

Product Summary

BV_{DSS}	R_{D(S(ON))}	I_D T_c = +25°C
30V	0.55mΩ @ V _{GS} = 10V	150A
	0.95mΩ @ V _{GS} = 4.5V	120A

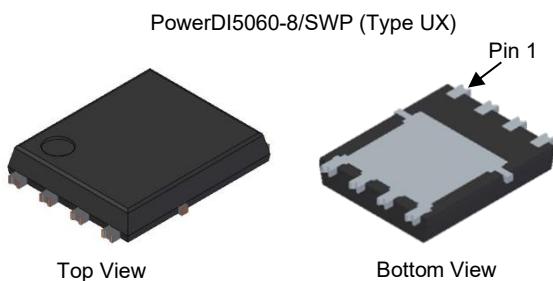
Features

- Rated to +175°C – Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switch (UIS) Test in Production
- Thermally Efficient Package – Cooler Running Applications
- High Conversion Efficiency
- Low R_{D(S(ON))} – 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)**
- An automotive-compliant part is available under a separate datasheet ([DMTH3M70LPSWQ](#))

Description and Applications

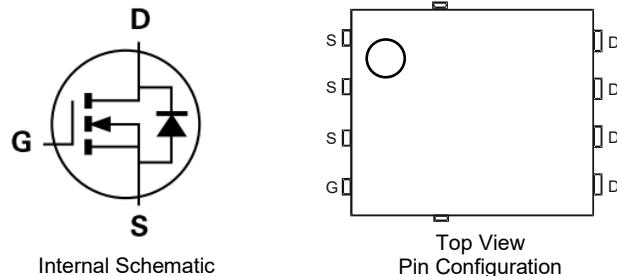
This new generation MOSFET is designed to minimize R_{D(S(ON))} yet maintain superior switching performance. This device is ideal for use in notebook battery power management and load switches.

- Body control electronics
- DC-DC converters



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)

Orderable Part Number	Package	Packing	
		Qty.	Carrier
DMTH3M70LPSW-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
 TH3M70LSW = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 25 = 2025)
 WW = Week Code (01 to 53)

PowerDI is a registered trademark of Diodes Incorporated in the United States and other countries.

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

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	30	V
Gate-Source Voltage		V_{GSS}	± 20	V
Continuous Drain Current, $V_{GS} = 10\text{V}$ (Note 5)	$T_C = +25^\circ\text{C}$ $T_C = +70^\circ\text{C}$	I_D	150 125	A
Continuous Drain Current, $V_{GS} = 10\text{V}$ (Note 6)	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	61 49	A
Pulsed Drain Current (380 μs Pulse, Duty Cycle = 1%)		I_{DM}	600	A
Maximum Continuous Body Diode Forward Current (Note 6)		I_S	4.48	A
Pulsed Body Diode Forward Current (380 μs Pulse, Duty Cycle = 1%)		I_{SM}	600	A
Avalanche Current, $L = 0.3\text{mH}$ (Note 7)		I_{AS}	48	A
Avalanche Energy, $L = 0.3\text{mH}$ (Note 7)		E_{AS}	345	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 8)		P_D	2.13	W
Thermal Resistance, Junction to Ambient (Note 8)	Steady State	$R_{\theta JA}$	58.6	$^\circ\text{C}/\text{W}$
Total Power Dissipation (Note 6)		P_D	3.85	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	32.5	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Case (Note 5)		$R_{\theta JC}$	1.04	$^\circ\text{C}/\text{W}$
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 9)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	—	—	V	$V_{GS} = 0\text{V}, I_D = 1\text{mA}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	$V_{DS} = 30\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	$V_{GS(TH)}$	1	—	3	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	0.39	0.55	$\text{m}\Omega$	$V_{GS} = 10\text{V}, I_D = 20\text{A}$
		—	0.67	0.95		$V_{GS} = 4.5\text{V}, I_D = 20\text{A}$
Diode Forward Voltage	V_{SD}	—	0.7	1	V	$V_{GS} = 0\text{V}, I_S = 20\text{A}$
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{iss}	—	11112	—	pF	$V_{DS} = 15\text{V}, V_{GS} = 0\text{V}$ $f = 1\text{MHz}$
Output Capacitance	C_{oss}	—	8689	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	325	—	pF	
Gate Resistance	R_g	—	0.6	—	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	—	152.7	—	nC	$V_{DS} = 15\text{V}, I_D = 20\text{A}$
Total Gate Charge ($V_{GS} = 4.5\text{V}$)	Q_g	—	69.4	—	nC	
Gate-Source Charge	Q_{gs}	—	28.8	—	nC	
Gate-Drain Charge	Q_{gd}	—	10.3	—	nC	$V_{DD} = 15\text{V}, V_{GEN} = 10\text{V}$ $R_{GEN} = 6\Omega, I_D = 24\text{A}$
Turn-On Delay Time	$t_{D(ON)}$	—	15	—	ns	
Turn-On Rise Time	t_R	—	29	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	89	—	ns	
Turn-Off Fall Time	t_F	—	42	—	ns	

Notes:

5. Thermal resistance from junction to soldering point (on the exposed drain pad).
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 $T_J = +25^\circ\text{C}$.
8. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
9. Short duration pulse test used to minimize self-heating effect.
10. Guaranteed by design. Not subject to product testing.

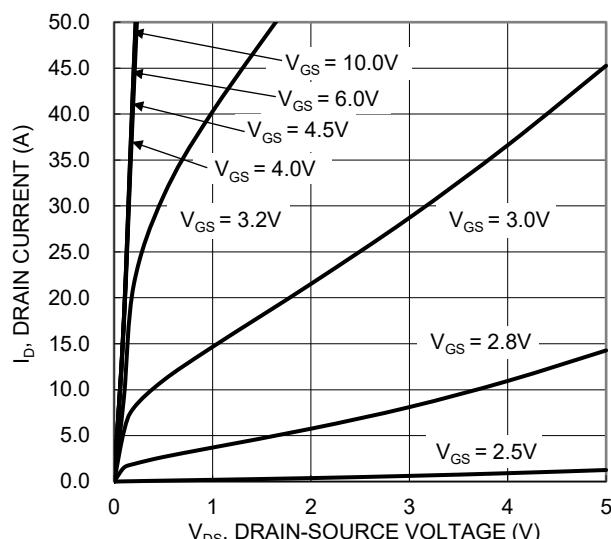


Figure 1. Typical Output Characteristic

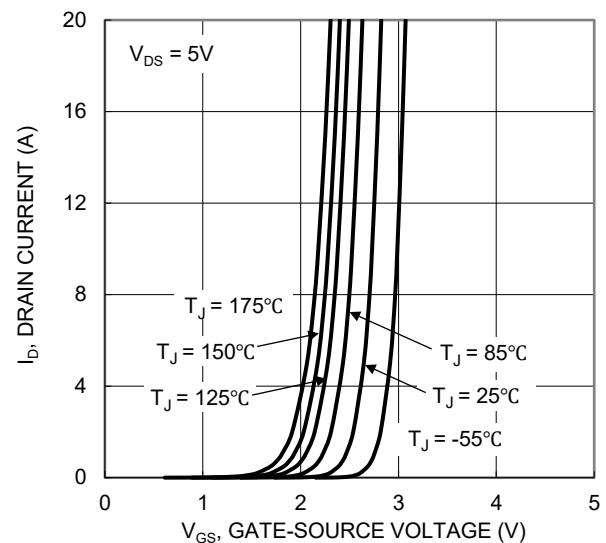


Figure 2. Typical Transfer Characteristic

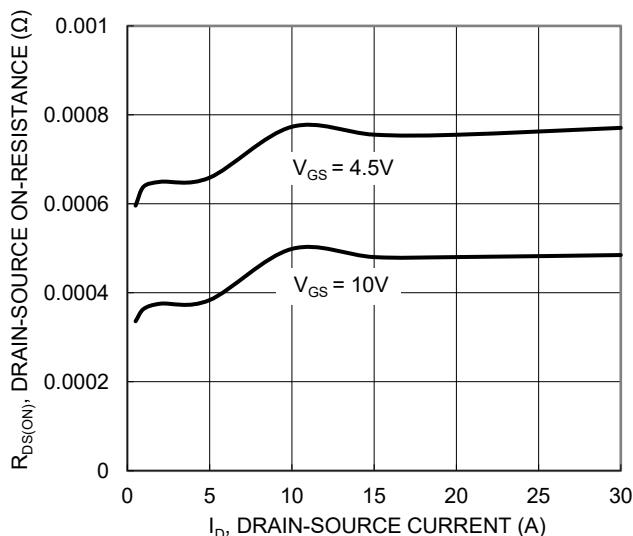


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

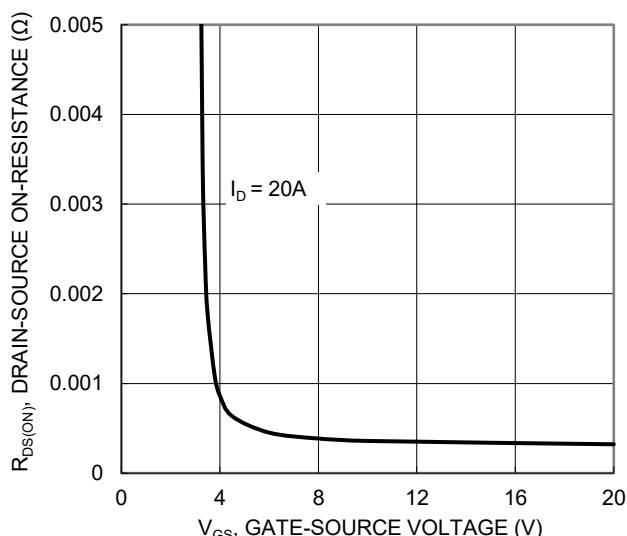


Figure 4. Typical Transfer Characteristic

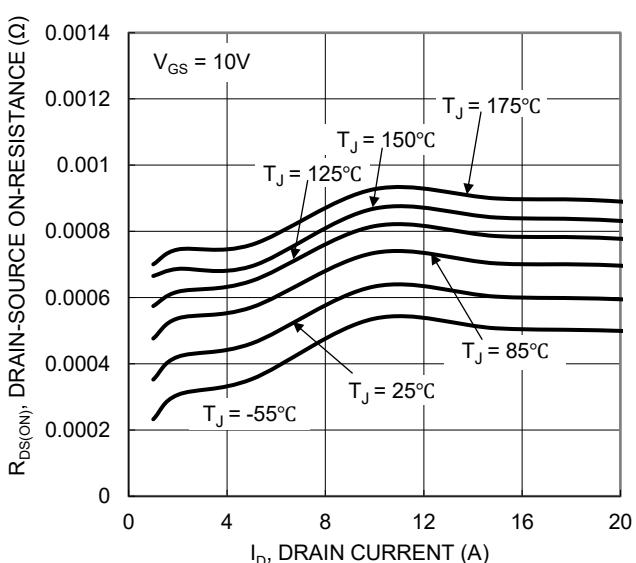


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

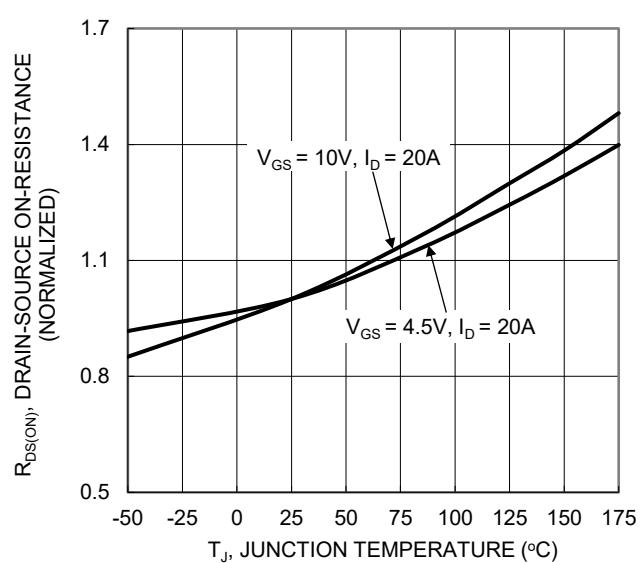


Figure 6. On-Resistance Variation with Junction Temperature

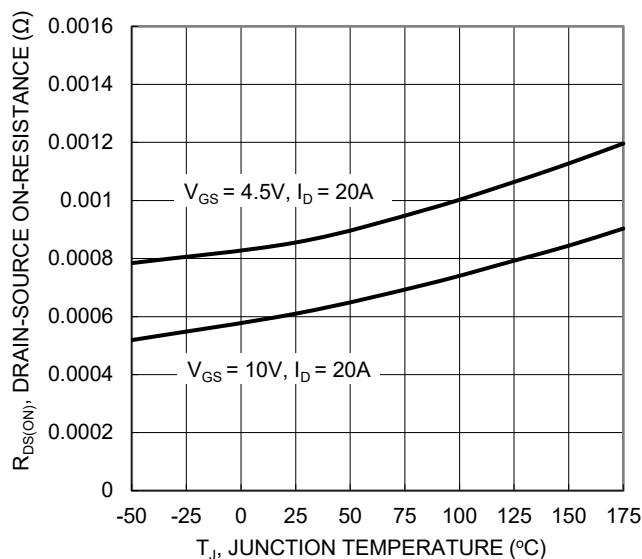


Figure 7. On-Resistance Variation with Junction Temperature

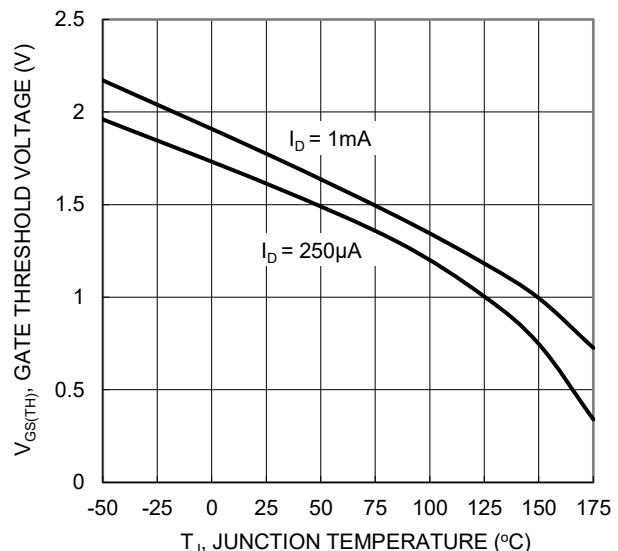


Figure 8. Gate Threshold Variation vs. Junction Temperature

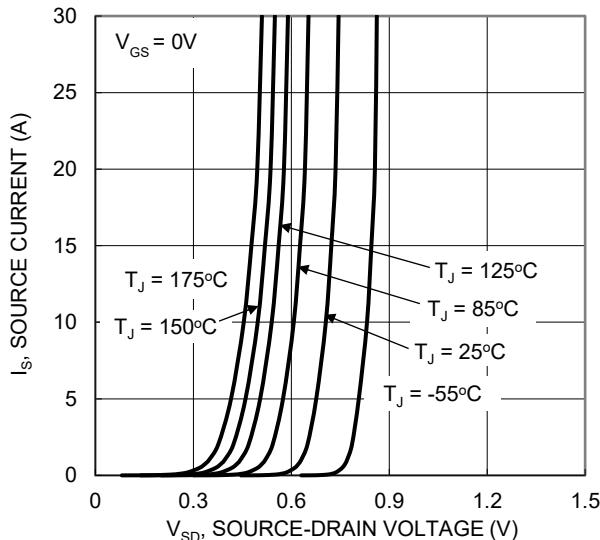


Figure 9. Diode Forward Voltage vs. Current

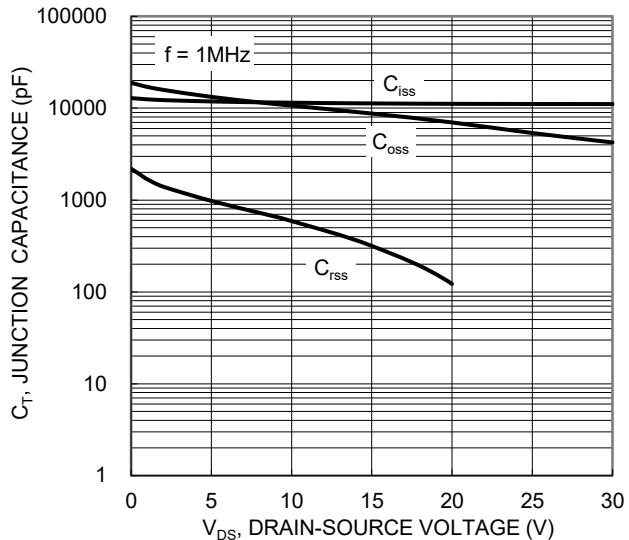


Figure 10. Typical Junction Capacitance

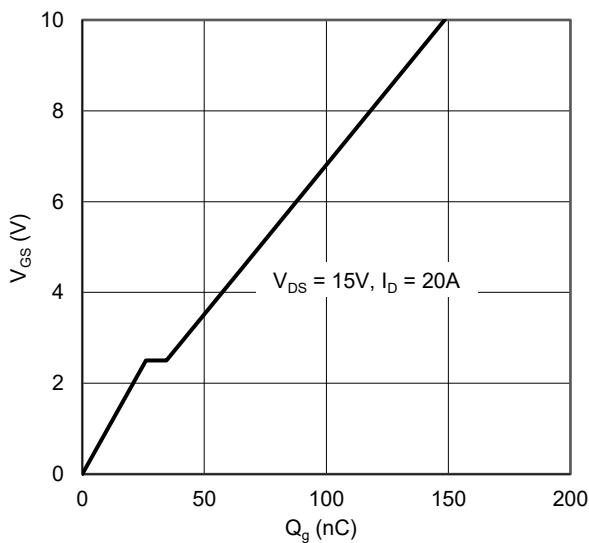


Figure 11. Gate Charge

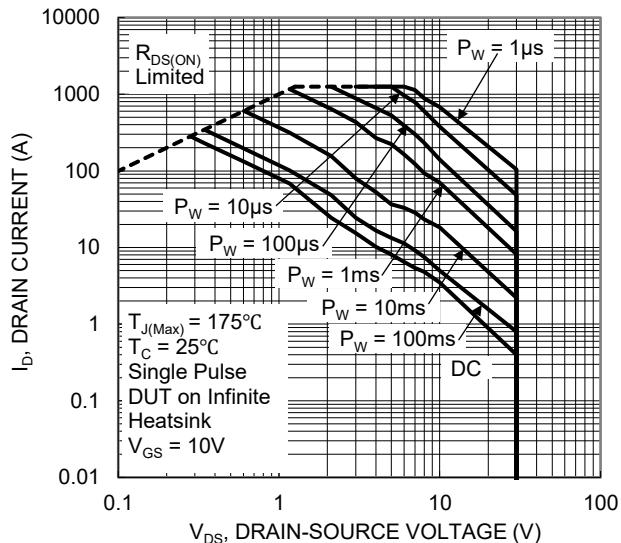


Figure 12. SOA, Safe Operation Area

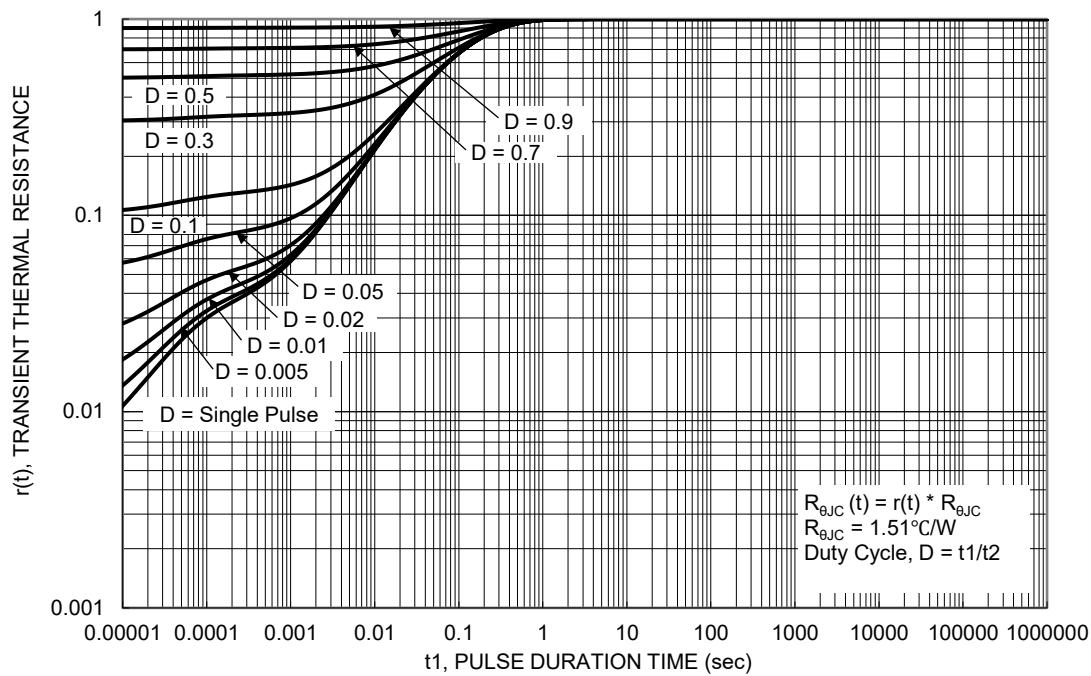
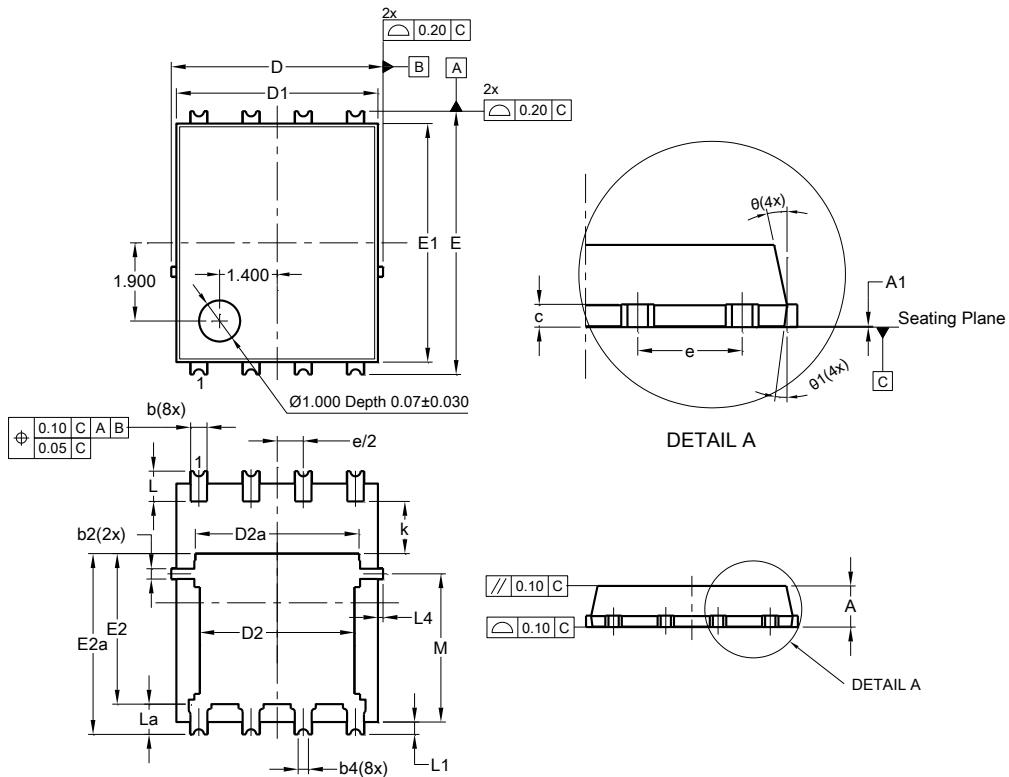


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

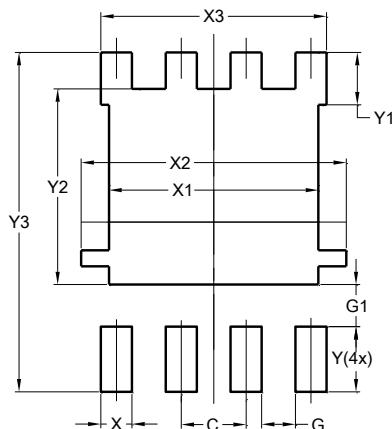
PowerDI5060-8/SWP (Type UX)



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	5.190
X3	4.420
Y	1.270
Y1	1.020
Y2	3.810
Y3	6.610

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