



30V N-CHANNEL ENHANCEMENT MODE MOSFET POWERDI®

Product Summary

V _{(BR)DSS}	R _{DS(ON)} max	I _D max T _A = 25°C
	13mΩ @ V _{GS} = 10V	9.5A
30V	14mΩ @ V _{GS} = 4.5V	9.0A

Features and Benefits

- DIOFET utilizes a unique patented process to monolithically integrate a MOSFET and a Schottky in a single die to deliver:
 - Low R_{DS(ON)} minimize conduction losses
 - Low V_{SD} reducing the losses due to body diode conduction
 - Low Q_{rr} lower Q_{rr} of the integrated Schottky reduces body diode switching losses
 - Low gate capacitance (Q_g/Q_{gs}) ratio reduces risk of shootthrough or cross conduction currents at high frequencies
- 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% Ra 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

Description and Applications

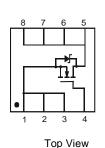
This MOSFET has been designed to minimize the on-state resistance (R_{DS(on)}) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- Backlighting
- **Power Management Functions**
- **DC-DC Converters**

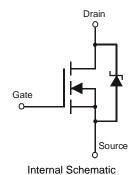
Mechanical Data

- 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 @3
- Weight: 0.072 grams (approximate)





Pin Configuration



Ordering Information (Note 4)

Part Number	Case	Packaging
DMS3014SFG-7	POWERDI3333-8	2000/Tape & Reel
DMS3014SFG-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



S29 = Product Type Marking Code YYWW = Date Code Marking YY = Last digit of year (ex: 11 = 2011) WW = Week code (01 ~ 53)

Maximum Ratings @TA = 25°C unless otherwise specified

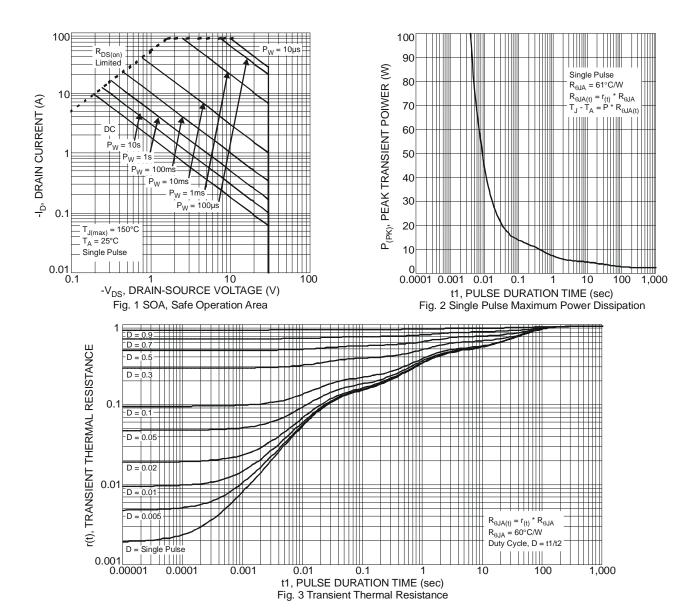
Characteristic	Symbol	Value	Units		
Drain-Source Voltage	V _{DSS}	30	V		
Gate-Source Voltage	V _{GSS}	±12	V		
Continuous Dusin Compant (Nata C) V	Steady State	T _A = 25°C T _A = 70°C	I _D	9.5 7.6	А
Continuous Drain Current (Note 6) V _{GS} = 10V	t<10s	$T_A = 25$ °C $T_A = 70$ °C	I _D	13.0 9.7	А
Continuous Dusin Compant (Nata C) V	Steady State	T _A = 25°C T _A = 70°C	I _D	9.0 7.4	А
Continuous Drain Current (Note 6) V _{GS} = 4.5V	t<10s	T _A = 25°C T _A = 70°C	I _D	12.2 9.3	А
Pulsed Drain Current (10µs pulse, duty cycle = 1%)	I _{DM}	80	Α		
Maximum Continuous Body Diode Forward Current (Is	3.0	Α		
Avalanche Current (Note 7) L = 0.1mH			I _{AR}	30	Α
Repetitive Avalanche Energy (Note 7) L = 0.1mH			E _{AR}	45	mJ

Thermal Characteristics $@T_A = 25^{\circ}C$ unless otherwise specified

Characteristic	Symbol	Value	Units	
Total Power Dissipation (Note 5)	P_{D}	1	W	
Thermal Resistance, Junction to Ambient (Note 5)	Steady state	6	131	°C/W
Thermal Resistance, Junction to Ambient (Note 5)	t<10s	$R_{\theta JA}$	72	°C/W
Total Power Dissipation (Note 6)		P_{D}	2.1	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady state	6	63	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	t<10s	$R_{\theta JA}$	35	°C/W
Thermal Resistance, Junction to Case (Note 6)		$R_{ heta JC}$	7.1	°C/W
Operating and Storage Temperature Range		$T_{J,}T_{STG}$	-55 to +150	°C

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. I_{AR} and E_{AR} rating are based on low frequency and duty cycles to keep T_J = 25°C



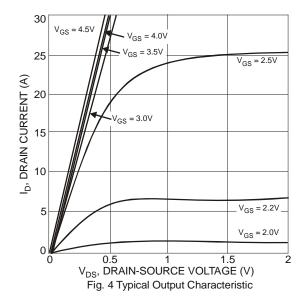


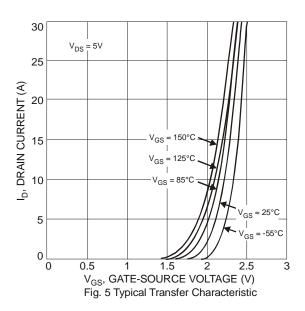


Electrical Characteristics T_A = 25°C unless otherwise specified

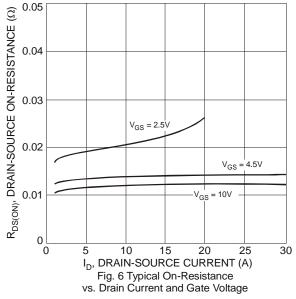
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 8)					-		
Drain-Source Breakdown Voltage	BV _{DSS}	30	-	-	V	$V_{GS} = 0V, I_D = 250\mu A$	
Zero Gate Voltage Drain Current	I _{DSS}	-	-	100	μΑ	$V_{DS} = 30V, V_{GS} = 0V$	
Gate-Source Leakage		-	-	±100	nA	$V_{GS} = \pm 12V, V_{DS} = 0V$	
ON CHARACTERISTICS (Note 8)							
Gate Threshold Voltage	$V_{GS(th)}$	1.0	-	2.2	V	$V_{DS} = V_{GS}, I_D = 250 \mu A$	
Static Drain-Source On-Resistance	D	-	9	13	mΩ	$V_{GS} = 10V, I_D = 10.4A$	
Static Dialit-Source Off-Resistance	R _{DS (ON)}	-	10	14	11122	$V_{GS} = 4.5V, I_D = 10.4A$	
Forward Transfer Admittance	Y _{fs}	-	23	-	S	$V_{DS} = 5V, I_{D} = 10.4A$	
Diode Forward Voltage	V_{SD}	-	0.4	0.55	V	$V_{GS} = 0V, I_{S} = 1A$	
DYNAMIC CHARACTERISTICS (Note 9)							
Input Capacitance	C _{iss}	-	2296	4310	pF	151/1/	
Output Capacitance	Coss	-	164	-	pF	$V_{DS} = 15V, V_{GS} = 0V,$ f = 1.0MHz	
Reverse Transfer Capacitance	C_{rss}	-	120	-	pF	71 = 1.0WH2	
Gate Resistance	R_{g}	0.26	1.3	2.34	Ω	$V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$	
Total Gate Charge V _{GS} = 4.5V	Qg	-	19.3	-	nC		
Total Gate Charge V _{GS} = 10V	Qg	-	45.7	-	nC	\/ 45\/ \/ 40\/ 40.4A	
Gate-Source Charge	Q _{gs}	-	5.0	-	nC	$V_{DS} = 15V, V_{GS} = 10V, I_{D} = 10.4A$	
Gate-Drain Charge	Q _{qd}	-	2.9	-	nC	7	
Turn-On Delay Time	t _{D(on)}	-	5.5	-	ns		
Turn-On Rise Time	t _r	-	24.4	-	ns	V _{GS} = 10V, V _{DS} = 15V,	
Turn-Off Delay Time	t _{D(off)}	-	33.1	-	ns	$R_G = 3\Omega$, $R_L = 1.2\Omega$	
Turn-Off Fall Time	t _f	-	6.6	-	ns	1	
Reverse Recovery Time	t _{rr}	-	12.9	-	ns	$I_F = 13A$, di/dt = 500A/ μ s	
Reverse Recovery Charge	Q _{rr}	-	8.0	-	nC	$I_F = 13A$, di/dt = 500A/ μ s	

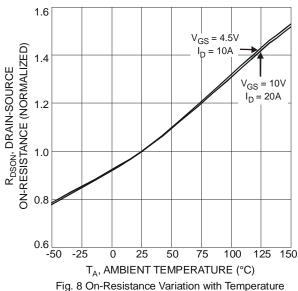
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing. Notes:

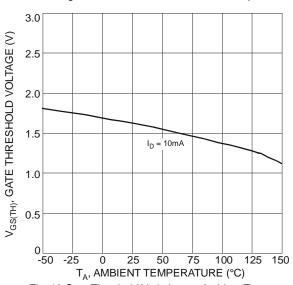




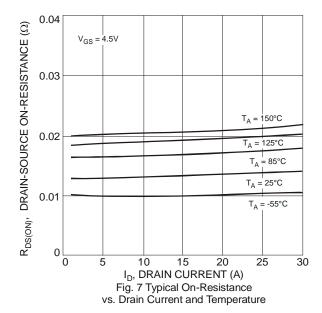












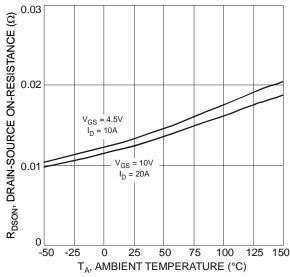


Fig. 9 On-Resistance Variation with Temperature

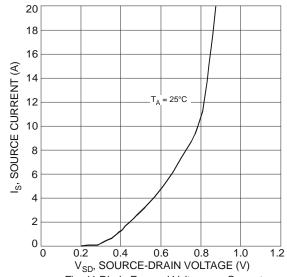
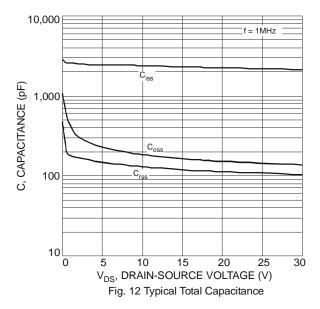
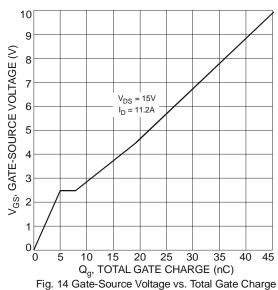
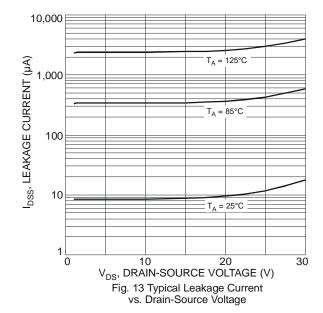


Fig. 11 Diode Forward Voltage vs. Current



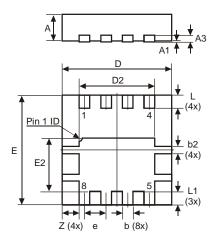






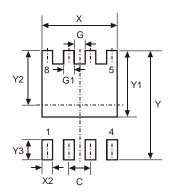


Package Outline Dimensions



POWERDI3333-8					
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 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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