



# 30V N-CHANNEL ENHANCEMENT MODE MOSFET POWERDI®

#### **Product Summary**

V <sub>(BR)DSS</sub>	R <sub>DS(ON)</sub> max	I <sub>D</sub> max T <sub>A</sub> = 25°C
	$23m\Omega$ @ $V_{GS} = 10V$	7.5A
30V	$33m\Omega$ @ $V_{GS} = 4.5V$	6.3 A

#### **Features and Benefits**

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

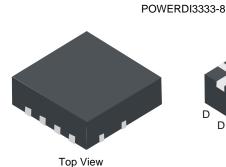
#### **Description and Applications**

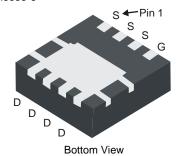
This MOSFET has been designed to minimize the on-state resistance  $(R_{DS(on)})$  and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

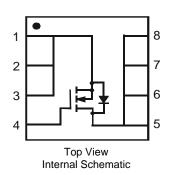
- Backlighting
- Power Management Functions
- DC-DC Converters

#### **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 <a href="#stage-3">(3)</a>
- Weight: 0.008 grams (approximate)







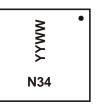
#### Ordering Information (Note 4)

Dout Number	Conn	Packaging
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)



### **Maximum Ratings** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Value	Units		
Drain-Source Voltage	V <sub>DSS</sub>	30	V		
Gate-Source Voltage	V <sub>GSS</sub>	±25	V		
Continuous Durin Courset (Note CVV 40V	Steady State	T <sub>A</sub> = 25°C T <sub>A</sub> = 70°C	I <sub>D</sub>	7.5 6.0	А
Continuous Drain Current (Note 6) V <sub>GS</sub> = 10V	t<10s	T <sub>A</sub> = 25°C T <sub>A</sub> = 70°C	ID	10.5 8.5	А
Continuous Dusis Courset (Note CVV	Steady State	T <sub>A</sub> = 25°C T <sub>A</sub> = 70°C	I <sub>D</sub>	6.3 5.0	А
Continuous Drain Current (Note 6) V <sub>GS</sub> = 4.5V	t<10s	T <sub>A</sub> = 25°C T <sub>A</sub> = 70°C	I <sub>D</sub>	8.5 7.6	А
Pulsed Drain Current (10µs pulse, duty cycle = 1%)	I <sub>DM</sub>	60	Α		
Avalanche Current (Note 7)	I <sub>AS</sub>	9	Α		
Repetitive Avalanche Energy (Note 7)	Eas	12	mJ		

#### Thermal Characteristics @TA = 25°C unless otherwise specified

Characteristic	Symbol	Value	Units	
Total Power Dissipation (Note 5)	T <sub>A</sub> = 25°C	C	0.9	W
Total Power Dissipation (Note 5)	$T_A = 70$ °C	$P_{D}$	0.5	
Thormal Posistance, Junction to Ambient (Note 5)	Steady state	C	145	°C/W
Thermal Resistance, Junction to Ambient (Note 5)	t<10s	$R_{ heta JA}$	74	
Total Barras Discipation (Note C)			2.2	W
Total Power Dissipation (Note 6)	$T_A = 70$ °C	P <sub>D</sub>	1.4	VV
Thermal Pagistanes, Junation to Ambient (Note 6)	Steady state		58	
Thermal Resistance, Junction to Ambient (Note 6)		$R_{\theta JA}$	31	°C/W
Thermal Resistance, Junction to Case (Note 6)	$R_{ heta JC}$	11		
Operating and Storage Temperature Range	$T_{J,}T_{STG}$	-55 to +150	°C	

Notes:

<sup>5.</sup> 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.

<sup>7 .</sup>UIS in production with L = 0.3mH, TJ = 25°C

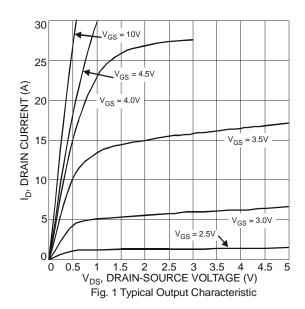


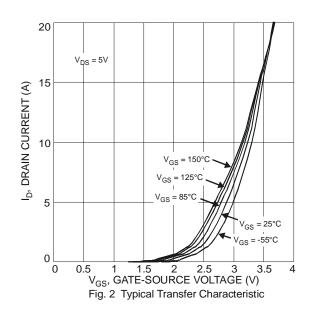
#### Electrical Characteristics T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 8)						•	
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	30	-	-	V	$V_{GS} = 0V, I_D = 250 \mu A$	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	-	-	1	μA	$V_{DS} = 30V, V_{GS} = 0V$	
Gate-Source Leakage	I <sub>GSS</sub>	-	-	±100	nA	$V_{GS} = \pm 25V, V_{DS} = 0V$	
ON CHARACTERISTICS (Note 8)							
Gate Threshold Voltage	V <sub>GS(th)</sub>	1.0	1.3	2.4	V	$V_{DS} = V_{GS}, I_D = 250 \mu A$	
Static Drain-Source On-Resistance		-	15	23	mΩ	$V_{GS} = 10V, I_D = 10A$	
Static Drain-Source On-Resistance	R <sub>DS (ON)</sub>	-	24	33		$V_{GS} = 4.5V, I_D = 7.5A$	
Forward Transfer Admittance	Y <sub>fs</sub>	-	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 <sub>iss</sub>	-	479	-	pF	151/1/ 01/	
Output Capacitance	Coss	-	97	-	pF	$V_{DS} = 15V, V_{GS} = 0V,$ f = 1.0MHz	
Reverse Transfer Capacitance	C <sub>rss</sub>	-	61	-	pF	1 = 1.000112	
Gate Resistance	$R_{g}$	0.4	1.1	1.6	Ω	$V_{DS} = 0V$ , $V_{GS} = 0V$ , $f = 1MHz$	
Total Gate Charge V <sub>GS</sub> = 4.5V	Qg	-	5.0	-	nC		
Total Gate Charge V <sub>GS</sub> = 10V	Qg	-	10.5	-	nC	1,, ,,,,,,,,,	
Gate-Source Charge	Q <sub>qs</sub>	-	1.8	-	nC	V <sub>DS</sub> = 15V, I <sub>D</sub> = 10A	
Gate-Drain Charge	Q <sub>qd</sub>	-	1.6	-	nC		
Turn-On Delay Time	t <sub>D(on)</sub>	-	2.9	-	ns		
Turn-On Rise Time	t <sub>r</sub>	-	7.9	-	ns	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 15V,	
Turn-Off Delay Time	t <sub>D(off)</sub>	-	14.6	-	ns	$R_G = 3\Omega$ , $R_L = 1.5\Omega$ ,	
Turn-Off Fall Time	t <sub>f</sub>	-	3.1	-	ns		

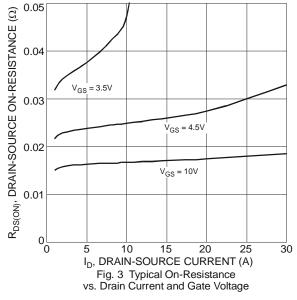
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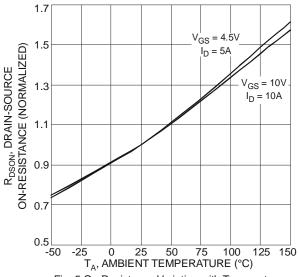
- 8. Short duration pulse test used to minimize self-heating effect.
- 9. Guaranteed by design. Not subject to product testing.

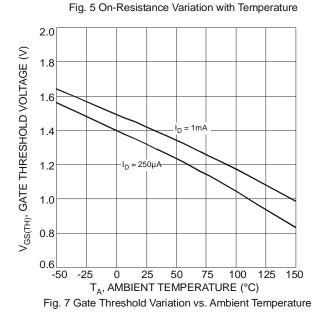


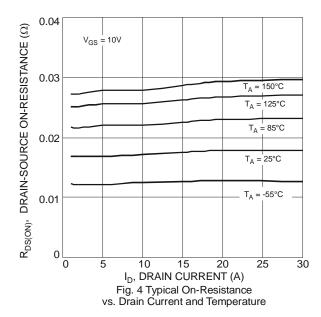


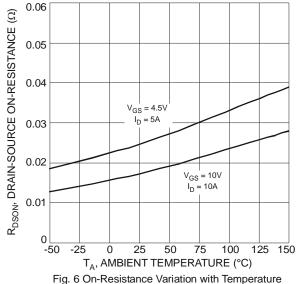




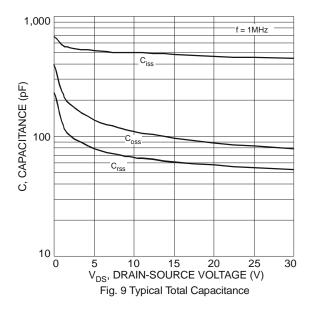


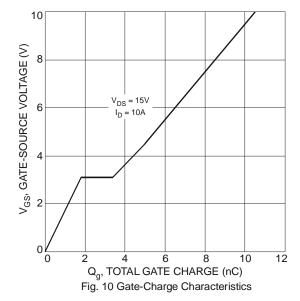


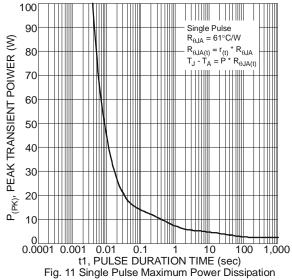


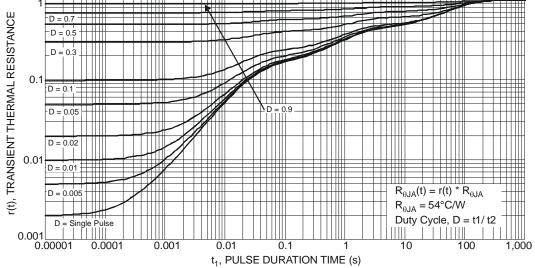






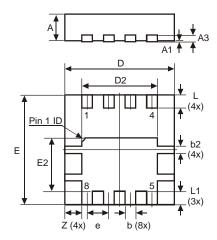






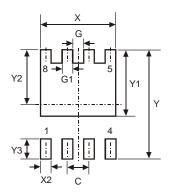


# **Package Outline Dimensions**



POWERDI3333-8					
Dim	Min	Max	Тур		
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		
Α	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		
е	-	-	0.65		
Ζ	_	_	0.515		
All Dimensions in mm					

# Suggested Pad Layout



Dimensions	Value (in mm)				
С	0.650				
G	0.230				
G1	0.420				
Υ	3.700				
Y1	2.250				
Y2	1.850				
Y3	0.700				
Х	2.370				
X2	0.420				



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