100V +175°C DUAL N-CHANNEL ENHANCEMENT MODE MOSFET
PowerDI5060-8

Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D Max T_C = +25°C
100V	23mΩ @ V_{GS} = 10V	42A
	30mΩ @ V_{GS} = 6V	38A
	45mΩ @ V_{GS} = 4.5V	33A

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
- Low Input Capacitance
- Fast Switching Speed
- Wettable Flank for Improved Optical Inspection
- Additional Tin-Plated on Sidewall Pads for Optical Solder Inspection
- **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 (DMTH10H025LPDWQ)**

Description and Applications

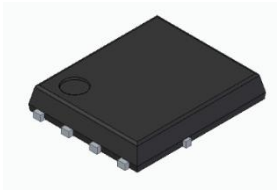
This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

- DC-DC converters
- Motors

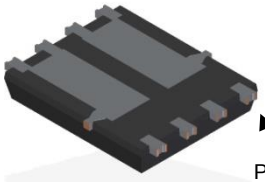
Mechanical Data

- 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)

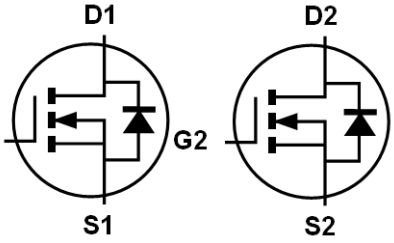
PowerDI5060-8/SWP (Type UXD)



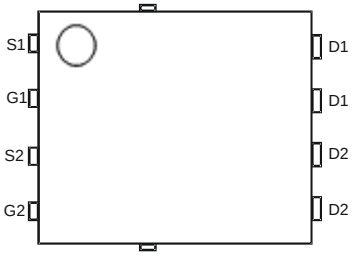
Top View



Bottom View



Equivalent Circuit



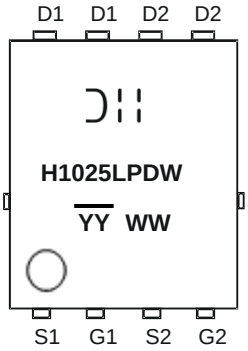
Top View
Pin Configuration

Ordering Information (Note 4)

Orderable Part Number	Package	Packing	
		Qty.	Carrier
DMTH10H025LPDW-13	PowerDI5060-8/SWP (Type UXD)	2500	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



= Manufacturer's Marking
H1025LPDW = Product Type Marking Code
YYWW = Date Code Marking
YY = Year (ex: 24 = 2024)
WW = Week (01 to 53)

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

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	100	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current, V_{GS} = 10V (Note 5)	T_C = +25°C T_C = +100°C	I_D	42 30	A
Maximum Body Diode Forward Current		I_S	42	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)		I_{DM}	168	A
Pulsed Body Diode Forward Current (10µs Pulse, T_C = +25°C, Package Limited)		I_{SM}	168	A
Avalanche Current, L = 0.1mH		I_{AS}	20.7	A
Avalanche Energy, L = 0.1mH		E_{AS}	21.4	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Thermal Resistance, Junction to Ambient (Note 6)		$R_{\theta JA}$	44	°C/W
Total Power Dissipation	T_A = +25°C	P_D	3.4	W
Thermal Resistance, Junction to Case (Note 5)		$R_{\theta JC}$	1.6	°C/W
Total Power Dissipation	T_C = +25°C	P_D	93	W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +175	°C

Notes: 5. Thermal resistance from junction to solder point (on the exposed drain pin).
6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	100	—	—	V	V_{GS} = 0V, I_D = 1mA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	V_{DS} = 80V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	1	—	3	V	V_{DS} = V_{GS}, I_D = 250μA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	16	23	mΩ	V_{GS} = 10V, I_D = 20A
		—	20	30		V_{GS} = 6V, I_D = 12A
		—	27	45		V_{GS} = 4.5V, I_D = 10A
Diode Forward Voltage	V_{SD}	—	0.9	1.3	V	V_{GS} = 0V, I_S = 20A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	1463	—	pF	V_{DS} = 50V, V_{GS} = 0V f = 1MHz
Output Capacitance	C_{oss}	—	258	—		
Reverse Transfer Capacitance	C_{rss}	—	19	—		
Gate Resistance	R_g	—	0.97	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge	Q_g	—	22	—	nC	V_{DD} = 50V, I_D = 20A V_{GS} = 10V
Gate-Source Charge	Q_{gs}	—	6.5	—		
Gate-Drain Charge	Q_{gd}	—	2.5	—		
Turn-On Delay Time	$t_{D(ON)}$	—	4.6	—	ns	V_{DD} = 50V, V_{GS} = 10V I_D = 20A, R_g = 6Ω
Turn-On Rise Time	t_R	—	4.5	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	21.3	—		
Turn-Off Fall Time	t_F	—	7.8	—		
Reverse-Recovery Time	t_{RR}	—	42	—	ns	I_F = 20A, di/dt = 100A/μs
Reverse-Recovery Charge	Q_{RR}	—	57	—	nC	

Notes: 7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to product testing.

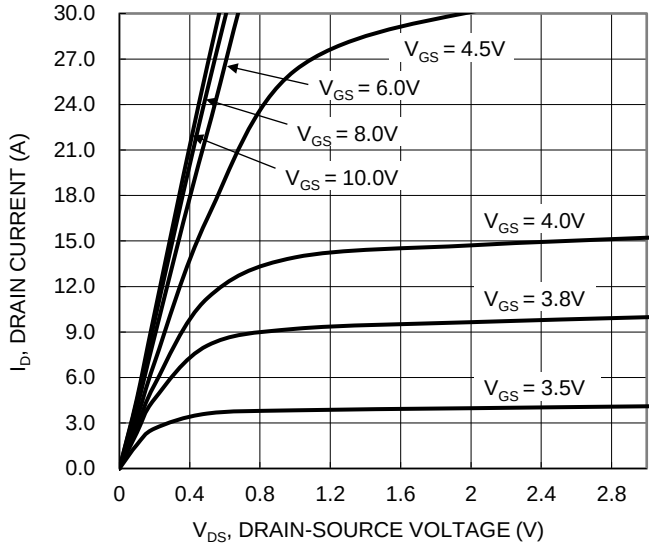


Figure 1. Typical Output Characteristic

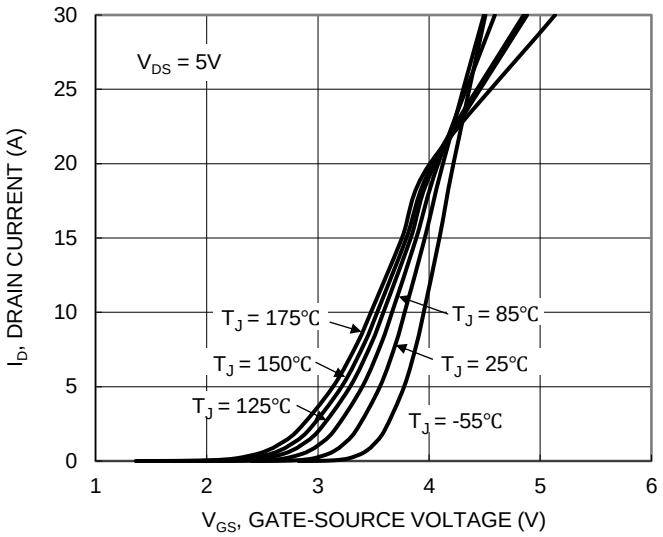


Figure 2. Typical Transfer Characteristic

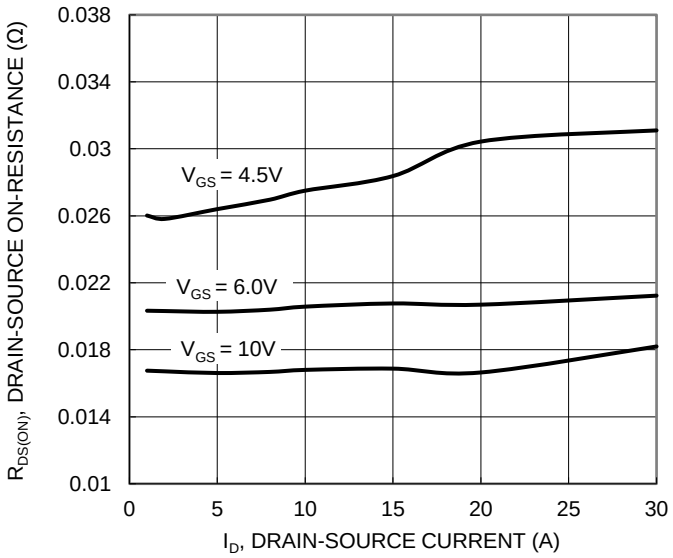


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

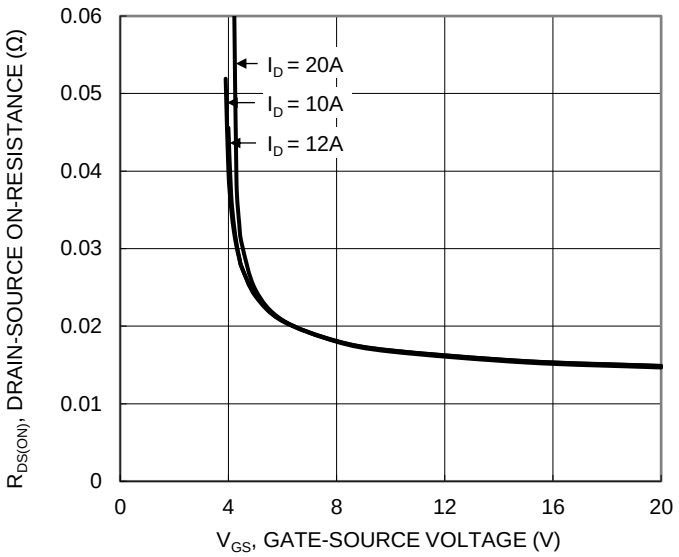


Figure 4. Typical Transfer Characteristic

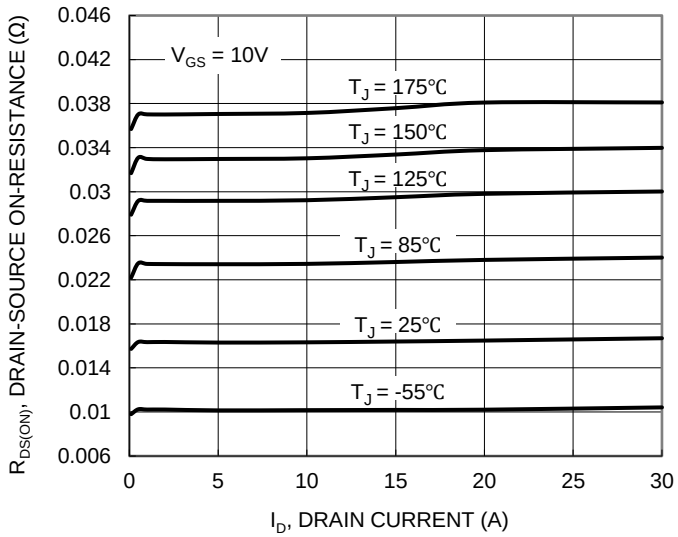


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

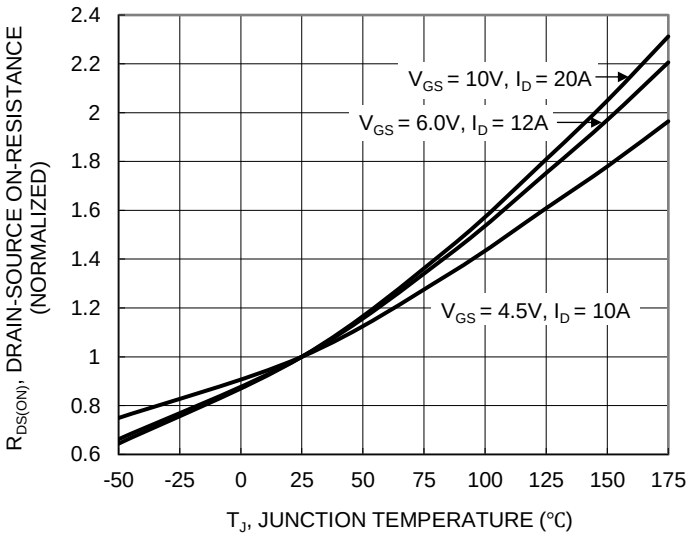


Figure 6. On-Resistance Variation with Junction Temperature

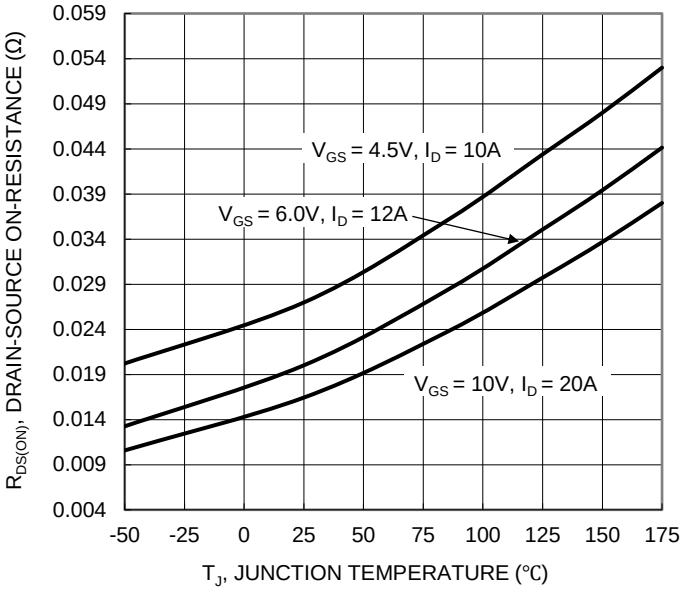


Figure 7. On-Resistance Variation with Junction Temperature

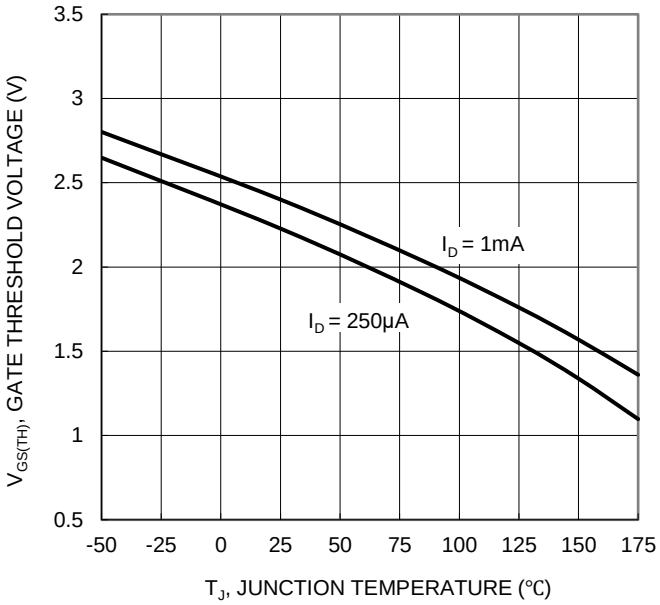


Figure 8. Gate Threshold Variation vs. Junction Temperature

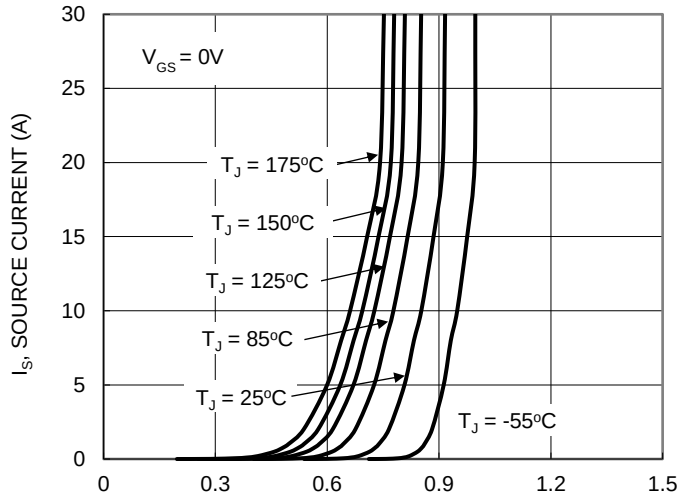


Figure 9. Diode Forward Voltage vs. Current

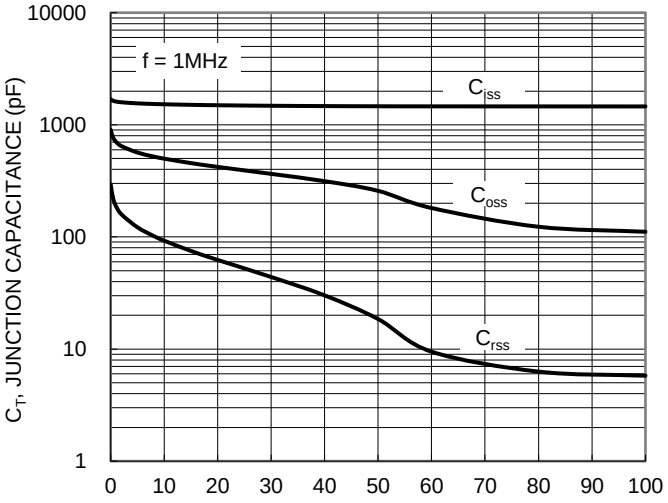


Figure 10. Typical Junction Capacitance

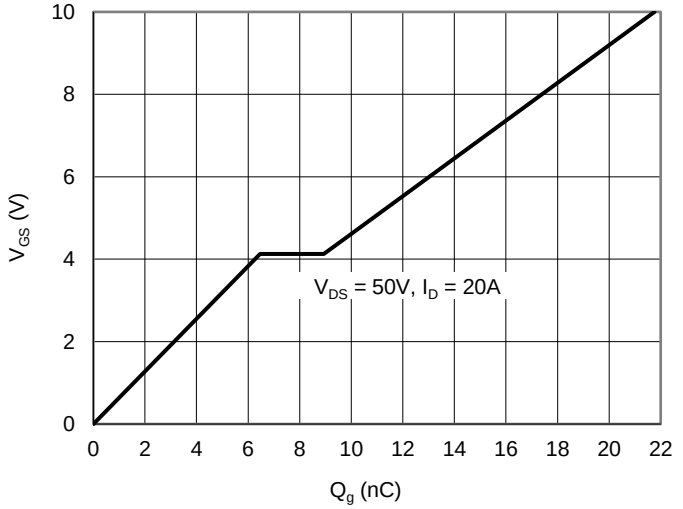


Figure 11. Gate Charge

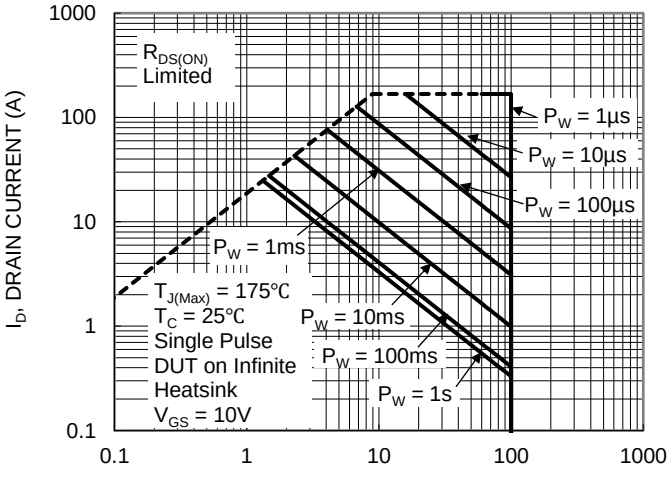


Figure 12. SOA, Safe Operation Area

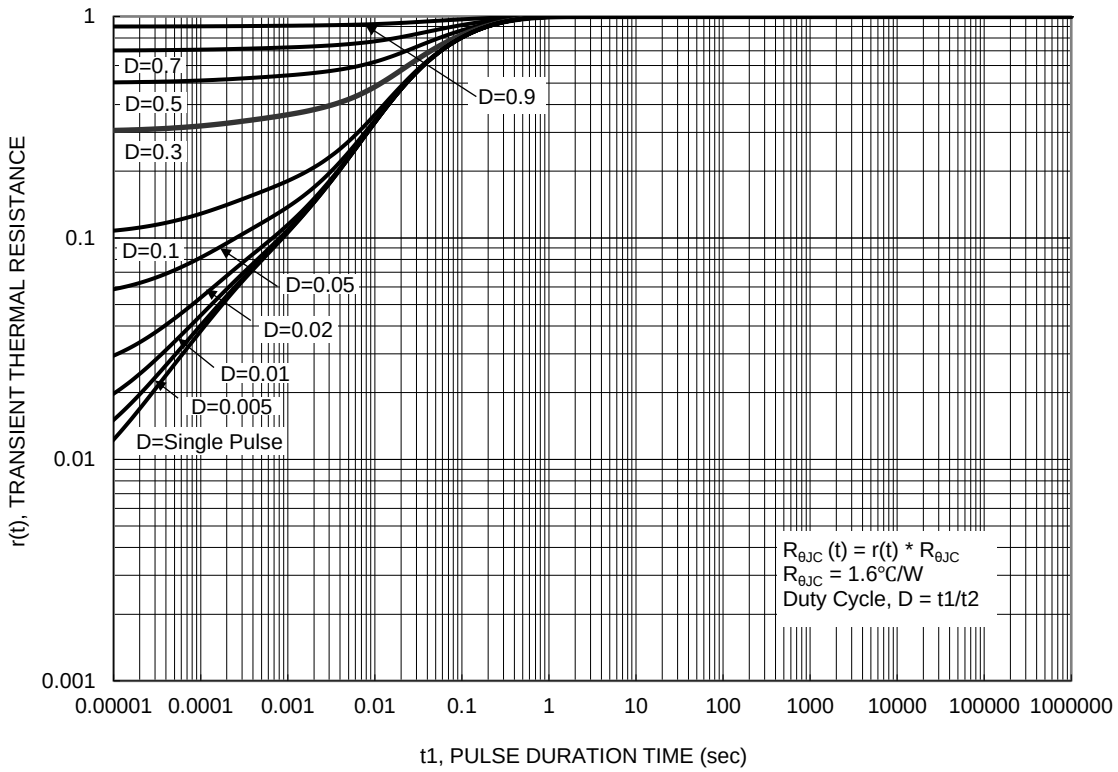
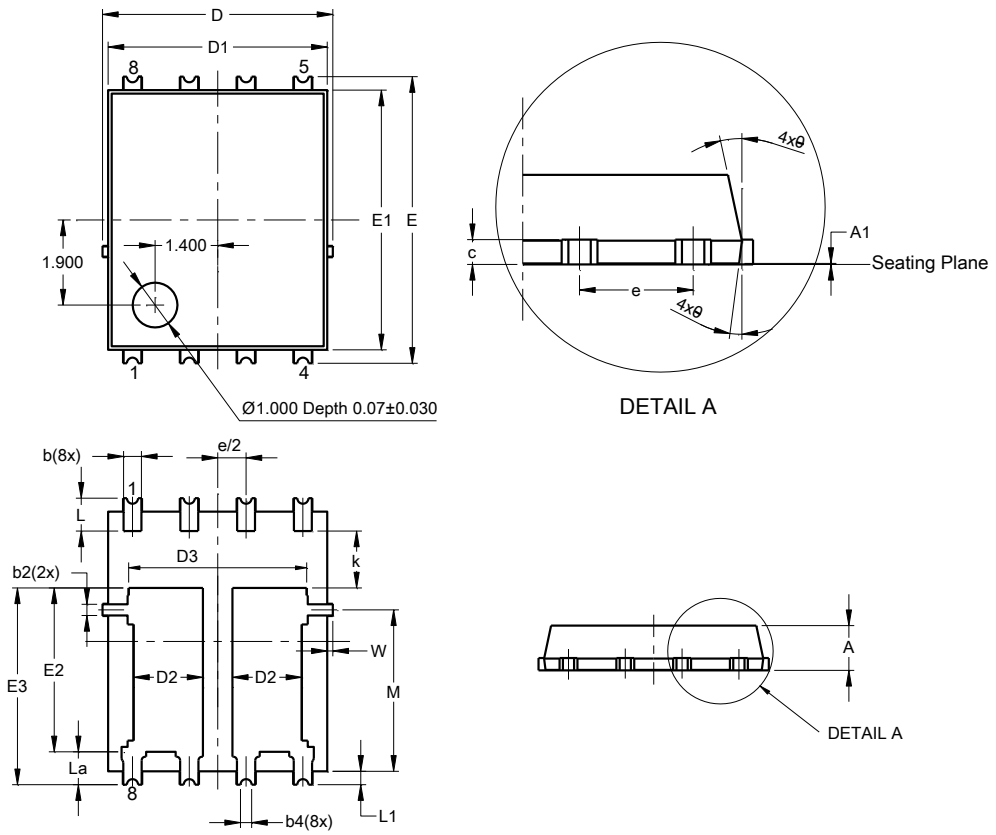


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI5060-8/SWP (Type UXD)

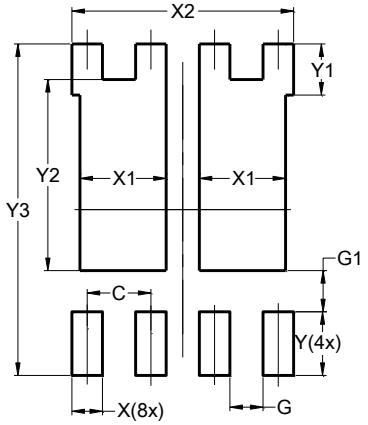


PowerDI5060-8/SWP (Type UXD)			
Dim	**Min**	**Max**	**Typ**
A	0.90	1.10	1.00
A1	0.00	0.05	--
b	0.30	0.50	0.41
b2	0.20	0.35	0.25
b4	0.25REF		
c	0.230	0.330	0.277
D	5.15 BSC		
D1	4.70	5.10	4.90
D2	1.46	1.66	1.55
D3	3.78	4.18	3.98
E	6.40 BSC		
E1	5.60	6.00	5.80
E2	3.46	3.86	3.66
E2a	4.195	4.595	4.395
e	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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