



**THE DATASHEET OF
DMS3016SFG-13**



Product Summary

BV _{DSS}	R _{DS(ON)} MAX	I _D MAX T _A = +25°C
30V	13mΩ @ V _{GS} = 10V	10.2A
	16mΩ @ V _{GS} = 4.5V	9.3A

Description

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

Applications

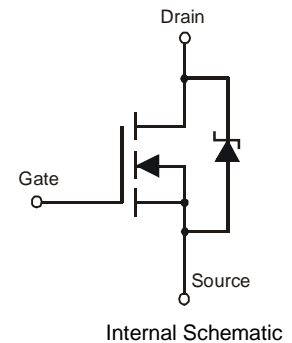
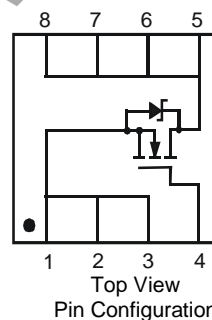
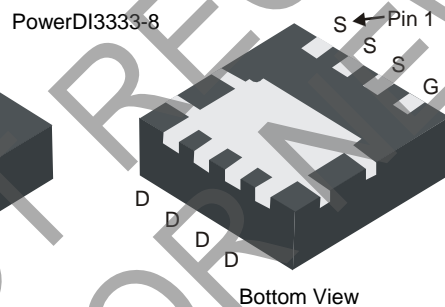
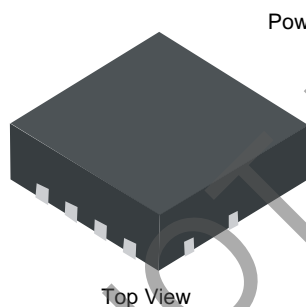
- DC-DC Converters
- Power Management Functions
- Analog Switch

Features and Benefits

- DIOFET Utilizes a Unique Patented Process to Monolithically Integrate a MOSFET and a Schottky in a Single Die to Deliver:
 - Low R_{DS(ON)} – Minimize Conduction Losses
 - Low V_{SD} – Reducing the Losses due to Body Diode Conduction
 - Low Q_{rr} – Lower Q_{rr} of the Integrated Schottky Reduces Body Diode Switching Losses
 - Low Gate Capacitance (Q_g/Q_{gs}) Ratio – Reduces Risk of Shoot-Through or Cross Conduction Currents at High Frequencies
 - Avalanche Rugged – I_{AR} and E_{AR} Rated
- 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
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

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: See Diagram
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.072 grams (Approximate)

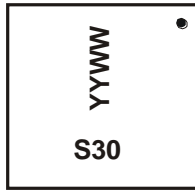


Ordering Information (Note 4)

Part Number	Case	Packaging
DMS3016SFG-7	PowerDI3333-8	2,000/Tape & Reel
DMS3016SFG-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 http://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



S30 = 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_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	30	V
Gate-Source Voltage			V _{GSS}	±12	V
Continuous Drain Current (Note 5) V _{GS} = 10V	Steady State	T _A = +25°C	I _D	7.0	A
		T _A = +70°C		5.5	
Continuous Drain Current (Note 5) V _{GS} = 4.5V	Steady State	T _A = +25°C	I _D	6.4	A
		T _A = +70°C		5.1	
Continuous Drain Current (Note 6) V _{GS} = 10V	Steady State	T _A = +25°C	I _D	10.2	A
		T _A = +70°C		8.1	
Continuous Drain Current (Note 6) V _{GS} = 4.5V	Steady State	T _A = +25°C	I _D	9.3	A
		T _A = +70°C		7.4	
Pulsed Drain Current (10μs Pulse, Duty Cycle=1%)			I _{DM}	80	A
Avalanche Current (Note 7)			I _{AR}	13	A
Repetitive Avalanche Energy (Note 7) L = 0.3mH			E _{AR}	24	mJ

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation	(Note 5)	P _D	0.98	W
	(Note 6)		2.08	
Thermal Resistance, Junction to Ambient	(Note 5)	R _{θJA}	127	°C/W
	(Note 6)		60	
Thermal Resistance, Junction to Case	(Note 6)	R _{θJC}	3.42	°C/W
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

- Notes:
- Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with thermal vias to bottom layer 1inch square copper plate.
 - I_{AR} and E_{AR} ratings are based on low frequency and duty cycles to keep T_J = +25°C.

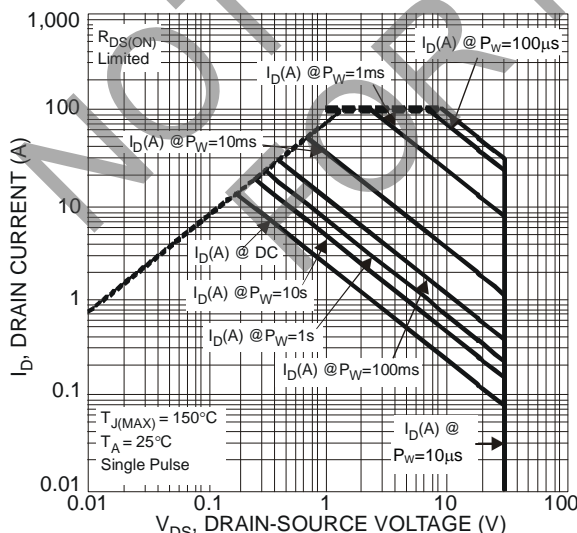


Fig. 1 SOA, Safe Operation Area

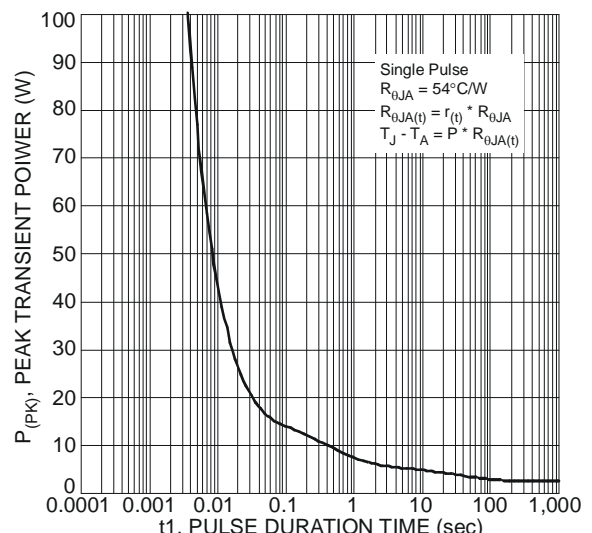
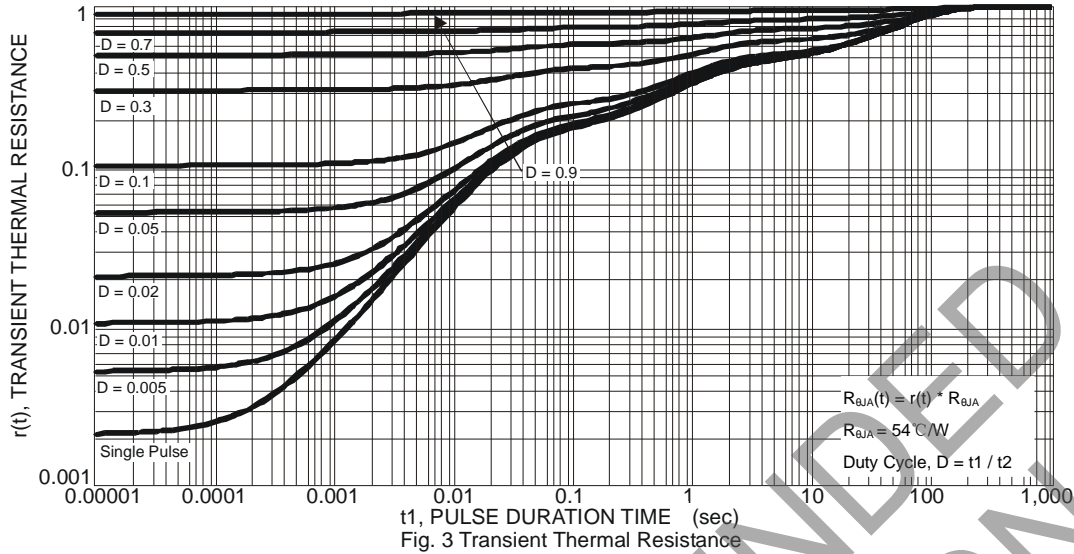


Fig. 2 Single Pulse Maximum Power Dissipation



Electrical Characteristics (@T_A = +25°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} = 0V, I _D = 1mA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	100	μA	V _{DS} = 30V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±12V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	1.0	—	2.2	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	10	13	mΩ	V _{GS} = 10V, I _D = 11.2A
		—	12	16		V _{GS} = 4.5V, I _D = 10.A
Forward Transfer Admittance	Y _{fs}	—	25	—	s	V _{DS} = 5V, I _D = 11.2A
Diode Forward Voltage	V _{SD}	—	0.37	0.6	V	V _{GS} = 0V, I _S = 1A
Maximum Body-Diode + Schottky Continuous Current	I _S	—	—	5	A	
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	1886	—	pF	V _{DS} = 15V, V _{GS} = 0V f = 1.0MHz
Output Capacitance	C _{oss}	—	372	—		
Reverse Transfer Capacitance	C _{rss}	—	128	—		
Gate Resistance	R _g	—	2.0	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	19.5	—	nC	V _{DS} = 15V, V _{GS} = 10V I _D = 11.2A
Total Gate Charge (V _{GS} = 10V)	Q _g	—	44.6	—		
Gate-Source Charge	Q _{gs}	—	4.8	—		
Gate-Drain Charge	Q _{gd}	—	4.6	—		
Turn-On Delay Time	t _{D(on)}	—	5.8	—	ns	V _{GS} = 10V, V _{DD} = 15V, R _g = 3Ω, R _L = 1.2Ω
Turn-On Rise Time	t _r	—	23.7	—		
Turn-Off Delay Time	t _{D(off)}	—	35.4	—		
Turn-Off Fall Time	t _f	—	7.7	—		

Notes: 8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to production testing.

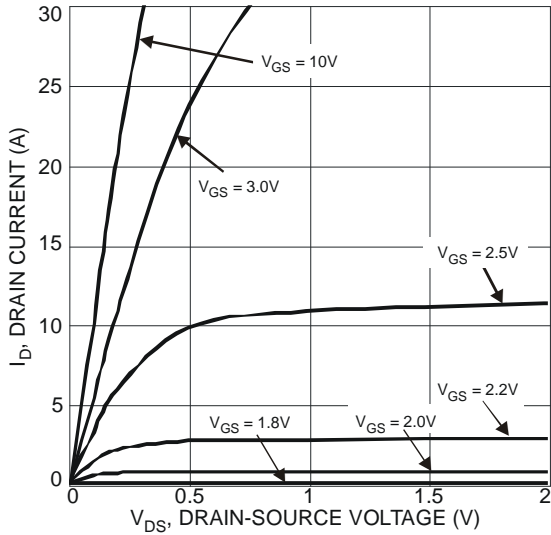


Fig. 4 Typical Output Characteristics

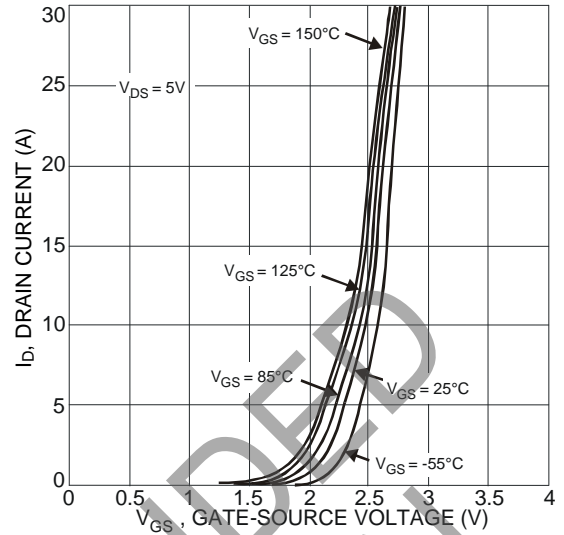


Fig. 5 Typical Transfer Characteristic

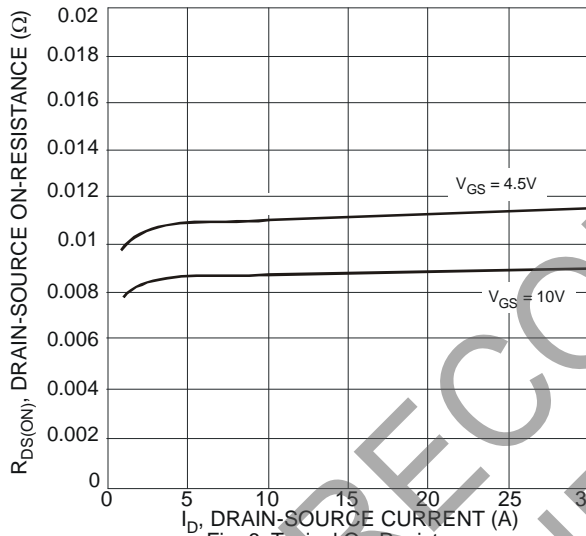


Fig. 6 Typical On-Resistance vs. Drain Current and Gate Voltage

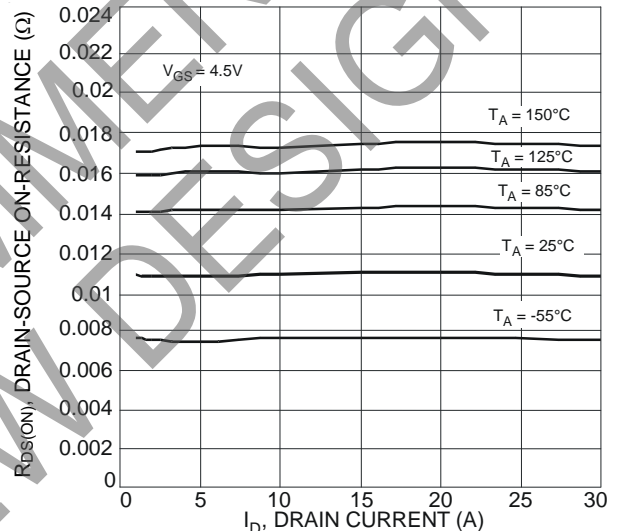


Fig. 7 Typical On-Resistance vs. Drain Current and Temperature

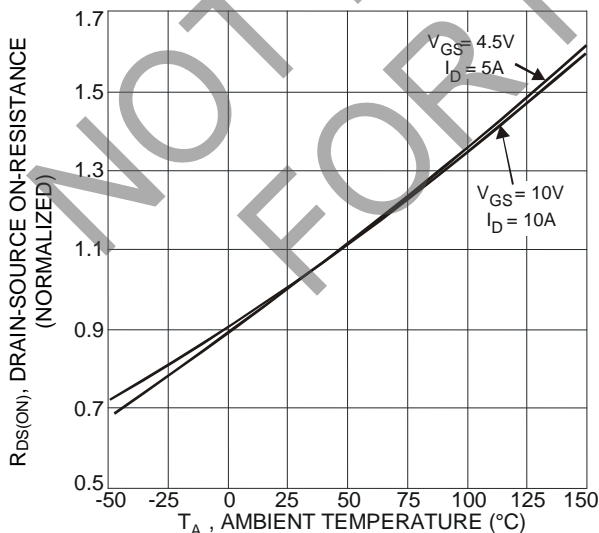


Fig. 8 On-Resistance Variation with Temperature

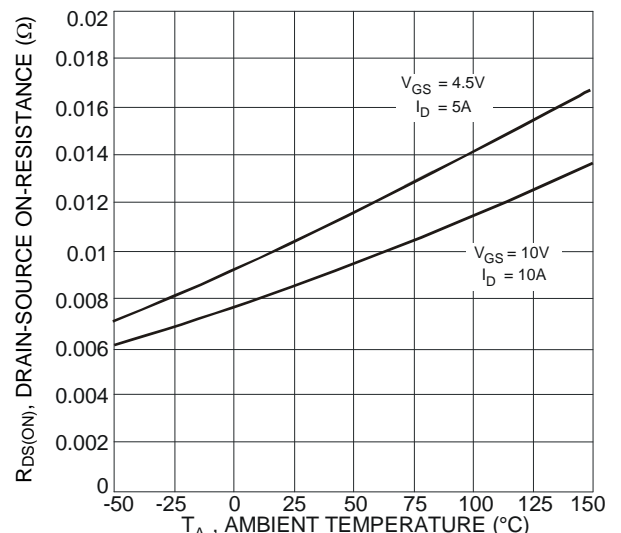


Fig. 9 On-Resistance Variation with Temperature

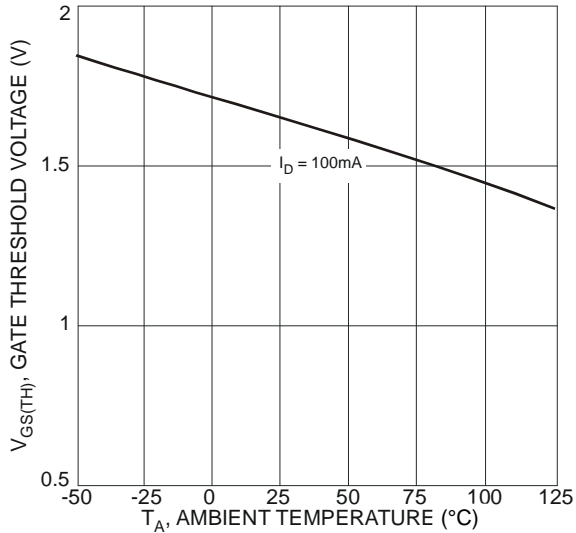


Fig. 10 Gate Threshold Variation vs. Ambient Temperature

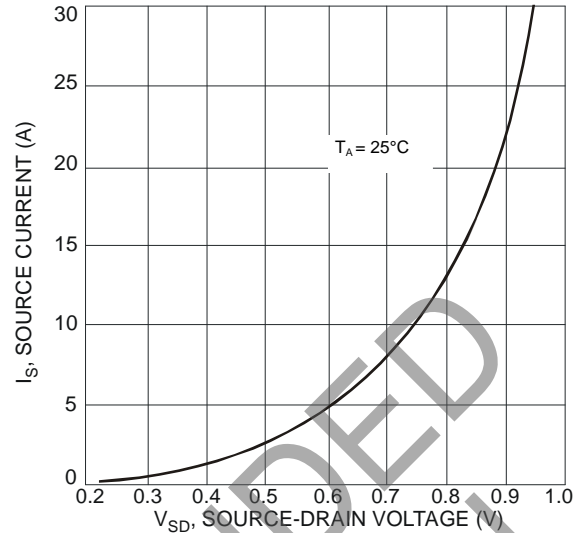


Fig. 11 Diode Forward Voltage vs. Current

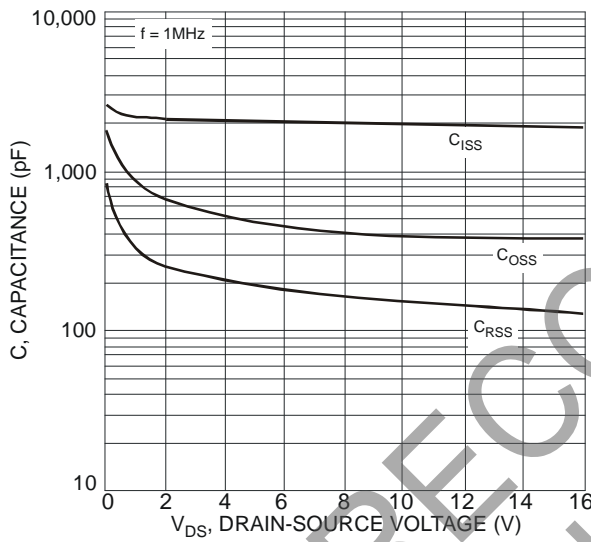


Fig. 12 Typical Total Capacitance

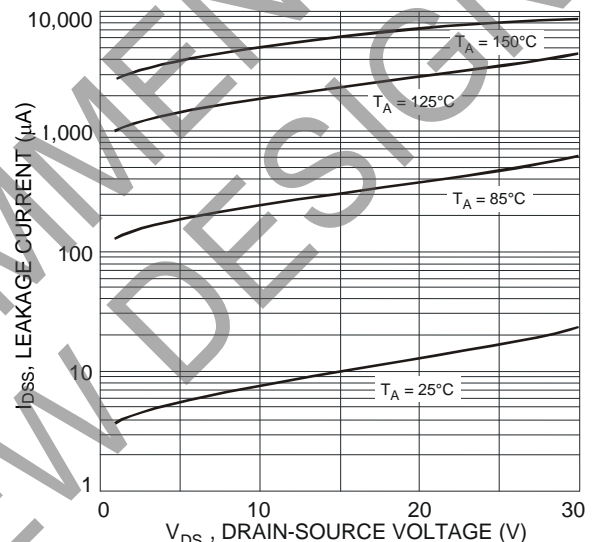


Fig. 13 Typical Drain-Source Leakage Current vs. Voltage

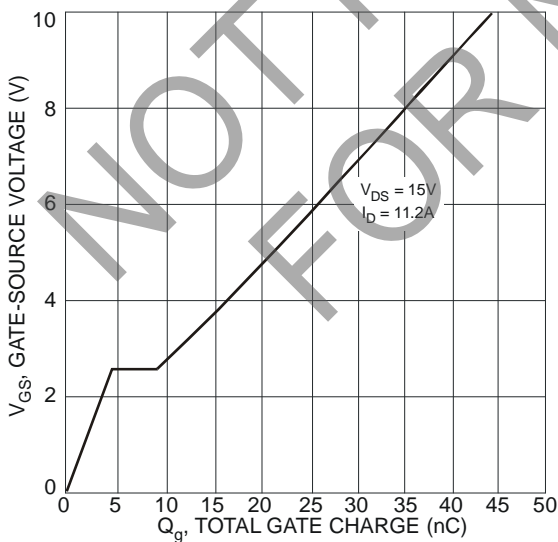
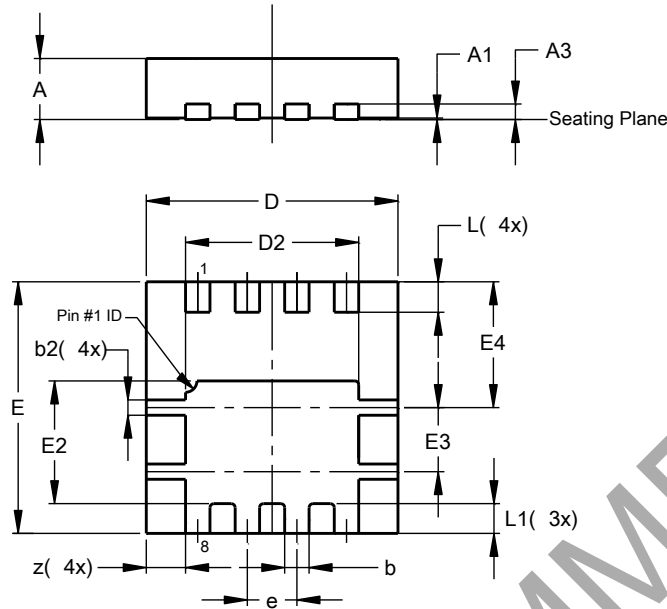


Fig. 14 Gate-Charge Characteristics

Package Outline Dimensions

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

PowerDI3333-8

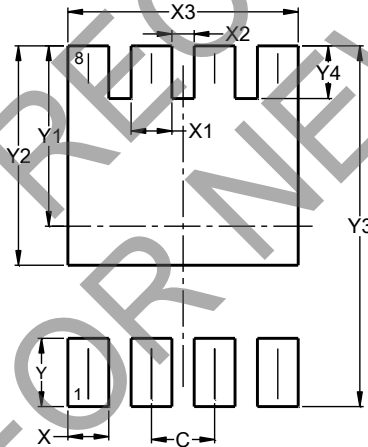


PowerDI3333-8			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	-	-	0.203
b	0.27	0.37	0.32
b2	0.15	0.25	0.20
D	3.25	3.35	3.30
D2	2.22	2.32	2.27
E	3.25	3.35	3.30
E2	1.56	1.66	1.61
E3	0.79	0.89	0.84
E4	1.60	1.70	1.65
e	-	-	0.65
L	0.35	0.45	0.40
L1	-	-	0.39
z	-	-	0.515
All Dimensions in mm			

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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