

## Product Summary

BV <sub>DSS</sub>	R <sub>DS(ON)</sub> Max	I <sub>D</sub> T <sub>C</sub> = +25°C (Note 5)
100V	8.8mΩ @ V <sub>GS</sub> = 10V	100A
	11.5mΩ @ V <sub>GS</sub> = 6V	100A

## Features and Benefits

- Rated to +175°C – Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switching – Ensures More Reliable and Robust End Application
- Low R<sub>DS(ON)</sub> – Minimizes On-State Losses
- Fast Switching Speed
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**
- **The DMTH10H010SPSWQ 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

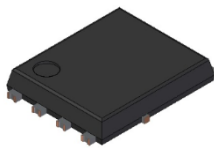
This new generation N-Channel Enhancement Mode MOSFET is designed to minimize R<sub>DS(ON)</sub> yet maintain superior switching performance. This device is ideal for use in notebook battery power management and load switches.

- Motor controls
- DC-DC converters
- Power management

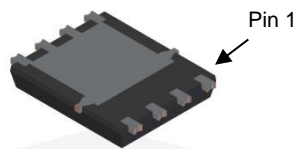
## Mechanical Data

- Package: PowerDI<sup>®</sup>5060-8
- 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 Lead-Frame. Solderable per MIL-STD-202, Method 208 Ⓔ3
- Weight: 0.097 grams (Approximate)

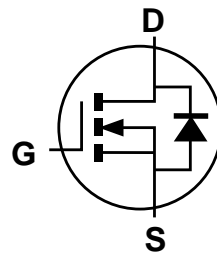
PowerDI5060-8/SWP (Type UX)



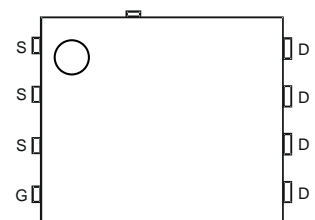
Top View



Bottom View



Internal Schematic



Top View  
Pin Configuration

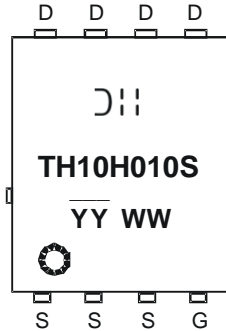
## Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMTH10H010SPSWQ-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/>.
  5. Package limited.

## Marking Information

PowerDI5060-8/SWP (Type UX)



= Manufacturer's Marking  
 TH10H010S = Product Type Marking Code  
 YYWW = Date Code Marking  
 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)	I <sub>D</sub>	T <sub>A</sub> = +25°C T <sub>A</sub> = +100°C	15 11	A
Continuous Drain Current, V <sub>GS</sub> = 10V (Note 7)		T <sub>C</sub> = +25°C (Note 5) T <sub>C</sub> = +100°C	100 87	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I <sub>DM</sub>	250	A	
Maximum Continuous Body Diode Forward Current	I <sub>S</sub>	100	A	
Avalanche Current, L = 0.3mH	I <sub>AS</sub>	25	A	
Avalanche Energy, L = 0.3mH	E <sub>AS</sub>	93.7	mJ	
Avalanche Current (Note 8), L = 3mH	I <sub>AS</sub>	14.3	A	
Avalanche Energy (Note 8), L = 3mH	E <sub>AS</sub>	307	mJ	

## Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 6)	P <sub>D</sub>	3	W
Thermal Resistance, Junction to Ambient (Note 6)	R <sub>θJA</sub>	49	°C/W
Total Power Dissipation (Note 7)	P <sub>D</sub>	166	W
Thermal Resistance, Junction to Case (Note 7)	R <sub>θJC</sub>	0.9	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +175	°C

- Notes:
5. Package limited.
  6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
  7. Thermal resistance from junction to soldering point (on the exposed drain pad).
  8. Guaranteed by design. Not subject to product testing.

**Electrical Characteristics** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 9)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	100	—	—	V	$V_{GS} = 0V, I_D = 1mA$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	1	$\mu A$	$V_{DS} = 80V, V_{GS} = 0V$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 100$	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
<b>ON CHARACTERISTICS (Note 9)</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	2	—	4	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	6.6	8.8	m $\Omega$	$V_{GS} = 10V, I_D = 13A$
		—	8.5	11.5		$V_{GS} = 6V, I_D = 13A$
Diode Forward Voltage	$V_{SD}$	—	0.8	1.3	V	$V_{GS} = 0V, I_S = 13A$
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	$C_{iss}$	—	4,468	—	pF	$V_{DS} = 50V, V_{GS} = 0V$ $f = 1MHz$
Output Capacitance	$C_{oss}$	—	746	—		
Reverse Transfer Capacitance	$C_{rss}$	—	32	—		
Gate Resistance	$R_g$	—	0.91	—	$\Omega$	$V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$
Total Gate Charge	$Q_g$	—	56.4	—	nC	$V_{DD} = 50V, I_D = 13A$ $V_{GS} = 10V$
Gate-Source Charge	$Q_{gs}$	—	15.4	—		
Gate-Drain Charge	$Q_{gd}$	—	14	—		
Turn-On Delay Time	$t_{D(ON)}$	—	18.6	—	ns	$V_{DD} = 50V, V_{GS} = 10V$ $I_D = 13A, R_g = 6\Omega$
Turn-On Rise Time	$t_r$	—	22.5	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	44.8	—		
Turn-Off Fall Time	$t_f$	—	29.5	—		
Reverse Recovery Time	$t_{RR}$	—	54.5	—	ns	$I_F = 13A, di/dt = 100A/\mu s$
Reverse Recovery Charge	$Q_{RR}$	—	106.4	—	nC	

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

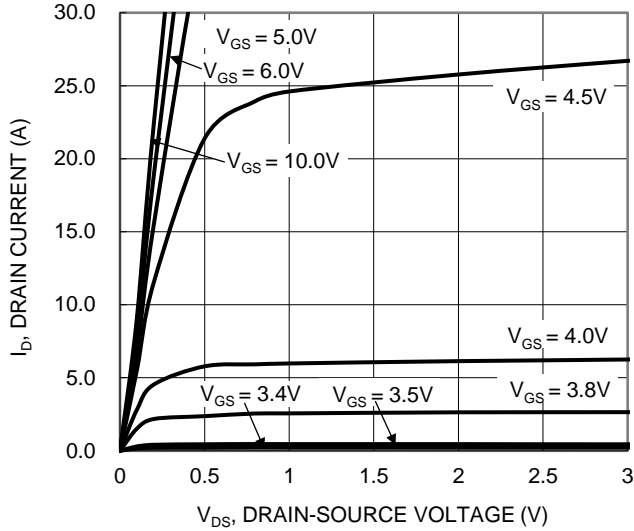


Figure 1. Typical Output Characteristic

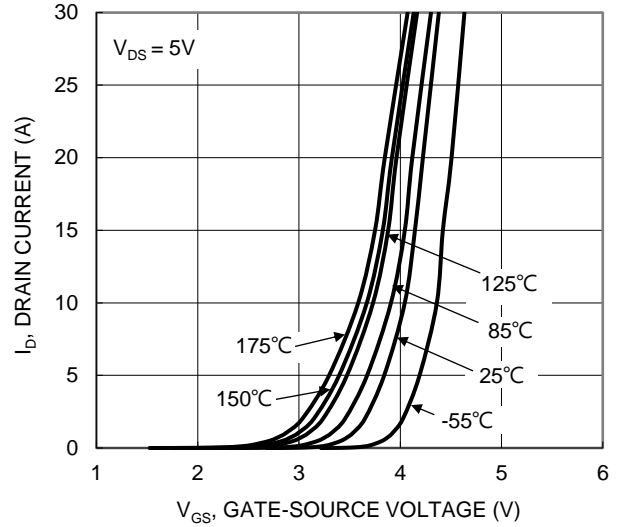


Figure 2. Typical Transfer Characteristic

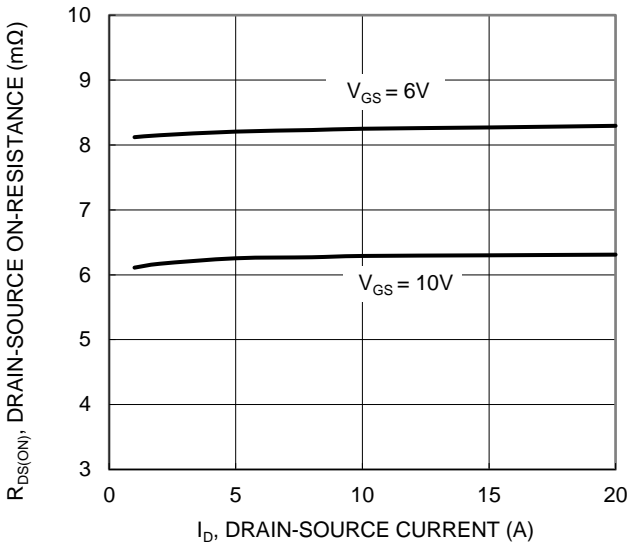


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

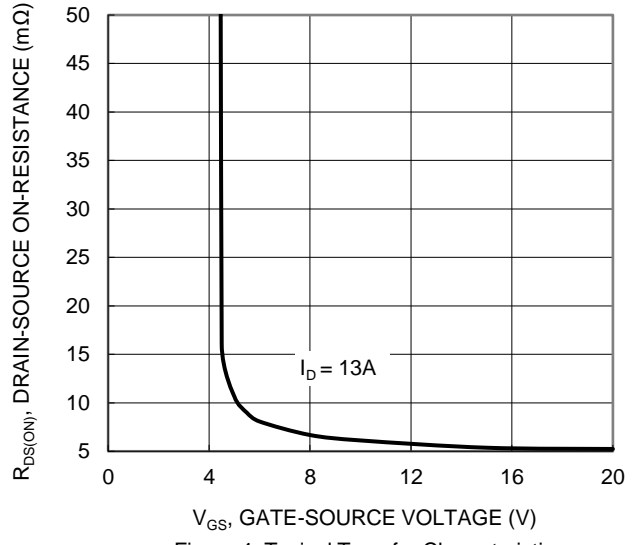


Figure 4. Typical Transfer Characteristic

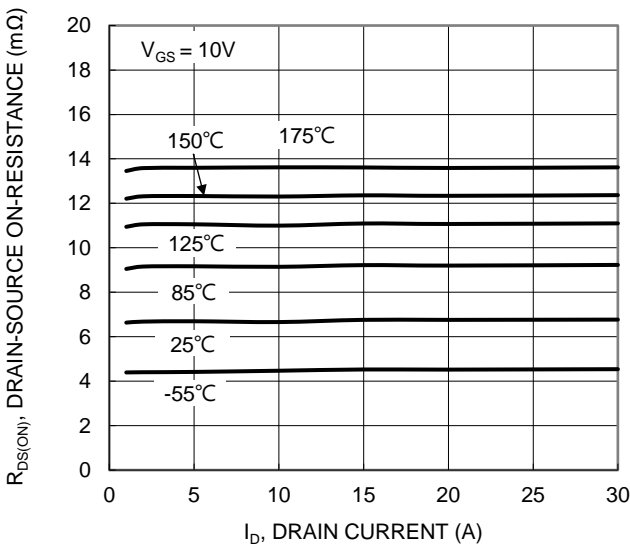


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

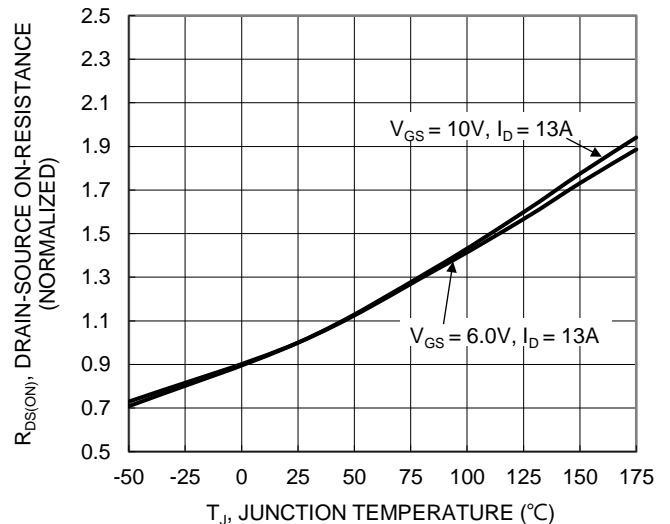


Figure 6. On-Resistance Variation with Junction Temperature

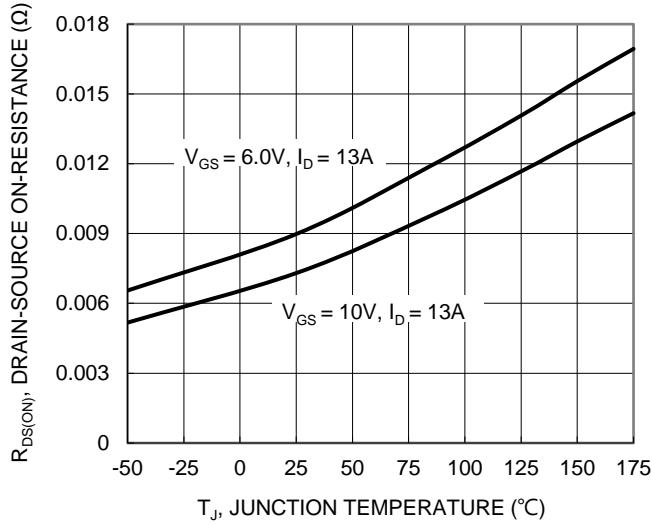


Figure 7. On-Resistance Variation with Junction Temperature

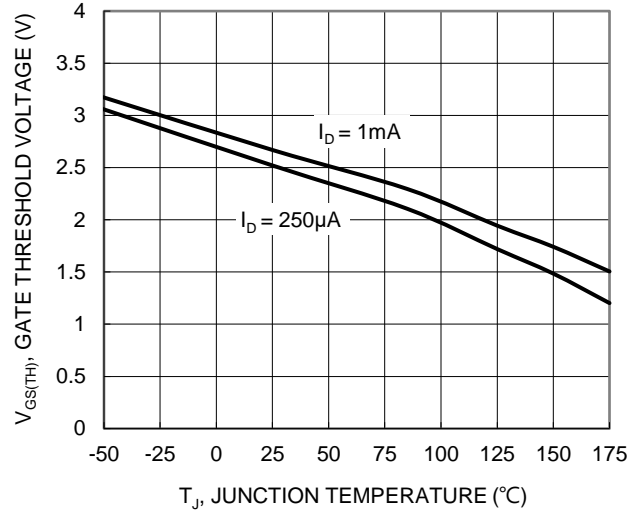


Figure 8. Gate Threshold Variation vs. Junction Temperature

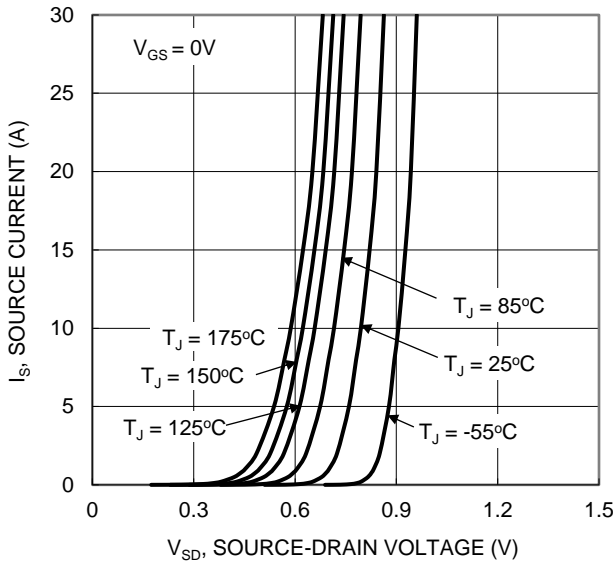


Figure 9. Diode Forward Voltage vs. Current

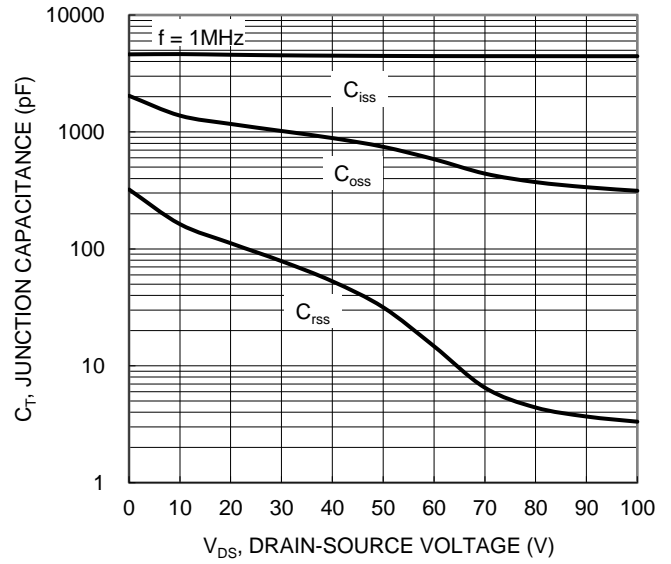


Figure 10. Typical Junction Capacitance

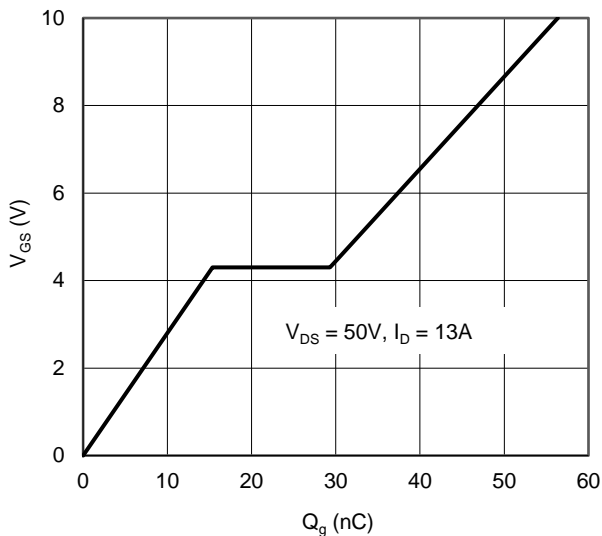


Figure 11. Gate Charge

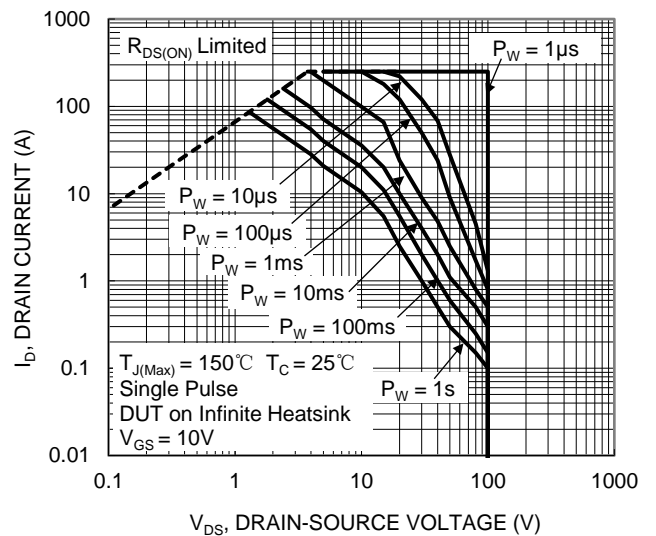


Figure 12. SOA, Safe Operation Area

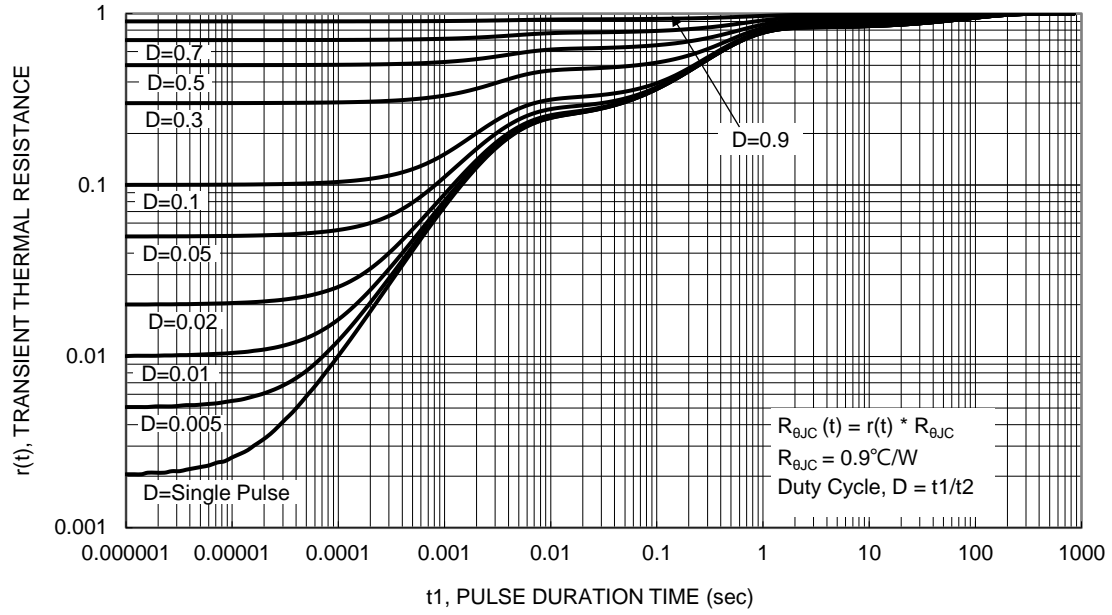
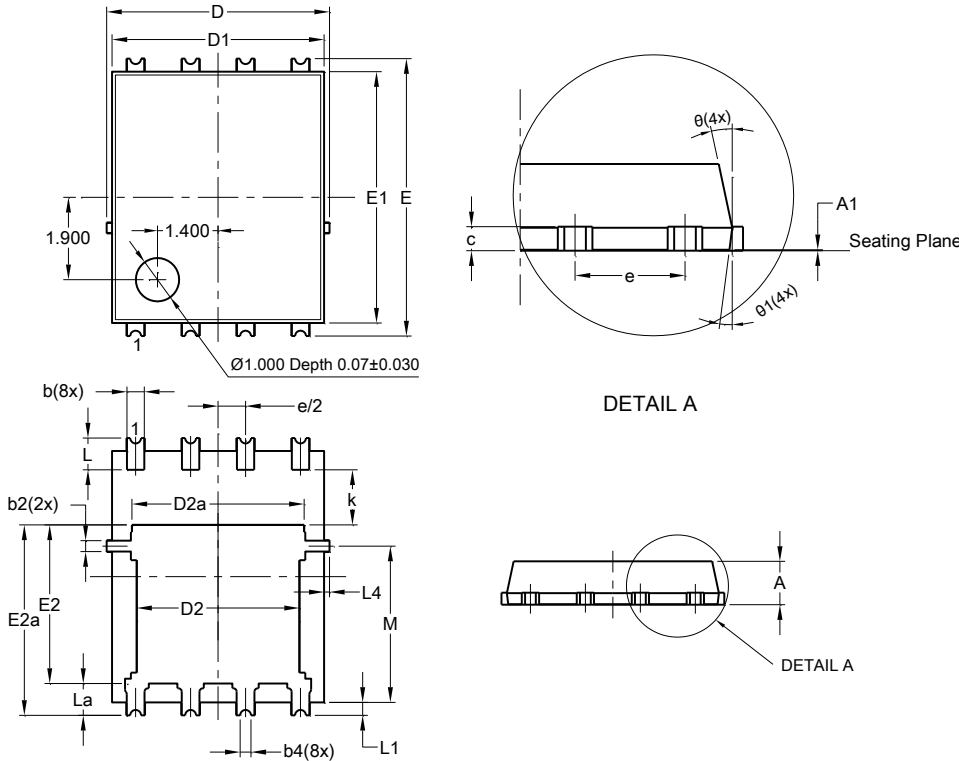


Figure 13. Transient Thermal Resistance

**Package Outline Dimensions**

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

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

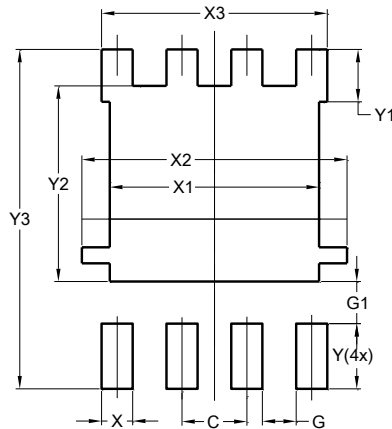


PowerDI5060-8/SWP (Type UX)			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0	0.05	--
b	0.30	0.50	0.41
b2	0.20	0.35	0.25
b4	0.25REF		
c	0.230	0.330	0.277
D	5.15 BSC		
D1	4.70	5.10	4.90
D2	3.56	3.96	3.76
D2a	3.78	4.18	3.98
E	6.40 BSC		
E1	5.60	6.00	5.80
E2	3.46	3.86	3.66
E2a	4.195	4.595	4.395
e	1.27BSC		
k	1.05	--	--
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
θ	10°	12°	11°
θ1	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	5.190
X3	4.420
Y	1.270
Y1	1.020
Y2	3.810
Y3	6.610

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