

## 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.

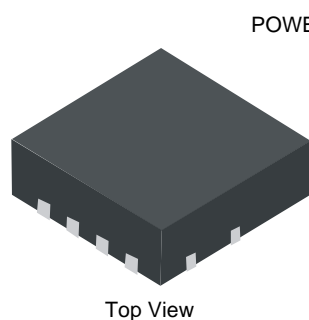
- Backlighting
- Power Management Functions
- DC-DC Converters

## Features and Benefits

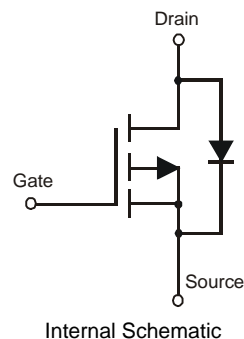
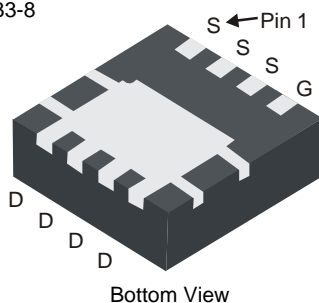
- Low  $R_{DS(ON)}$  – ensures on state losses are minimized
- Small form factor thermally efficient package enables higher density end products
- Occupies just 33% of the board area occupied by SO-8 enabling smaller end product
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen 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 
- Weight: 0.008 grams (approximate)



POWERDI3333-8

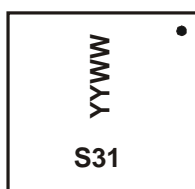


## Ordering Information (Note 4)

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<sub>A</sub> = 25°C unless otherwise specified

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V <sub>DSS</sub>	-30	V
Gate-Source Voltage			V <sub>GSS</sub>	±20	V
Continuous Drain Current (Note 6) V <sub>GS</sub> = -10V	Steady State	T <sub>A</sub> = 25°C T <sub>A</sub> = 70°C	I <sub>D</sub>	-8.6 -7.0	A
	t < 10s	T <sub>A</sub> = 25°C T <sub>A</sub> = 70°C	I <sub>D</sub>	-11.7 -9.3	A
Continuous Drain Current (Note 6) V <sub>GS</sub> = -4.5V	Steady State	T <sub>A</sub> = 25°C T <sub>A</sub> = 70°C	I <sub>D</sub>	-7.1 -5.6	A
	t < 10s	T <sub>A</sub> = 25°C T <sub>A</sub> = 70°C	I <sub>D</sub>	-9.6 -7.6	A
Pulsed Drain Current (10μs pulse, duty cycle = 1%)			I <sub>DM</sub>	-80	A
Maximum Continuous Body Diode Forward Current (Note 6)			I <sub>S</sub>	-3.0	A

**Thermal Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)		P <sub>D</sub>	0.9	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady state	R <sub>θJA</sub>	140	°C/W
	t < 10s		72	°C/W
Total Power Dissipation (Note 6)		P <sub>D</sub>	2.2	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady state	R <sub>θJA</sub>	57	°C/W
	t < 10s		30	°C/W
Thermal Resistance, Junction to Case (Note 6)		R <sub>θJC</sub>	7.1	°C/W
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-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.

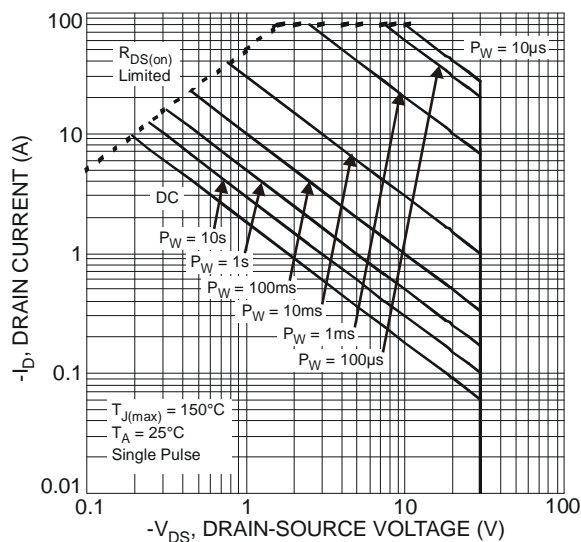


Fig. 1 SOA, Safe Operation Area

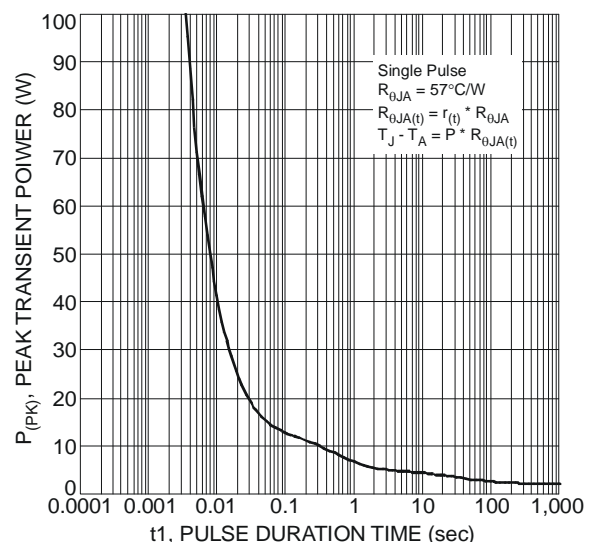
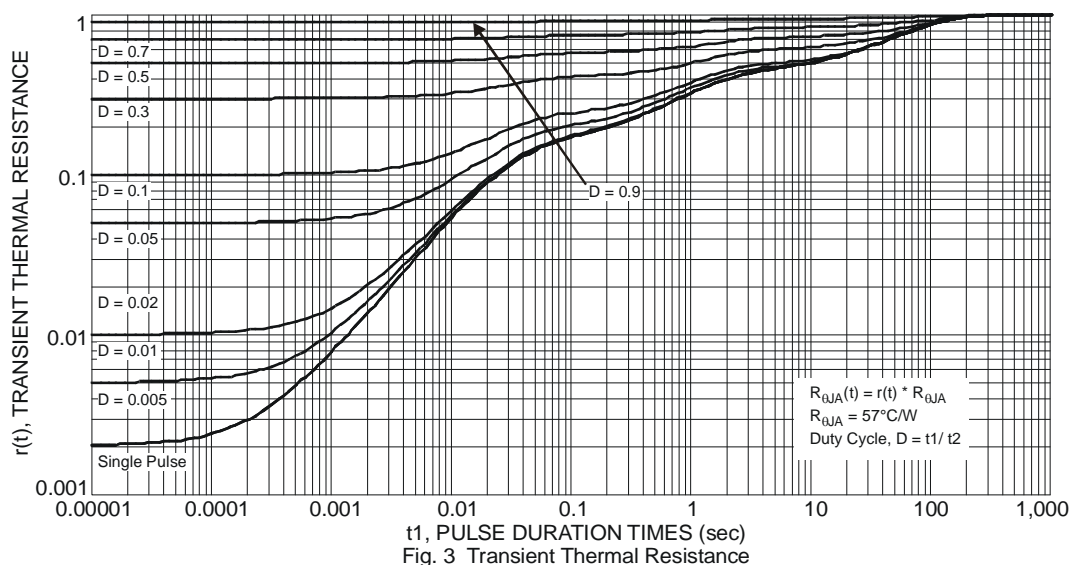


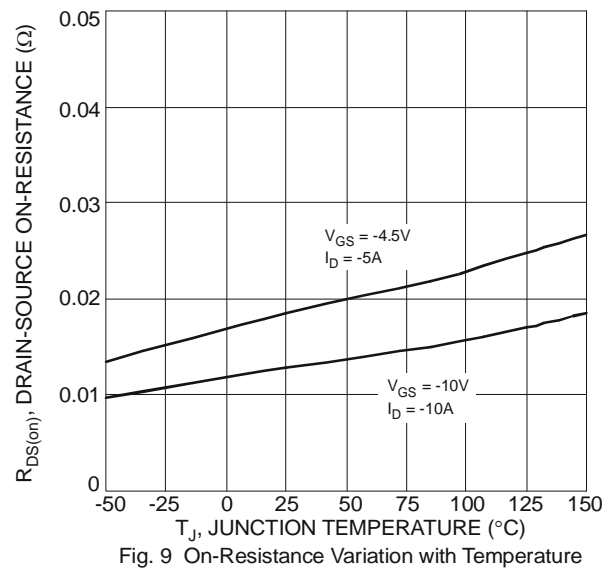
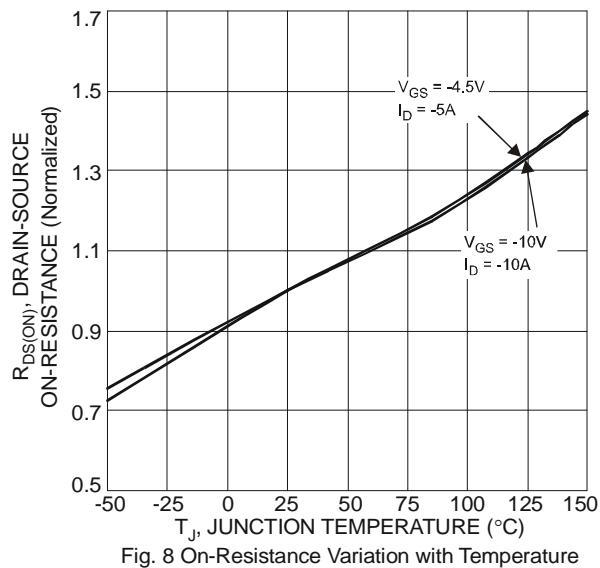
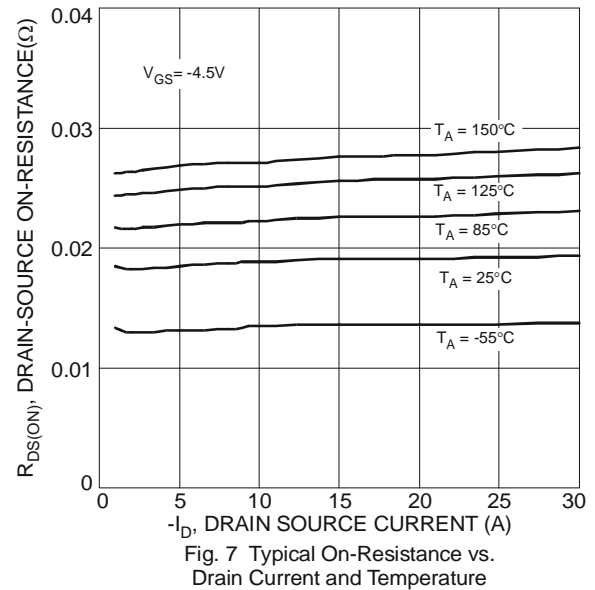
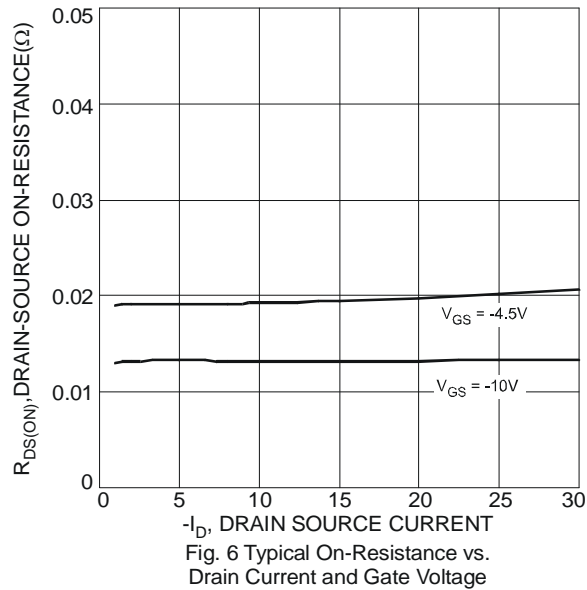
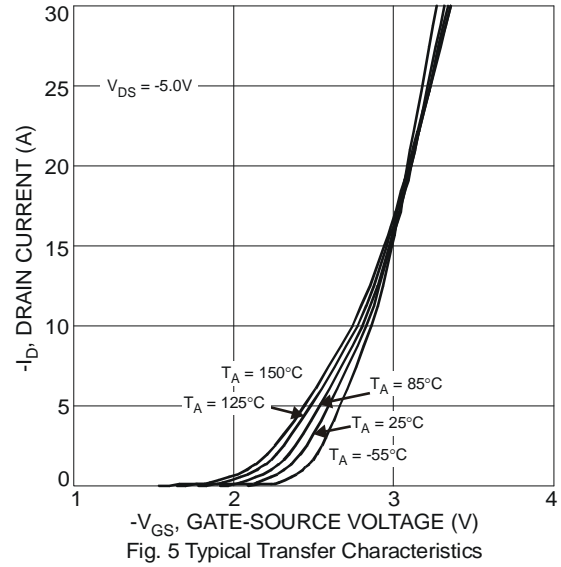
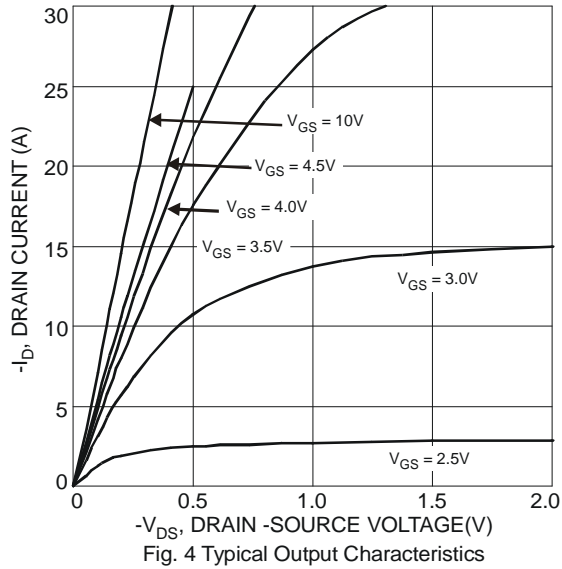
Fig. 2 Single Pulse Maximum Power Dissipation



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

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



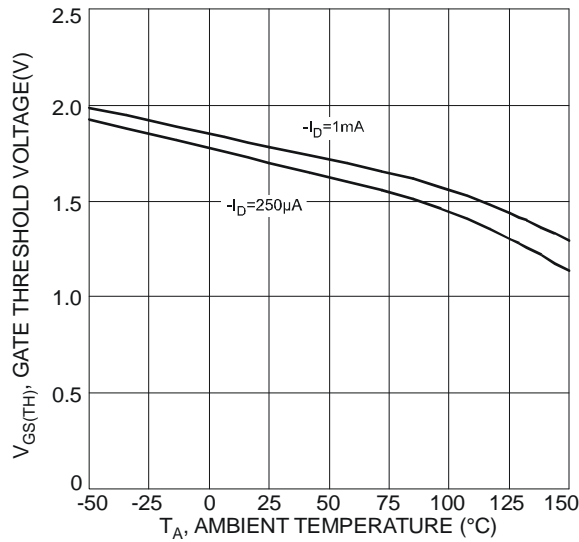


Fig. 10 Gate Threshold Variation vs. Ambient Temperature

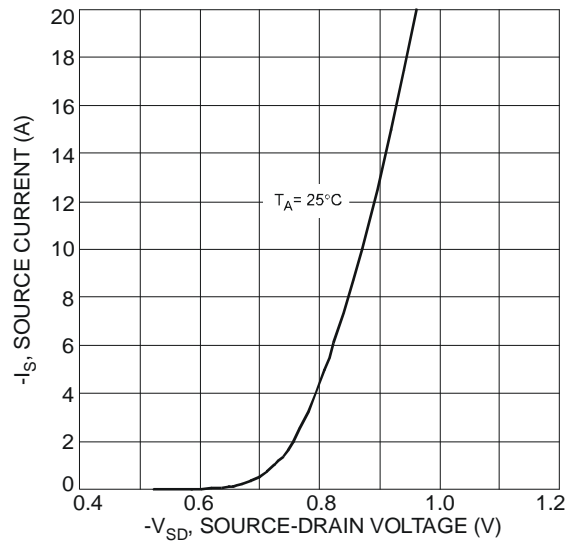


Fig. 11 Diode Forward Voltage vs. Current

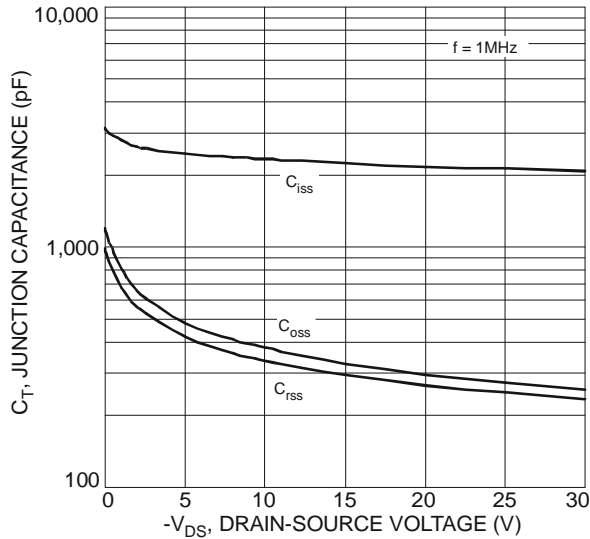


Fig. 12 Typical Junction Capacitance

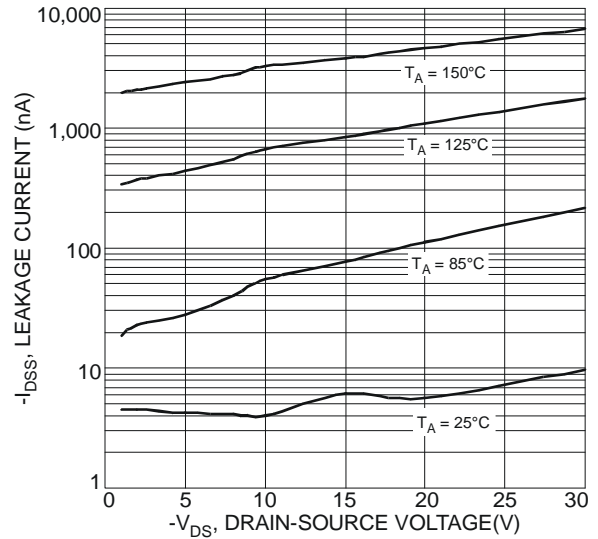


Fig. 13 Typical Drain-Source Leakage Current vs. Voltage

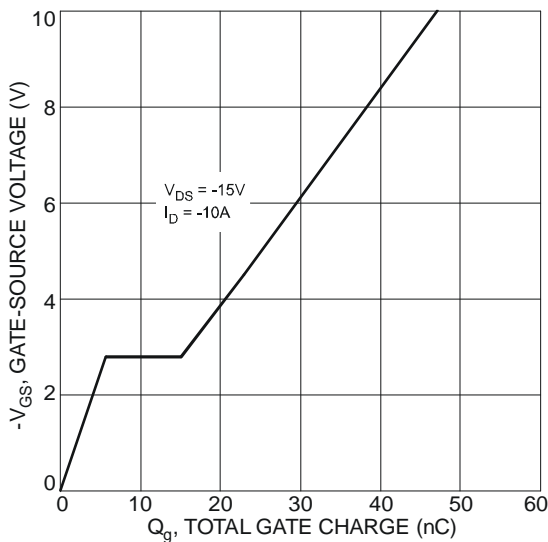
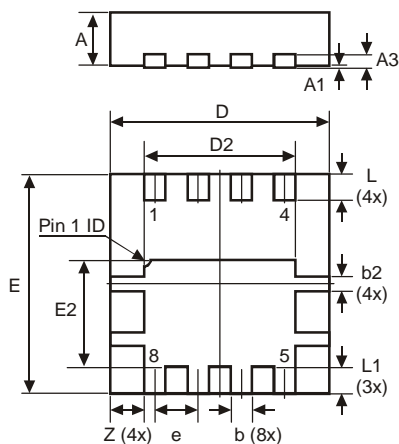


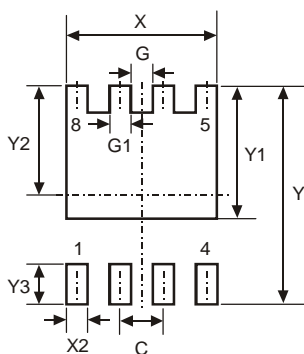
Fig. 14 Gate-Charge Characteristics

## 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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