

## Product Summary

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

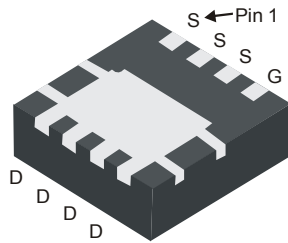
- Synchronous Rectifier
- Backlighting
- Power Management Functions
- DC-DC Converters

## Features and Benefits

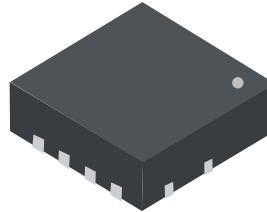
- Low  $R_{DS(ON)}$  – Ensures on State Losses Are Minimized
- Excellent  $Q_{gd} \times R_{DS(ON)}$  Product (FOM)
- Advanced Technology for DC/DC Converts
- Small Form Factor Thermally Efficient Package Enables Higher Density End Products
- Occupies Just 33% of the Board Area Occupied by SO-8 Enabling 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

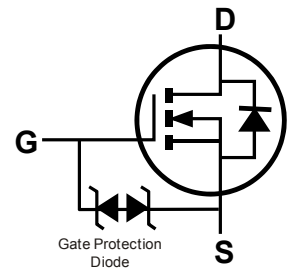
- Case: POWERDI<sup>®</sup>3333-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See diagram
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 <sup>(e)</sup>3
- Weight: 0.008 grams (approximate)



Bottom View



Top View  
Internal Schematic

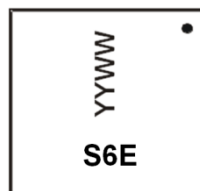


## Ordering Information (Note 4)

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](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<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Units
Drain-Source Voltage	V <sub>DSS</sub>	60	V
Gate-Source Voltage	V <sub>GSS</sub>	±12	V
Continuous Drain Current (Note 5) V <sub>GS</sub> = 10V	I <sub>D</sub>	T <sub>A</sub> = +25°C	13
		T <sub>A</sub> = +70°C	11
	I <sub>D</sub>	T <sub>C</sub> = +25°C	60
		T <sub>C</sub> = +70°C	48
Maximum Continuous Body Diode Forward Current (Note 5)	I <sub>S</sub>	3	A
Pulsed Drain Current (10µs pulse, duty cycle = 1%)	I <sub>DM</sub>	80	A
Avalanche Current (Note 6)	I <sub>AS</sub>	13	A
Avalanche Energy (Note 6)	E <sub>AS</sub>	25	mJ

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	P <sub>D</sub>	T <sub>A</sub> = +25°C	2.2
		T <sub>C</sub> = +25°C	41
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	Steady State	58
		t < 10s	35
Thermal Resistance, Junction to Case (Note 5)	R <sub>θJC</sub>	3	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	60	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 1mA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1	µA	V <sub>DS</sub> = 48V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±10	µA	V <sub>GS</sub> = ±10V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	0.7	—	2.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	—	5.0	7.5	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A
		—	6.5	11.5		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 20A
		—	19	—		V <sub>GS</sub> = 3V, I <sub>D</sub> = 3A
		—	—	—		V <sub>GS</sub> = 0V, I <sub>S</sub> = 20A
Diode Forward Voltage	V <sub>SD</sub>	—	0.9	1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 20A
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	C <sub>iss</sub>	—	2713	—	pF	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	822	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	57	—		
Gate Resistance	R <sub>g</sub>	—	0.54	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Q <sub>g</sub>	—	22.4	—	nC	V <sub>DS</sub> = 30V, I <sub>D</sub> = 20A
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>g</sub>	—	50.4	—		
Gate-Source Charge	Q <sub>gs</sub>	—	9.6	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	7.8	—		
Turn-On Delay Time	t <sub>D(on)</sub>	—	7.0	—	nS	V <sub>DD</sub> = 30V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A, R <sub>G</sub> = 3Ω,
Turn-On Rise Time	t <sub>r</sub>	—	4.4	—		
Turn-Off Delay Time	t <sub>D(off)</sub>	—	24.4	—		
Turn-Off Fall Time	t <sub>f</sub>	—	7.0	—		

- Notes:
- R<sub>θJA</sub> is determined with the device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate. R<sub>θJC</sub> is guaranteed by design while R<sub>θJA</sub> is determined by the user's board design.
  - UIS in production with L = 0.3mH, T<sub>J</sub> = +25°C
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.

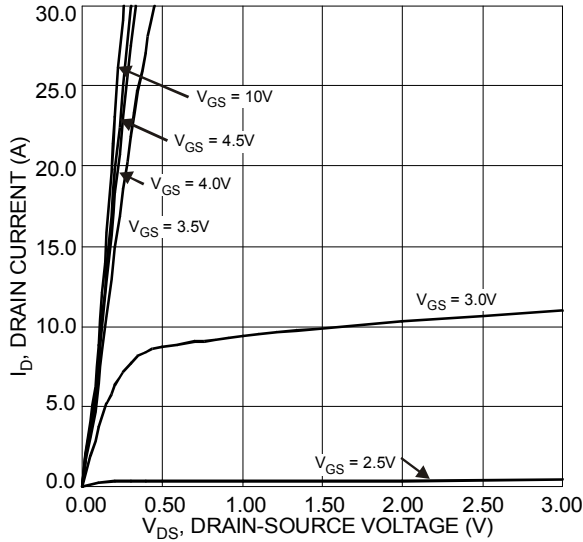


Figure 1 Typical Output Characteristics

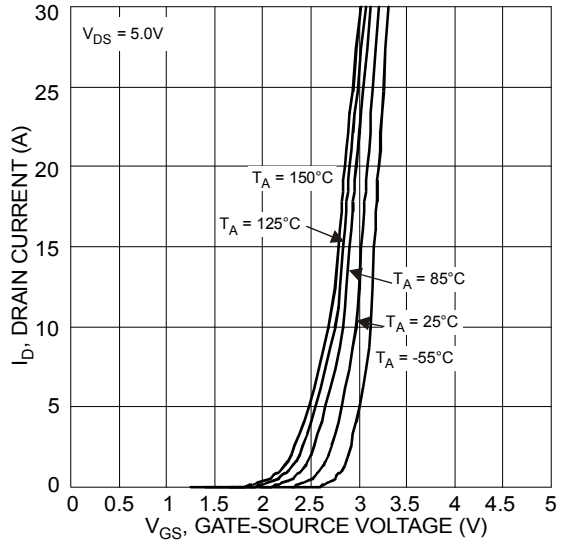


Figure 2 Typical Transfer Characteristics

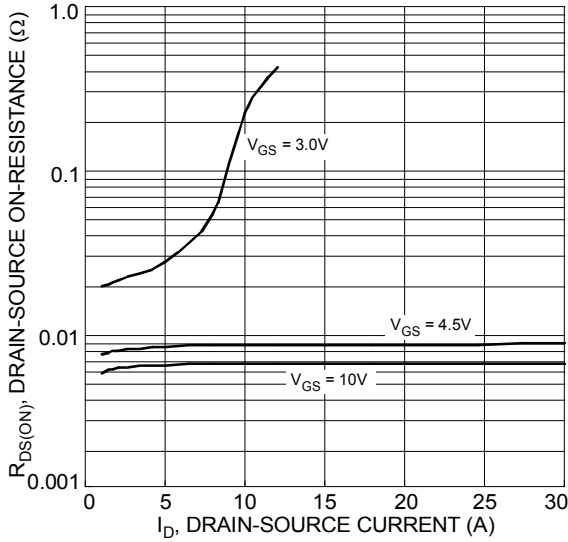


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

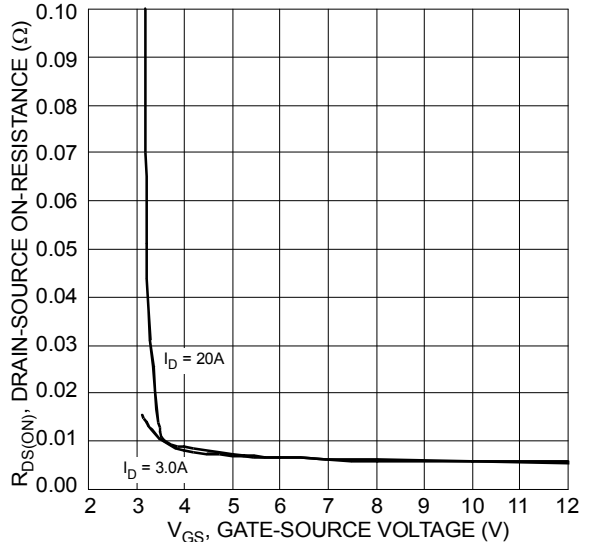


Figure 4 Typical Transfer Characteristics

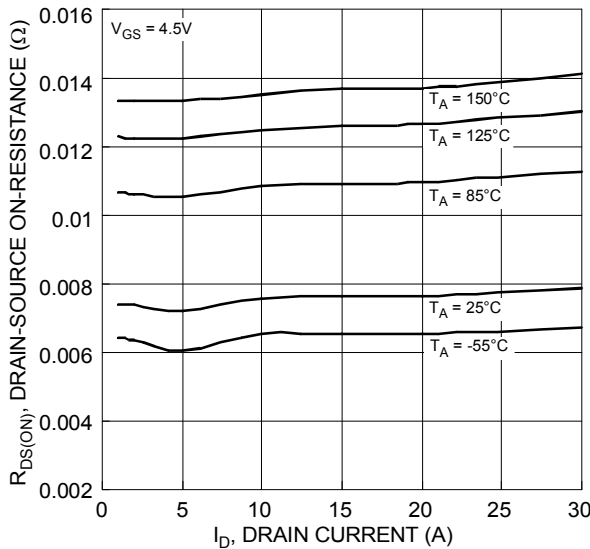


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

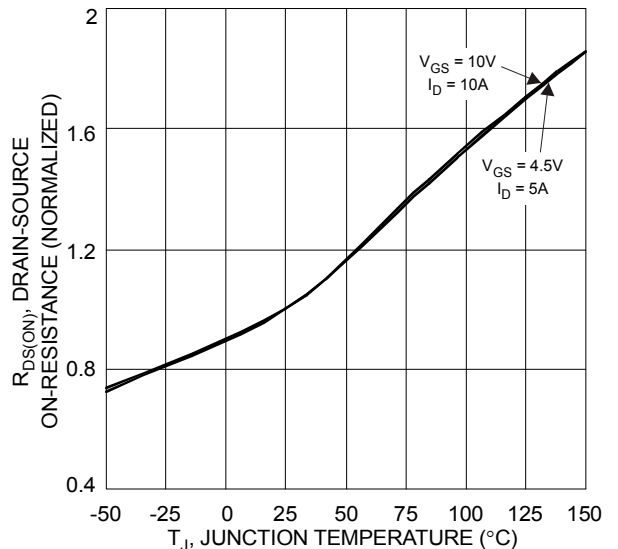


Figure 6 On-Resistance Variation with Temperature

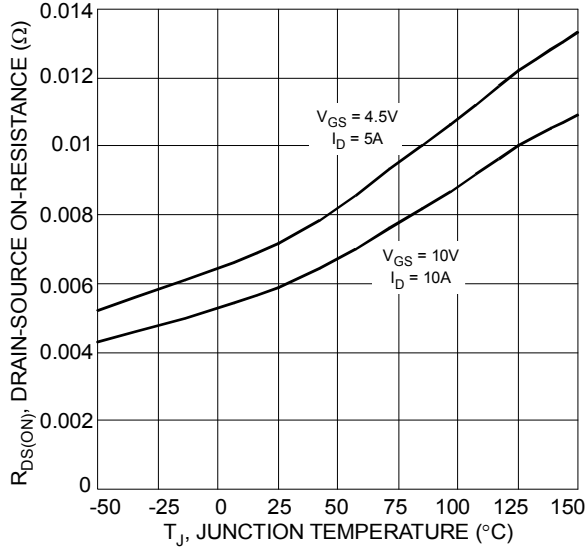


Figure 7 On-Resistance Variation with Temperature

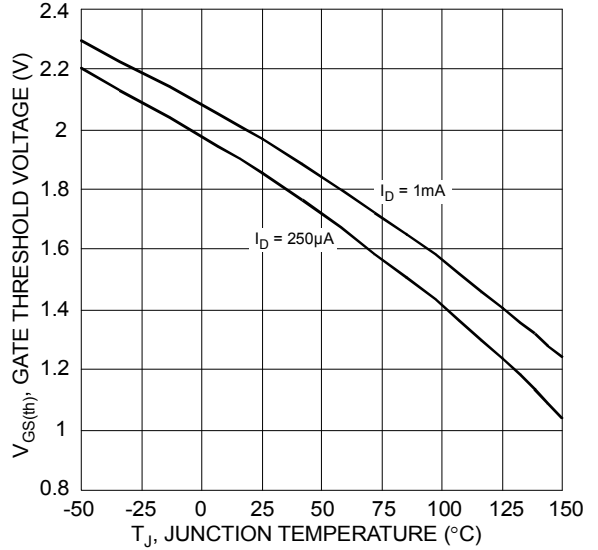


Figure 8 Gate Threshold Variation vs. Ambient Temperature

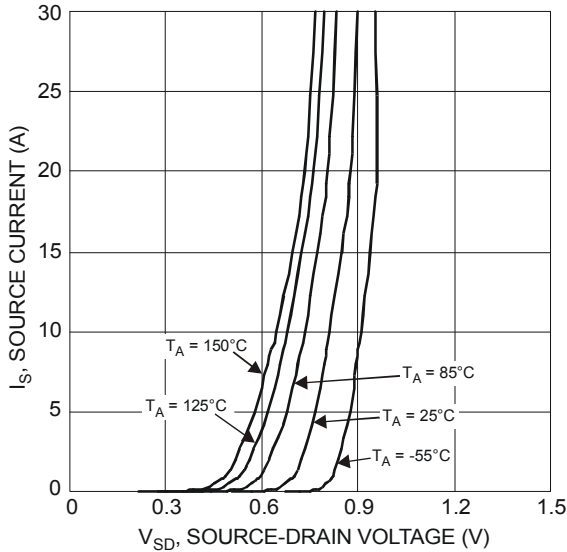


Figure 9 Diode Forward Voltage vs. Current

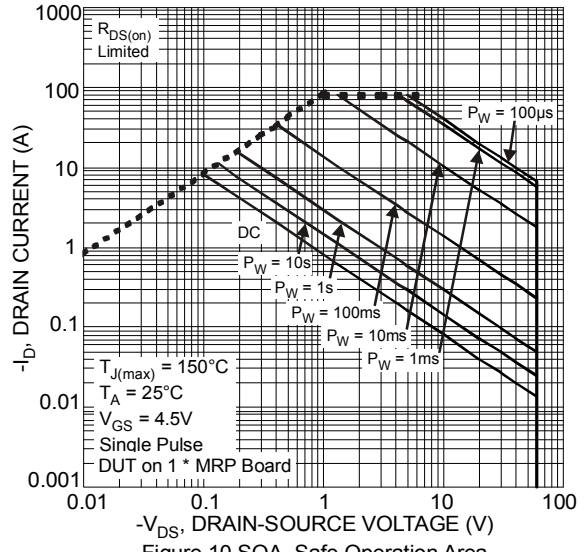


Figure 10 SOA, Safe Operation Area

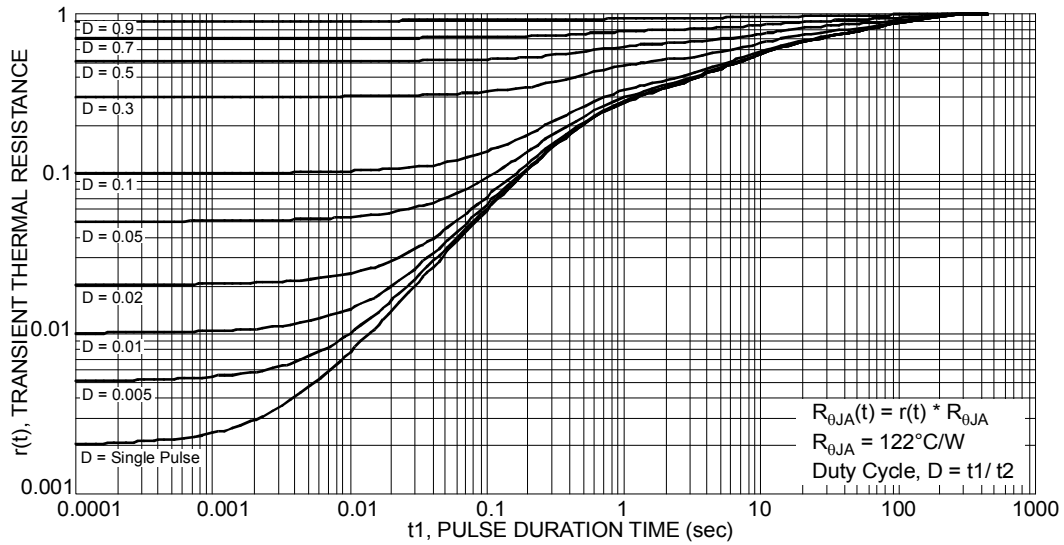
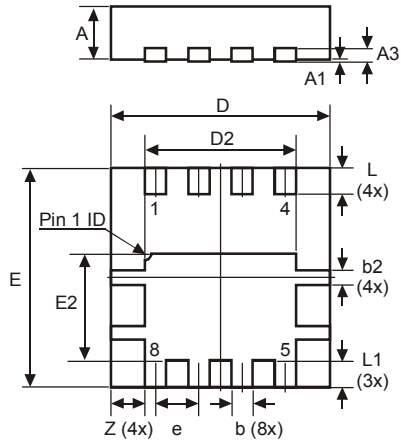


Figure 11 Transient Thermal Resistance

$R_{\theta JA}(t) = r(t) * R_{\theta JA}$   
 $R_{\theta JA} = 122^{\circ}\text{C/W}$   
 Duty Cycle,  $D = t_1 / t_2$

**Package Outline Dimensions**

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

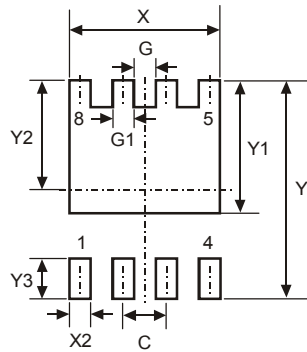


POWERDI <sup>®</sup> 3333-8			
Dim	Min	Max	Typ
D	3.25	3.35	3.30
E	3.25	3.35	3.30
D2	2.22	2.32	2.27
E2	1.56	1.66	1.61
A	0.75	0.85	0.80
A1	0	0.05	0.02
A3	-	-	0.203
b	0.27	0.37	0.32
b2	-	-	0.20
L	0.35	0.45	0.40
L1	-	-	0.39
e	-	-	0.65
Z	-	-	0.515
All Dimensions in mm			

NEW PRODUCT

**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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