DMS3014SFG

30V N-CHANNEL ENHANCEMENT MODE MOSFET
POWERDI®

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ max	I_D max $T_A = 25°C$
30V	13mΩ @ V_{GS} = 10V	9.5A
	14mΩ @ V_{GS} = 4.5V	9.0A

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
- 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
- 100% UIS (Avalanche) rated
- 100% Rg tested
- **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**

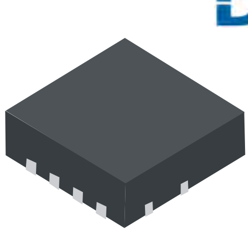
Description and Applications

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.

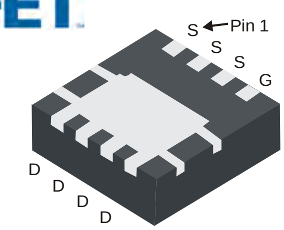
- Backlighting
- Power Management Functions
- DC-DC Converters

Mechanical Data

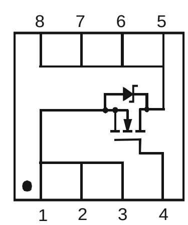
- Case: POWERDI3333-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See diagram
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.072 grams (approximate)



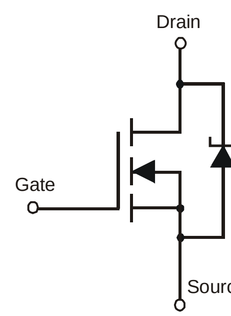
Top View



Bottom View



Top View
Pin Configuration



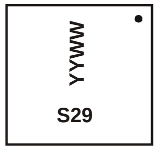
Internal Schematic

Ordering Information (Note 4)

Part Number	Case	Packaging
DMS3014SFG-7	POWERDI3333-8	2000/Tape & Reel
DMS3014SFG-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



S29 = 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°C unless otherwise specified

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V_{DSS}	30	V
Gate-Source Voltage			V_{GSS}	±12	V
Continuous Drain Current (Note 6) V_{GS} = 10V	Steady State	T_A = 25°C T_A = 70°C	I_D	9.5 7.6	A
	t<10s	T_A = 25°C T_A = 70°C	I_D	13.0 9.7	A
Continuous Drain Current (Note 6) V_{GS} = 4.5V	Steady State	T_A = 25°C T_A = 70°C	I_D	9.0 7.4	A
	t<10s	T_A = 25°C T_A = 70°C	I_D	12.2 9.3	A
Pulsed Drain Current (10µs pulse, duty cycle = 1%)			I_{DM}	80	A
Maximum Continuous Body Diode Forward Current (Note 6)			I_S	3.0	A
Avalanche Current (Note 7) L = 0.1mH			I_{AR}	30	A
Repetitive Avalanche Energy (Note 7) L = 0.1mH			E_{AR}	45	mJ

Thermal Characteristics @T_A = 25°C unless otherwise specified

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)		P_D	1	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady state	$R_{\theta JA}$	131	°C/W
	t<10s		72	°C/W
Total Power Dissipation (Note 6)		P_D	2.1	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady state	$R_{\theta JA}$	63	°C/W
	t<10s		35	°C/W
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.
7. I_{AR} and E_{AR} rating are based on low frequency and duty cycles to keep T_J = 25°C

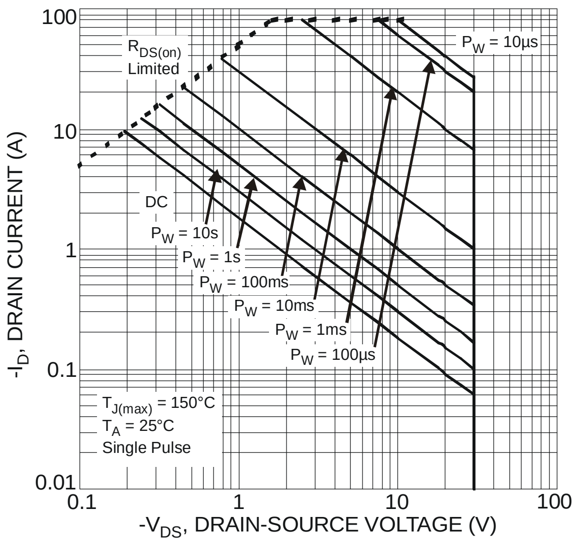


Fig. 1 SOA, Safe Operation Area

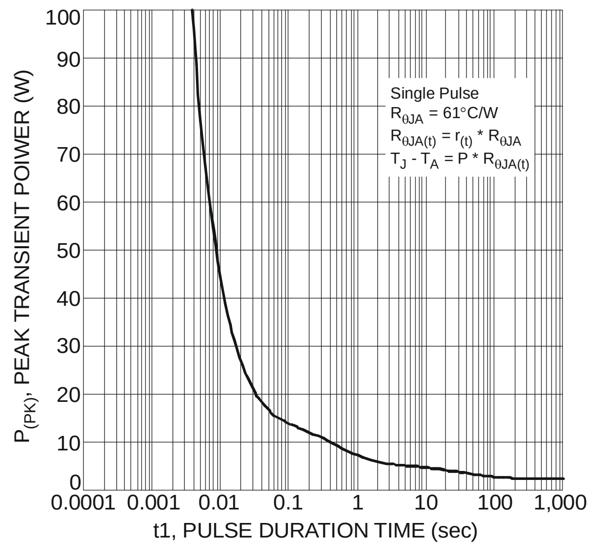


Fig. 2 Single Pulse Maximum Power Dissipation

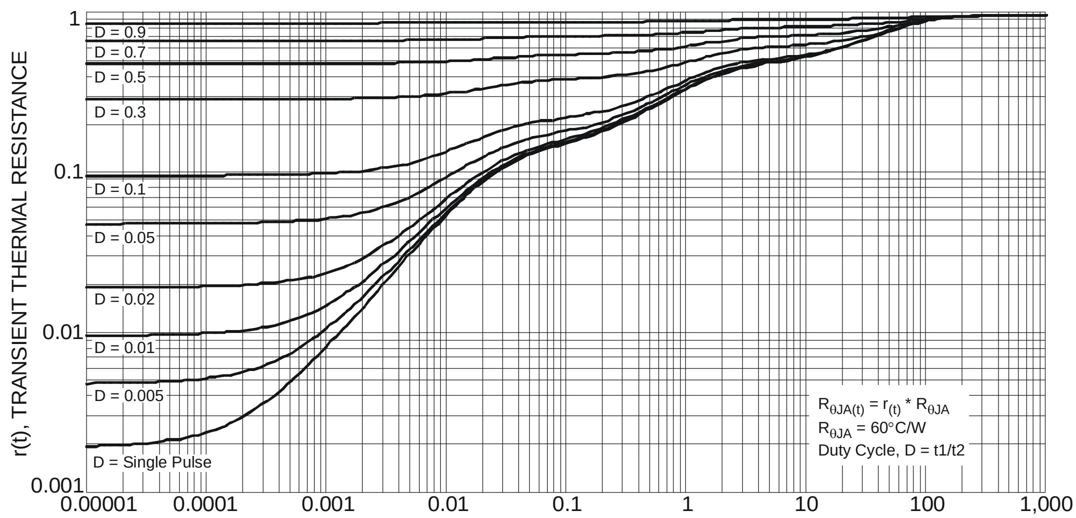


Fig. 3 Transient Thermal Resistance

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 = 250μA
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	$R_{DS\ (ON)}$	-	9	13	mΩ	V_{GS} = 10V, I_D = 10.4A
		-	10	14		V_{GS} = 4.5V, I_D = 10.4A
Forward Transfer Admittance	$\|Y_{fs}\|$	-	23	-	S	V_{DS} = 5V, I_D = 10.4A
Diode Forward Voltage	V_{SD}	-	0.4	0.55	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	-	2296	4310	pF	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	-	164	-	pF	
Reverse Transfer Capacitance	C_{rss}	-	120	-	pF	
Gate Resistance	R_g	0.26	1.3	2.34	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge V_{GS} = 4.5V	Q_g	-	19.3	-	nC	V_{DS} = 15V, V_{GS} = 10V, I_D = 10.4A
Total Gate Charge V_{GS} = 10V	Q_g	-	45.7	-	nC	
Gate-Source Charge	Q_{gs}	-	5.0	-	nC	
Gate-Drain Charge	Q_{gd}	-	2.9	-	nC	
Turn-On Delay Time	$t_{D(on)}$	-	5.5	-	ns	V_{GS} = 10V, V_{DS} = 15V, R_G = 3Ω, R_L = 1.2Ω
Turn-On Rise Time	t_r	-	24.4	-	ns	
Turn-Off Delay Time	$t_{D(off)}$	-	33.1	-	ns	
Turn-Off Fall Time	t_f	-	6.6	-	ns	
Reverse Recovery Time	t_{rr}	-	12.9	-	ns	I_F = 13A, di/dt = 500A/μs
Reverse Recovery Charge	Q_{rr}	-	8.0	-	nC	I_F = 13A, di/dt = 500A/μs

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

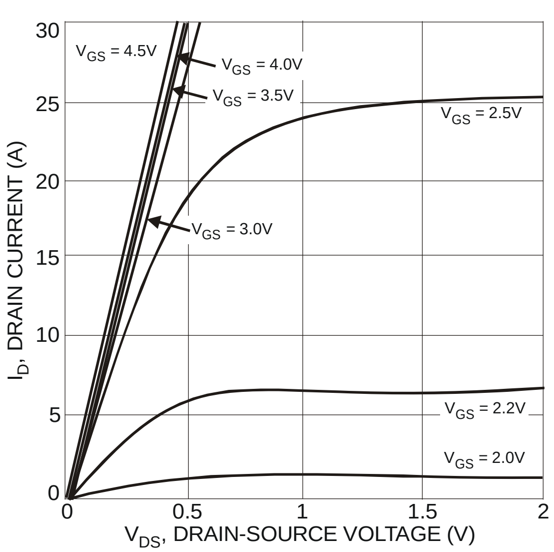


Fig. 4 Typical Output Characteristic

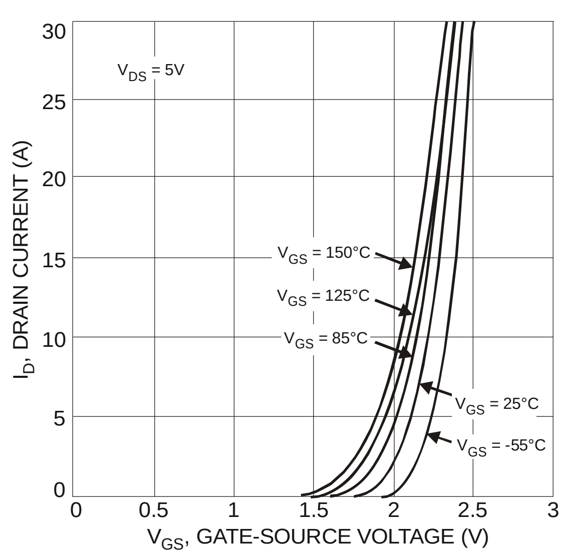


Fig. 5 Typical Transfer Characteristic

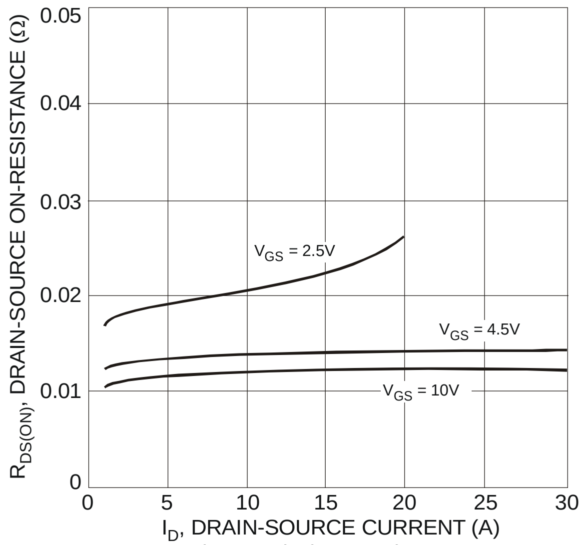


Fig. 6 Typical On-Resistance vs. Drain Current and Gate Voltage

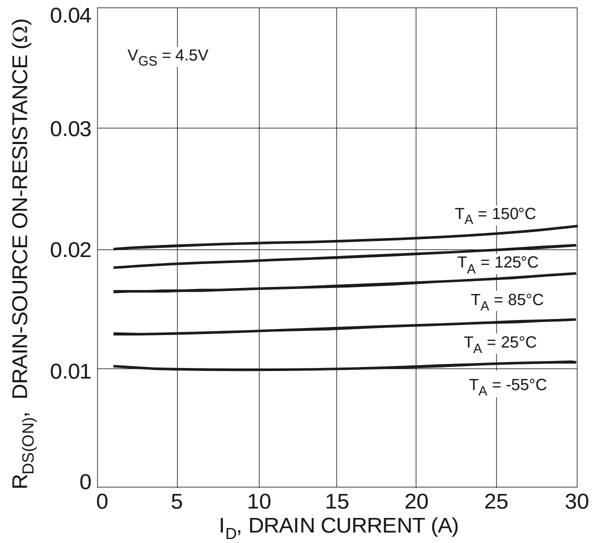


Fig. 7 Typical On-Resistance vs. Drain Current and Temperature

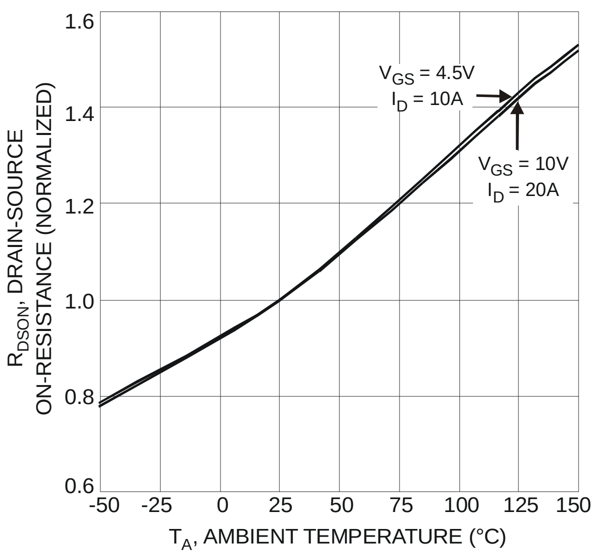


Fig. 8 On-Resistance Variation with Temperature

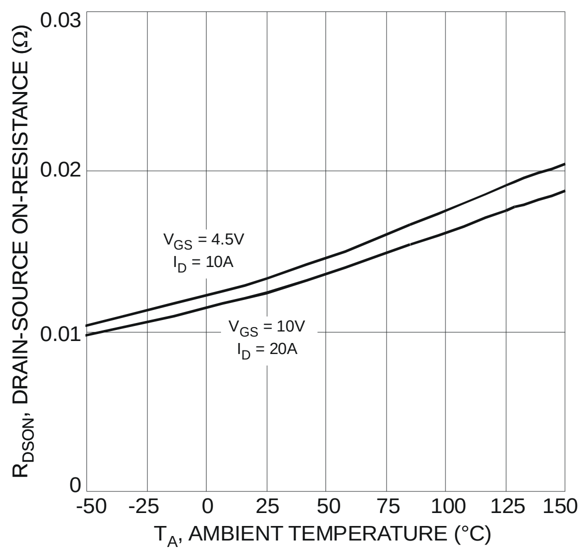


Fig. 9 On-Resistance Variation with Temperature

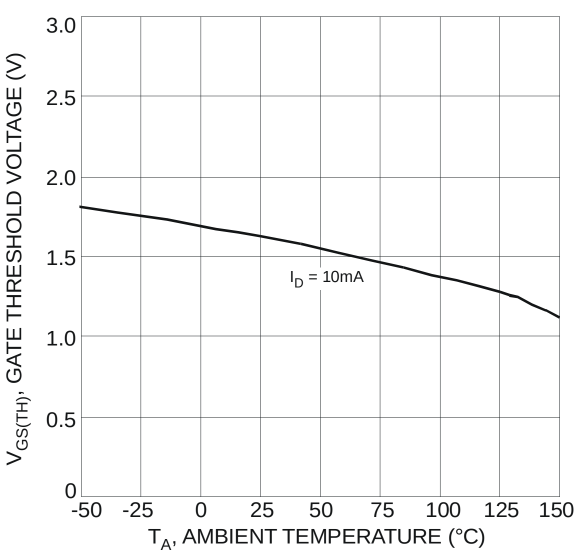


Fig. 10 Gate Threshold Variation vs. Ambient Temperature

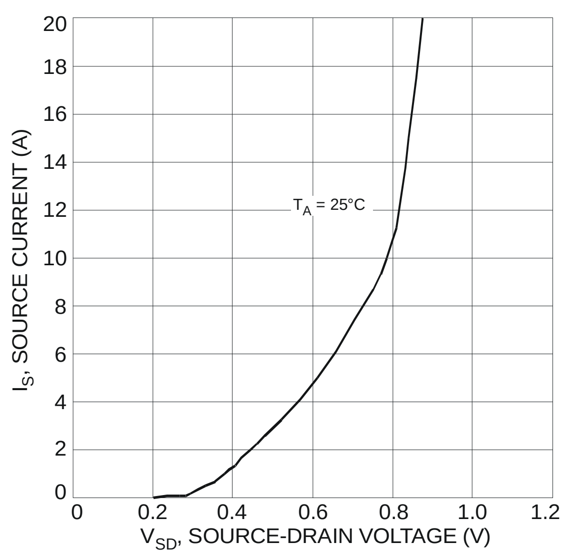


Fig. 11 Diode Forward Voltage vs. Current

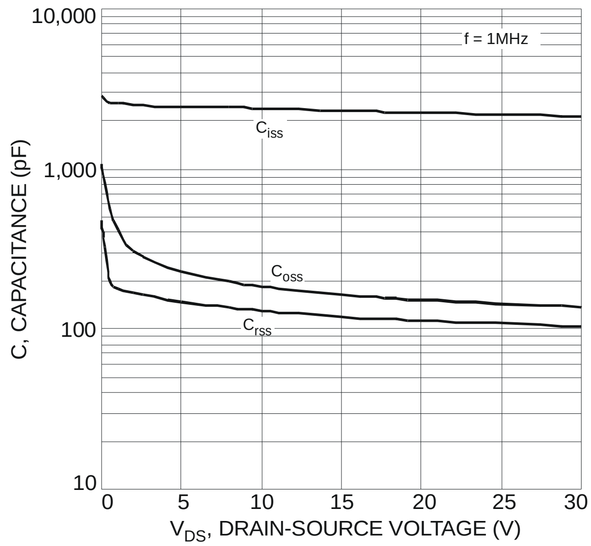


Fig. 12 Typical Total Capacitance

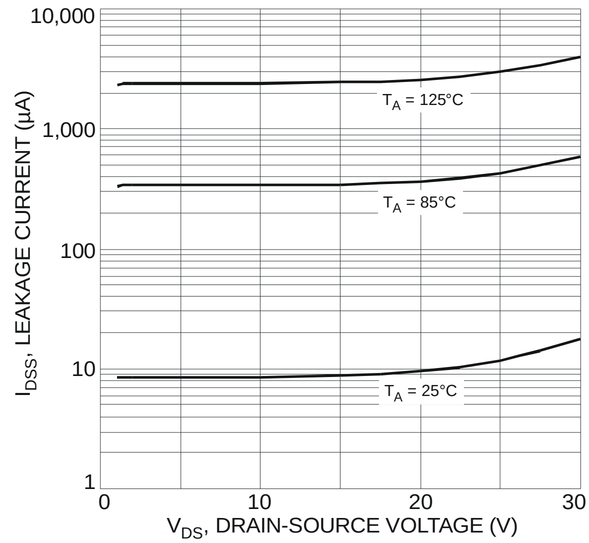


Fig. 13 Typical Leakage Current vs. Drain-Source Voltage

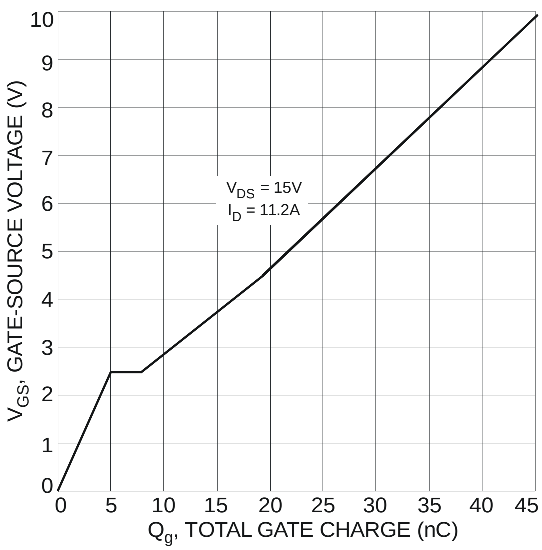
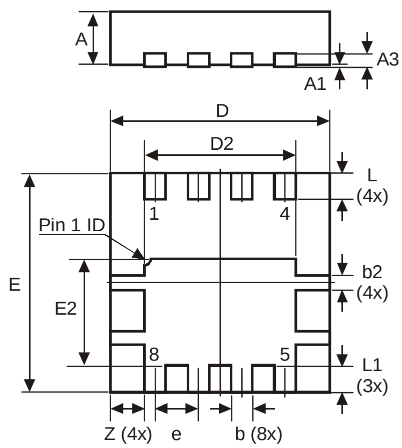


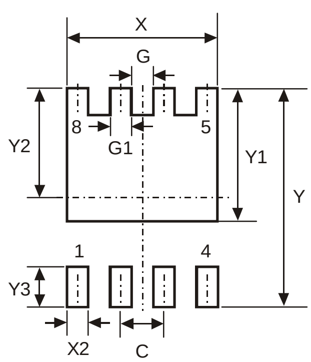
Fig. 14 Gate-Source Voltage vs. Total Gate Charge

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