

Product Summary

BV _{DSS}	R _{DS(ON)}	I _D T _C = +25°C
60V	12mΩ @ V _{GS} = 10V	31.5A
	17mΩ @ V _{GS} = 4.5V	26.5A

Description and Applications

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

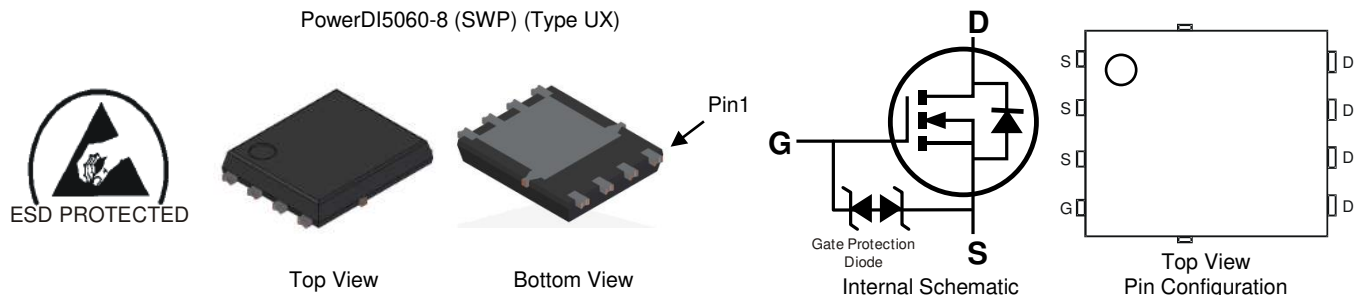
- Synchronous Rectifier
- DC-DC Converters
- Power Management

Features

- 100% Unclamped Inductive Switching (UIS) Test in Production — Ensures More Reliable and Robust End Application
- High Conversion Efficiency
- Low R_{DS(ON)} — Minimizes On State Losses
- Low Input Capacitance
- Fast Switching Speed
- ESD Protected Gate
- Wettable Flank for Improved Optical Inspection
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](https://www.diodes.com/quality/product-definitions/) or your local Diodes representative.**

Mechanical Data

- Case: PowerDI[®]5060-8
- Case 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)

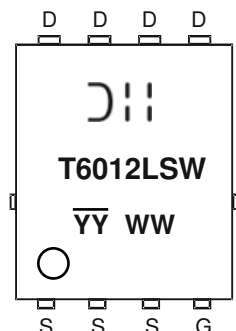


Ordering Information (Note 4)

Part Number	Case	Packaging
DMT6012LPSW-13	PowerDI5060-8 (SWP) (Type UX)	2,500 / Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 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



D D D D = Manufacturer's Marking
 T6012LSW = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 19 = 2019)
 WW = Week Code (01 to 53)

PowerDI is a registered trademark of Diodes Incorporated.

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V _{DSS}	60	V
Gate-Source Voltage	V _{GSS}	±20	V
Continuous Drain Current (Note 5) V _{GS} = 10V	I _D	13.1 10.5	A
Continuous Drain Current (Note 6) V _{GS} = 10V	I _D	31.5 25.2	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)	I _{DM}	120	A
Maximum Continuous Body Diode Forward Current (Note 6)	I _S	30	A
Pulsed Body Diode Forward Current (10μs Pulse, Duty Cycle = 1%)	I _{SM}	120	A
Avalanche Current, L = 0.3mH	I _{AS}	16.3	A
Avalanche Energy, L = 0.3mH	E _{AS}	39.5	mJ

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P _D	3.1	W
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	40.3	°C/W
Total Power Dissipation (Note 6)	P _D	17.9	W
Thermal Resistance, Junction to Case (Note 6)	R _{θJC}	7.0	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

Electrical Characteristics (@T_A = +25°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} = 0V, I _D = 1mA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	μA	V _{DS} = 48V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±10	μA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(TH)}	1	—	2.5	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	9.1	12	mΩ	V _{GS} = 10V, I _D = 20A
		—	12.9	17	mΩ	V _{GS} = 4.5V, I _D = 12.5A
Diode Forward Voltage	V _{SD}	—	0.8	1.2	V	V _{GS} = 0V, I _S = 20A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	1522	—	pF	V _{DS} = 30V, V _{GS} = 0V, f = 1MHz
Output Capacitance	C _{oss}	—	352	—		
Reverse Transfer Capacitance	C _{rss}	—	27.5	—		
Gate Resistance	R _G	—	1.4	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	10.7	—	nC	V _{DS} = 30V, I _D = 10A
Total Gate Charge (V _{GS} = 10V)	Q _g	—	22.2	—		
Gate-Source Charge	Q _{gs}	—	3.3	—		
Gate-Drain Charge	Q _{gd}	—	4.2	—		
Turn-On Delay Time	t _{D(ON)}	—	4.4	—	ns	V _{DS} = 30V, V _{GS} = 10V, I _D = 10A, R _G = 6Ω
Turn-On Rise Time	t _R	—	6.7	—		
Turn-Off Delay Time	t _{D(OFF)}	—	25.5	—		
Turn-Off Fall Time	t _F	—	12.5	—		
Reverse Recovery Time	t _{RR}	—	25.8	—	ns	I _F = 10A, di/dt = 100A/μs
Reverse Recovery Charge	Q _{RR}	—	15.1	—	nC	

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 - Thermal resistance from junction to soldering point (on the exposed drain pad).
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

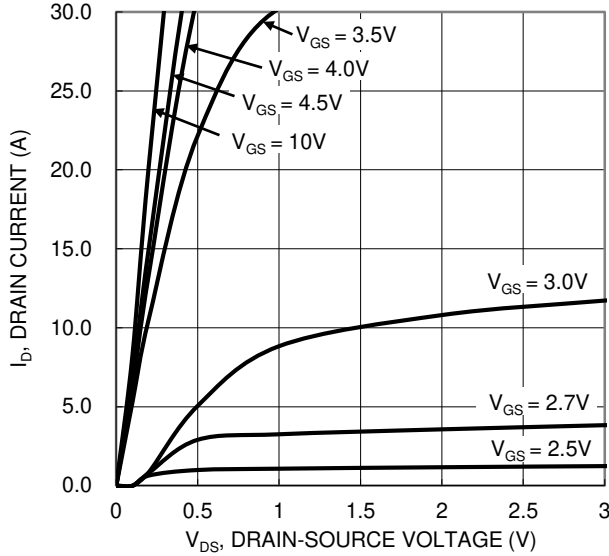


Figure 1. Typical Output Characteristic

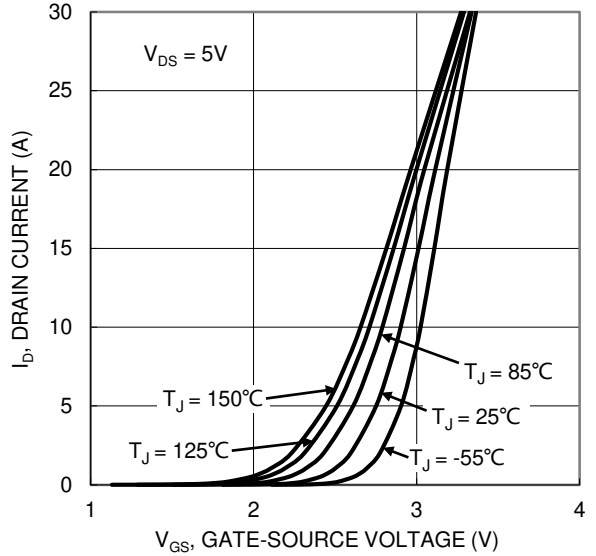


Figure 2. Typical Transfer Characteristic

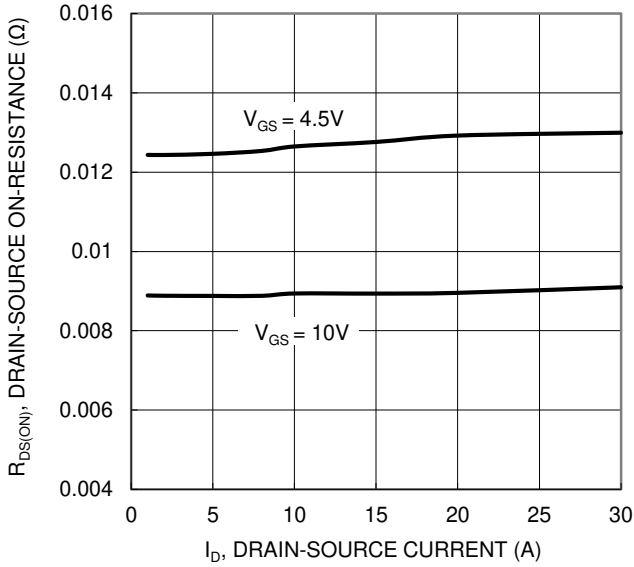


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

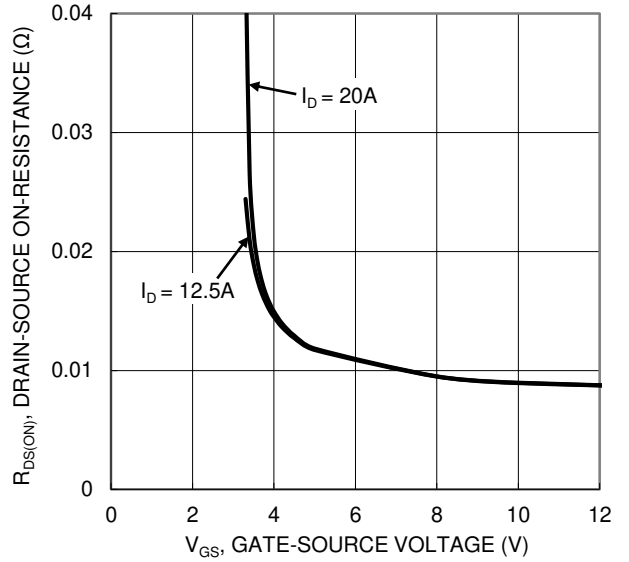


Figure 4. Typical Transfer Characteristic

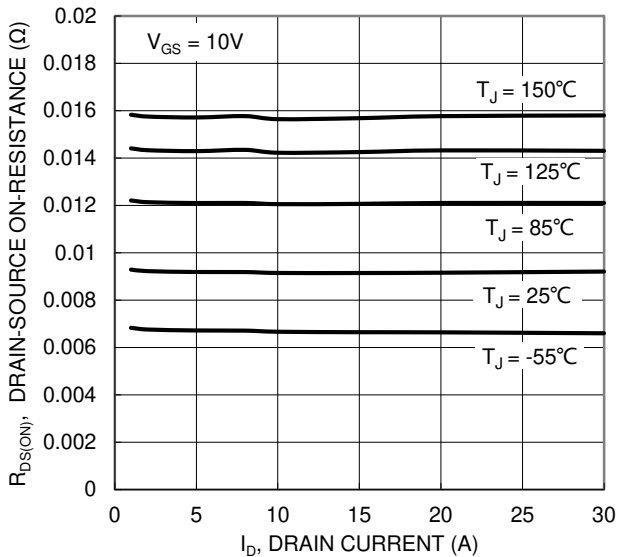


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

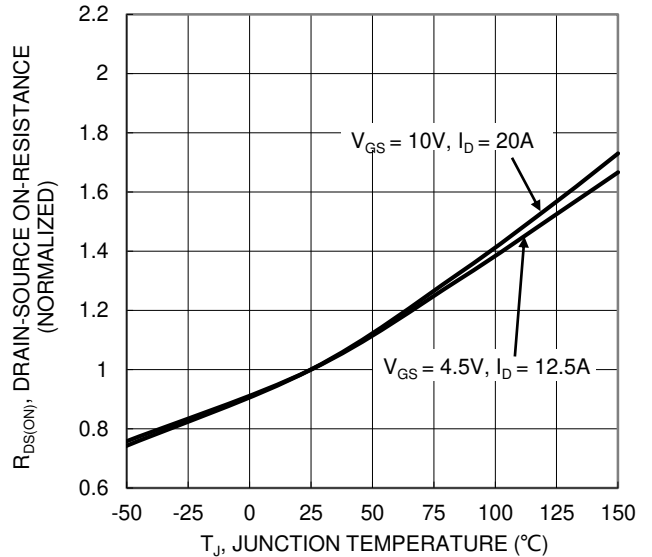


Figure 6. On-Resistance Variation with Junction Temperature

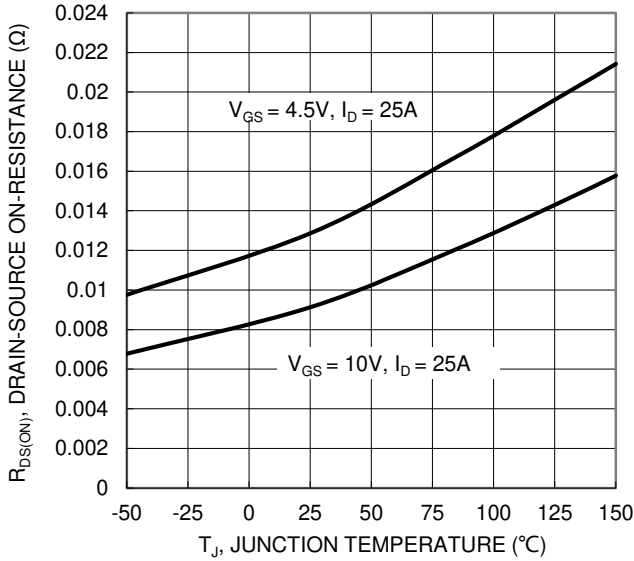


Figure 7. On-Resistance Variation with Junction Temperature

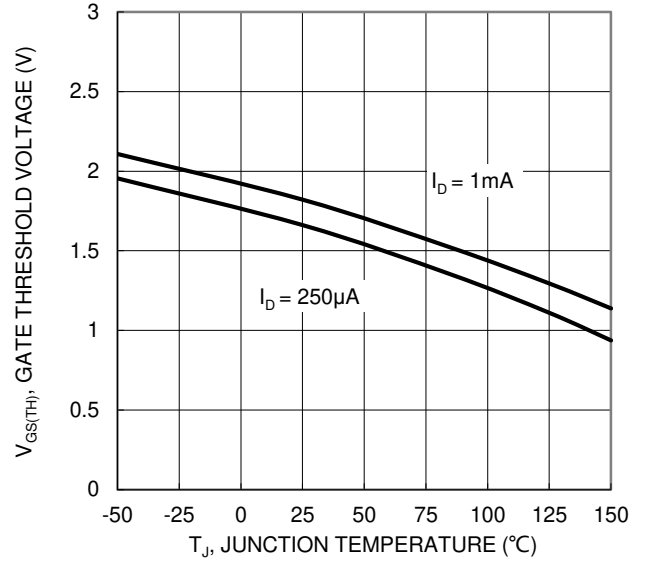


Figure 8. Gate Threshold Variation vs. Junction Temperature

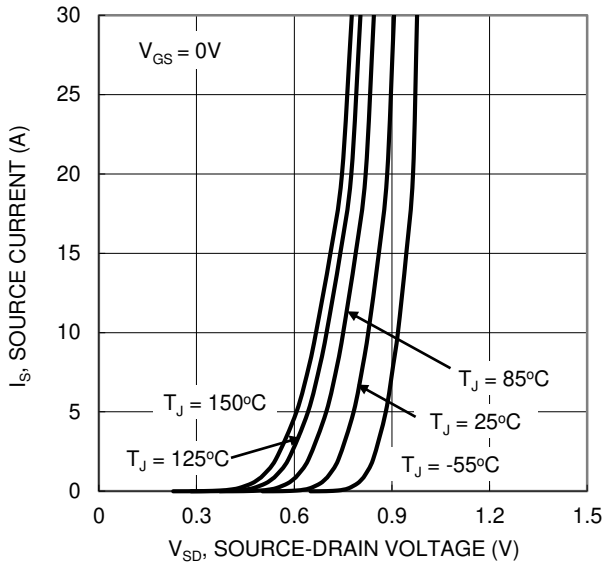


Figure 9. Diode Forward Voltage vs. Current

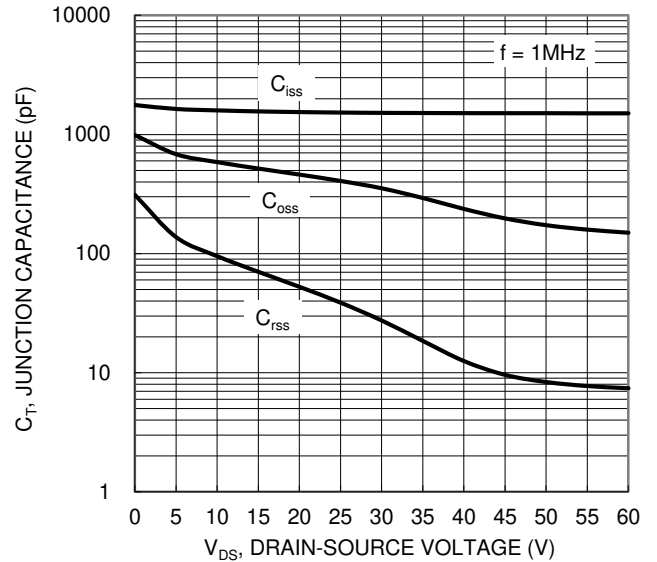


Figure 10. Typical Junction Capacitance

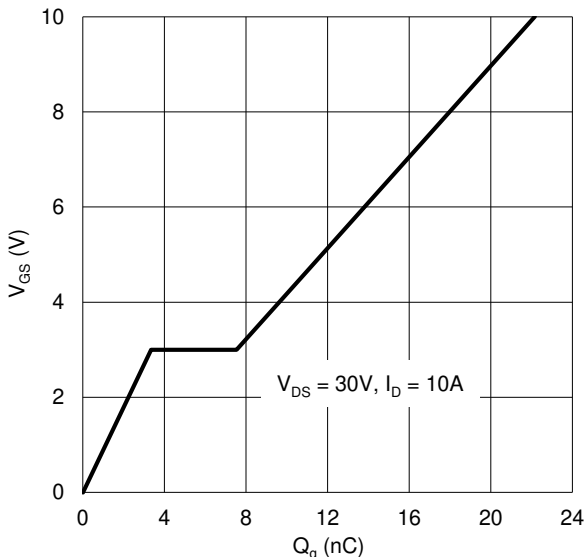


Figure 11. Gate Charge

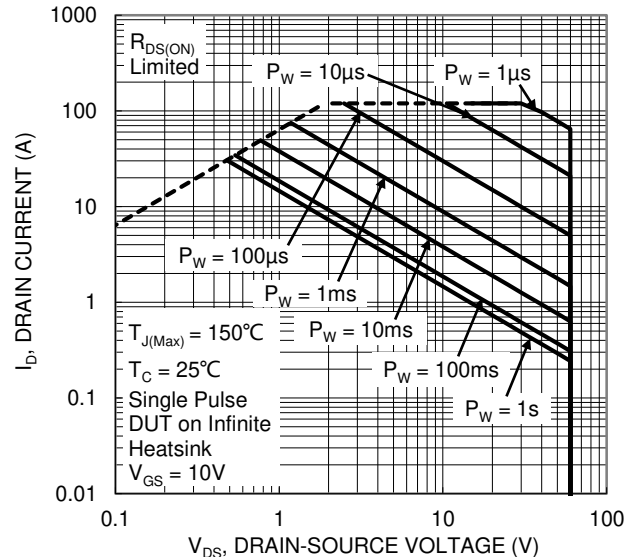


Figure 12. SOA, Safe Operation Area

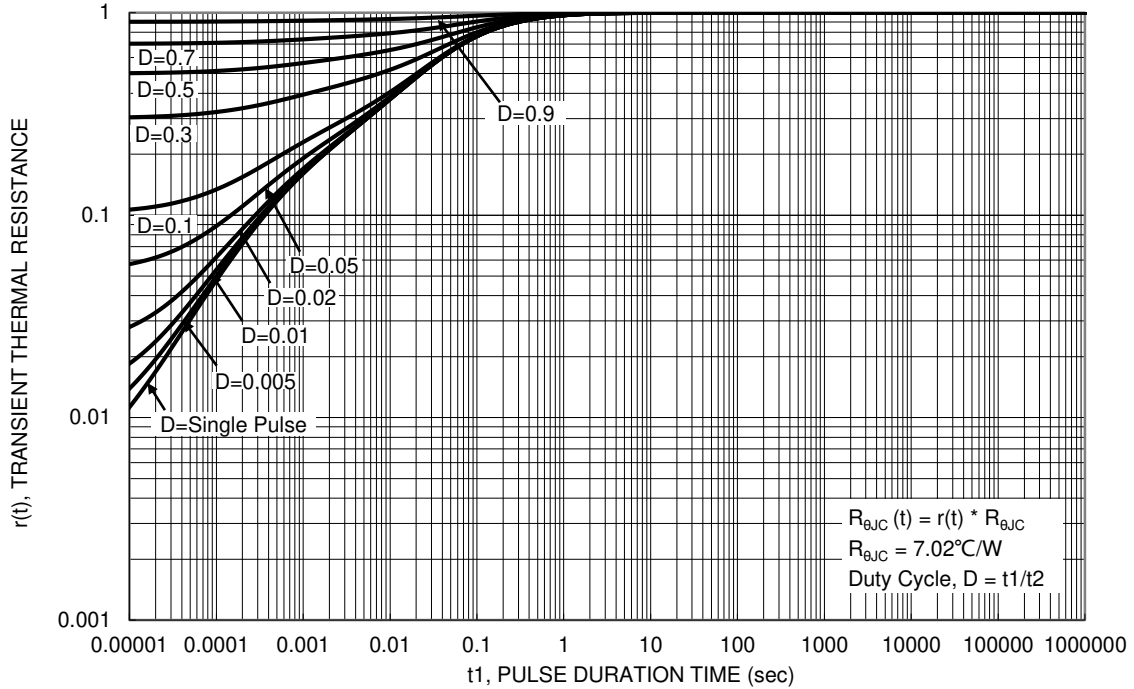
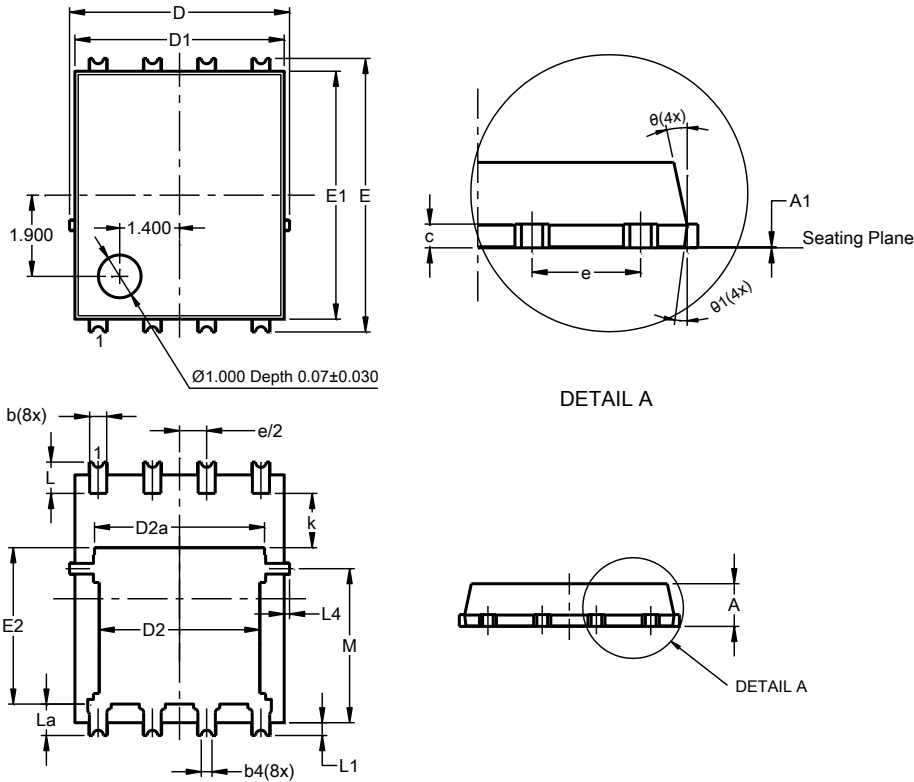


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI5060-8 (SWP) (Type UX)

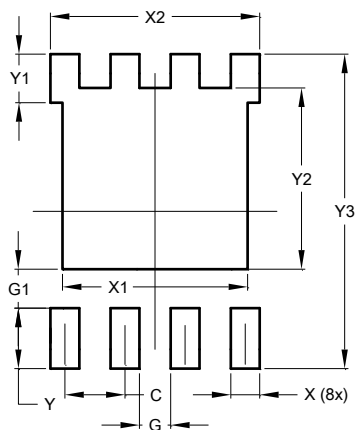


PowerDI5060-8 (SWP) (Type UX)			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0	0.05	--
b	0.30	0.50	0.41
b2	0.20	0.35	0.25
b4	0.25REF		
c	0.230	0.330	0.277
D	5.15 BSC		
D1	4.70	5.10	4.90
D2	3.56	3.96	3.76
D2a	3.78	4.18	3.98
E	6.40 BSC		
E1	5.60	6.00	5.80
E2	3.46	3.86	3.66
E2a	4.195	4.595	4.395
e	1.27BSC		
k	1.05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