

## Product Summary

$BV_{DSS}$	$R_{DS(ON)}$	$I_D$ $T_c = +25^\circ C$
100V	28m $\Omega$ @ $V_{GS} = 10V$	40A

## 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:

- Engine management systems
- Body control electronics
- DC-DC converters

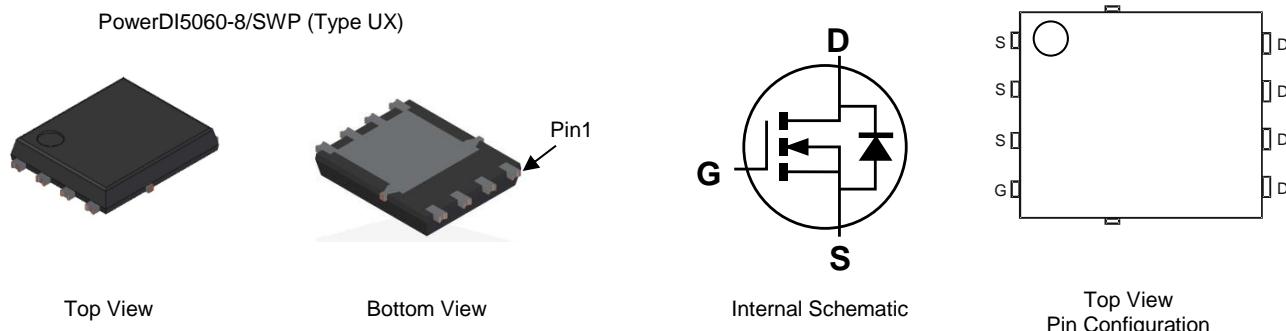
## Features and Benefits

- Thermally Efficient Package-Cooler Running Applications
- High Conversion Efficiency
- Low  $R_{DS(ON)}$  – Minimizes On-State Losses
- Low Input Capacitance
- Fast Switching Speed
- < 1.1mm Package Profile – Ideal for Thin Applications
- Wettable Flank for Improved Optical Inspections
- Lead-Free Finish; RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- The DMNH10H028SPSWQ 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: PowerDI®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
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.097 grams (Approximate)



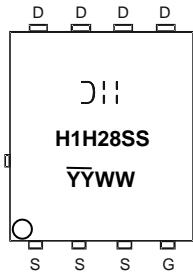
## Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMNH10H028SPSWQ-13	PowerDI5060-8/SWP (Type UX)	2500	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



**DII** = Manufacturer's Marking  
**H1H28SS** = 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 (@ $T_c = +25^\circ\text{C}$ , 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, $V_{GS} = 10\text{V}$	Steady State	$T_c = +25^\circ\text{C}$ $T_c = +100^\circ\text{C}$	$I_D$	40 25	A
Pulsed Drain Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%) (Note 5)			$I_{DM}$	54	A
Maximum Continuous Body Diode Forward Current (Note 6)			$I_S$	3.9	A
Avalanche Current (Note 7) $L=0.1\text{mH}$			$I_{AS}$	26	A
Avalanche Energy (Note 7) $L=0.1\text{mH}$			$E_{AS}$	35	mJ

## Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)		$P_D$	1.6	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	97	$^\circ\text{C}/\text{W}$
Total Power Dissipation (Note 6)		$P_D$	2.9	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	52	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Case		$R_{\theta JC}$	1.8	
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 minimum recommended pad layout.

6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

7.  $I_{AS}$  and  $E_{AS}$  ratings are based on low frequency and duty cycles to keep  $T_J = +25^\circ\text{C}$ .

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 8)</b>						
Drain-Source Breakdown Voltage	$\text{BV}_{\text{DSS}}$	100	—	—	V	$\text{V}_{\text{GS}} = 0\text{V}$ , $\text{I}_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	$\text{I}_{\text{DSS}}$	—	—	1.0	$\mu\text{A}$	$\text{V}_{\text{DS}} = 100\text{V}$ , $\text{V}_{\text{GS}} = 0\text{V}$
Gate-Source Leakage	$\text{I}_{\text{GSS}}$	—	—	$\pm 100$	$\text{nA}$	$\text{V}_{\text{GS}} = \pm 20\text{V}$ , $\text{V}_{\text{DS}} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	$\text{V}_{\text{GS(TH)}}$	2.0	2.5	4.0	V	$\text{V}_{\text{DS}} = \text{V}_{\text{GS}}$ , $\text{I}_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$\text{R}_{\text{DS(ON)}}$	—	19	28	$\text{m}\Omega$	$\text{V}_{\text{GS}} = 10\text{V}$ , $\text{I}_D = 20\text{A}$
Diode Forward Voltage	$\text{V}_{\text{SD}}$	—	0.7	1.2	V	$\text{V}_{\text{GS}} = 0\text{V}$ , $\text{I}_S = 1.0\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	$\text{C}_{\text{iss}}$	—	2245	—	pF	$\text{V}_{\text{DS}} = 50\text{V}$ , $\text{V}_{\text{GS}} = 0\text{V}$ , $f = 1.0\text{MHz}$
Output Capacitance	$\text{C}_{\text{oss}}$	—	173	—		
Reverse Transfer Capacitance	$\text{C}_{\text{rss}}$	—	68	—		
Gate Resistance	$\text{R}_G$	—	1.9	—		
Total Gate Charge ( $\text{V}_{\text{GS}} = 10\text{V}$ )	$\text{Q}_g$	—	36	—	nC	$\text{V}_{\text{DD}} = 50\text{V}$ , $\text{I}_D = 20\text{A}$
Total Gate Charge ( $\text{V}_{\text{GS}} = 6.0\text{V}$ )	$\text{Q}_g$	—	22	—		
Gate-Source Charge	$\text{Q}_{\text{gs}}$	—	7.3	—		
Gate-Drain Charge	$\text{Q}_{\text{gd}}$	—	9.2	—		
Turn-On Delay Time	$\text{t}_{\text{D(ON)}}$	—	6.4	—	ns	$\text{V}_{\text{GS}} = 10\text{V}$ , $\text{V}_{\text{DS}} = 50\text{V}$ , $\text{R}_G = 3.0\Omega$ , $\text{I}_D = 20\text{A}$
Turn-On Rise Time	$\text{t}_R$	—	5.8	—		
Turn-Off Delay Time	$\text{t}_{\text{D(OFF)}}$	—	17.8	—		
Turn-Off Fall Time	$\text{t}_F$	—	4.8	—		
Reverse-Recovery Time	$\text{t}_{\text{RR}}$	—	35	—	ns	$\text{I}_F = 20\text{A}$ , $\text{di}/\text{dt} = 100\text{A}/\mu\text{s}$
Reverse-Recovery Charge	$\text{Q}_{\text{RR}}$	—	47	—	nC	$\text{I}_F = 20\text{A}$ , $\text{di}/\text{dt} = 100\text{A}/\mu\text{s}$

Notes: 8. Short duration pulse test used to minimize self-heating effect.

9. Guaranteed by design. Not subject to product testing.

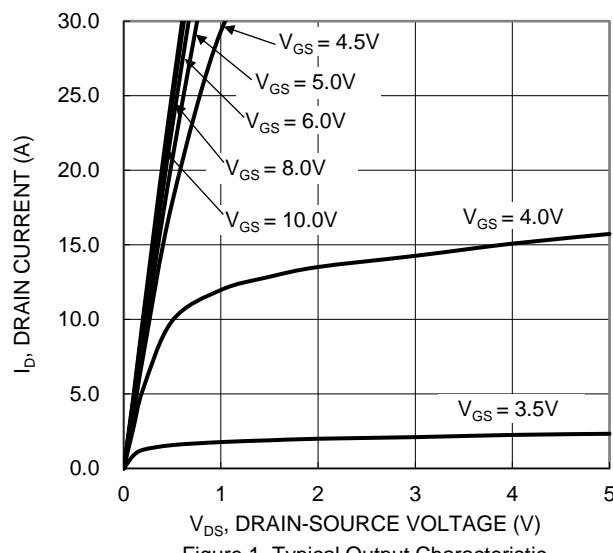


Figure 1. Typical Output Characteristic

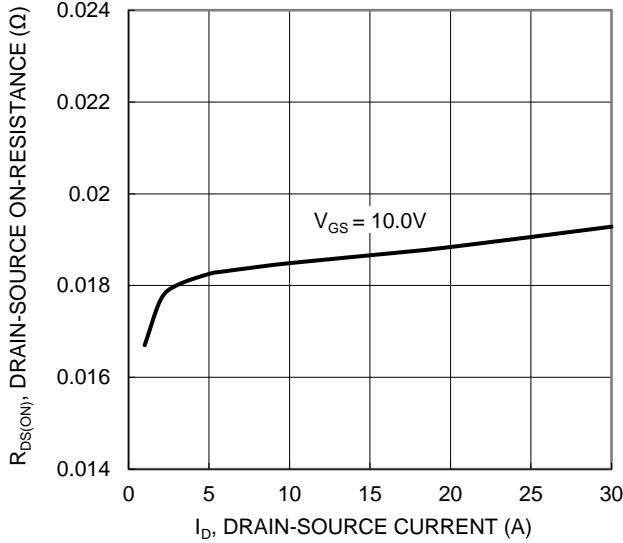


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

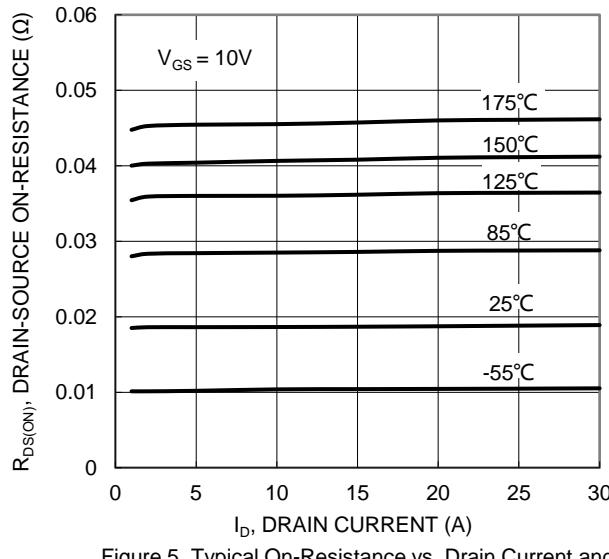


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

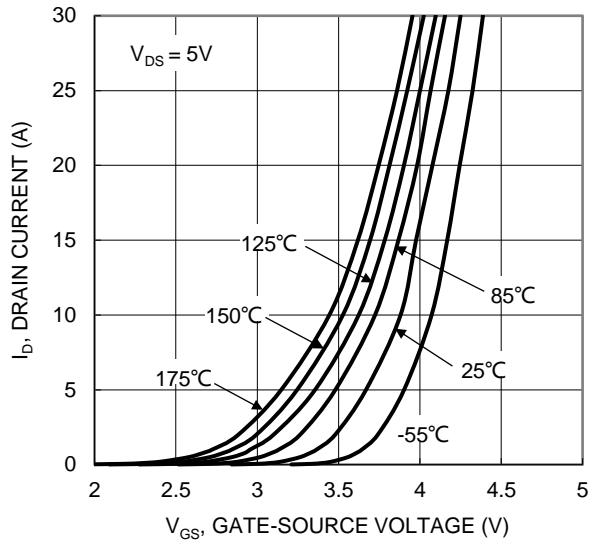


Figure 2. Typical Transfer Characteristic

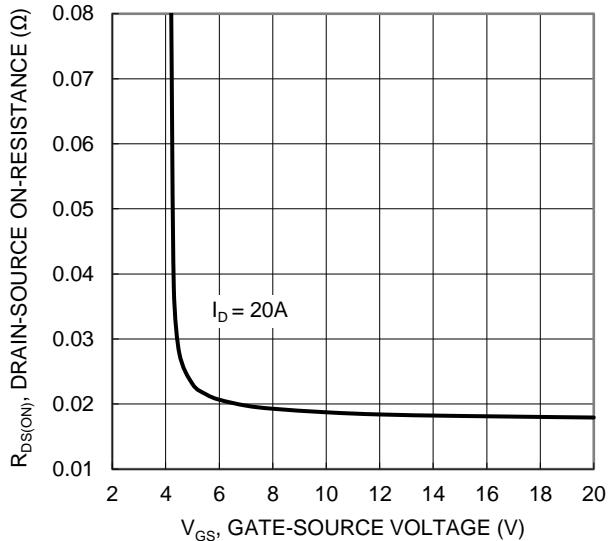


Figure 4. Typical Transfer Characteristic

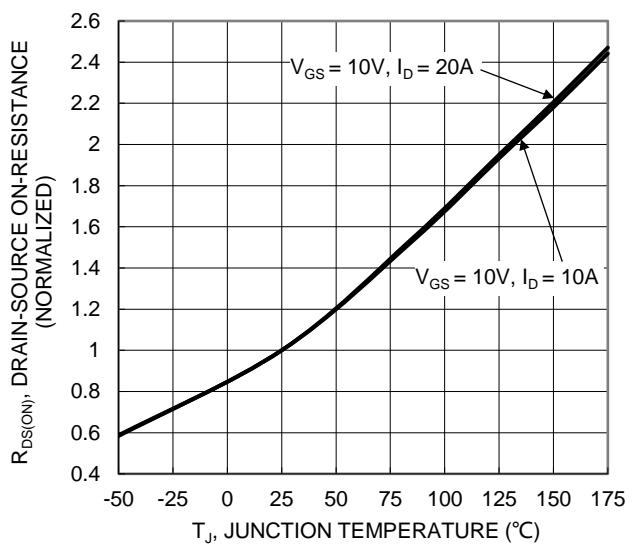


Figure 6. On-Resistance Variation with Temperature

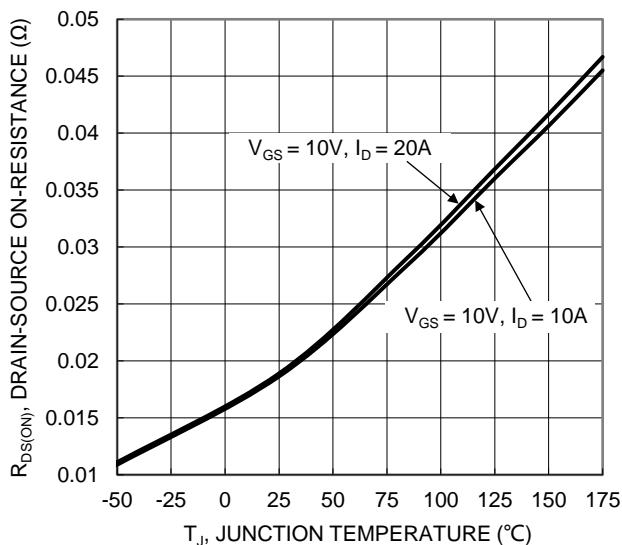


Figure 7. On-Resistance Variation with Temperature

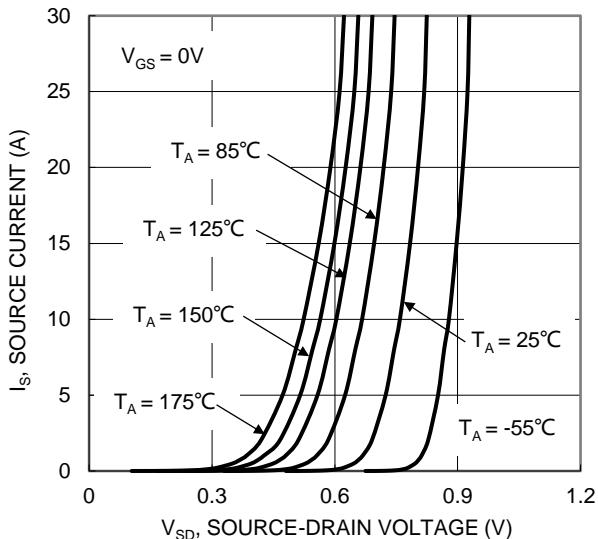


Figure 9. Diode Forward Voltage vs. Current

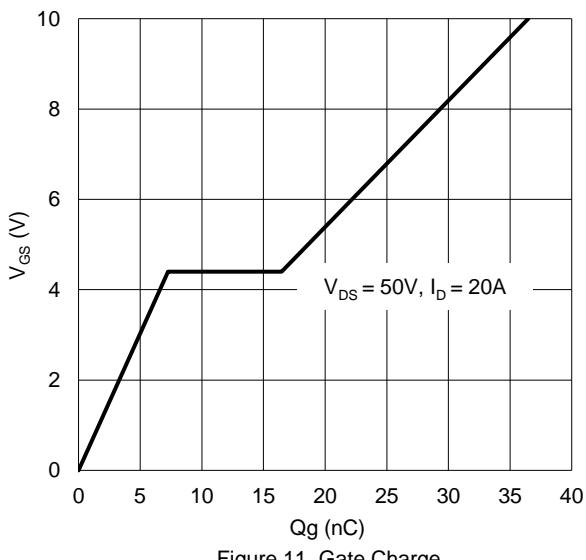


Figure 11. Gate Charge

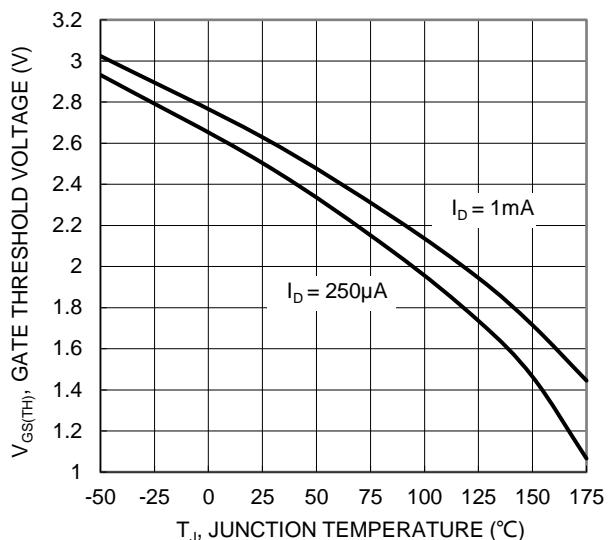


Figure 8. Gate Threshold Variation vs. Junction Temperature

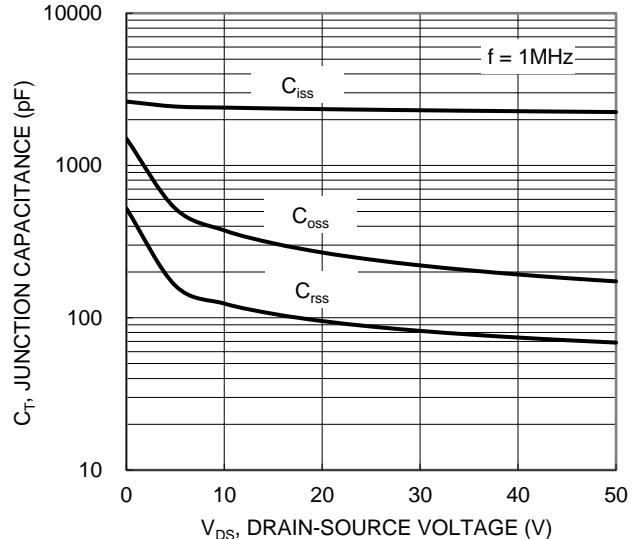


Figure 10. Typical Junction Capacitance

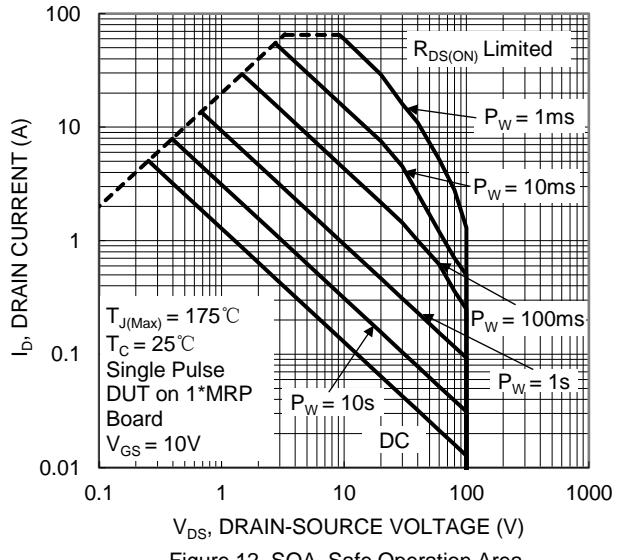


Figure 12. SOA, Safe Operation Area

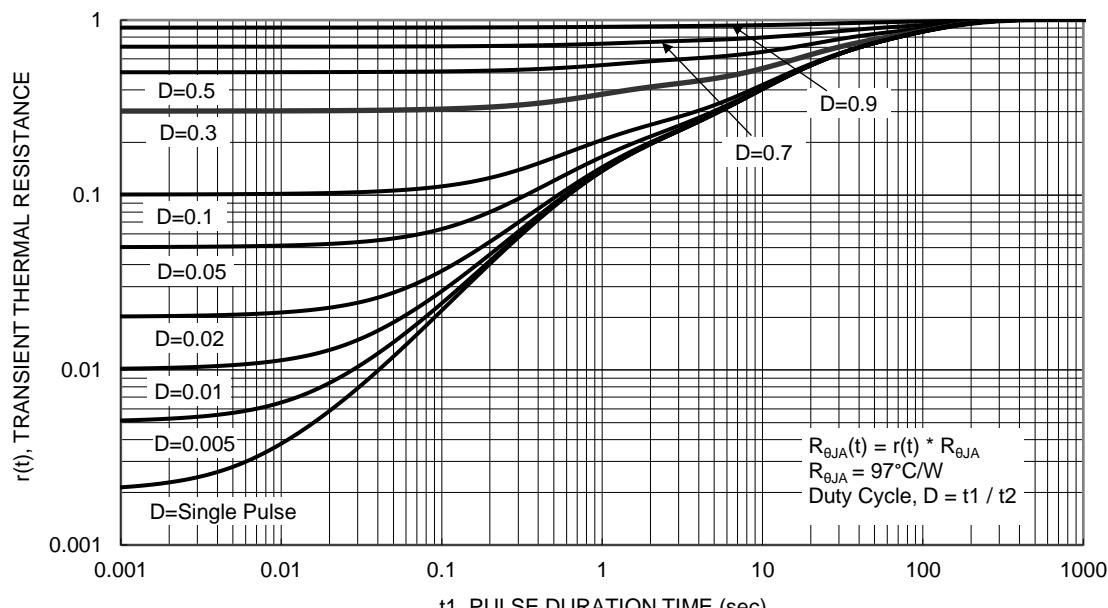
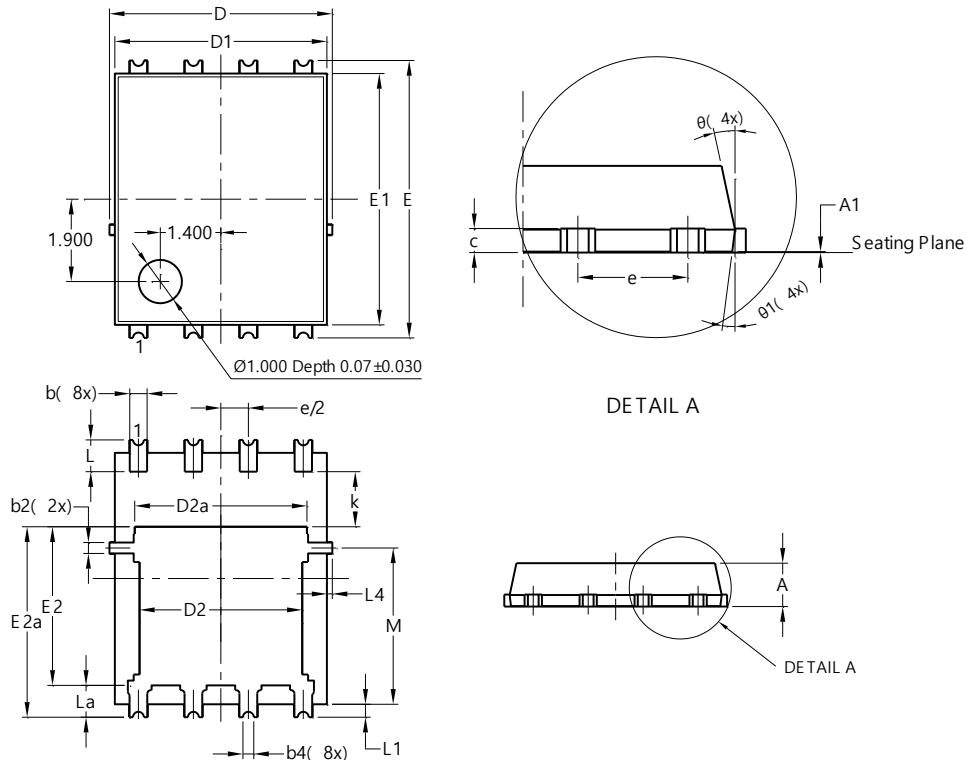


Figure 13. Transient Thermal Resistance

## Package Outline Dimensions

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

PowerDI5060-8/SWP (Type UX)



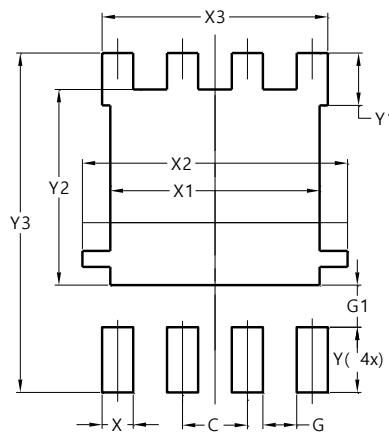
PowerDI5060-8/SWP (Type UX)			
Dim	Min	Max	Typ
<b>A</b>	0.90	1.10	1.00
<b>A1</b>	0	0.05	--
<b>b</b>	0.30	0.50	0.41
<b>b2</b>	0.20	0.35	0.25
<b>b4</b>	0.25REF		
<b>c</b>	0.230	0.330	0.277
<b>D</b>	5.15 BSC		
<b>D1</b>	4.70	5.10	4.90
<b>D2</b>	3.56	3.96	3.76
<b>D2a</b>	3.78	4.18	3.98
<b>E</b>	6.40 BSC		
<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>L1a</b>	0.050REF		
<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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