

## Product Summary

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

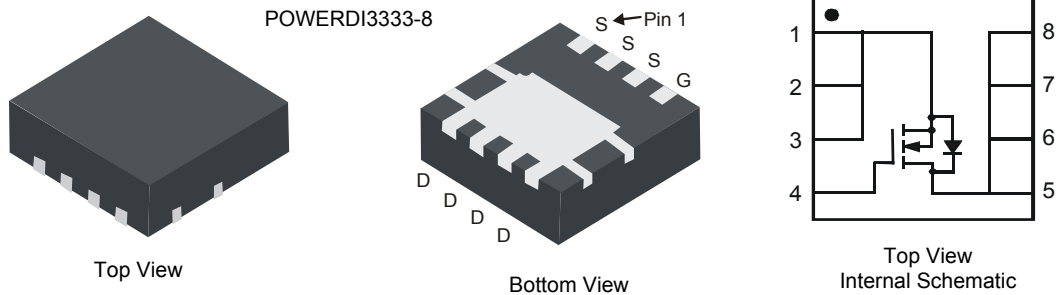
- Backlighting
- DC-DC Converters
- Power Management Functions

## 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 (3)
- Weight: 0.008 grams (approximate)

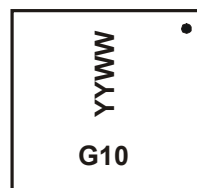


## Ordering Information (Note 4)

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			$V_{DSS}$	30	V
Gate-Source Voltage			$V_{GSS}$	$\pm 20$	V
Continuous Drain Current (Note 5) $V_{GS} = 10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	11 8.5	A
	$t < 10\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	14 11	A
Continuous Drain Current (Note 5) $V_{GS} = 10\text{V}$	Steady State	$T_C = +25^\circ\text{C}$	$I_D$	30	A
		$T_C = +100^\circ\text{C}$		20	
Pulsed Drain Current (10 $\mu\text{s}$ pulse, duty cycle = 1%)			$I_{DM}$	90	A
Avalanche Current (Notes 6) $L = 0.1\text{mH}$			$I_{AR}$	24	A
Repetitive Avalanche Energy (Notes 6) $L = 0.1\text{mH}$			$E_{AR}$	29	mJ

**Thermal Characteristics**

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 4)		$P_D$	0.9	W
Thermal Resistance, Junction to Ambient (Note 4)	Steady State	$R_{\theta JA}$	140	$^\circ\text{C/W}$
	$t < 10\text{s}$		90	$^\circ\text{C/W}$
Total Power Dissipation (Note 5)		$P_D$	2.4	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	52	$^\circ\text{C/W}$
	$t < 10\text{s}$		35	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case		$R_{\theta JC}$	4.8	$^\circ\text{C/W}$
Operating and Storage Temperature Range		$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 8)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	30	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS} = 30\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 100$	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	1.0	—	2.5	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(on)}$	—	6.5	8.5	m $\Omega$	$V_{GS} = 10\text{V}, I_D = 18\text{A}$
		—	8	10.5		$V_{GS} = 4.5\text{V}, I_D = 16\text{A}$
Forward Transfer Admittance	$ Y_{fs} $	—	20	—	S	$V_{DS} = 5\text{V}, I_D = 18\text{A}$
Diode Forward Voltage	$V_{SD}$	—	0.75	1.0	V	$V_{GS} = 0\text{V}, I_S = 1\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	$C_{iss}$	—	2075	—	pF	$V_{DS} = 15\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	—	190	—		
Reverse Transfer Capacitance	$C_{rss}$	—	138	—		
Gate resistance	$R_g$	—	2.4	—	$\Omega$	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Total Gate Charge ( $V_{GS} = 4.5\text{V}$ )	$Q_g$	—	16.1	—	nC	$V_{DS} = 15\text{V}, I_D = 18\text{A}$
Total Gate Charge ( $V_{GS} = 10\text{V}$ )	$Q_g$	—	37	—		
Gate-Source Charge	$Q_{gs}$	—	6.1	—		
Gate-Drain Charge	$Q_{gd}$	—	5.9	—		
Turn-On Delay Time	$t_{D(on)}$	—	4.5	—	ns	$V_{DS} = 15\text{V}, V_{GS} = 10\text{V}, R_L = 0.83\Omega, R_{GEN} = 3\Omega,$
Turn-On Rise Time	$t_r$	—	19.6	—		
Turn-Off Delay Time	$t_{D(off)}$	—	31	—		
Turn-Off Fall Time	$t_f$	—	10.7	—		
Reverse Recovery Time	$t_{rr}$	—	13.7	—	ns	$I_F = 15\text{A}, di/dt = 500\text{A}/\mu\text{s}$
Reverse Recovery Charge	$Q_{rr}$	—	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.
  - $I_{AR}$  and  $E_{AR}$  rating are based on low frequency and duty cycles to keep  $T_J = +25^\circ\text{C}$ .
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to production testing.

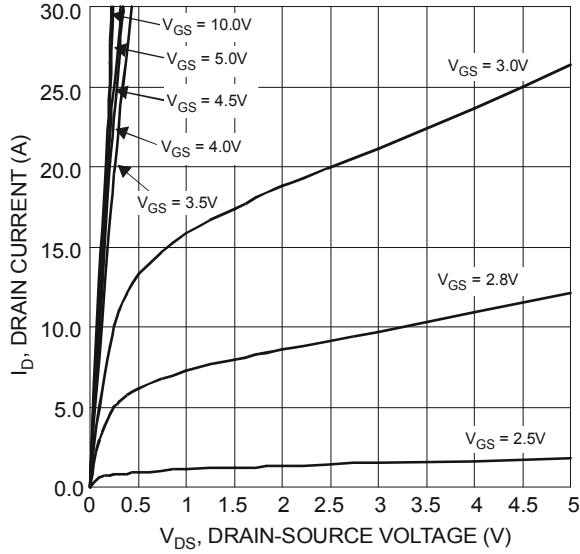


Figure 1 Typical Output Characteristics

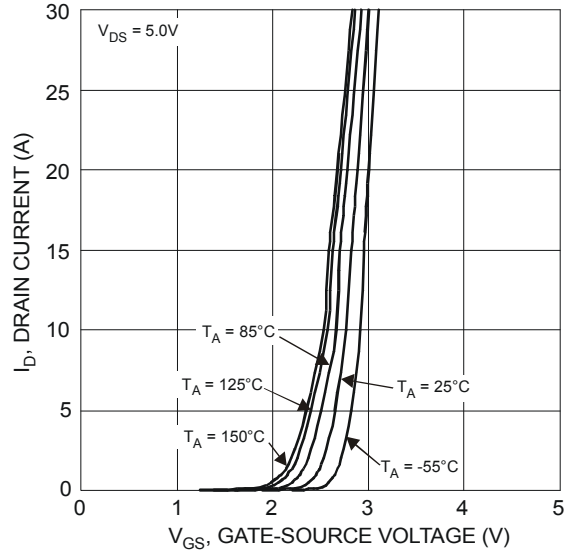


Figure 2 Typical Transfer Characteristics

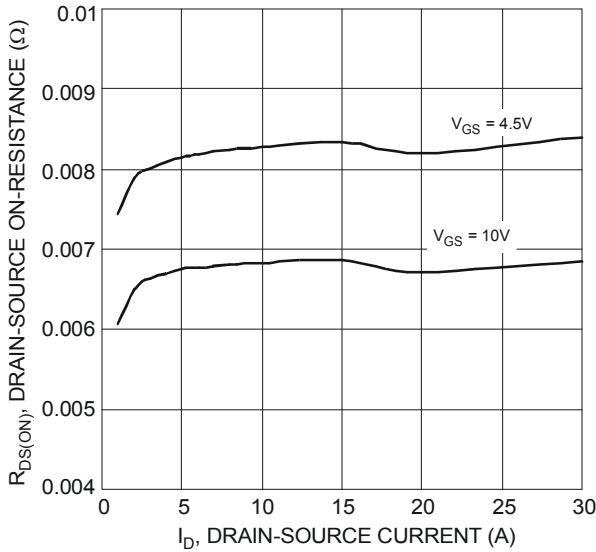


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

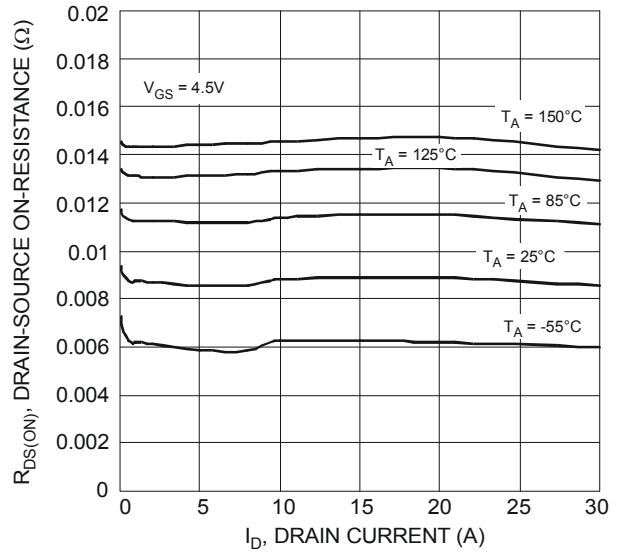


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

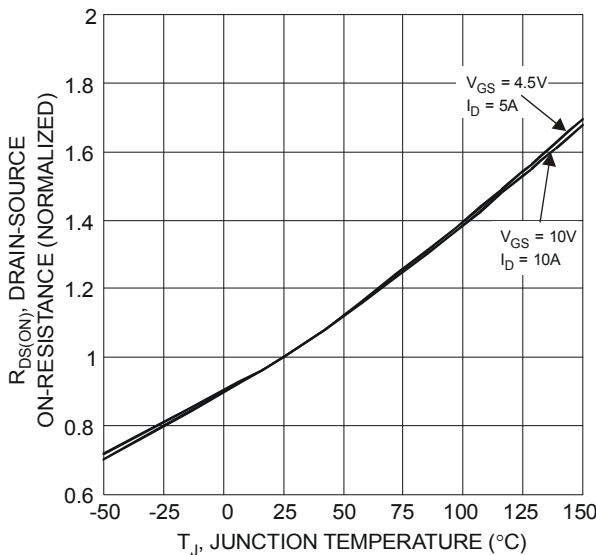


Figure 5 On-Resistance Variation with Temperature

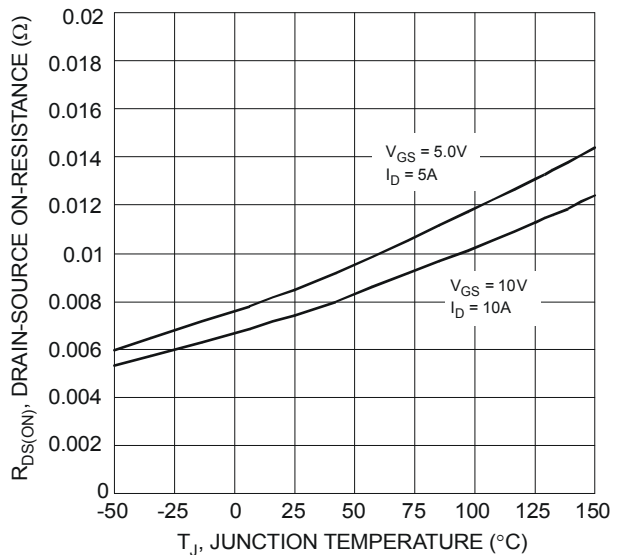


Figure 6 On-Resistance Variation with Temperature

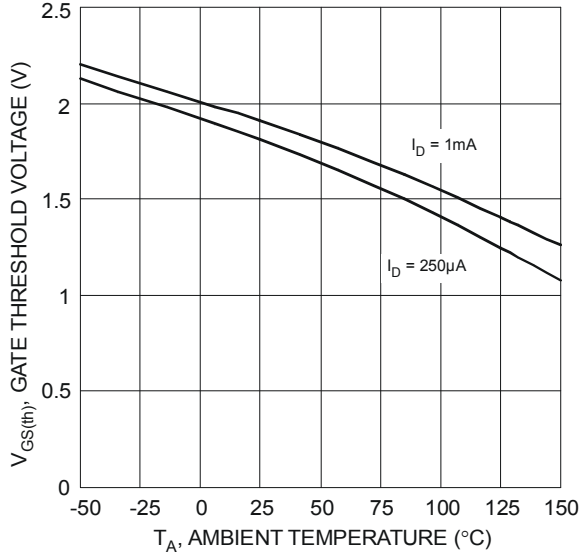


Figure 7 Gate Threshold Variation vs. Ambient Temperature

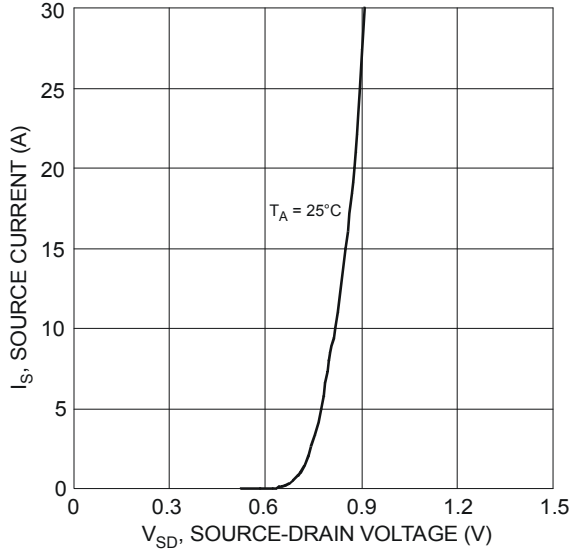


Figure 8 Diode Forward Voltage vs. Current

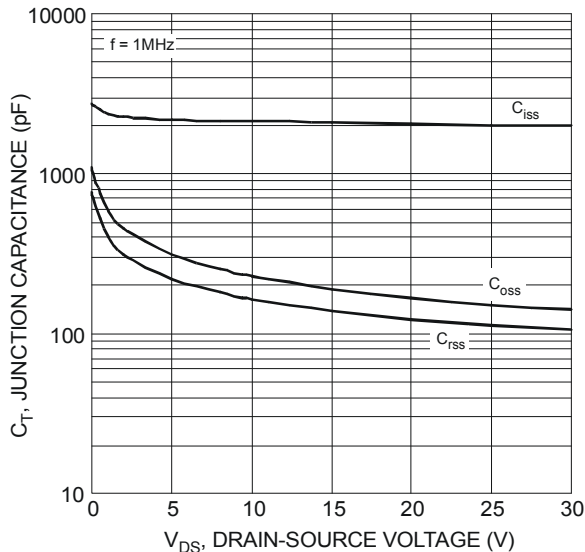


Figure 9 Typical Junction Capacitance

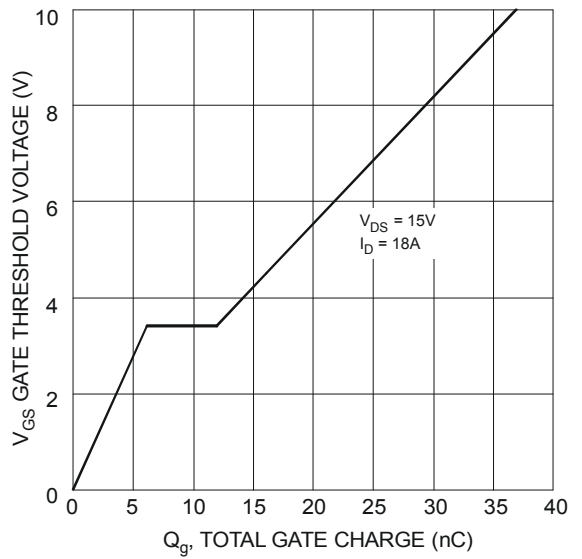


Figure 10 Gate Charge

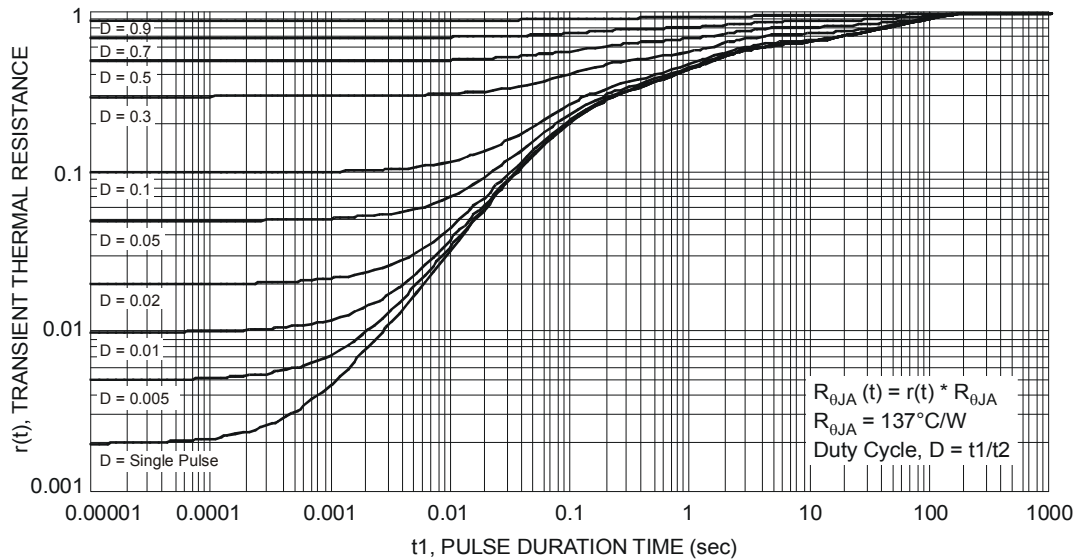
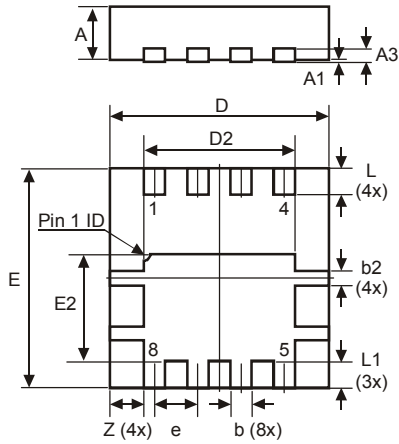


Figure 11 Transient Thermal Resistance

$R_{\theta JA}(t) = r(t) * R_{\theta JA}$   
 $R_{\theta JA} = 137^{\circ}\text{C/W}$   
 Duty Cycle,  $D = t_1/t_2$

## Package Outline Dimensions

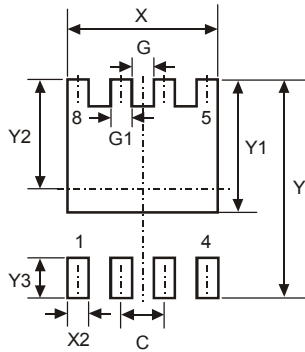
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



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			

## 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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