



40V 175°C N-CHANNEL ENHANCEMENT MODE MOSFET POWERDI®

Product Summary

| BV _{DSS} | R _{DS(ON)} Max | I _D T _C = +25°C |
|-------------------|--|--|
| 40V | $6.5 \text{m}\Omega$ @ $V_{GS} = 10V$ | 100A |
| | $9.8 \text{m}\Omega$ @ $V_{GS} = 4.5 \text{V}$ | 80A |

Description

This new generation N-Channel Enhancement Mode MOSFET is designed to minimize $R_{DS(ON),}$ yet maintain superior switching performance.

Applications

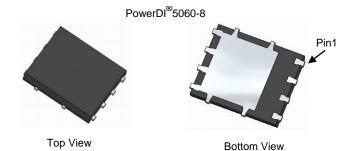
- Notebook Battery Power Management
- DC-DC Converters
- Loadswitch

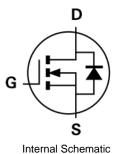
Features

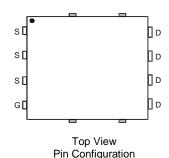
- Thermally Efficient Package Cooler Running Applications
- High Conversion Efficiency
- Low R_{DS(ON)} Minimizes On-State Losses
- Low Input Capacitance
- Fast Switching Speed
- <1.1mm Package Profile Ideal for Thin Applications
- Lead-Free Finish; RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability

Mechanical Data

- Case: 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 Finish Matte Tin Annealed over Copper Leadframe.
 Solderable per MIL-STD-202, Method 208 63
- Weight: 0.097 grams (Approximate)







Ordering Information (Note 4)

| Part Number | Case | Packaging |
|----------------|-----------------------------|-------------------|
| DMTH4007LPS-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



Oll-Manufacturer's Marking
H4007LS = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 15 = 2015)
WW = Week Code (01 to 53)



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

| Characteristic | | Symbol | Value | Unit |
|--|---|------------------|------------|------|
| Drain-Source Voltage | | V_{DSS} | 40 | V |
| Gate-Source Voltage | | V _{GSS} | ±20 | V |
| Continuous Drain Current, V _{GS} = 10V (Note 5) | $T_A = +25$ °C $T_A = +70$ °C | ID | 15.5 13 | А |
| Continuous Drain Current, V _{GS} = 10V (Note 6) | $T_{C} = +25^{\circ}C$ $T_{C} = +100^{\circ}C$ | I _D | 100 80 | Α |
| Avalanche Current, L = 0.1mH | | I _{AS} | 20 | А |
| Avalanche Energy, L = 0.1mH | | E _{AS} | 20 | mJ |

Thermal Characteristics

| Characteristic | | Symbol | Value | Unit |
|---|----------------|-------------------|-------------|------|
| Total Power Dissipation (Note 5) | $T_A = +25$ °C | P_{D} | 2.7 | W |
| Thermal Resistance, Junction to Ambient (Note 5) | | $R_{\theta JA}$ | 55 | °C/W |
| Total Power Dissipation (Note 6) T _C = +25°C | | P_{D} | 150 | W |
| Thermal Resistance, Junction to Case (Note 6) | | R _{eJC} | 1 | °C/W |
| Operating and Storage Temperature Range | | $T_{J_i} T_{STG}$ | -55 to +175 | °C |

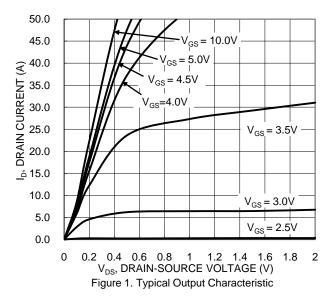
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Тур | Max | Unit | Test Condition | |
|--|---------------------|-----|-------|------|------|---|--|
| OFF CHARACTERISTICS (Note 7) | <u> </u> | | | | l . | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 40 | _ | _ | V | $V_{GS} = 0V$, $I_D = 1mA$ | |
| Zero Gate Voltage Drain Current | I _{DSS} | _ | _ | 1 | μA | $V_{DS} = 32V, V_{GS} = 0V$ | |
| Gate-Source Leakage | I _{GSS} | _ | _ | ±100 | nA | $V_{GS} = \pm 20V, V_{DS} = 0V$ | |
| ON CHARACTERISTICS (Note 7) | | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | 1 | _ | 3 | V | $V_{DS} = V_{GS}, I_{D} = 250 \mu A$ | |
| Static Drain-Source On-Resistance | | _ | 5.4 | 6.5 | mΩ | $V_{GS} = 10V, I_D = 20A$ | |
| Static Drain-Source On-Resistance | R _{DS(ON)} | _ | 8.4 | 9.8 | | $V_{GS} = 4.5V, I_D = 20A$ | |
| Diode Forward Voltage | V _{SD} | _ | _ | 1.2 | V | $V_{GS} = 0V, I_{S} = 20A$ | |
| DYNAMIC CHARACTERISTICS (Note 8) | | | | | | | |
| Input Capacitance | C _{iss} | _ | 1,895 | _ | pF | $V_{DS} = 30V$, $V_{GS} = 0V$, $f = 1MHz$ | |
| Output Capacitance | Coss | _ | 485 | _ | | | |
| Reverse Transfer Capacitance | C _{rss} | _ | 20.9 | _ | | | |
| Gate Resistance | Rg | _ | 0.62 | _ | Ω | $V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$ | |
| Total Gate Charge (V _{GS} = 4.5V) | Qg | _ | 12.4 | _ | | | |
| Total Gate Charge (V _{GS} = 10V) | Qg | _ | 29.1 | _ | nC | V 20V I 20A | |
| Gate-Source Charge | Q _{gs} | _ | 5.9 | _ | IIC | $V_{DS} = 30V, I_{D} = 20A$ | |
| Gate-Drain Charge | Q_{gd} | _ | 3.5 | _ | | | |
| Turn-On Delay Time | t _{D(ON)} | _ | 5.4 | _ | | | |
| Turn-On Rise Time | t _R | _ | 4.5 | _ | | $V_{DD} = 30V, V_{GS} = 10V,$ | |
| Turn-Off Delay Time | t _{D(OFF)} | _ | 16.2 | _ | ns | $I_D = 20A$, $R_G = 3\Omega$ | |
| Turn-Off Fall Time | t _F | _ | 3.5 | _ | | | |
| Body Diode Reverse Recovery Time | t _{RR} | _ | 30.6 | _ | ns | IE 200 di/dt 4000/: | |
| Body Diode Reverse Recovery Charge | Q _{RR} | _ | 28.1 | _ | nC | IF = 20A, di/dt = 100A/μs | |

Notes

- 5. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1-inch square copper plate.
- 6. Thermal resistance from junction to soldering point (on the exposed drain pad).
- 7. Short duration pulse test used to minimize self-heating effect.
- 8. Guaranteed by design. Not subject to product testing.





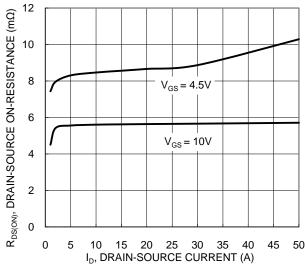


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

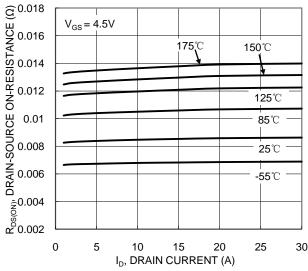


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

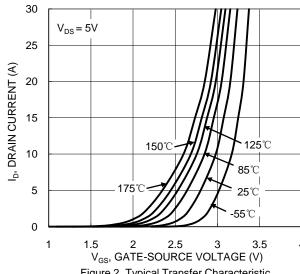


Figure 2. Typical Transfer Characteristic

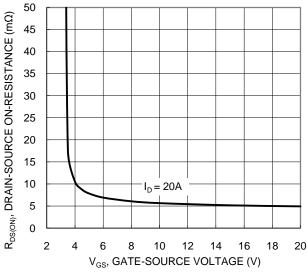


Figure 4. Typical Transfer Characteristic

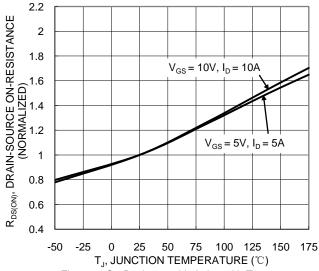


Figure 6. On-Resistance Variation with Temperature



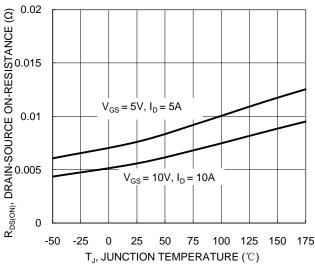
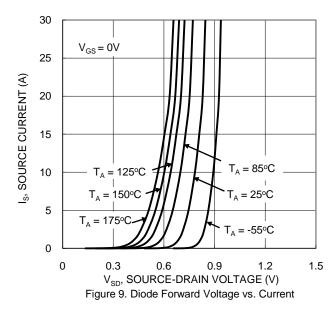
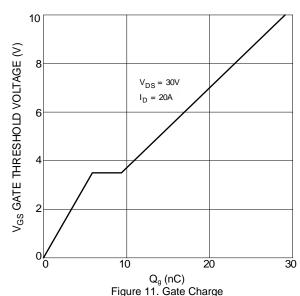


Figure 7. On-Resistance Variation with Temperature





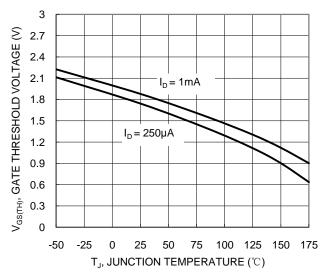
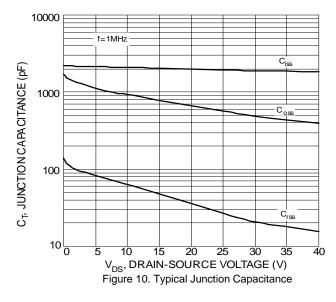
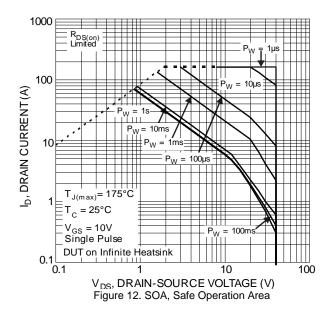


Figure 8. Gate Threshold Variation vs. Junction Temperature







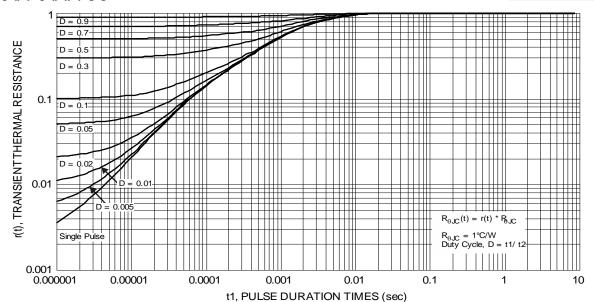


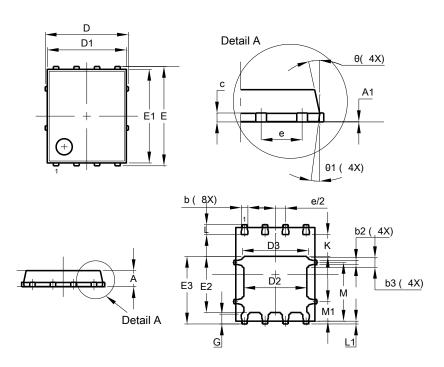
Figure 13. Transient Thermal Resistance



Package Outline

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

PowerDI[®]5060-8

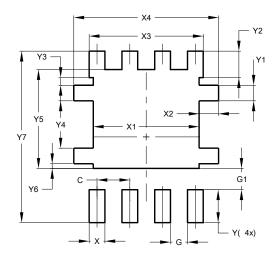


| PowerDI5060-8 | | | | | |
|----------------------|----------|----------|-------|--|--|
| Dim | Min | Max | Тур | | |
| Α | 0.90 | 1.10 | 1.00 | | |
| A1 | 0.00 | 0.05 | _ | | |
| b | 0.33 | 0.51 | 0.41 | | |
| b2 | 0.200 | 0.350 | 0.273 | | |
| b3 | 0.40 | 0.80 | 0.60 | | |
| С | 0.230 | 0.330 | 0.277 | | |
| D | ţ | 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 | (| 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 | | |
| 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 | | | |
| 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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