

Product Summary

BV_{DSS}	R_{DSS(ON)}	I_D T_C = +25°C
60V	12.5mΩ @ V _{GS} = 10V	49A
	16.8mΩ @ V _{GS} = 4.5V	42A

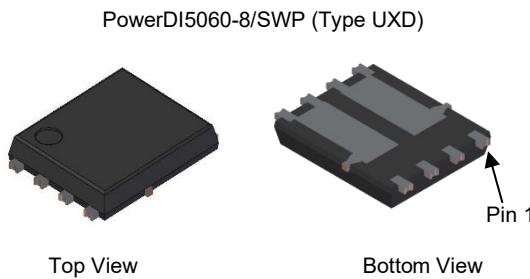
Features and Benefits

- 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_{DSS(ON)} – Minimizes On-State Losses
- Low Input Capacitance
- Fast Switching Speed
- < 1.1mm Package Profile – Ideal for Thin Applications
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**
- An automotive-compliant part is available under a separate datasheet ([DMTH69M9LPDWQ](#))**

Description and Applications

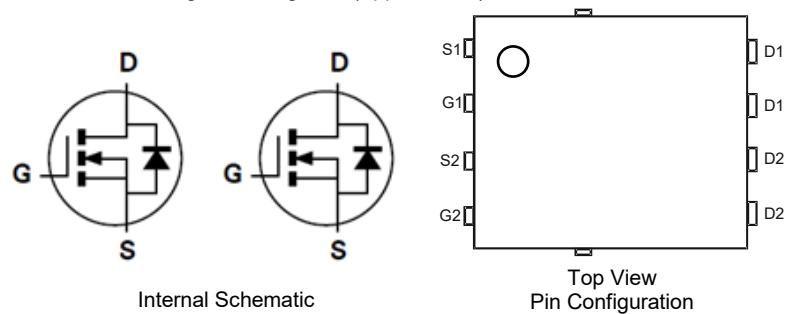
This MOSFET is designed to minimize the on-state resistance (R_{DSS(ON)}) and maintain superior switching performance, making it ideal for high-efficiency power-management applications.

- Wireless charging
- DC-DC converters
- Power management



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
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.097 grams (Approximate)

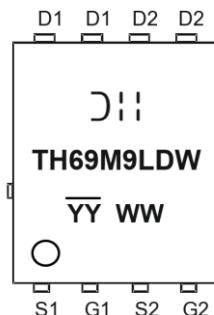


Ordering Information (Note 4)

Orderable Part Number	Package	Packing	
		Qty.	Carrier
DMTH69M9LPDW-13	PowerDI5060-8/SWP (Type UXD)	2500	Tape & Reel

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 - 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
 TH69M9LDW = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 25 = 2025)
 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}	60	V	
Gate-Source Voltage	V_{GSS}	± 16	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	49 34	A
Pulsed Drain Current (10 μs Pulse, Duty Cycle = 1%)	I_{DM}	196	A	
Maximum Continuous Body Diode Forward Current (Note 6)	I_S	48	A	
Pulsed Body Diode Forward Current (10 μs Pulse, Duty Cycle = 1%)	I_{SM}	196	A	
Avalanche Current, $L = 0.1\text{mH}$	I_{AS}	32	A	
Avalanche Energy, $L = 0.1\text{mH}$	E_{AS}	51.2	mJ	

Thermal Characteristics

Characteristic	Symbol	Value	Unit	
Total Power Dissipation (Note 5)	$T_A = +25^\circ\text{C}$	P_D	2.8	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	54	$^\circ\text{C}/\text{W}$	
Total Power Dissipation (Note 6)	$T_C = +25^\circ\text{C}$	P_D	51.7	W
Thermal Resistance, Junction to Case (Note 6)	$R_{\theta JC}$	2.9	$^\circ\text{C}/\text{W}$	
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}	60	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	$V_{DS} = 48\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 16\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.7	—	2	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	10.7	12.5	$\text{m}\Omega$	$V_{GS} = 10\text{V}, I_D = 20\text{A}$
		—	12.4	16.8		$V_{GS} = 4.5\text{V}, I_D = 15\text{A}$
Diode Forward Voltage	V_{SD}	—	0.9	1.2	V	$V_{GS} = 0\text{V}, I_S = 20\text{A}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	2178	—	pF	$V_{DS} = 30\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Output Capacitance	C_{oss}	—	456	—		
Reverse Transfer Capacitance	C_{rss}	—	29.5	—		
Gate Resistance	R_G	—	1.7	—	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	—	32	—	nC	$V_{DD} = 30\text{V}, I_D = 13.5\text{A}$
Total Gate Charge ($V_{GS} = 4.5\text{V}$)	Q_g	—	14	—		
Gate-Source Charge	Q_{gs}	—	10	—		
Gate-Drain Charge	Q_{gd}	—	2.6	—		
Turn-On Delay Time	$t_{D(ON)}$	—	6.84	—	ns	$V_{GS} = 10\text{V}, V_{DD} = 30\text{V}, R_G = 6\Omega, I_D = 13.5\text{A}$
Turn-On Rise Time	t_R	—	25.7	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	51.5	—		
Turn-Off Fall Time	t_F	—	38	—		
Reverse-Recovery Time	t_{RR}	—	42	—	ns	$I_F = 13.5\text{A}, dI/dt = 300\text{A}/\mu\text{s}$
Reverse-Recovery Charge	Q_{RR}	—	70	—	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.

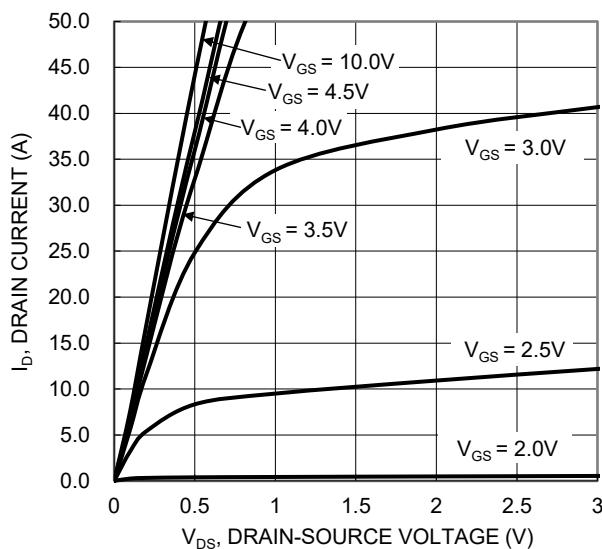


Figure 1. Typical Output Characteristic

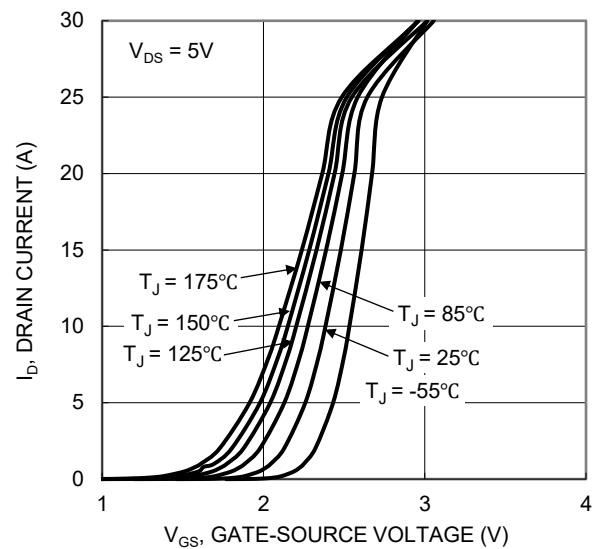


Figure 2. Typical Transfer Characteristic

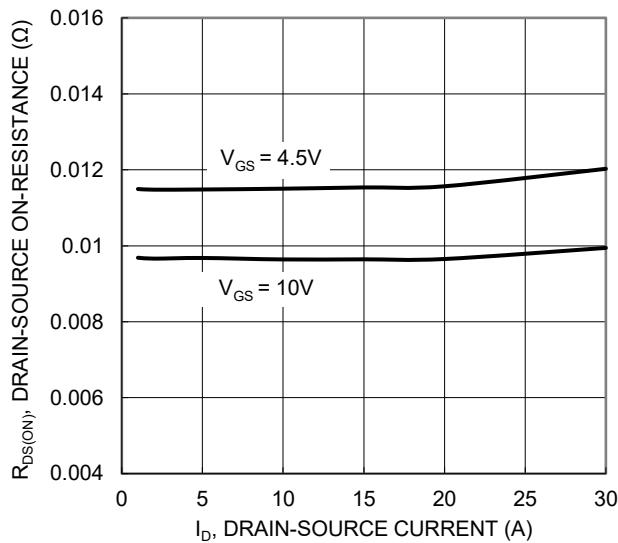


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

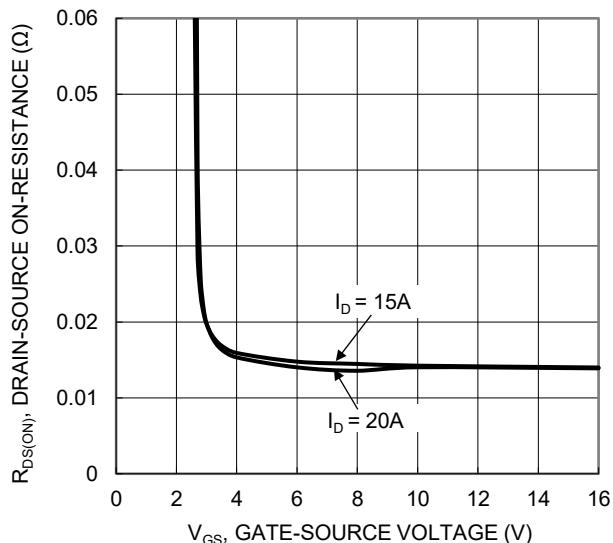


Figure 4. Typical Transfer Characteristic

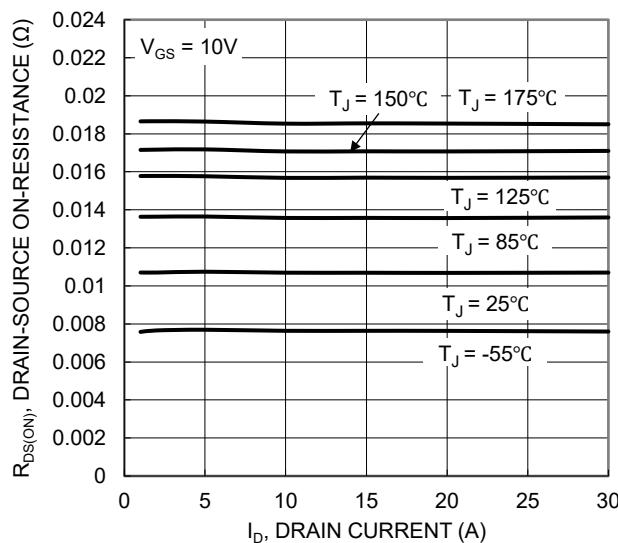


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

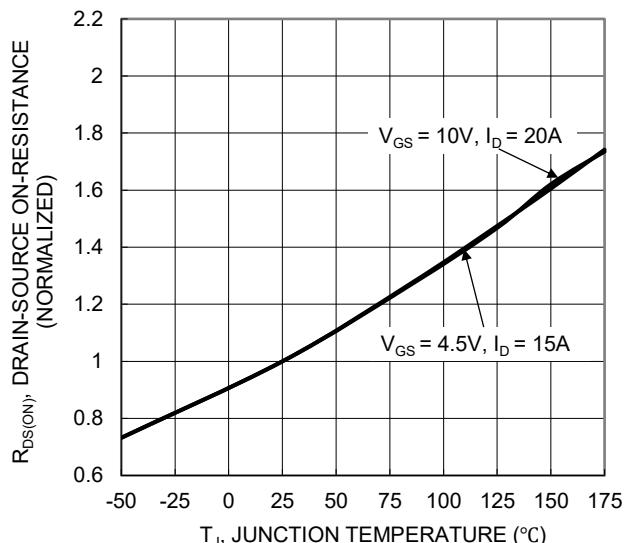


Figure 6. On-Resistance Variation with Junction Temperature

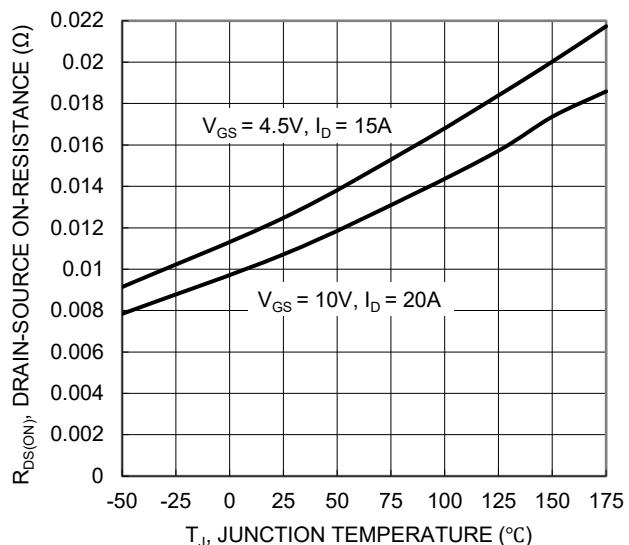


Figure 7. On-Resistance Variation with Junction Temperature

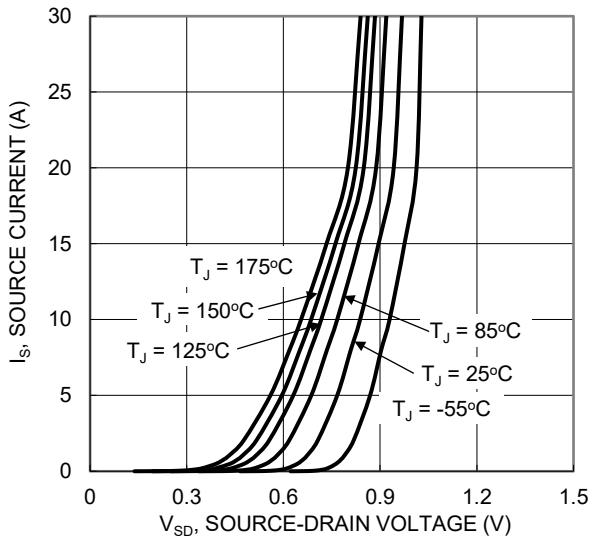
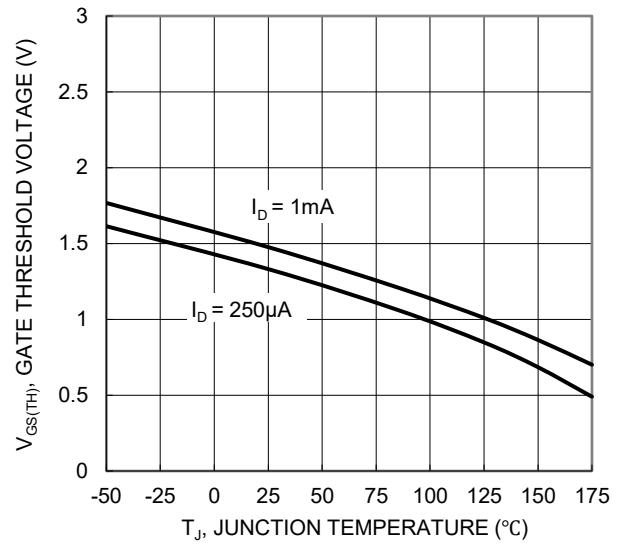


Figure 9. Diode Forward Voltage vs. Current

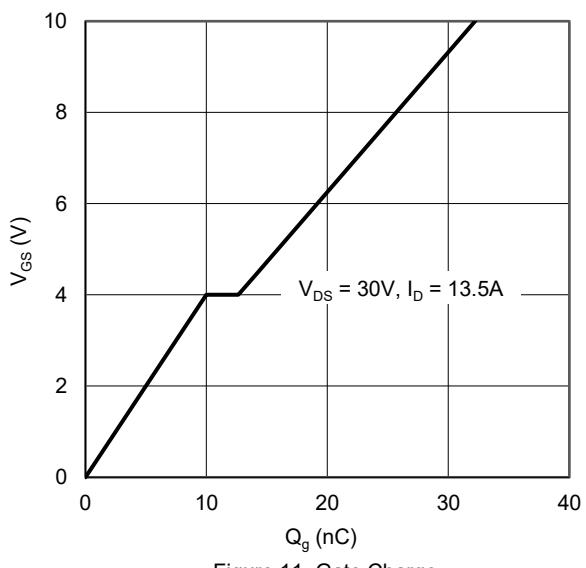
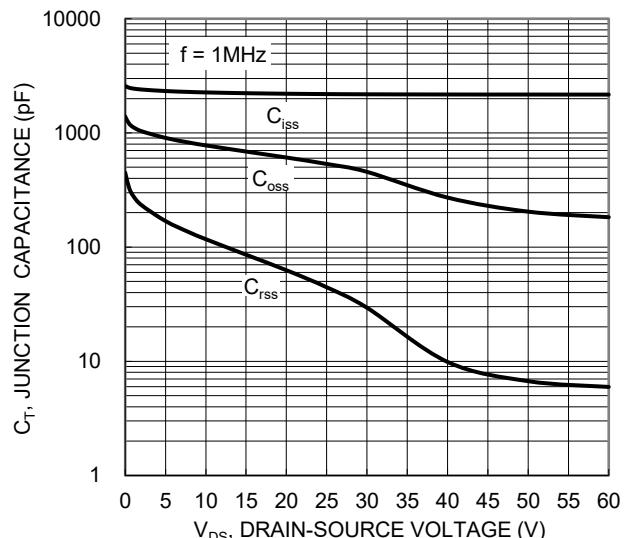
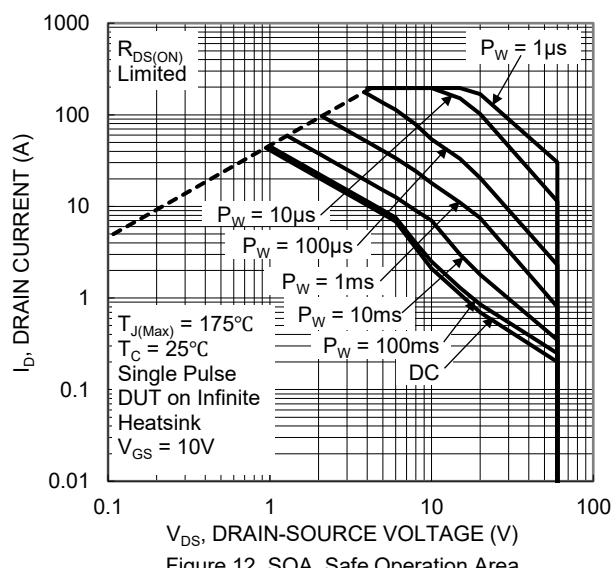


Figure 11. Gate Charge



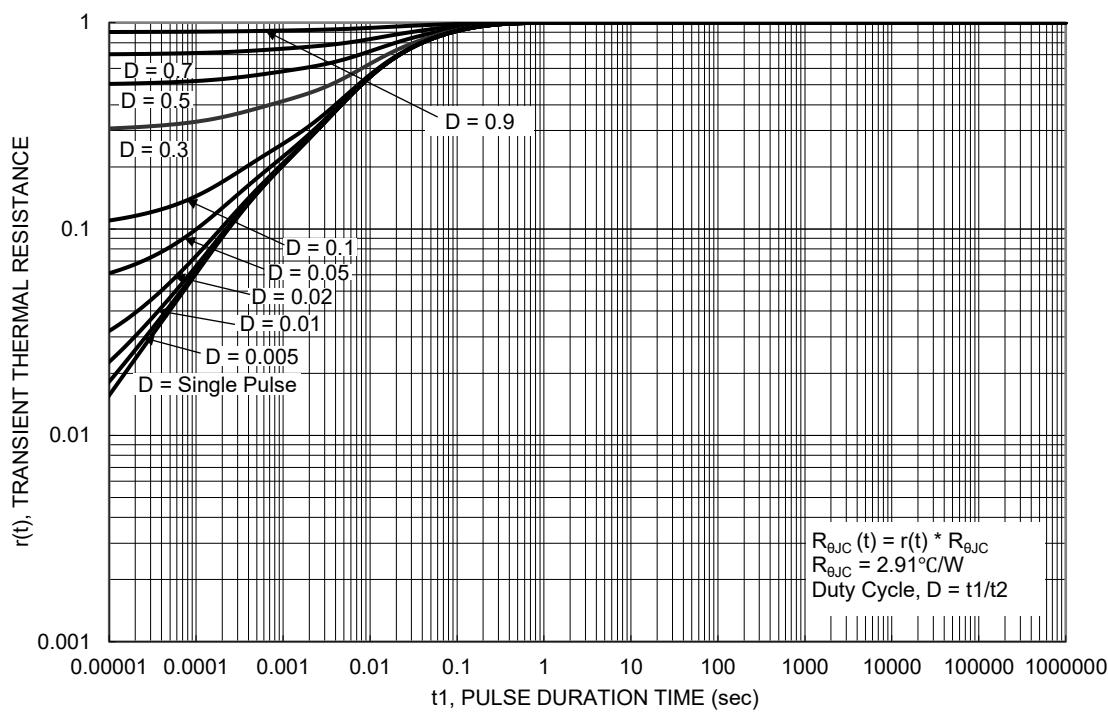
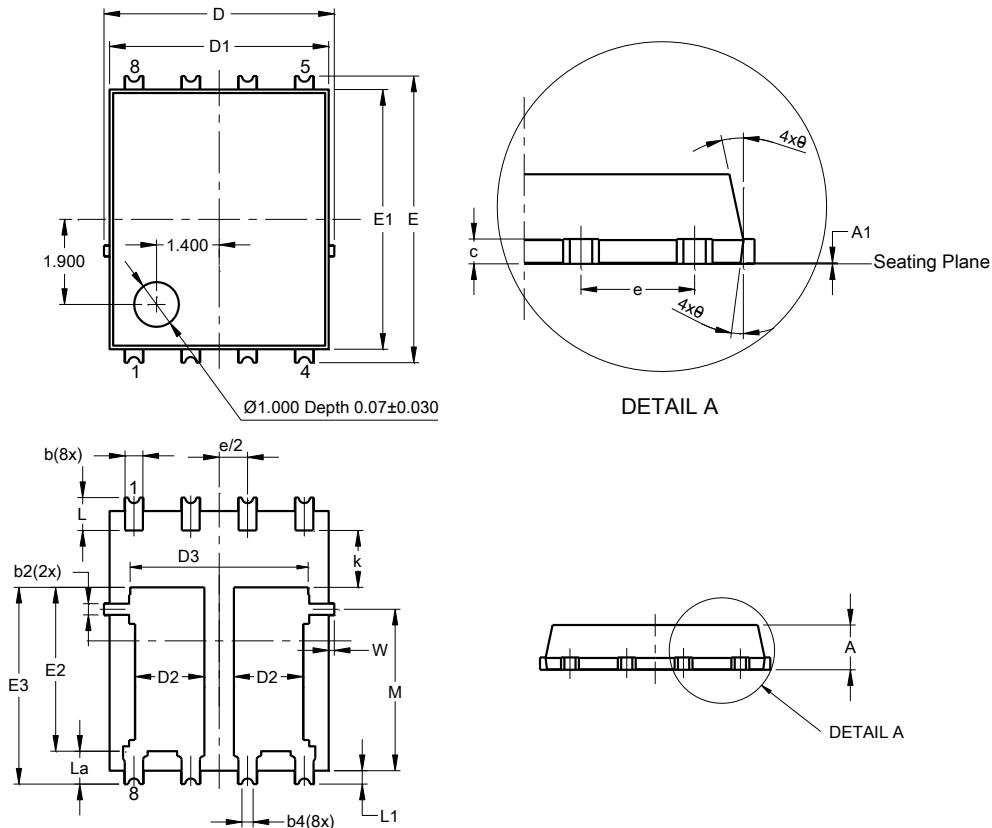


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI5060-8/SWP (Type UXD)



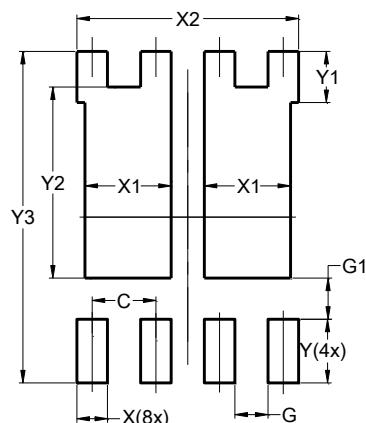
PowerDI5060-8/SWP (Type UXD)			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0.00	0.05	--
b	0.30	0.50	0.41
b2	0.20	0.35	0.25
b4	0.25REF		
c	0.230	0.330	0.277
D	5.15 BSC		
D1	4.70	5.10	4.90
D2	1.46	1.66	1.55
D3	3.78	4.18	3.98
E	6.40 BSC		
E1	5.60	6.00	5.80
E2	3.46	3.86	3.66
E2a	4.195	4.595	4.395
e	1.27BSC		
k	1.05	--	--
L	0.635	0.835	0.735
La	0.635	0.835	0.735
L1	0.200	0.400	0.300
M	3.205	4.005	3.605
W	0.025	0.225	0.125
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 UXD)



Dimensions	Value (in mm)
C	1.270
G	0.660
G1	0.820
X	0.610
X1	1.720
X2	4.420
Y	1.270
Y1	1.020
Y2	3.810
Y3	6.610

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