



60V 175°C N-CHANNEL ENHANCEMENT MODE MOSFET POWERDI

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _C = +25°C
	$23m\Omega$ @ $V_{GS} = 10V$	55A
60V	28mΩ @ V _{GS} = 4.5V	48A

Description and Applications

This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

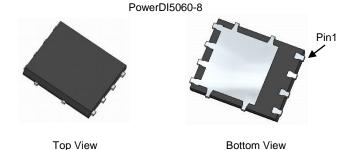
- Driving Solenoids
- Driving Relays
- Power Management Functions

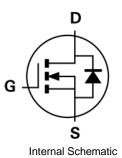
Features and Benefits

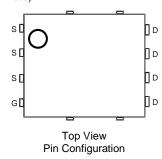
- Rated to +175°C Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switching Ensures More Reliable and Robust End Application
- High Conversion Efficiency
- Low R_{DS(ON)} Minimizes On-State Losses
- Low Input Capacitance
- · Fast Switching Speed
- Lead-Free Finish; RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability
- PPAP Capable (Note 4)

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 Finish Matte Tin Annealed over Copper Leadframe.
 Solderable per MIL-STD-202, Method 208 @3
- Weight: 0.097 grams (Approximate)







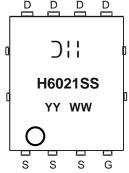
Ordering Information (Note 5)

Part Number	Case	Packaging
DMNH6021SPSQ-13	PowerDI5060-8	2,500 / Tape & Reel

Notes:

- 1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
- 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to http://www.diodes.com/product_compliance_definitions.html.
- 5. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

Marking Information



);; = Manufacturer's Marking
H6021SS = Product Type Marking Code
YYWW = Date Code Marking
YY = Year (ex: 16 = 2016)
WW = Week (01 to 53)

PowerDI is a registered trademark of Diodes Incorporated.



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

Characteristic	Symbol	Value	Unit	
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current, $V_{GS} = 10V$ (Note 8) $ T_C = +25^{\circ}C $ $ T_C = +100^{\circ}C $		I _D	55 39	А
Maximum Continuous Body Diode Forward Current (Note 8)	I _S	55	Α	
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)		I _{DM}	88	Α
Avalanche Current, L = 0.1mH (Note 9)		I _{AS}	35	Α
Avalanche Energy, L = 0.1mH (Note 9)	E _{AS}	64	mJ	

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 6)	T _A = +25°C	P_{D}	1.6	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	96	°C/W
Total Power Dissipation (Note 7)	T _A = +25°C	P _D	3.0	W
Thermal Resistance, Junction to Ambient (Note 7)	Steady State	$R_{\theta JA}$	50	°C/W
Total Power Dissipation (Note 8) $T_C = +25^{\circ}C$		P _D	53	W
Thermal Resistance, Junction to Case (Note 8)	$R_{ heta JC}$	1.5	°C/W	
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +175	°C	

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

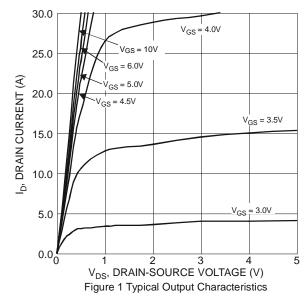
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 10)							
Drain-Source Breakdown Voltage	BV _{DSS}	60	-	-	V	$V_{GS} = 0V, I_D = 250\mu A$	
Zero Gate Voltage Drain Current	I _{DSS}	-	-	1	μΑ	$V_{DS} = 60V, V_{GS} = 0V$	
Gate-Source Leakage	I _{GSS}	-	-	±100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$	
ON CHARACTERISTICS (Note 10)							
Gate Threshold Voltage	V _{GS(TH)}	1	-	3	V	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$	
Static Drain-Source On-Resistance		-	12	23	mΩ	$V_{GS} = 10V, I_D = 12A$	
Static Drain-Source On-Resistance	R _{DS(ON)}	-	18	28		$V_{GS} = 4.5V, I_D = 12A$	
Diode Forward Voltage	V _{SD}	-	0.75	1.2	V	V _{GS} = 0V, I _S = 20A	
DYNAMIC CHARACTERISTICS (Note 11)		•	•	•			
Input Capacitance	C _{iss}	-	1,016	-		$V_{DS} = 30V$, $V_{GS} = 0V$, $f = 1MHz$	
Output Capacitance	Coss	-	153	-	pF		
Reverse Transfer Capacitance	C _{rss}	-	76.8	-			
Gate Resistance	R_g	-	2.5	-	Ω	$V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$	
Total Gate Charge (V _{GS} = 4.5V)	Q_{g}	-	9.5	-			
Total Gate Charge (V _{GS} = 10V)	Qg	-	19.7	-	nC V _{DS} = 30V. I _D = 20A		
Gate-Source Charge	Q _{gs}	-	3.6	-	IIC	$V_{DS} = 30V, I_{D} = 20A$	
Gate-Drain Charge	Q_{gd}	-	4.8	-			
Turn-On Delay Time	t _{D(ON)}	-	4.2	-			
Turn-On Rise Time	t _R	-	13	-	20	$V_{DD} = 30V, V_{GS} = 10V,$ $I_{D} = 10A, R_{g} = 4.7\Omega$	
Turn-Off Delay Time	t _{D(OFF)}	-	27.5	-	ns		
Turn-Off Fall Time	t _F	-	15.3	-			
Body Diode Reverse Recovery Time	t _{RR}	-	20.8	-	ns	1 200 4:/4+ 4000////	
Body Diode Reverse Recovery Charge	Q _{RR}	-	13.9	-	nC	I _F = 20A, di/dt = 100A/μs	

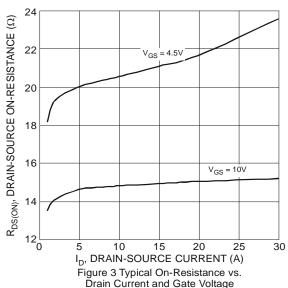
Notes:

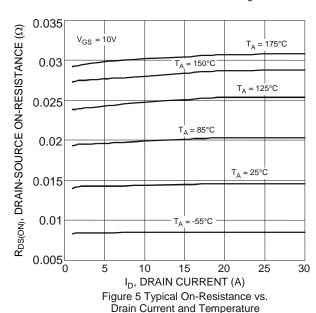
- 6. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
- Device mounted on FR-4 PC board, with minimum recommended pad rayout, single sided.
 Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
 Thermal resistance from junction to soldering point (on the exposed drain pad).
 I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.
 Short duration pulse test used to minimize self-heating effect.
 Guaranteed by design. Not subject to product testing.

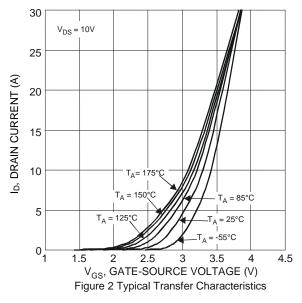


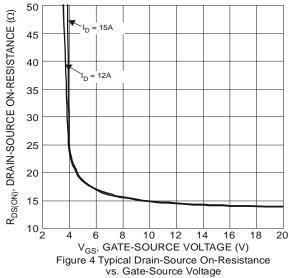












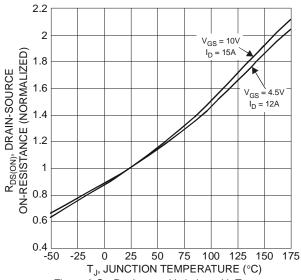
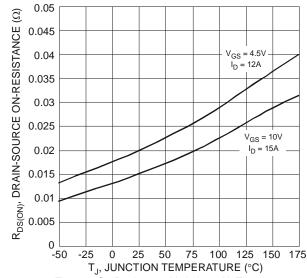
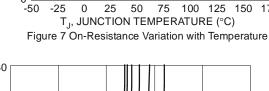


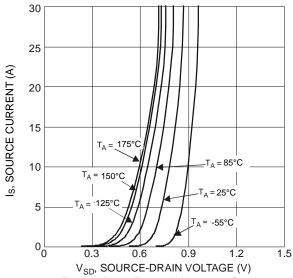
Figure 6 On-Resistance Variation with Temperature

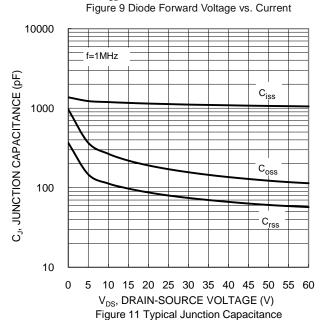












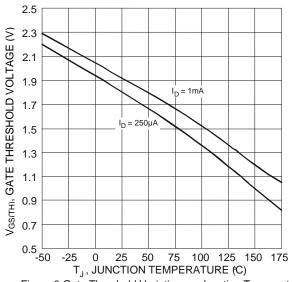
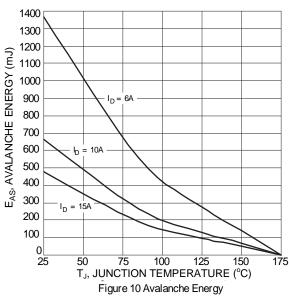
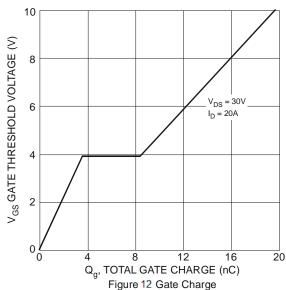


Figure 8 Gate Threshold Variation vs. Junction Temperature







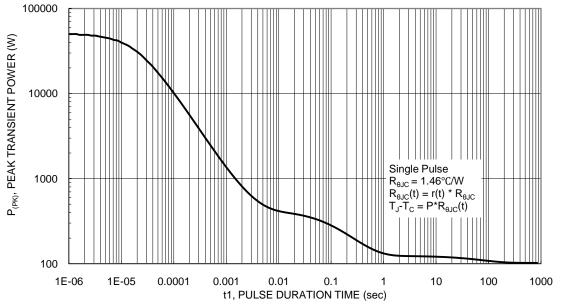
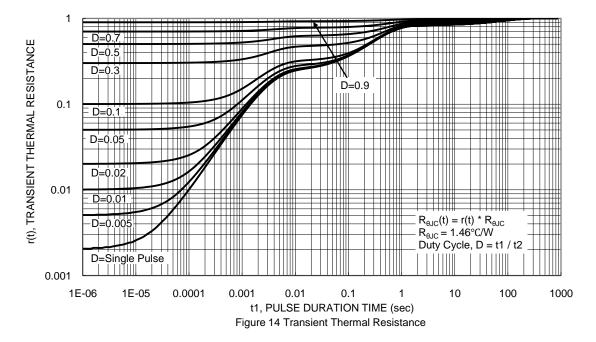


Figure 13 Single Pulse Maximum Power Dissipation

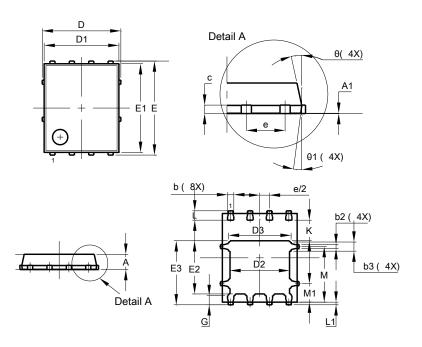




Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

PowerDI5060-8

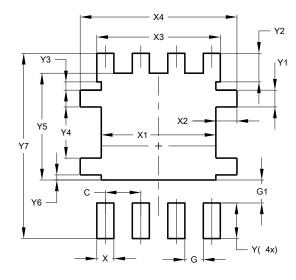


PowerDI5060-8				
Dim	Min	Max	Тур	
Α	0.90	1.10	1.00	
A1	0.00	0.05	_	
b	0.33	0.51	0.41	
b2	0.200	0.350	0.273	
b3	0.40	0.80	0.60	
С	0.230	0.330	0.277	
D		5.15 BSC		
D1	4.70	5.10	4.90	
D2	3.70	4.10	3.90	
D3	3.90	3.90 4.30 4.10		
Е	(6.15 BSC	;	
E1	5.60	6.00	5.80	
E2	3.28	3.68	3.48	
E3	3.99	4.39	4.19	
е		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	6º	8°	7º	
All Dimensions in mm				

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

PowerDI5060-8



Dimensions	Value (in mm)
С	1.270
G	0.660
G1	0.820
Χ	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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многоканальный

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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