

**175°C P-CHANNEL ENHANCEMENT MODE MOSFET
 POWERDI®**
Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ Max	I_D $T_C = +25^\circ\text{C}$
-30V	7.5m Ω @ $V_{GS} = -10\text{V}$	-60A
	10m Ω @ $V_{GS} = -4.5\text{V}$	-50A

Description and Applications

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

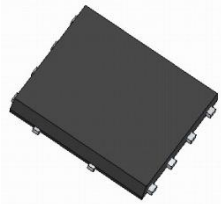
- DC-DC Converters
- Power Management Functions
- Analog Switch

Features and Benefits

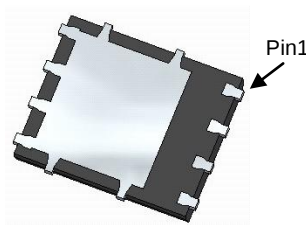
- Rated to $+175^\circ\text{C}$ – Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switch (UIS) Test in Production
- Low On-Resistance
- Fast Switching Speed
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

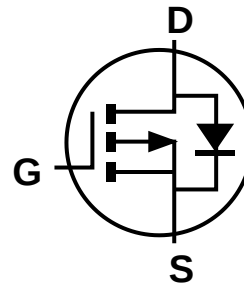
- Case: POWERDI®5060-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – 100% Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.097 grams (Approximate)



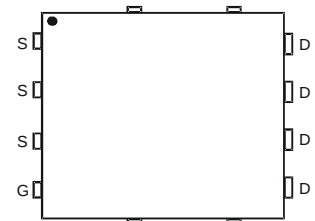
Top View



Bottom View



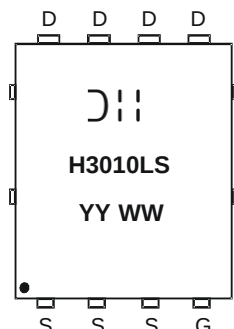
Internal Schematic


 Top View
 Pin Configuration

Ordering Information (Note 4)

Part Number	Case	Packaging
DMPH3010LPS-13	POWERDI®5060-8	2,500 / Tape & Reel

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
 2. See http://www.diodes.com/quality/lead_free.html 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 <http://www.diodes.com/products/packages.html>.

Marking Information


D = Manufacturer's Marking
 H3010LS = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Year (ex: 15 = 2015)
 WW = Week (01 to 53)

POWERDI is a registered trademark of Diodes Incorporated

DMPH3010LPS
 Document number: DS37129 Rev. 1 - 2

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Maximum Ratings (@T_A = +25°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 (Note 6), V _{GS} = -10V	Steady State	T _C = +25°C T _C = +100°C	I _D	-60 -40	A
	Steady State	T _A = +25°C T _A = +100°C	I _D	-15 -11	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)			I _{DM}	-100	A
Maximum Body Diode Continuous Current (Note 6)			I _S	-3.5	A
Avalanche Current (Note 7), L = 0.1mH			I _{AS}	-47	A
Avalanche Energy (Note 7), L = 0.1mH			E _{AS}	113	mJ

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T _A = +25°C	P _D	1.5	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R _{θJA}	98	°C/W
Total Power Dissipation (Note 6)	T _A = +25°C	P _D	2.6	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R _{θJA}	58	°C/W
Thermal Resistance, Junction to Case		R _{θJC}	0.9	°C/W
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +175	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV _{DSS}	-30	—	—	V	V _{GS} = 0V, I _D = -250μA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-1.0	μA	V _{DS} = -30V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	-1.1	-1.6	-2.1	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	5.7	7.5	mΩ	V _{GS} = -10V, I _D = -10A
		—	7.2	10		V _{GS} = -4.5V, I _D = -10A
Diode Forward Voltage	V _{SD}	—	-0.65	-1.0	V	V _{GS} = 0V, I _S = -1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	6807	—	pF	V _{DS} = -15V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	988	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	647	—	pF	
Gate Resistance	R _g	—	6.2	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = -4.5V)	Q _g	—	66	—	nC	V _{DS} = -15V, I _D = -10A
Total Gate Charge (V _{GS} = -10V)	Q _g	—	139	—	nC	
Gate-Source Charge	Q _{gs}	—	19.1	—	nC	
Gate-Drain Charge	Q _{gd}	—	21.7	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	9.0	—	ns	V _{DS} = -15V, V _{GEN} = -10V, R _G = 6Ω, I _D = -1A
Turn-On Rise Time	t _r	—	10.5	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	255	—	ns	
Turn-Off Fall Time	t _f	—	95	—	ns	
Body Diode Reverse Recovery Time	t _{RR}	—	27	—	ns	I _F = -10A, di/dt = -100A/μs
Body Diode Reverse Recovery Charge	Q _{RR}	—	21	—	nC	I _F = -10A, di/dt = -100A/μs

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 - I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J =+ 25°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

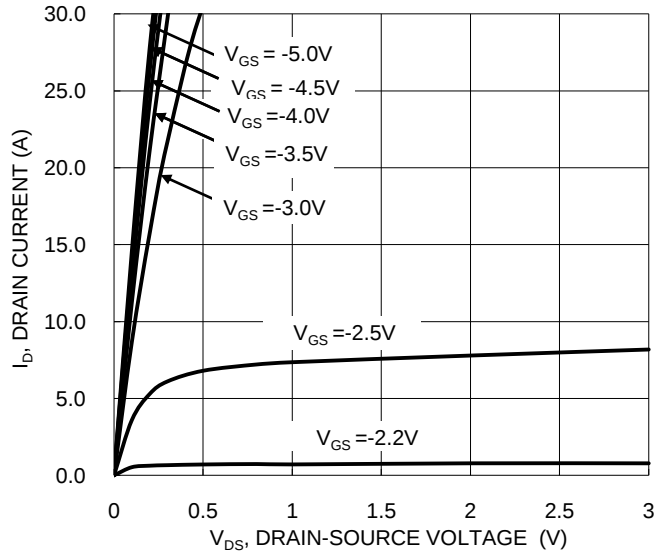


Figure 1. Typical Output Characteristic

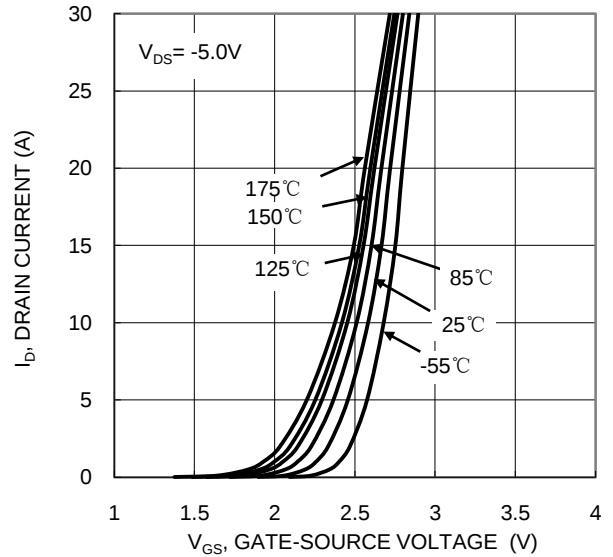


Figure 2. Typical Transfer Characteristic

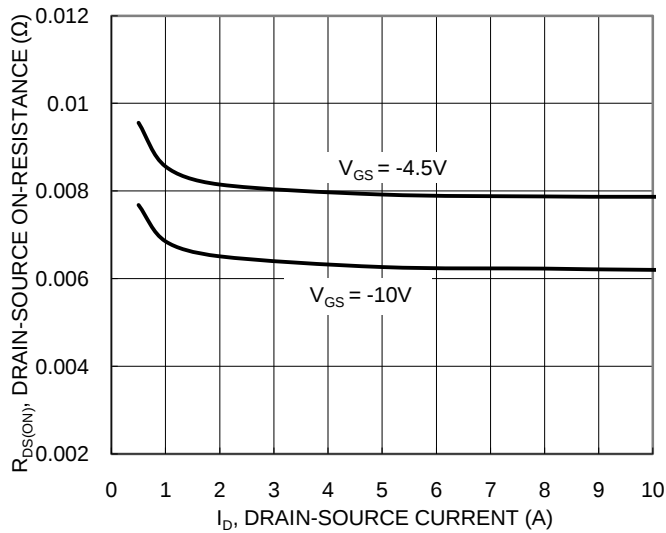


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

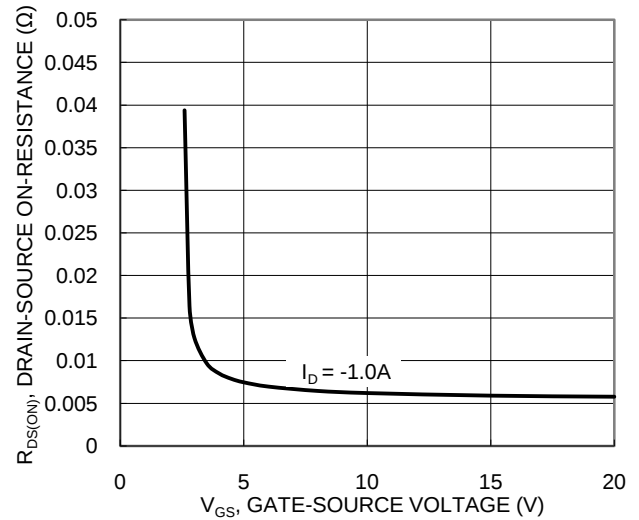


Figure 4. Typical Transfer Characteristic

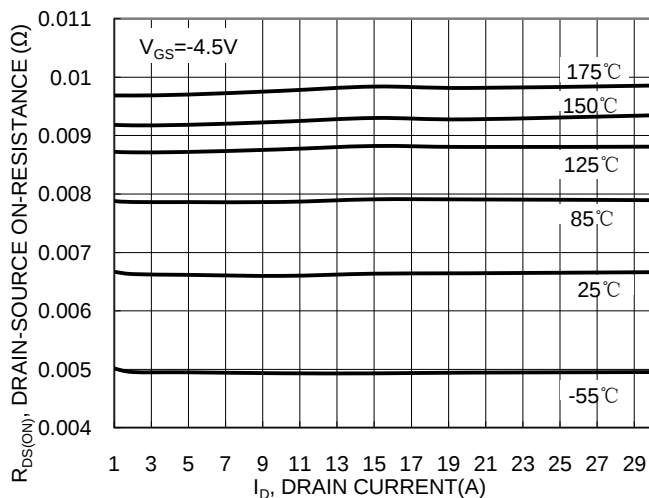


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

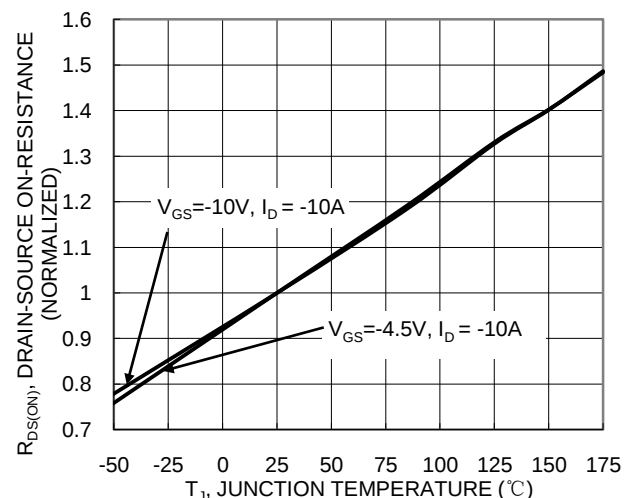
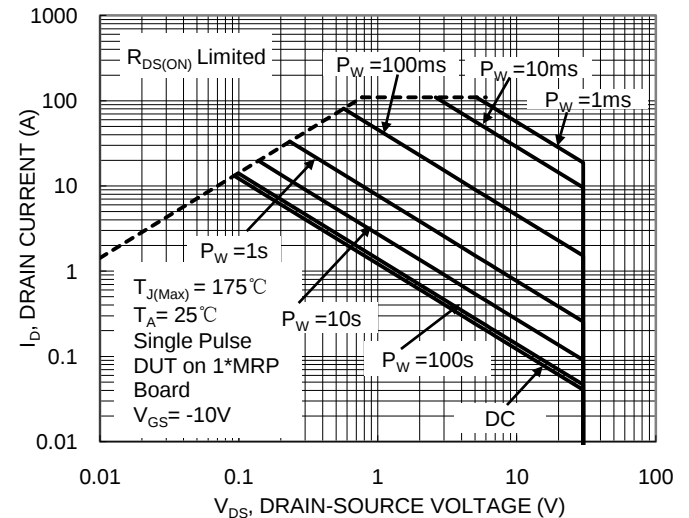
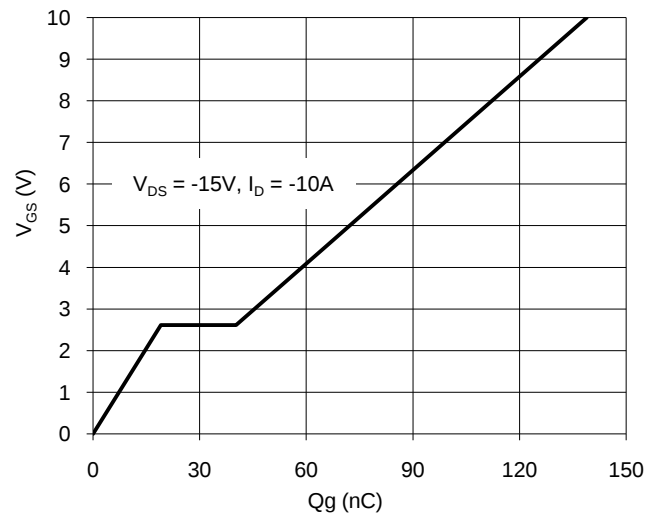
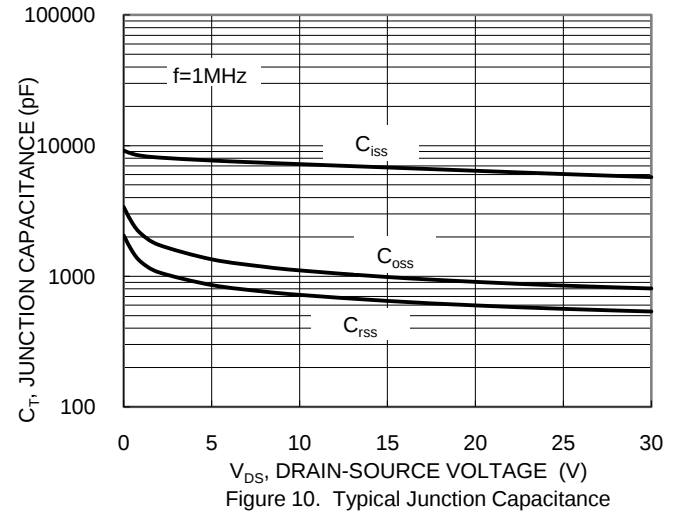
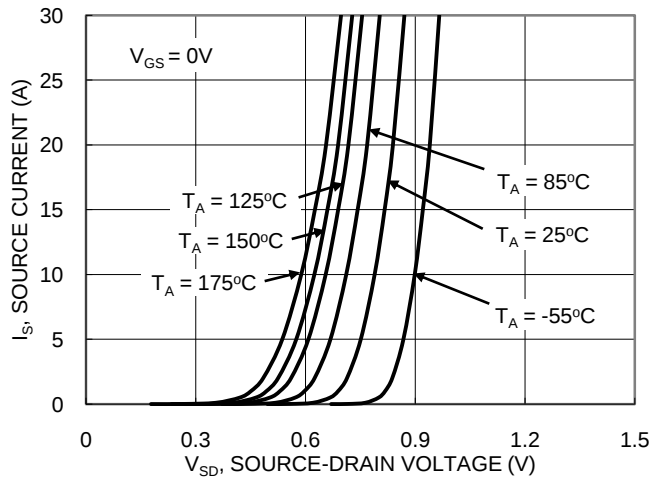
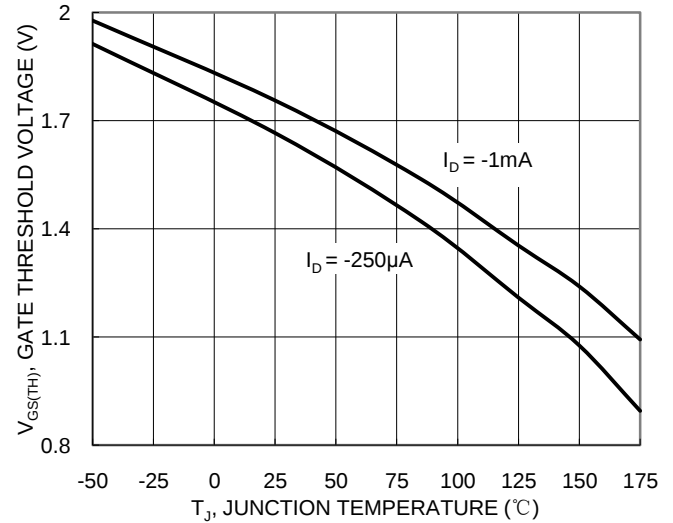
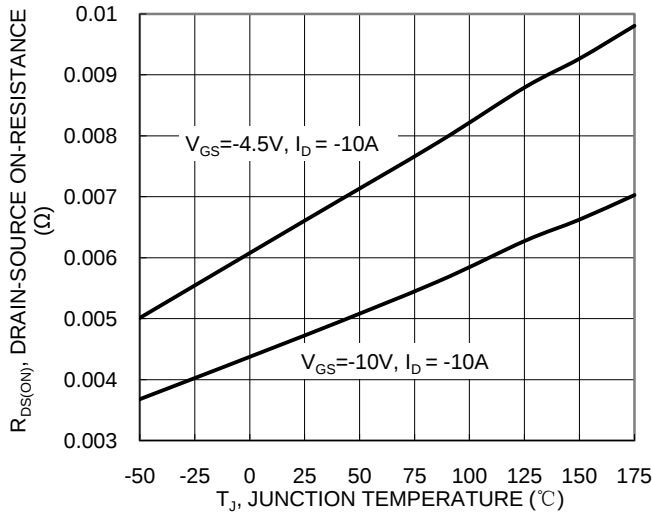


Figure 6. On-Resistance Variation with Temperature



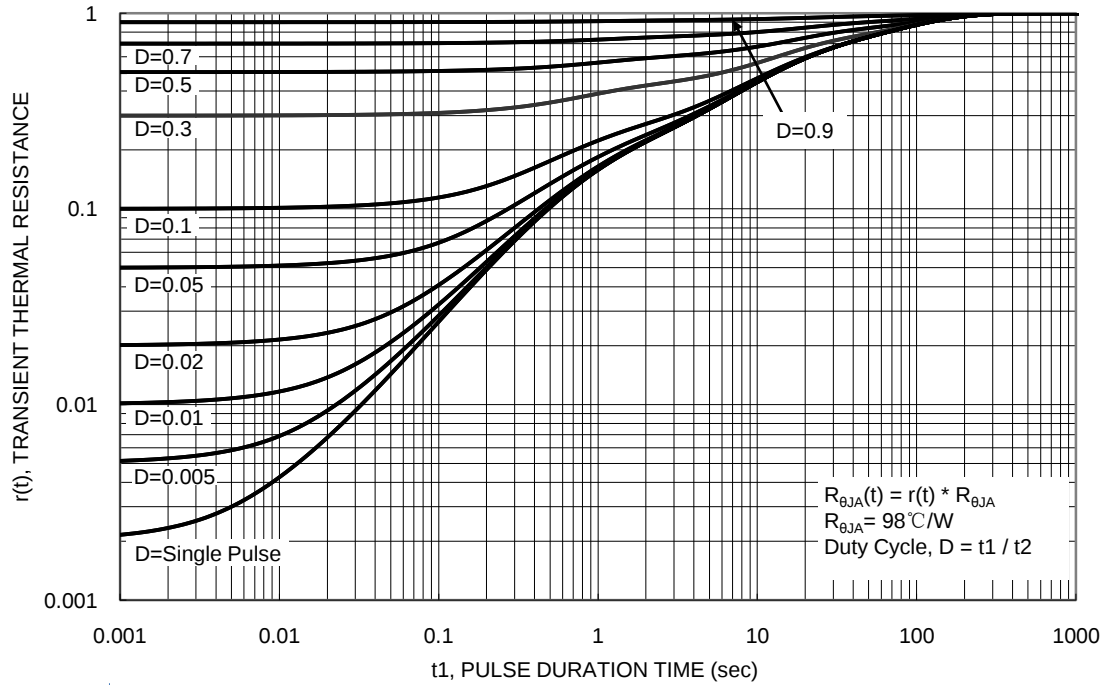
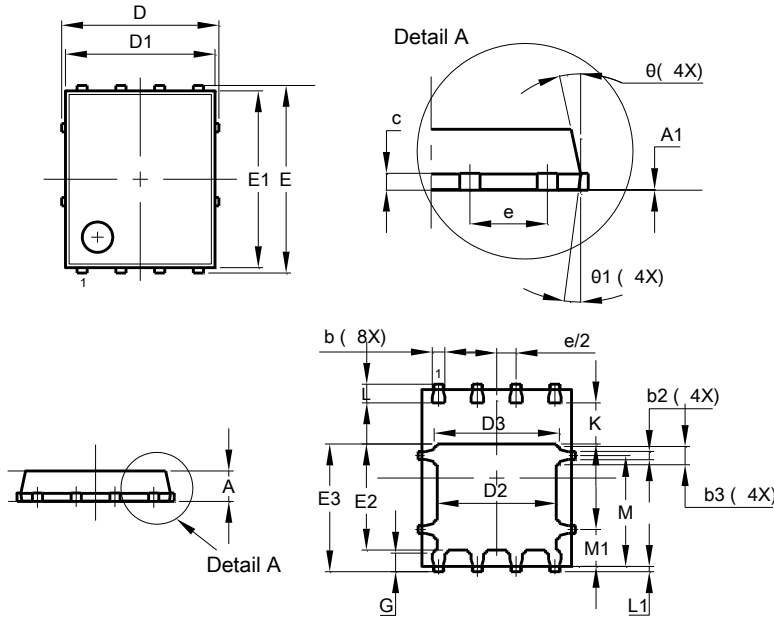


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.

POWERDI® 5060-8

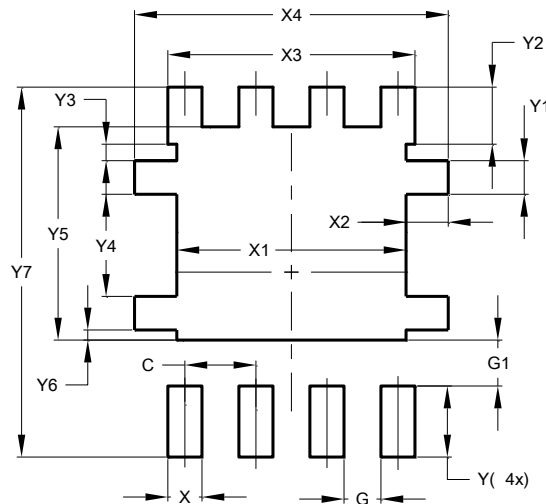


POWERDI® 5060-8			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0.00	0.05	—
b	0.33	0.51	0.41
b2	0.200	0.350	0.273
b3	0.40	0.80	0.60
c	0.230	0.330	0.277
D	5.15 BSC		
D1	4.70	5.10	4.90
D2	3.70	4.10	3.90
D3	3.90	4.30	4.10
E	6.15 BSC		
E1	5.60	6.00	5.80
E2	3.28	3.68	3.48
E3	3.99	4.39	4.19
e	1.27 BSC		
G	0.51	0.71	0.61
K	0.51	—	—
L	0.51	0.71	0.61
L1	0.100	0.200	0.175
M	3.235	4.035	3.635
M1	1.00	1.40	1.21
θ	10°	12°	11°
$\theta 1$	6°	8°	7°
All Dimensions in mm			

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.

POWERDI® 5060-8



Dimensions	Value (in mm)
C	1.270
G	0.660
G1	0.820
X	0.610
X1	4.100
X2	0.755
X3	4.420
X4	5.610
Y	1.270
Y1	0.600
Y2	1.020
Y3	0.295
Y4	1.825
Y5	3.810
Y6	0.180
Y7	6.610

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