

Product Summary

BV _{DSS}	R _{DSON} Max	I _D T _C = +25°C (Note 10)
120V	8.9mΩ @ V _{GS} = 10V	84A
	16mΩ @ V _{GS} = 6V	70A

Description and Applications

This MOSFET is designed to minimize the on-state resistance (R_{DSON}) yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- Switching
- DC-DC converters



Top View

Bottom View

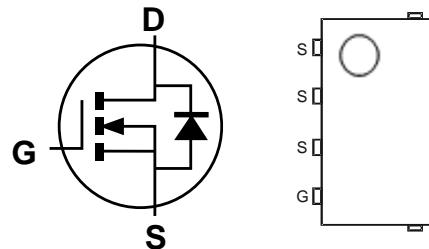
Features and Benefits

- 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_{DSON} – Minimizes On-State Losses
- <1.1mm Package Profile – Ideal for Thin Applications
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)
- The DIODES™ DMTH12H007SPSWQ 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 Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.097 grams (Approximate)



Top View
Pin Configuration

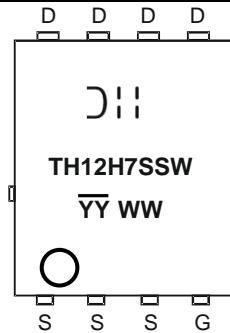
Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMTH12H007SPSWQ-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



DII = Manufacturer's Marking
TH12H7SSW = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 22 = 2022)
WW = Week Code (01 to 53)

PowerDI is a registered trademark of Diodes Incorporated.

DMTH12H007SPSWQ

Document number: DS44558 Rev. 2 - 2

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

Characteristic	Symbol	Value	Unit	
Drain-Source Voltage	V_{DSS}	120	V	
Gate-Source Voltage	V_{GSS}	± 20	V	
Continuous Drain Current, $V_{GS} = 10\text{V}$ (Note 6)	$T_c = +25^\circ\text{C}$ $T_c = +100^\circ\text{C}$	I_D	84 60	A
Pulsed Drain Current (10 μs Pulse, $T_c = +25^\circ\text{C}$, Package Limited)	I_{DM}	336	A	
Continuous Body Diode Forward Current (Note 6)	$T_c = +25^\circ\text{C}$	I_S	84	A
Pulsed Body Diode Current (10 μs Pulse, $T_c = +25^\circ\text{C}$, Package Limited)	$T_c = +25^\circ\text{C}$	I_{SM}	336	A
Avalanche Current, $L = 3\text{mH}$ (Note 9)	I_{AS}	15.5	A	
Avalanche Energy, $L = 3\text{mH}$ (Note 9)	E_{AS}	360.4	mJ	

Thermal Characteristics

Characteristic	Symbol	Value (Typ.)	Unit
Total Power Dissipation (Note 5)	P_D	3.5	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	43	$^\circ\text{C}/\text{W}$
Total Power Dissipation (Note 6)	P_D	125	W
Thermal Resistance, Junction to Case (Note 6)	$R_{\theta JC}$	1.2	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +175	$^\circ\text{C}$

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	120	—	—	V	$V_{GS} = 0\text{V}, I_D = 10\text{mA}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	$V_{DS} = 96\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	2	—	4	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	7.5	8.9	$\text{m}\Omega$	$V_{GS} = 10\text{V}, I_D = 30\text{A}$
		—	12	16		$V_{GS} = 6\text{V}, I_D = 10\text{A}$
Diode Forward Voltage	V_{SD}	—	0.8	1.2	V	$V_{GS} = 0\text{V}, I_S = 30\text{A}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	3142	—	pF	$V_{DS} = 60\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Output Capacitance	C_{oss}	—	665	—		
Reverse Transfer Capacitance	C_{rss}	—	29	—		
Gate Resistance	R_G	—	1.9	—	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge ($V_{GS} = 10\text{V}$)	Q_g	—	44	—	nC	$V_{DS} = 60\text{V}, I_D = 25\text{A}$
Gate-Source Charge	Q_{gs}	—	15	—		
Gate-Drain Charge	Q_{gd}	—	9	—		
Turn-On Delay Time	$t_{D(ON)}$	—	12.5	—	ns	$V_{DD} = 60\text{V}, V_{GS} = 10\text{V}, I_D = 25\text{A}, R_G = 2.7\Omega$
Turn-On Rise Time	t_R	—	13.7	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	24.4	—		
Turn-Off Fall Time	t_F	—	10.9	—		
Reverse Recovery Time	t_{RR}	—	55	—	ns	$I_F = 25\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge	Q_{RR}	—	105	—	nC	

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).

7. Short duration pulse test used to minimize self-heating effect.

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

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

10. Package limited.

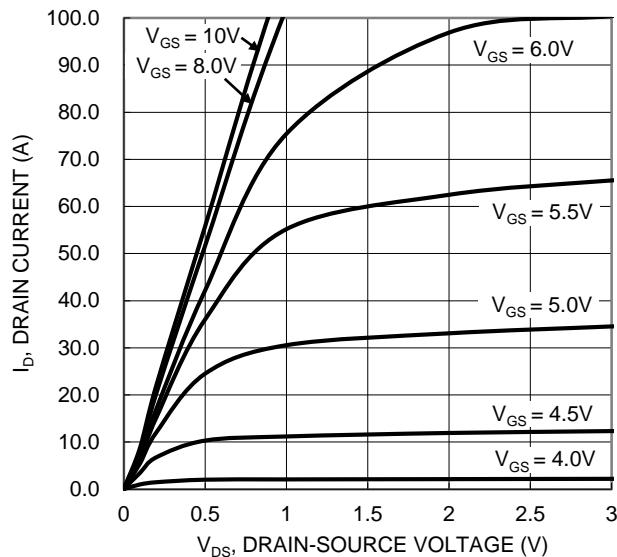


Figure 1. Typical Output Characteristic

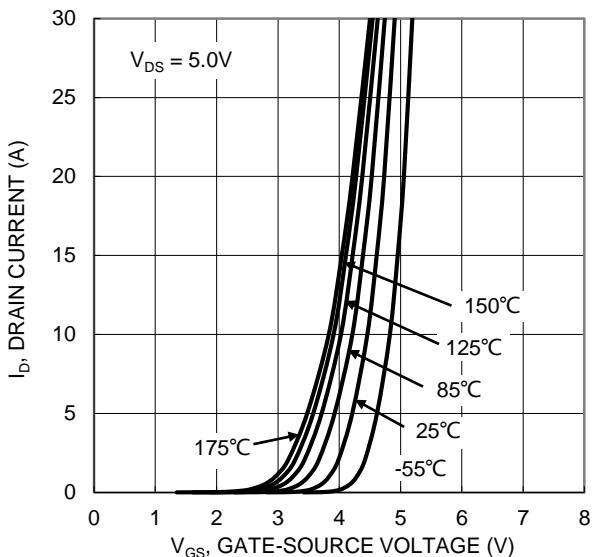


Figure 2. Typical Transfer Characteristic

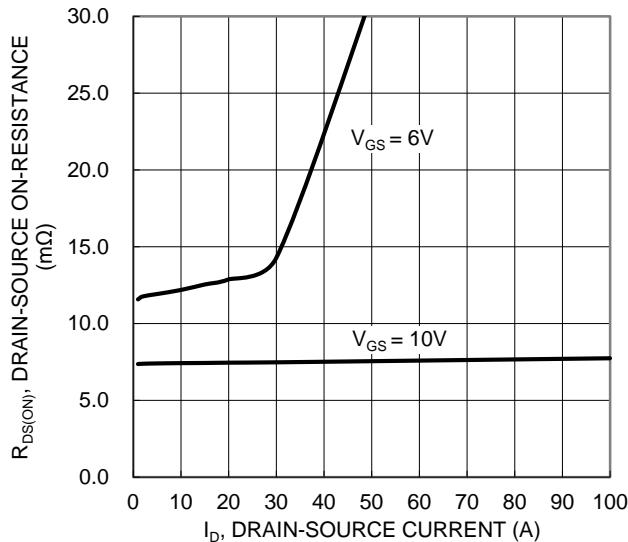


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

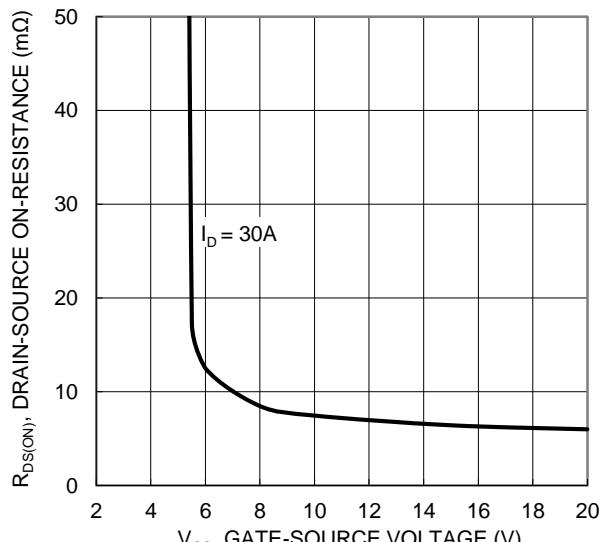


Figure 4. Typical Transfer Characteristic

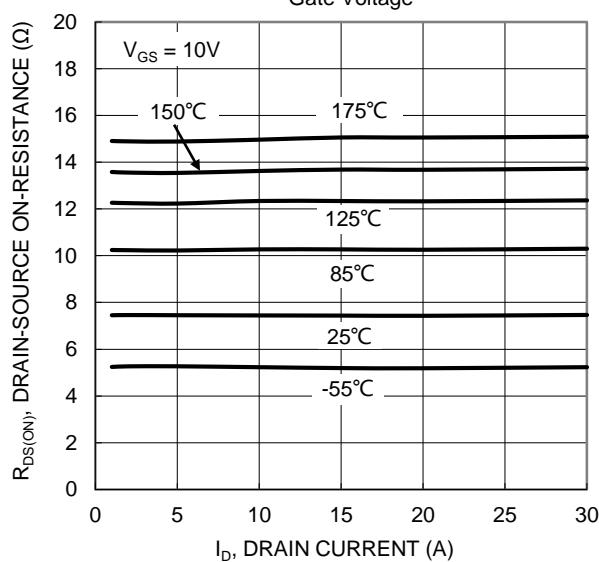


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

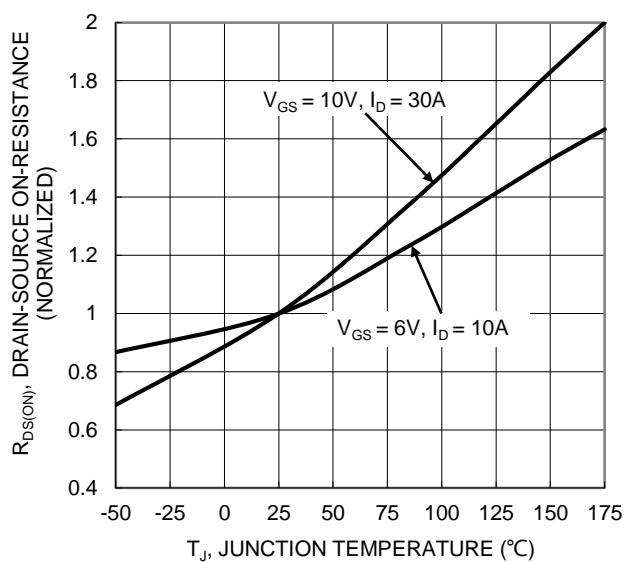
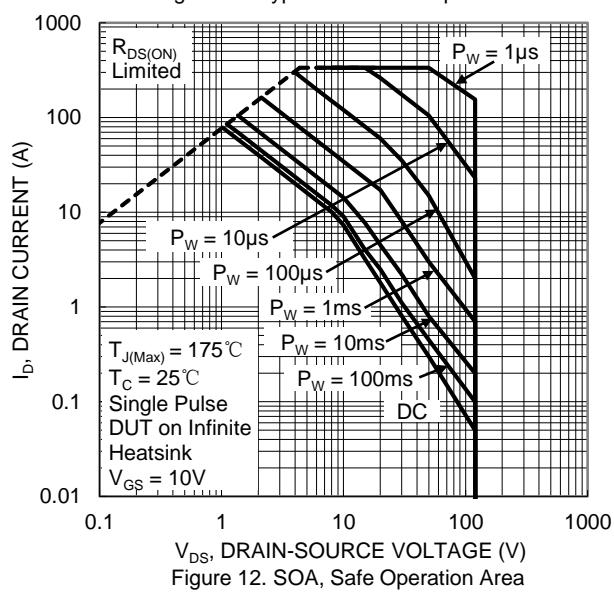
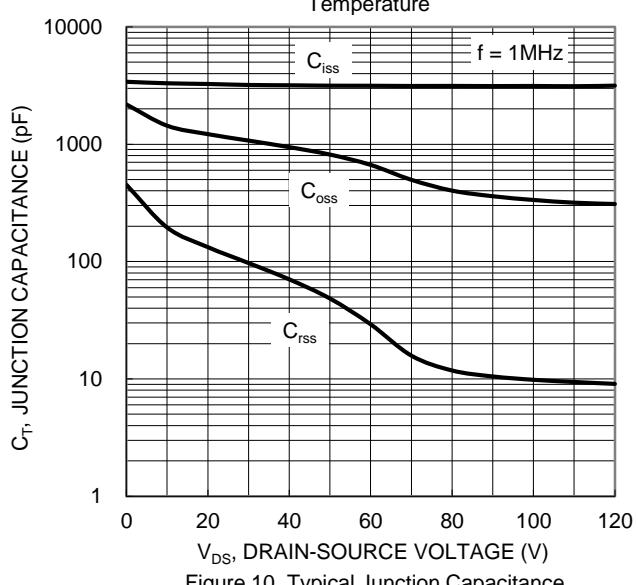
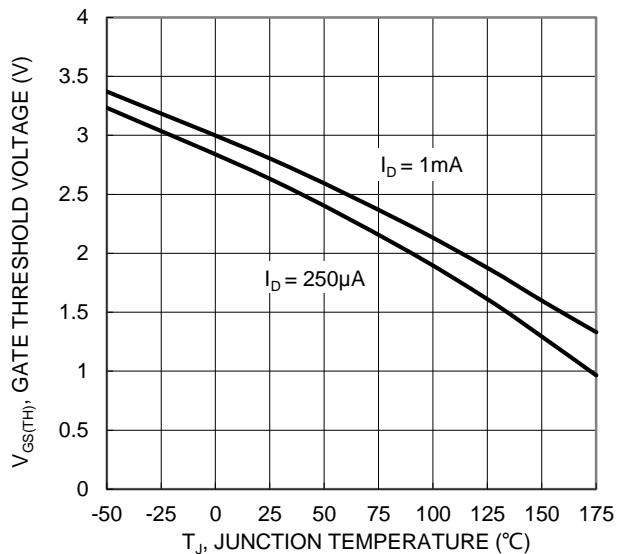
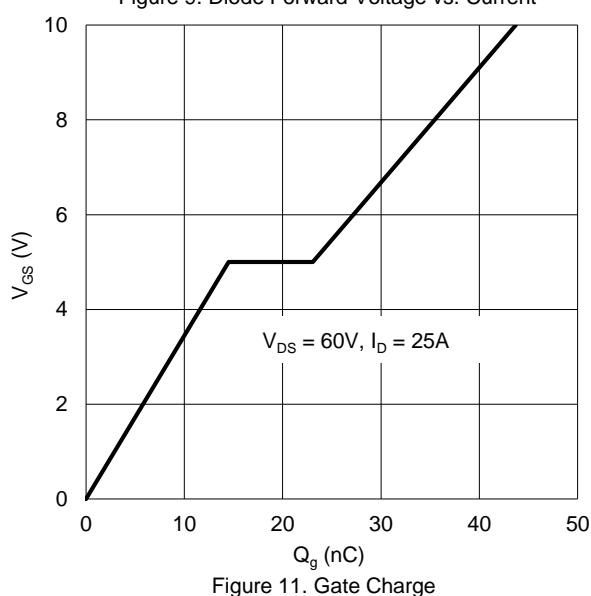
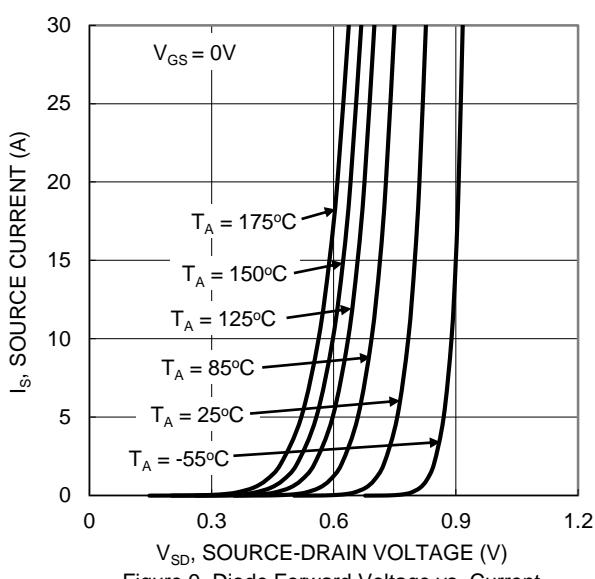
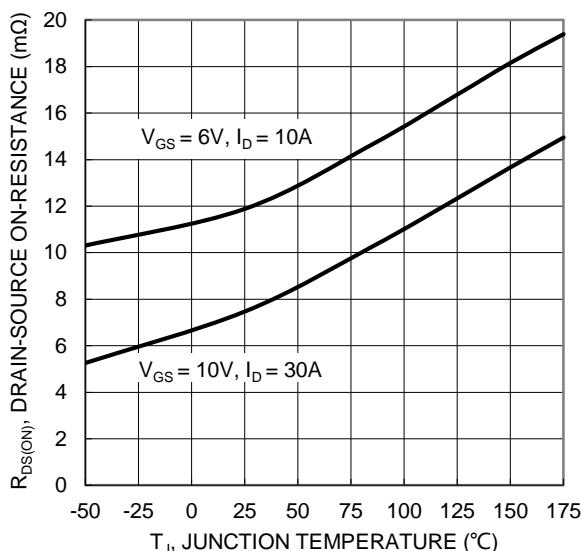


Figure 6. On-Resistance Variation with Temperature



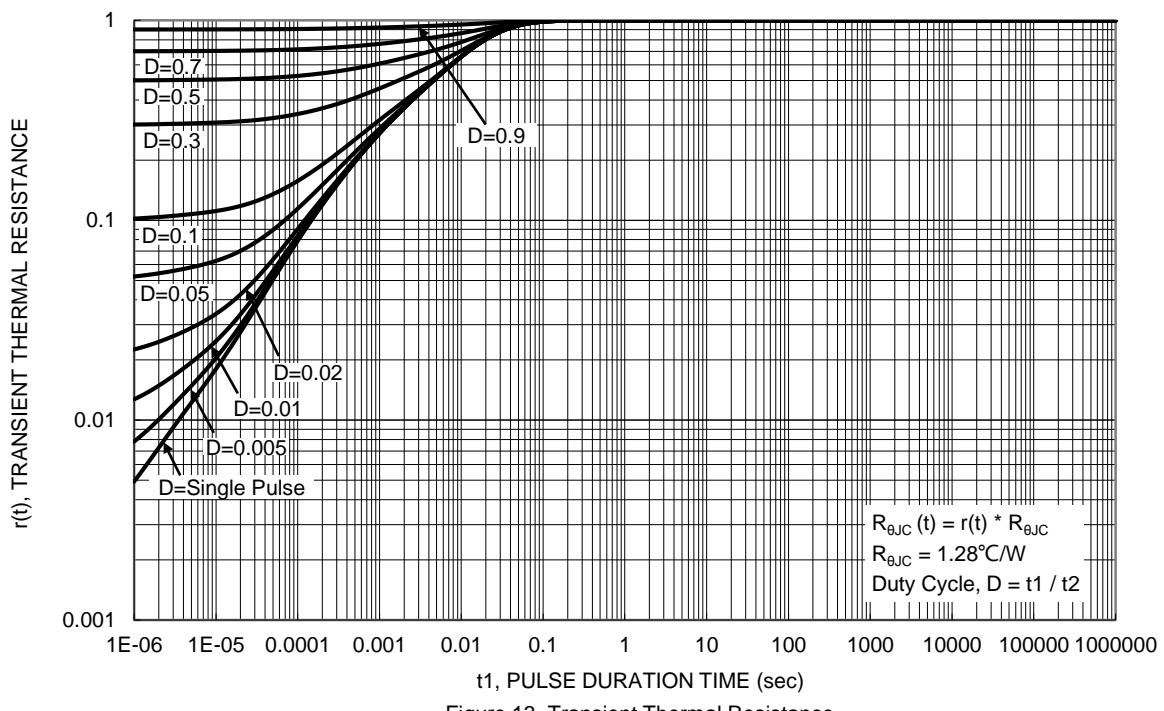
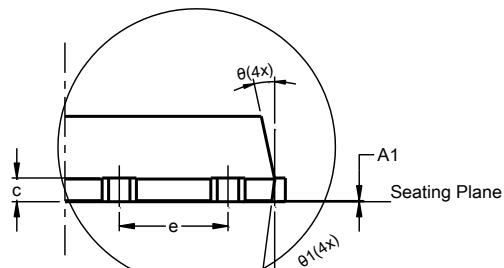
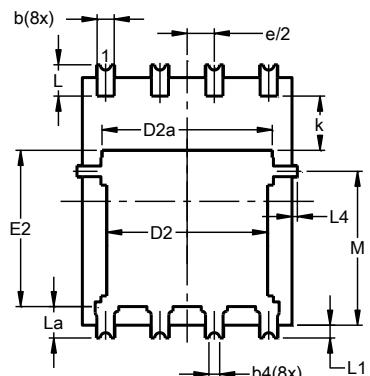
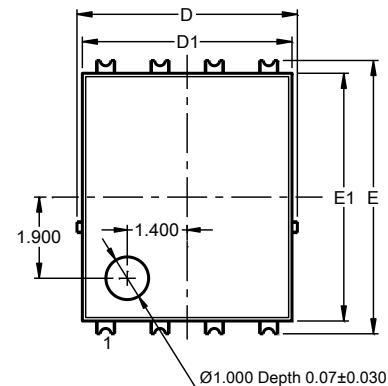


Figure 13. Transient Thermal Resistance

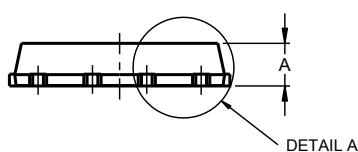
Package Outline Dimensions

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

PowerDI5060-8 (SWP) (Type UX)



DETAIL A



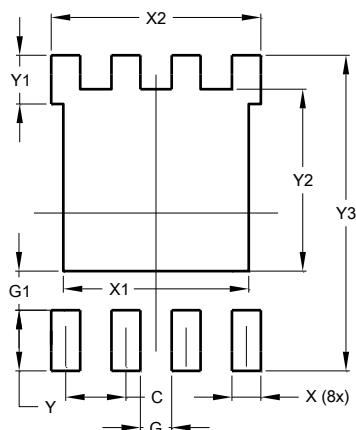
DETAIL A

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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