

#### **N-CHANNEL ENHANCEMENT MODE MOSFET POWERDI®**

## **Product Summary**

V <sub>(BR)DSS</sub>	R <sub>DS(ON)</sub>	I <sub>D</sub> T <sub>C</sub> = +25°C	
30V	$8.5 m\Omega @ V_{GS} = 10V$	30A	
30 V	$10.5 \text{m}\Omega @ V_{GS} = 4.5 \text{V}$	25A	

## **Description**

This new generation MOSFET is designed to minimize the on-state resistance (R<sub>DS(ON)</sub>) and yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

## **Applications**

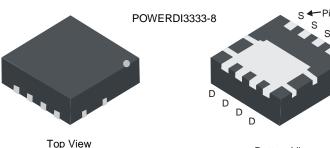
- Backlighting
- **DC-DC Converters**
- **Power Management Functions**

#### **Features**

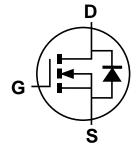
- Low R<sub>DS(ON)</sub> ensures on state losses are minimized
- Small form factor thermally efficient package enables higher density end products
- Occupies just 33% of the board area occupied by SO-8 enabling smaller end product
- 100% UIS (Avalanche) rated
- 100% Rg tested
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability

#### **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: See Diagram Below
- Terminals: Finish Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (3)
- Weight: 0.072 grams (Approximate)







**Equivalent Circuit** 

### Ordering Information (Note 4)

Part Number	Compliance	Case	Packaging
DMN3010LFG-7	Standard	POWERDI3333-8	2,000/Tape & Reel
DMN3010LFG-13	Standard	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.

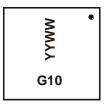
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4. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

## Marking Information

PowerDI3333-8



G10 = Product Marking Code YYWW = Date Code Marking YY = Last Digit of Year (ex: 15 for 2015) WW = Week Code (01 - 53)



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

Characteris	Symbol	Value	Unit		
Drain-Source Voltage	$V_{DSS}$	30	V		
Gate-Source Voltage	V <sub>GSS</sub>	±20	V		
Continuous Prain Correct (Note C) // 40)/	Steady State	$T_A = +25$ °C $T_A = +70$ °C	I <sub>D</sub>	11 8.5	А
Continuous Drain Current (Note 6) V <sub>GS</sub> = 10V	t<10s	$T_A = +25$ °C $T_A = +70$ °C	I <sub>D</sub>	14 11	А
Continuous Drain Current (Note 6) V <sub>GS</sub> = 10V	I <sub>D</sub>	30 20	А		
Pulsed Drain Current (10µs pulse, duty cycle = 1%	I <sub>DM</sub>	90	A		
Avalanche Current (Note 7) L = 0.1mH	I <sub>AS</sub>	12.7	A		
Avalanche Energy (Note 7) L = 0.1mH	E <sub>AS</sub>	8.1	mJ		

#### **Thermal Characteristics**

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)		$P_D$	0.9	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	5	137	°C/W
Thermal Resistance, Junction to Ambient (Note 5)	t < 10s	$R_{\theta JA}$	90	°C/W
Total Power Dissipation (Note 6)		$P_{D}$	2.4	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	D	52	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	t < 10s	$R_{\theta JA}$	35	°C/W
Total Power Dissipation (Note 6)	Tc = +25°C	$P_D$	26	W
Thermal Resistance, Junction to Case (Note 6)		$R_{ heta JC}$	4.8	°C/W
Operating and Storage Temperature Range		$T_{J}, T_{STG}$	-55 to +150	°C

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

Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 8)							
Drain-Source Breakdown Voltage		30	_	_	V	$V_{GS} = 0V, I_D = 250\mu A$	
Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C		I	_	1	μA μA	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V	
Zero Gate Voltage Drain Current T <sub>J</sub> = +150°C (Note 9)	I <sub>DSS</sub>	l	_	100			
Gate-Source Leakage	I <sub>GSS</sub>	l		±100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$	
ON CHARACTERISTICS (Note 8)							
Gate Threshold Voltage	V <sub>GS(th)</sub>	1.0	_	2.5	V	$V_{DS} = V_{GS}$ , $I_D = 250\mu A$	
Static Drain-Source On-Resistance	D	1	6.5	8.5	mΩ	$V_{GS} = 10V, I_D = 18A$	
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	l	8	10.5	11122	$V_{GS} = 4.5V, I_D = 16A$	
Diode Forward Voltage	$V_{SD}$		0.75	1.0	V	$V_{GS} = 0V, I_{S} = 1A$	
On State Drain Current (Note 9)		10	_	_	Α	$VDS \leq 5V$ , $VGS = 4.5V$	
On State Drain Current (Note 9) $I_{D(ON)}$ 10 $I_{D(ON)}$ 4 $V_{DS} \le 5V$ , $V_{GS} = 4.5V$ <b>DYNAMIC CHARACTERISTICS (Note 9)</b>							
Input Capacitance	C <sub>iss</sub>	l	2,075	4,150		V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V, f = 1.0MHz	
Output Capacitance	Coss		190	380	pF		
Reverse Transfer Capacitance	C <sub>rss</sub>	_	138	276		I = I.OIVII IZ	
Gate Resistance	$R_g$	_	2.4	5	Ω	$V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz$	
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Qg	_	16.1	32			
Total Gate Charge (V <sub>GS</sub> = 10V)	$Q_g$	_	37	74	nC	V <sub>DS</sub> = 15V. I <sub>D</sub> = 18A	
Gate-Source Charge	Q <sub>gs</sub>		6.1	12	iiC	V <sub>DS</sub> = 15V, I <sub>D</sub> = 16A	
Gate-Drain Charge	$Q_{gd}$	_	5.9	12			
Turn-On Delay Time	t <sub>D(on)</sub>		4.5	10			
Turn-On Rise Time	t <sub>r</sub>	_	19.6	35		$V_{DS} = 15V, V_{GS} = 10V,$	
Turn-Off Delay Time	t <sub>D(off)</sub>	-	31	50	ns	$R_L = 0.83\Omega$ , $R_{GEN} = 3\Omega$ ,	
Turn-Off Fall Time	t <sub>f</sub>	_	10.7	21			
Reverse Recovery Time	t <sub>rr</sub>		13.7	27	ns	1 45A 31/31 500A/	
Reverse Recovery Charge	Q <sub>rr</sub>	1	18.3	37	nC	-I <sub>F</sub> =15A, di/dt=500A/μs	

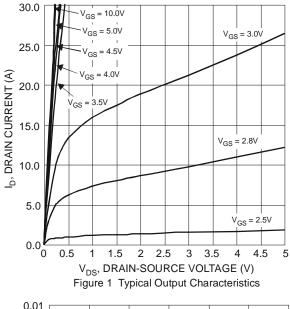
Notes:

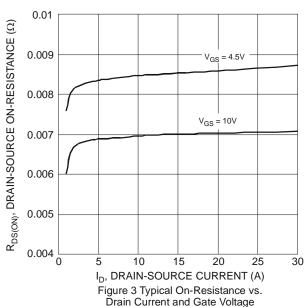
Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 Device mounted on FR-4 substrate PC board, 2oz copper, with thermal vias to bottom layer 1-inch square copper plate.

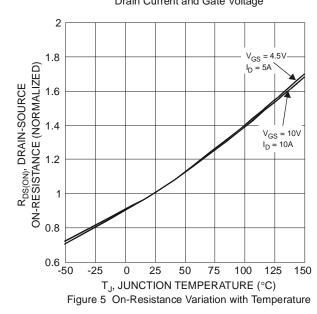
<sup>7.</sup> UIS in production with L = 1mH, TJ = +25°C.

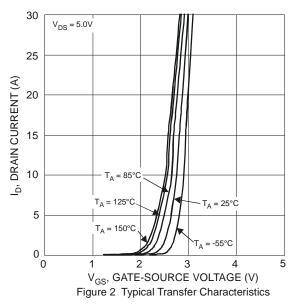
S. Short duration pulse test used to minimize self-heating effect.
 Guaranteed by design. Not subject to production testing.

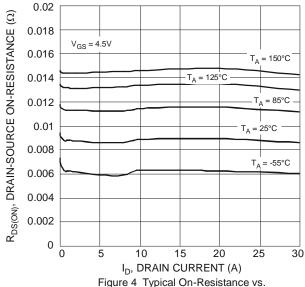


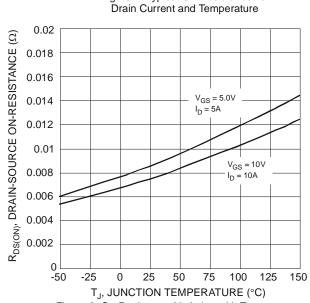














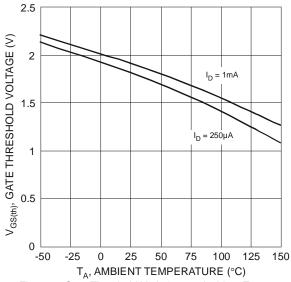
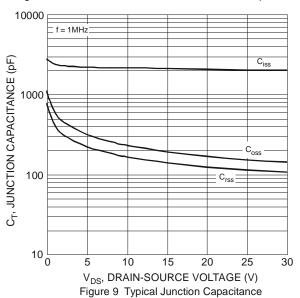
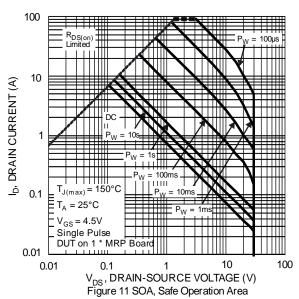
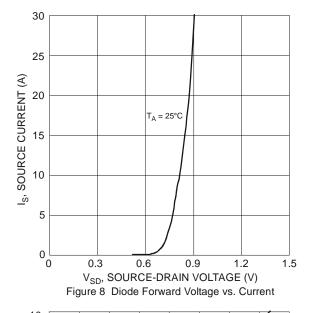
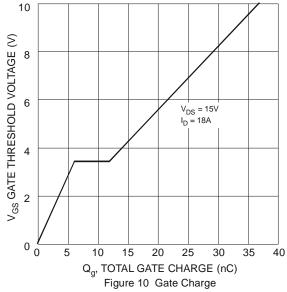


Figure 7 Gate Threshold Variation vs. Ambient Temperature

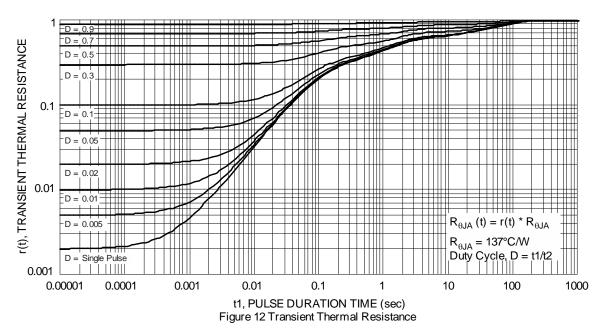








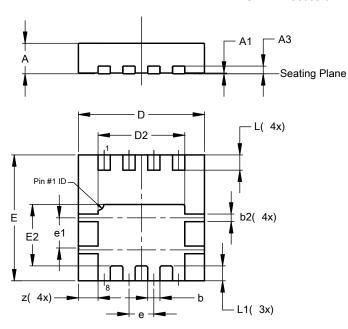




## **Package Outline Dimensions**

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

#### POWERDI®3333-8



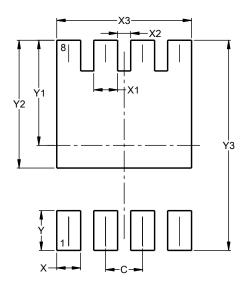
POWERDI®3333-8						
Dim	Min	Max	Тур			
Α	0.75	0.85	0.80			
A1	0.00	0.05	0.02			
A3	_	_	0.203			
b	0.27	0.37	0.32			
b2	_	_	0.20			
D	3.25	3.35	3.30			
D2	2.22	2.32	2.27			
Е	3.25	3.35	3.30			
E2	1.56	1.66	1.61			
е	_	_	0.65			
e1	0.79	0.89	0.84			
L	0.35	0.45	0.40			
L1	_	_	0.39			
Z	_	_	0.515			
All Dimensions in mm						



# **Suggested Pad Layout**

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

#### POWERDI®3333-8



Dimensions	Value (in mm)
С	0.650
Х	0.420
X1	0.420
X2	0.230
Х3	2.370
Υ	0.700
Y1	1.850
Y2	2.250
Y3	3.700



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многоканальный

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