

Product Summary

BV_{DSS}	R_{DSON} max	I_D max T_C = +25°C
30V	4.4mΩ @ V _{GS} = 10V	62A
	5.5mΩ @ V _{GS} = 4.5V	56A

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:

- Backlighting
- Power Management Functions
- DC-DC Converters

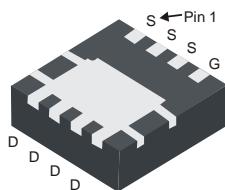
Features and Benefits

- Low R_{DSON} – Ensures on-state losses are minimized
- Small, form factor thermally efficient package enables higher density end products
- Occupies only 33% of the board area occupied by SO-8 enabling smaller end products
- 100% Unclamped Inductive Switch (UIS) Test in Production
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- Qualified to AEC-Q101 Standards for High Reliability
- **PPAP Capable (Note 4)**

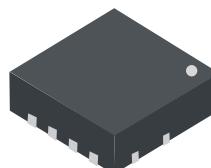
Mechanical Data

- Case: PowerDI3333-8
- 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)

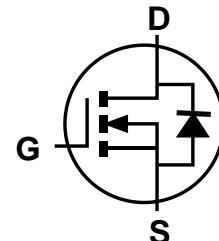
PowerDI3333-8



Bottom View



Top View



Equivalent Circuit

Ordering Information (Note 5)

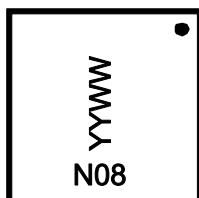
Part Number	Case	Packaging
DMN3008SFGQ-7	PowerDI3333-8	2,000/Tape & Reel
DMN3008SFGQ-13	PowerDI3333-8	3,000/Tape & Reel

Notes:

1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to http://www.diodes.com/product_compliance_definitions.html.
5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information

PowerDI3333-8



N08 = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 16 = 2016)
WW = Week Code (01 to 53)

Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V_{DSS}	30	V
Gate-Source Voltage			V_{GSS}	± 20	V
Continuous Drain Current (Note 7) $V_{GS} = 10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	17.6 14.1	A
	$t < 10\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	23.0 18.4	A
	Steady State	$T_C = +25^\circ\text{C}$ $T_C = +70^\circ\text{C}$	I_D	62 50	A
Pulsed Drain Current (10 μs pulse, duty cycle = 1%)			I_{DM}	80	A
Maximum Continuous Body Diode Forward Current (Note 7)			I_S	2	A
Avalanche Current, $L = 0.1\text{mH}$			I_{AS}	45	A
Avalanche Energy, $L = 0.1\text{mH}$			E_{AS}	101	mJ

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 6)	$T_A = +25^\circ\text{C}$	P_D	0.9	W
	$T_A = +70^\circ\text{C}$		0.6	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	134	$^\circ\text{C/W}$
	$t < 10\text{s}$		79	
Total Power Dissipation (Note 7)	$T_A = +25^\circ\text{C}$	P_D	2.1	W
	$T_A = +70^\circ\text{C}$		1.3	
Thermal Resistance, Junction to Ambient (Note 7)	Steady State	$R_{\theta JA}$	58	$^\circ\text{C/W}$
	$t < 10\text{s}$		34	
Thermal Resistance, Junction to Case (Note 7)		$R_{\theta JC}$	4.8	$^\circ\text{C/W}$
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 Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	10	μA	$V_{DS} = 30\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(\text{TH})}$	1	—	2.3	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(\text{ON})}$	—	3.9	4.4	$\text{m}\Omega$	$V_{GS} = 10\text{V}, I_D = 13.5\text{A}$
		—	4.6	5.5		$V_{GS} = 4.5\text{V}, I_D = 13.5\text{A}$
Diode Forward Voltage	V_{SD}	—	0.75	1.2	V	$V_{GS} = 0\text{V}, I_S = 1\text{A}$
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	3,690	—	pF	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Output Capacitance	C_{oss}	—	530	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	459	—	pF	
Gate Resistance	R_g	—	0.9	—	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge ($V_{GS} = 4.5\text{V}$)	Q_g	—	41	—	nC	$V_{DS} = 24\text{V}, I_D = 27\text{A}$
Total Gate Charge ($V_{GS} = 10\text{V}$)	Q_g	—	86	—	nC	
Gate-Source Charge	Q_{gs}	—	9.2	—	nC	
Gate-Drain Charge	Q_{gd}	—	18.6	—	nC	
Turn-On Delay Time	$t_{D(\text{ON})}$	—	5.7	—	ns	$V_{DD} = 15\text{V}, V_{GS} = 10\text{V}, R_L = 1.11\Omega, R_G = 4.7\Omega, I_D = 13.5\text{A}$
Turn-On Rise Time	t_R	—	14.0	—	ns	
Turn-Off Delay Time	$t_{D(\text{OFF})}$	—	63.7	—	ns	
Turn-Off Fall Time	t_F	—	28.4	—	ns	
Reverse Recovery Time	t_{RR}	—	19.3	—	ns	$I_F = 13.5\text{A}, di/dt=100\text{A}/\mu\text{s}$
Reverse Recovery Charge	Q_{RR}	—	10.7	—	nC	

Notes: 6. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

7. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

8. Short duration pulse test used to minimize self-heating effect.

9. Guaranteed by design. Not subject to product testing.

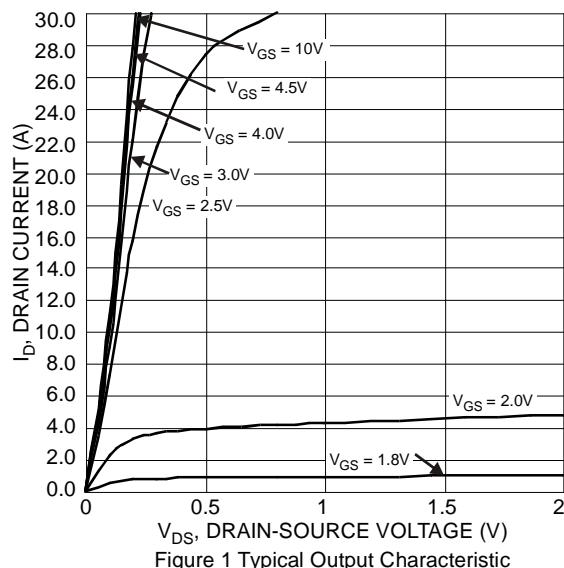


Figure 1 Typical Output Characteristic

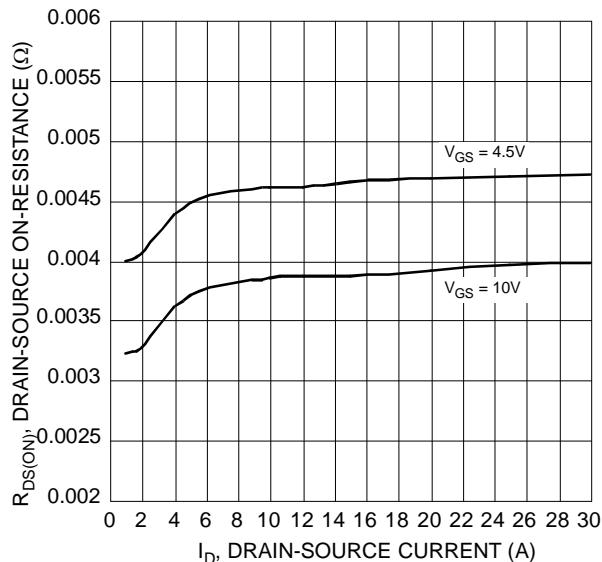


Figure 3 Typical On-Resistance vs.
Drain Current and Gate Voltage

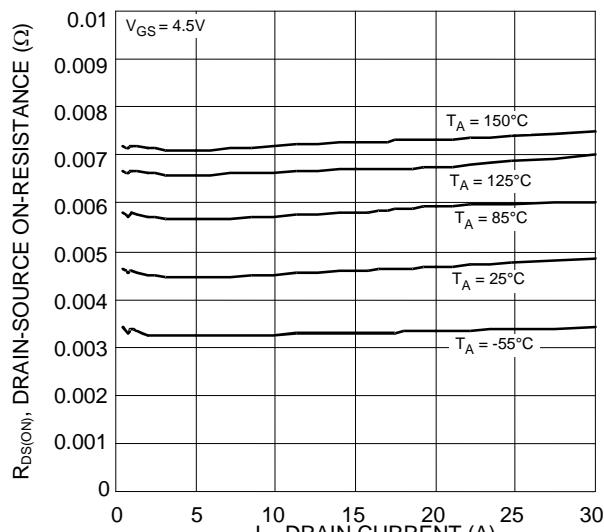


Figure 5 Typical On-Resistance vs.
Drain Current and Temperature

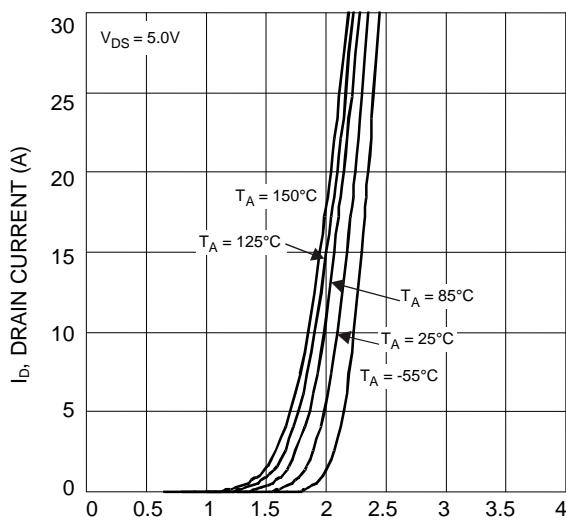


Figure 2 Typical Transfer Characteristics

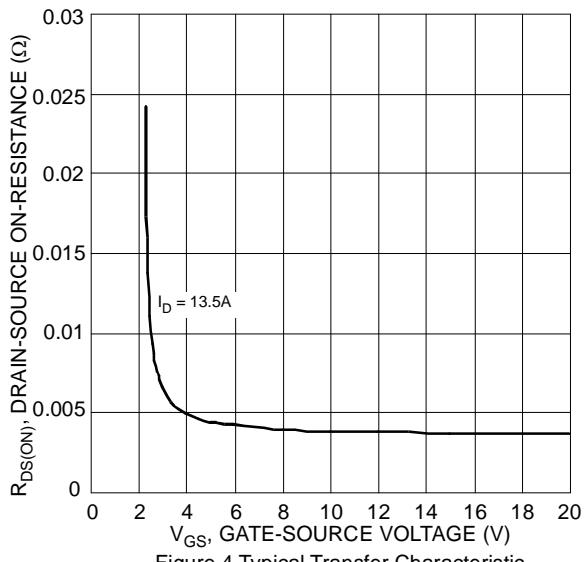


Figure 4 Typical Transfer Characteristic

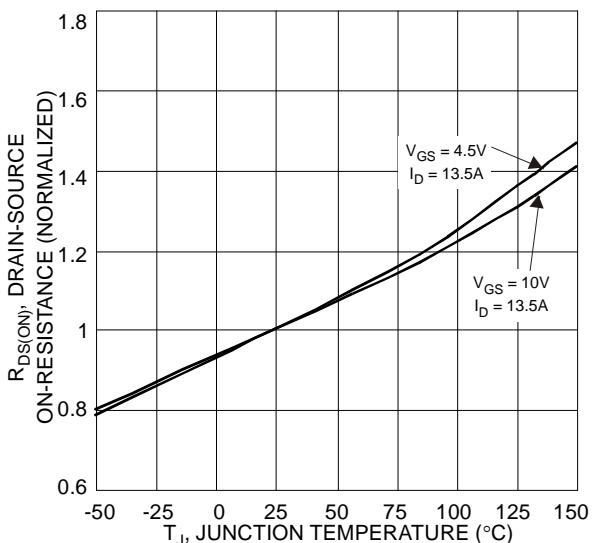


Figure 6 On-Resistance Variation with Temperature

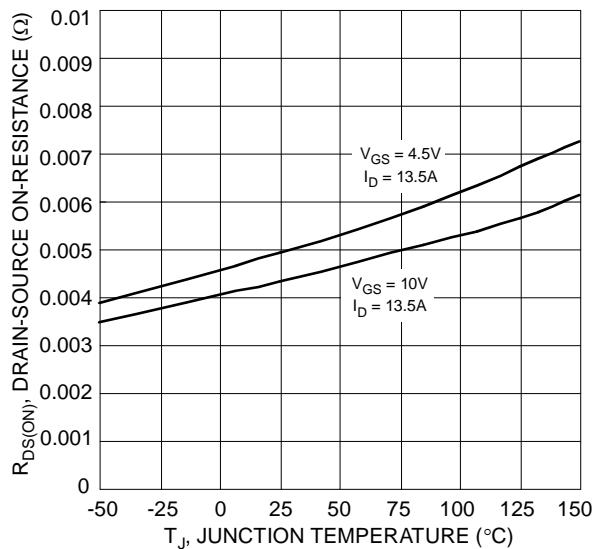


Figure 7 On-Resistance Variation with Temperature

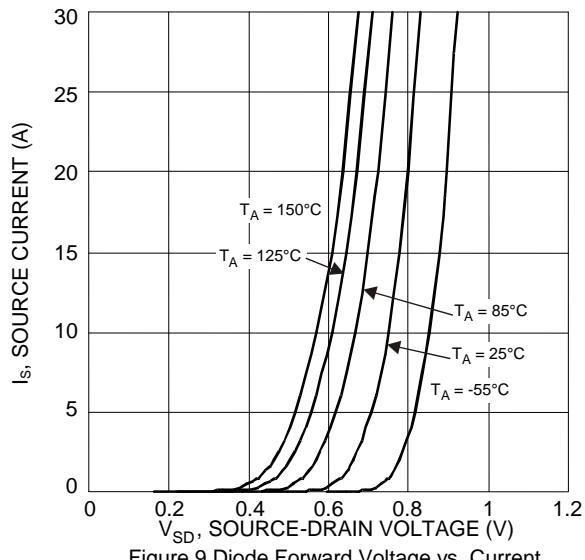


Figure 9 Diode Forward Voltage vs. Current

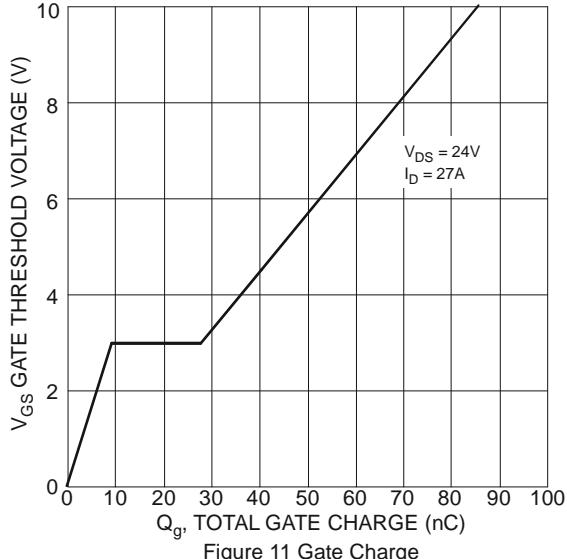


Figure 11 Gate Charge

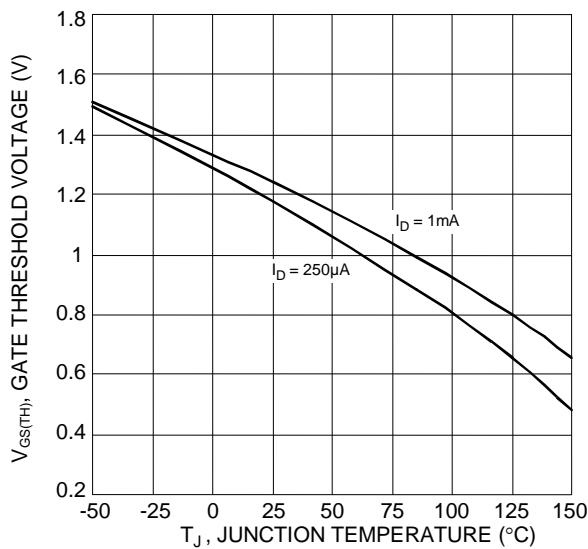


Figure 8 Gate Threshold Variation vs. Junction Temperature

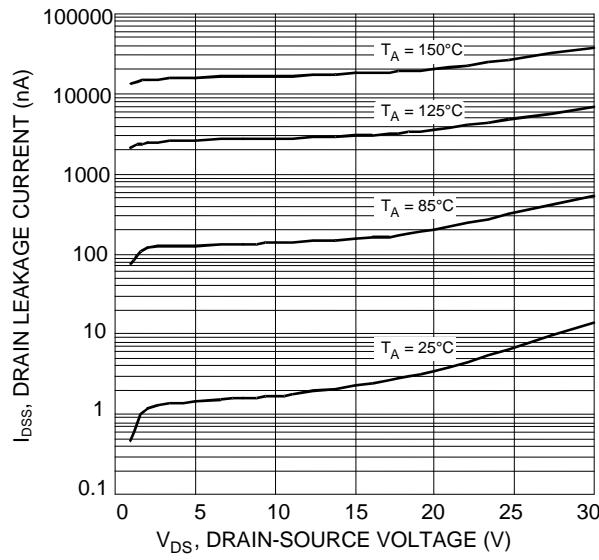
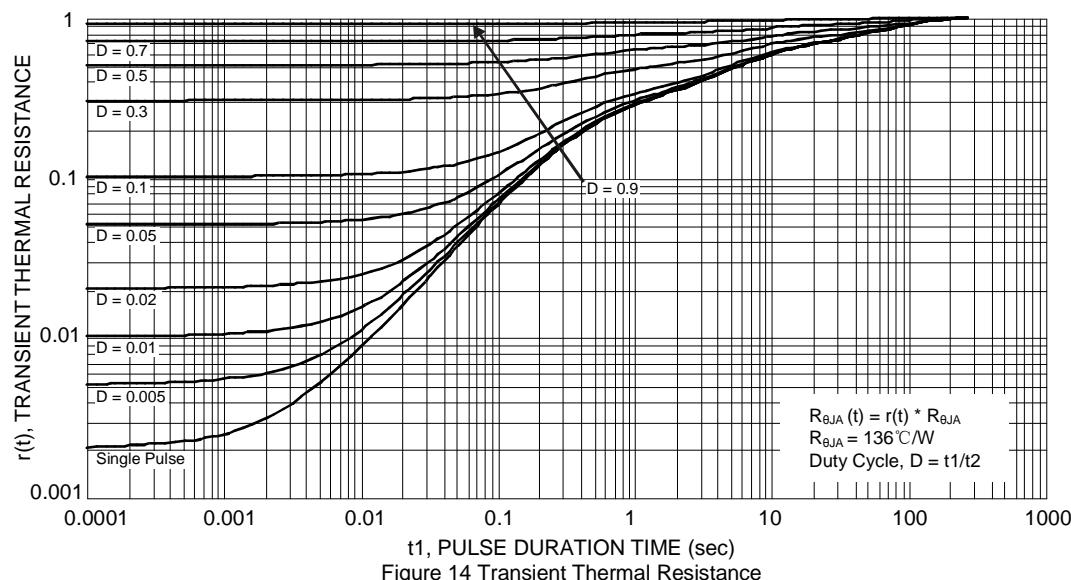
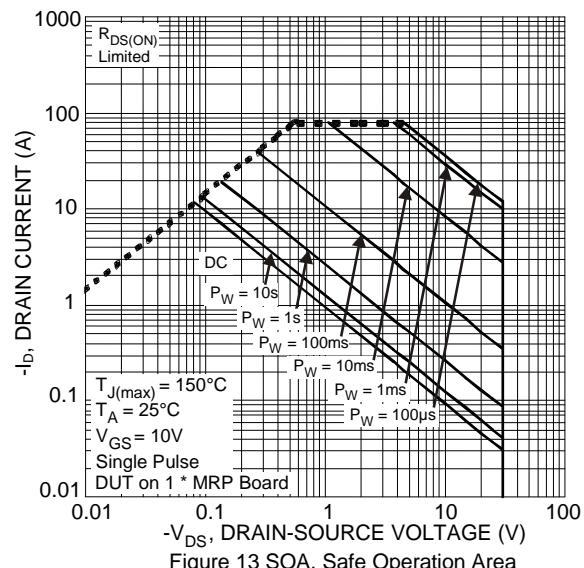
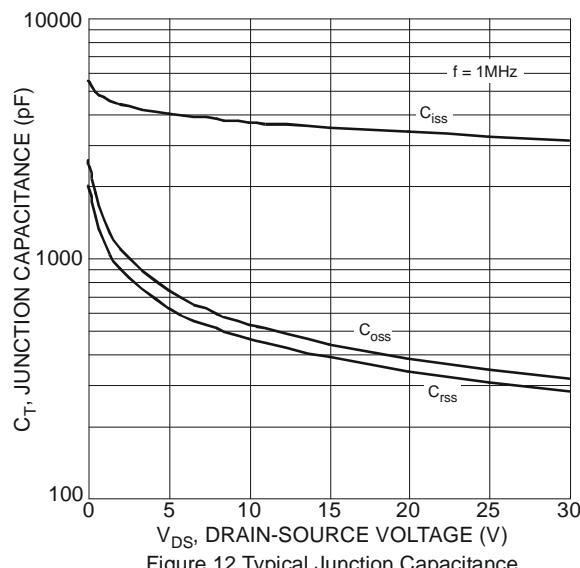


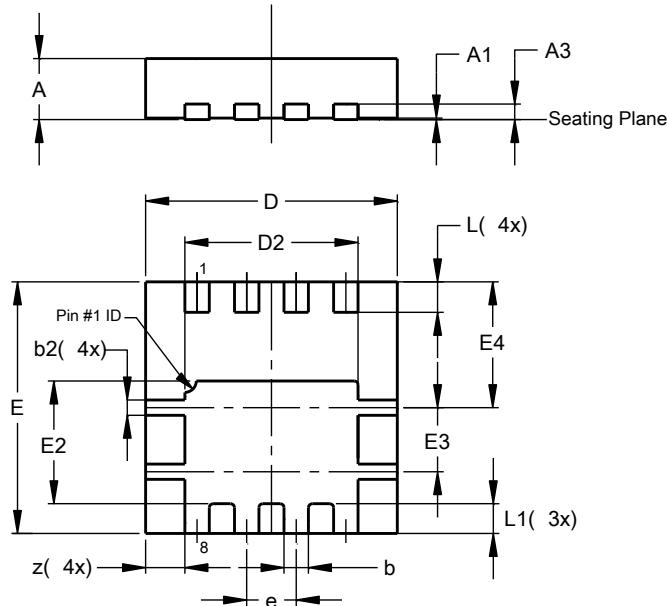
Figure 10 Typical Drain-Source Leakage Current vs. Voltage



Package Outline Dimensions

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

PowerDI3333-8



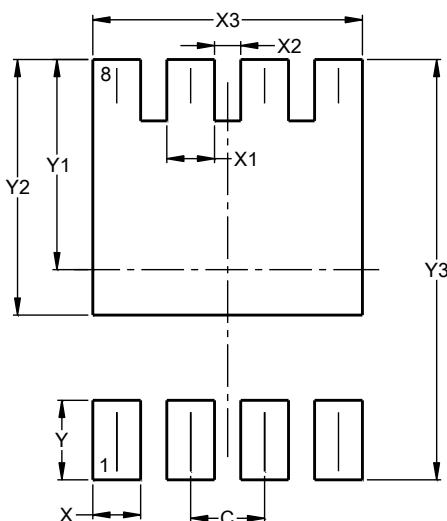
PowerDI3333-8			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	—	—	0.203
b	0.27	0.37	0.32
b2	0.15	0.25	0.20
D	3.25	3.35	3.30
D2	2.22	2.32	2.27
E	3.25	3.35	3.30
E2	1.56	1.66	1.61
E3	0.79	0.89	0.84
E4	1.60	1.70	1.65
e	—	—	0.65
L	0.35	0.45	0.40
L1	—	—	0.39
z	—	—	0.515

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

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