

## Product Summary

BV <sub>DSS</sub>	R <sub>DS(ON)</sub>	I <sub>D</sub> T <sub>C</sub> = +25°C
80V	25mΩ @ V <sub>GS</sub> = 10V	41.7A
	41mΩ @ V <sub>GS</sub> = 4.5V	32.5A

## Features

- 100% Unclamped Inductive Switching (UIS) Test in Production — Ensures More Reliable and Robust End Application
- High Conversion Efficiency
- Low Input Capacitance
- Fast Switching Speed
- Wettable Flank for Improved Optical Inspection
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DMTH8028LPSWQ 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/>

## Description and Applications

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:

- Synchronous Rectifiers
- Backlighting
- Power Management Functions
- DC-DC Converters

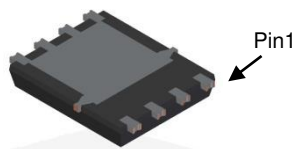
## Mechanical Data

- Case: PowerDI<sup>®</sup>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 Lead-Frame; Solderable per MIL-STD-202, Method 208 **e3**
- Weight: 0.097 grams (Approximate)

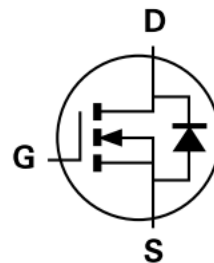
PowerDI5060-8 (SWP) (Type UX)



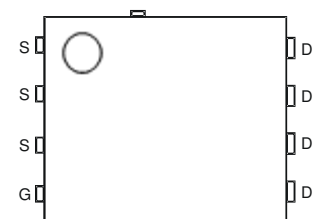
Top View



Bottom View



Internal Schematic



Top View  
Pin Configuration

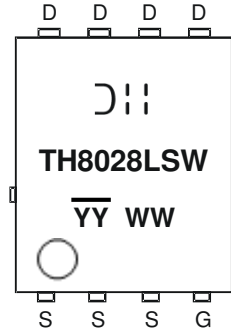
## Ordering Information (Note 4)

Part Number	Case	Packaging
DMTH8028LPSWQ-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

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



**Dii** = Manufacturer's Marking  
**TH8028LSW** = Product Type Marking Code  
**YYWW** = Date Code Marking  
**YY** = Last Two Digits of Year (ex: 20 = 2020)  
**WW** = Week Code (01 to 53)

## Maximum Ratings (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSS}$	80	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current, $V_{GS} = 10\text{V}$ (Note 6)	$I_D$	$T_C = +25^\circ\text{C}$ 41.7	A
		$T_C = +100^\circ\text{C}$ 29.5	
Pulsed Drain Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%)	$I_{DM}$	166.8	A
Maximum Continuous Body Diode Forward Current (Note 6)	$I_S$	41	A
Pulsed Body Diode Forward Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%)	$I_{SM}$	166.8	A
Avalanche Current, $L = 0.3\text{mH}$ (Note 9)	$I_{AS}$	12.5	A
Avalanche Energy, $L = 0.3\text{mH}$ (Note 9)	$E_{AS}$	23.4	mJ

## Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	$P_D$	$T_A = +25^\circ\text{C}$ 3.9	W
Thermal Resistance, Junction to Ambient (Note 5)		$R_{\theta JA}$ 38	
Total Power Dissipation (Note 6)	$P_D$	$T_C = +25^\circ\text{C}$ 65	W
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$ 2.3	
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +175	$^\circ\text{C}$

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.  
 6. Thermal resistance from junction to soldering point (on the exposed drain pad).

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	80	—	—	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> = 64V, 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 (Note 7)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	1.3	—	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>	—	18	25	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 5A
		—	28	41		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 4.5A
Diode Forward Voltage	V <sub>SD</sub>	—	0.8	1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 5A
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	C <sub>iss</sub>	—	641	—	pF	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	272	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	32	—		
Gate Resistance	R <sub>g</sub>	—	1.4	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Q <sub>g</sub>	—	5.4	—	nC	V <sub>DS</sub> = 40V, I <sub>D</sub> = 7.5A
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>g</sub>	—	10.4	—		
Gate-Source Charge	Q <sub>gs</sub>	—	1.8	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	2.4	—		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	11.3	—	ns	V <sub>DD</sub> = 40V, V <sub>GS</sub> = 4.5V, R <sub>G</sub> = 2.7Ω, I <sub>D</sub> = 10A
Turn-On Rise Time	t <sub>R</sub>	—	14.3	—		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	10.8	—		
Turn-Off Fall Time	t <sub>F</sub>	—	8.3	—		
Body Diode Reverse Recovery Time	t <sub>RR</sub>	—	25.5	—	ns	I <sub>F</sub> = 7.5A, di/dt = 100A/μs
Body Diode Reverse Recovery Charge	Q <sub>RR</sub>	—	20.6	—	nC	

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

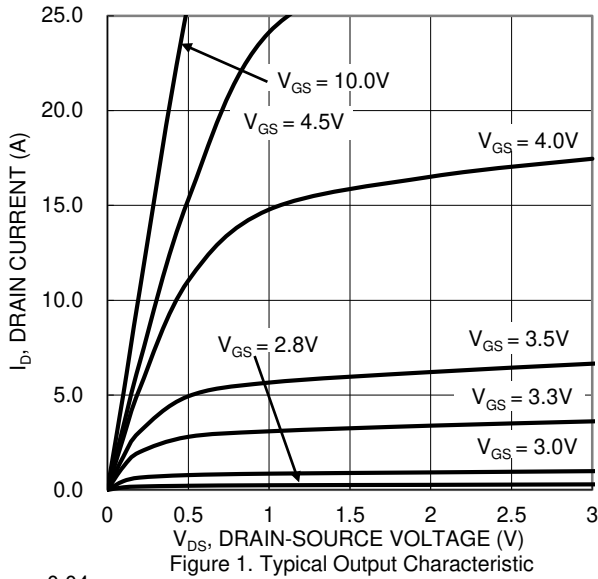


Figure 1. Typical Output Characteristic

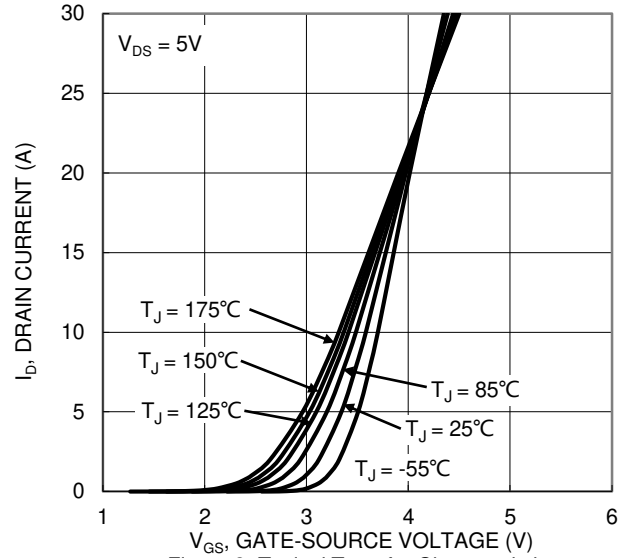


Figure 2. Typical Transfer Characteristic

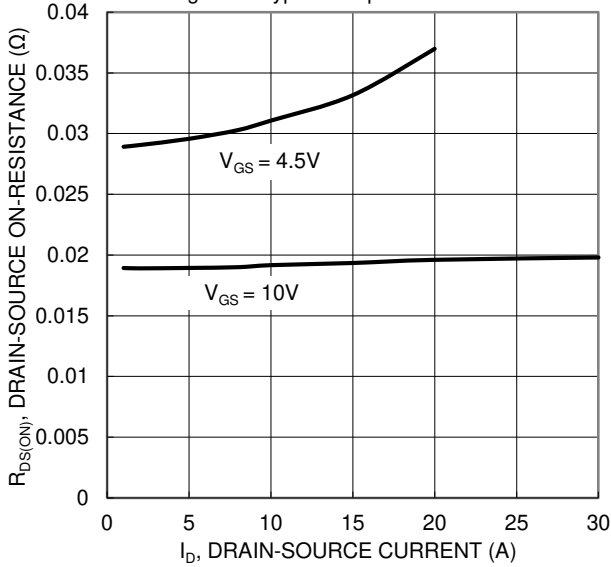


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

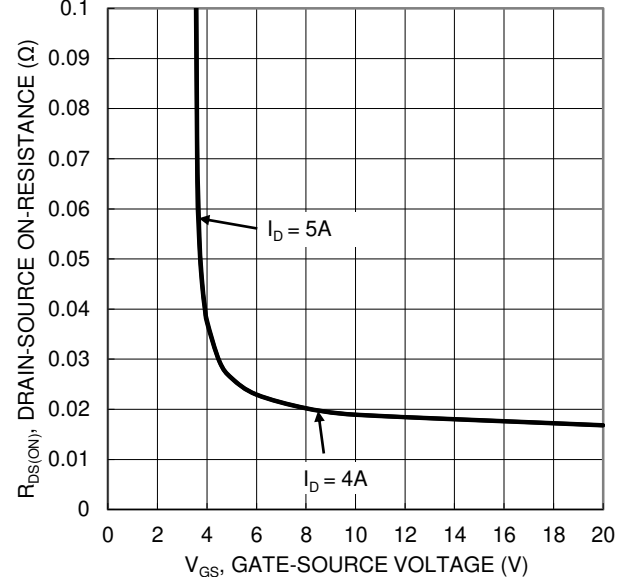


Figure 4. Typical Transfer Characteristic

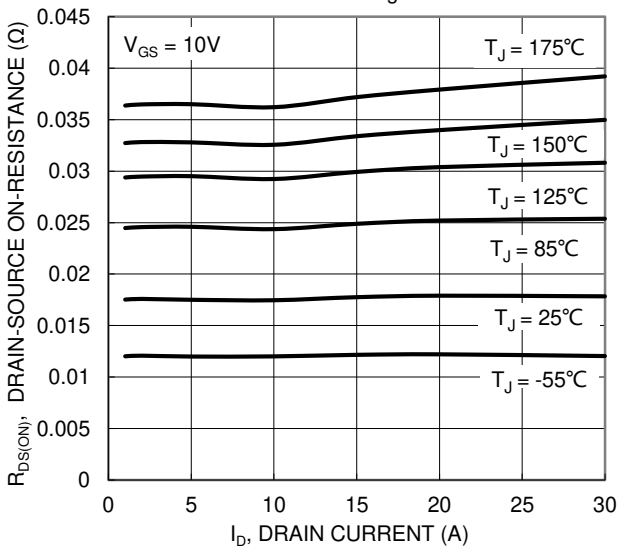


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

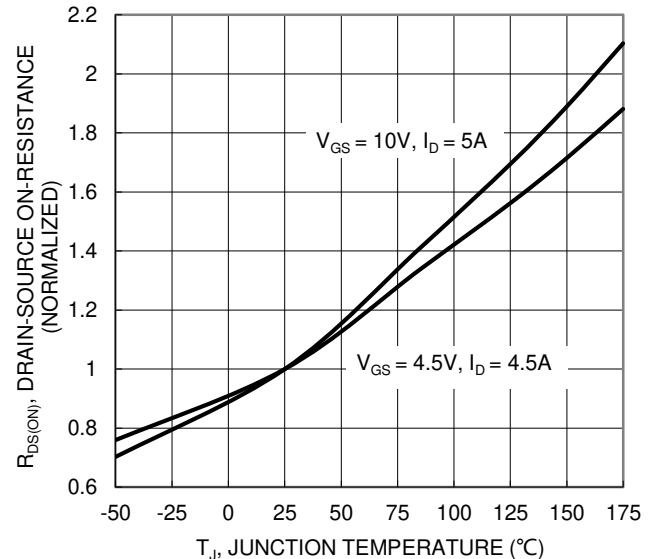


Figure 6. On-Resistance Variation with Junction Temperature

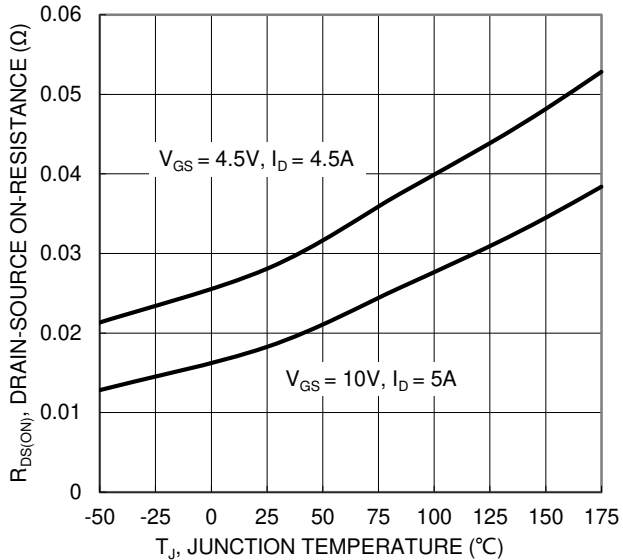


Figure 7. On-Resistance Variation with Junction Temperature

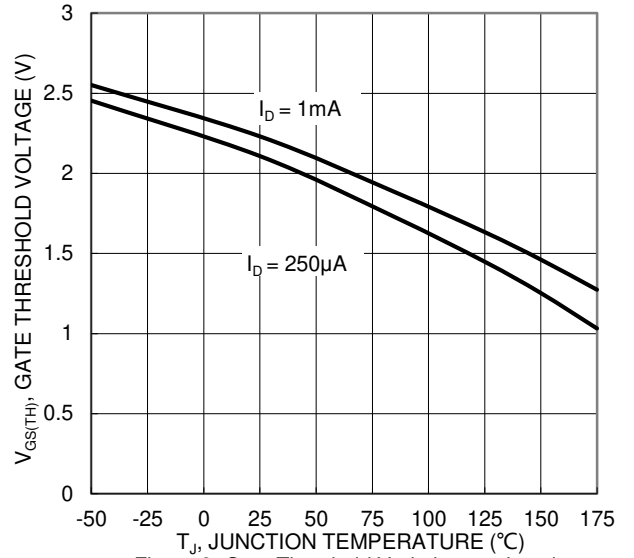


Figure 8. Gate Threshold Variation vs. Junction Temperature

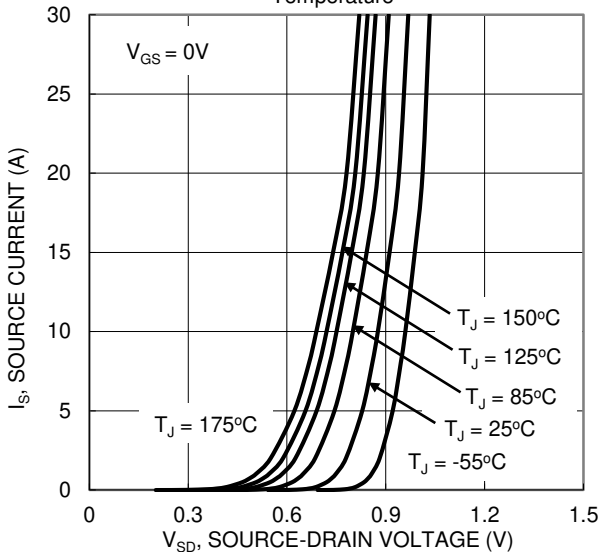


Figure 9. Diode Forward Voltage vs. Current

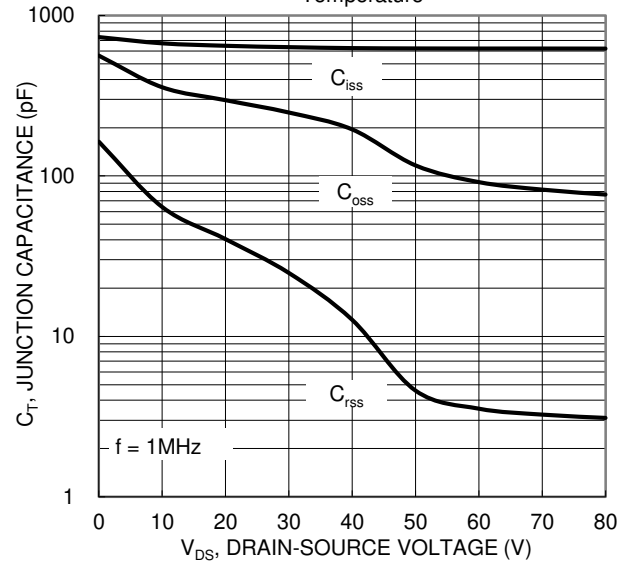


Figure 10. Typical Junction Capacitance

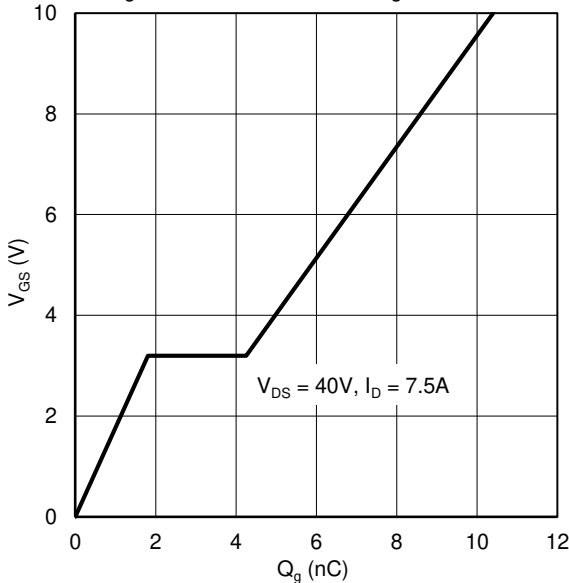


Figure 11. Gate Charge

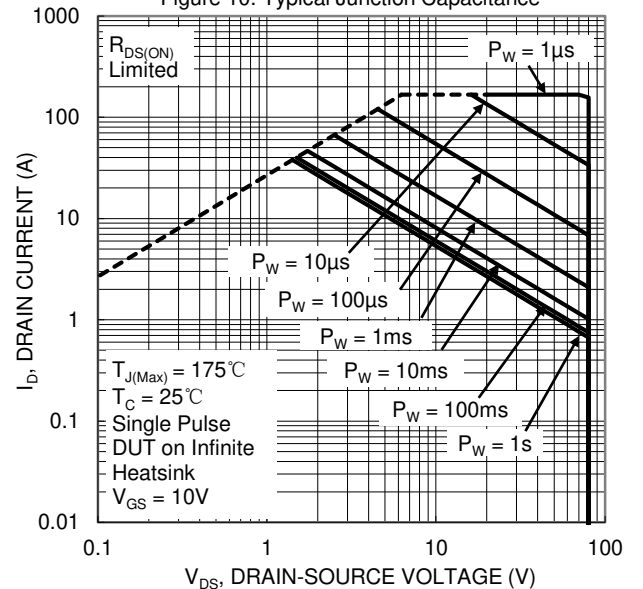


Figure 12. SOA, Safe Operation Area

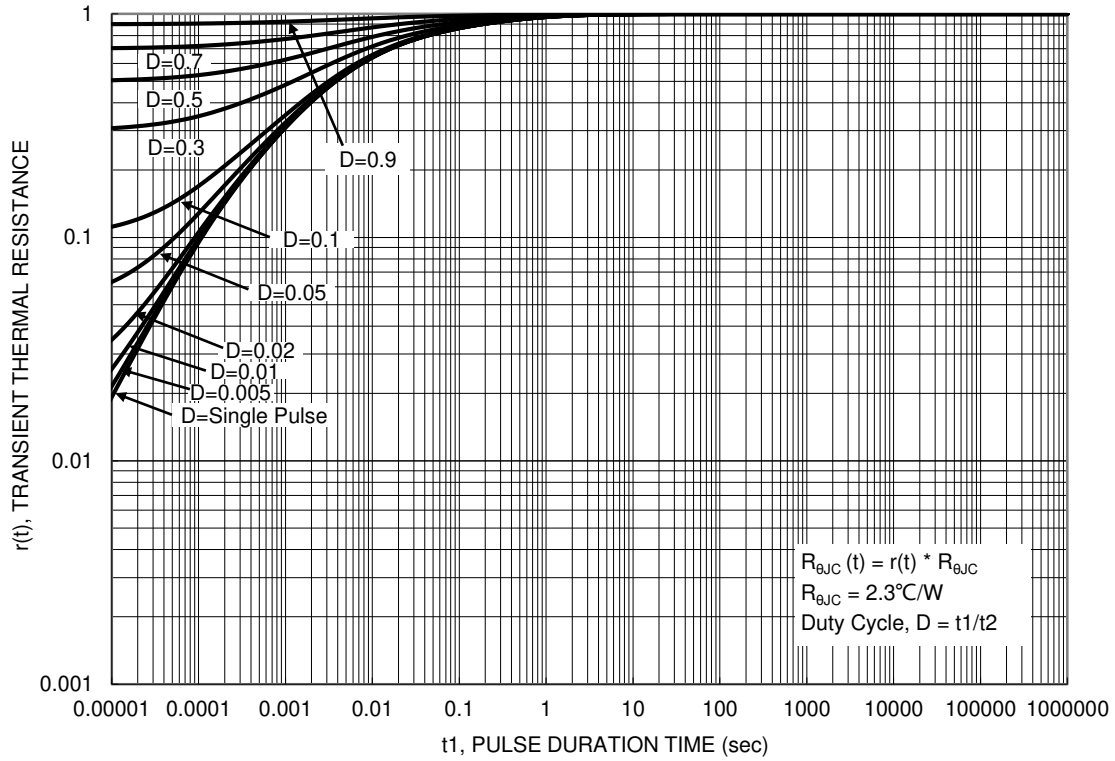
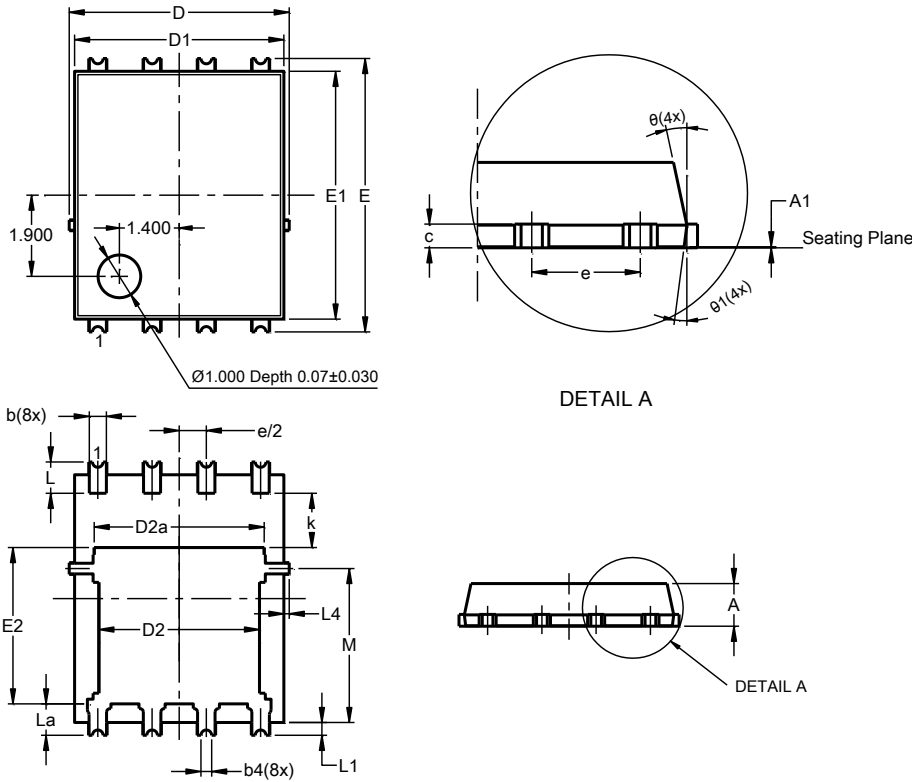


Figure 13. Transient Thermal Resistance

**Package Outline Dimensions**

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

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

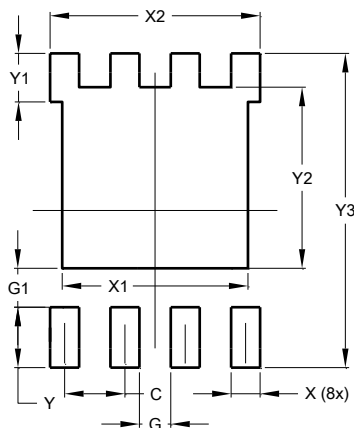


PowerDI5060-8 (SWP) (Type UX)			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0	0.05	--
b	0.30	0.50	0.41
b2	0.20	0.35	0.25
b4	0.25REF		
c	0.230	0.330	0.277
D	5.15 BSC		
D1	4.70	5.10	4.90
D2	3.56	3.96	3.76
D2a	3.78	4.18	3.98
E	6.40 BSC		
E1	5.60	6.00	5.80
E2	3.46	3.86	3.66
E2a	4.195	4.595	4.395
e	1.27BSC		
k	1.05	--	--
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
θ	10°	12°	11°
θ1	6°	8°	7°
<b>All Dimensions in mm</b>			

**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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