



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

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D T _C = +25°C (Note 5)
60V	$5.5 \text{m}\Omega$ @ V _{GS} = 10V	100A

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:

- High-frequency switching
- · Sync rectifications
- DC-DC converters

Features

- Rated to +175°C Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switching Ensures More Reliable and Robust End Application
- Low R_{DS(ON)} Minimizes Power Losses
- Low Q_q Minimizes Switching Losses
- Lead-Free Finish; RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- The DMTH6005LPSWQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.

https://www.diodes.com/quality/product-definitions/

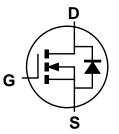
Mechanical Data

- Package: PowerDI[®]5060-8
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish Matte Tin Annealed over Copper Leadframe.
 Solderable per MIL-STD-202, Method 208 (3)
- Weight: 0.097 grams (Approximate)

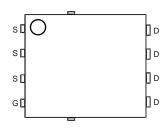
PowerDI5060-8/SWP (Type UX)







Internal Schematic



Top View Pin Configuration

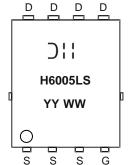
Ordering Information (Note 4)

Part Number	Pookago	Pac	Packing		
Part Number	Package	Qty.	Carrier		
DMTH6005LPSWQ-13	PowerDI5060-8/SWP (Type UX)	2500	Tape & Reel		

Notes:

- 1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
- 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/.
- 5. Package limited.

Marking Information



⊃¦¦ = Manufacturer's Marking H6005LS = Product Type Marking Code YYWW = Date Code Marking YY = Year (ex: 23 = 2023) WW = Week (01 to 53)



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

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		Vgss	±20	V
Continuous Drain Current (Note 6)	$T_A = +25^{\circ}C$ $T_A = +70^{\circ}C$	ΙD	20.6 17.2	А
Continuous Drain Current (Note 7)	$T_{C} = +25^{\circ}C$ (Note 5) $T_{C} = +100^{\circ}C$	lσ	100 90	А
Maximum Continuous Body Diode Forward Current (Note 7)	Is	100	А	
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)		Ірм	160	Α
Avalanche Current, L = 1mH		las	14.8	Α
Avalanche Energy, L = 1mH		Eas	98	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 6)	T _A = +25°C	PD	3.2	W
Thermal Resistance, Junction to Ambient (Note 6)		Reja	47	°C/W
Total Power Dissipation (Note 7)	T _C = +25°C	P _D	150	W
Thermal Resistance, Junction to Case (Note 7)	•	Rejc	1	°C/W
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +175	°C

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

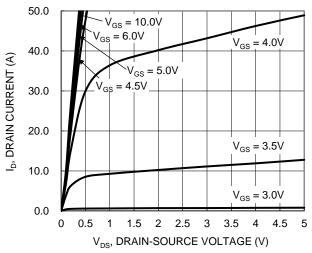
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 8)	1 27	1	, - 7 P	1			
Drain-Source Breakdown Voltage	BV _{DSS}	60	_	_	V	VGS = 0V, ID = 1mA	
Zero Gate Voltage Drain Current	I _{DSS}	_	_	1	μA	V _{DS} = 48V, V _{GS} = 0V	
Gate-Source Leakage	Igss	_	_	±100	nA	Vgs = ±20V, Vps = 0V	
ON CHARACTERISTICS (Note 8)							
Gate Threshold Voltage	Vgs(TH)	1	_	3	V	$V_{DS} = V_{GS}$, $I_D = 250\mu A$	
		_	4.4	5.5	mΩ	Vgs = 10V, ID = 50A	
Static Drain-Source On-Resistance	R _{DS(ON)}	_	5.7	7.2		$V_{GS} = 6V, I_D = 20A$	
		_	7.7	10		Vgs = 4.5V, ID = 12.5A	
Diode Forward Voltage	VsD	_	0.9	_	V	Vgs = 0V, Is = 50A	
DYNAMIC CHARACTERISTICS (Note 9)							
Input Capacitance	Ciss		2962			.,	
Output Capacitance	Coss	_	965.2	_	pF	$V_{DS} = 30V$, $V_{GS} = 0V$, $f = 1MHz$	
Reverse Transfer Capacitance	Crss	_	59.8	_			
Gate Resistance	Rg	_	0.66	_	Ω	$V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$	
Total Gate Charge (V _{GS} = 10V)	Qg	_	47.1	_			
Total Gate Charge (V _{GS} = 4.5V)	Qg	_	23.1	_	nC	$V_{DD} = 30V, I_D = 50A$	
Gate-Source Charge	Qgs	_	10.2	_	nc nc		
Gate-Drain Charge	Qgd	_	12.5	_			
Turn-On Delay Time	t _{D(ON)}	_	8.3	_			
Turn-On Rise Time	t _R	_	9.4	_		$V_{DD} = 30V$, $V_{GS} = 10V$, $I_{D} = 30A$, $R_{G} = 3.3\Omega$	
Turn-Off Delay Time	tD(OFF)	_	22	_	ns		
Turn-Off Fall Time	t _F	_	8.9	_			
Body Diode Reverse-Recovery Time	trr	_	40.4		ns	1 004 11/11 1004/	
Body Diode Reverse-Recovery Charge	Q _{RR}	_	49.7	_	nC	$I_F = 30A$, di/dt = 100A/ μ s	

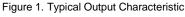
Notes: 5. Package limited.

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

- 9. Guaranteed by design. Not subject to product testing.







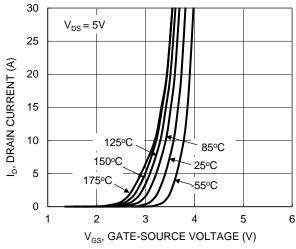


Figure 2. Typical Transfer Characteristic

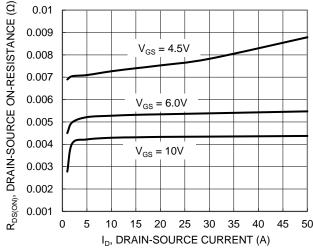


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

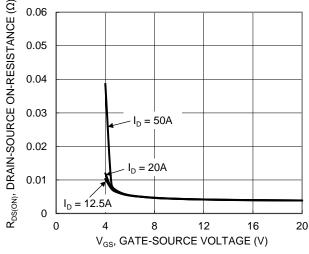


Figure 4. Typical Transfer Characteristic

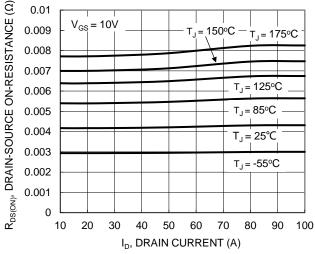


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

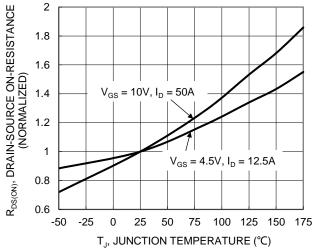


Figure 6. On-Resistance Variation with Junction Temperature



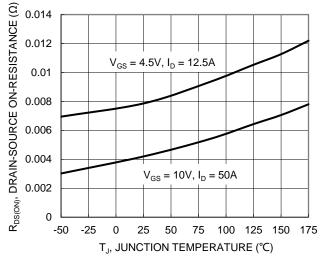


Figure 7. On-Resistance Variation with Junction Temperature

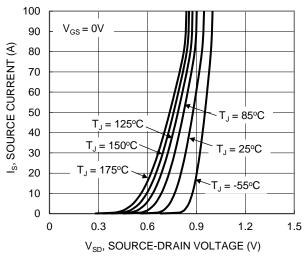


Figure 9. Diode Forward Voltage vs. Current

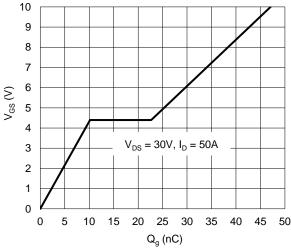


Figure 11. Gate Charge

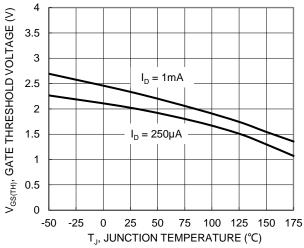


Figure 8. Gate Threshold Variation vs. Junction Temperature

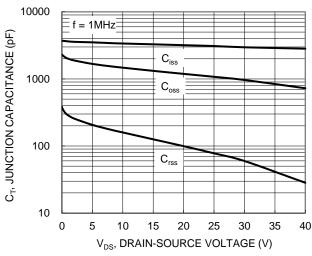


Figure 10. Typical Junction Capacitance

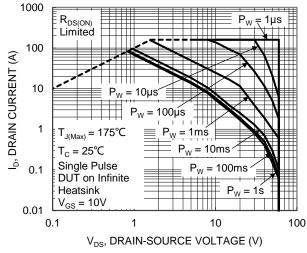


Figure 12. SOA, Safe Operation Area



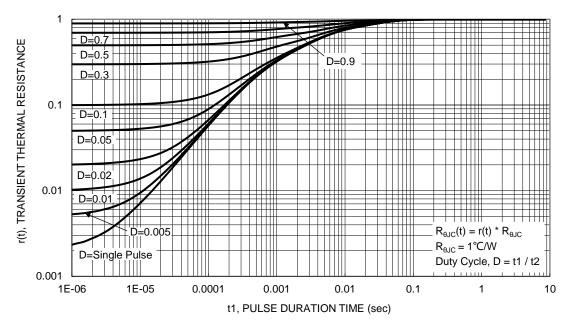


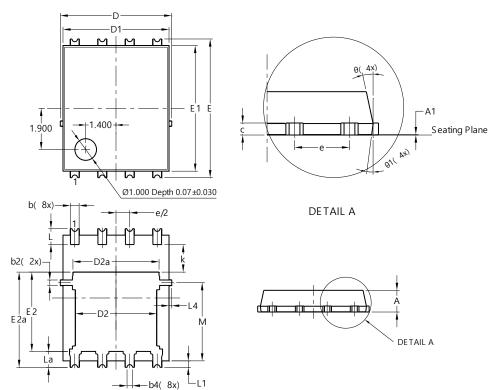
Figure 13. Transient Thermal Resistance



Package Outline Dimensions

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

PowerDI5060-8/SWP (Type UX)

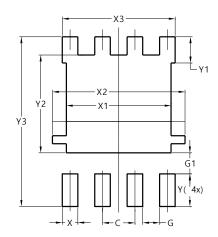


PowerDI5060-8/SWP (Type UX)					
Dim	Min	Тур			
Α	0.90	1.10	1.00		
A1	0	0.05			
b	0.30	0.50	0.41		
b2	0.20	0.35	0.25		
b4).25REF			
С	0.230	0.330	0.277		
D	5	.15 BS0)		
D1	4.70	5.10	4.90		
D2	3.56	3.96	3.76		
D2a	3.78 4.18		3.98		
Е	6	.40 BS0			
E1	5.60	6.00	5.80		
E2	3.46	3.86	3.66		
E2a	4.195	4.595	4.395		
е	1.27BSC				
k	1.05				
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 UX)



Dimensions	Value			
Dillielisions	(in mm)			
С	1.270			
G	0.660			
G1	0.820			
X	0.610			
X1	4.100			
X2	5.190			
Х3	4.420			
Y	1.270			
Y1	1.020			
Y2	3.810			
Y3	6.610			



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