

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	$I_D$ $T_A = +25^\circ C$
30V	8.5mΩ @ $V_{GS} = 10V$	30A
	10.5mΩ @ $V_{GS} = 4.5V$	25A

## Description

This new generation 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

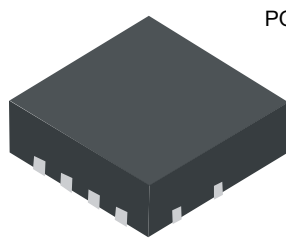
- Backlighting
- DC-DC Converters
- Power Management Functions

## Features

- Low  $R_{DS(ON)}$  – 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**

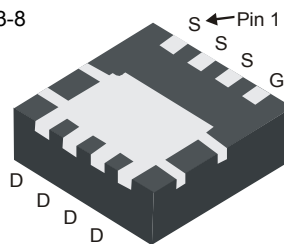
## Mechanical Data

- 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 (E3)
- Weight: 0.008 grams (approximate)

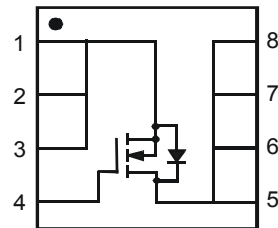


Top View

POWERDI3333-8



Bottom View



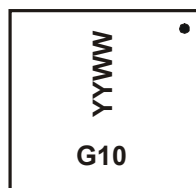
Top View  
Internal Schematic

## Ordering Information (Note 4)

Part Number	Compliance	Case	Packaging
DMN3010LFG-7	Standard	POWERDI3333-8	2000/Tape & Reel
DMN3010LFG-13	Standard	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/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



G10 = Product marking code  
YYWW = Date code marking  
YY = Last digit of year (ex: 10 for 2010)  
WW = Week code (01 – 53)

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V <sub>DSS</sub>	30	V
Gate-Source Voltage			V <sub>GSS</sub>	±20	V
Continuous Drain Current (Note 5) V <sub>GS</sub> = 10V	Steady State	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	11 8.5	A
	t < 10s	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	14 11	A
Continuous Drain Current (Note 5) V <sub>GS</sub> = 10V	Steady State	T <sub>C</sub> = +25°C T <sub>C</sub> = +100°C	I <sub>D</sub>	30 20	A
Pulsed Drain Current (10μs pulse, duty cycle = 1%)			I <sub>DM</sub>	90	A
Avalanche Current (Notes 6) L = 0.1mH			I <sub>AR</sub>	24	A
Repetitive Avalanche Energy (Notes 6) L = 0.1mH			E <sub>AR</sub>	29	mJ

**Thermal Characteristics**

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 4)		P <sub>D</sub>	0.9	W
Thermal Resistance, Junction to Ambient (Note 4)	Steady State	R <sub>θJA</sub>	140	°C/W
	t < 10s		90	°C/W
Total Power Dissipation (Note 5)		P <sub>D</sub>	2.4	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R <sub>θJA</sub>	52	°C/W
	t < 10s		35	°C/W
Thermal Resistance, Junction to Case		R <sub>θJC</sub>	4.8	°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 8)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	30	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1	μA	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	1.0	—	2.5	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	6.5	8.5	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 18A
		—	8	10.5		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 16A
Forward Transfer Admittance	Y <sub>fs</sub>	—	20	—	S	V <sub>DS</sub> = 5V, I <sub>D</sub> = 18A
Diode Forward Voltage	V <sub>SD</sub>	—	0.75	1.0	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>iss</sub>	—	2075	—	pF	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	190	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	138	—		
Gate resistance	R <sub>g</sub>	—	2.4	—	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>	—	16.1	—	nC	V <sub>DS</sub> = 15V, I <sub>D</sub> = 18A
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>g</sub>	—	37	—		
Gate-Source Charge	Q <sub>gs</sub>	—	6.1	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	5.9	—		
Turn-On Delay Time	t <sub>D(on)</sub>	—	4.5	—	ns	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 10V, R <sub>L</sub> = 0.83Ω, R <sub>GEN</sub> = 3Ω,
Turn-On Rise Time	t <sub>r</sub>	—	19.6	—		
Turn-Off Delay Time	t <sub>D(off)</sub>	—	31	—		
Turn-Off Fall Time	t <sub>f</sub>	—	10.7	—	ns	I <sub>F</sub> = 15A, di/dt = 500A/μs
Reverse Recovery Time	t <sub>rr</sub>	—	13.7	—		
Reverse Recovery Charge	Q <sub>rr</sub>	—	18.3	—	nC	

- Notes:
- Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
  - Device mounted on 2" x 2" FR-4 PCB with high coverage 2 oz. Copper, single sided.
  - Repetitive rating, pulse width limited by junction temperature.
  - I<sub>AR</sub> and E<sub>AR</sub> rating are based on low frequency and duty cycles to keep T<sub>J</sub> = +25°C.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to production testing.

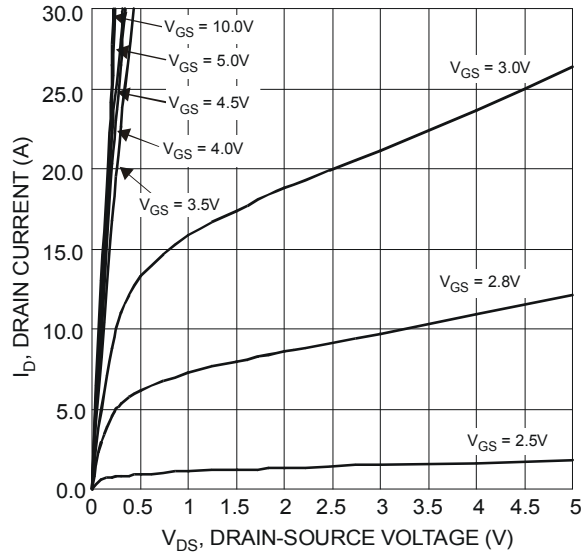


Figure 1 Typical Output Characteristics

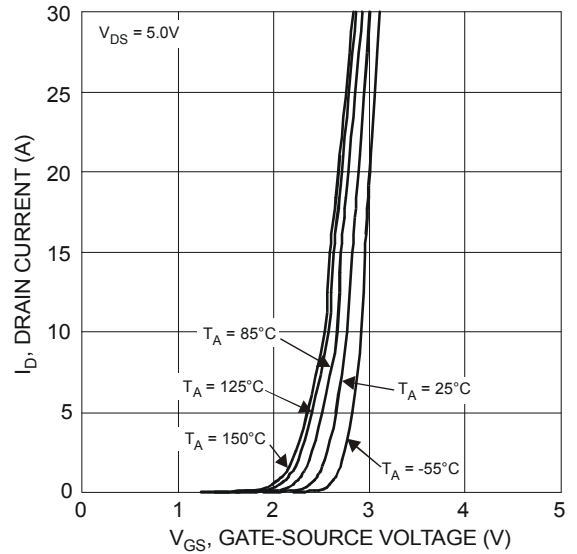


Figure 2 Typical Transfer Characteristics

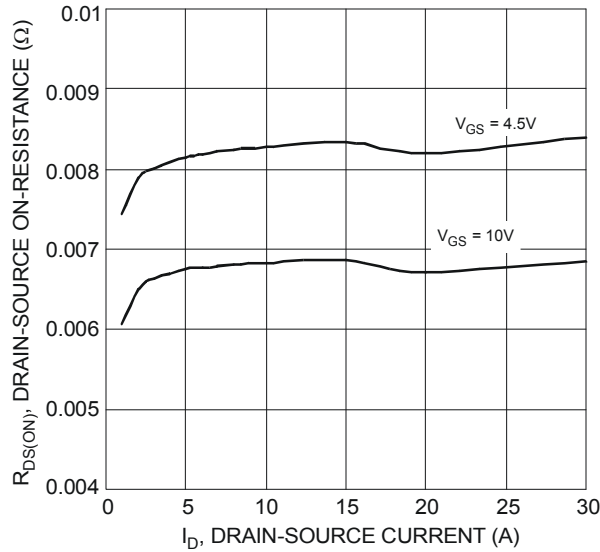


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

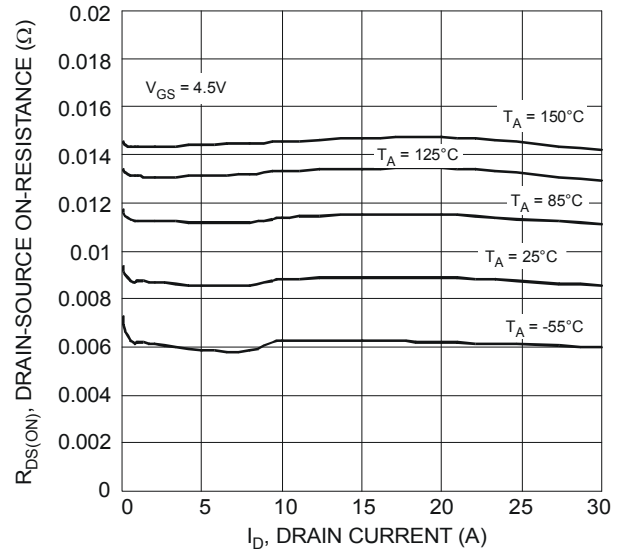


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

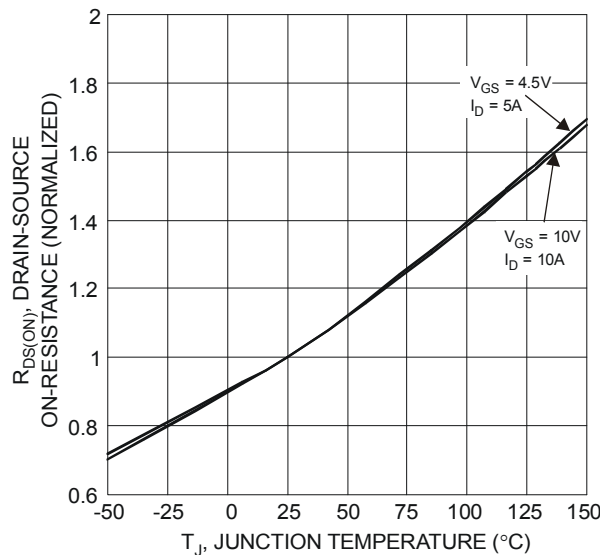


Figure 5 On-Resistance Variation with Temperature

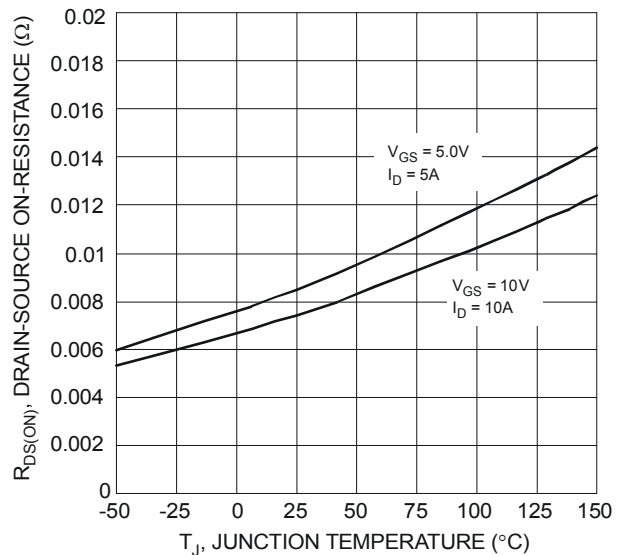


Figure 6 On-Resistance Variation with Temperature

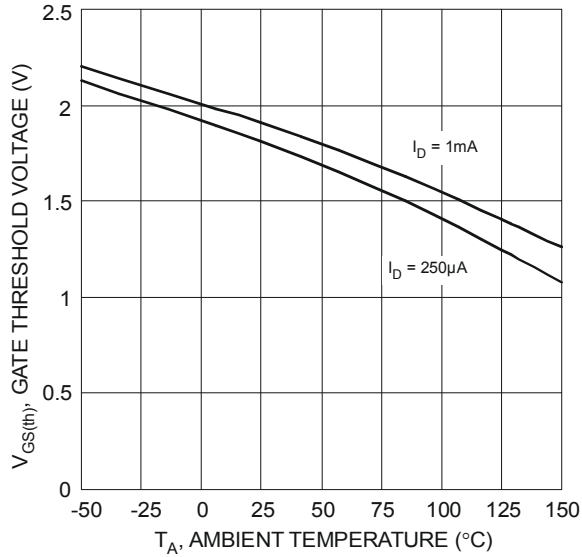


Figure 7 Gate Threshold Variation vs. Ambient Temperature

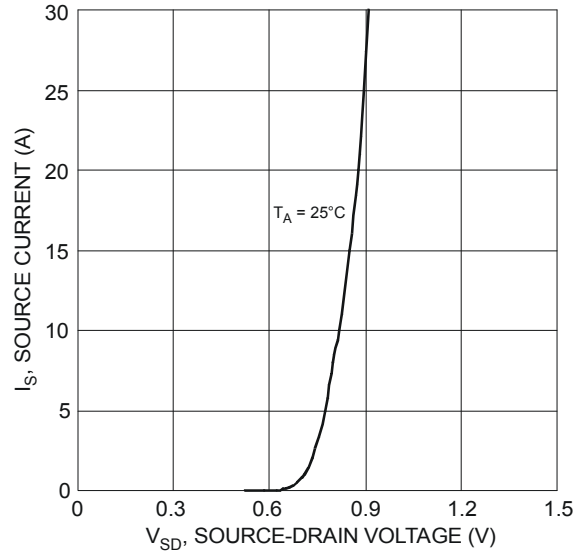


Figure 8 Diode Forward Voltage vs. Current

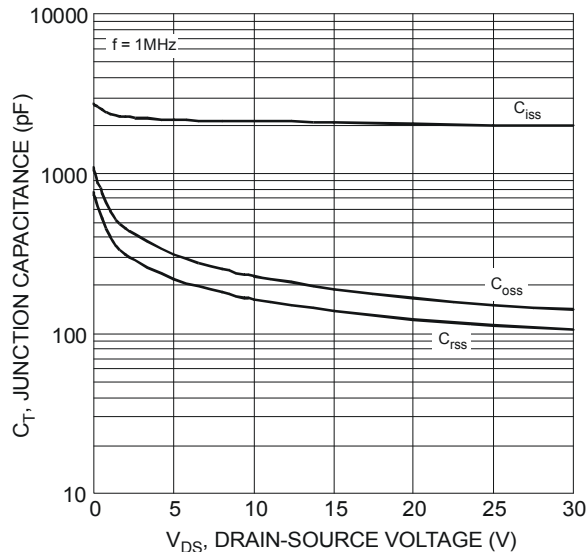


Figure 9 Typical Junction Capacitance

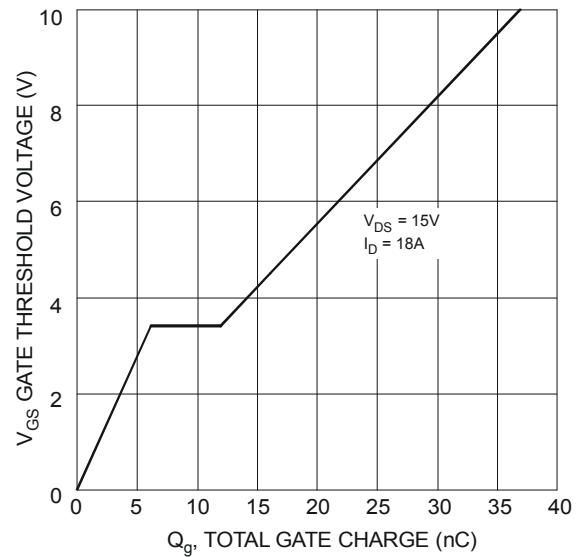


Figure 10 Gate Charge

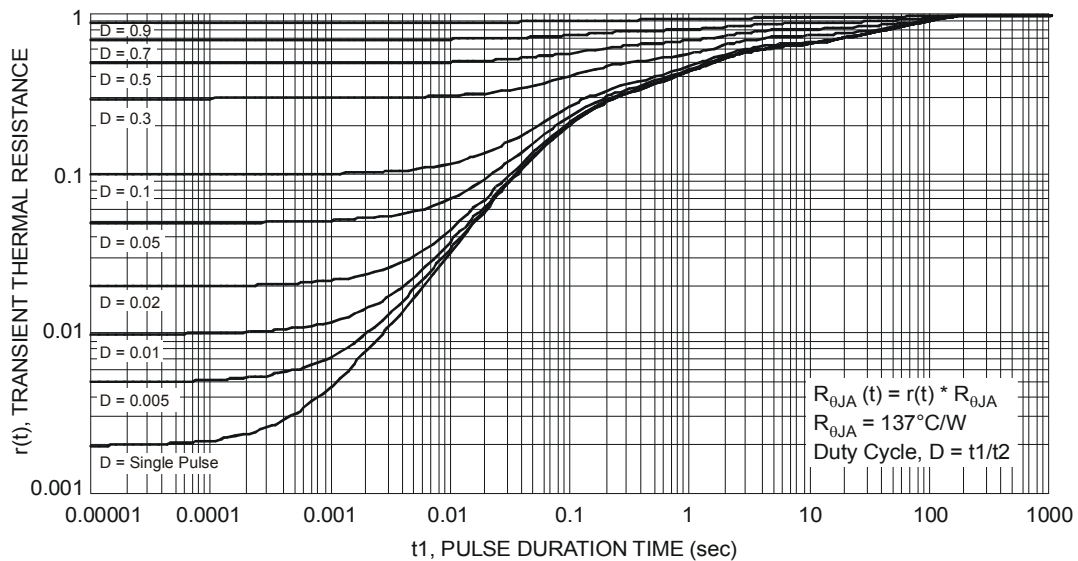
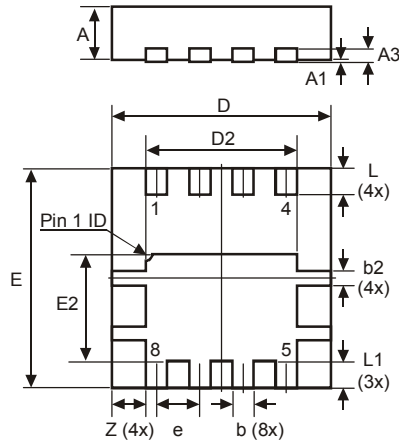


Figure 11 Transient Thermal Resistance

## Package Outline Dimensions

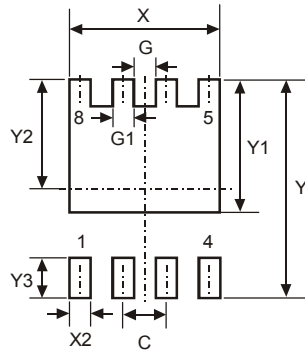
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



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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