

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)} \text{ max}$	$I_D \text{ max}$ $T_A = +25^\circ\text{C}$
100V	122mΩ @ $V_{GS} = 10\text{V}$	2.9A
	133mΩ @ $V_{GS} = 4.5\text{V}$	2.7A

## 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

- Backlighting
- Power Management Functions
- DC-DC Converters

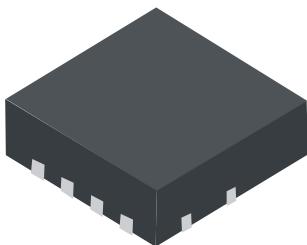
## Features

- 100% Unclamped Inductive Switch (UIS) test in production
- 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
- **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**

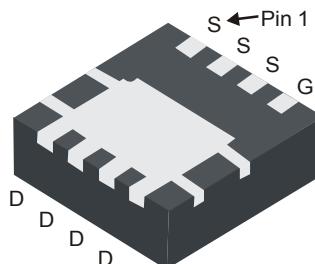
## Mechanical Data

- Case: POWERDI3333
- 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: 0.034 grams (approximate)

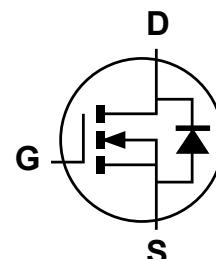
POWERDI3333



Top View



Bottom View



Equivalent Circuit

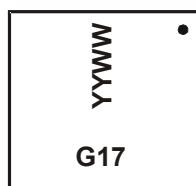
## Ordering Information (Note 4)

Part Number	Compliance	Case	Packaging
DMN10H170SFG-7	Standard	POWERDI3333	2000/Tape & Reel
DMN10H170SFG-13	Standard	POWERDI3333	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



G17 = 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	Units
Drain-Source Voltage		$V_{DSS}$	100	V
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V
Continuous Drain Current (Note 6) $V_{GS} = 10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$ $T_C = +25^\circ\text{C}$	$I_D$	2.9 2.4 8.5
	$t < 10\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	3.7 3.0
Maximum Continuous Body Diode Forward Current (Note 6)		$I_S$	3.0	A
Pulsed Drain Current (10 $\mu\text{s}$ pulse, duty cycle = 1%)		$I_{DM}$	16	A
Avalanche Current (Note 7)		$I_{AR}$	5.3	A
Avalanche Energy (Note 7)		$E_{AR}$	20	mJ

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

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	$T_A = +25^\circ\text{C}$	$P_D$	0.94	W
	$T_A = +70^\circ\text{C}$		0.6	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	137	°C/W
	$t < 10\text{s}$		82	
Total Power Dissipation (Note 6)	$T_A = +25^\circ\text{C}$	$P_D$	2.0	W
	$T_A = +70^\circ\text{C}$		1.3	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	60	°C/W
	$t < 10\text{s}$		36	
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	7.0	°C/W
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
<b>OFF CHARACTERISTICS (Note 8)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	100	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	1.0	$\mu\text{A}$	$V_{DS} = 100\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GS}$	—	—	$\pm 100$	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	$V_{GS(\text{th})}$	1.0	—	3.0	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(\text{ON})}$	—	99	122	$\text{m}\Omega$	$V_{GS} = 10\text{V}, I_D = 3.3\text{A}$
		—	104	133		$V_{GS} = 4.5\text{V}, I_D = 3.0\text{A}$
Forward Transfer Admittance	$ Y_{fs} $	—	4.4	—	S	$V_{DS} = 10\text{V}, I_D = 3.3\text{A}$
Diode Forward Voltage	$V_{SD}$	—	0.7	1.0	V	$V_{GS} = 0\text{V}, I_S = 3.3\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	$C_{iss}$	—	870.7	—	pF	$V_{DS} = 25\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	—	40.8	—	pF	
Reverse Transfer Capacitance	$C_{rss}$	—	24.6	—	pF	
Gate resistance	$R_g$	—	1.1	—	$\Omega$	
Total Gate Charge ( $V_{GS} = 4.5\text{V}$ )	$Q_g$	—	7.0	—	nC	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Total Gate Charge ( $V_{GS} = 10\text{V}$ )	$Q_g$	—	14.9	—	nC	
Gate-Source Charge	$Q_{gs}$	—	3.3	—	nC	
Gate-Drain Charge	$Q_{gd}$	—	3.0	—	nC	
Turn-On Delay Time	$t_{D(\text{on})}$	—	4.4	—	ns	$V_{DD} = 50\text{V}, V_{GEN} = 10\text{V}, R_{GEN} = 6.0\Omega, I_D = 3.3\text{A}$
Turn-On Rise Time	$t_r$	—	2.3	—	ns	
Turn-Off Delay Time	$t_{D(\text{off})}$	—	13.9	—	ns	
Turn-Off Fall Time	$t_f$	—	3.4	—	ns	
Reverse Recovery Time	$t_{rr}$	—	22.4	—	ns	$I_S = 3.3\text{A}, dI/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge	$Q_{rr}$	—	19.7	—	nC	

Notes:

5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
7. UIS in production with  $L = 1.43\text{mH}$ ,  $T_J = +25^\circ\text{C}$ .
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.

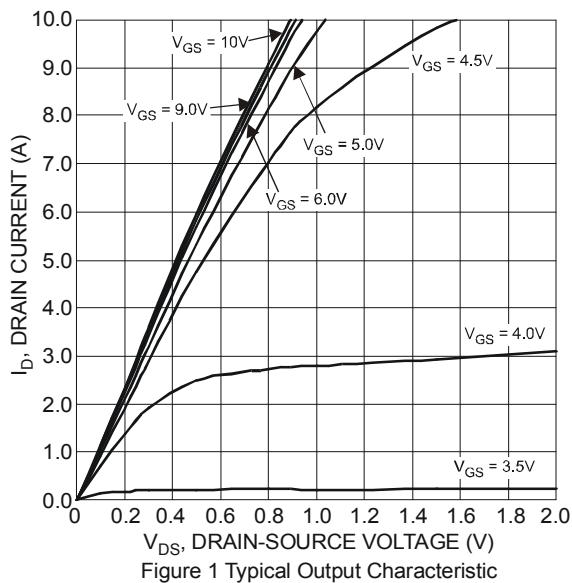


Figure 1 Typical Output Characteristic

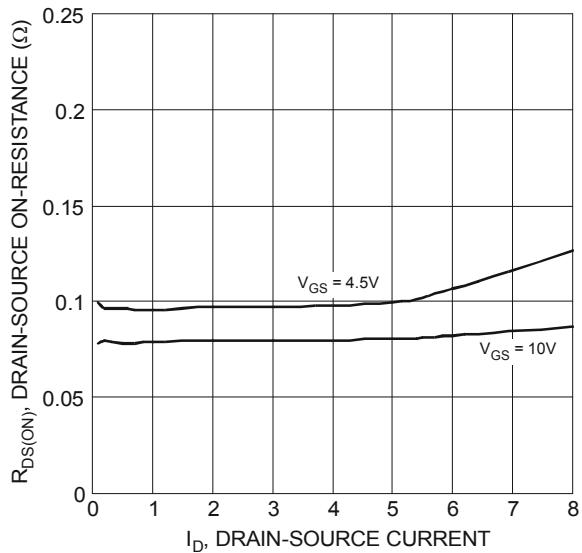


Figure 3 Typical On-Resistance vs.  
Drain Current and Gate Voltage

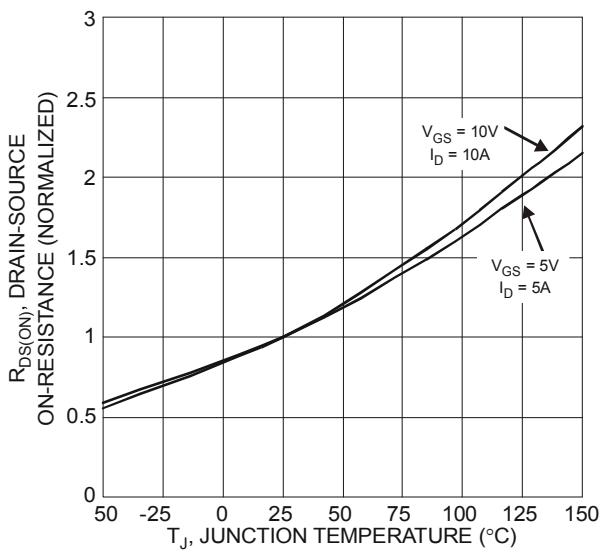


Figure 5 On-Resistance Variation with Temperature

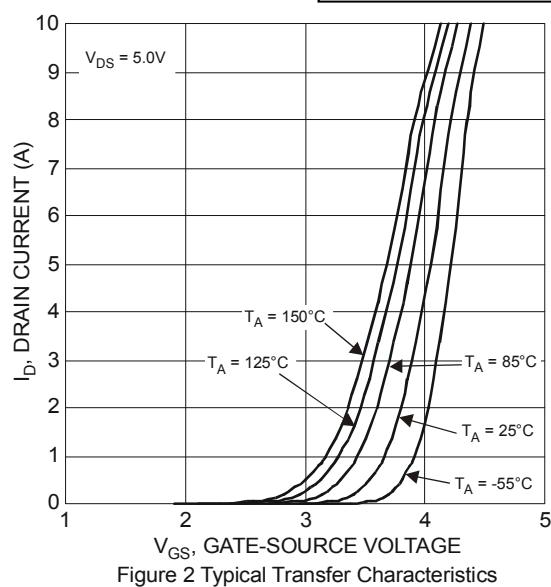


Figure 2 Typical Transfer Characteristics

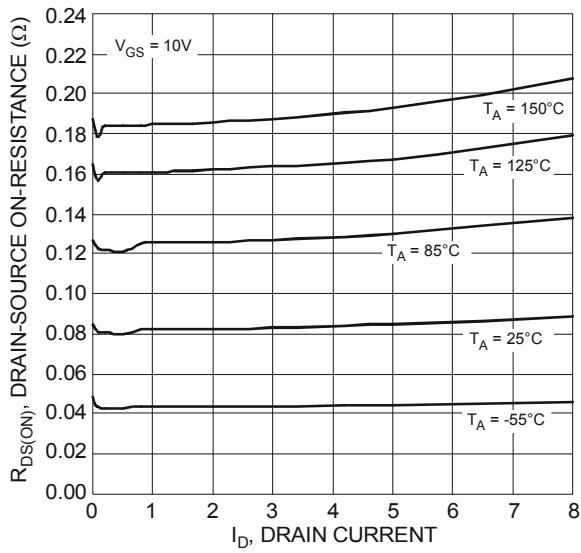


Figure 4 Typical On-Resistance vs.  
Drain Current and Temperature

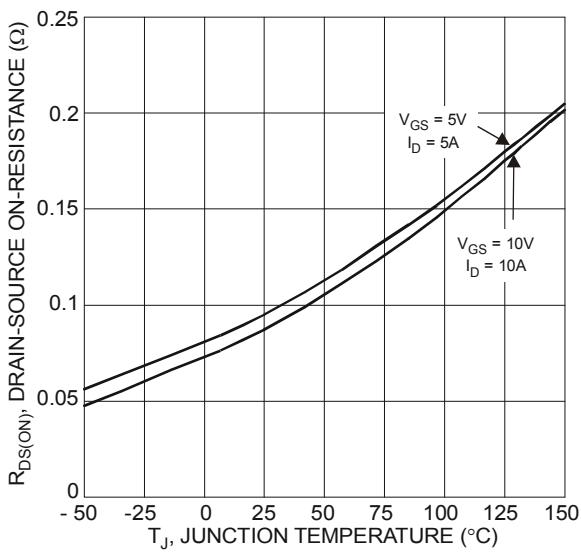


Figure 6 On-Resistance Variation with Temperature

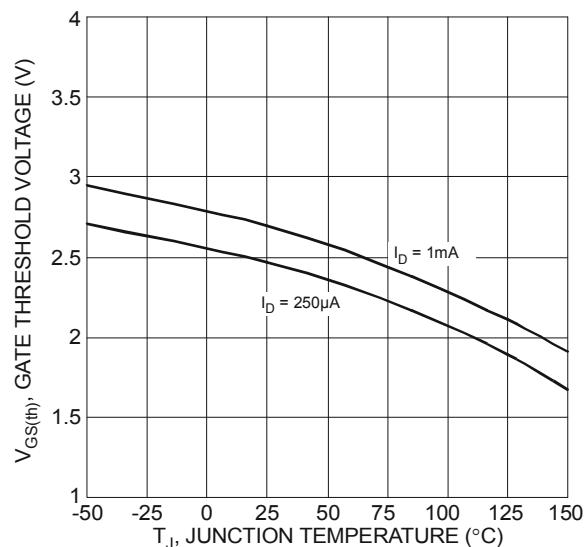


Figure 7 Gate Threshold Variation vs. Ambient Temperature

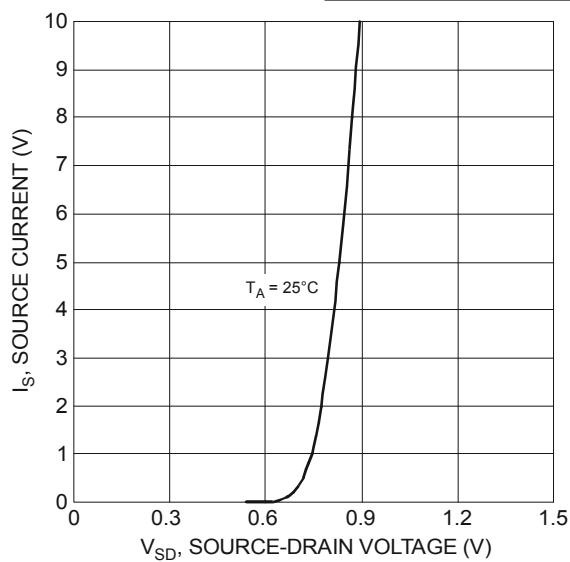


Figure 8 Diode Forward Voltage vs. Current

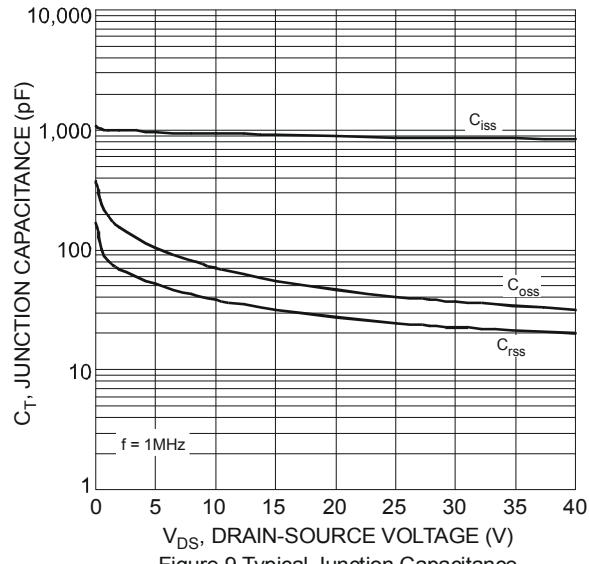


Figure 9 Typical Junction Capacitance

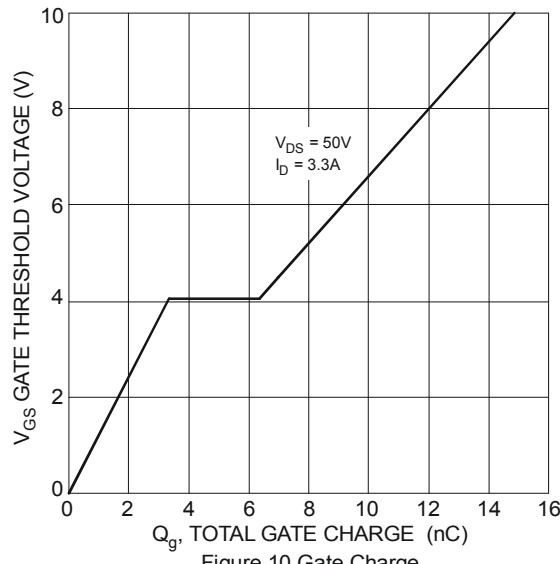


Figure 10 Gate Charge

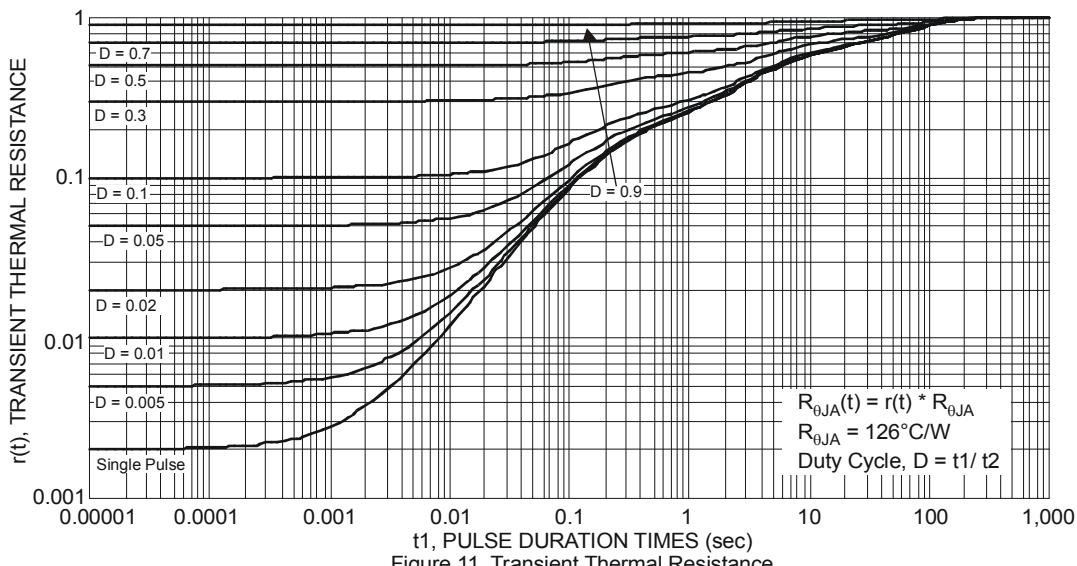
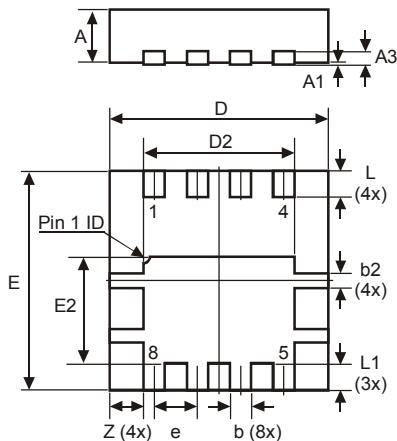


Figure 11 Transient Thermal Resistance

## Package Outline Dimensions

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

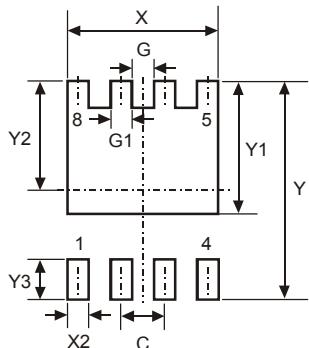


POWERDI3333-8			
Dim	Min	Max	Typ
<b>D</b>	3.25	3.35	3.30
<b>E</b>	3.25	3.35	3.30
<b>D2</b>	2.22	2.32	2.27
<b>E2</b>	1.56	1.66	1.61
<b>A</b>	0.75	0.85	0.80
<b>A1</b>	0	0.05	0.02
<b>A3</b>	—	—	0.203
<b>b</b>	0.27	0.37	0.32
<b>b2</b>	—	—	0.20
<b>L</b>	0.35	0.45	0.40
<b>L1</b>	—	—	0.39
<b>e</b>	—	—	0.65
<b>Z</b>	—	—	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)
<b>C</b>	0.650
<b>G</b>	0.230
<b>G1</b>	0.420
<b>Y</b>	3.700
<b>Y1</b>	2.250
<b>Y2</b>	1.850
<b>Y3</b>	0.700
<b>X</b>	2.370
<b>X2</b>	0.420

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