



30V +175°C N-CHANNEL ENHANCEMENT MODE MOSFET PowerDI

Product Summary

BV _{DSS}	$R_{DS(ON)} \qquad I_{D} T_{C} = +25^{\circ}C$	
30V	$1.6 m\Omega$ @ $V_{GS} = 10V$	240A

Description

This new generation N-Channel Enhancement Mode MOSFET is designed to minimize $R_{DS(ON)}$, yet maintain superior switching performance. This device is ideal for use in power management and load switch.

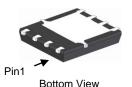
Applications

- DC-DC Converters
- Load Switch

PowerDI5060-8 (Type K)





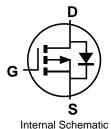


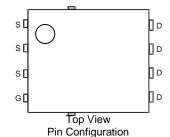
Features

- Thermally Efficient Package Cooler Running Applications
- <1.1mm Package Profile Ideal for Thin Applications
- 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

Mechanical Data

- Case: PowerDI5060-8 (Type K)
- 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)





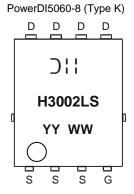
Ordering Information (Note 4)

Part Number	Case	Packaging	
DMTH3002LPS-13	PowerDI5060-8 (Type K)	2,500/Tape & Reel	

Notes:

- 1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
- 2. 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. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

Marking Information



☐ I = Manufacturer's Marking
H3002LS = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 17 = 2017)
WW = Week Code (01 to 53)



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

Characteristic	Symbol	Value	Unit		
Drain-Source Voltage	V_{DSS}	30	V		
Gate-Source Voltage	V_{GSS}	±16	V		
Continuous Drain Current, V _{GS} = 10V (Note 7)	Steady State	$T_{C} = +25^{\circ}C$ $T_{C} = +100^{\circ}C$	I _D	240 240	А
Maximum Continuous Body Diode Forward Current (Note	I _S	100	Α		
Pulsed Drain Current (380µs Pulse, Duty Cycle = 1%)	I _{DM}	400	Α		
Pulsed Continuous Body Diode Forward Current (380µs	I _{SM}	400	Α		
Avalanche Current, L=3mH (Note 8)			I _{AS}	15	Α
Avalanche Energy, L=3mH (Note 8)			E _{AS}	700	mJ

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

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	$T_A = +25^{\circ}C$	P_{D}	1.2	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	103	°C/W
Total Power Dissipation (Note 6)	T _A = +25°C	P _D	2.5	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	51	°C/W
Total Power Dissipation (Note 7)	T _C = +25°C	P_{D}	136	W
Thermal Resistance, Junction to Case (Note 7)		R ₀ JC	1.1	°C/W
Operating and Storage Temperature Range		$T_{J_{I}}T_{STG}$	-55 to +175	°C

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

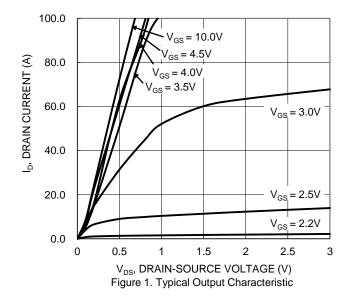
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 9)							
Drain-Source Breakdown Voltage	BV _{DSS}	30	_	_	V	$V_{GS} = 0V$, $I_D = 250\mu A$	
Zero Gate Voltage Drain Current	I _{DSS}	_	_	1	μΑ	$V_{DS} = 24V, V_{GS} = 0V$	
Gate-Source Leakage	I _{GSS}	_	_	±100	nA	$V_{GS} = \pm 16V, V_{DS} = 0V$	
ON CHARACTERISTICS (Note 9)							
Gate Threshold Voltage	V _{GS(TH)}	1	_	2	V	$V_{DS} = V_{GS}$, $I_D = 1mA$	
Static Drain-Source On-Resistance	D	_	1.25	1.6	mΩ	$V_{GS} = 10V, I_D = 25A$	
Static Drain-Source Off-Resistance	R _{DS(ON)}	_	2	2.5	11177	$V_{GS} = 4.5V, I_D = 25A$	
Diode Forward Voltage	V_{SD}	_	0.8	1.1	V	$V_{GS} = 0V, I_{S} = 25A$	
DYNAMIC CHARACTERISTICS (Note 10)							
Input Capacitance	C _{ISS}	_	5,000	_		V _{DS} = 15V, V _{GS} = 0V, f = 1MHz	
Output Capacitance	Coss	_	2,660	_	pF		
Reverse Transfer Capacitance	C _{RSS}	_	300	_			
Gate Resistance	R_{G}	_	0.75	_	Ω	$V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$	
Total Gate Charge (V _{GS} = 4.5V)	Q_{G}	_	37	_			
Total Gate Charge (V _{GS} = 10V)	Q _G	_	77	_	nC	V _{DS} = 15V, I _D = 25A	
Gate-Source Charge	Q_{GS}	_	10	_	IIC		
Gate-Drain Charge	Q_{GD}	_	14	_			
Turn-On Delay Time	t _{D(ON)}	_	21	_			
Turn-On Rise Time	t _R	_	45	_		$V_{DD} = 15V, V_{GS} = 4.5V,$ $I_D = 25A, R_G = 4.7\Omega$	
Turn-Off Delay Time	t _{D(OFF)}	_	32	_	ns		
Turn-Off Fall Time	t _F	_	26	_			
Body Diode Reverse Recovery Time	t _{RR}	_	44	_	ns	1 15A di/dt 100A/uc	
Body Diode Reverse Recovery Charge	Q _{RR}	_	52	_	nC	I _S = 15A, di/dt = 100A/μs	

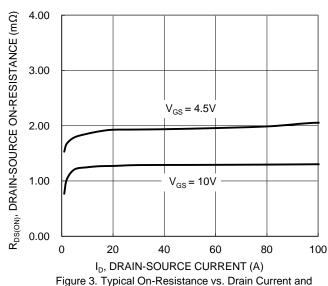
Notes:

- 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 1-inch square copper plate.7. Thermal resistance from junction to soldering point (on the exposed drain pad).
- 8. I_{AS} and E_{AS} rating 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.

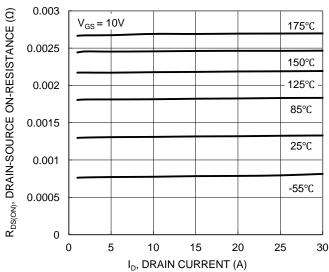


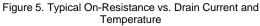


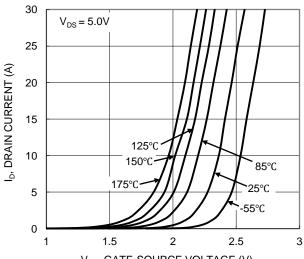




Gate Voltage







 $V_{\rm GS}, \, {\rm GATE}\text{-}{\rm SOURCE} \, \, {\rm VOLTAGE} \, ({\rm V})$ Figure 2. Typical Transfer Characteristic

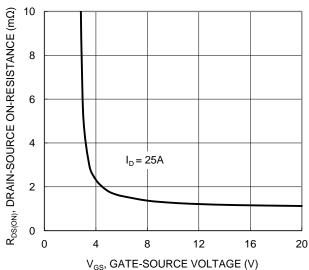


Figure 4. Typical Transfer Characteristic

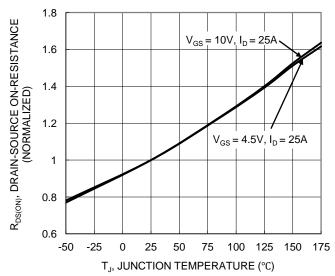


Figure 6. On-Resistance Variation with Temperature





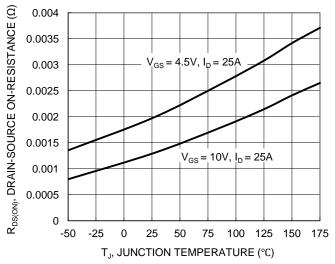
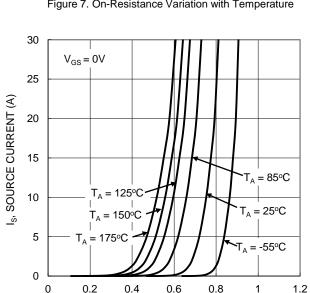


Figure 7. On-Resistance Variation with Temperature



 V_{SD} , SOURCE-DRAIN VOLTAGE (V) Figure 9. Diode Forward Voltage vs. Current

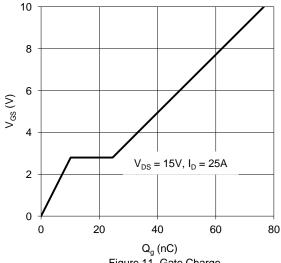


Figure 11. Gate Charge

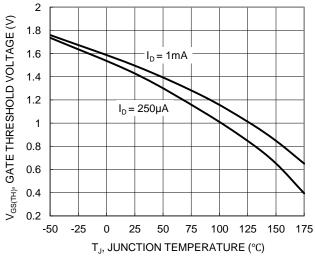


Figure 8. Gate Threshold Variation vs. JunctionTemperature

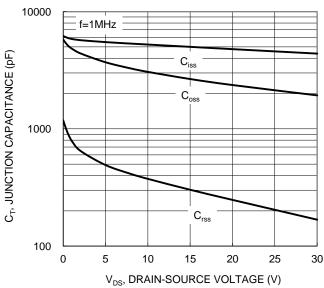
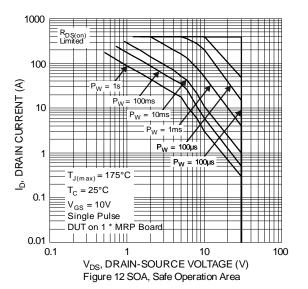


Figure 10. Typical Junction Capacitance





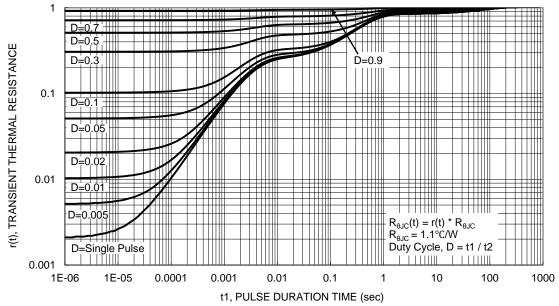


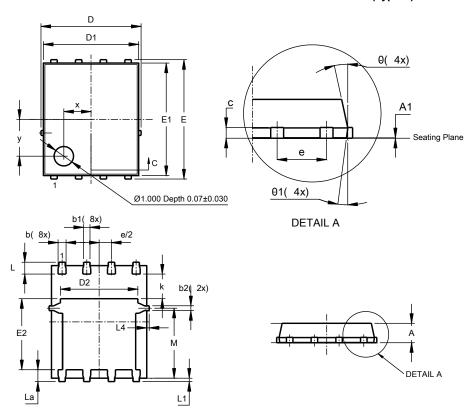
Figure 13. Transient Thermal Resistance



Package Outline Dimensions

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

PowerDI5060-8 (Type K)

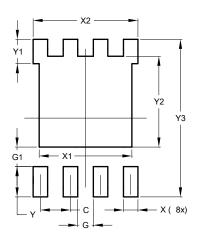


PowerDI5060-8					
(Type K)					
Dim	Min	Max	Тур		
Α	0.90	1.10	1.00		
A1	0	0.05	0.02		
b	0.33	0.51	0.41		
b1	0.300	0.366	0.333		
b2	0.20	0.35	0.25		
С	0.23	0.33	0.277		
D	5	.15 BS0			
D1	4.85	4.95	4.90		
D2	-	-	3.98		
Е		.15 BS0			
E1	5.75	5.85	5.80		
E2	3.56	3.725	3.66		
Е	1	.27BSC			
k	-	-	1.27		
L	0.51	0.71	0.61		
La	0.51	0.675	0.61		
L1	0.05	0.20	0.175		
L4	-	-	0.125		
M	3.50	3.71	3.605		
X	-	-	1.400		
У	-	-	1.900		
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 (Type K)



Dimensions	Value (in mm)		
С	1.270		
G	0.660		
G1	0.820		
X	0.610		
X1	3.910		
X2	4.420		
Y	1.270		
Y1	1.020		
Y2	3.810		
Y3	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