

## Product Summary

BV <sub>bss</sub>	R <sub>DS(ON)</sub> Max	I <sub>D</sub> Max T <sub>c</sub> = +25°C
150V	17.5mΩ @ V <sub>GS</sub> = 10V	50A
	25.5mΩ @ V <sub>GS</sub> = 4.5V	43A

## Description and Applications

This new generation N-Channel Enhancement Mode MOSFET is designed to minimize R<sub>DS(ON)</sub> yet maintain superior switching performance. This device is ideal for use in notebook battery power management and load switch.

- Synchronous rectification
- Power switching
- Class D audio amplifiers

## 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 DIODES™ DMTH15H017LPSWQ 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/>

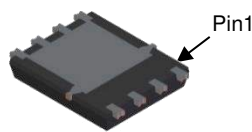
## Mechanical Data

- 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)

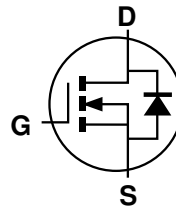
PowerDI5060-8 (SWP) (Type UX)



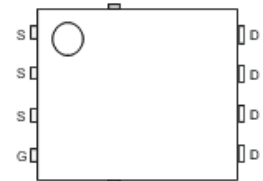
Top View



Bottom View



Internal Schematic



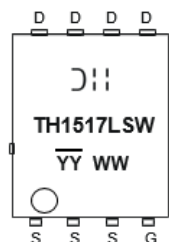
Top View  
Pin Configuration

## Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMTH15H017LPSWQ-13	PowerDI5060-8 (SWP) (Type UX)	2,500	Tape & Reel

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

## Marking Information



= Manufacturer's Marking  
 TH1517LSW = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Last Two Digits of Year (ex: 22 = 2022)  
 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>	150	V
Gate-Source Voltage			V <sub>GSS</sub>	±20	V
Continuous Drain Current V <sub>GS</sub> = 10V (Note 5)	Steady State	T <sub>A</sub> = +25°C	I <sub>D</sub>	8	A
		T <sub>A</sub> = +100°C		5.7	
Continuous Drain Current V <sub>GS</sub> = 10V (Note 6)	Steady State	T <sub>C</sub> = +25°C	I <sub>D</sub>	50	A
		T <sub>C</sub> = +100°C		35	
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I <sub>DM</sub>	200	A
Maximum Continuous Body Diode Forward Current			I <sub>S</sub>	50	A
Pulsed Body Diode Current (10µs Pulse, Duty Cycle = 1%)			I <sub>SM</sub>	200	A
Avalanche Current (Note 7), L = 3mH			I <sub>AS</sub>	14.5	A
Avalanche Energy (Note 7), L = 3mH			E <sub>AS</sub>	315.4	mJ

**Thermal Characteristics**

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 8)	T <sub>A</sub> = +25°C	P <sub>D</sub>	1.5	W
Thermal Resistance, Junction to Ambient (Note 8)	Steady State	R <sub>θJA</sub>	99	°C/W
Total Power Dissipation (Note 5)	T <sub>A</sub> = +25°C	P <sub>D</sub>	2.8	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R <sub>θJA</sub>	53	°C/W
Total Power Dissipation (Note 6)	T <sub>C</sub> = +25°C	P <sub>D</sub>	107	W
Thermal Resistance, Junction to Case (Note 6)		R <sub>θJC</sub>	1.4	°C/W
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +175	°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>	150	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 10mA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1	µA	V <sub>DS</sub> = 120V, 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>	1.3	—	2.6	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	13	17.5	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A
		—	17	25.5		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 20A
Diode Forward Voltage	V <sub>SD</sub>	—	0.8	1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 20A
<b>DYNAMIC CHARACTERISTICS</b> (Note 10)						
Input Capacitance	C <sub>iss</sub>	—	3369	—	pF	V <sub>DS</sub> = 75V, V <sub>GS</sub> = 0V f = 1MHz
Output Capacitance	C <sub>oss</sub>	—	211	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	6.7	—		
Gate Resistance	R <sub>g</sub>	—	1.9	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge	Q <sub>g</sub>	—	50	—	nC	V <sub>DD</sub> = 75V, I <sub>D</sub> = 20A V <sub>GS</sub> = 10V
Gate-Source Charge	Q <sub>gs</sub>	—	12.8	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	9.4	—		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	10.5	—	ns	V <sub>DD</sub> = 75V, V <sub>GS</sub> = 10V I <sub>D</sub> = 20A, R <sub>g</sub> = 6Ω
Turn-On Rise Time	t <sub>r</sub>	—	16.3	—		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	44.6	—		
Turn-Off Fall Time	t <sub>f</sub>	—	17.7	—		
Reverse Recovery Time	t <sub>RR</sub>	—	72	—	ns	I <sub>F</sub> = 20A, di/dt = 100A/µs
Reverse Recovery Charge	Q <sub>RR</sub>	—	215	—	nC	

- Notes:
- 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.
  - Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.

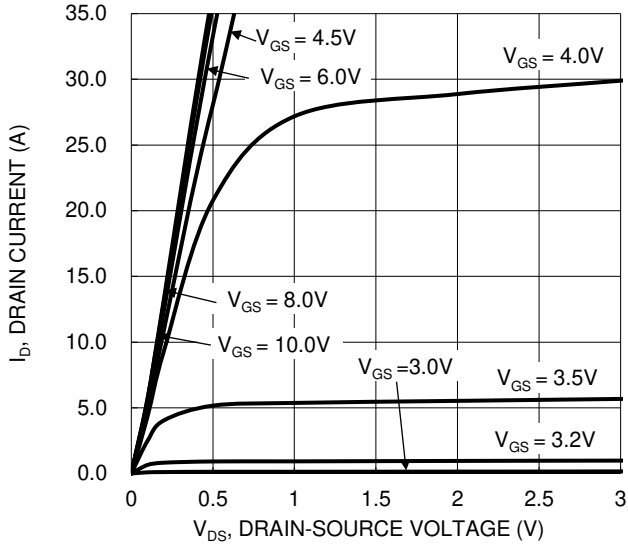


Figure 1. Typical Output Characteristic

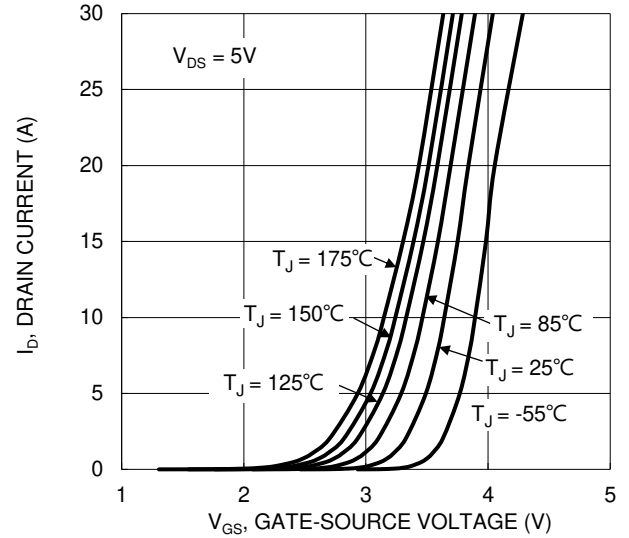


Figure 2. Typical Transfer Characteristic

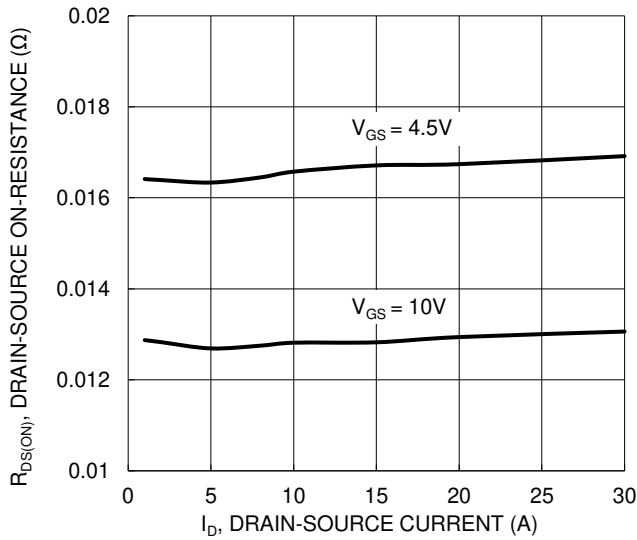


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

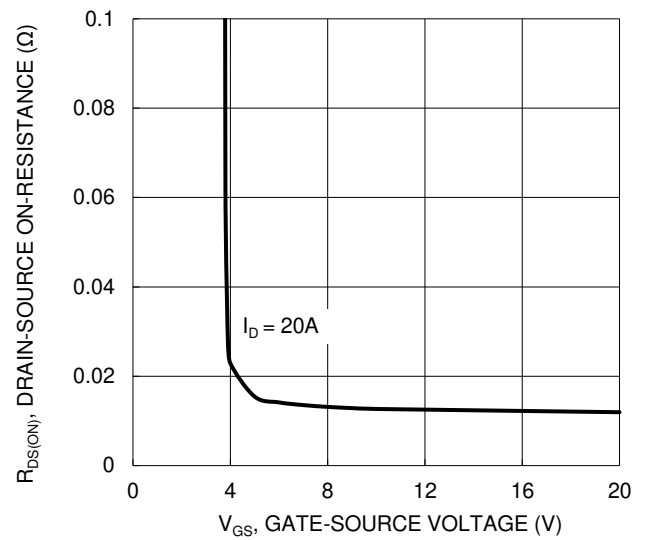


Figure 4. Typical Transfer Characteristic

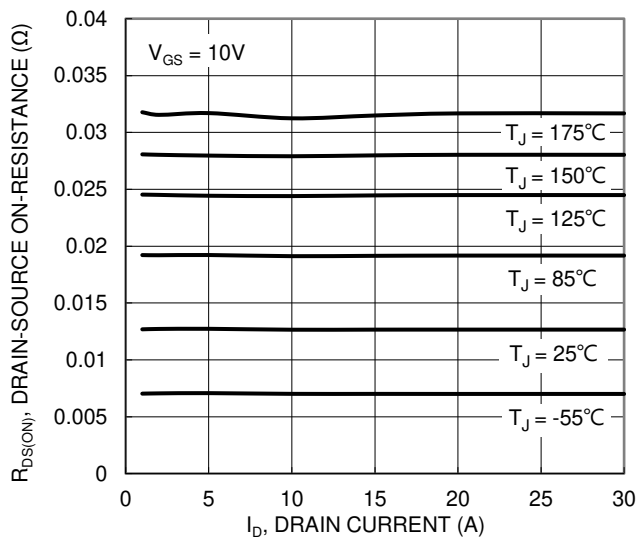


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

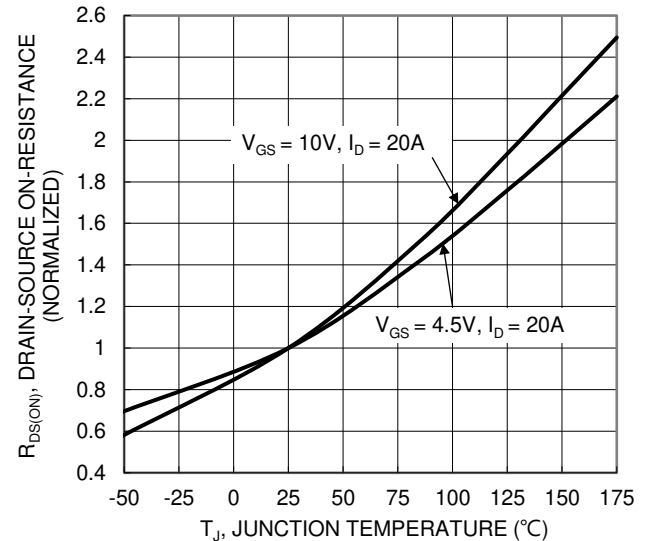


Figure 6. On-Resistance Variation with Junction Temperature

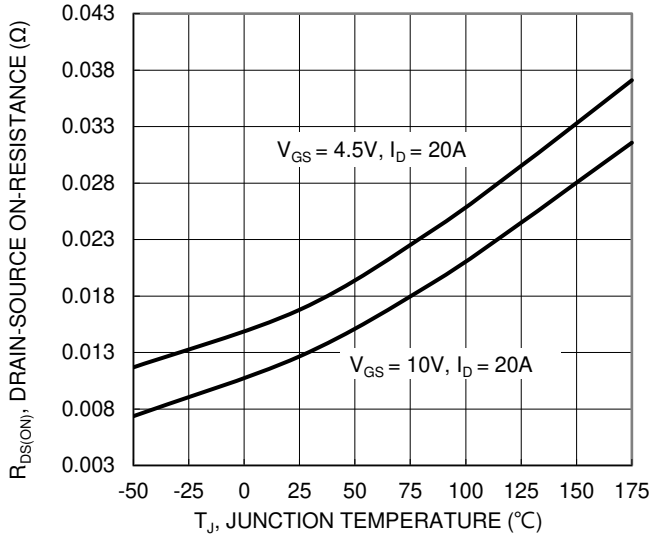


Figure 7. On-Resistance Variation with Junction Temperature

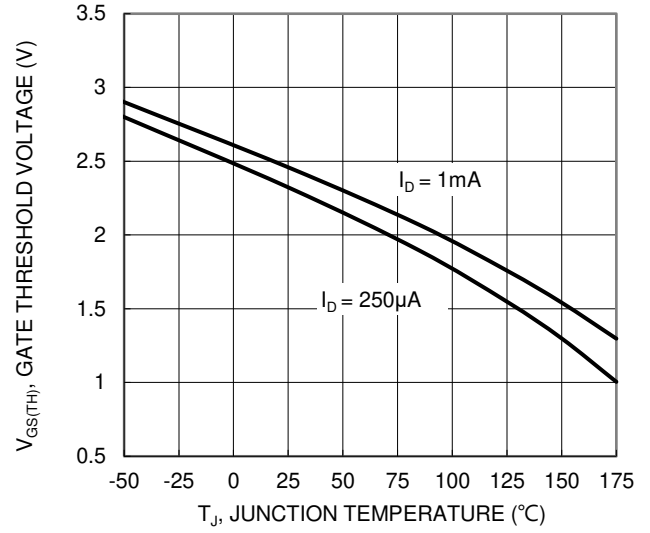


Figure 8. Gate Threshold Variation vs. Junction Temperature

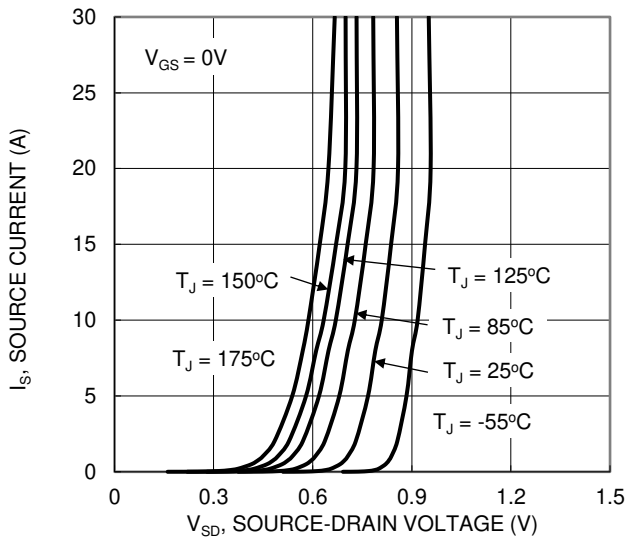


Figure 9. Diode Forward Voltage vs. Current

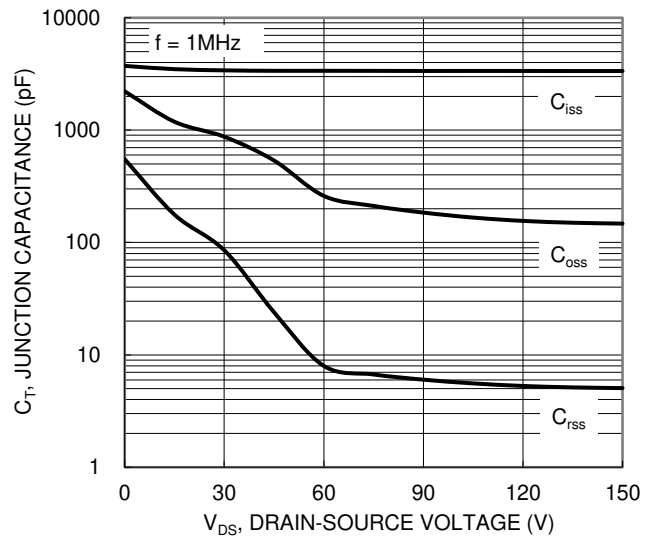


Figure 10. Typical Junction Capacitance

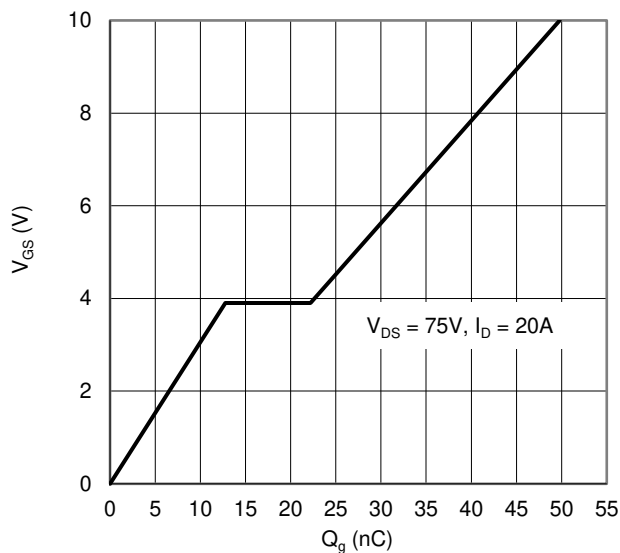


Figure 11. Gate Charge

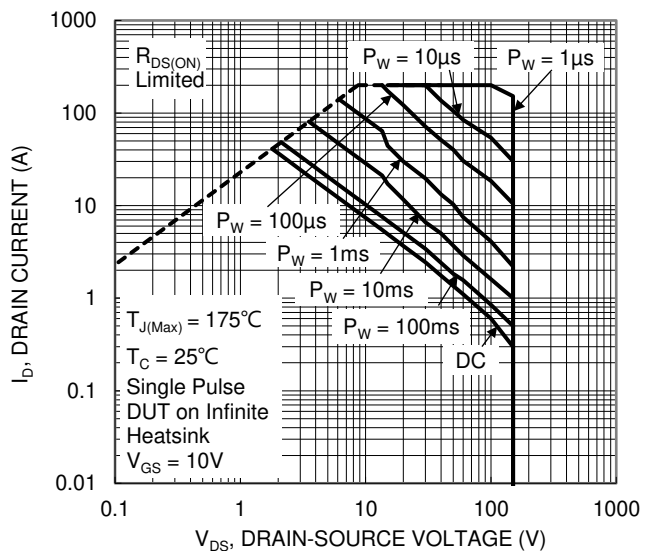


Figure 12. SOA, Safe Operation Area

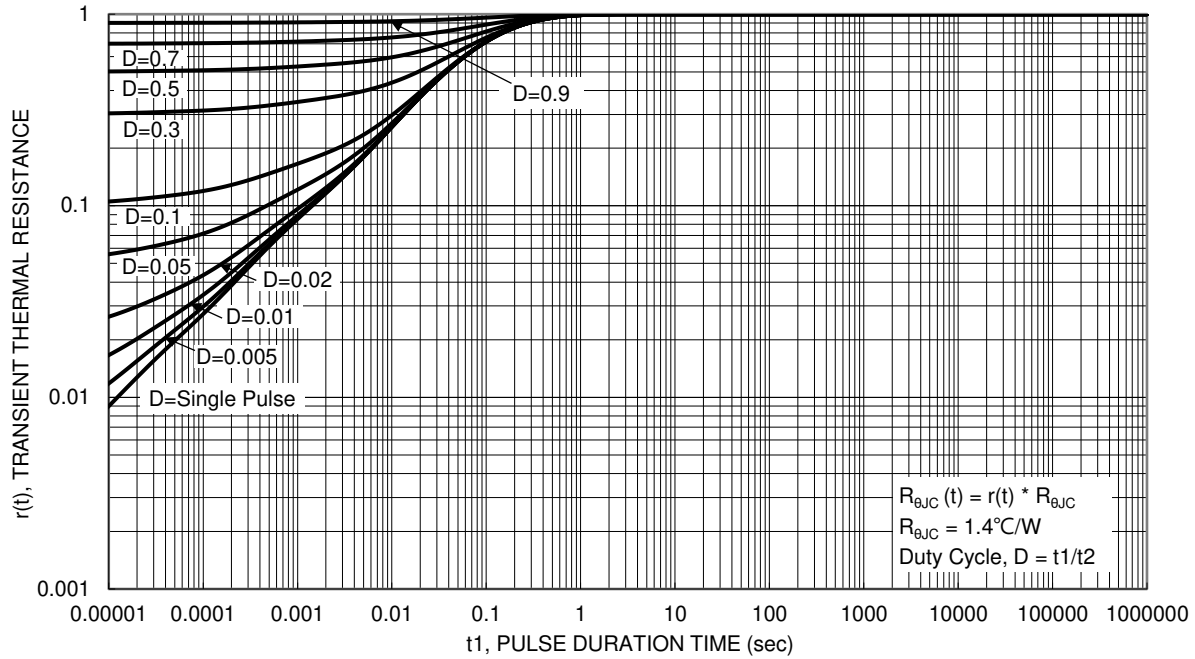
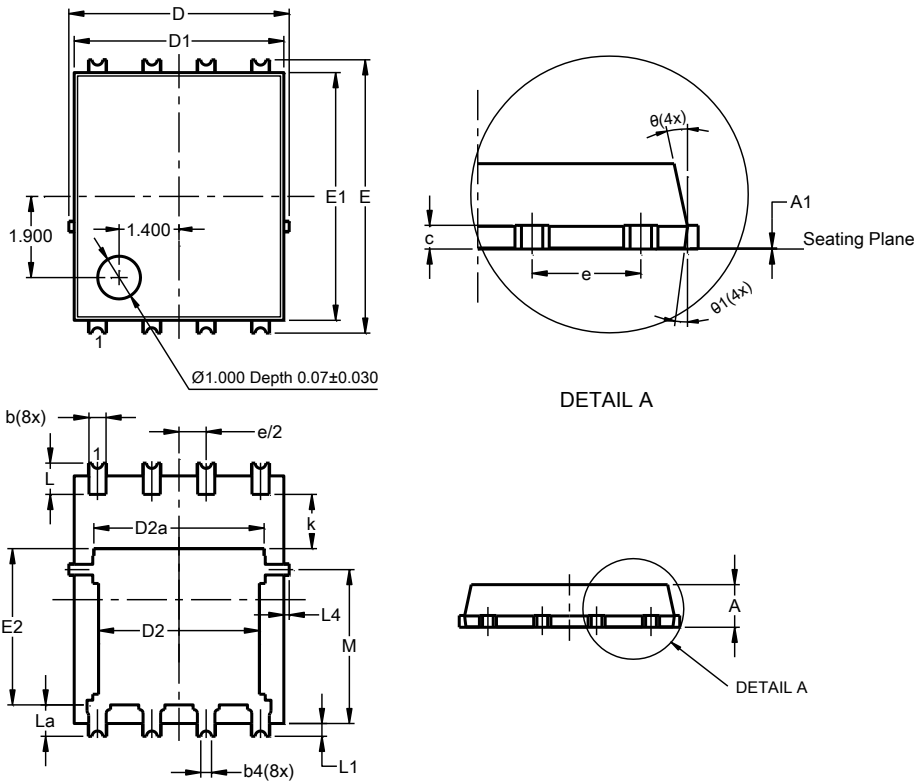


Figure 13. Transient Thermal Resistance

## Package Outline Dimensions

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

### PowerDI5060-8 (SWP) (Type UX)

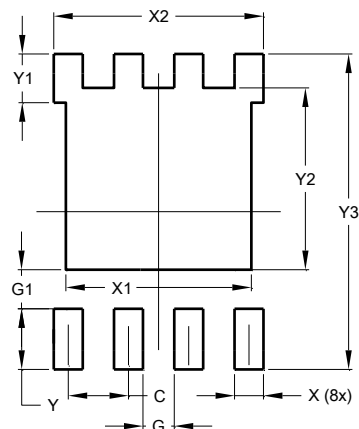


PowerDI5060-8 (SWP) (Type UX)			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0	0.05	--
b	0.30	0.50	0.41
b2	0.20	0.35	0.25
b4	0.25REF		
c	0.230	0.330	0.277
D	5.15 BSC		
D1	4.70	5.10	4.90
D2	3.56	3.96	3.76
D2a	3.78	4.18	3.98
E	6.40 BSC		
E1	5.60	6.00	5.80
E2	3.46	3.86	3.66
E2a	4.195	4.595	4.395
e	1.27BSC		
k	1.05	--	--
L	0.635	0.835	0.735
La	0.635	0.835	0.735
L1	0.200	0.400	0.300
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.

### 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	4.420
Y	1.270
Y1	1.020
Y2	3.810
Y3	6.610

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