

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _C = +25°C
30V	5.5mΩ @ V _{GS} = 10V	45A
	9mΩ @ V _{GS} = 4.5V	30A

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

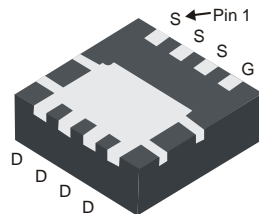
Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- 100% Unclamped Inductive Switching (UIS) Test in Production – Ensures More Reliable and Robust End Application
- **Lead-Free Finish; 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-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at <https://www.diodes.com/products/automotive/automotive-products/>.**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability.**
<https://www.diodes.com/quality/product-definitions/>
- **An Automotive-Compliant Part is Available Under Separate Datasheet (DMN3009SFGQ)**

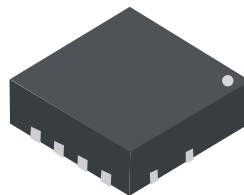
Mechanical Data

- 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 @3
- Weight: 0.072 grams (Approximate)

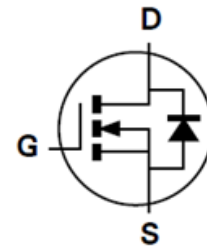
PowerDI3333-8



Bottom View



Top View



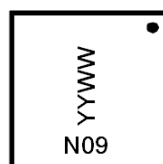
Equivalent Circuit

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) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
 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



N09= Product Type Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 19 = 2019)
WW = Week Code (01 to 53)

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

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

Thermal Characteristics

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

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)						
Drain-Source Breakdown Voltage	BV _{DSS}	30	—	—	V	V _{GS} = 0V, I _D = 250µA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	µA	V _{DS} = 24V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	V _{GS(TH)}	1	—	2.5	V	V _{DS} = V _{GS} , I _D = 250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	3.4	5.5	mΩ	V _{GS} = 10V, I _D = 20A
		—	4.4	9		V _{GS} = 4.5V, I _D = 16A
Diode Forward Voltage	V _{SD}	—	0.7	1	V	V _{GS} = 0V, I _S = 1A
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C _{iss}	—	2,000	—	pF	V _{DS} = 15V, V _{GS} = 0V, f = 1MHz
Output Capacitance	C _{oss}	—	315	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	248	—	pF	
Gate Resistance	R _g	—	2.2	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	20	—	nC	V _{DS} = 15V, I _D = 15A
Total Gate Charge (V _{GS} = 10V)	Q _g	—	42	—	nC	
Gate-Source Charge	Q _{gs}	—	4.7	—	nC	
Gate-Drain Charge	Q _{gd}	—	7.4	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	3.9	—	ns	V _{DD} = 15V, V _{GS} = 10V, R _G = 3.3Ω, I _D = 15A
Turn-On Rise Time	t _R	—	4.1	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	31	—	ns	
Turn-Off Fall Time	t _F	—	14.6	—	ns	
Reverse Recovery Time	t _{RR}	—	15	—	ns	I _F = 15A, di/dt = 100A/µs
Reverse Recovery Charge	Q _{RR}	—	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.

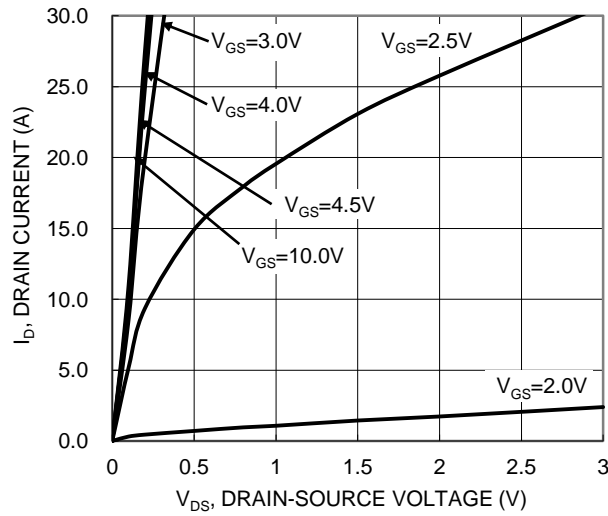


Figure 1. Typical Output Characteristic

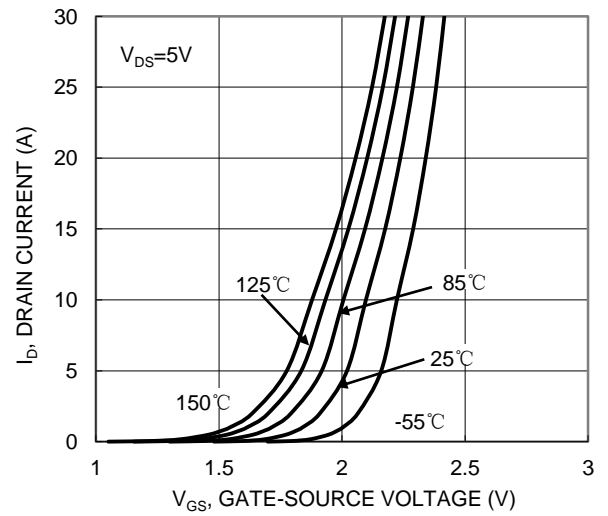


Figure 2. Typical Transfer Characteristic

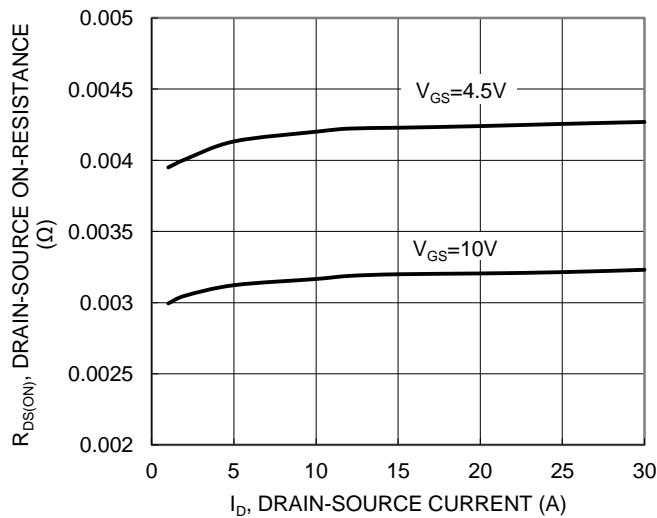


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

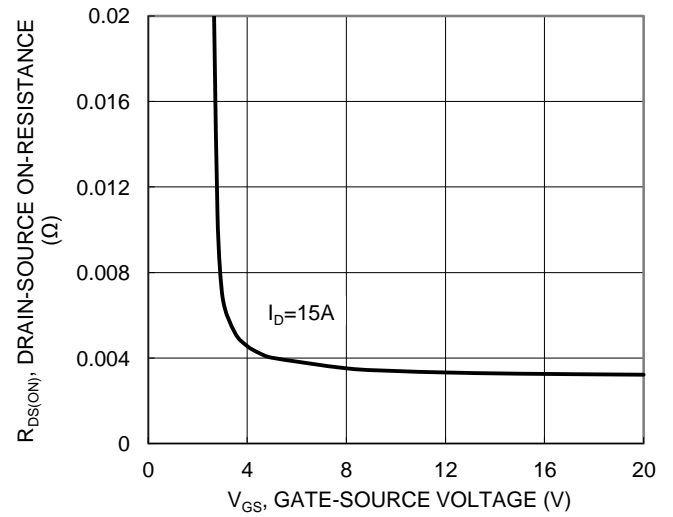


Figure 4. Typical Transfer Characteristic

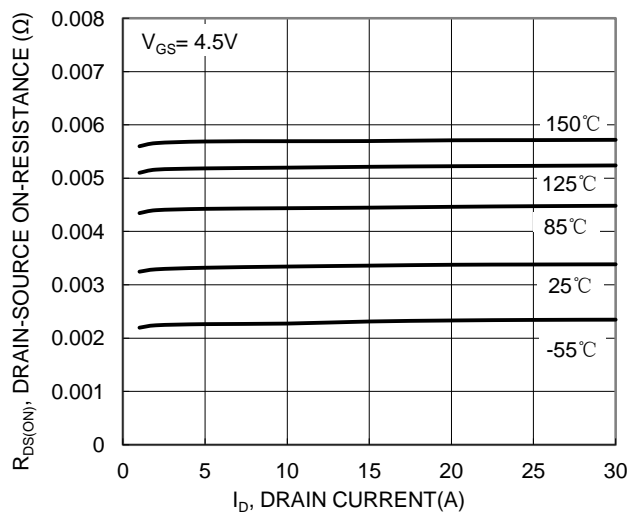


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

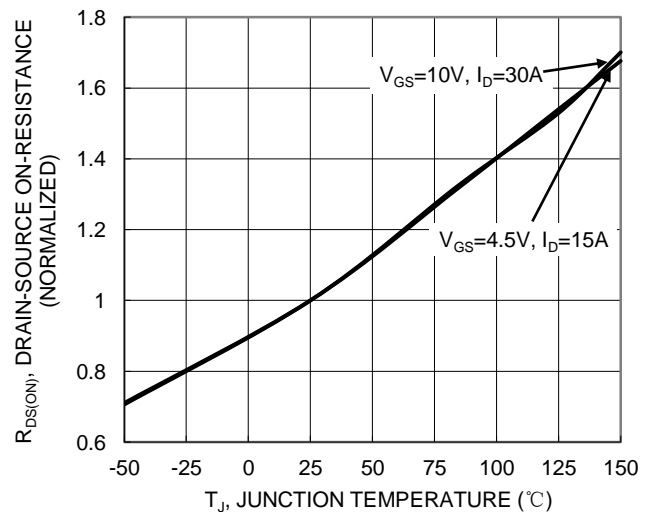


Figure 6. On-Resistance Variation with Temperature

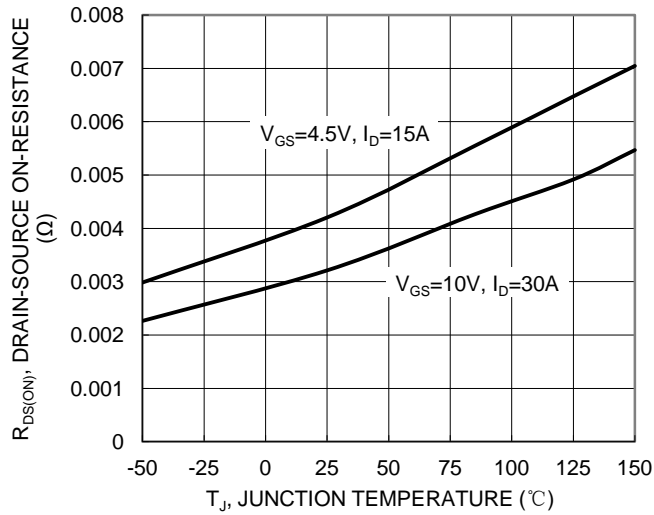


Figure 7. On-Resistance Variation with Temperature

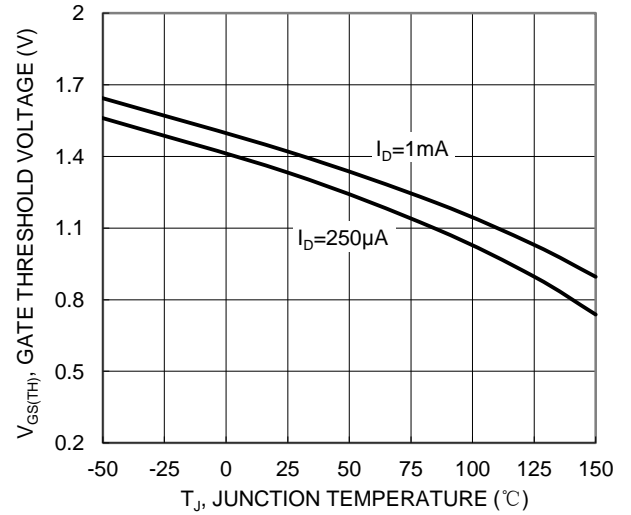


Figure 8. Gate Threshold Variation vs. Junction Temperature

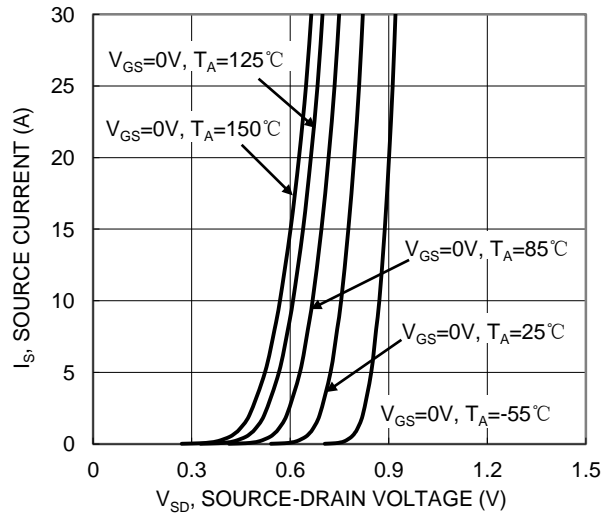


Figure 9. Diode Forward Voltage vs. Current

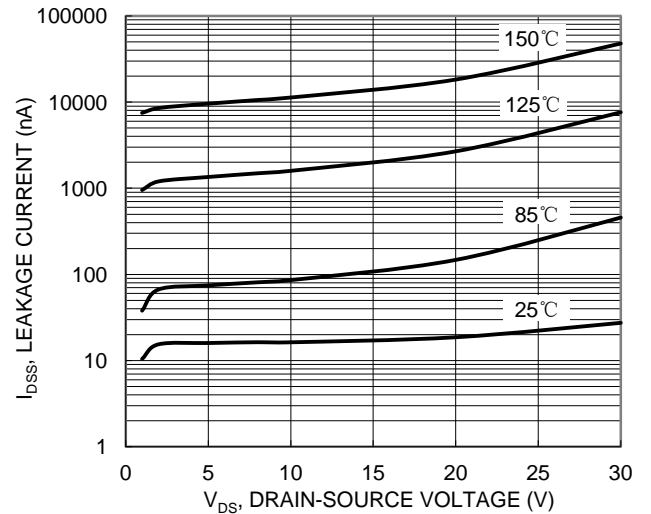


Figure 10. Typical Drain-Source Leakage Current vs. Voltage

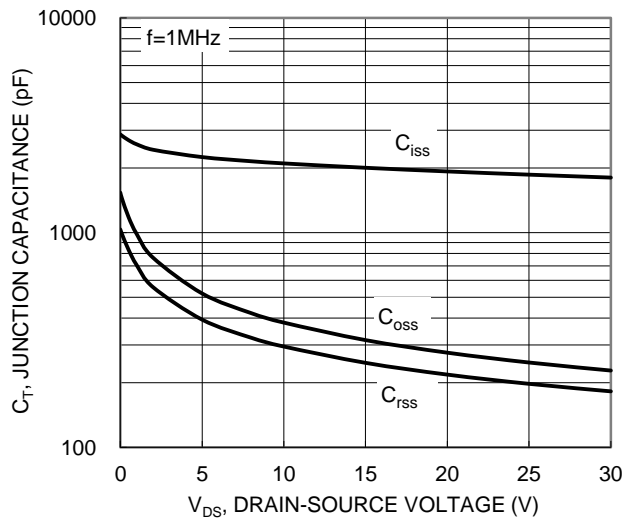


Figure 11. Typical Junction Capacitance

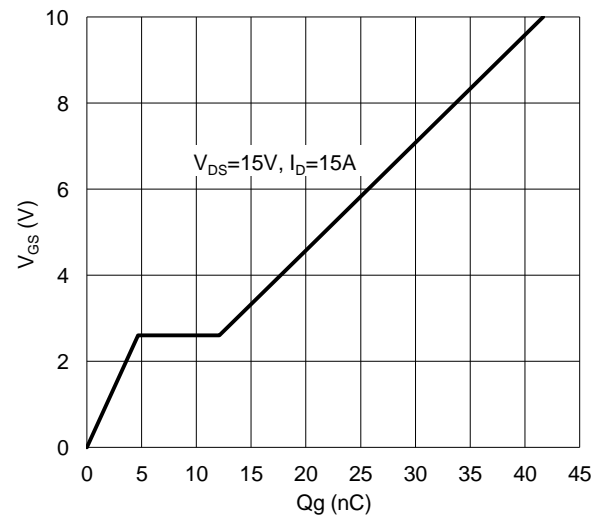
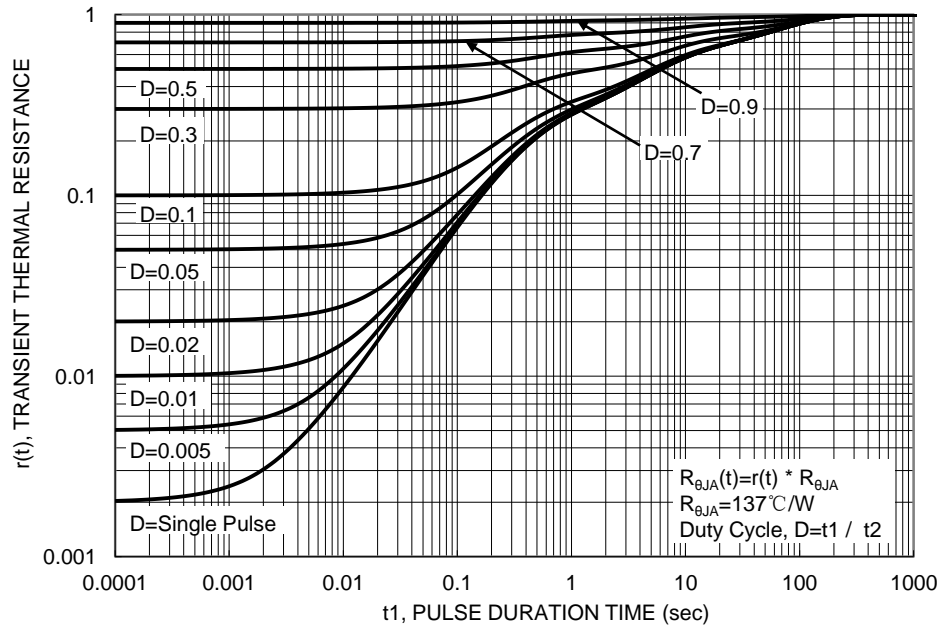
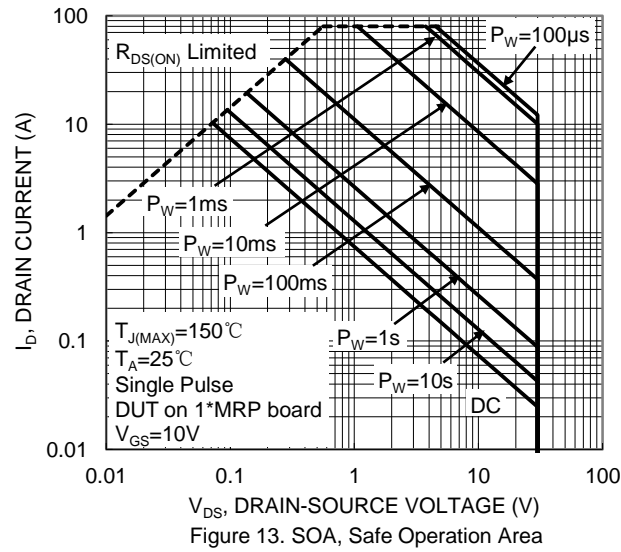


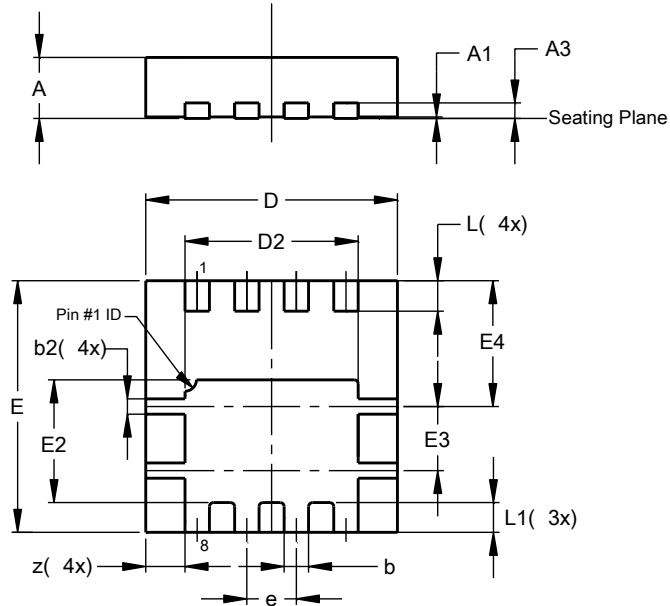
Figure 12. Gate Charge



Package Outline Dimensions

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

PowerDI3333-8

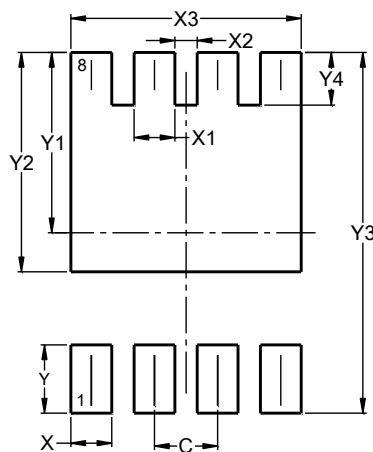


PowerDI3333-8			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	—	—	0.203
b	0.27	0.37	0.32
b2	0.15	0.25	0.20
D	3.25	3.35	3.30
D2	2.22	2.32	2.27
E	3.25	3.35	3.30
E2	1.56	1.66	1.61
E3	0.79	0.89	0.84
E4	1.60	1.70	1.65
e	—	—	0.65
L	0.35	0.45	0.40
L1	—	—	0.39
z	—	—	0.515
All Dimensions in mm			

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> 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
Y4	0.540

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