

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)} \text{ max}$	$I_D \text{ max}$ $T_A = 25^\circ\text{C}$
-30V	17mΩ @ $V_{GS} = -10\text{V}$	-8.6A
	25mΩ @ $V_{GS} = -4.5\text{V}$	-7.1A

Description and Applications

This MOSFET has been 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.

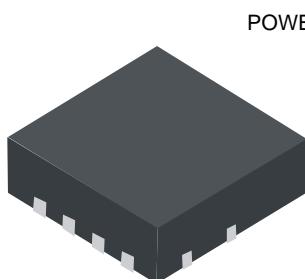
- Backlighting
- Power Management Functions
- DC-DC Converters

Features and Benefits

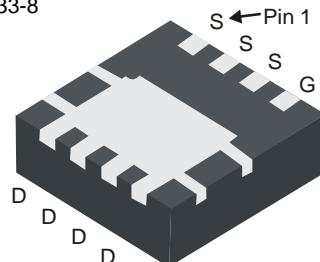
- Low $R_{DS(ON)}$ – ensures on state losses are minimized
- Small form factor thermally efficient package enables higher density end products
- Occupies just 33% of the board area occupied by SO-8 enabling smaller end product
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability

Mechanical Data

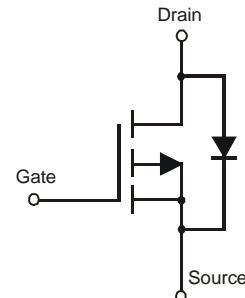
- Case: POWERDI3333-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See diagram
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.008 grams (approximate)



POWERDI3333-8



Bottom View



Internal Schematic

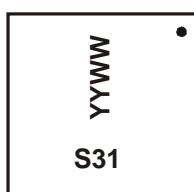
Ordering Information (Note 4)

Part Number	Case	Packaging
DMP3008SFG-7	POWERDI3333-8	2000/Tape & Reel
DMP3008SFG-13	POWERDI3333-8	3000/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> 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>.

Marking Information



S31 = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last digit of year (ex: 11 = 2011)
 WW = Week code (01 ~ 53)

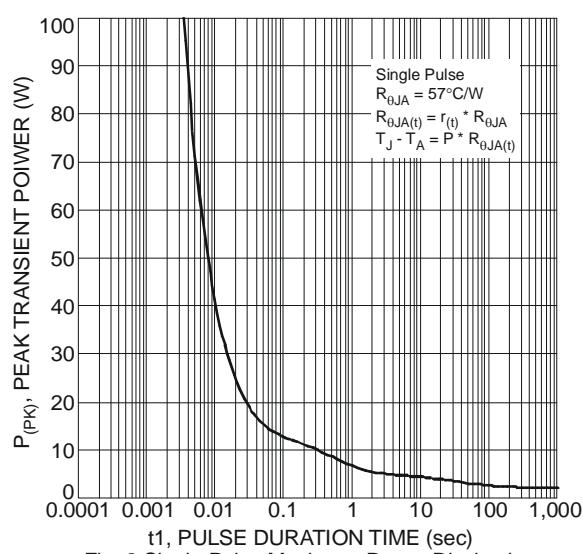
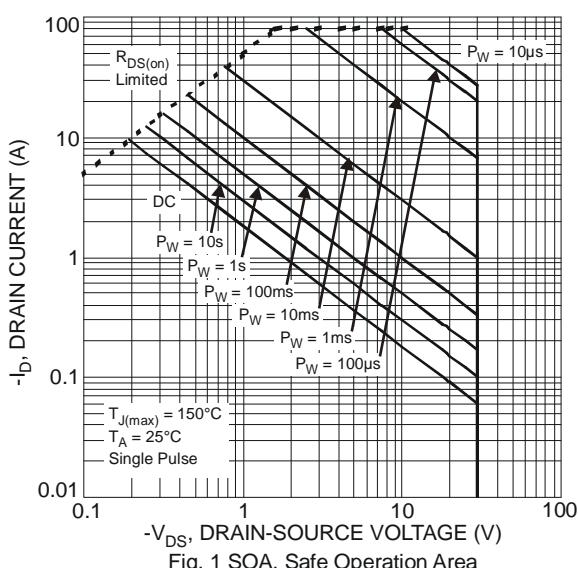
Maximum Ratings @ $T_A = 25^\circ\text{C}$ unless otherwise specified

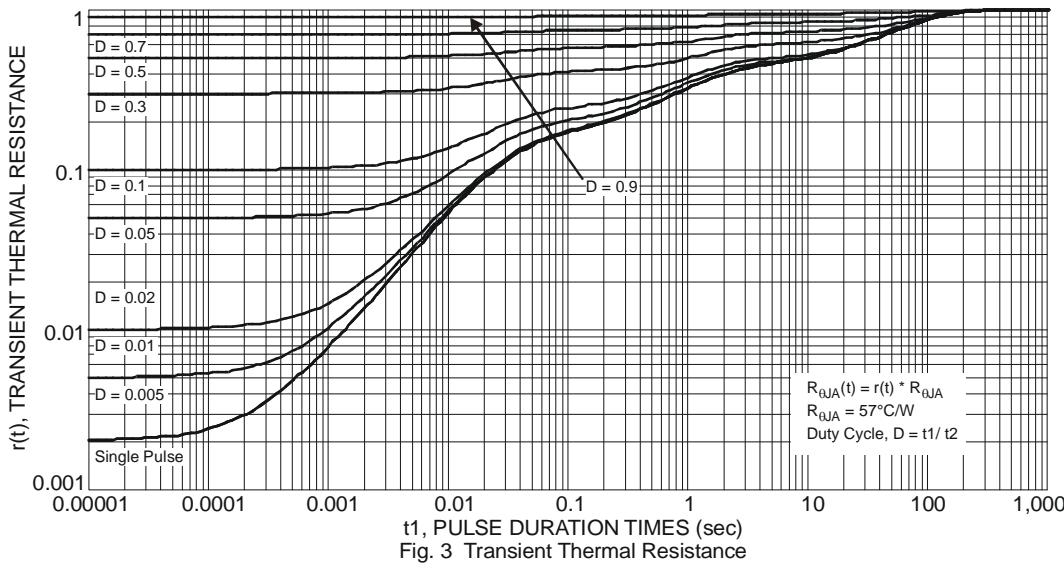
Characteristic			Symbol	Value	Units
Drain-Source Voltage			V_{DSS}	-30	V
Gate-Source Voltage			V_{GSS}	± 20	V
Continuous Drain Current (Note 6) $V_{GS} = -10V$	Steady State	$T_A = 25^\circ C$ $T_A = 70^\circ C$	I_D	-8.6 -7.0	A
	$t < 10s$	$T_A = 25^\circ C$ $T_A = 70^\circ C$	I_D	-11.7 -9.3	A
Continuous Drain Current (Note 6) $V_{GS} = -4.5V$	Steady State	$T_A = 25^\circ C$ $T_A = 70^\circ C$	I_D	-7.1 -5.6	A
	$t < 10s$	$T_A = 25^\circ C$ $T_A = 70^\circ C$	I_D	-9.6 -7.6	A
Pulsed Drain Current (10 μ s pulse, duty cycle = 1%)			I_{DM}	-80	A
Maximum Continuous Body Diode Forward Current (Note 6)			I_S	-3.0	A

Thermal Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	P_D	0.9	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady state	$R_{\theta JA}$	140
	$t < 10s$		72
Total Power Dissipation (Note 6)	P_D	2.2	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady state	$R_{\theta JA}$	57
	$t < 10s$		30
Thermal Resistance, Junction to Case (Note 6)	$R_{\theta JC}$	7.1	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

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.




Electrical Characteristics $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	-30	—	—	V	$\text{V}_{\text{GS}} = 0\text{V}$, $\text{I}_D = -250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1.0	μA	$\text{V}_{\text{DS}} = -30\text{V}$, $\text{V}_{\text{GS}} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$\text{V}_{\text{GS}} = \pm 20\text{V}$, $\text{V}_{\text{DS}} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$\text{V}_{\text{GS(th)}}$	-1.1	-1.6	-2.1	V	$\text{V}_{\text{DS}} = \text{V}_{\text{GS}}$, $\text{I}_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$\text{R}_{\text{DS(on)}}$	—	12.5	17	$\text{m}\Omega$	$\text{V}_{\text{GS}} = -10\text{V}$, $\text{I}_D = -10\text{A}$
—	—	—	18.5	25	—	$\text{V}_{\text{GS}} = -4.5\text{V}$, $\text{I}_D = -10\text{A}$
Forward Transfer Admittance	$ \text{Y}_{\text{fs}} $	—	13	—	S	$\text{V}_{\text{DS}} = -15\text{V}$, $\text{I}_D = -10\text{A}$
Diode Forward Voltage	V_{SD}	—	-0.7	-1.0	V	$\text{V}_{\text{GS}} = 0\text{V}$, $\text{I}_S = -1\text{A}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	2230	—	pF	$\text{V}_{\text{DS}} = -15\text{V}$, $\text{V}_{\text{GS}} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	328	—		
Reverse Transfer Capacitance	C_{rss}	—	294	—		
Gate Resistance	R_{G}	—	6.4	—	Ω	$\text{V}_{\text{DS}} = 0\text{V}$, $\text{V}_{\text{GS}} = 0\text{V}$, $f = 1.0\text{MHz}$
Total Gate Charge ($\text{V}_{\text{GS}} = -10\text{V}$)	Q_{g}	—	47	—	nC	$\text{V}_{\text{DS}} = -15\text{V}$, $\text{I}_D = -10\text{A}$
Total Gate Charge ($\text{V}_{\text{GS}} = -4.5\text{V}$)	Q_{g}	—	23	—		
Gate-Source Charge	Q_{gs}	—	9.4	—		
Gate-Drain Charge	Q_{gd}	—	5.6	—		
Turn-On Delay Time	$\text{t}_{\text{D(on)}}$	—	10.5	—	ns	$\text{V}_{\text{GS}} = -10\text{V}$, $\text{V}_{\text{DS}} = -15\text{V}$, $\text{R}_{\text{G}} = 6\Omega$
Turn-On Rise Time	t_{r}	—	8.5	—		
Turn-Off Delay Time	$\text{t}_{\text{D(off)}}$	—	90	—		
Turn-Off Fall Time	t_{f}	—	40	—		

Notes: 7. Short duration pulse test used to minimize self-heating effect.
 8. Guaranteed by design. Not subject to product testing.

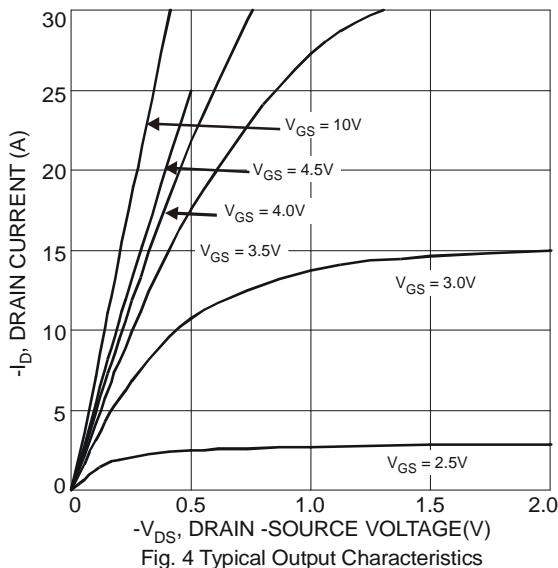


Fig. 4 Typical Output Characteristics

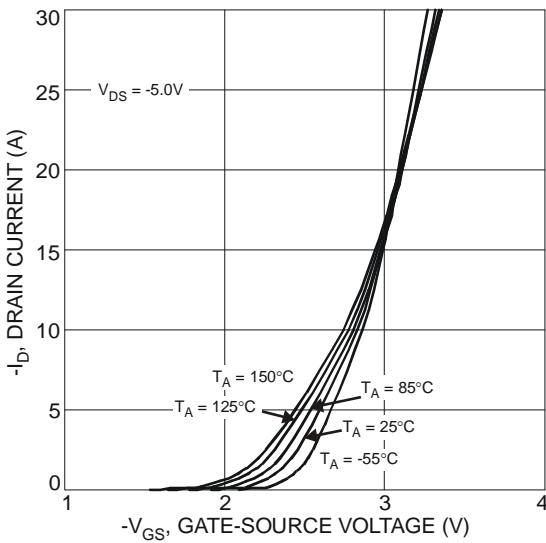


Fig. 5 Typical Transfer Characteristics

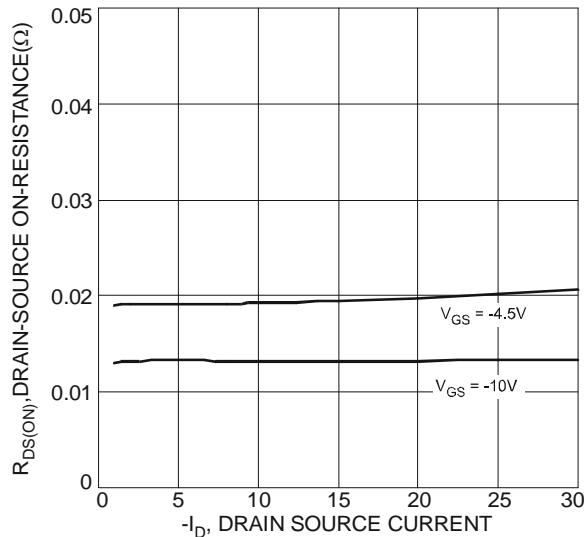


Fig. 6 Typical On-Resistance vs.
Drain Current and Gate Voltage

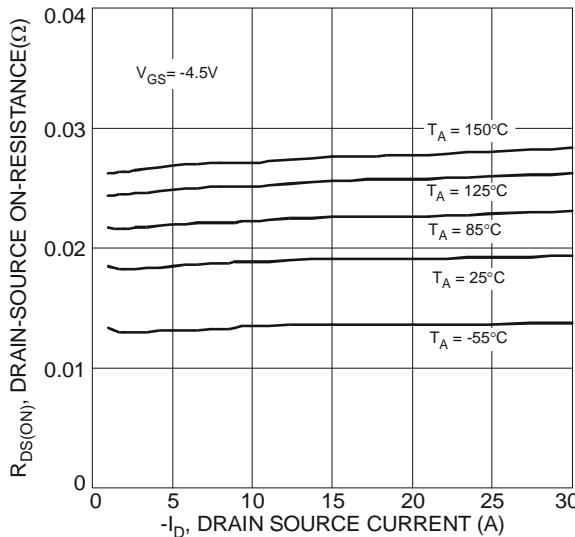


Fig. 7 Typical On-Resistance vs.
Drain Current and Temperature

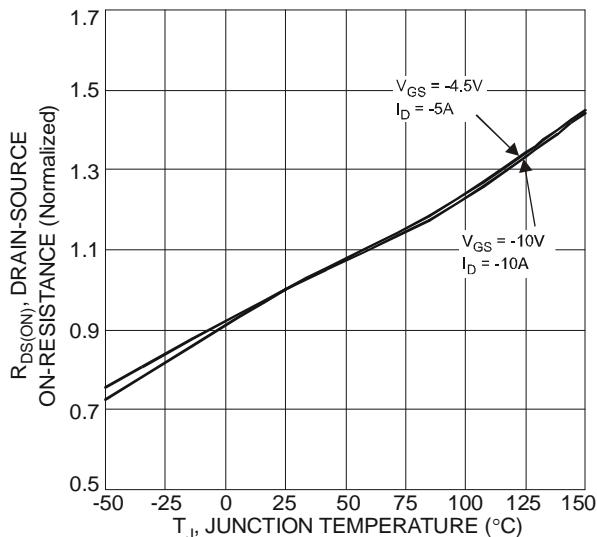


Fig. 8 On-Resistance Variation with Temperature

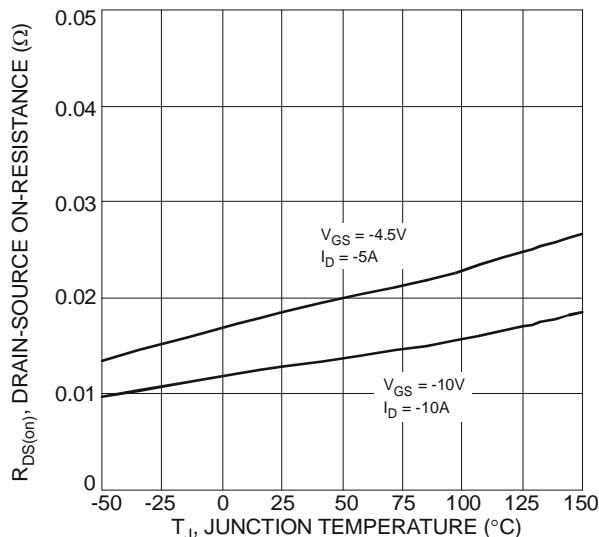


Fig. 9 On-Resistance Variation with Temperature

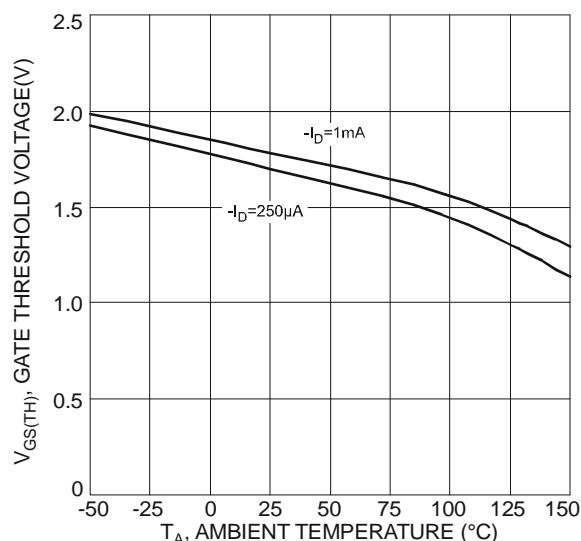


Fig. 10 Gate Threshold Variation vs. Ambient Temperature

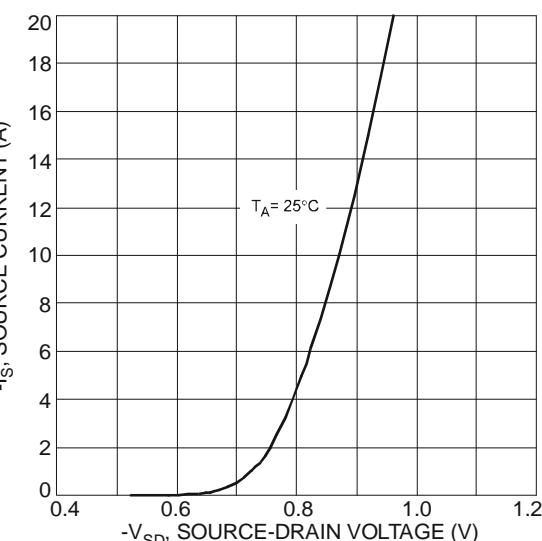


Fig. 11 Diode Forward Voltage vs. Current

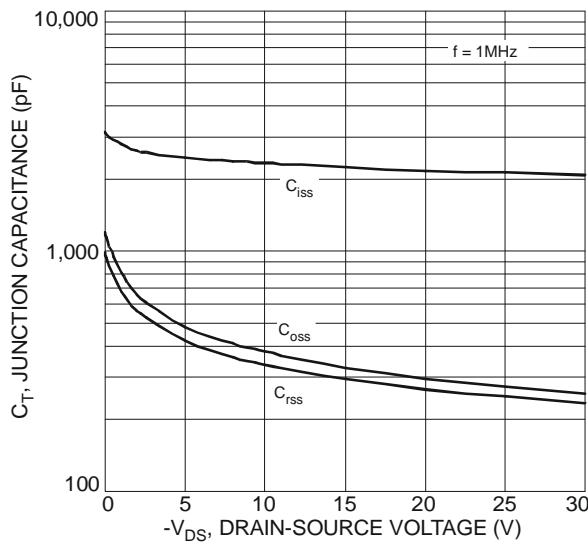


Fig. 12 Typical Junction Capacitance

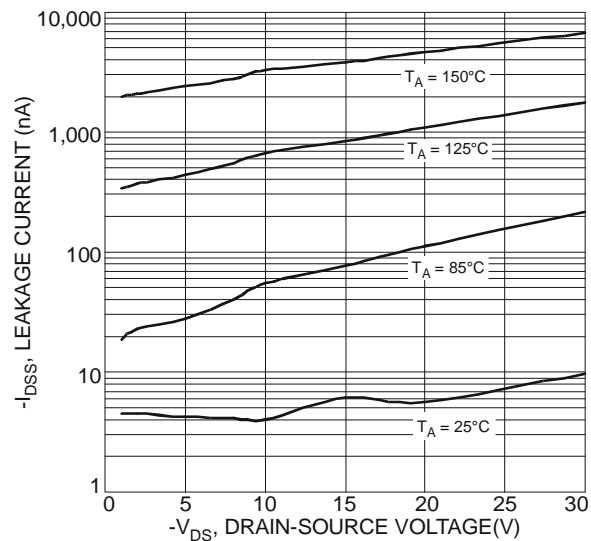


Fig. 13 Typical Drain-Source Leakage Current vs. Voltage

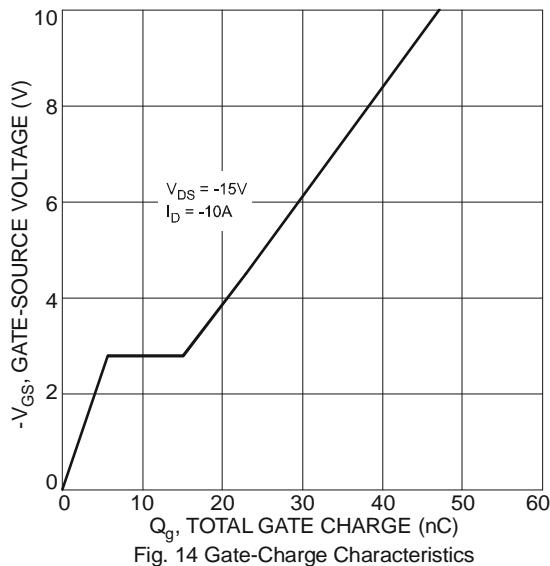
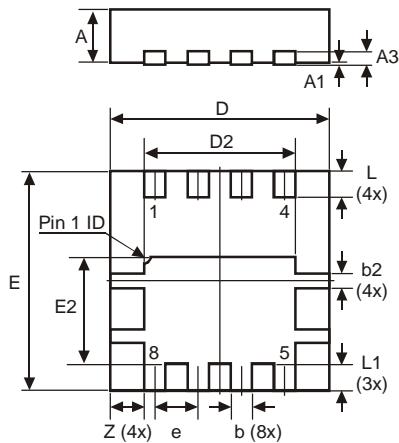


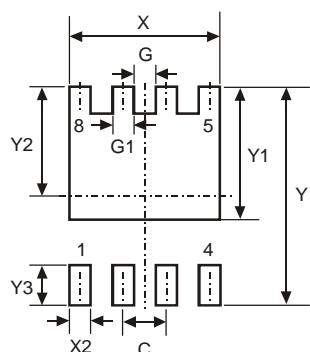
Fig. 14 Gate-Charge Characteristics

Package Outline Dimensions



POWERDI3333-8			
Dim	Min	Max	Typ
D	3.25	3.35	3.30
E	3.25	3.35	3.30
D2	2.22	2.32	2.27
E2	1.56	1.66	1.61
A	0.75	0.85	0.80
A1	0	0.05	0.02
A3	—	—	0.203
b	0.27	0.37	0.32
b2	—	—	0.20
L	0.35	0.45	0.40
L1	—	—	0.39
e	—	—	0.65
Z	—	—	0.515
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
C	0.650
G	0.230
G1	0.420
Y	3.700
Y1	2.250
Y2	1.850
Y3	0.700
X	2.370
X2	0.420

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