



30V N-CHANNEL ENHANCEMENT MODE MOSFET POWERDI[®]

Product Summary

V _{(BR)DSS}	R _{DS(ON)} max	I _D T _A = +25°C
201/	12mΩ @ V _{GS} = 10V	10.8A
30V	16mΩ @ V _{GS} = 4.5V	9.5A

Description and Applications

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

POWERDI5060-8

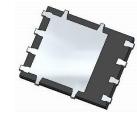
- DC-DC Converters
- **Power Management Functions**
- Analog Switch

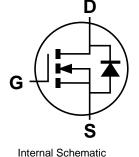
Features and Benefits

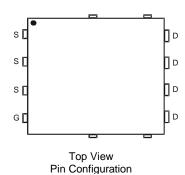
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- <1.1mm Package Profile Ideal for Thin Applications
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability

Mechanical Data

- Case: POWERDI5060-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.097 grams (Approximate)







Top View

Bottom View

Ordering Information (Note 4)

Part Number	Case	Packaging	
DMN3016LPS-13	POWERDI5060-8	2500 / Tape & Reel	

Pin1

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"
- 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



☐ ☐ Manufacturer's Marking N3016LP = Product Type Marking Code YYWW = Date Code Marking YY = Last Digit of Year (ex: 14 = 2014) WW = Week Code (01 to 53)



Maximum Ratings ($@T_A = +25^{\circ}C$, unless otherwise specified.)

Characteristic	Symbol	Value	Units		
Drain-Source Voltage	V_{DSS}	30	V		
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Desir Courset (Note C) V	Steady State	$T_A = +25$ °C $T_A = +70$ °C	I _D	10.8 8.5	А
Continuous Drain Current (Note 6) V _{GS} = 10V	t<10s	$T_A = +25$ °C $T_A = +70$ °C	I _D	15.5 12.3	А
Continuous Desir Courset (Note C) V	Steady State	$T_A = +25^{\circ}C$ $T_A = +70^{\circ}C$	I _D	9.5 7.5	А
Continuous Drain Current (Note 6) V _{GS} = 4.5V	t<10s	$T_A = +25$ °C $T_A = +70$ °C	I _D	13.5 10.8	А
Pulsed Drain Current (10µs pulse, duty cycle = 1%)			I _{DM}	70	Α
Avalanche Current (Note 7) L = 0.1mH			I _{AS}	22	Α
Avalanche Energy (Note 7) L = 0.1mH			E _{AS}	24	mJ

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

Characteristic	Symbol	Value	Units	
Total Power Dissipation (Note 5)		P_{D}	1.18	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	D	109	°C/W
Thermal Resistance, Junction to Ambient (Note 5)	t<10s	$R_{\theta JA}$	49	°C/W
Total Power Dissipation (Note 6)		P_{D}	2.75	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	C	46	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	t<10s	$R_{\theta JA}$	24	°C/W
Thermal Resistance, Junction to Case (Note 6)		R ₀ JC	4.5	°C/W
Operating and Storage Temperature Range		$T_{J_i} T_{STG}$	-55 to +150	°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}	ı	-	1	μΑ	$V_{DS} = 30V, V_{GS} = 0V$	
Gate-Source Leakage	I _{GSS}	-	-	±100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$	
ON CHARACTERISTICS (Note 8)							
Gate Threshold Voltage	$V_{GS(th)}$	1.4	-	2.0	>	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$	
Static Drain-Source On-Resistance	2	ı	8.5	12	mΩ	$V_{GS} = 10V, I_D = 20A$	
Static Drain-Source On-Resistance	R _{DS} (ON)	ı	10.5	16	11122	$V_{GS} = 4.5V, I_D = 20A$	
Diode Forward Voltage	V_{SD}	-	0.7	1.0	V	$V_{GS} = 0V, I_{S} = 1A$	
DYNAMIC CHARACTERISTICS (Note 9)							
Input Capacitance	C _{iss}	-	1415	-	pF	15)()(
Output Capacitance	C _{oss}	ı	119	-	рF	$V_{DS} = 15V, V_{GS} = 0V,$ f = 1.0MHz	
Reverse Transfer Capacitance	C _{rss}	-	82	-	pF	1 = 1.000112	
Gate Resistance	R_{g}	ı	3.0	-	Ω	$V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz$	
Total Gate Charge (V _{GS} = 4.5V)	Qg	ı	11.3	-	nC		
Total Gate Charge (V _{GS} = 10V)	Qg	ı	25.1	-	nC	$V_{DS} = 15V, I_D = 12A$	
Gate-Source Charge	Q_{gs}	ı	3.5	-	nC	VDS = 13V, ID = 12A	
Gate-Drain Charge	Q_gd	-	3.6	-	nC		
Turn-On Delay Time	t _{D(ON)}	-	4.8	-	ns		
Turn-On Rise Time	t _R	-	16.5	-	ns	V _{DD} = 15V, V _{GS} = 10V,	
Turn-Off Delay Time	t _{D(OFF)}	-	26.1	-	ns	$R_L = 1.25\Omega$, $R_G = 3\Omega$	
Turn-Off Fall Time	t _F	-	5.6	-	ns]	
Reverse Recovery Time	t _{RR}	-	12.3	-	ns	1 424 4:/44 5004/	
Reverse Recovery Charge	Q _{rr}	-	10.4	-	nC	I _F = 12A, di/dt = 500A/μs	

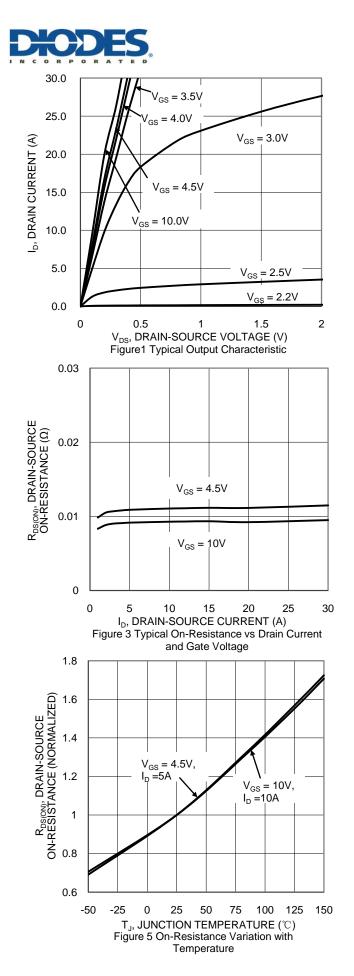
Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

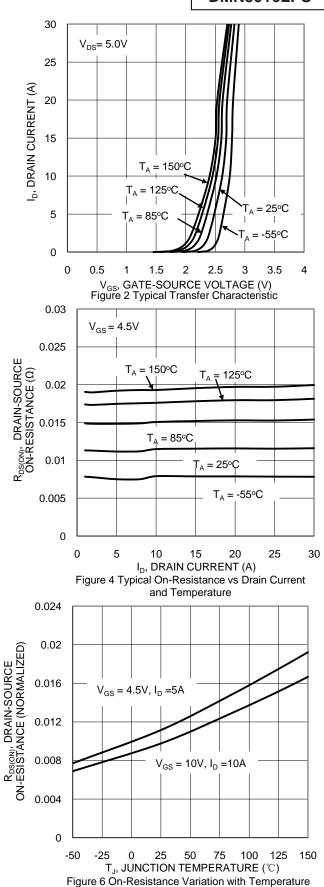
^{6.} Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

^{7.} I_{AS} and E_{AS} rating are based on low frequency and duty cycles to keep $T_J = +25 ^{\circ} C$.

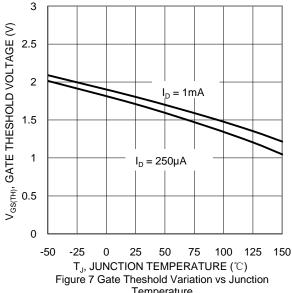
^{8.} Short duration pulse test used to minimize self-heating effect.

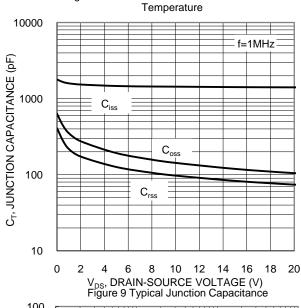
^{9.} Guaranteed by design. Not subject to product testing.

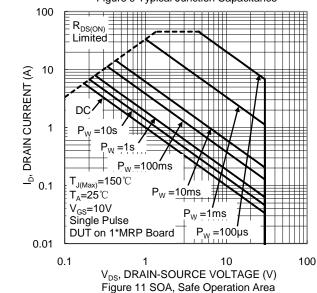


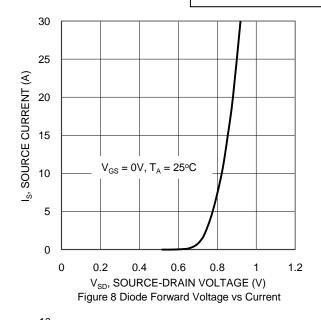


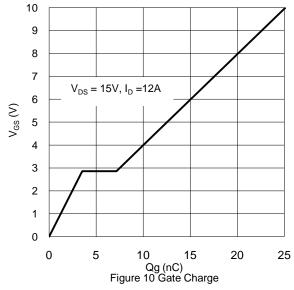














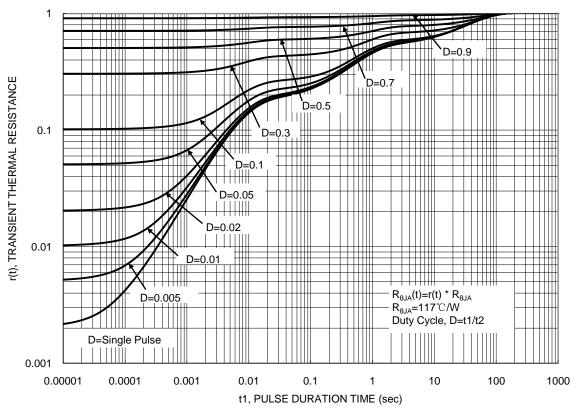


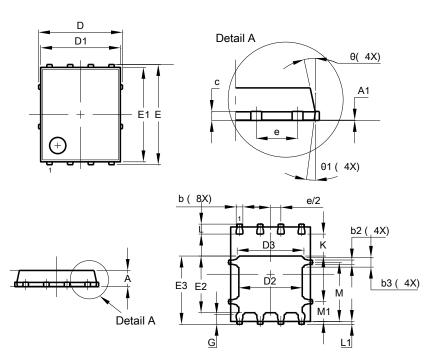
Figure 12 Transient Thermal Resistance



Package Outline Dimensions

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

(1) Package Type: POWERDI®5060-8

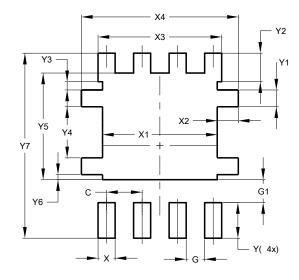


POWERDI®5060-8				
Dim	Min	Max	Тур	
Α	0.90	1.10	1.00	
A1	0.00	0.05		
b	0.33	0.51	0.41	
b2	0.200	0.350	0.273	
b3	0.40	0.80	0.60	
С	0.230	0.330	0.277	
D		5.15 BSC	;	
D1	4.70	5.10	4.90	
D2	3.70	4.10	3.90	
D3	3.90	4.30	4.10	
Е	(6.15 BSC	;	
E1	5.60	6.00	5.80	
E2	3.28	3.68	3.48	
E3	3.99	4.39	4.19	
е		1.27 BSC	;	
G	0.51	0.71	0.61	
K	0.51			
L	0.51	0.71	0.61	
L1	0.100	0.200	0.175	
М	3.235	4.035	3.635	
M1	1.00	1.40	1.21	
Θ	10°	12º	11º	
Θ1	6°	8°	7º	
All Dimensions in mm				

Suggested Pad Layout

Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.

(1) Package Type: POWERDI®5060-8



Dimensions	Value (in mm)			
С	1.270			
G	0.660			
G1	0.820			
X	0.610			
X1	4.100			
X2	0.755			
Х3	4.420			
X4	5.610			
Υ	1.270			
Y1	0.600			
Y2	1.020			
Y3	0.295			
Y4	1.825			
Y5	3.810			
Y6	0.180			
Y7	6.610			



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Офис по работе с юридическими лицами:

105318, г. Москва, ул. Щербаковская д. 3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru moschip.ru_6 moschip.ru 4 moschip.ru 9