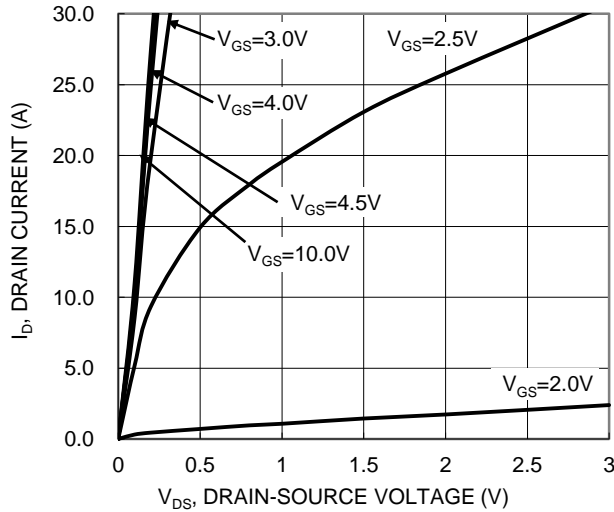


Figure 1. Typical Output Characteristic

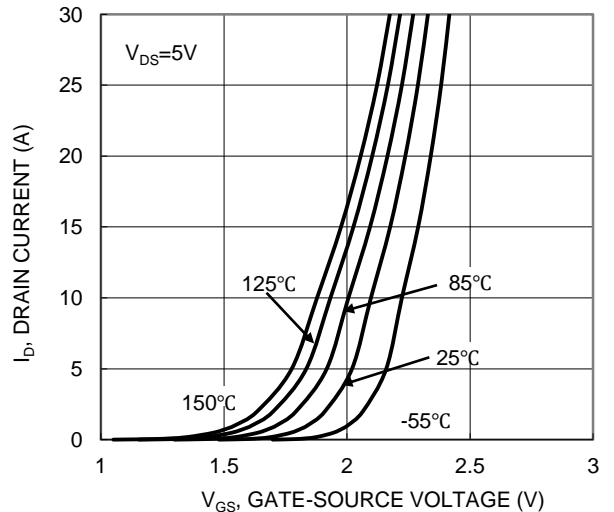


Figure 2. Typical Transfer Characteristic

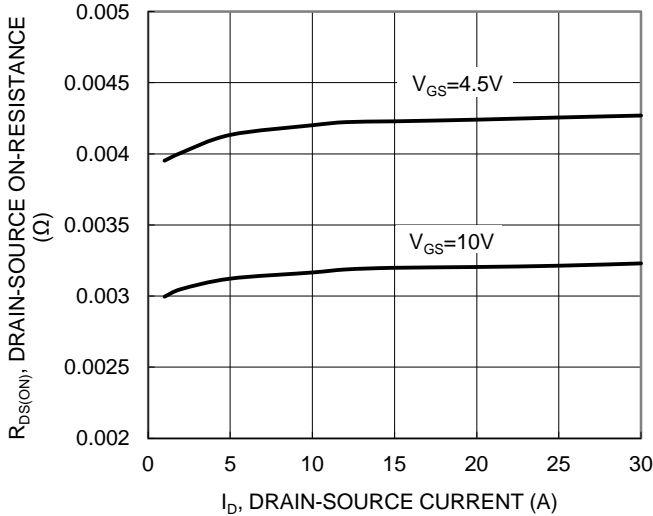


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

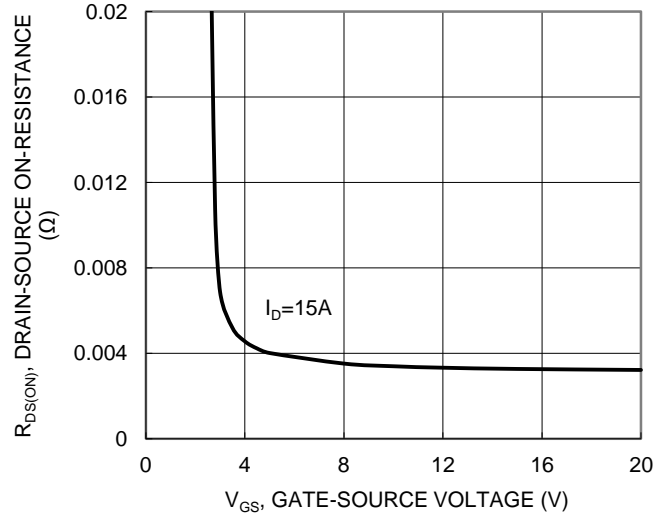


Figure 4. Typical Transfer Characteristic

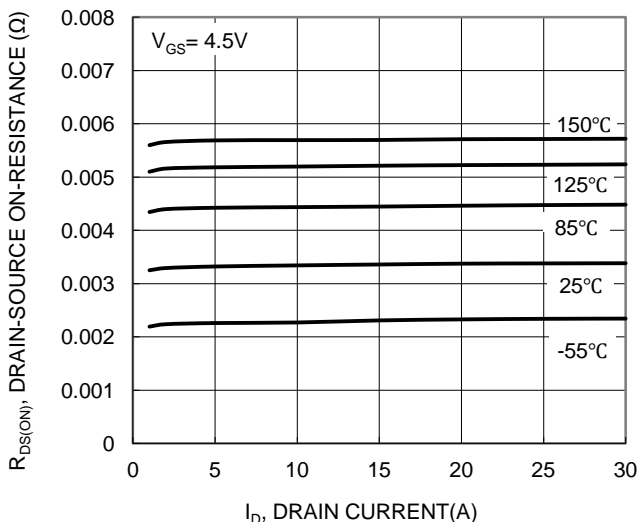


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

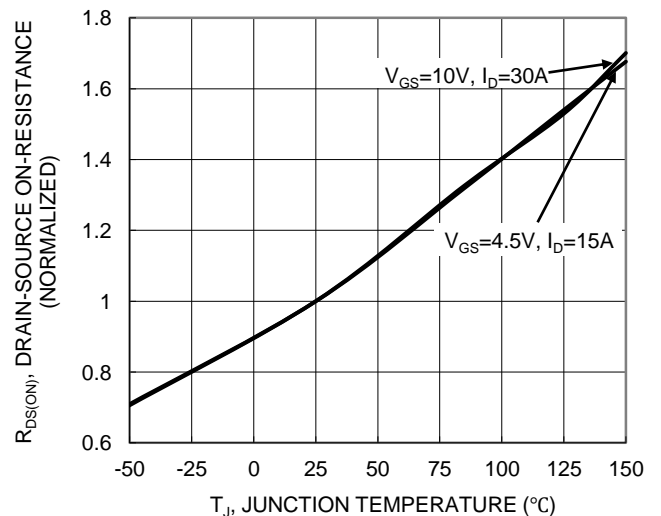


Figure 6. On-Resistance Variation with Temperature

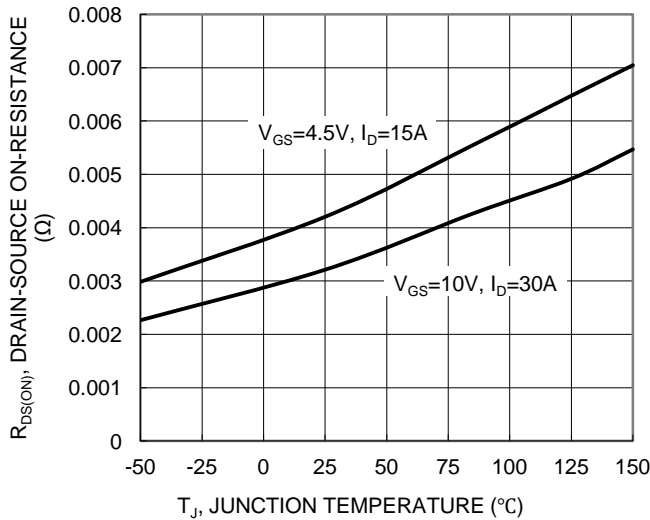


Figure 7. On-Resistance Variation with Temperature

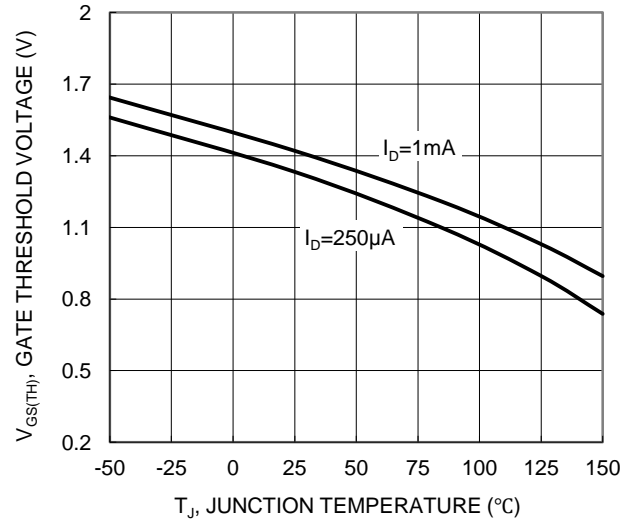


Figure 8. Gate Threshold Variation vs. Junction Temperature

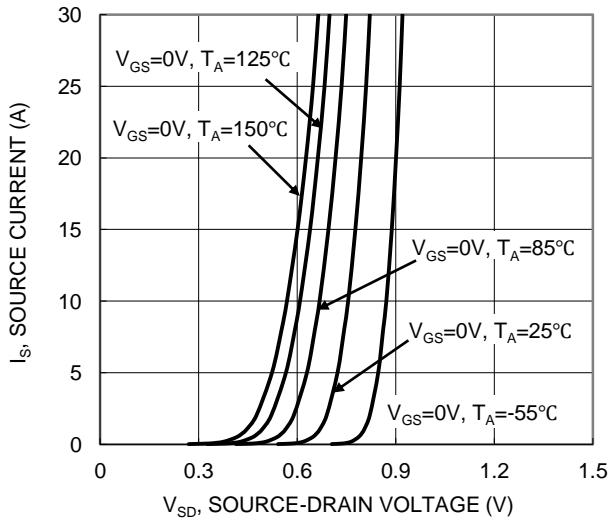


Figure 9. Diode Forward Voltage vs. Current

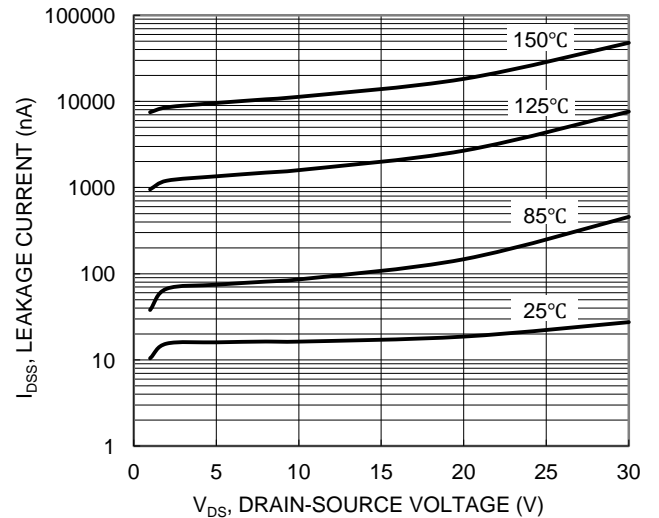


Figure 10. Typical Drain-Source Leakage Current vs. Voltage

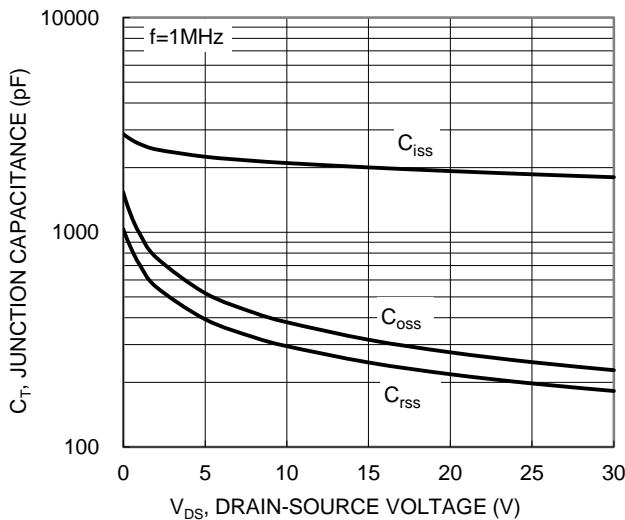


Figure 11. Typical Junction Capacitance

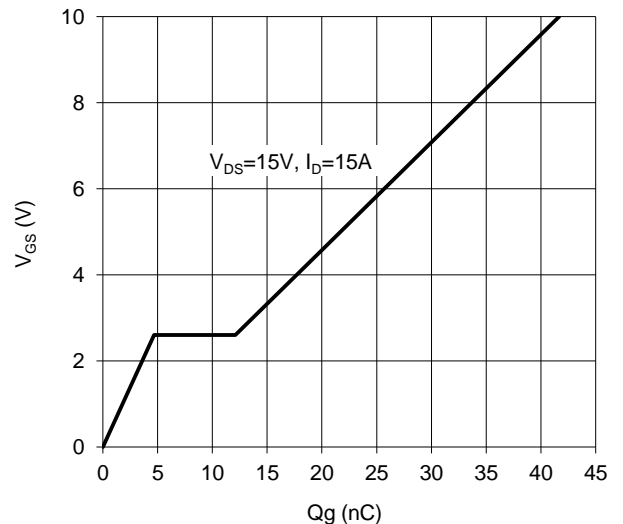
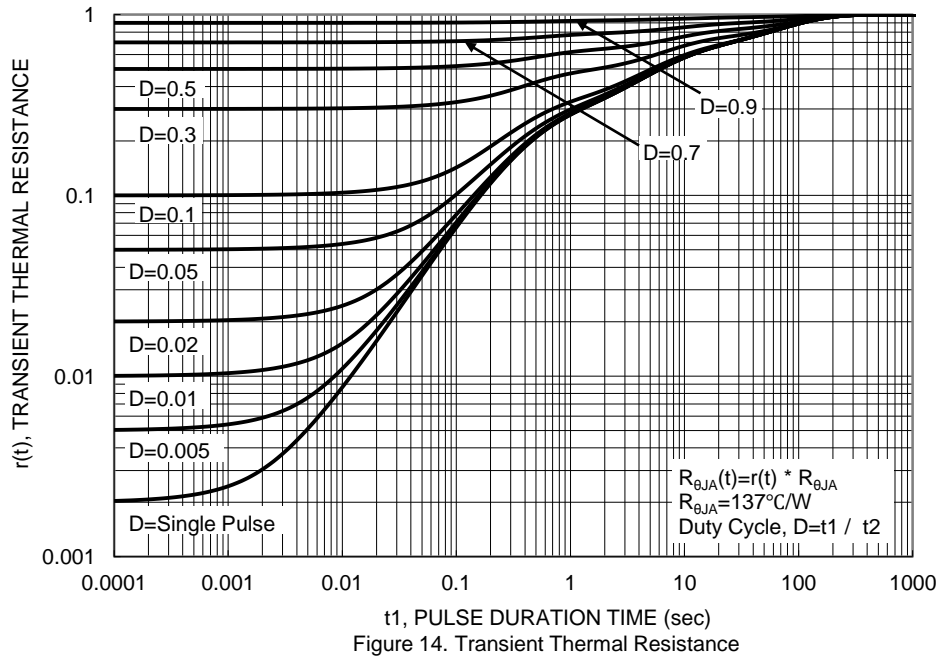
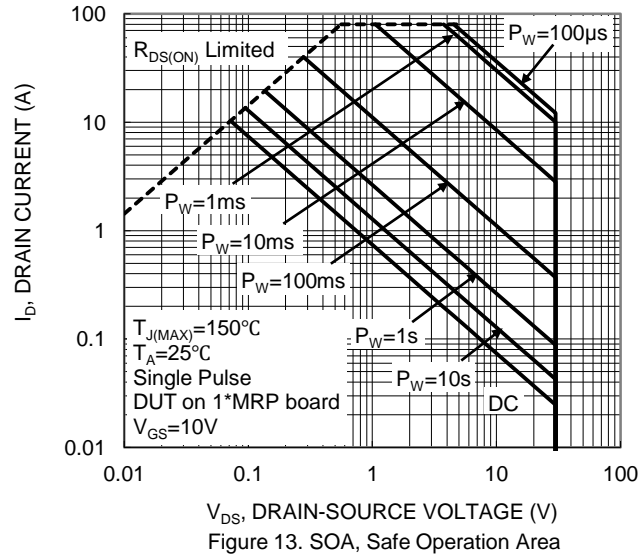


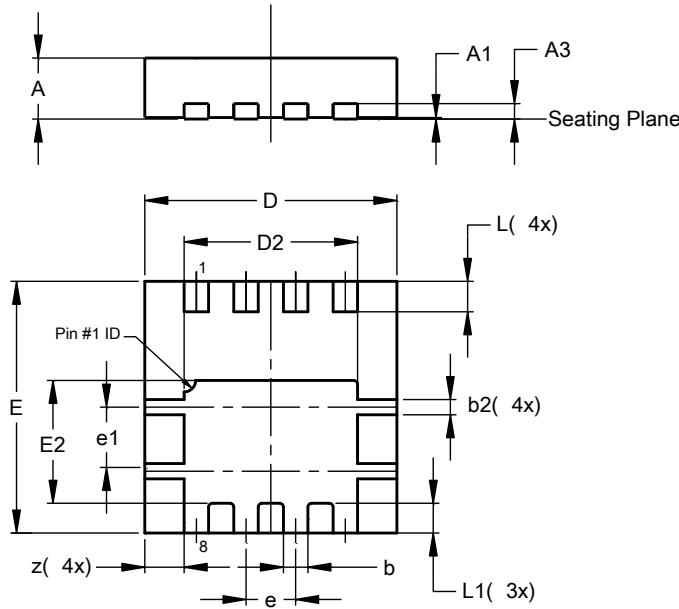
Figure 12. Gate Charge



**Package Outline Dimensions**

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

**PowerDI3333-8**

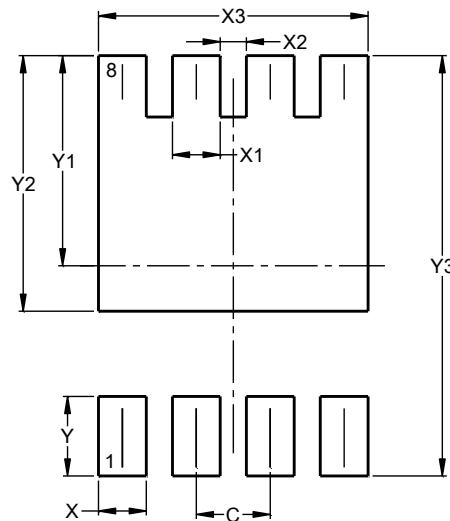


PowerDI3333-8			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	-	-	0.203
b	0.27	0.37	0.32
b2	-	-	0.20
D	3.25	3.35	3.30
D2	2.22	2.32	2.27
E	3.25	3.35	3.30
E2	1.56	1.66	1.61
e	-	-	0.65
e1	0.79	0.89	0.84
L	0.35	0.45	0.40
L1	-	-	0.39
z	-	-	0.515
All Dimensions in mm			

**Suggested Pad Layout**

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

**PowerDI3333-8**



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

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Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: [ocean@oceanchips.ru](mailto:ocean@oceanchips.ru)

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А