

## Product Summary

BV <sub>DSS</sub>	R <sub>D(on)</sub> Max	I <sub>D</sub> T <sub>C</sub> = +25°C
100V	16mΩ @ V <sub>GS</sub> = 10V	44A
	18mΩ @ V <sub>GS</sub> = 6.0V	41A

## Description

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

## Features

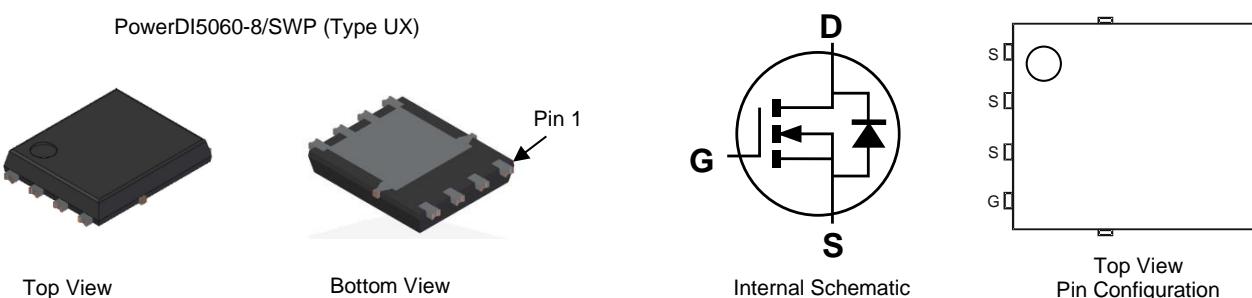
- Thermally Efficient Package – Cooler Running Applications
- High Conversion Efficiency
- Low R<sub>D(on)</sub> – Minimizes On-State Losses
- Low Input Capacitance
- Fast Switching Speed
- < 1.1mm Package Profile – Ideal for Thin Applications (PowerDI<sup>®</sup>)
- Lead-Free Finish; RoHS Compliant (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 refer to the related automotive grade (Q-suffix) part. A listing can be found at <https://www.diodes.com/products/automotive/automotive-products/>.**
- This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability.**
- <https://www.diodes.com/quality/product-definitions/>

## Applications

- Motor controls
- DC-DC converters
- Power management

## 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 Indicator: See Diagram
- Terminals: Finish – Matte Tin Annealed over Copper Lead-Frame. Solderable per MIL-STD-202, Method 208 <sup>(e3)</sup>
- Weight: 0.097 grams (Approximate)



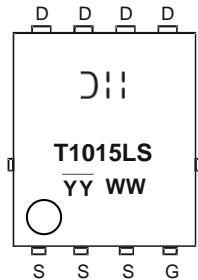
## Ordering Information (Note 4)

Orderable Part Number	Package	Packing	
		Qty.	Carrier
DMT10H015LPSW-13	PowerDI5060-8/SWP (Type UX)	2,500	Tape & Reel

Notes:

- EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
- 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.
- Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
- For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



DII = Manufacturer's Marking  
 T1015LS = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Last Two Digits of Year (ex: 24 = 2024)  
 WW = Week Code (01 to 53)

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

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSS}$	100	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current (Note 5) $V_{GS} = 10\text{V}$	Steady State $T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$ 10 8	A
	Steady State $T_C = +25^\circ\text{C}$ $T_C = +100^\circ\text{C}$	$I_D$ 44 28	A
Pulsed Drain Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%)	$I_{DM}$	150	A
Maximum Continuous Body Diode Forward Current (Note 5)	$I_S$	1.5	A
Pulsed Body Diode Forward Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%)	$I_{SM}$	150	A
Avalanche Current (Note 6) $L = 3\text{mH}$	$I_{AS}$	7.5	A
Avalanche Energy (Note 6) $L = 3\text{mH}$	$E_{AS}$	85	mJ

## Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	$T_A = +25^\circ\text{C}$	$P_D$	2.4
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	52	$^\circ\text{C}/\text{W}$
Total Power Dissipation	$T_C = +25^\circ\text{C}$	$P_D$	46
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.7	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.  
 6. 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 7)</b>						
Drain-Source Breakdown Voltage	$\text{BV}_{\text{DSS}}$	100	—	—	V	$\text{V}_{\text{GS}} = 0\text{V}$ , $\text{I}_D = 1\text{mA}$
Zero Gate Voltage Drain Current	$\text{I}_{\text{DSS}}$	—	—	1	$\mu\text{A}$	$\text{V}_{\text{DS}} = 80\text{V}$ , $\text{V}_{\text{GS}} = 0\text{V}$
Gate-Source Leakage	$\text{I}_{\text{GSS}}$	—	—	$\pm 100$	nA	$\text{V}_{\text{GS}} = \pm 20\text{V}$ , $\text{V}_{\text{DS}} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	$\text{V}_{\text{GS(TH)}}$	1.4	2.3	3	V	$\text{V}_{\text{DS}} = \text{V}_{\text{GS}}$ , $\text{I}_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$\text{R}_{\text{DS(ON)}}$	—	11	16	$\text{m}\Omega$	$\text{V}_{\text{GS}} = 10\text{V}$ , $\text{I}_D = 20\text{A}$
		—	13.5	18		$\text{V}_{\text{GS}} = 6\text{V}$ , $\text{I}_D = 20\text{A}$
		—	18	25		$\text{V}_{\text{GS}} = 4.5\text{V}$ , $\text{I}_D = 5\text{A}$
Diode Forward Voltage	$\text{V}_{\text{SD}}$	—	0.9	1.3	V	$\text{V}_{\text{GS}} = 0\text{V}$ , $\text{I}_S = 20\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 6)</b>						
Input Capacitance	$\text{C}_{\text{iss}}$	—	1871	—	$\text{pF}$	$\text{V}_{\text{DS}} = 50\text{V}$ , $\text{V}_{\text{GS}} = 0\text{V}$ $f = 1\text{MHz}$
Output Capacitance	$\text{C}_{\text{oss}}$	—	261	—		
Reverse Transfer Capacitance	$\text{C}_{\text{rss}}$	—	6.9	—		
Gate Resistance	$\text{R}_{\text{g}}$	—	0.75	—	$\Omega$	$\text{V}_{\text{DS}} = 0\text{V}$ , $\text{V}_{\text{GS}} = 0\text{V}$ , $f = 1\text{MHz}$
Total Gate Charge	$\text{Q}_{\text{g}}$	—	33.3	—	$\text{nC}$	$\text{V}_{\text{DD}} = 50\text{V}$ , $\text{I}_D = 10\text{A}$ $\text{V}_{\text{GS}} = 10\text{V}$
Gate-Source Charge	$\text{Q}_{\text{gs}}$	—	6.9	—		
Gate-Drain Charge	$\text{Q}_{\text{gd}}$	—	5.1	—		
Turn-On Delay Time	$\text{t}_{\text{D(ON)}}$	—	6.5	—	$\text{ns}$	$\text{V}_{\text{DD}} = 50\text{V}$ , $\text{V}_{\text{GS}} = 10\text{V}$ $\text{I}_D = 10\text{A}$ , $\text{R}_{\text{G}} = 6\Omega$
Turn-On Rise Time	$\text{t}_{\text{R}}$	—	7.0	—		
Turn-Off Delay Time	$\text{t}_{\text{D(OFF)}}$	—	19.7	—		
Turn-Off Fall Time	$\text{t}_{\text{F}}$	—	8.1	—		
Reverse-Recovery Time	$\text{t}_{\text{RR}}$	—	37.9	—	$\text{ns}$	$\text{I}_F = 10\text{A}$ , $\text{di/dt} = 100\text{A}/\mu\text{s}$
Reverse-Recovery Charge	$\text{Q}_{\text{RR}}$	—	51.9	—	$\text{nC}$	

Notes: 6. Guaranteed by design. Not subject to product testing.  
7. Short duration pulse test used to minimize self-heating effect.

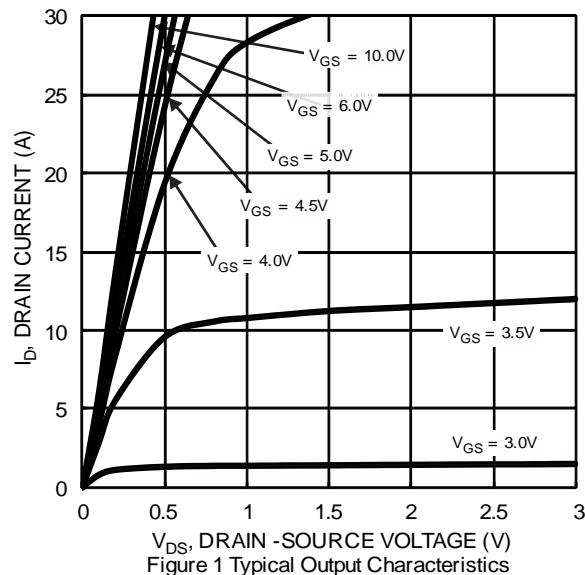


Figure 1 Typical Output Characteristics

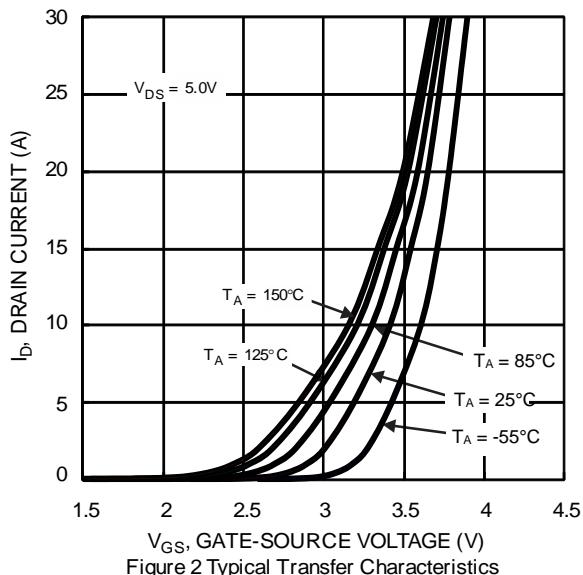


Figure 2 Typical Transfer Characteristics

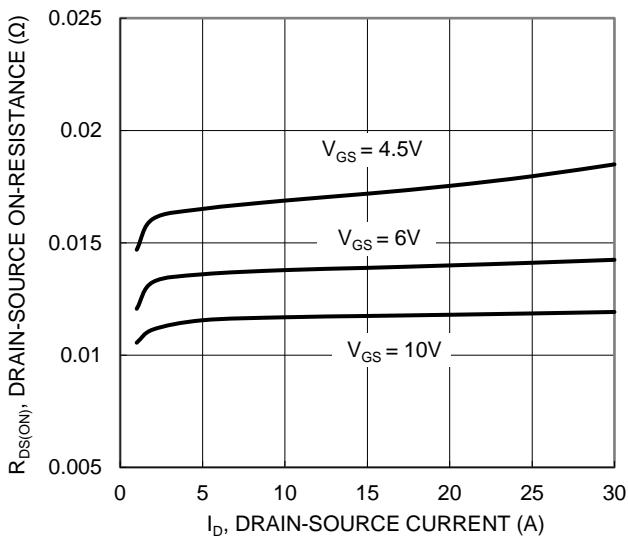


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

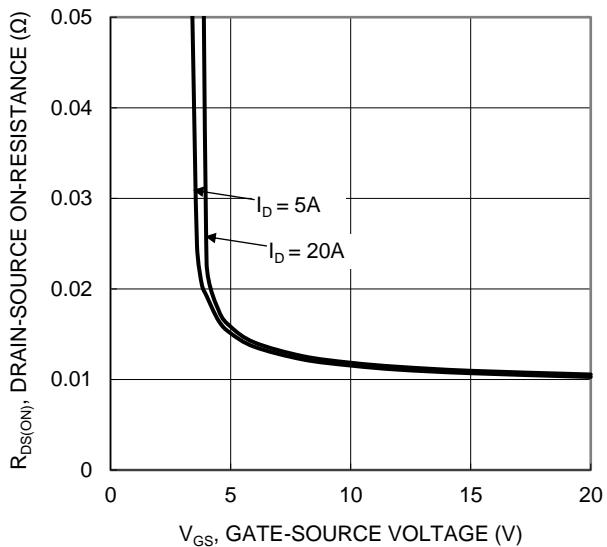


Figure 4 Typical Transfer Characteristic

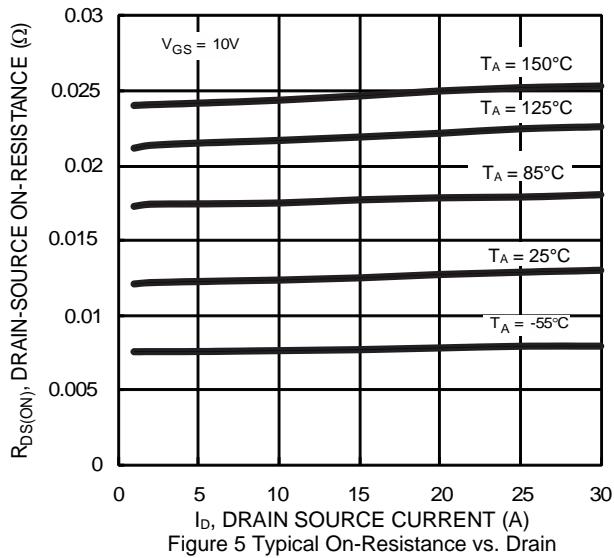


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

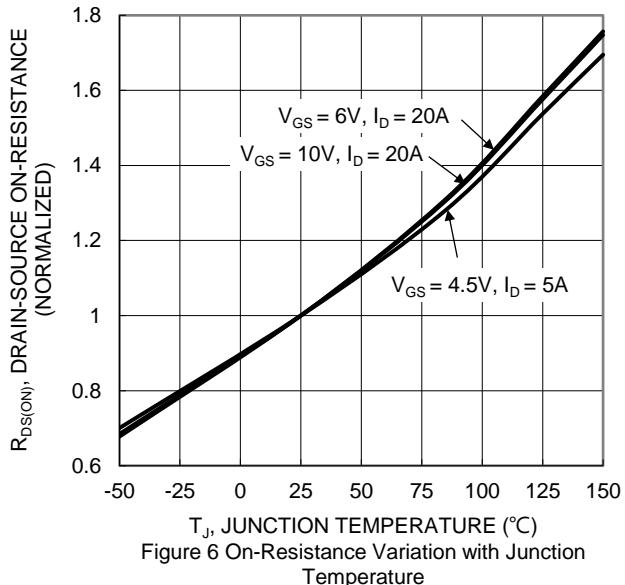


Figure 6 On-Resistance Variation with Junction Temperature

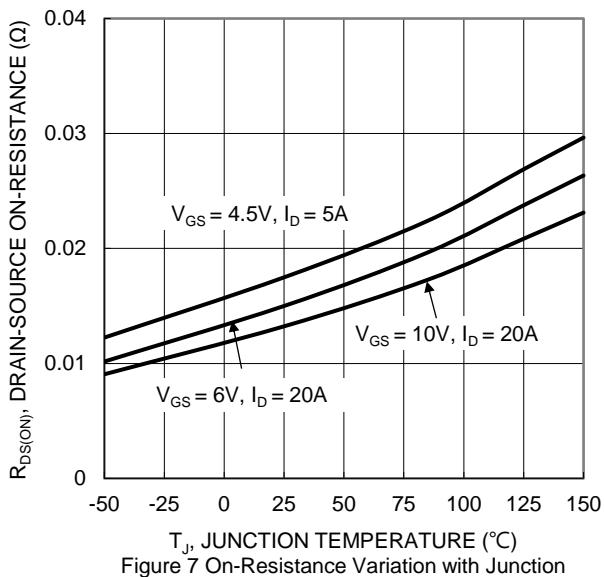


Figure 7 On-Resistance Variation with Junction Temperature

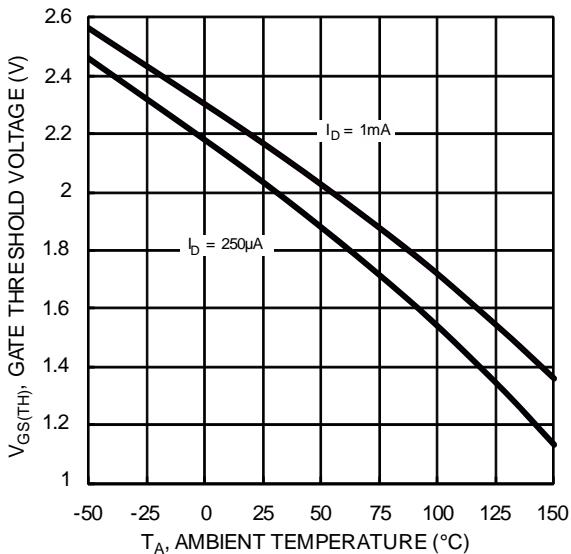


Figure 8 Gate Threshold Variation vs. Ambient Temperature

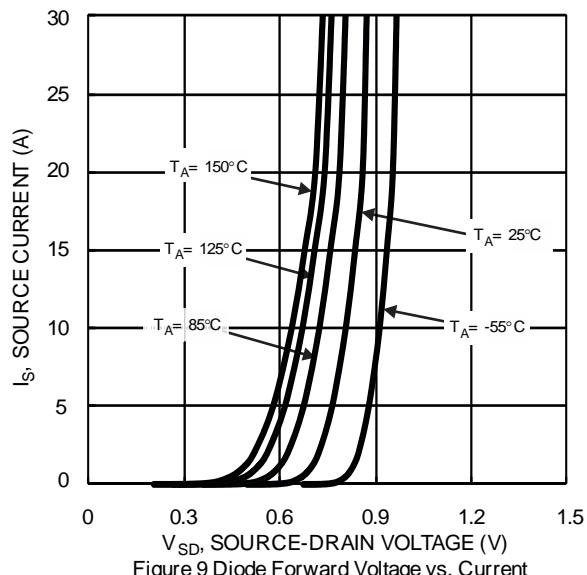


Figure 9 Diode Forward Voltage vs. Current

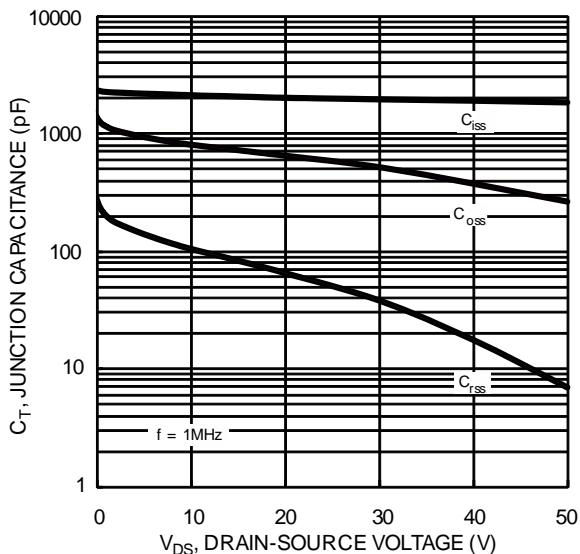


Figure 10 Typical Junction Capacitance

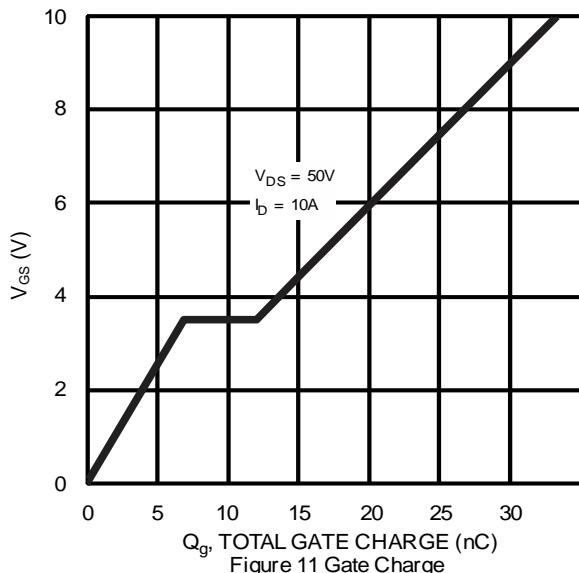


Figure 11 Gate Charge

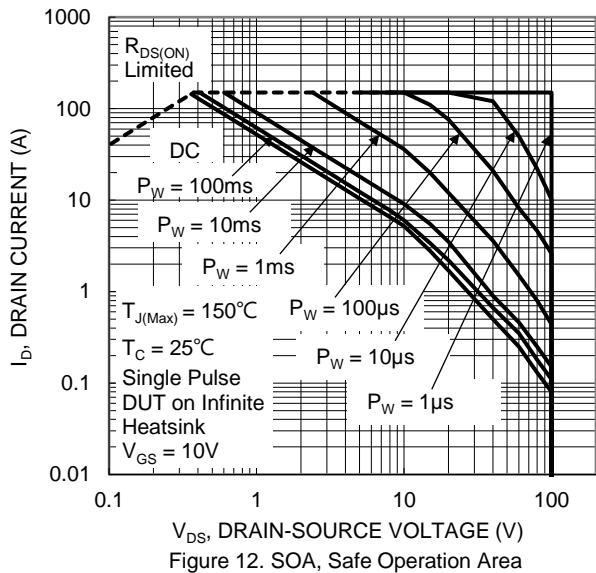


Figure 12. SOA, Safe Operation Area

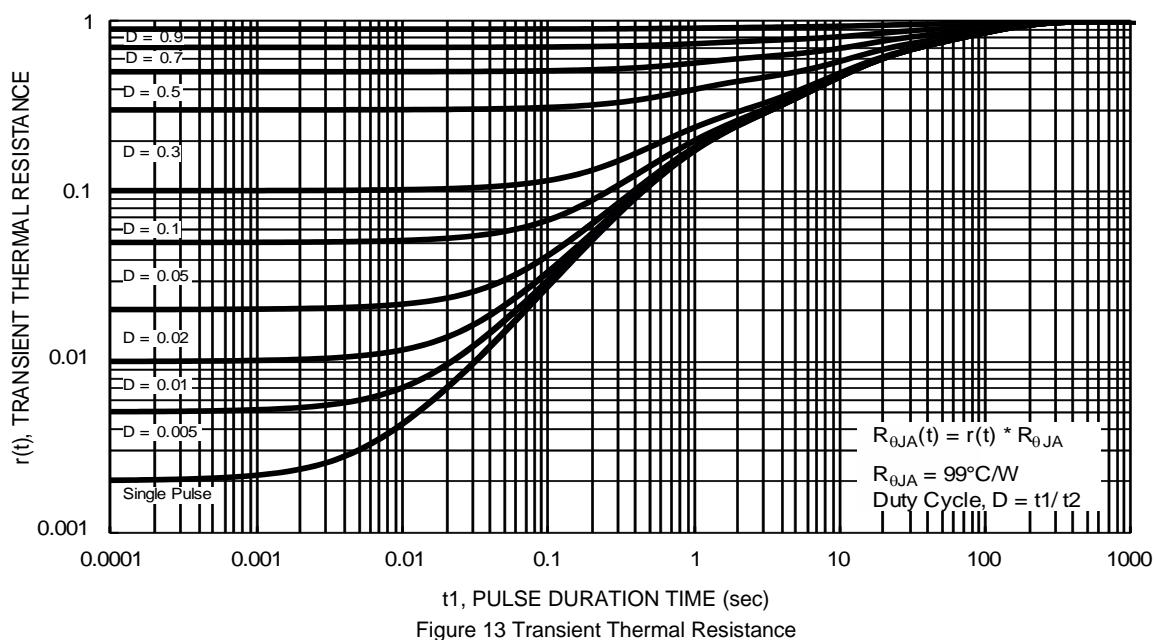
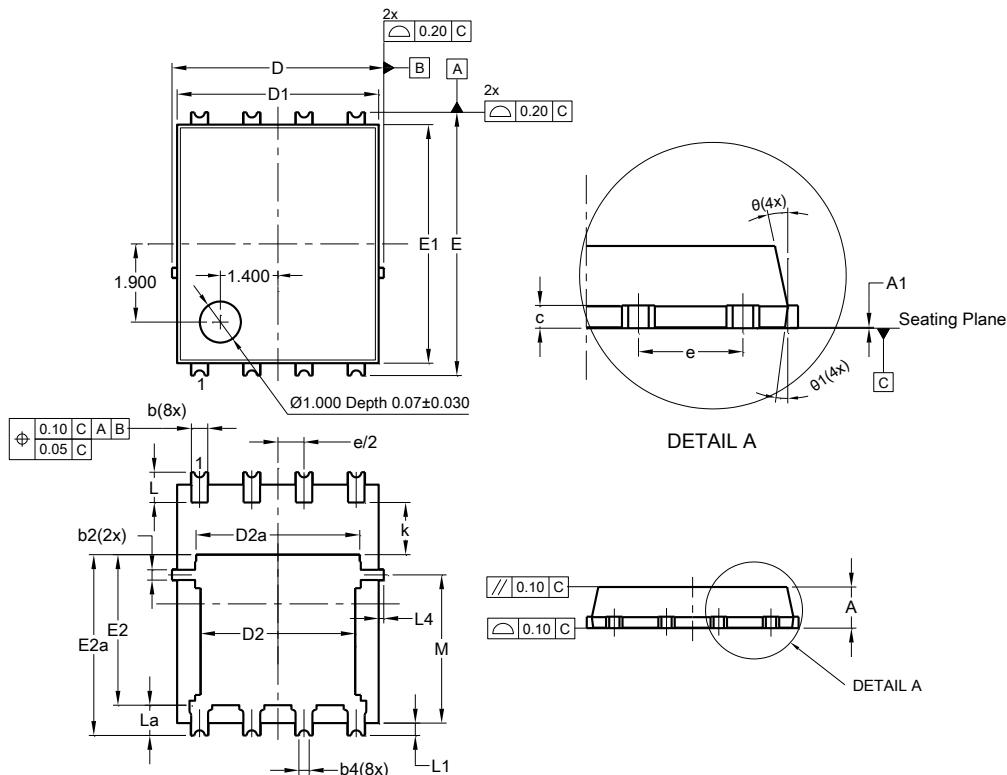


Figure 13 Transient Thermal Resistance

## Package Outline Dimensions

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

PowerDI5060-8/SWP (Type UX)

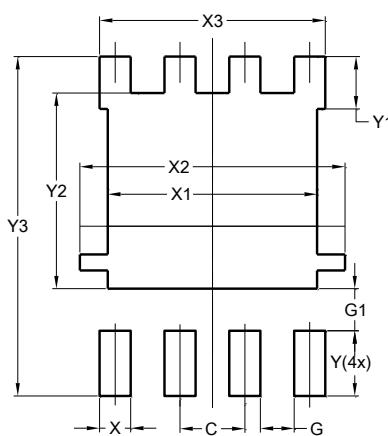


PowerDI5060-8/SWP (Type UX)			
Dim	Min	Max	Typ
<b>A</b>	0.90	1.10	1.00
<b>A1</b>	0	0.05	--
<b>b</b>	0.30	0.50	0.41
<b>b2</b>	0.20	0.35	0.25
<b>b4</b>	0.25REF		
<b>c</b>	0.230	0.330	0.277
<b>D</b>	5.15 BSC		
<b>D1</b>	4.70	5.10	4.90
<b>D2</b>	3.56	3.96	3.76
<b>D2a</b>	3.78	4.18	3.98
<b>E</b>	6.40 BSC		
<b>E1</b>	5.60	6.00	5.80
<b>E2</b>	3.46	3.86	3.66
<b>E2a</b>	4.195	4.595	4.395
<b>e</b>	1.27BSC		
<b>k</b>	1.05	--	--
<b>L</b>	0.635	0.835	0.735
<b>La</b>	0.635	0.835	0.735
<b>L1</b>	0.200	0.400	0.300
<b>L4</b>	0.025	0.225	0.125
<b>M</b>	3.205	4.005	3.605
<b>θ</b>	10°	12°	11°
<b>θ1</b>	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)
<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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