



60V +175°C DUAL N-CHANNEL ENHANCEMENT MODE MOSFET PowerDI5060-8

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _C = +25°C
60V	$25m\Omega @ V_{GS} = 10V$	32A
60 V	$40m\Omega @ V_{GS} = 4.5V$	25A

Description

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

Applications

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

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
- Wettable Flank for Improved Optical Inspections
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- An Automotive-Compliant Part is Available Under Separate Datasheet (DMNH6021SPDWQ)

Mechanical Data

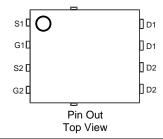
- Case: PowerDI[®]5060-8
- Case Material: Molded Plastic, "Green" Molding Compound.
 UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 per J-STD-020
- Terminal Connections Indicator: See Diagram
- Terminals: Finish Matte Tin Annealed Over Copper Leadframe.
 Solderable per MIL-STD-202, Method 208 [®]
- Weight: 0.097 grams (Approximate)

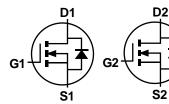


Top View



Bottom View





Equivalent Circuit

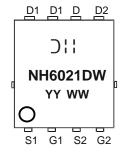
Ordering Information (Note 4)

Part Number		Case	Packaging	
	DMNH6021SPDW-13	PowerDI5060-8 (SWP) (Type R)	2500 / Tape & Reel	

Notes:

- 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
- 2. See https://www.diodes.com/quality/lead-free/ 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 https://www.diodes.com/design/support/packaging/diodes-packaging/

Marking Information



Oll = Manufacturer's Marking
NH6021DW = Product Type Marking Code
YYWW = Date Code Marking
YY = Year (ex: 19 = 2019)
WW = Week (01 to 53)



Maximum Ratings (@T_A = +25°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 (Note 6) V _{GS} = 10V	I _D	8.2 6.5	А	
Continuous Drain Current (Note 7) $V_{GS} = 10V$ $T_C = +25^{\circ}C$ $T_C = +100^{\circ}C$		I _D	32 22	А
Pulsed Drain Current (380µs Pulse, Duty Cycle = 1%)	I _{DM}	80	А	
Maximum Continuous Body Diode Forward Current (Note 7)	Is	32	А	
Avalanche Current, L = 0.1mH (Note 8)	I _{AS}	35	Α	
Avalanche Energy, L = 0.1mH (Note 8)	E _{AS}	64	mJ	

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

Characteristic	Symbol	Value	Unit		
Total Power Dissipation (Note 5)	P_{D}	1.5	W		
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{ hetaJA}$	99	°C/W	
Thermal Resistance, Junction to Ambient (Note 3)	t<10s		53		
Total Power Dissipation (Note 6)		P_{D}	2.8	W	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	Б	54	°C/W	
Thermal Resistance, Junction to Ambient (Note 6)	t<10s	$R_{ hetaJA}$	27	C/VV	
Thermal Resistance, Junction to Case (Note 7)	$R_{ heta JC}$	2.2	°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 9)							
Drain-Source Breakdown Voltage		60	_	_	V	$V_{GS} = 0V, I_D = 250\mu A$	
Zero Gate Voltage Drain Current T _J = +25°C		_	_	1	μA	$V_{DS} = 60V, V_{GS} = 0V$	
Gate-Source Leakage	I _{GSS}	_	_	±100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$	
ON CHARACTERISTICS (Note 9)	ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	V _{GS(TH)}	1	_	3	V	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$	
Static Drain-Source On-Resistance		_	15	25	mΩ	$V_{GS} = 10V, I_D = 15A$	
Static Dialii-Source Off-Resistance	R _{DS(ON)}	_	21	40	11122	V _{GS} = 4.5V, I _D = 12A	
Diode Forward Voltage	V_{SD}	_	0.75	1.2	V	$V_{GS} = 0V, I_{S} = 2.6A$	
DYNAMIC CHARACTERISTICS (Note 10)					•		
Input Capacitance	C _{iss}	_	1,143	_	pF		
Output Capacitance	Coss	_	168	_	pF	$V_{DS} = 25V, V_{GS} = 0V,$ $f = 1MHz$	
Reverse Transfer Capacitance	C _{rss}		69	_	pF	T = TIVIHZ	
Gate Resistance	R_g	_	2.5	_	Ω	$V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$	
Total Gate Charge (V _{GS} = 10V)	Qg	_	20.1	_	nC		
Total Gate Charge (V _{GS} = 6V) Gate-Source Charge		_	12	_	nC	7,, 00,4, 00,4	
		_	4.3	_	nC	$V_{DS} = 30V, I_D = 20A$	
Gate-Drain Charge	Q_{gd}	_	5.5	_	nC	1	
Turn-On Delay Time	t _{D(ON)}	_	4.4	_	ns		
Turn-On Rise Time	t _R	-	6.0	_	ns	$V_{DD} = 30V, V_{GS} = 10V,$	
Turn-Off Delay Time	t _{D(OFF)}	-	14.2	_	ns	$R_g = 4.7\Omega, I_D = 20A$	
Turn-Off Fall Time	t _F	-	5.4	_	ns	1 ~	
Body Diode Reverse Recovery Time	t _{RR}	_	21.2	_	ns	1 004 11/11 4004/	
Body Diode Reverse Recovery Charge	Q _{RR}	_	15.2	_	nC	$I_F = 20A$, di/dt = 100A/ μ s	

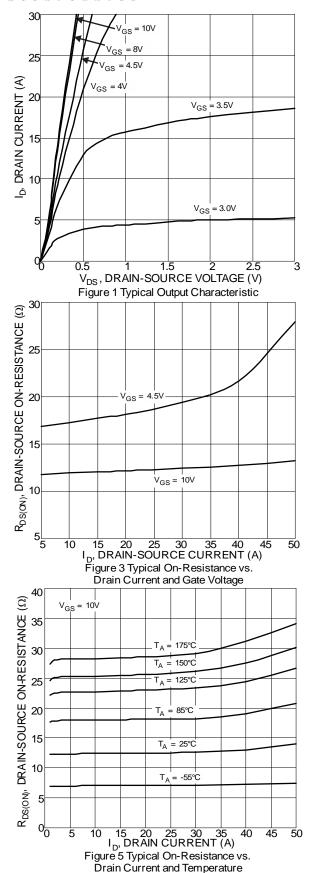
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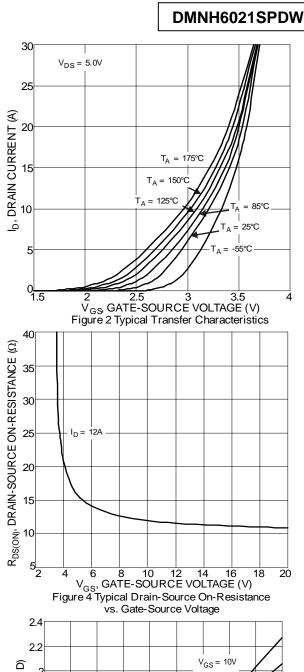
Notes:

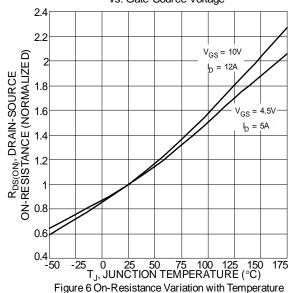
- 5. Device mounted on FR-4 PC board with minimum recommended pad layout, single sided.
- 6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
 7. Thermal resistance from junction to soldering point (on the exposed drain pad).
- 8. I_{AS}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



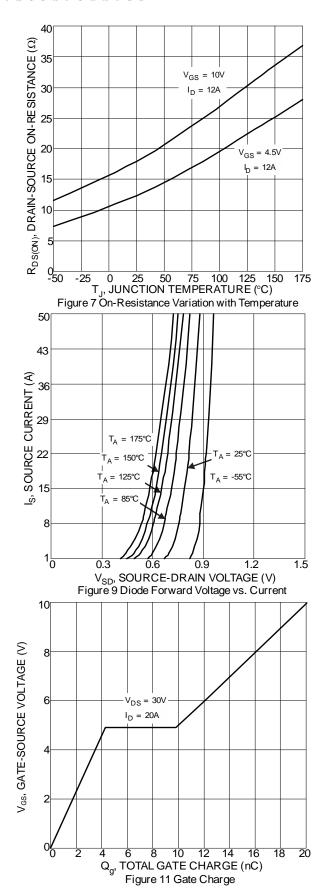


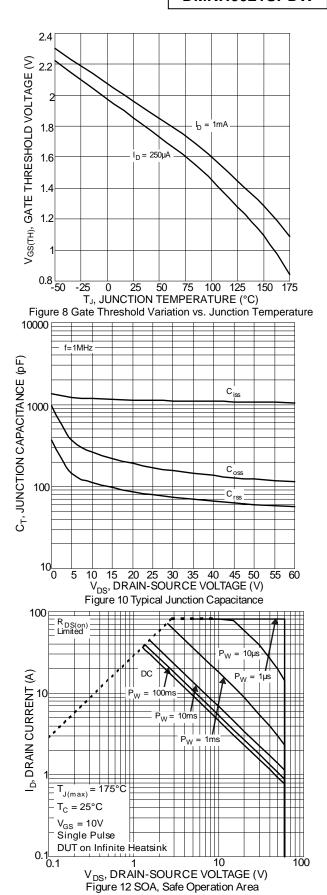




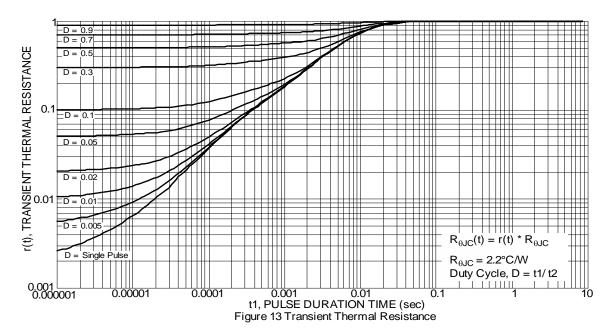










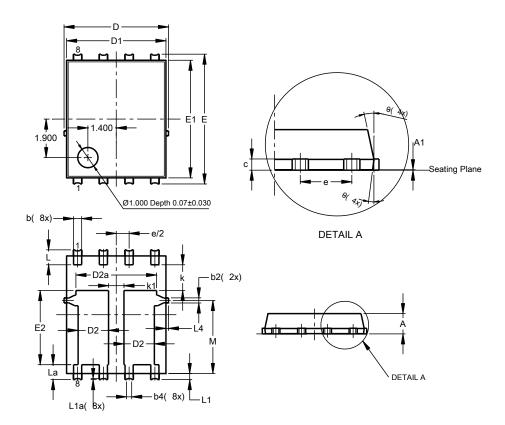




Package Outline Dimensions

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

PowerDI5060-8 (SWP) (Type R)

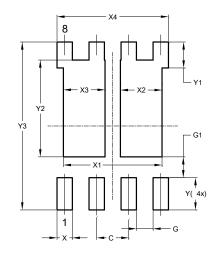


PowerDI5060-8 (SWP)					
(Type R)					
Dim	Min Max		Тур		
Α	0.90	1.10	1.00		
A1	0	0.05			
b	0.30	0.50	0.41		
b2	0.20	0.35	0.25		
b4	().25REF	-		
С	0.230	0.330	0.277		
D	5.15 BSC				
D1	4.70	4.70 5.10			
D2	1.40 1.60		1.50		
D2a	3.78 4.18		3.98		
Е	6.40 BSC				
E1	5.60	6.00	5.80		
E2	3.46	3.86	3.66		
е	1	.27BS0)		
k	1.05		-		
k1	0.56				
L	0.635	0.835	0.735		
La	0.635	0.835	0.735		
L1	0.200	0.400	0.300		
L1a	0.050REF				
L4	0.025	0.225	0.125		
М	3.205	4.005	3.605		
θ	10°	12°	11°		
θ1	6°	8°	7°		
All Dimensions in mm					

Suggested Pad Layout

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

PowerDI5060-8 (SWP) (Type R)



Dimensions	Value		
	(in mm)		
С	1.270		
G	0.660		
G1	0.820		
X	0.610		
X1	3.910		
X2	1.650		
Х3	1.650		
X4	4.420		
Υ	1.270		
Y1	1.020		
Y2	3.810		
Y3	6.610		



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