



**THE DATASHEET OF
DMT6016LPS-13**



Product Summary

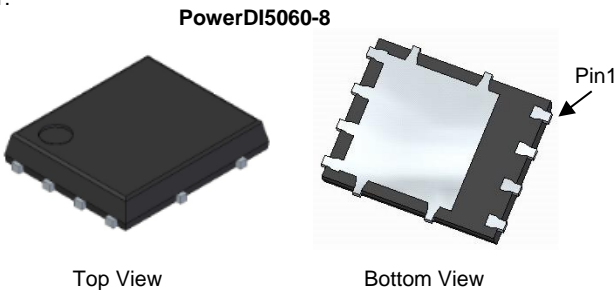
| BV _{DSS} | R _{DS(ON)} | I _D T _C = +25°C |
|-------------------|-------------------------------|--|
| 60V | 15mΩ @ V _{GS} = 10V | 32A |
| | 24mΩ @ V _{GS} = 4.5V | 24A |

Description and Applications

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

- Load switches
- Adaptor switches
- Notebook PCs

Site 1:

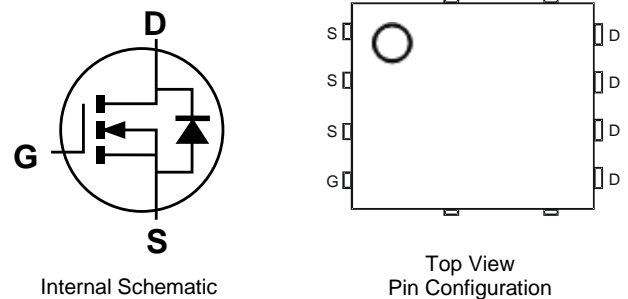


Features

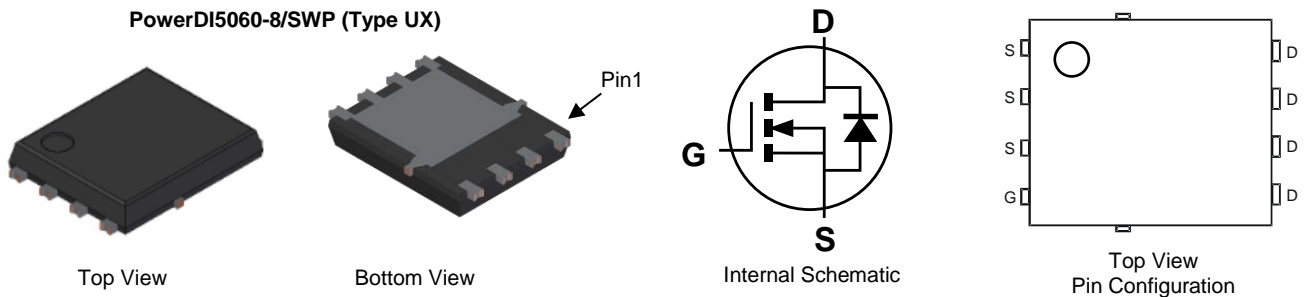
- 100% Unclamped Inductive Switching (UIS) Test in Production – Ensures More Reliable and Robust End Application
- Thermally Efficient Package - Cooler Running Applications
- High Conversion Efficiency
- Low R_{DS(ON)} – Minimizes On-State Losses
- Low Input Capacitance
- Fast Switching Speed
- <1.1mm Package Profile – Ideal for Thin Applications
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

Mechanical Data

- Package: PowerDI5060-8
- Package 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
- Terminal Connections: See Diagram Below
- Weight: 0.097 grams (Approximate)



Site 2:

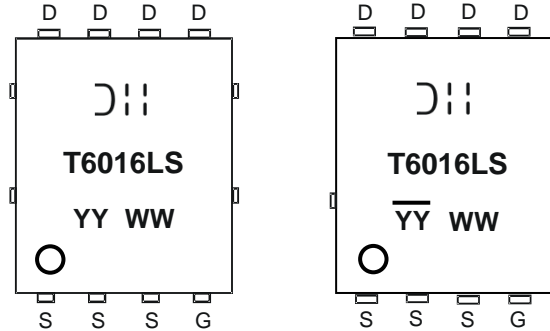


Ordering Information (Note 4)

| Part Number | Package | Packing | |
|---------------|-----------------------------|---------|-------------|
| | | Qty. | Carrier |
| DMT6016LPS-13 | PowerDI5060-8 | 2,500 | Tape & Reel |
| DMT6016LPS-13 | PowerDI5060-8/SWP (Type UX) | 2,500 | 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



DII = Manufacturer's Marking
T6016LS = Product Type Marking Code
YYWW or **YYWW** = Date Code Marking
YY or **YY** = Last Two Digits of Year (ex: 24 = 2024)
WW = Week Code (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 | T _C = +25°C | I _D | 32 | A |
| | T _C = +70°C | I _D | 25 | A |
| Continuous Drain Current (Note 5) V _{GS} = 10V | Steady State | T _A = +25°C | 10 | A |
| | | T _A = +70°C | 8 | A |
| Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%) | | I _{DM} | 120 | A |
| Maximum Continuous Body Diode Forward Current (Note 6) | | I _S | 27 | A |
| Avalanche Current (Note 7) L = 0.1mH | | I _{AS} | 15.3 | A |
| Avalanche Energy (Note 7) L = 0.1mH | | E _{AS} | 11.7 | mJ |

Thermal Characteristics

| Characteristic | | Symbol | Value | Unit |
|--|------------------------|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 5) | T _A = +25°C | P _D | 2.6 | W |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady State | R _{θJA} | 49 | °C/W |
| Total Power Dissipation (Note 6) | T _C = +25°C | P _D | 26 | W |
| Thermal Resistance, Junction to Ambient (Note 6) | | R _{θJC} | 4.8 | °C/W |
| Operating and Storage Temperature Range | | T _J , T _{STG} | -55 to +150 | °C |

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. I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.

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

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|---------------------|-----|-----|------|------|--|
| OFF CHARACTERISTICS (Note 8) | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 60 | — | — | V | V _{GS} = 0V, I _D = 250μA |
| Zero Gate Voltage Drain Current | I _{DSS} | — | — | 1 | μA | V _{DS} = 48V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ±100 | nA | V _{GS} = ±20V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 8) | | | | | | |
| Gate Threshold Voltage | V _{GS(TH)} | 1 | — | 2.5 | V | V _{DS} = V _{GS} , I _D = 250μA |
| Static Drain-Source On-Resistance | R _{DS(ON)} | — | — | 15 | mΩ | V _{GS} = 10V, I _D = 20A |
| | | — | — | 24 | | V _{GS} = 4.5V, I _D = 18A |
| Diode Forward Voltage | V _{SD} | — | 0.7 | 1.2 | V | V _{GS} = 0V, I _S = 1A |
| DYNAMIC CHARACTERISTICS (Note 9) | | | | | | |
| Input Capacitance | C _{iss} | — | 864 | — | pF | V _{DS} = 30V, V _{GS} = 0V, f = 1MHz |
| Output Capacitance | C _{oss} | — | 282 | — | | |
| Reverse Transfer Capacitance | C _{rss} | — | 27 | — | | |
| Gate Resistance | R _G | — | 1.3 | — | Ω | V _{DS} = 0V, V _{GS} = 0V, f = 1MHz |
| Total Gate Charge (V _{GS} = 4.5V) | Q _g | — | 8.4 | — | nC | V _{DS} = 30V, I _D = 10A |
| Total Gate Charge (V _{GS} = 10V) | Q _g | — | 17 | — | | |
| Gate-Source Charge | Q _{gs} | — | 3.1 | — | | |
| Gate-Drain Charge | Q _{gd} | — | 4.3 | — | | |
| Turn-On Delay Time | t _{D(ON)} | — | 3.4 | — | ns | V _{GS} = 10V, V _{DS} = 30V, R _G = 6Ω, I _D = 10A |
| Turn-On Rise Time | t _R | — | 5.2 | — | | |
| Turn-Off Delay Time | t _{D(OFF)} | — | 13 | — | | |
| Turn-Off Fall Time | t _F | — | 7 | — | | |
| Reverse Recovery Time | t _{RR} | — | 22 | — | ns | I _F = 10A, di/dt = 100A/μs |
| Reverse Recovery Charge | Q _{RR} | — | 11 | — | nC | |

Notes: 8. Short duration pulse test used to minimize self-heating effect.

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

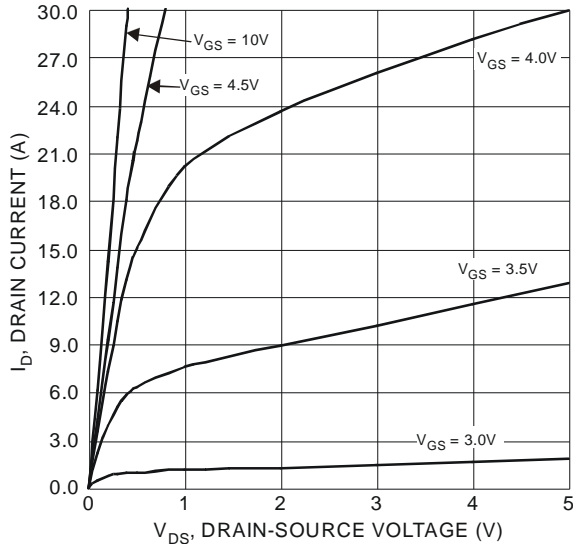


Figure 1 Typical Output Characteristics

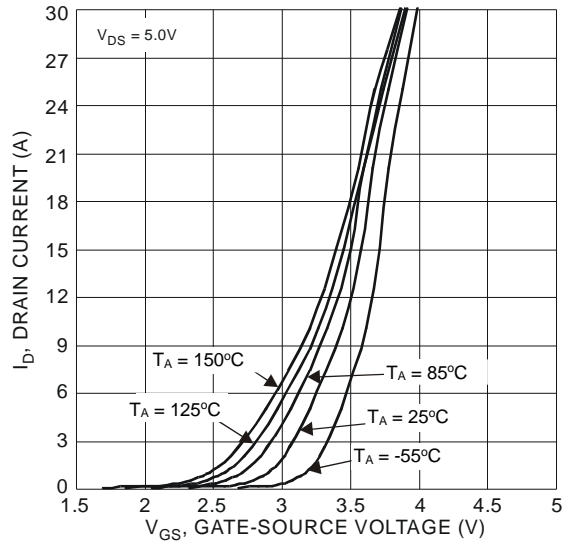


Figure 2 Typical Transfer Characteristics

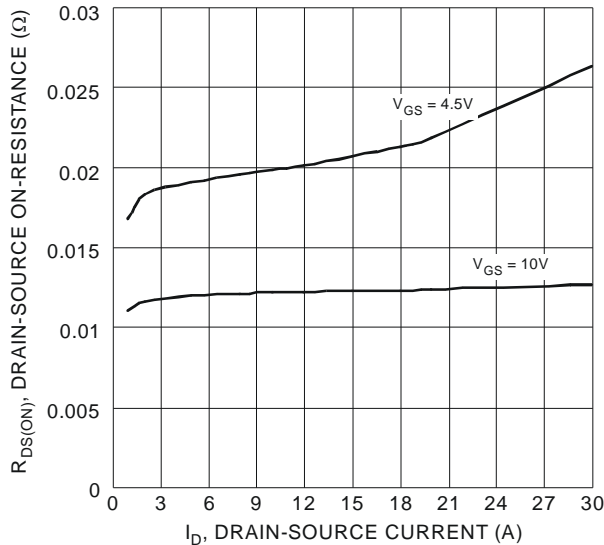


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

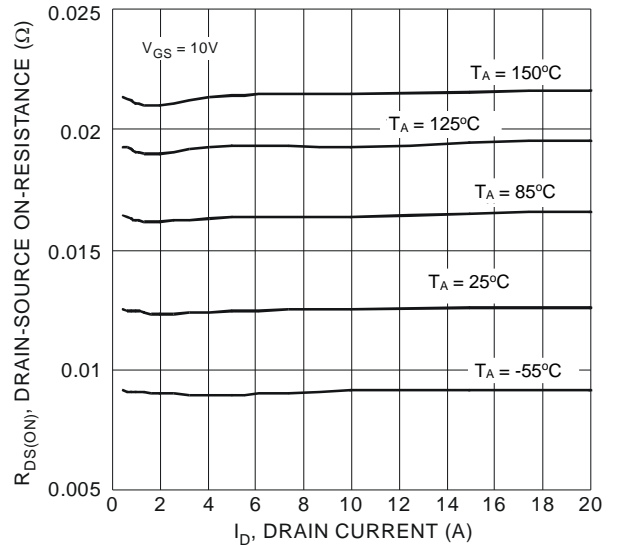


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

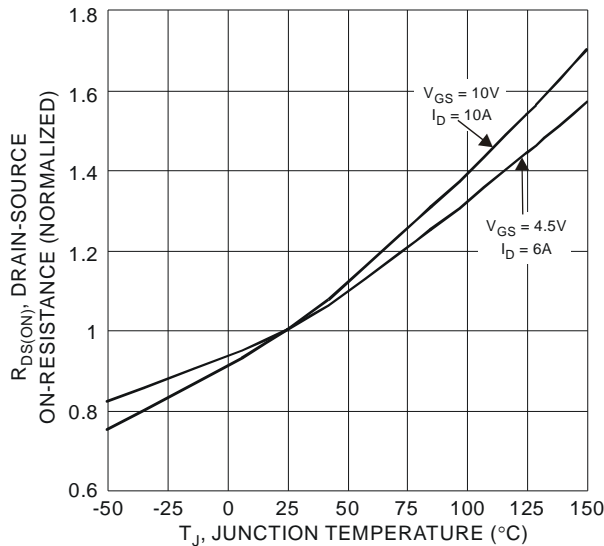


Figure 5 On-Resistance Variation with Temperature

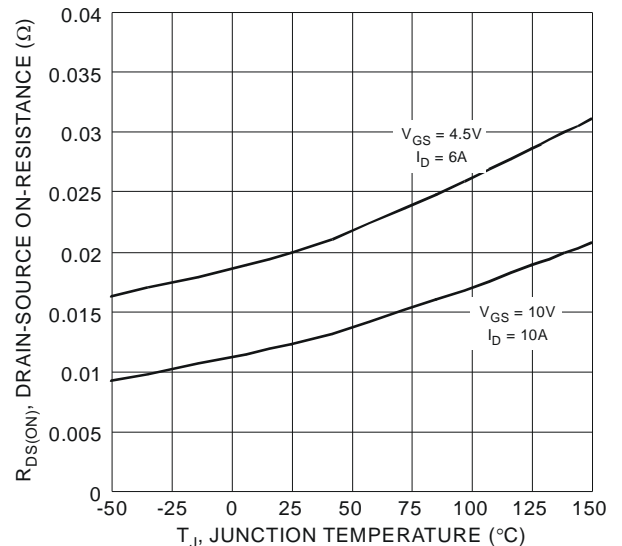


Figure 6 On-Resistance Variation with Temperature

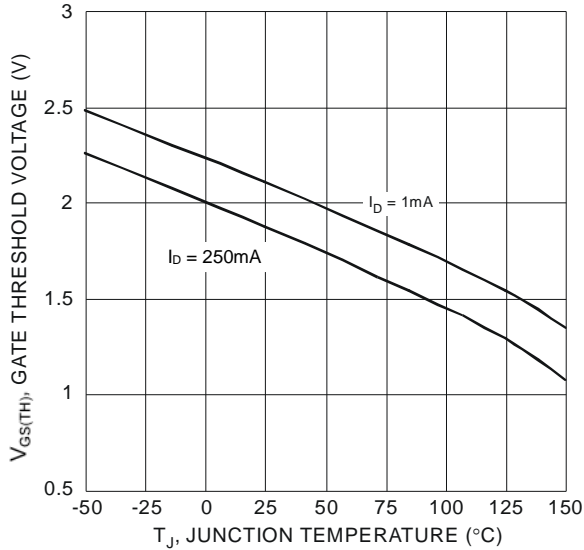


Figure 7 Gate Threshold Variation vs. Junction Temperature

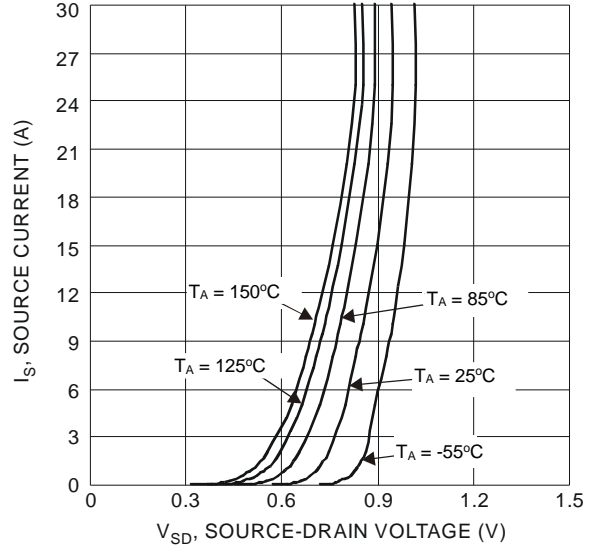


Figure 8 Diode Forward Voltage vs. Current

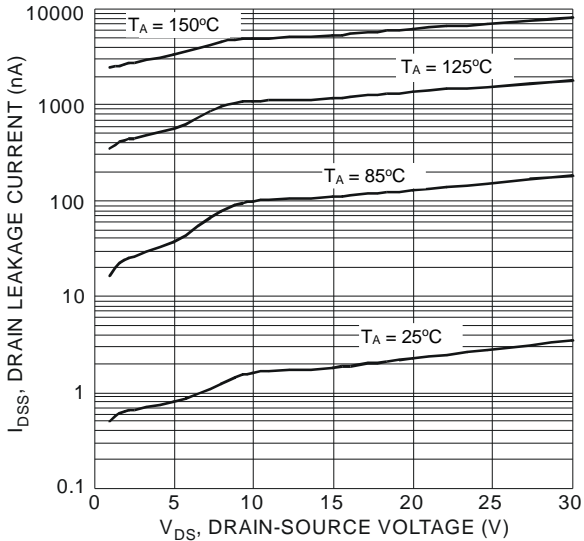


Figure 9 Typical Drain-Source Leakage Current vs. Voltage

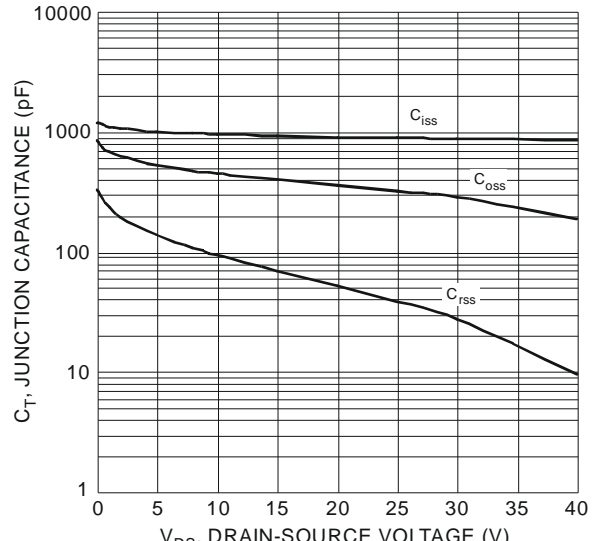


Figure 10 Typical Junction Capacitance

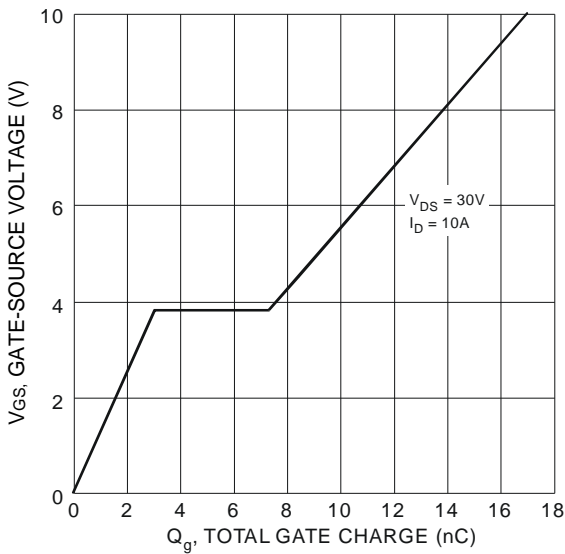


Figure 11 Gate Charge

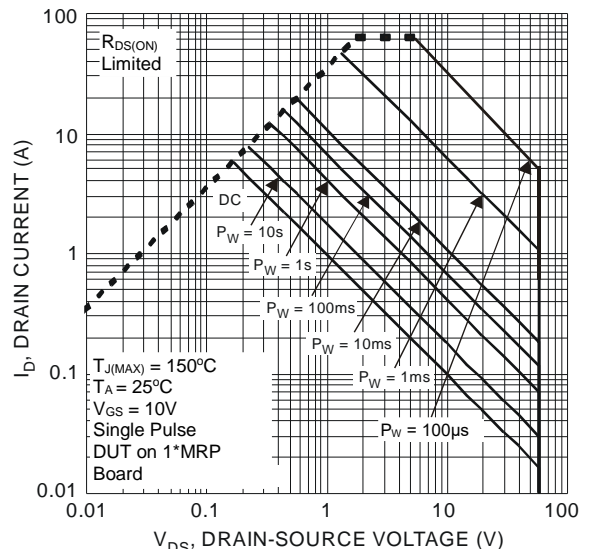


Figure 12 SOA, Safe Operation Area

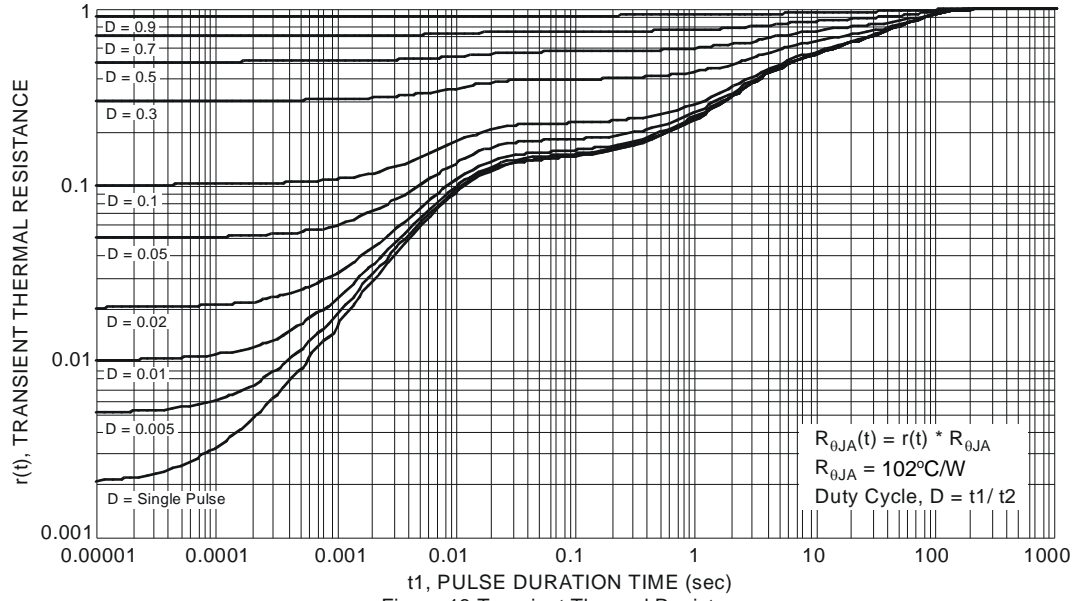


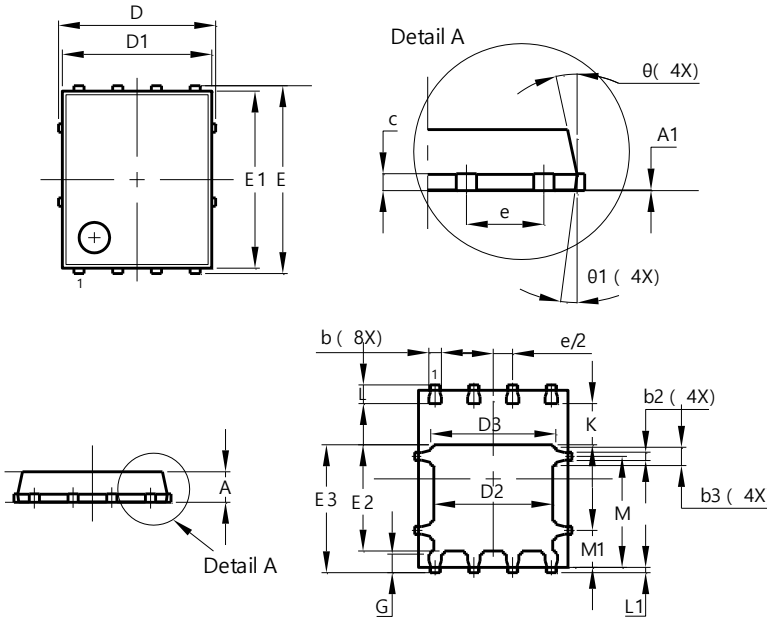
Figure 13 Transient Thermal Resistance

Package Outline Dimensions

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

Site1:

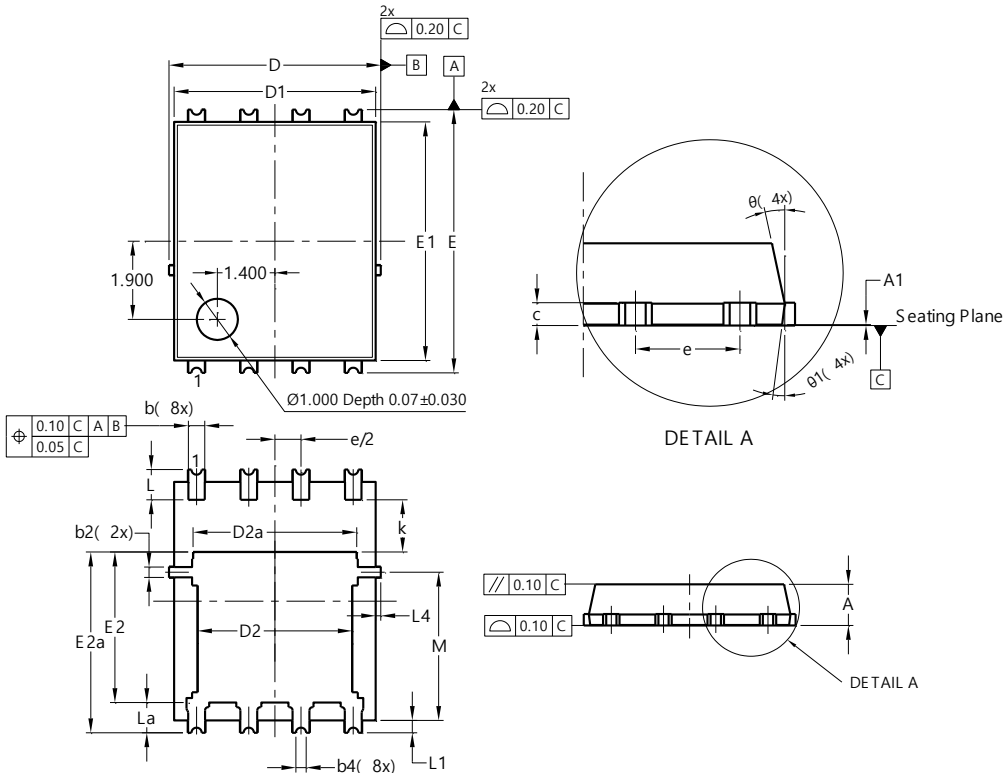
PowerDI5060-8



| PowerDI5060-8 | | | |
|----------------------|----------|-------|-------|
| Dim | Min | Max | Typ |
| 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 |
| c | 0.230 | 0.330 | 0.277 |
| 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 |
| E | 6.15 BSC | | |
| E1 | 5.60 | 6.00 | 5.80 |
| E2 | 3.28 | 3.68 | 3.48 |
| E3 | 3.99 | 4.39 | 4.19 |
| e | 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 |
| theta | 10° | 12° | 11° |
| theta1 | 6° | 8° | 7° |
| All Dimensions in mm | | | |

Site2:

PowerDI5060-8/SWP (Type UX)



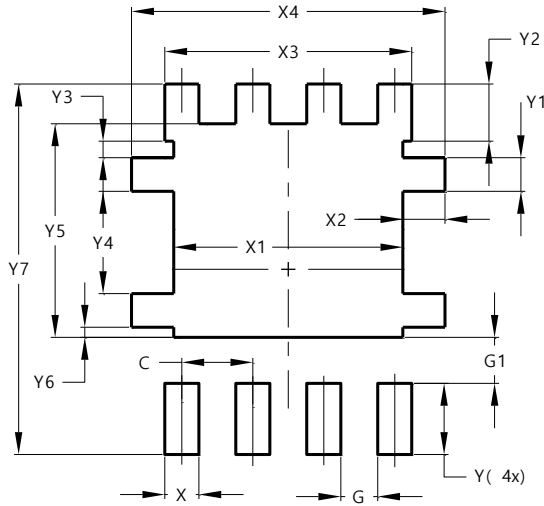
| PowerDI5060-8/SWP (Type UX) | | | |
|-----------------------------|----------|-------|-------|
| Dim | Min | Max | Typ |
| A | 0.90 | 1.10 | 1.00 |
| A1 | 0 | 0.05 | -- |
| b | 0.30 | 0.50 | 0.41 |
| b2 | 0.20 | 0.35 | 0.25 |
| b4 | 0.25REF | | |
| c | 0.230 | 0.330 | 0.277 |
| D | 5.15 BSC | | |
| D1 | 4.70 | 5.10 | 4.90 |
| D2 | 3.56 | 3.96 | 3.76 |
| D2a | 3.78 | 4.18 | 3.98 |
| E | 6.40 BSC | | |
| E1 | 5.60 | 6.00 | 5.80 |
| E2 | 3.46 | 3.86 | 3.66 |
| E2a | 4.195 | 4.595 | 4.395 |
| e | 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 |
| L4 | 0.025 | 0.225 | 0.125 |
| M | 3.205 | 4.005 | 3.605 |
| theta | 10° | 12° | 11° |
| theta1 | 6° | 8° | 7° |
| All Dimensions in mm | | | |

Suggested Pad Layout

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

Site1:

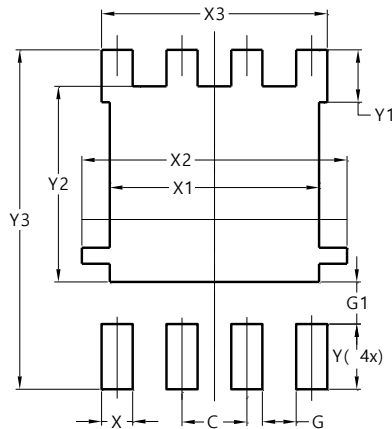
PowerDI5060-8



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 1.270 |
| G | 0.660 |
| G1 | 0.820 |
| X | 0.610 |
| X1 | 4.100 |
| X2 | 0.755 |
| X3 | 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 |

Site 2:

PowerDI5060-8/SWP (Type UX)



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 1.270 |
| G | 0.660 |
| G1 | 0.820 |
| X | 0.610 |
| X1 | 4.100 |
| X2 | 5.190 |
| X3 | 4.420 |
| Y | 1.270 |
| Y1 | 1.020 |
| Y2 | 3.810 |
| Y3 | 6.610 |

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