

## Product Summary

$BV_{DSS}$	$R_{DS(ON)}$ Max	$I_D$ Max $T_A = +25^\circ\text{C}$
30V	11m $\Omega$ @ $V_{GS} = 10\text{V}$	10.5A
	15m $\Omega$ @ $V_{GS} = 4.5\text{V}$	9.2A

## 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
- Power Management Functions
- DC-DC Converters

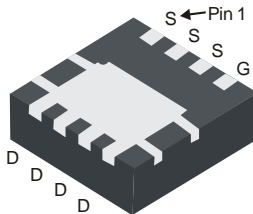
## Features and Benefits

- Low  $R_{DS(ON)}$  – Ensures On State Losses Are Minimized
- 100% Unclamped Inductive Switching, Test in Production – Ensures More Reliable And Robust End Application
- Small Form Factor Thermally Efficient Package Enables Higher Density End Products
- Occupies Just 33% of The Board Area Occupied by SO-8 Enabling Smaller End Product
- **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)**

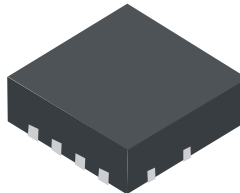
## Mechanical Data

- Case: PowerDI<sup>®</sup> 3333-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 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)

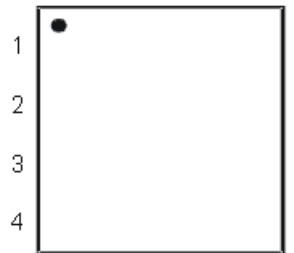
PowerDI3333-8



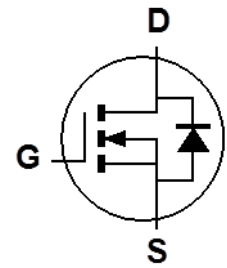
Bottom View



Top View



Top View



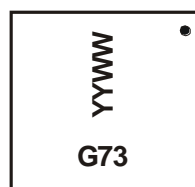
Equivalent Circuit

## Ordering Information (Note 5)

Part Number	Case	Packaging
DMG7430LFGQ-7	PowerDI3333-8	2000/Tape & Reel
DMG7430LFGQ-13	PowerDI3333-8	3000/Tape & 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to <https://www.diodes.com/quality/>.
  5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



G73 = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Last Two Digits of Year (ex: 18 = 2018)  
 WW = Week Code (01 to 53)

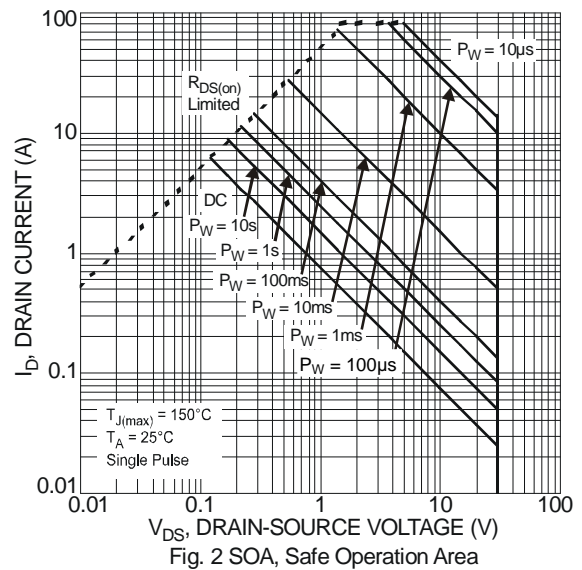
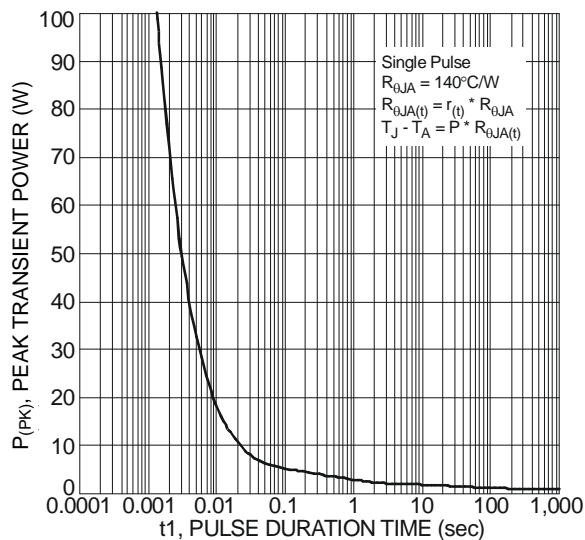
**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

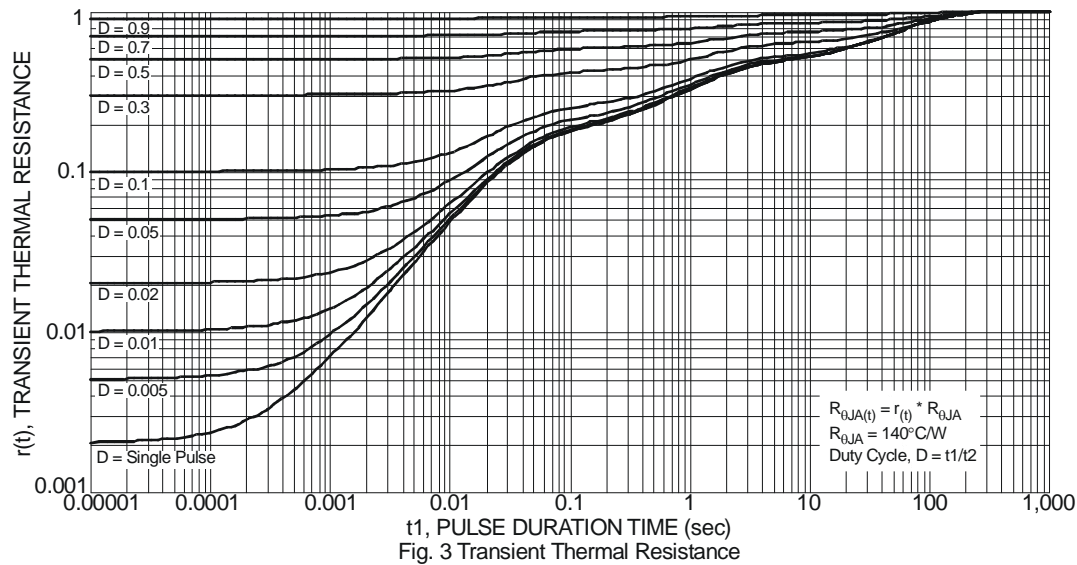
Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V <sub>DSS</sub>	30	V
Gate-Source Voltage			V <sub>GSS</sub>	±20	V
Continuous Drain Current (Note 7) V <sub>GS</sub> = 10V	Steady State	T <sub>A</sub> = +25°C	I <sub>D</sub>	10.5	A
		T <sub>A</sub> = +70°C		8.5	A
	t < 10s	T <sub>A</sub> = +25°C	I <sub>D</sub>	14	A
		T <sub>A</sub> = +70°C		11	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)			I <sub>DM</sub>	90	A
Maximum Continuous Body Diode Forward Current (Note 7)			I <sub>S</sub>	3.0	A
Avalanche Current (Note 8) L = 0.1mH			I <sub>AR</sub>	22	A
Repetitive Avalanche Energy (Note 8) L = 0.1mH			E <sub>AR</sub>	24	mJ

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 6)	Steady State	P <sub>D</sub>	0.9	W
	t < 10s		1.5	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R <sub>θJA</sub>	142	°C/W
	t < 10s		78	
Total Power Dissipation (Note 7)	Steady State	P <sub>D</sub>	2.2	W
	t < 10s		3.5	
Thermal Resistance, Junction to Ambient (Note 7)	Steady State	R <sub>θJA</sub>	59	°C/W
	t < 10s		33	
Thermal Resistance, Junction to Case (Note 7)		R <sub>θJC</sub>	11	
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

- 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. I<sub>AR</sub> and E<sub>AR</sub> ratings are based on low frequency and duty cycles to keep T<sub>J</sub> = +25°C.

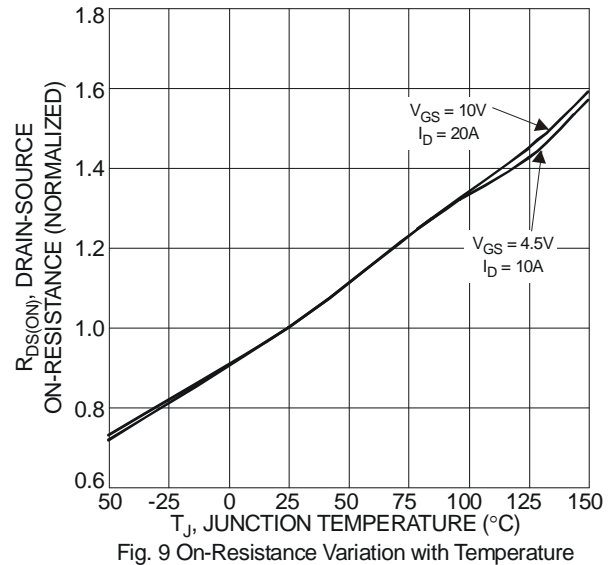
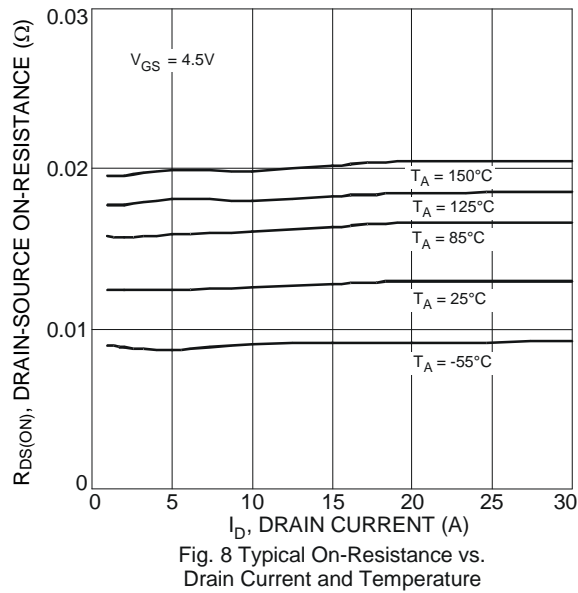
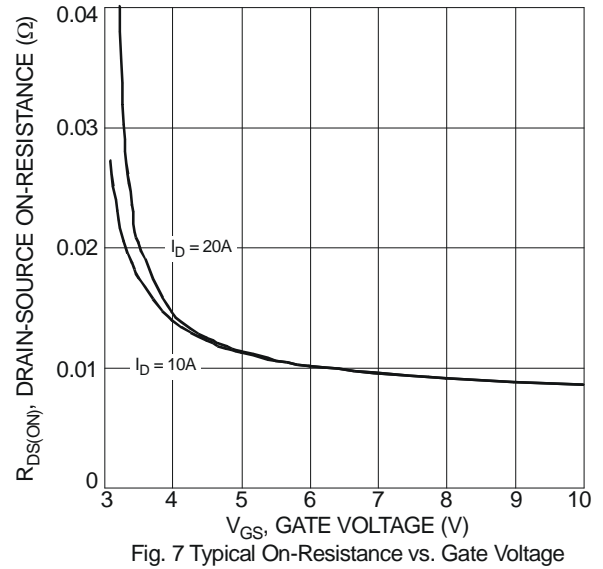
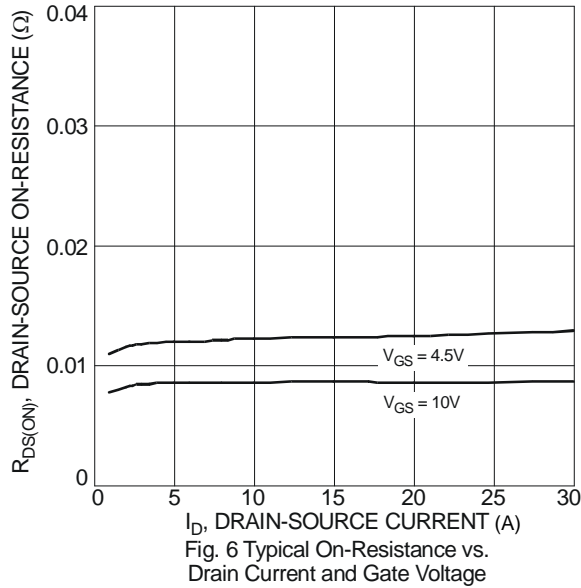
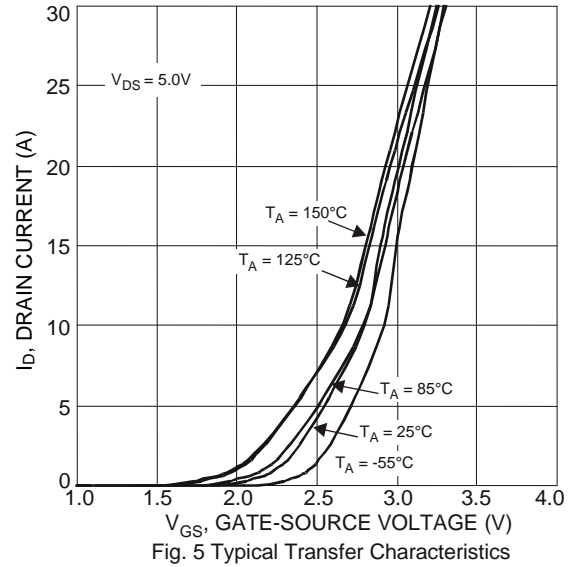
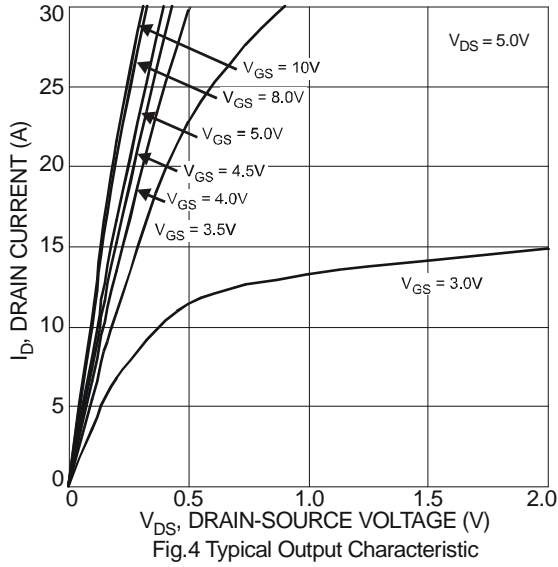




### Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 9)</b>						
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> = 30V, 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 (Note 9)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	1.4	-	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>	-	7	11	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A
		-	11	15		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 20A
Forward Transfer Admittance	Y <sub>fs</sub>	-	74	-	S	V <sub>DS</sub> = 5V, I <sub>D</sub> = 20A
Diode Forward Voltage	V <sub>SD</sub>	-	0.75	1.0	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A
<b>DYNAMIC CHARACTERISTICS (Note 10)</b>						
Input Capacitance	C <sub>iss</sub>	-	1281	-	pF	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	-	145	-	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	-	125	-	pF	
Gate Resistance	R <sub>g</sub>	-	1.2	-	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Q <sub>g</sub>	-	12.5	-	nC	
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>g</sub>	-	26.7	-	nC	
Gate-Source Charge	Q <sub>gs</sub>	-	3.6	-	nC	
Gate-Drain Charge	Q <sub>gd</sub>	-	4.4	-	nC	
Turn-On Delay Time	t <sub>D(ON)</sub>	-	5.2	-	ns	V <sub>DD</sub> = 15V, V <sub>GS</sub> = 10V, R <sub>L</sub> = 1.25Ω, R <sub>G</sub> = 3Ω
Turn-On Rise Time	t <sub>R</sub>	-	21.2	-	ns	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	-	22.3	-	ns	
Turn-Off Fall Time	t <sub>F</sub>	-	5.1	-	ns	
Reverse Recovery Time	t <sub>RR</sub>	-	8.5	-	ns	I <sub>F</sub> = 12A, di/dt = 500A/μs
Reverse Recovery Charge	Q <sub>RR</sub>	-	7.0	-	nC	I <sub>F</sub> = 12A, di/dt = 500A/μs

Notes: 9. Short duration pulse test used to minimize self-heating effect.  
 10. Guaranteed by design. Not subject to product testing.



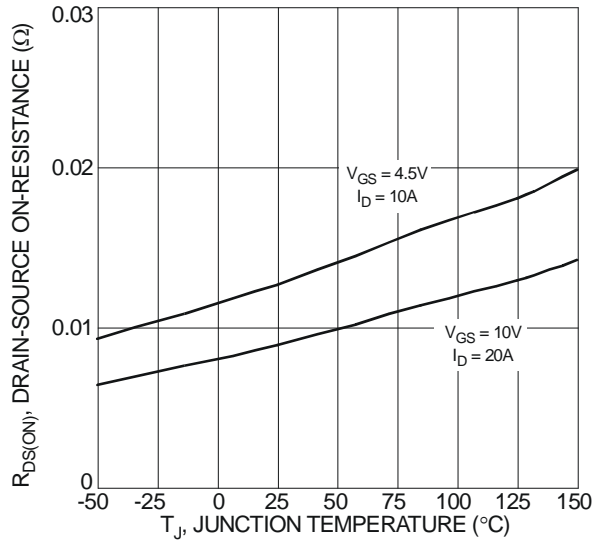


Fig. 10 On-Resistance Variation with Temperature

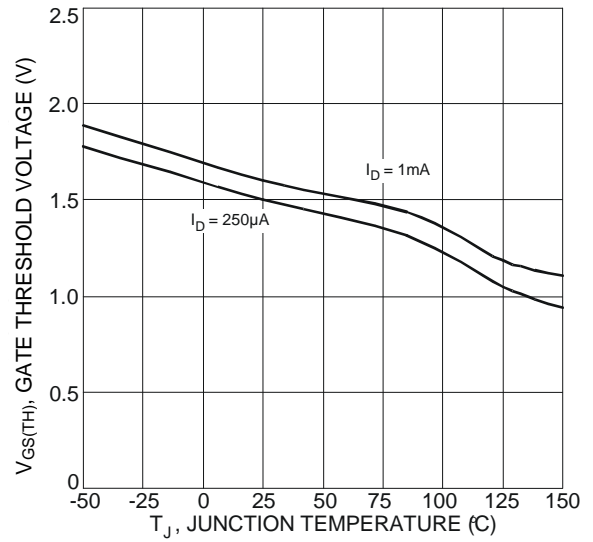


Fig. 11 Gate Threshold Variation vs. Junction Temperature

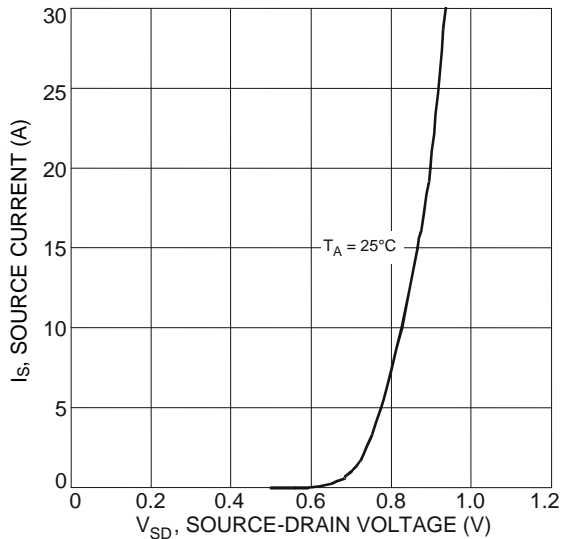


Fig. 12 Diode Forward Voltage vs. Current

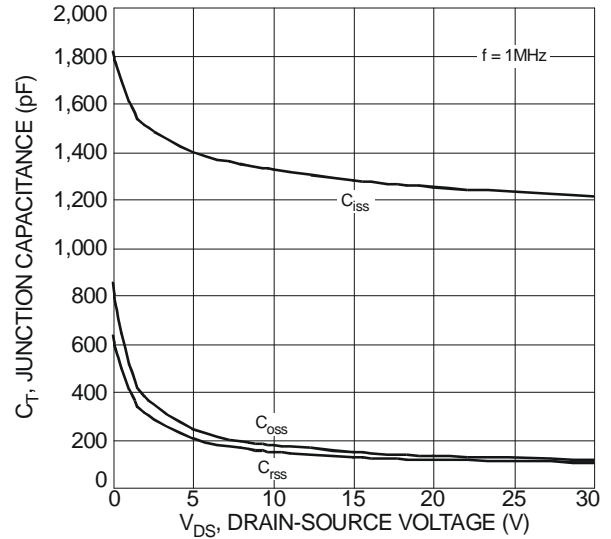


Fig. 13 Typical Junction Capacitance

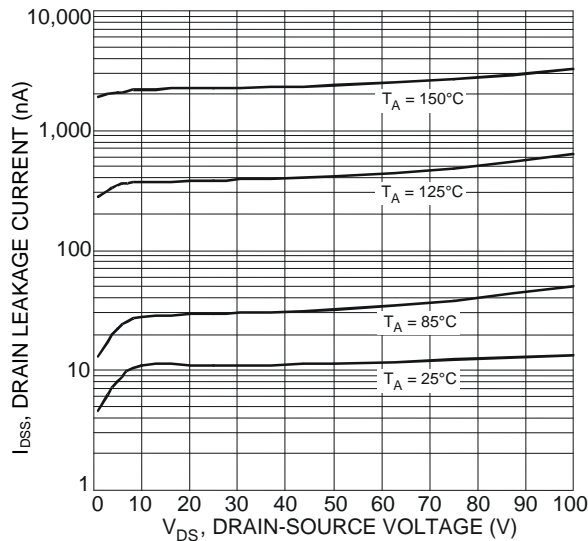


Fig. 14 Typical Drain-Source Leakage Current vs. Voltage

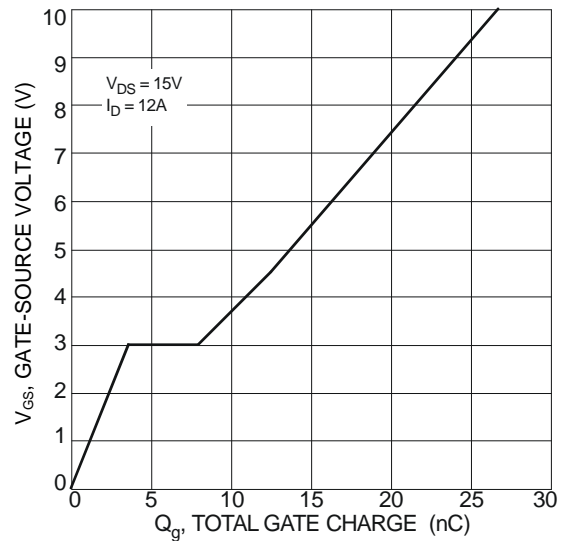
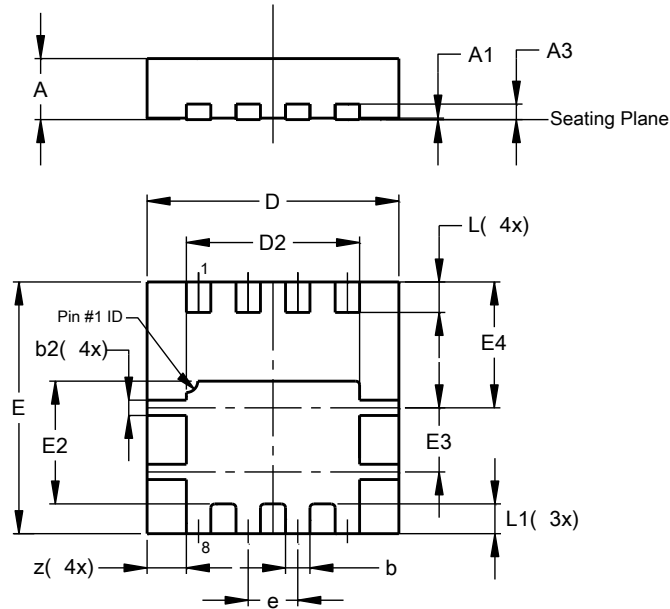


Fig. 15 Gate Charge

## Package Outline Dimensions

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

**PowerDI3333-8**

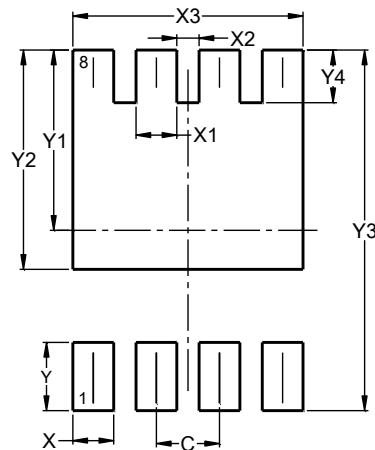


PowerDI3333-8			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	—	—	0.203
b	0.27	0.37	0.32
b2	0.15	0.25	0.20
D	3.25	3.35	3.30
D2	2.22	2.32	2.27
E	3.25	3.35	3.30
E2	1.56	1.66	1.61
E3	0.79	0.89	0.84
E4	1.60	1.70	1.65
e	—	—	0.65
L	0.35	0.45	0.40
L1	—	—	0.39
z	—	—	0.515
All Dimensions in mm			

## 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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