Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ Max	I_D Max T_C = +25°C
60V	7.5mΩ @ V_{GS} = 10V	30A
	11.5mΩ @ V_{GS} = 4.5V	25A

Description

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

Applications

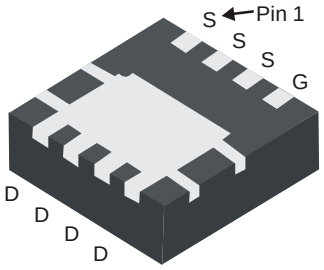
- Synchronous Rectifier
- Backlighting
- Power Management Functions
- DC-DC Converters

Features and Benefits

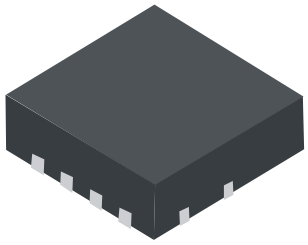
- Low $R_{DS(ON)}$ – Ensures On-State Losses are Minimized
- Excellent Q_{GD} x $R_{DS(ON)}$ Product (FOM)
- Advanced Technology for DC-DC Converters
- Small form factor thermally efficient package enables higher density end products
- Occupies just 33% of the board area occupied by SO-8, enabling smaller end product
- 100% UIS (Avalanche) Rated
- **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**

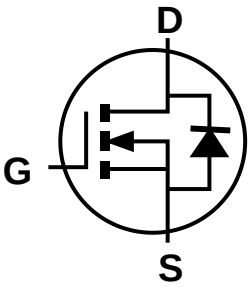
Mechanical Data

- Case: 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 Indicator: See Diagram
- Terminal Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.008 grams (Approximate)



Bottom View


Top View



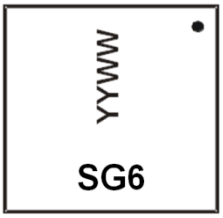
Equivalent Circuit

Ordering Information (Note 4)

Part Number	Case	Packaging
DMT6010LFG-7	PowerDI3333-8	2,000/Tape & Reel
DMT6010LFG-13	PowerDI3333-8	3,000/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/quality/lead_free.html 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/products/packages.html.

Marking Information



SG6 = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Digit of Year (ex: 13 = 2013)
WW = Week Code (01 ~ 53)

PowerDI is a registered trademark of Diodes Incorporated.

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Units
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current (Note 5) V_{GS} = 10V	T_A = +25°C T_A = +70°C	I_D	13 11	A
	T_C = +25°C T_C = +70°C	I_D	30 24	A
Maximum Continuous Body Diode Forward Current (Note 5)		I_S	3	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)		I_{DM}	80	A
Avalanche Current, L=0.1mH		I_{AS}	20	A
Avalanche Energy, L=0.1mH		E_{AS}	20	mJ

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

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	T_A = +25°C	P_D	2.2	W
	T_C = +25°C		41	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	55	°C/W
	t<10s		35	
Thermal Resistance, Junction to Case (Note 5)		$R_{\theta JC}$	3	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)						
Drain-Source Breakdown Voltage	BV_{DSS}	60	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	µA	V_{DS} = 48V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.8	—	2	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	6	7.5	mΩ	V_{GS} = 10V, I_D = 20A
		—	7.8	11.5		V_{GS} = 4.5V, I_D = 20A
Diode Forward Voltage	V_{SD}	—	0.9	1.2	V	V_{GS} = 0V, I_S = 20A
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C_{ISS}	—	2,090	—	pF	V_{DS} = 30V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{OSS}	—	746	—		
Reverse Transfer Capacitance	C_{RSS}	—	38.5	—		
Gate resistance	R_G	—	0.59	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
Total Gate Charge (V_{GS} = 4.5V)	Q_G	—	19.3	—	nC	V_{DS} = 30V, I_D = 20A
Total Gate Charge (V_{GS} = 10V)	Q_G	—	41.3	—		
Gate-Source Charge	Q_{GS}	—	6.0	—		
Gate-Drain Charge	Q_{GD}	—	8.8	—		
Turn-On Delay Time	$t_{D(ON)}$	—	5.7	—	nS	V_{DD} = 30V, V_{GS} = 10V, I_D = 20A, R_G = 3Ω,
Turn-On Rise Time	t_R	—	4.3	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	23.4	—		
Turn-Off Fall Time	t_F	—	9.7	—		

Notes: 5. $R_{\theta JA}$ is determined with the device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate. $R_{\theta JC}$ is guaranteed by design while $R_{\theta JA}$ is determined by the user's board design.
6. Short duration pulse test used to minimize self-heating effect.
7. Guaranteed by design. Not subject to product testing.

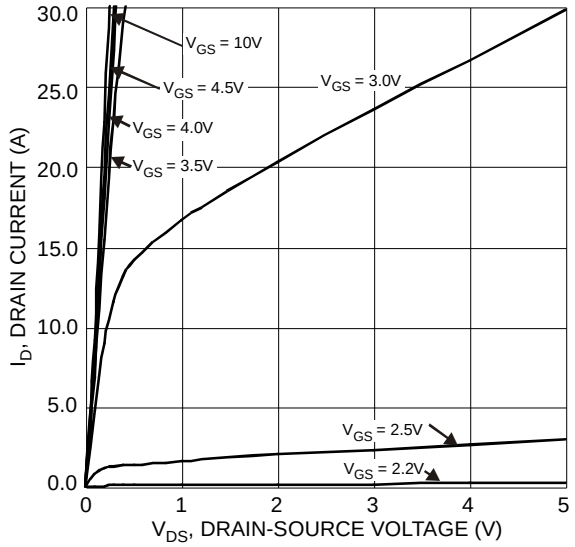


Figure 1 Typical Output Characteristic

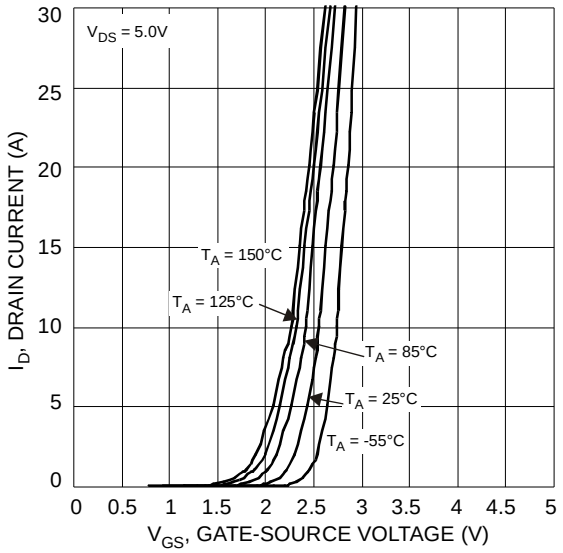


Figure 2 Typical Transfer Characteristics

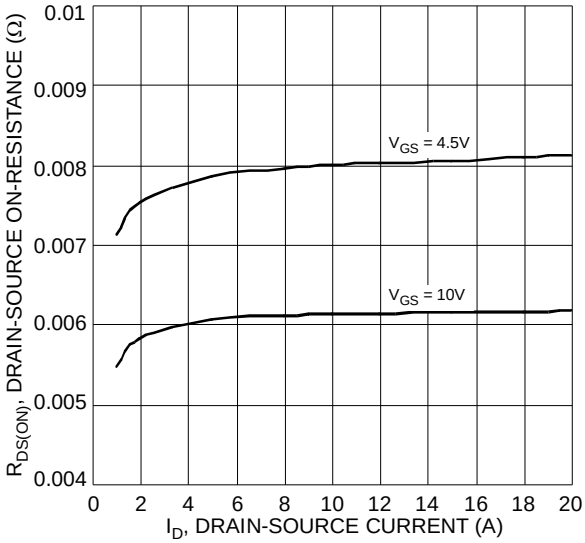


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

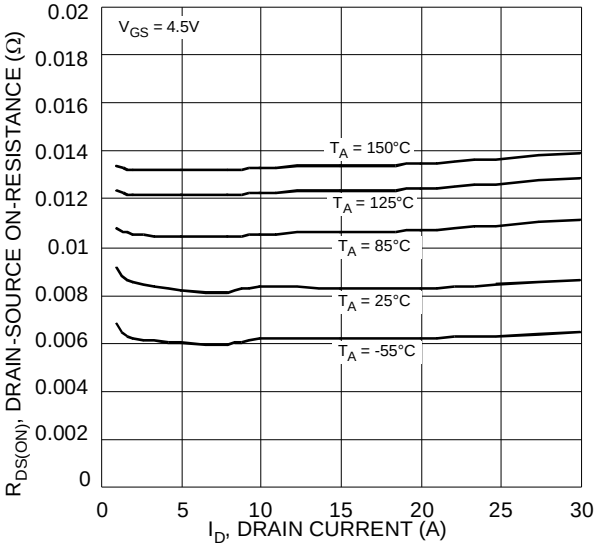


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

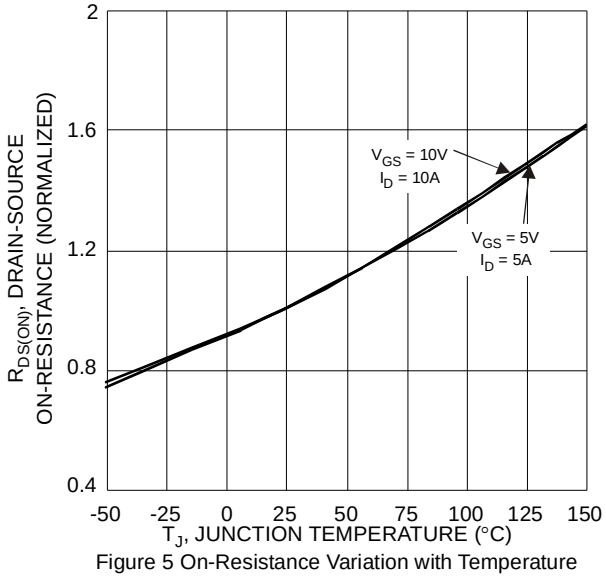


Figure 5 On-Resistance Variation with Temperature

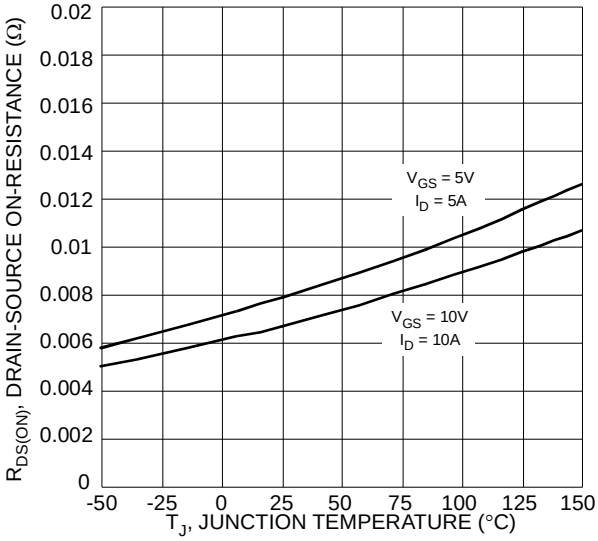


Figure 6 On-Resistance Variation with Temperature

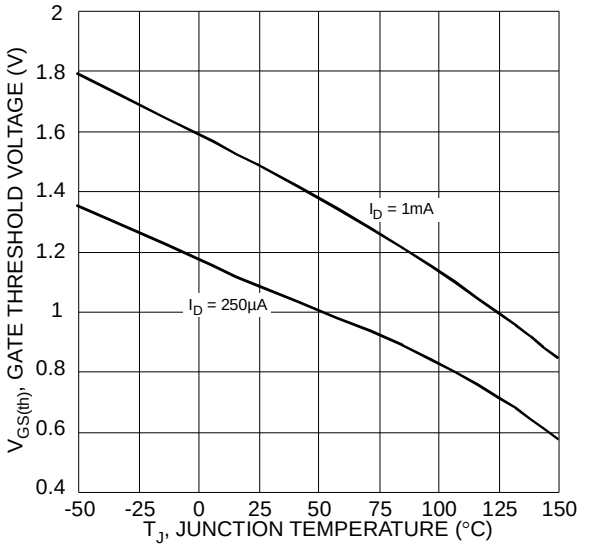


Figure 7 Gate Threshold Variation vs. Ambient Temperature

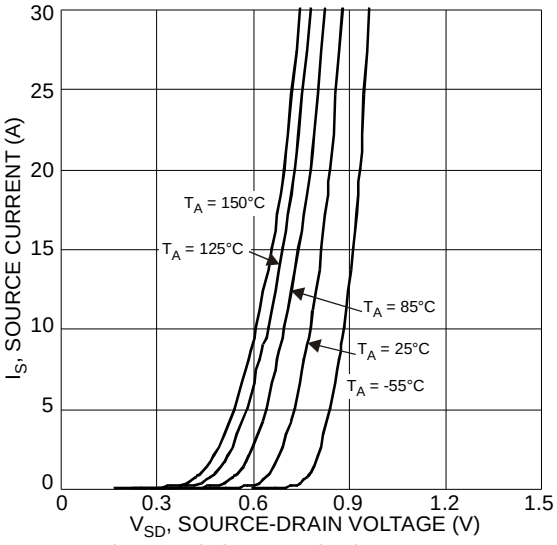


Figure 8 Diode Forward Voltage vs. Current

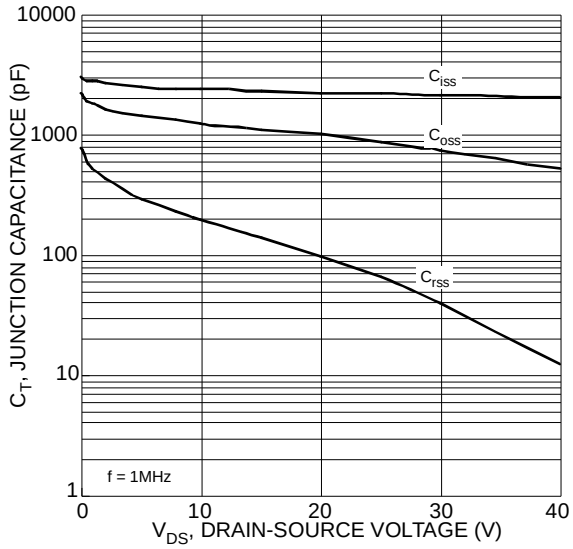


Figure 9 Typical Junction Capacitance

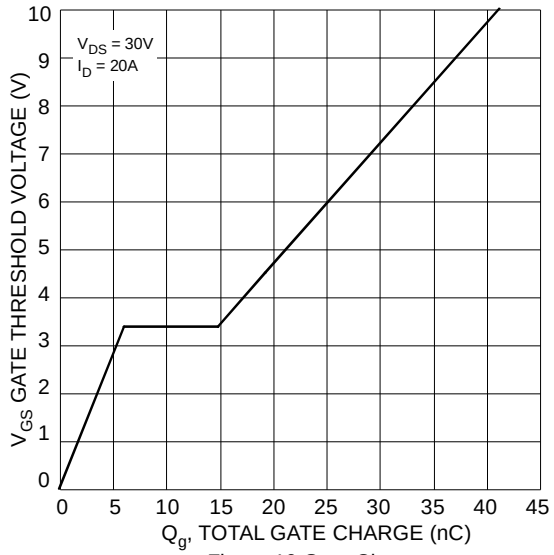


Figure 10 Gate Charge

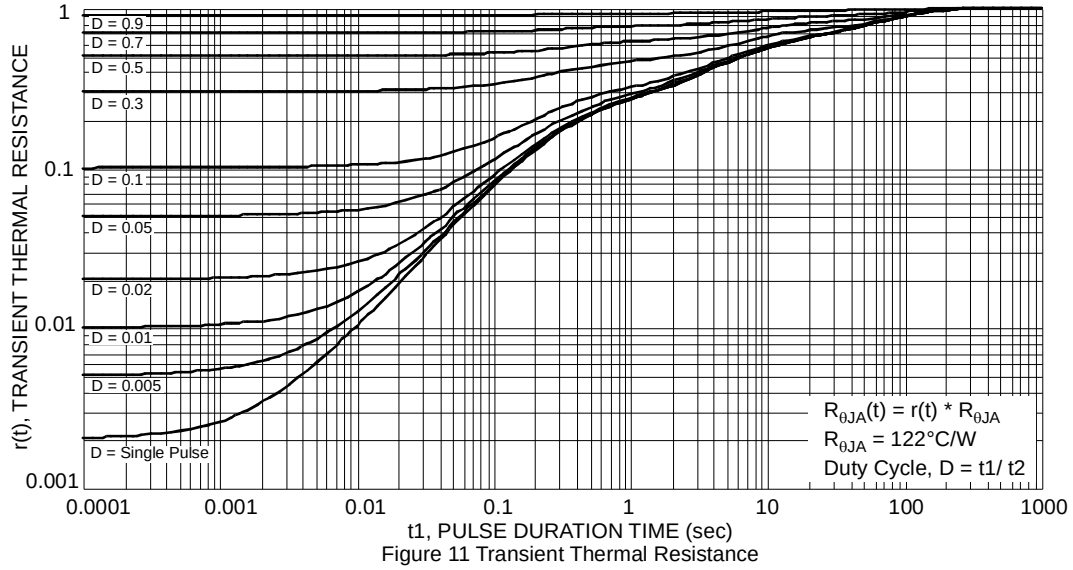
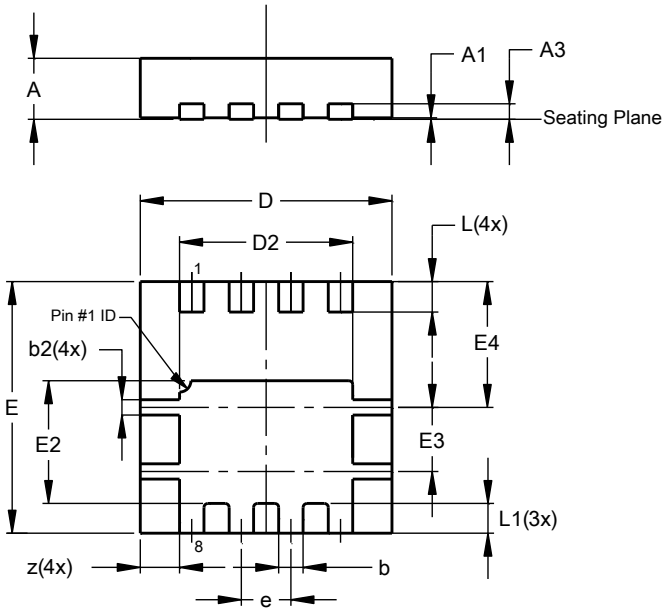


Figure 11 Transient Thermal Resistance

Package Outline Dimensions

Please see AP02001 at http://www.diodes.com/_files/datasheets/ap02001.pdf for the latest version.

PowerDI3333-8

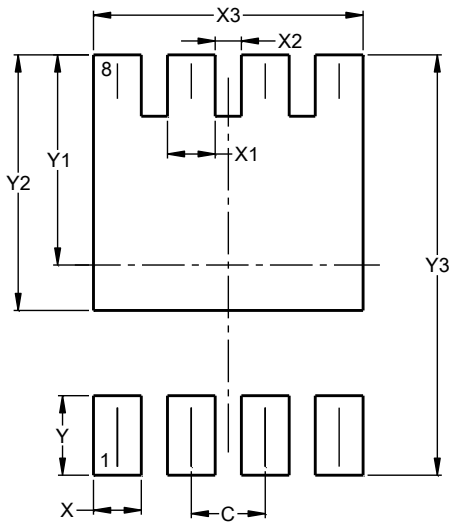


POWERDI3333-8			
Dim	**Min**	**Max**	**Typ**
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	–	–	0.203
b	0.27	0.37	0.32
b2	0.15	0.25	0.20
D	3.25	3.35	3.30
D2	2.22	2.32	2.27
E	3.25	3.35	3.30
E2	1.56	1.66	1.61
E3	0.79	0.89	0.84
E4	1.60	1.70	1.65
e	–	–	0.65
L	0.35	0.45	0.40
L1	–	–	0.39
z	–	–	0.515
All Dimensions in mm			

Suggested Pad Layout

Please see AP02001 at http://www.diodes.com/_files/datasheets/ap02001.pdf 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

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