



30V 175°C N-CHANNEL ENHANCEMENT MODE MOSFET POWERDI®

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _C = +25°C
	3.8mΩ @ V _{GS} = 10V	145A
30V	6mΩ @ V _{GS} = 4.5V	115A

Description and Applications

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.

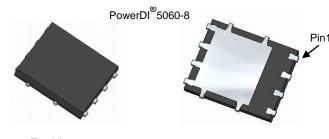
- Backlighting
- Power Management Functions
- DC-DC Converters

Features and Benefits

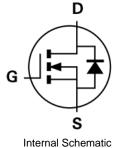
- Low R_{DS(ON)} Minimizes On-State Losses
- Excellent Q_{gd} x R_{DS(ON)} Product (FOM)
- Advanced Technology for DC-DC Converters
- Small Form Factor Thermally Efficient Package Enables Higher Density End Products
- 100% Unclamped Inductive Switching Ensures More Reliability
- Lead-Free Finish; RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability
- An Automotive-Compliant Part is Available Under Separate Datasheet (DMTH3004LPSQ)

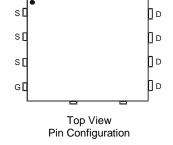
Mechanical Data

- Case: POWERDI[®]5060-8
- Case Material: Molded Plastic, "Green" Molding Compound.
 UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Diagram
- Terminals: 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	
DMTH3004LPS-13	POWERDI [®] 5060-8	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



⊃¦¦ = Manufacturer's Marking H3004LS = Product Type Marking Code YYWW = Date Code Marking YY = Year (ex: 15 = 2015) WW = Week (01 to 53)



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

Characteristic	Symbol	Value	Unit	
Drain-Source Voltage	V _{DSS}	30	V	
Gate-Source Voltage		V_{GSS}	+20 -16	V
Continuous Drain Current, V _{GS} = 10V (Note 5)	$T_A = +25^{\circ}C$ $T_A = +70^{\circ}C$	I _D	22 18	А
Continuous Drain Current, $V_{GS} = 10V$ $T_C = +25^{\circ}C$ $T_C = +70^{\circ}C$		I _D	145 120	А
Maximum Continuous Body Diode Forward Current (Note 5)	Is	3	Α	
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I _{DM}	180	Α	
Avalanche Current, L=0.3mH	I _{AS}	27	Α	
Avalanche Energy, L=0.3mH	E _{AS}	110	mJ	

Thermal Characteristics

Characteristic		Symbol	Value	Unit	
Total Power Dissipation	T _A = +25°C (Note 5)	P _D	3.2	W	
	$T_C = +25$ °C		136		
Thermal Resistance, Junction to Ambient (Note 5) Steady State		$R_{\theta JA}$	47	°C/W	
Thermal Resistance, Junction to Case		R ₀ JC	1.1	C/VV	
Operating and Storage Temperature Range		$T_{J_{i}}T_{STG}$	-55 to +175	°C	

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

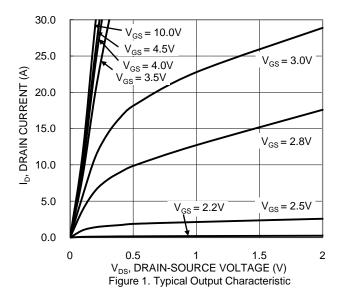
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 6)							
Drain-Source Breakdown Voltage	BV _{DSS}	30	_	_	V	$V_{GS} = 0V, I_D = 250\mu A$	
Zero Gate Voltage Drain Current	I _{DSS}	_	_	1	μA	$V_{DS} = 24V, V_{GS} = 0V$	
Gate-Source Leakage	I _{GSS}	_	_	±100	nA	$V_{GS} = +20V, V_{DS} = 0V$ $V_{GS} = -16V, V_{DS} = 0V$	
ON CHARACTERISTICS (Note 6)	'		I.		L	, ==	
Gate Threshold Voltage	V _{GS(TH)}	1	_	3	V	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$	
Static Busin Source On Bosistance		_	3.3	3.8	0	V _{GS} = 10V, I _D = 20A	
Static Drain-Source On-Resistance	R _{DS(ON)}	_	5	6	mΩ	$V_{GS} = 4.5V, I_D = 7A$	
Diode Forward Voltage	V _{SD}	_	0.70	1	V	V _{GS} = 0V, I _S = 1A	
DYNAMIC CHARACTERISTICS (Note 7)	•		•		•		
Input Capacitance	C _{iss}	l	2370			V _{DS} = 15V, V _{GS} = 0V, f = 1MHz	
Output Capacitance	Coss	_	1360	_	pF		
Reverse Transfer Capacitance	C _{rss}	_	240	_			
Gate Resistance	Rg	_	0.7	_	Ω	$V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$	
Total Gate Charge (V _{GS} = 10V)	Qg	_	43.7	_			
Gate-Source Charge	Q_gs	_	6.9	_	nC	$V_{DS} = 15V, I_{D} = 20A$	
Gate-Drain Charge	Q_{gd}	_	8	_			
Turn-On Delay Time	t _{D(ON)}	_	6.2	_		$V_{DD} = 15V, V_{GS} = 10V,$ $R_G = 3\Omega, R_L = 0.75\Omega$	
Turn-On Rise Time	t _R	_	4.2	_			
Turn-Off Delay Time	t _{D(OFF)}	_	21	_	ns		
Turn-Off Fall Time	t _F	_	8	_			
Body Diode Reverse Recovery Time	t _{RR}	_	25	_	ns	1 15A di/dt 500A/v-	
Body Diode Reverse Recovery Charge	Q _{RR}	_	37	_	nC	nC I _F = 15A, di/dt = 500A/µs	

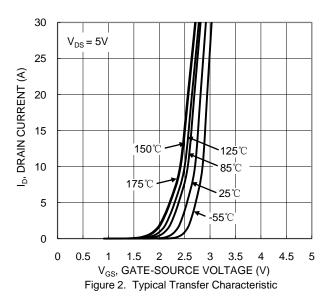
Notes: 5. R_{8JA} is determined with the device mounted on FR-4 substrate PC board, 2oz copper, with 1in. square copper plate. R_{8JC} is guaranteed by design while R_{8JA} is determined by the user's board design.

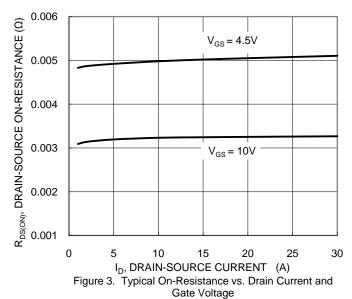
^{6.} Short duration pulse test used to minimize self-heating effect.

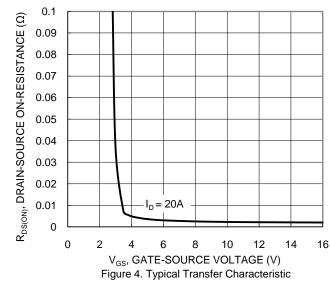
^{7.} Guaranteed by design. Not subject to product testing.

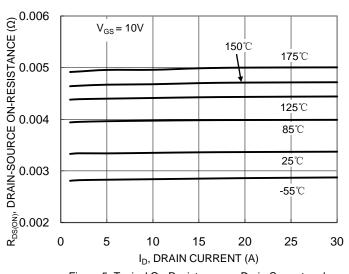












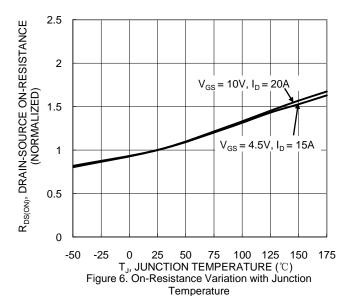


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature





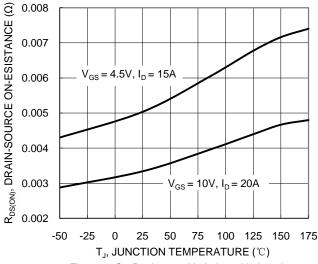


Figure 7. On-Resistance Variation with Junction Temperature

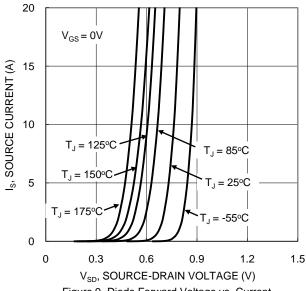
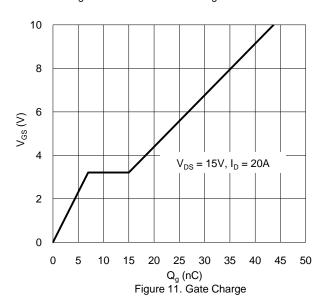
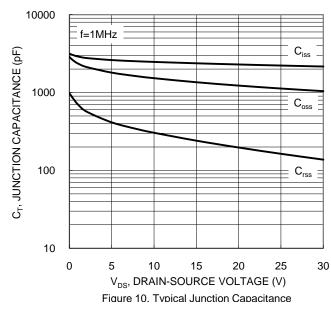


Figure 9. Diode Forward Voltage vs. Current



2.5 GATE THRESHOLD VOLTAGE (V) 20 1 2 7 2 7 $I_D = 1mA$ $I_{D} = 250 \mu A$ $V_{GS(TH)}$, (0 -50 -25 25 50 75 100 125 150 175 T_J, JUNCTION TEMPERATURE (°C)

Figure 8. Gate Threshold Variation vs. Junction Temperature



1000 $R_{\text{DS}(\text{ON})}\,\text{Limited}$ ID, DRAIN CURRENT (A) 100 P_W =10ms 10 $T_{J(Max)} = 175\,^{\circ}\mathrm{C}$ T_C = 25°C Single Pulse DUT on Infinite Heatsink V_{GS}= 10V 0.1 0.1 10 100 V_{DS} , DRAIN-SOURCE VOLTAGE (V) Figure 12. SOA, Safe Operation Area



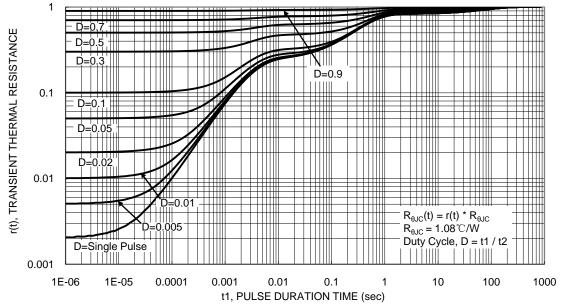


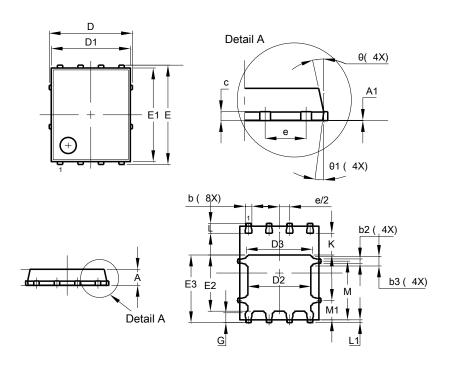
Figure 13. Transient Thermal Resistance



Package Outline Dimensions

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

POWERDI®5060-8

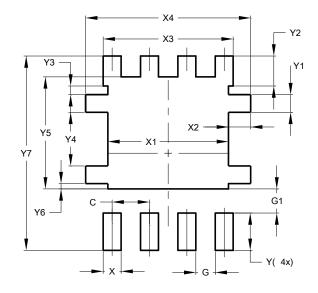


POWERDI [®] 5060-8					
Dim	Min	Max	Тур		
A	0.90	1.10	1.00		
A1	0.00	0.05	_		
b	0.33	0.51	0.41		
b2	0.200	0.350	0.273		
b3	0.40	0.80	0.60		
С	0.230	0.330	0.277		
C D	5.15 BSC				
D1	4.70	5.10	4.90		
D2	3.70	4.10	3.90		
D3	3.90	4.30	4.10		
Е	(3.15 BSC	;		
E1	5.60	6.00	5.80		
E2	3.28	3.68	3.48		
E3	3.99	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		
M	3.235	4.035	3.635		
M1	1.00	1.40	1.21		
θ	10°	12°	11°		
θ1	6°	8°	7°		
All Dimensions in mm					

Suggested Pad Layout

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

POWERDI[®]5060-8



Dimensions	Value (in mm)				
С	1.270				
G	0.660				
G1	0.820				
Х	0.610				
X1	4.100				
X2	0.755				
Х3	4.420				
X4	5.610				
Y	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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ПОСТАВКА ЭЛЕКТРОННЫХ КОМПОНЕНТОВ

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