

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _C = +25°C
150V	17.5mΩ @V _{GS} = 10V	50A
	25.5mΩ @V _{GS} = 4.5V	43A

Description and Applications

This new generation N-Channel Enhancement Mode MOSFET is designed to minimize R_{DS(ON)} 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 and Benefits

- 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_{DS(ON)} – 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)**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability.**
<https://www.diodes.com/quality/product-definitions/>
- **An Automotive-Compliant Part is Available Under Separate Datasheet (DMTH15H017LPSWQ)**

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 
- Weight: 0.097 grams (Approximate)

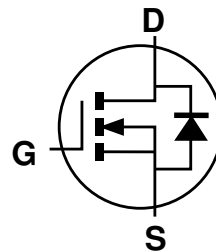
PowerDI5060-8 (SWP) (Type UX)



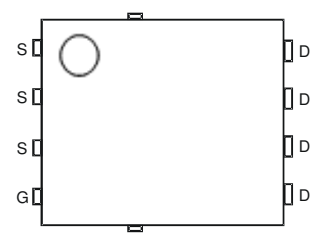
Top View



Bottom View



Internal Schematic



Top View
Pin Configuration

Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMTH15H017LPSW-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/>.

PowerDI is a registered trademark of Diodes Incorporated.

Marking Information



DII = 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_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	150	V
Gate-Source Voltage			V _{GSS}	±20	V
Continuous Drain Current V _{GS} = 10V (Note 6)	Steady State	T _A = +25°C	I _D	8	A
		T _A = +100°C		5.7	
Continuous Drain Current V _{GS} = 10V (Note 7)	Steady State	T _C = +25°C	I _D	50	A
		T _C = +100°C		35	
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)			I _{DM}	200	A
Maximum Continuous Body Diode Forward Current			I _S	50	A
Pulsed Body Diode Current (10μs Pulse, Duty Cycle = 1%)			I _{SM}	200	A
Avalanche Current (Note 8), L = 3mH			I _{AS}	14.5	A
Avalanche Energy (Note 8), L = 3mH			E _{AS}	315.4	mJ

Thermal Characteristics

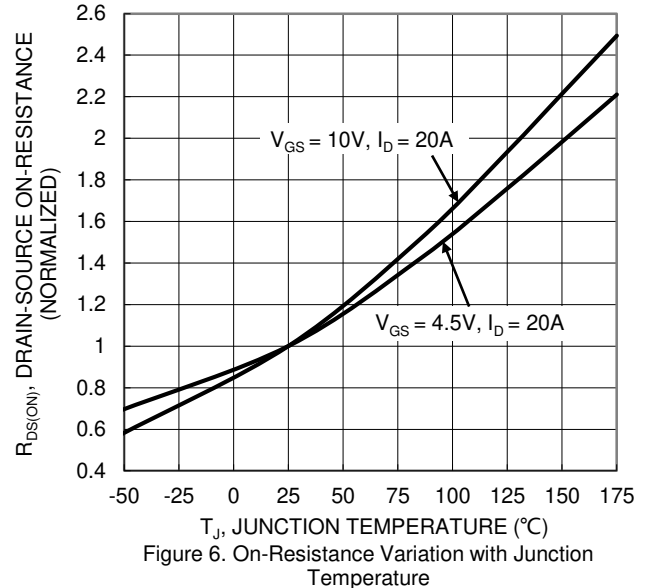
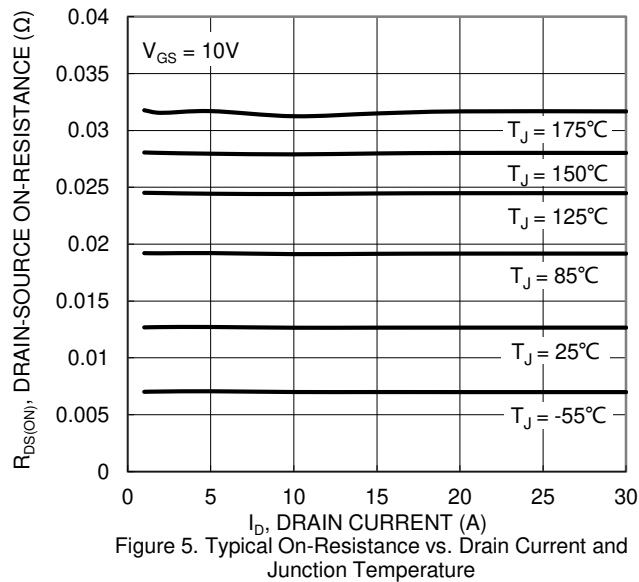
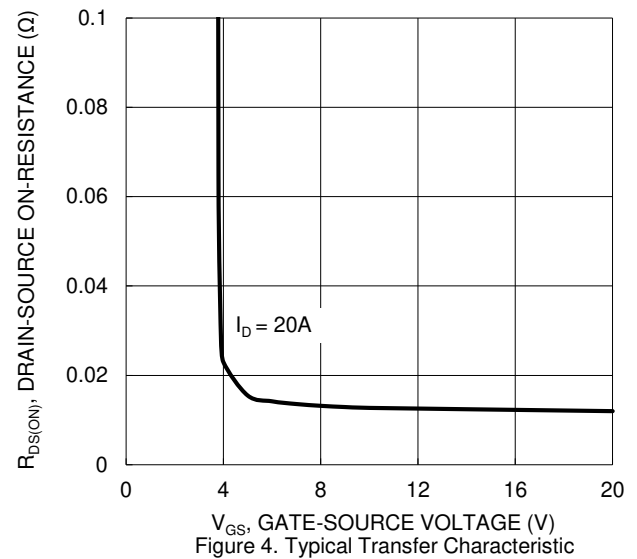
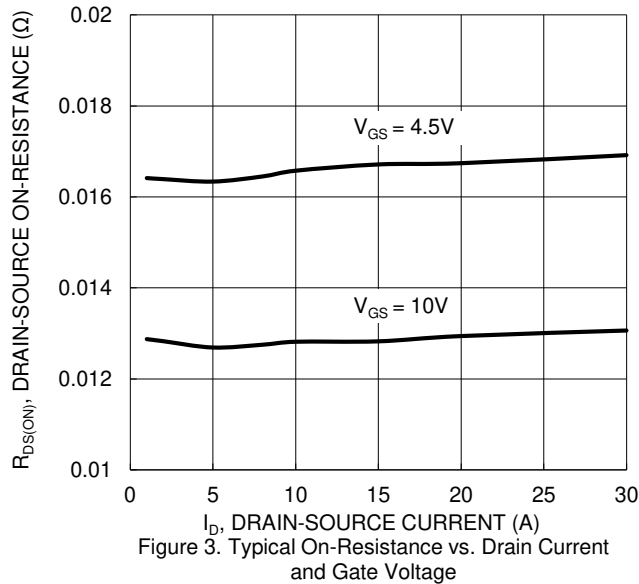
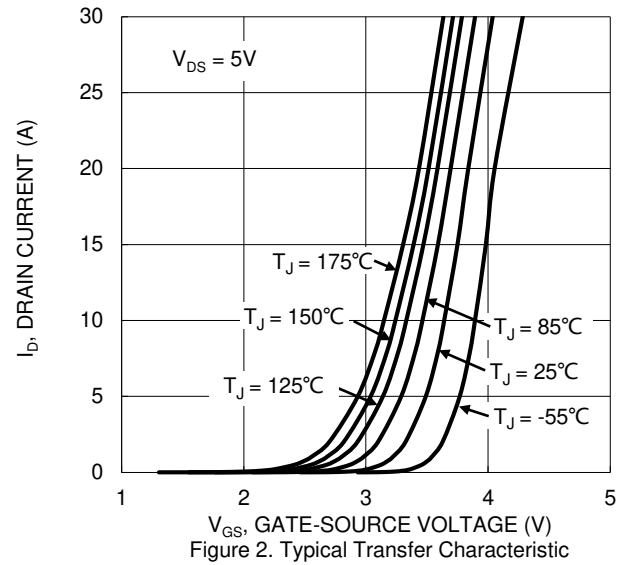
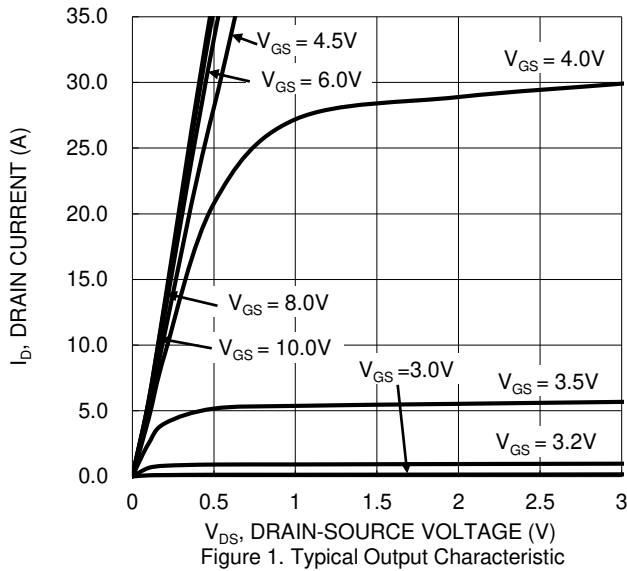
Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T _A = +25°C	P _D	1.5	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R _{θJA}	99	°C/W
Total Power Dissipation (Note 6)	T _A = +25°C	P _D	2.8	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R _{θJA}	53	°C/W
Total Power Dissipation (Note 7)	T _C = +25°C	P _D	107	W
Thermal Resistance, Junction to Case (Note 7)		R _{θJC}	1.4	°C/W
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +175	°C

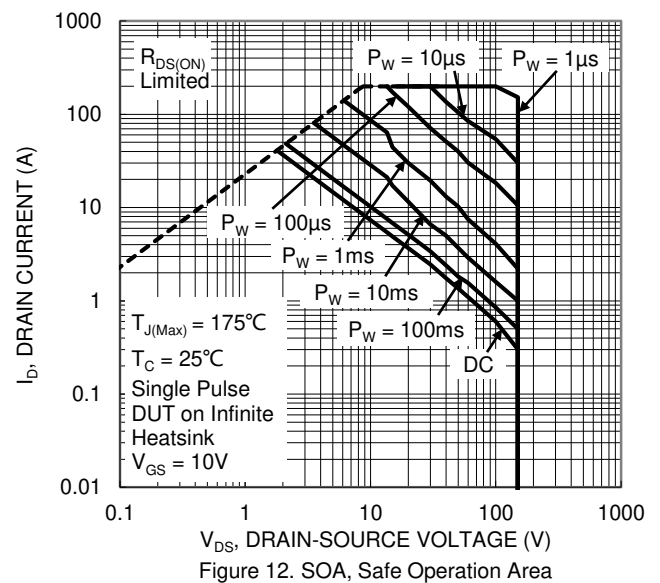
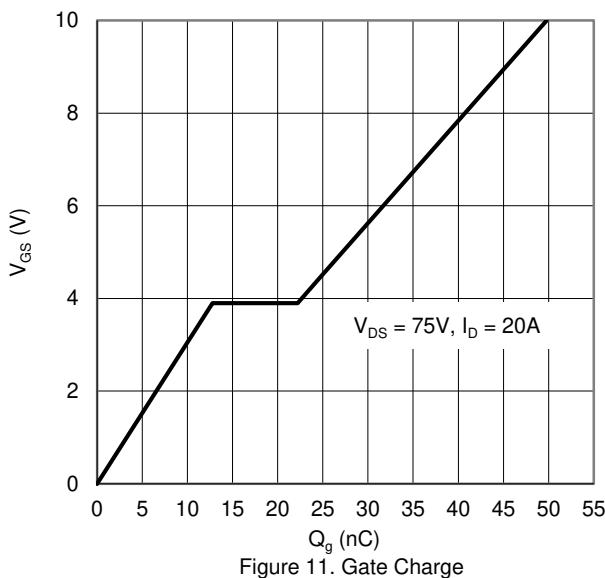
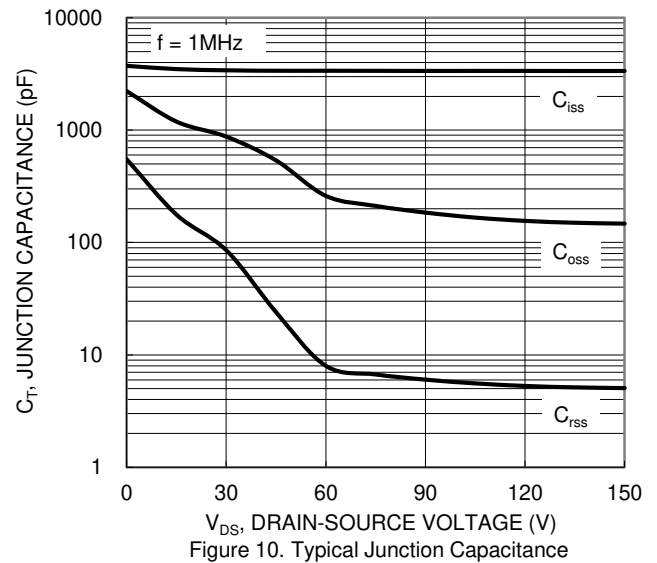
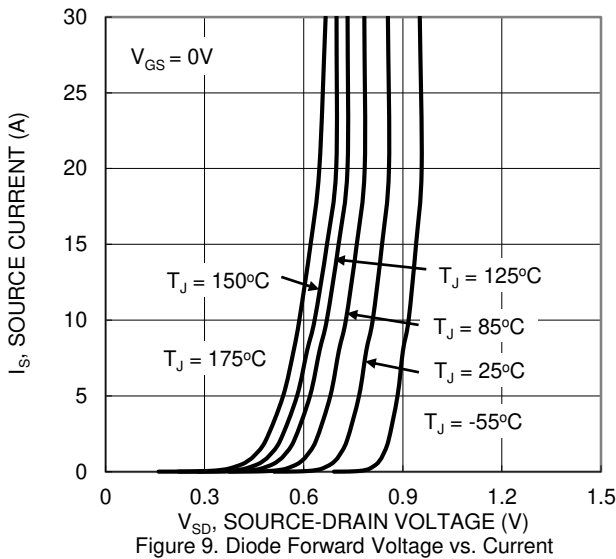
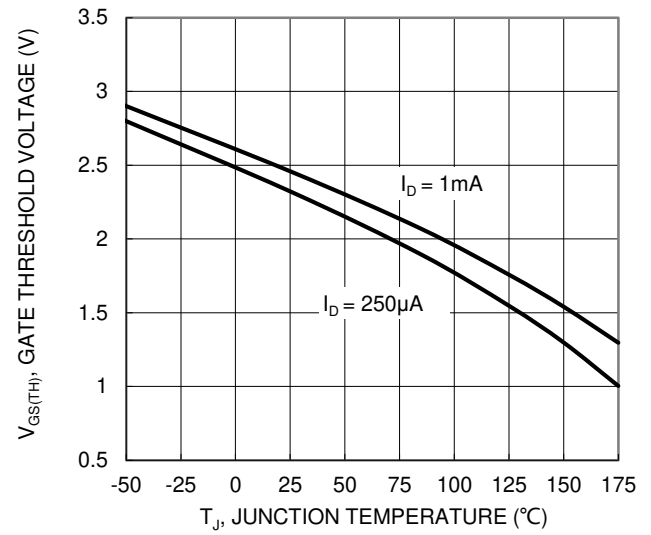
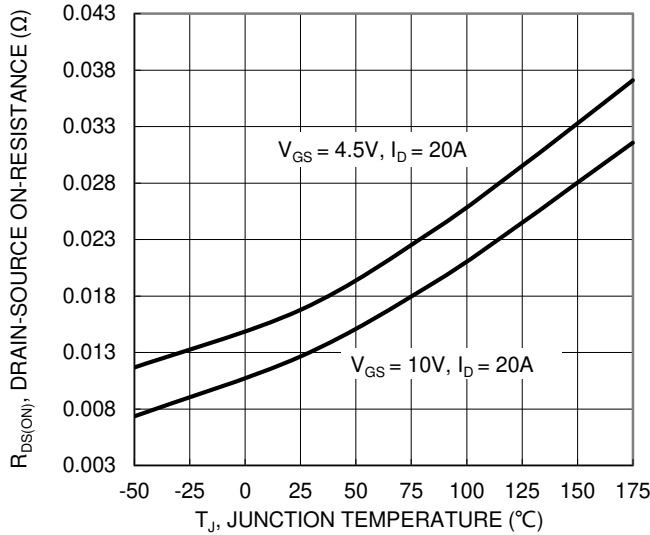
- Notes:
- Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
 - Thermal resistance from junction to soldering point (on the exposed drain pad).
 - I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 9)						
Drain-Source Breakdown Voltage	BV _{DSS}	150	—	—	V	V _{GS} = 0V, I _D = 10mA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	μA	V _{DS} = 120V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	V _{GS(TH)}	1.3	—	2.6	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	13	17.5	mΩ	V _{GS} = 10V, I _D = 20A
		—	17	25.5		V _{GS} = 4.5V, I _D = 20A
Diode Forward Voltage	V _{SD}	—	0.8	1.2	V	V _{GS} = 0V, I _S = 20A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C _{iss}	—	3369	—	pF	V _{DS} = 75V, V _{GS} = 0V, f = 1MHz
Output Capacitance	C _{oss}	—	211	—		
Reverse Transfer Capacitance	C _{rss}	—	6.7	—		
Gate Resistance	R _g	—	1.9	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge	Q _g	—	50	—	nC	V _{DD} = 75V, I _D = 20A, V _{GS} = 10V
Gate-Source Charge	Q _{gs}	—	12.8	—		
Gate-Drain Charge	Q _{gd}	—	9.4	—		
Turn-On Delay Time	t _{D(ON)}	—	10.5	—	ns	V _{DD} = 75V, V _{GS} = 10V, I _D = 20A, R _g = 6Ω
Turn-On Rise Time	t _R	—	16.3	—		
Turn-Off Delay Time	t _{D(OFF)}	—	44.6	—		
Turn-Off Fall Time	t _F	—	17.7	—	ns	I _F = 20A, di/dt = 100A/μs
Reverse Recovery Time	t _{RR}	—	72	—		
Reverse Recovery Charge	Q _{RR}	—	215	—	nC	

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





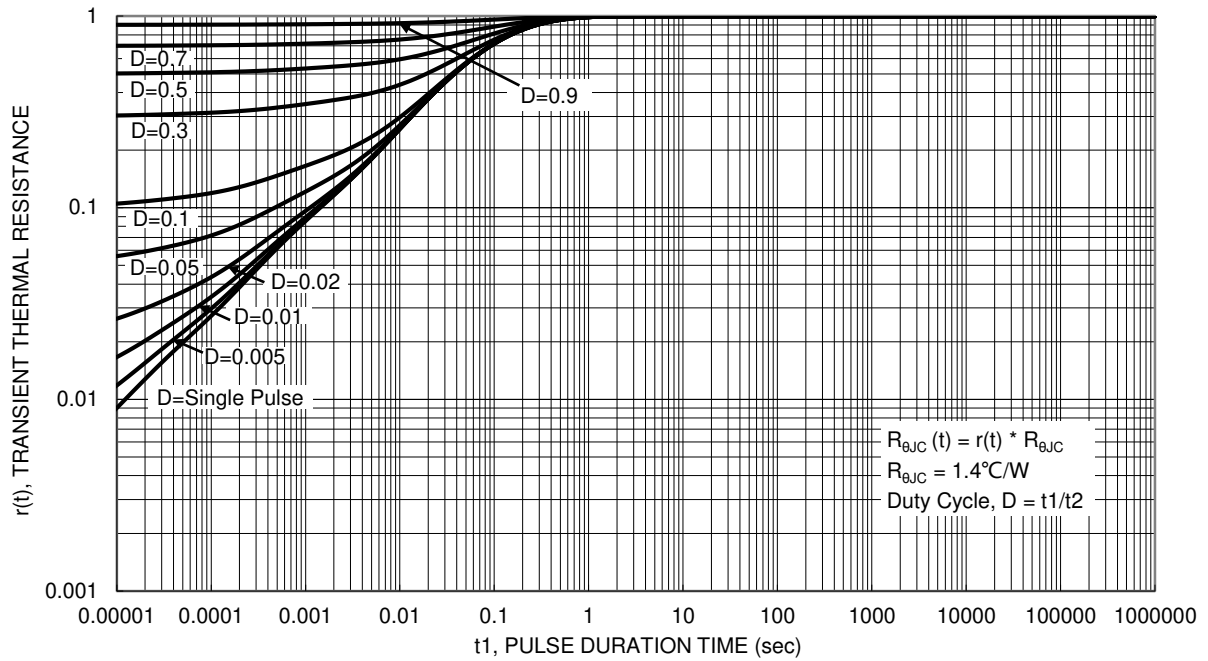
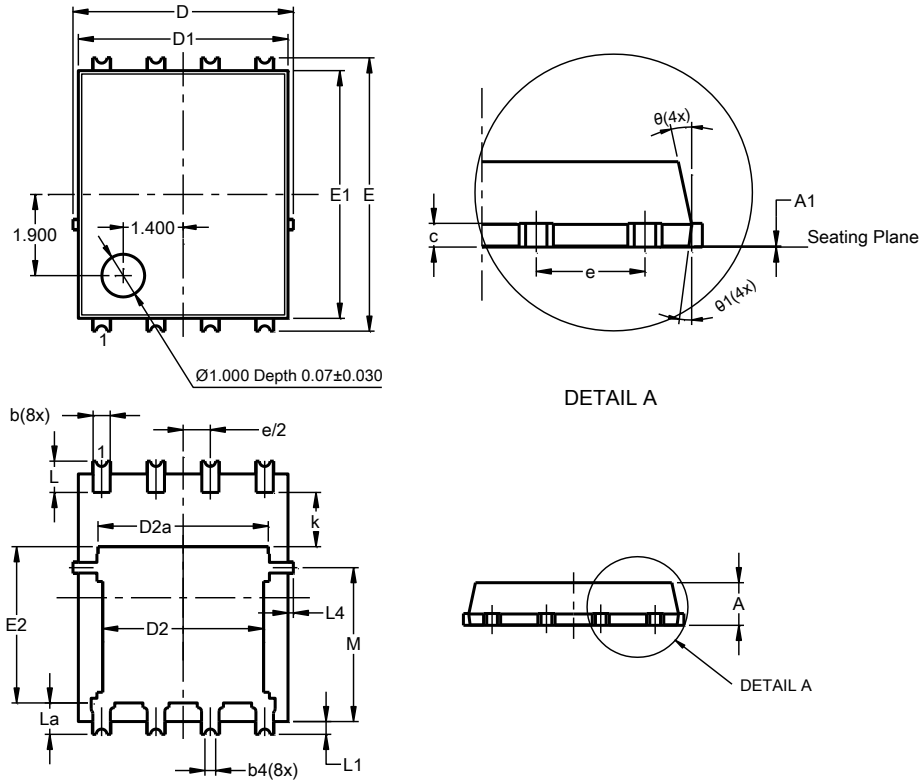


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI5060-8 (SWP) (Type UX)

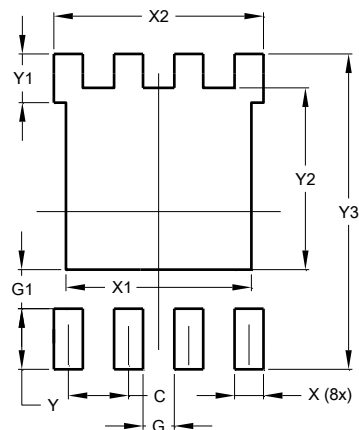


PowerDI5060-8 (SWP) (Type UX)			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0	0.05	--
b	0.30	0.50	0.41
b2	0.20	0.35	0.25
b4	0.25REF		
c	0.230	0.330	0.277
D	5.15 BSC		
D1	4.70	5.10	4.90
D2	3.56	3.96	3.76
D2a	3.78	4.18	3.98
E	6.40 BSC		
E1	5.60	6.00	5.80
E2	3.46	3.86	3.66
E2a	4.195	4.595	4.395
e	1.27BSC		
k	1.05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

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