

**Product Summary**

BV <sub>DSS</sub>	R <sub>DS(ON)</sub> Max	I <sub>D</sub> Max T <sub>C</sub> = +25°C
100V	8mΩ @ V <sub>GS</sub> = 10V	91A
	12.5mΩ @ V <sub>GS</sub> = 4.5V	73A

**Description**

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:

- Motor controls
- DC-DC converters
- Power managements

**Features**

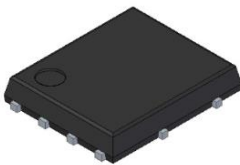
- Rated to +175°C – Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switching (UIS) Test in Production – Ensures More Reliable and Robust End Application
- Thermally Efficient Package-Cooler Running Applications
- High Conversion Efficiency
- Low R<sub>DS(ON)</sub> – Minimizes On-State Losses
- Low Input Capacitance
- Fast Switching Speed
- <1.1mm Package Profile – Ideal for Thin Applications (PowerDI®)
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**
- **The DMTH10H009LPSQ 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**

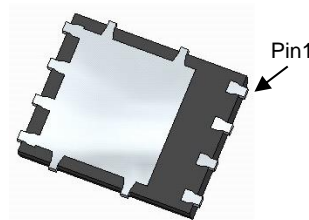
- Package: PowerDI5060-8
- Package Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram Below
- Terminal Finish - Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.097 grams (Approximate)

Site 1:

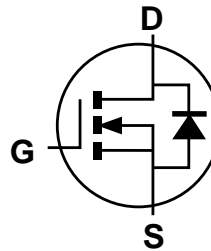
PowerDI5060-8



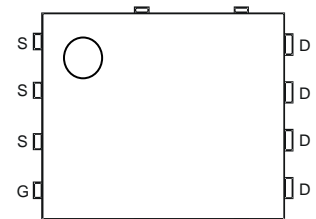
Top View



Bottom View



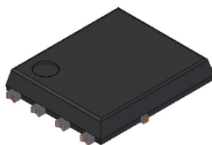
Internal Schematic



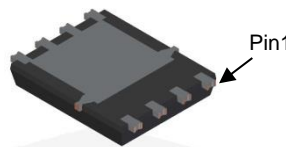
Top View  
Pin Configuration

Site 2:

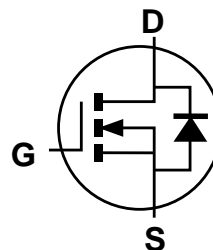
PowerDI5060-8/SWP (Type UX)



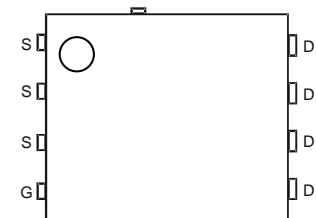
Top View



Bottom View



Internal Schematic



Top View  
Pin Configuration

Notes:

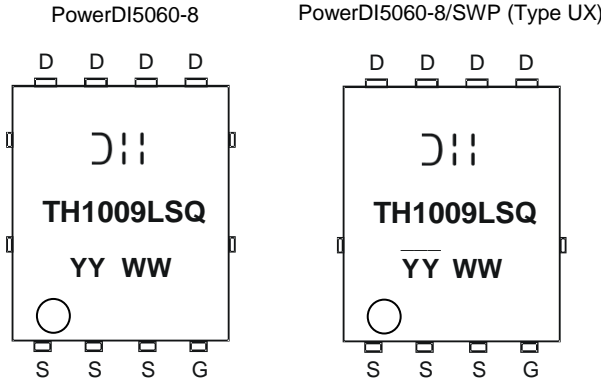
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

### Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMTH10H009LPSQ-13	PowerDI5060-8	2,500	Tape & Reel
DMTH10H009LPSQ-13	PowerDI5060-8/SWP (Type UX)	2,500	Tape & Reel

Note: 4. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

### Marking Information



= Manufacturer's Marking  
 TH1009LSQ = Product Type Marking Code  
 YYWW or YYWW = Date Code Marking  
 YY or YY = Last Two Digits of Year (ex: 23 = 2023)  
 WW = Week Code (01 to 53)

### Maximum Ratings (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V <sub>DSS</sub>	100	V
Gate-Source Voltage			V <sub>GSS</sub>	±20	V
Continuous Drain Current V <sub>GS</sub> = 10V (Note 6)	Steady State	T <sub>A</sub> = +25°C	I <sub>D</sub>	15	A
		T <sub>A</sub> = +100°C		11	
Continuous Drain Current V <sub>GS</sub> = 10V (Note 7)	Steady State	T <sub>C</sub> = +25°C	I <sub>D</sub>	91	A
		T <sub>C</sub> = +100°C		64	
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I <sub>DM</sub>	360	A
Maximum Continuous Body Diode Forward Current			I <sub>S</sub>	85	A
Pulsed Body Diode Current (10µs Pulse, Duty Cycle = 1%)			I <sub>SM</sub>	360	A
Avalanche Current (Note 8), L=0.3mH			I <sub>AS</sub>	21	A
Avalanche Energy (Note 8), L=0.3mH			E <sub>AS</sub>	66	mJ
V <sub>DS</sub> Spike, L=0.1mH		t = 10µs	V <sub>SPIKE</sub>	110	V

### Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T <sub>A</sub> = +25°C	P <sub>D</sub>	1.5	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R <sub>θJA</sub>	99	°C/W
Total Power Dissipation (Note 6)	T <sub>A</sub> = +25°C	P <sub>D</sub>	3.1	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R <sub>θJA</sub>	49	°C/W
Total Power Dissipation (Note 7)	T <sub>C</sub> = +25°C	P <sub>D</sub>	100	W
Thermal Resistance, Junction to Case (Note 7)		R <sub>θJC</sub>	1.5	°C/W
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +175	°C

- Notes:
- Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
  - Thermal resistance from junction to soldering point (on the exposed drain pad).
  - I<sub>AS</sub> and E<sub>AS</sub> ratings are based on low frequency and duty cycles to keep T<sub>J</sub> = +25°C.

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b> (Note 9)						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	100	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 1mA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1	μA	V <sub>DS</sub> = 80V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS</b> (Note 9)						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	1.2	—	2.5	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	6	8	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A
		—	9	12.5		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 5A
Diode Forward Voltage	V <sub>SD</sub>	—	0.8	1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 13A
<b>DYNAMIC CHARACTERISTICS</b> (Note 10)						
Input Capacitance	C <sub>iss</sub>	—	2309	—	pF	V <sub>DS</sub> = 50V, V <sub>GS</sub> = 0V f = 1MHz
Output Capacitance	C <sub>oss</sub>	—	536	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	13.7	—		
Gate Resistance	R <sub>g</sub>	—	1.9	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>g</sub>	—	40.2	—	nC	V <sub>DD</sub> = 50V, I <sub>D</sub> = 20A
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Q <sub>g</sub>	—	20.2	—		
Gate-Source Charge	Q <sub>gs</sub>	—	7.0	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	8.5	—		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	5.4	—	ns	V <sub>DD</sub> = 50V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A, R <sub>g</sub> = 3Ω
Turn-On Rise Time	t <sub>R</sub>	—	10.6	—		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	28.3	—		
Turn-Off Fall Time	t <sub>F</sub>	—	14.9	—		
Reverse Recovery Time	t <sub>RR</sub>	—	44.3	—	ns	I <sub>F</sub> = 20A, di/dt = 100A/μs
Reverse Recovery Charge	Q <sub>RR</sub>	—	65.5	—	nC	

Notes: 9. Short duration pulse test used to minimize self-heating effect.  
10. Guaranteed by design. Not subject to product testing.

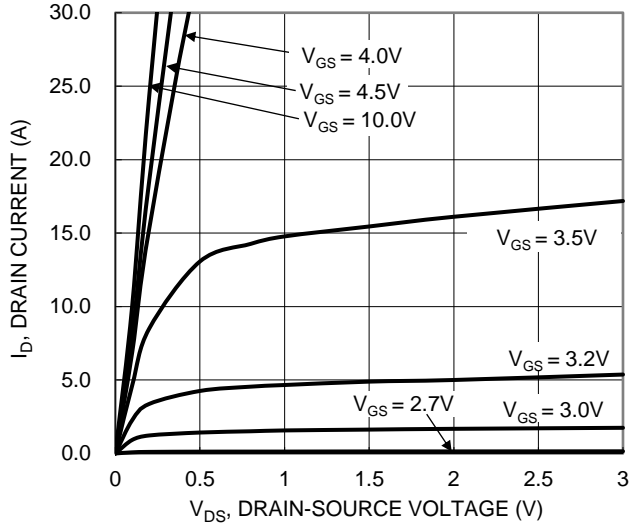


Figure 1. Typical Output Characteristic

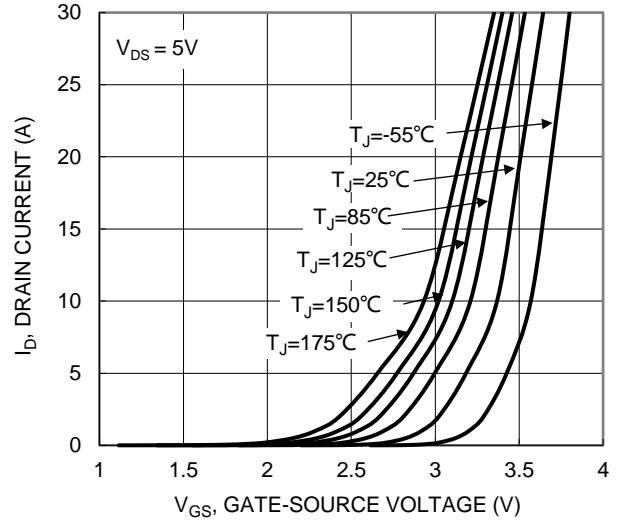


Figure 2. Typical Transfer Characteristic

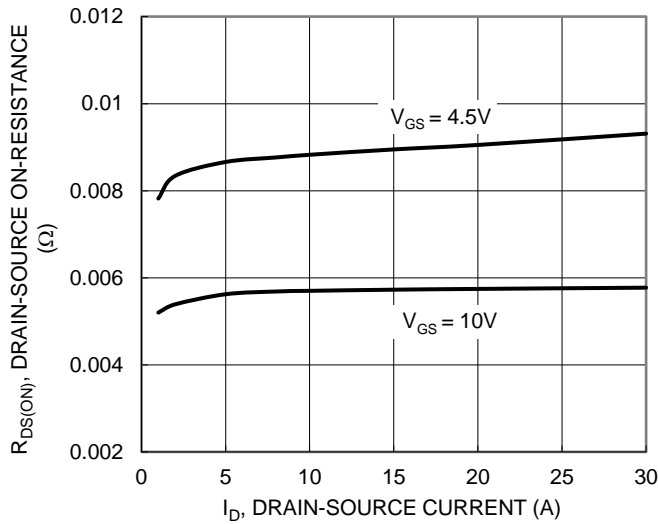


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

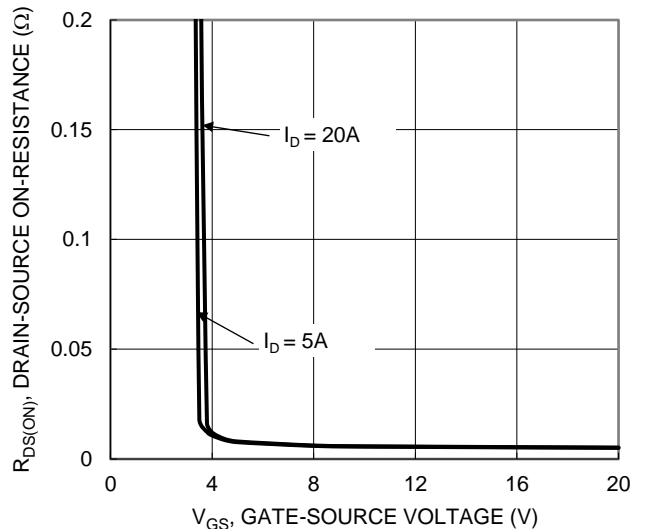


Figure 4. Typical Transfer Characteristic

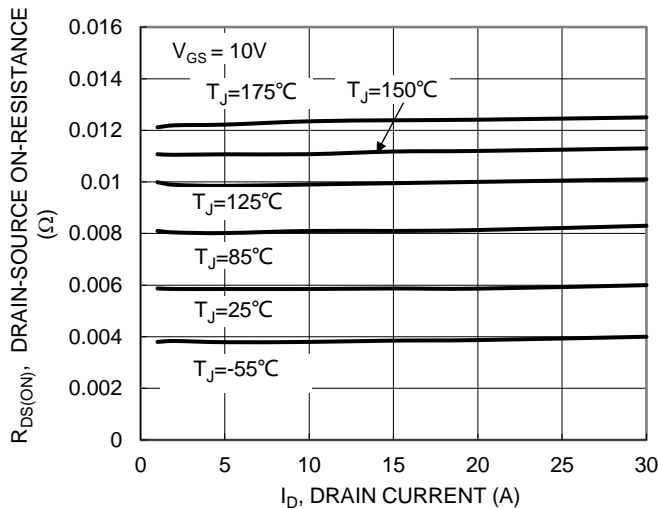


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

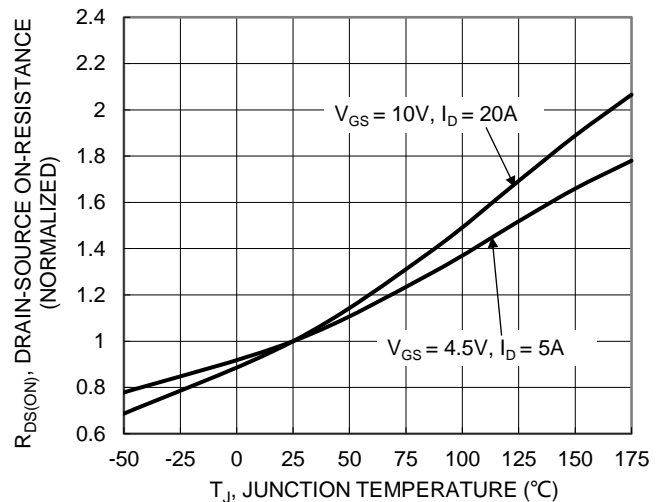


Figure 6. On-Resistance Variation with Junction Temperature

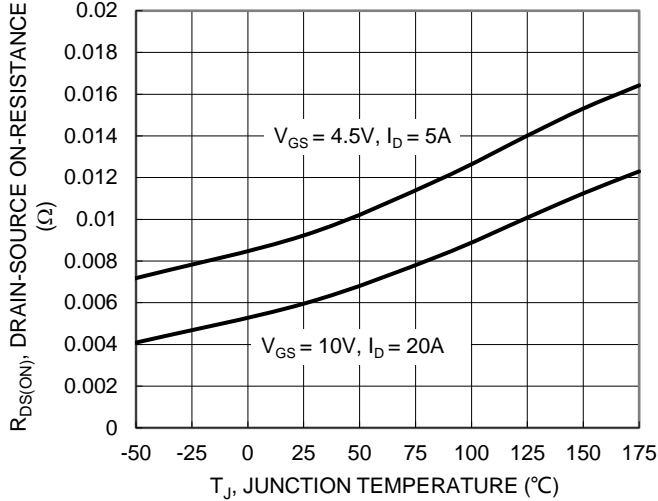


Figure 7. On-Resistance Variation with Junction Temperature

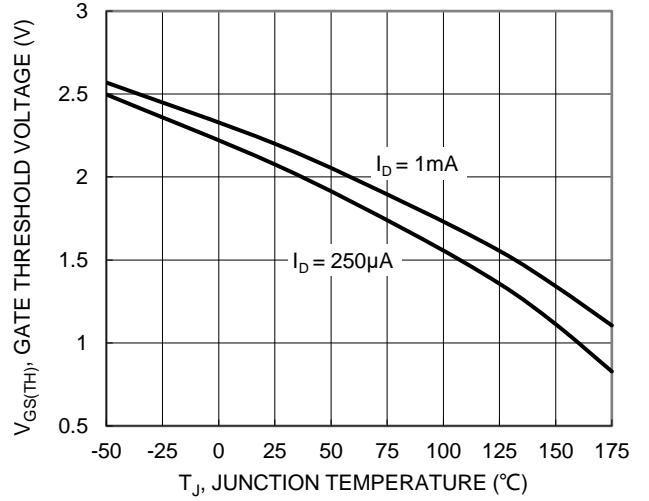


Figure 8. Gate Threshold Variation vs. Junction Temperature

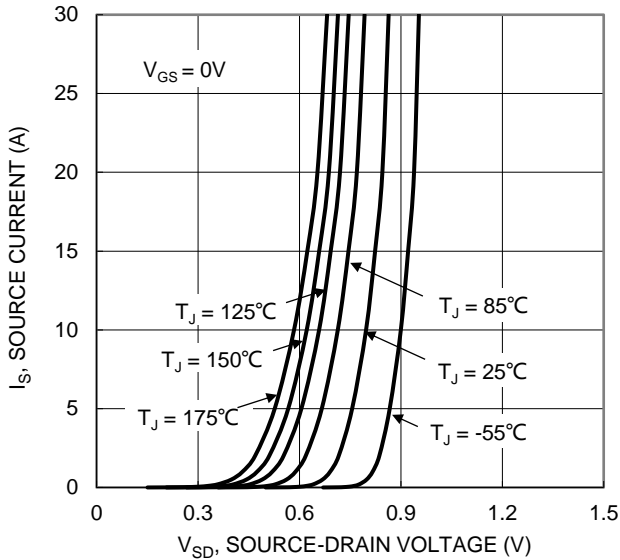


Figure 9. Diode Forward Voltage vs. Current

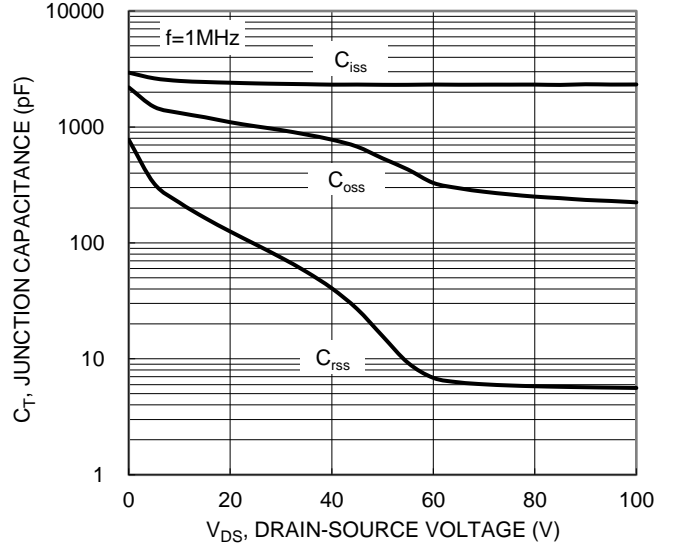


Figure 10. Typical Junction Capacitance

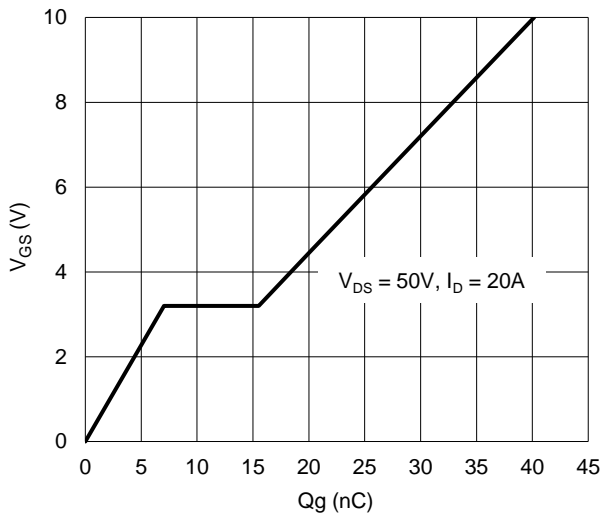


Figure 11. Gate Charge

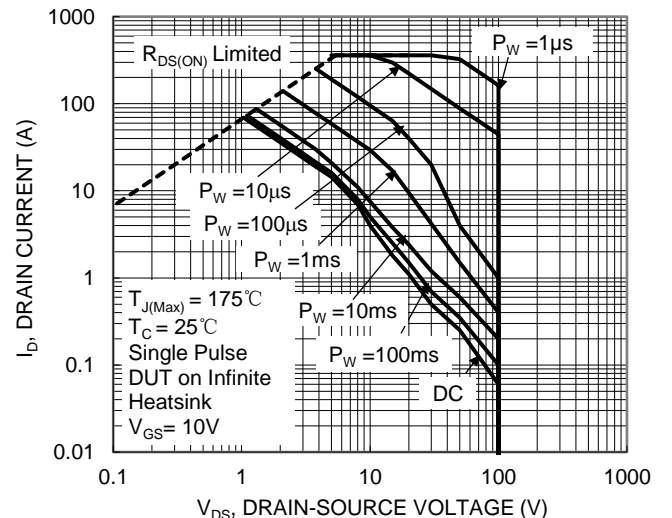


Figure 12. SOA, Safe Operation Area

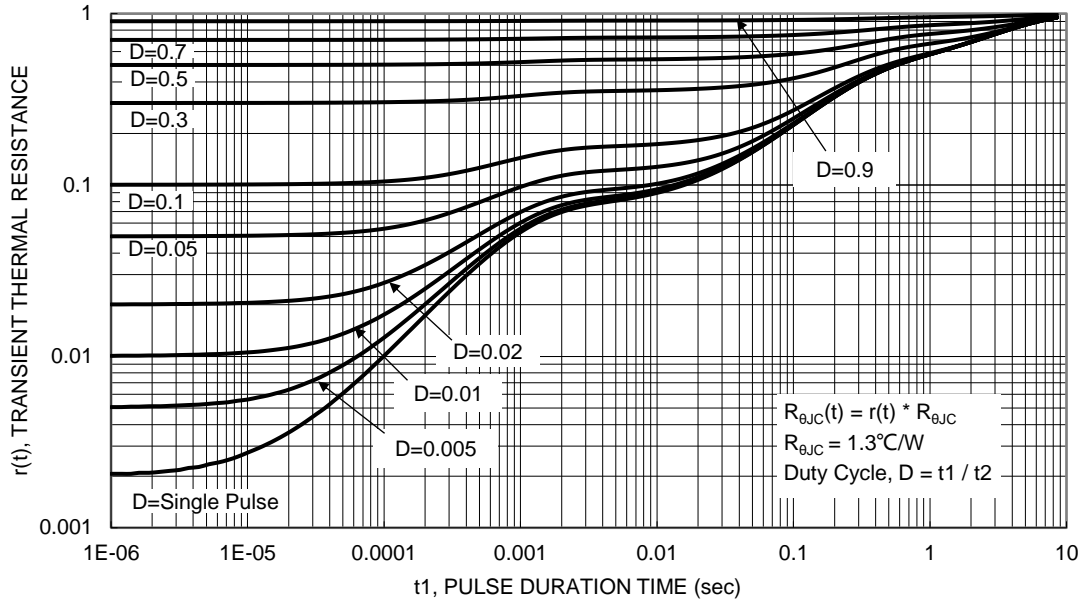


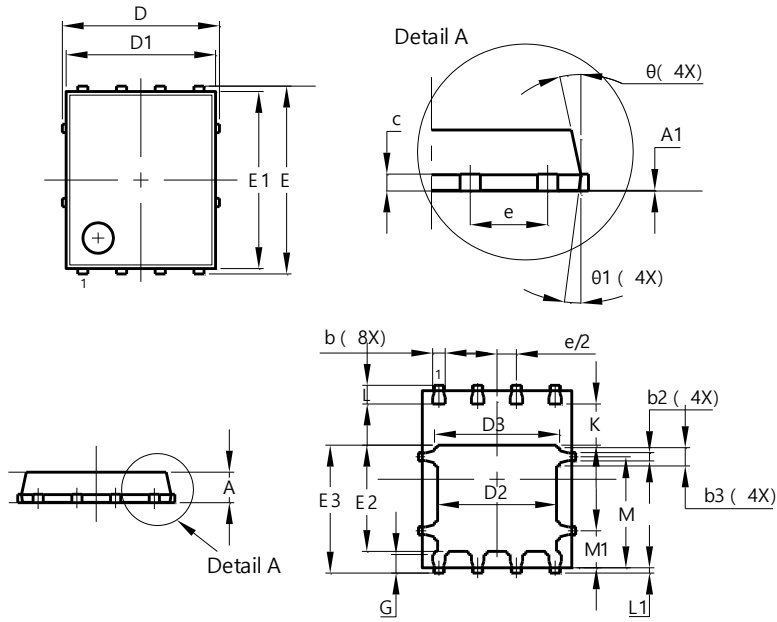
Figure 13. Transient Thermal Resistance

**Package Outline Dimensions**

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

Site 1:

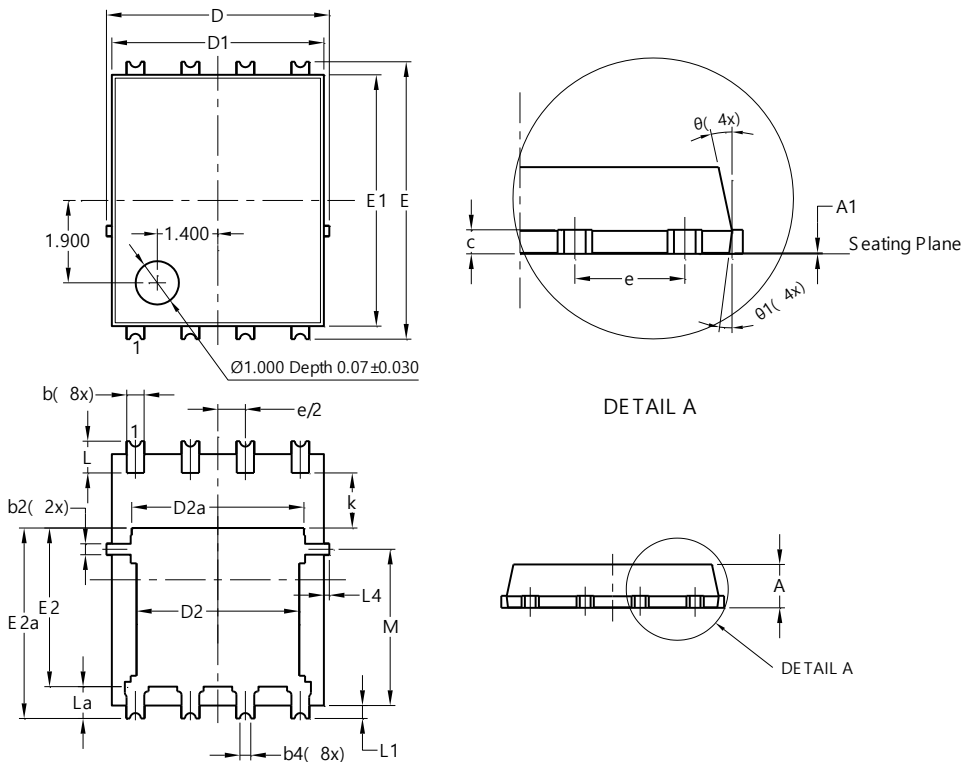
**PowerDI5060-8**



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			

Site 2:

**PowerDI5060-8/SWP (Type UX)**



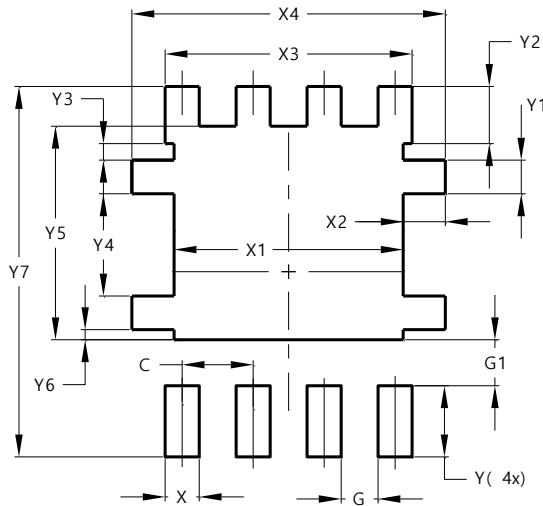
PowerDI5060-8/SWP (Type UX)			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0	0.05	--
b	0.30	0.50	0.41
b2	0.20	0.35	0.25
b4	0.25REF		
c	0.230	0.330	0.277
D	5.15 BSC		
D1	4.70	5.10	4.90
D2	3.56	3.96	3.76
D2a	3.78	4.18	3.98
E	6.40 BSC		
E1	5.60	6.00	5.80
E2	3.46	3.86	3.66
E2a	4.195	4.595	4.395
e	1.27 BSC		
k	1.05	--	--
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
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.

Site 1:

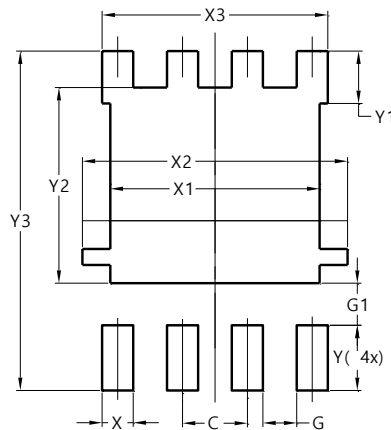
**PowerDI5060-8**



Dimensions	Value (in mm)
<b>C</b>	1.270
<b>G</b>	0.660
<b>G1</b>	0.820
<b>X</b>	0.610
<b>X1</b>	4.100
<b>X2</b>	0.755
<b>X3</b>	4.420
<b>X4</b>	5.610
<b>Y</b>	1.270
<b>Y1</b>	0.600
<b>Y2</b>	1.020
<b>Y3</b>	0.295
<b>Y4</b>	1.825
<b>Y5</b>	3.810
<b>Y6</b>	0.180
<b>Y7</b>	6.610

Site 2:

**PowerDI5060-8/SWP (Type UX)**



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



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