

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ max	I_D max $T_C = +25^\circ C$
60V	7.5mΩ @ $V_{GS} = 10V$	60A
	11.5mΩ @ $V_{GS} = 4.5V$	49A

Description

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.

Applications

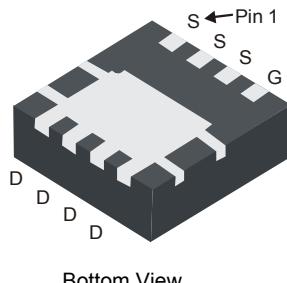
- Synchronous Rectifier
- Backlighting
- Power Management Functions
- DC-DC Converters

Features and Benefits

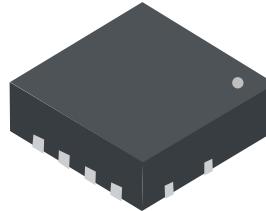
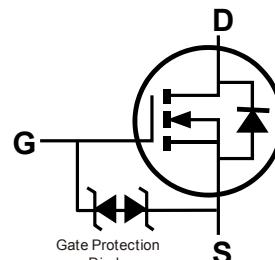
- Low $R_{DS(ON)}$ – Ensures on State Losses Are Minimized
- Excellent $Q_{gd} \times R_{DS(ON)}$ Product (FOM)
- Advanced Technology for DC/DC Converts
- Small Form Factor Thermally Efficient Package Enables Higher Density End Products
- Occupies Just 33% of the Board Area Occupied by SO-8 Enabling Smaller End Product
- 100% UIS (Avalanche) rated
- ESD Protected Gate
- **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
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.008 grams (approximate)



Bottom View

Top View
Internal Schematic

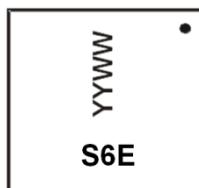
Ordering Information (Note 4)

Part Number	Case	Packaging
DMT6008LFG-7	POWERDI3333-8	2,000/Tape & Reel
DMT6008LFG-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



S6E = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last digit of year (ex: 13 = 2013)
 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}	60	V
Gate-Source Voltage	V_{GSS}	± 12	V
Continuous Drain Current (Note 5) $V_{GS} = 10\text{V}$	I_D	13	A
	I_D	11	A
$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	60	A
	I_D	48	A
Maximum Continuous Body Diode Forward Current (Note 5)	I_S	3	A
Pulsed Drain Current (10 μs pulse, duty cycle = 1%)	I_{DM}	80	A
Avalanche Current (Note 6)	I_{AS}	13	A
Avalanche Energy (Note 6)	E_{AS}	25	mJ

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	P_D	2.2	W
		41	
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	58	°C/W
		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 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	60	—	—	V	$V_{GS} = 0\text{V}, I_D = 1\text{mA}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	$V_{DS} = 48\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 10	μA	$V_{GS} = \pm 10\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(\text{th})}$	0.7	—	2.0	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(\text{ON})}$	—	5.0	7.5	mΩ	$V_{GS} = 10\text{V}, I_D = 20\text{A}$
		—	6.5	11.5		$V_{GS} = 4.5\text{V}, I_D = 20\text{A}$
		—	19	—		$V_{GS} = 3\text{V}, I_D = 3\text{A}$
Diode Forward Voltage	V_{SD}	—	0.9	1.2	V	$V_{GS} = 0\text{V}, I_S = 20\text{A}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	2713	—	pF	$V_{DS} = 30\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	822	—		
Reverse Transfer Capacitance	C_{rss}	—	57	—		
Gate Resistance	R_g	—	0.54	—	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Total Gate Charge ($V_{GS} = 4.5\text{V}$)	Q_g	—	22.4	—	nC	$V_{DS} = 30\text{V}, I_D = 20\text{A}$
Total Gate Charge ($V_{GS} = 10\text{V}$)	Q_g	—	50.4	—		
Gate-Source Charge	Q_{gs}	—	9.6	—		
Gate-Drain Charge	Q_{gd}	—	7.8	—	nS	$V_{DD} = 30\text{V}, V_{GS} = 10\text{V}, I_D = 20\text{A}, R_G = 3\Omega$
Turn-On Delay Time	$t_{D(\text{on})}$	—	7.0	—		
Turn-On Rise Time	t_r	—	4.4	—		
Turn-Off Delay Time	$t_{D(\text{off})}$	—	24.4	—	nS	$V_{DD} = 30\text{V}, V_{GS} = 10\text{V}, I_D = 20\text{A}, R_G = 3\Omega$
Turn-Off Fall Time	t_f	—	7.0	—		

Notes: 5. $R_{\theta JA}$ is determined with the device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate. $R_{\theta JC}$ is guaranteed by design while $R_{\theta JA}$ is determined by the user's board design.

6. UIS in production with $L = 0.3\text{mH}, T_J = +25^\circ\text{C}$

7. Short duration pulse test used to minimize self-heating effect.

8. Guaranteed by design. Not subject to product testing.

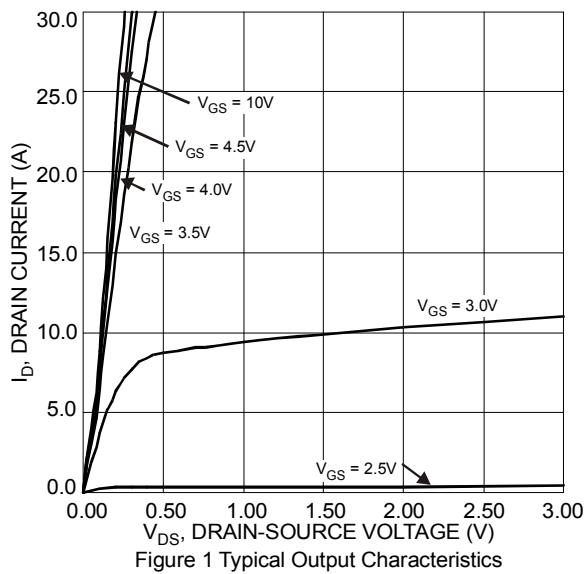


Figure 1 Typical Output Characteristics

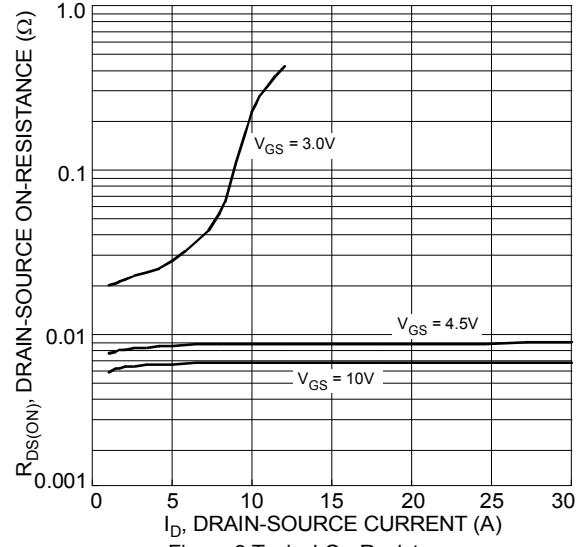


Figure 3 Typical On-Resistance vs.
Drain Current and Gate Voltage

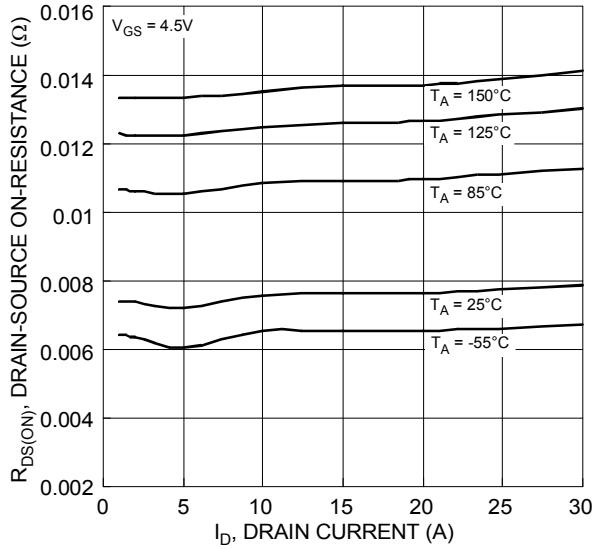


Figure 5 Typical On-Resistance vs.
Drain Current and Temperature

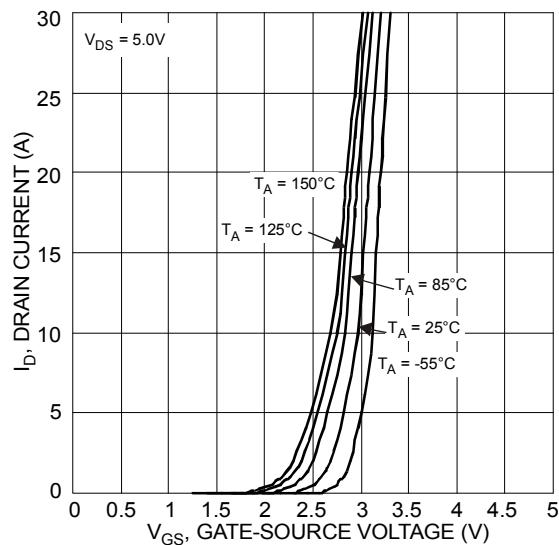


Figure 2 Typical Transfer Characteristics

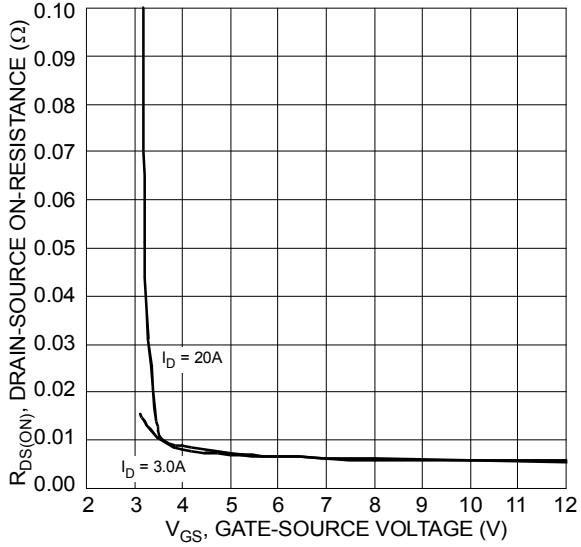


Figure 4 Typical Transfer Characteristics

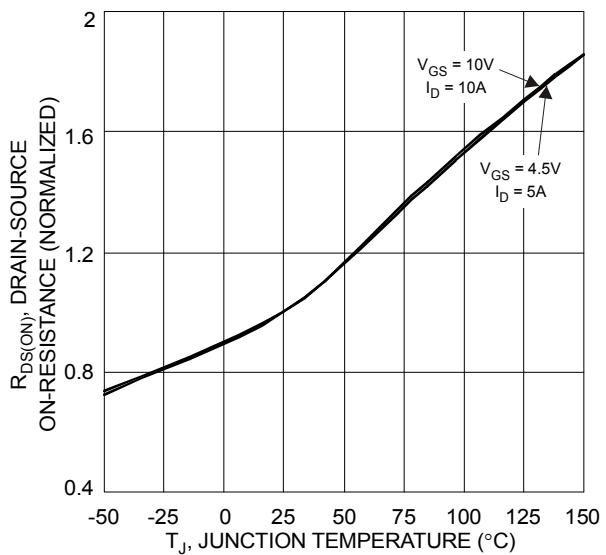
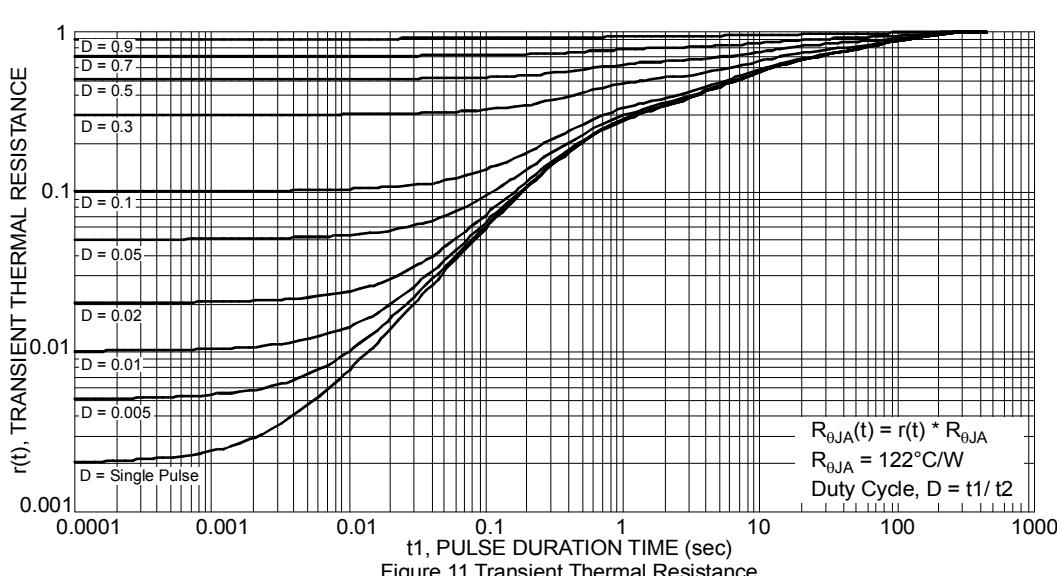
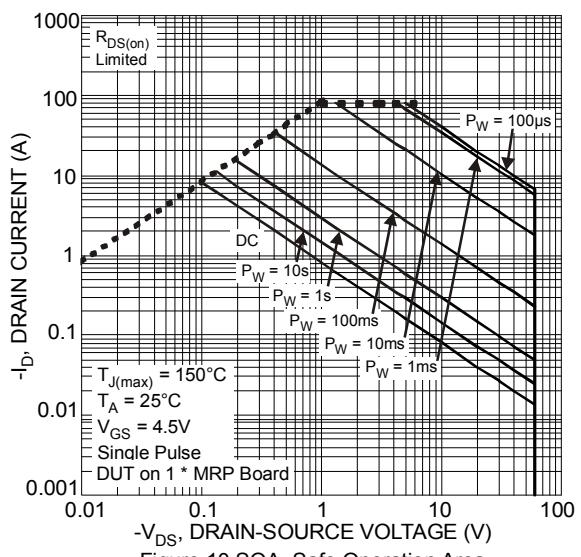
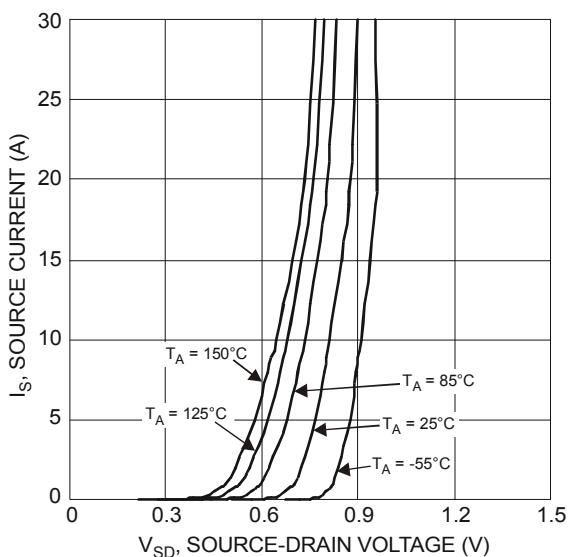
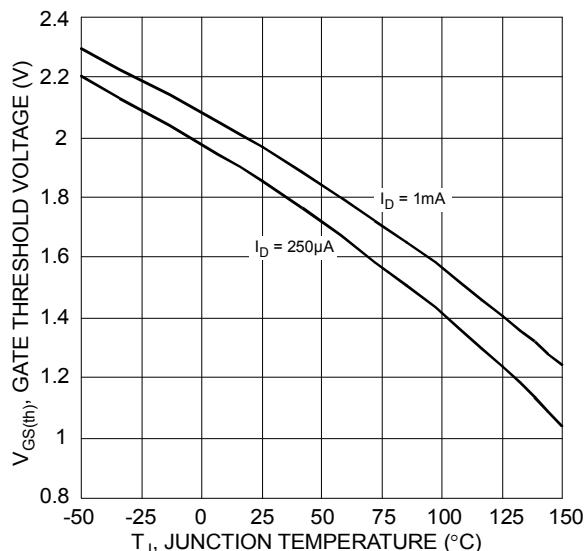
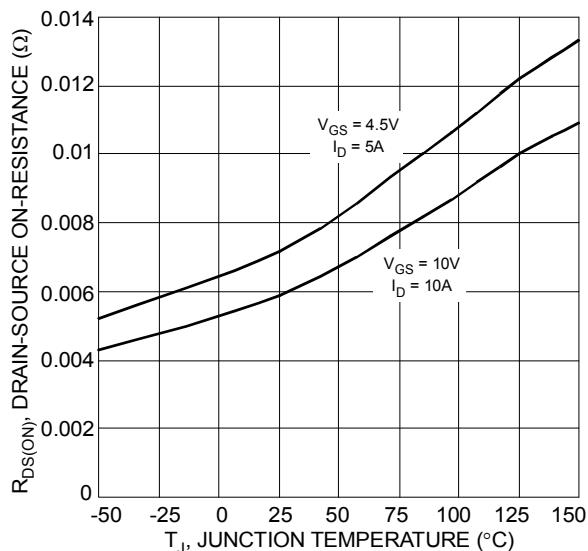
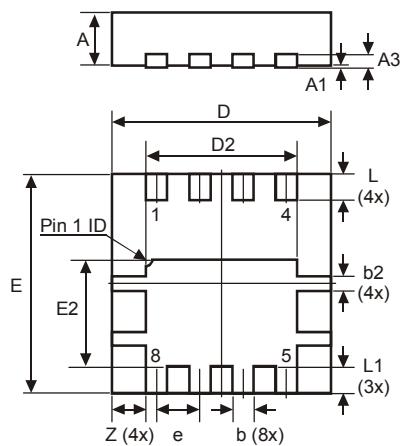


Figure 6 On-Resistance Variation with Temperature



Package Outline Dimensions

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.

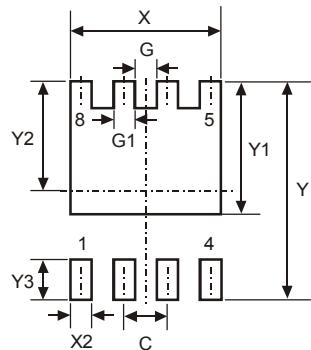


POWERDI® 3333-8			
Dim	Min	Max	Typ
D	3.25	3.35	3.30
E	3.25	3.35	3.30
D2	2.22	2.32	2.27
E2	1.56	1.66	1.61
A	0.75	0.85	0.80
A1	0	0.05	0.02
A3	—	—	0.203
b	0.27	0.37	0.32
b2	—	—	0.20
L	0.35	0.45	0.40
L1	—	—	0.39
e	—	—	0.65
Z	—	—	0.515

All Dimensions in mm

Suggested Pad Layout

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



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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