30V N-CHANNEL ENHANCEMENT MODE MOSFET
POWERDI®

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ max	I_D max T_A = 25°C
30V	23mΩ @ V_{GS} = 10V	7.5A
	33mΩ @ V_{GS} = 4.5V	6.3 A

Features and Benefits

- 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**

Description and Applications

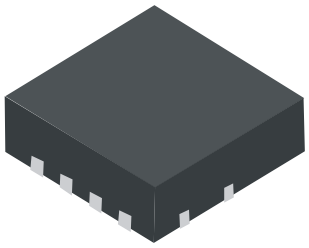
This MOSFET has been designed to minimize the on-state resistance ($R_{DS(on)}$) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- Backlighting
- Power Management Functions
- DC-DC Converters

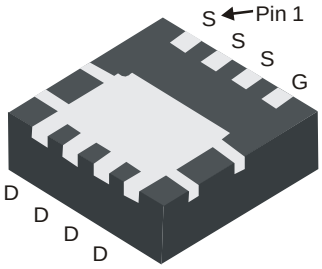
Mechanical Data

- 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 Indicator: See diagram
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.008 grams (approximate)

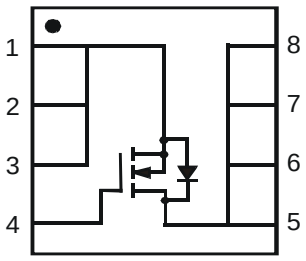
POWERDI3333-8



Top View



Bottom View



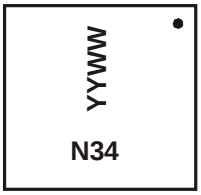
Top View
Internal Schematic

Ordering Information (Note 4)

Part Number	Case	Packaging
DMN3024SFG-7	POWERDI3333-8	2000/Tape & Reel
DMN3024SFG-13	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 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.

Marking Information



N34 = Product Type Marking Code
YYWW = Date Code Marking
YY = Last digit of year (ex: 11 = 2011)
WW = Week code (01 ~ 53)

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Maximum Ratings @T_A = 25°C unless otherwise specified

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V_{DSS}	30	V
Gate-Source Voltage			V_{GSS}	±25	V
Continuous Drain Current (Note 6) V_{GS} = 10V	Steady State	T_A = 25°C T_A = 70°C	I_D	7.5 6.0	A
	t<10s	T_A = 25°C T_A = 70°C	I_D	10.5 8.5	A
Continuous Drain Current (Note 6) V_{GS} = 4.5V	Steady State	T_A = 25°C T_A = 70°C	I_D	6.3 5.0	A
	t<10s	T_A = 25°C T_A = 70°C	I_D	8.5 7.6	A
Pulsed Drain Current (10µs pulse, duty cycle = 1%)			I_{DM}	60	A
Avalanche Current (Note 7)			I_{AS}	9	A
Repetitive Avalanche Energy (Note 7)			E_{AS}	12	mJ

Thermal Characteristics @T_A = 25°C unless otherwise specified

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	T_A = 25°C	P_D	0.9	W
	T_A = 70°C		0.5	
Thermal Resistance, Junction to Ambient (Note 5)	Steady state	$R_{\theta JA}$	145	°C/W
	t<10s		74	
Total Power Dissipation (Note 6)	T_A = 25°C	P_D	2.2	W
	T_A = 70°C		1.4	
Thermal Resistance, Junction to Ambient (Note 6)	Steady state	$R_{\theta JA}$	58	°C/W
	t<10s		31	
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	11	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

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 = 0.3mH, TJ = 25°C

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Electrical Characteristics T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	-	-	V	V_{GS} = 0V, I_D = 250 µA
Zero Gate Voltage Drain Current	I_{DSS}	-	-	1	µA	V_{DS} = 30V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	-	-	±100	nA	V_{GS} = ±25V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(th)}$	1.0	1.3	2.4	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	-	15	23	mΩ	V_{GS} = 10V, I_D = 10A
		-	24	33		V_{GS} = 4.5V, I_D = 7.5A
Forward Transfer Admittance	$\|Y_{fs}\|$	-	11	-	S	V_{DS} = 5V, I_D = 10.0A
Diode Forward Voltage	V_{SD}	-	0.69	1	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	-	479	-	pF	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	-	97	-	pF	
Reverse Transfer Capacitance	C_{rss}	-	61	-	pF	
Gate Resistance	R_g	0.4	1.1	1.6	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge V_{GS} = 4.5V	Q_g	-	5.0	-	nC	V_{DS} = 15V, I_D = 10A
Total Gate Charge V_{GS} = 10V	Q_g	-	10.5	-	nC	
Gate-Source Charge	Q_{gs}	-	1.8	-	nC	
Gate-Drain Charge	Q_{gd}	-	1.6	-	nC	
Turn-On Delay Time	$t_{D(on)}$	-	2.9	-	ns	V_{GS} = 10V, V_{DS} = 15V, R_G = 3Ω, R_L= 1.5Ω,
Turn-On Rise Time	t_r	-	7.9	-	ns	
Turn-Off Delay Time	$t_{D(off)}$	-	14.6	-	ns	
Turn-Off Fall Time	t_f	-	3.1	-	ns	

Notes: 8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.

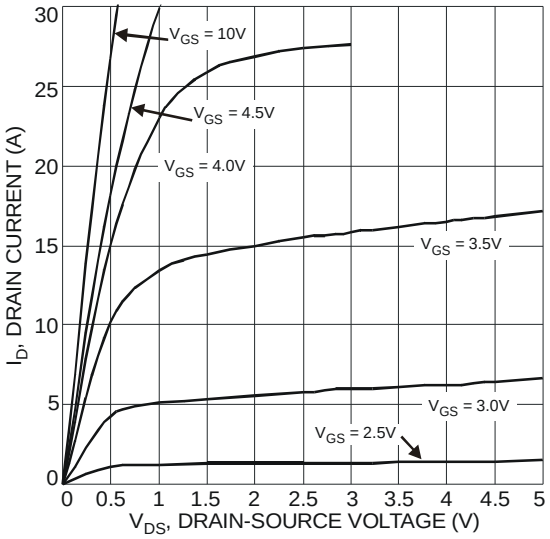


Fig. 1 Typical Output Characteristic

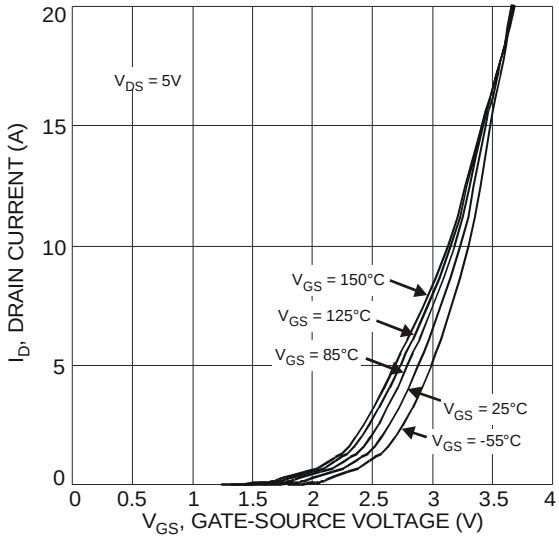


Fig. 2 Typical Transfer Characteristic

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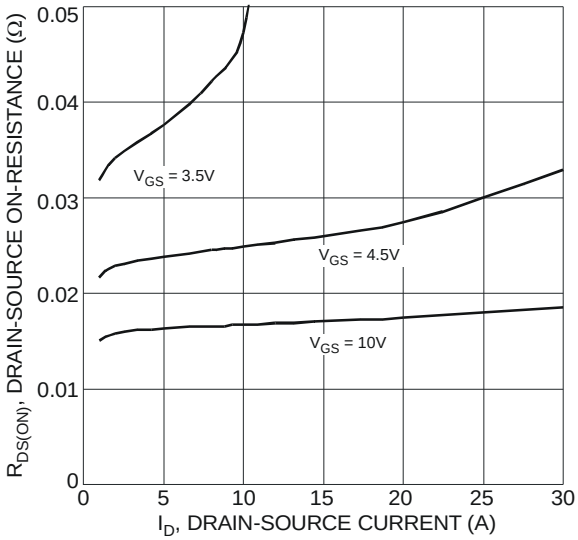


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

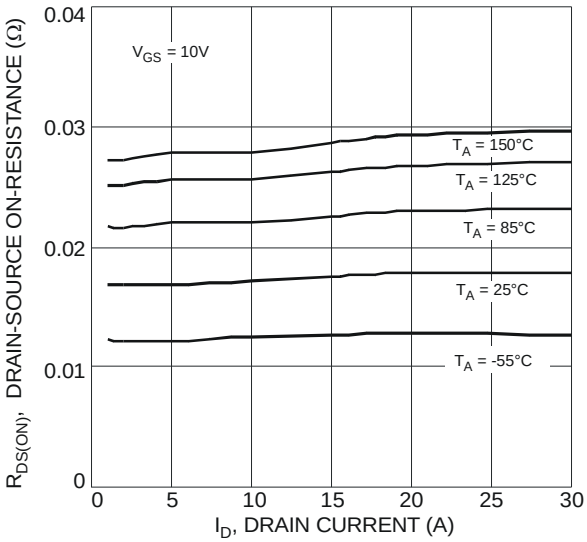


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

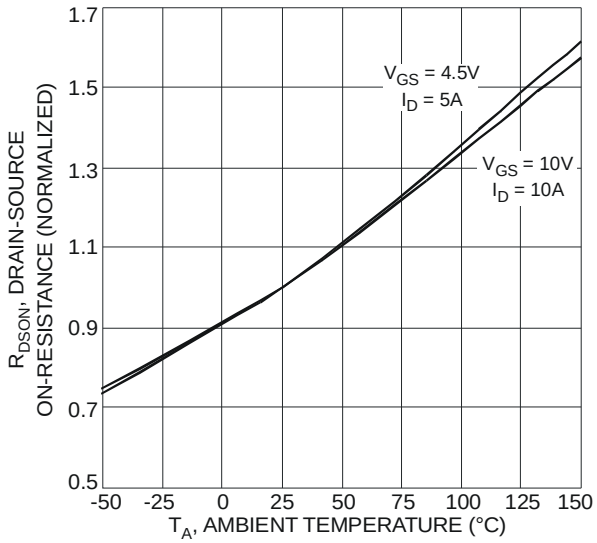


Fig. 5 On-Resistance Variation with Temperature

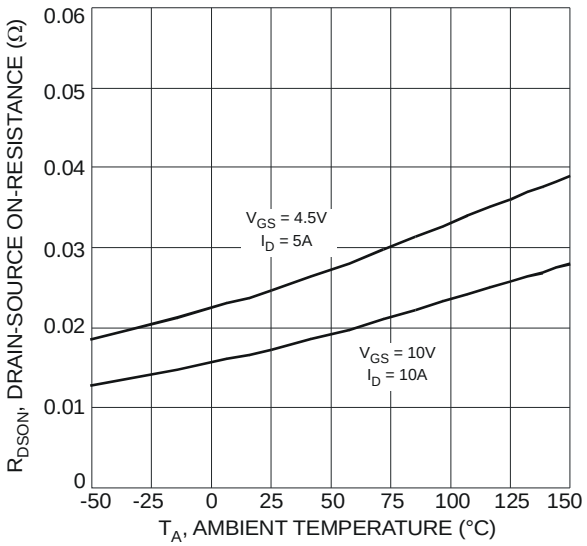


Fig. 6 On-Resistance Variation with Temperature

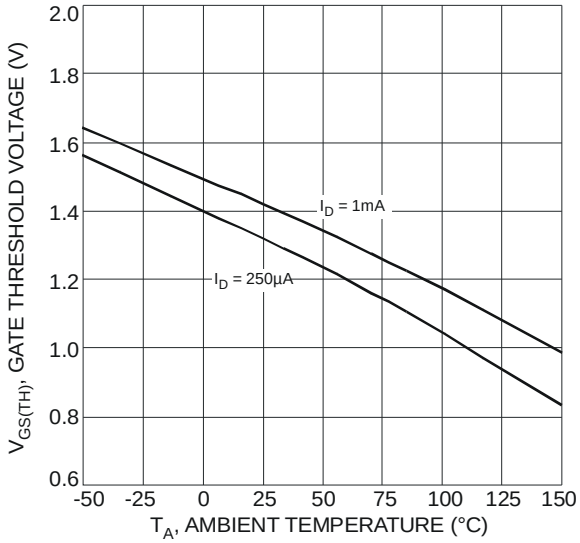


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

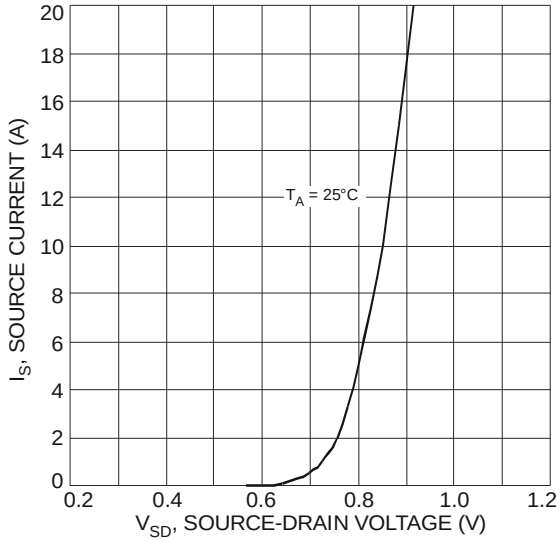


Fig. 8 Diode Forward Voltage vs. Current

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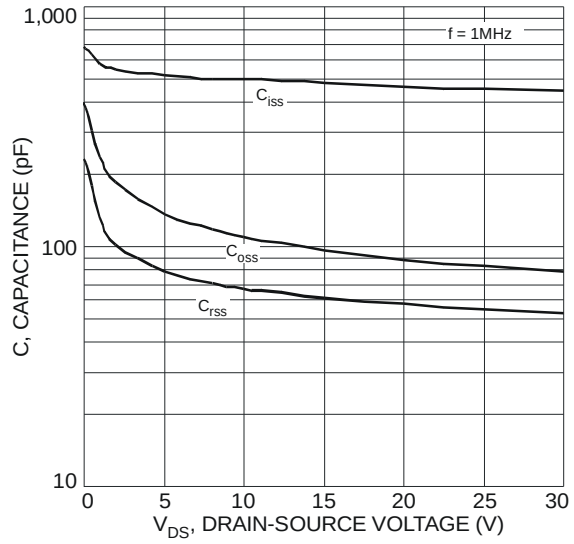


Fig. 9 Typical Total Capacitance

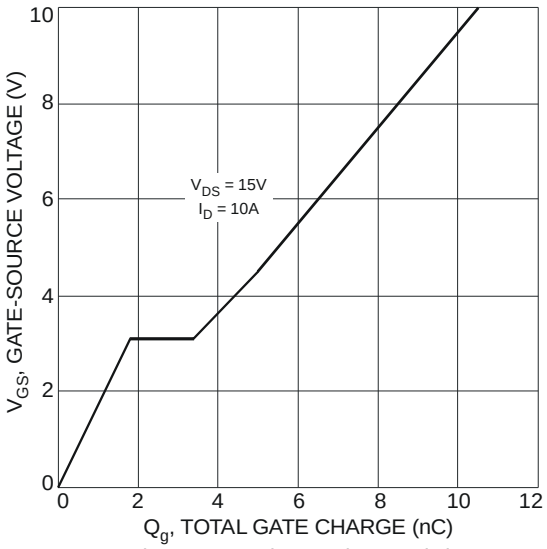


Fig. 10 Gate-Charge Characteristics

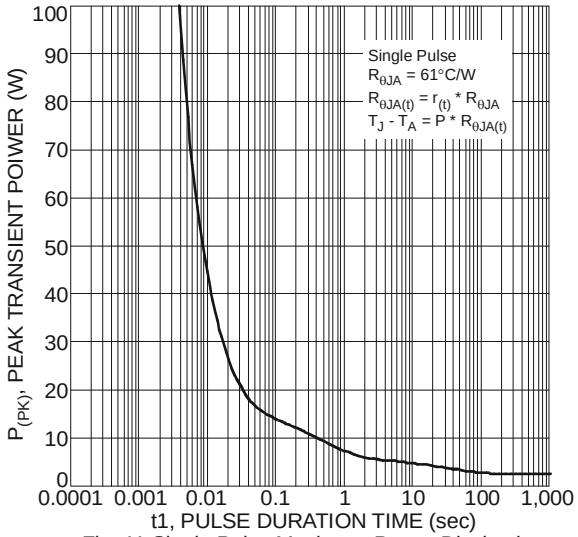


Fig. 11 Single Pulse Maximum Power Dissipation

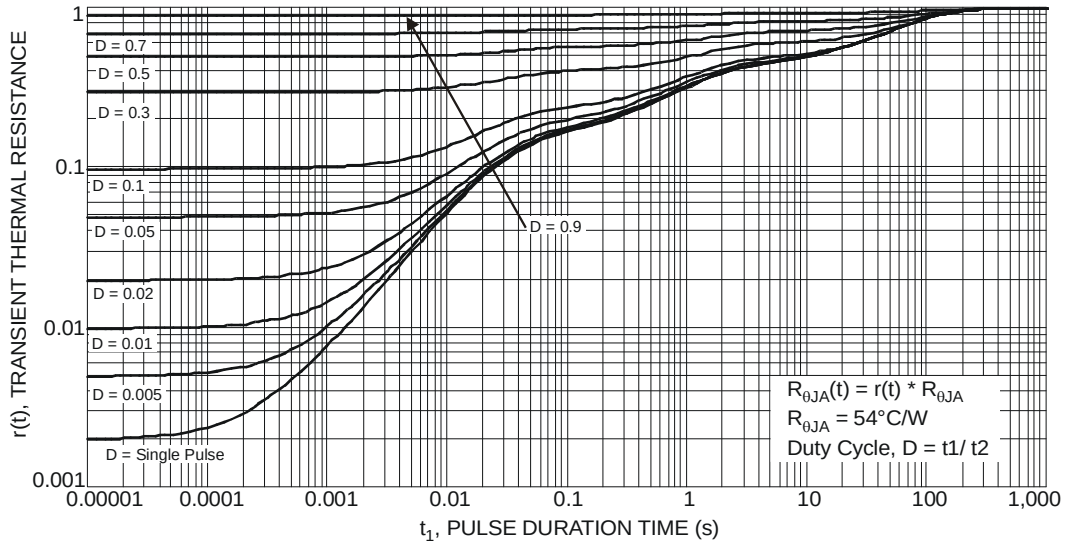
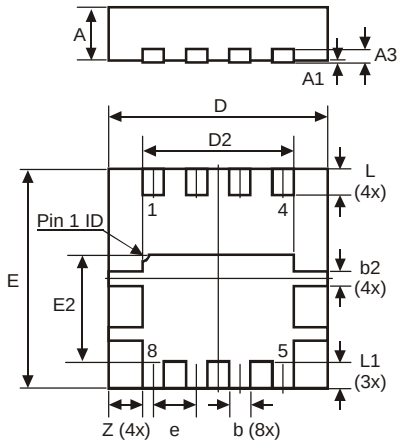


Fig. 12 Transient Thermal Response

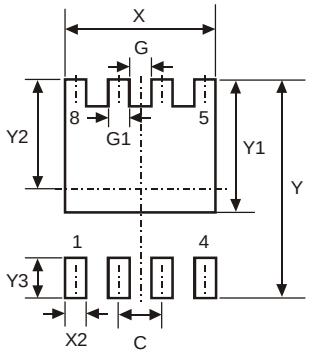
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Package Outline Dimensions



POWERDI3333-8			
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



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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