



40V N-CHANNEL ENHANCEMENT MODE MOSFET POWERDI®

Product Summary

V _{(BR)DSS}	R _{DS(ON)} max	I _D max T _A = +25 °C		
40V	$12m\Omega$ @ $V_{GS} = 10V$	11.5A		
40 V	$15m\Omega$ @ $V_{GS} = 4.5V$	10.3A		

Features and Benefits

- 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

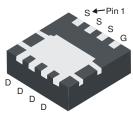
This MOSFET is designed to minimize the on-state resistance $(R_{DS(ON)})$ and yet maintain superior switching performance, making it ideal for high-efficiency power management applications such as:

- Backlighting
- Power Management Functions
- DC-DC Converters

Mechanical Data

- Case: POWERDI 3333-8
- 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@3
- Weight: 0.072 grams (Approximate)

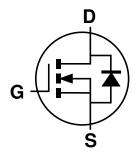
POWERDI 3333-8







Top View



Equivalent Circuit

Ordering Information (Note 4)

Part Number	Case	Packaging
DMN4010LFG-7	POWERDI 3333-8	2,000/Tape & Reel
DMN4010LFG-13	POWERDI 3333-8	3,000/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 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

POWERDI 3333-8



N41= Product Type Marking Code YYWW = Date Code Marking YY = Last Digit of Year (ex: 13 = 2013) WW = Week Code (01 ~ 53)



Maximum Ratings (@ $T_A = +25$ °C, unless otherwise specified.)

Characteristic	Symbol	Value	Units		
Drain-Source Voltage	V _{DSS}	40	V		
Gate-Source Voltage	V _{GSS}	±20	V		
Continuous Drain Current (Note C) V 10V	Steady State	T _A = +25 °C T _A = +70 °C	ID	11.5 9.2	А
Continuous Drain Current (Note 6) V _{GS} = 10V	t<10s	T _A = +25 °C T _A = +70 °C	I _D	14.2 11.4	А
Pulsed Drain Current (10µs pulse, duty cycle = 1%)	I _{DM}	80	Α		
Maximum Continuous Body Diode Forward Current (Is	2	Α		
Avalanche Current (Note 7) L = 0.1mH			I _{AS}	27	Α
Avalanche Energy (Note 7) L = 0.1mH	Eas	37	mJ		

Thermal Characteristics (@TA = +25 °C, unless otherwise specified.)

Characteristic	Symbol	Value	Units	
Total Power Dissipation (Note 5)		P_{D}	0.93	W
Thermal Begintenes, Junction to Ambient (Note 5)	Steady state	Б	137	°C/W
Thermal Resistance, Junction to Ambient (Note 5)	t<10s	$R_{\theta JA}$	89	
Total Power Dissipation (Note 6)		P _D	2.45	W
Thermal Begintenes, Junction to Ambient (Note 6)	Steady state	Б	52	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	t<10s	$R_{\theta JA}$	34	
Thermal Resistance, Junction to Case (Note 6)	$R_{ heta JC}$	3		
Operating and Storage Temperature Range		T _{J,} T _{STG}	-55 to +150	∞

5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.

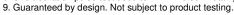
^{6.} Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate. 7. I_{AS} and E_{AS} rating are based on low frequency and duty cycles to keep $T_J = +25$ °C.

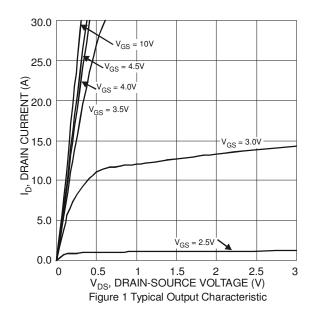


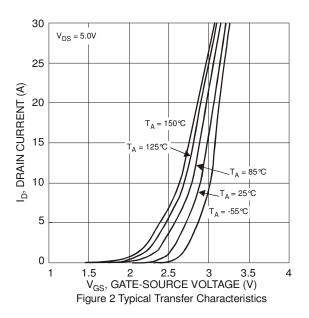
Electrical Characteristics (@T_A = +25 °C, unless otherwise specified.)

Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 8)							
Drain-Source Breakdown Voltage	BV _{DSS}	40	_	_	٧	$V_{GS}=0V,\ I_D=250\mu A$	
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}		_	1	μΑ	$V_{DS} = 32V, V_{GS} = 0V$	
Gate-Source Leakage		_	_	±100	nA	$V_{GS} = \pm 20V$, $V_{DS} = 0V$	
ON CHARACTERISTICS (Note 8)							
Gate Threshold Voltage	$V_{GS(th)}$	1.0	_	3.0	V	$V_{DS} = V_{GS}, I_D = 250 \mu A$	
Static Drain-Source On-Resistance	В	_	_	12	mΩ	$V_{GS} = 10V, I_D = 14A$	
Static Drain-Source On-Resistance	R _{DS (ON)}		_	15	11122	$V_{GS} = 4.5V, I_D = 11A$	
Diode Forward Voltage	V_{SD}	_	0.72	_	V	V _{GS} = 0V, I _S = 14A	
DYNAMIC CHARACTERISTICS (Note 9)							
Input Capacitance	C _{iss}	1	1,810	_	pF	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	
Output Capacitance	Coss		135	_	pF	$V_{DS} = 20V, V_{GS} = 0V,$ f = 1.0MHz	
Reverse Transfer Capacitance	Crss	_	112	_	pF	1 - 1.000112	
Gate Resistance	R_g	_	1.7	_	Ω	$V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$	
Total Gate Charge (V _{GS} = 4.5V)	Q_g	1	17	_	nC		
Total Gate Charge (V _{GS} = 10V)	Qg	_	37	_	nC	V 00V L 144	
Gate-Source Charge	Q _{gs}	_	5.6	_	nC	$V_{DS} = 20V, I_D = 14A$	
Gate-Drain Charge	Q_{gd}	_	7.1	_	nC	1	
Turn-On Delay Time	t _{D(on)}	_	5.1	_	ns		
Turn-On Rise Time	t _r		13	_	ns	$V_{GS} = 10V, V_{DS} = 20V,$	
Turn-Off Delay Time	t _{D(off)}		36	_	ns	$R_G = 6\Omega$, $I_D = 14A$	
Turn-Off Fall Time	t _f	_	13	_	ns	1	
Body Diode Reverse Recovery Time	t _{rr}	_	12.2	_	nS	$I_F = 3A$, $di/dt = 100A/\mu s$	
Body Diode Reverse Recovery Charge	Q _{rr}	_	5.4	_	nC	I _F = 3A, di/dt = 100A/µs	

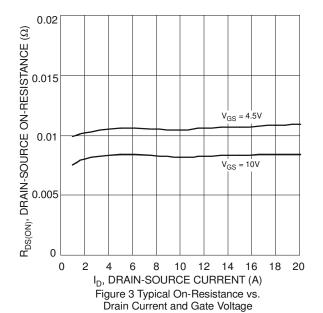
Notes: 8. Short duration pulse test used to minimize self-heating effect.

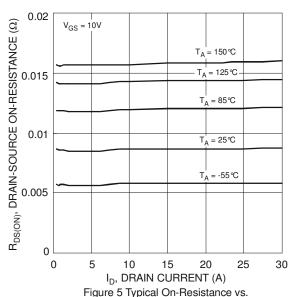












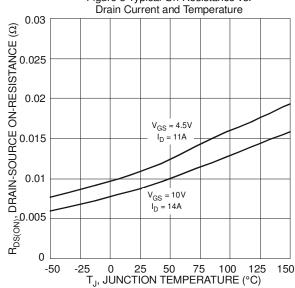
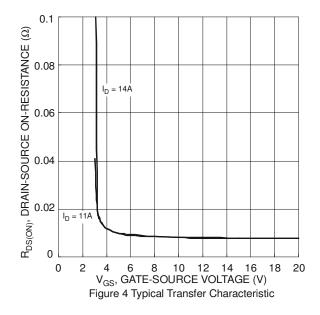
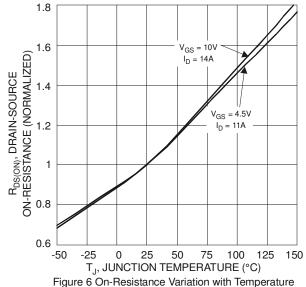


Figure 7 On-Resistance Variation with Temperature

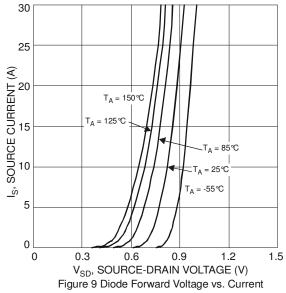


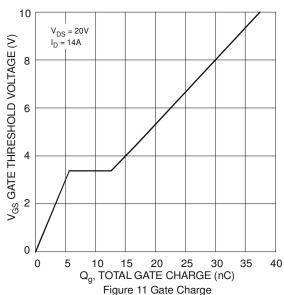


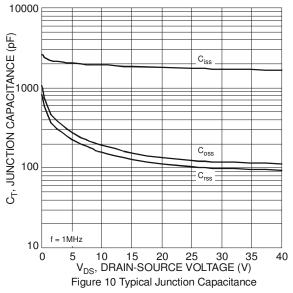
2.3 $V_{\text{GS(th)}},$ GATE THRESHOLD VOLTAGE (V) 2 1.7 $I_D = 250 \mu A$ 1.4 1.1 8.0 -50 25 50 75 100 125 T_J, JUNCTION TEMPERATURE (°C)

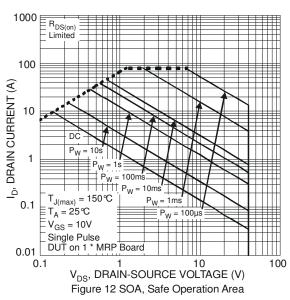
Figure 8 Gate Threshold Variation vs. Ambient Temperature

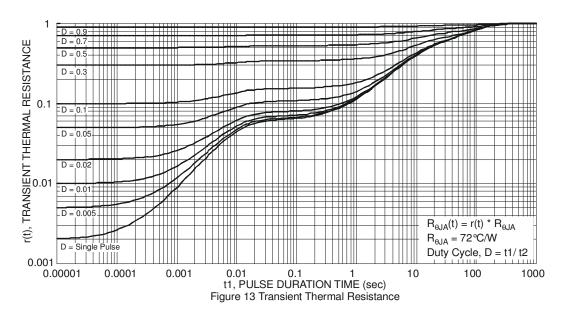








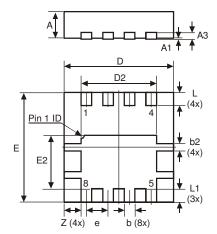






Package Outline Dimensions

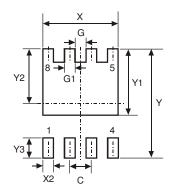
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



POWERDI®3333-8					
Dim	Min	Max	Тур		
D	3.25	3.35	3.30		
Е	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		
А3	_	_	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		
Z	_	_	0.515		
All I	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			
Υ	3.700			
Y1	2.250			
Y2	1.850			
Y3	0.700			
Х	2.370			
X2	0.420			



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Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001 Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

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