

## Product Summary

$BV_{DSS}$	$R_{DS(ON)} \text{ Max}$	$I_D$ $T_C = +25^\circ\text{C}$
100V	8.6m $\Omega$ @ $V_{GS} = 10\text{V}$	98.4A

## Description

This new generation N-Channel Enhancement Mode MOSFET is designed to minimize  $R_{DS(ON)}$ , yet maintain superior switching performance. This device is ideal for use in notebook battery power management and load switch.

## Applications

- Motor Control
- DC-DC Converters
- Power Management

## Features

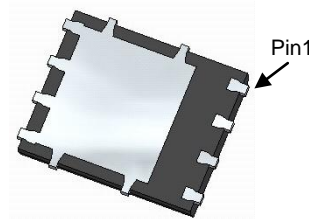
- Rated to +175°C – Ideal for High Ambient Temperature Environments
- Thermally Efficient Package-Cooler Running Applications
- High Conversion Efficiency
- Low  $R_{DS(ON)}$  – Minimizes On-State Losses
- Low Input Capacitance
- Fast Switching Speed
- <1.1mm Package Profile – Ideal for Thin Applications
- **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<sup>®</sup> 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 Below
- Terminal Finish - Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.097 grams (Approximate)

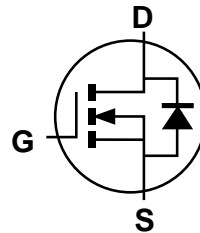


Top View

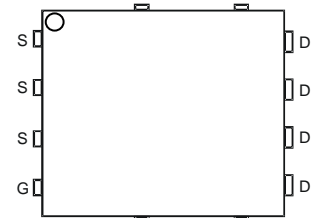


Bottom View

PowerDI5060-8



Internal Schematic



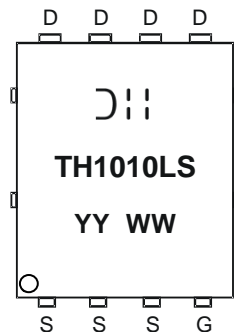
Top View  
Pin Configuration

## Ordering Information (Note 4)

Part Number	Case	Packaging
DMTH10H010LPS-13	PowerDI5060-8	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](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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



= Manufacturer's Marking  
 TH1010LS = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Last Two Digits of Year (ex: 17= 2017)  
 WW = Week Code (01 to 53)

PowerDI is a registered trademark of Diodes Incorporated.

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit	
Drain-Source Voltage	V <sub>DSS</sub>	100	V	
Gate-Source Voltage	V <sub>GSS</sub>	±20	V	
Continuous Drain Current (V <sub>GS</sub> = 10V)	Steady State	T <sub>A</sub> = +25°C T <sub>A</sub> = +100°C	10.8 7.6	A
	Steady State	T <sub>C</sub> = +25°C T <sub>C</sub> = +100°C	98.4 69.6	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I <sub>DM</sub>	250	A	
Maximum Continuous Body Diode Forward Current	I <sub>S</sub>	95	A	
Pulsed Body Diode Forward Current (10µs Pulse, Duty Cycle = 1%)	I <sub>SM</sub>	250	A	
Avalanche Current, L=0.3mH	I <sub>AS</sub>	15	A	
Avalanche Energy, L=0.3mH	E <sub>AS</sub>	33.7	mJ	

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P <sub>D</sub>	1.5	W
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	99	°C/W
Total Power Dissipation	P <sub>D</sub>	125	W
Thermal Resistance, Junction to Case	R <sub>θJC</sub>	1.2	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +175	°C

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b> (Note 6)						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	100	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 1mA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1	µA	V <sub>DS</sub> = 80V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS</b> (Note 6)						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	1.4	1.9	3	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	6.9	8.6	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 13A
		—	7.5	12		V <sub>GS</sub> = 6V, I <sub>D</sub> = 13A
		—	10	20		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 5A
Diode Forward Voltage	V <sub>SD</sub>	—	0.8	1.3	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 13A
<b>DYNAMIC CHARACTERISTICS</b> (Note 7)						
Input Capacitance	C <sub>iSS</sub>	—	2592	—	pF	V <sub>DS</sub> = 50V, V <sub>GS</sub> = 0V f = 1MHz
Output Capacitance	C <sub>oSS</sub>	—	792	—		
Reverse Transfer Capacitance	C <sub>rSS</sub>	—	45	—		
Gate Resistance	R <sub>g</sub>	—	2	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge	Q <sub>g</sub>	—	53.7	—	nC	V <sub>DD</sub> = 50V, I <sub>D</sub> = 13A, V <sub>GS</sub> = 10V
Gate-Source Charge	Q <sub>gs</sub>	—	10.6	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	8.2	—		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	11.6	—	ns	V <sub>DD</sub> = 50V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 13A, R <sub>g</sub> = 6Ω
Turn-On Rise Time	t <sub>r</sub>	—	14.1	—		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	42.9	—		
Turn-Off Fall Time	t <sub>f</sub>	—	22	—		
Reverse Recovery Time	t <sub>rR</sub>	—	49.8	—	ns	I <sub>F</sub> = 13A, di/dt = 100A/µs
Reverse Recovery Charge	Q <sub>rR</sub>	—	85.1	—	nC	

- Notes: 5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.  
6. Short duration pulse test used to minimize self-heating effect.  
7. Guaranteed by design. Not subject to product testing.

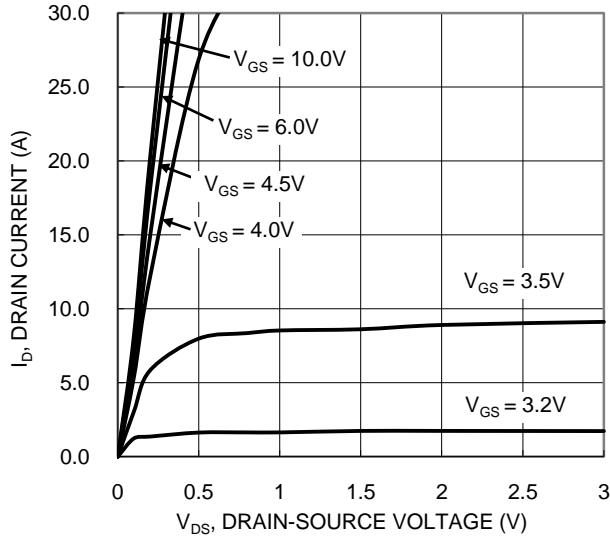


Figure 1. Typical Output Characteristic

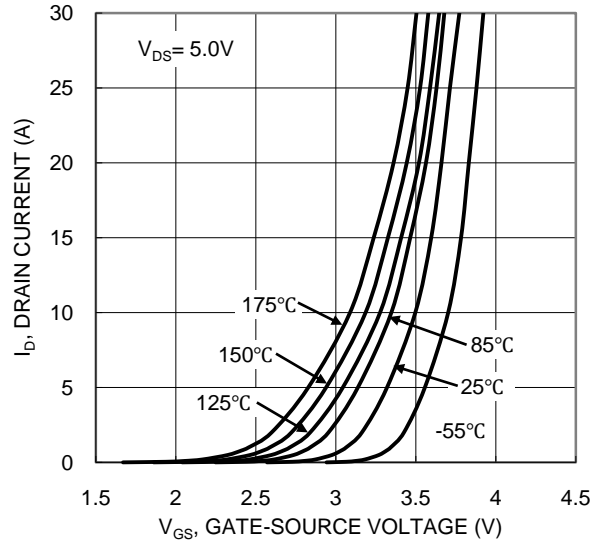


Figure 2. Typical Transfer Characteristic

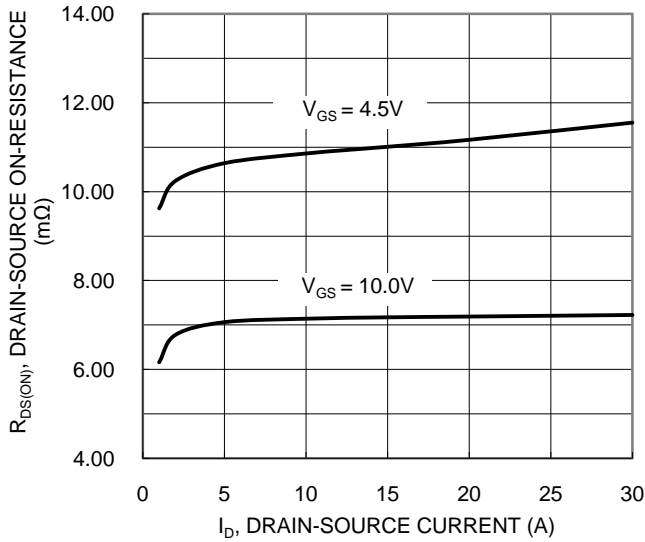


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

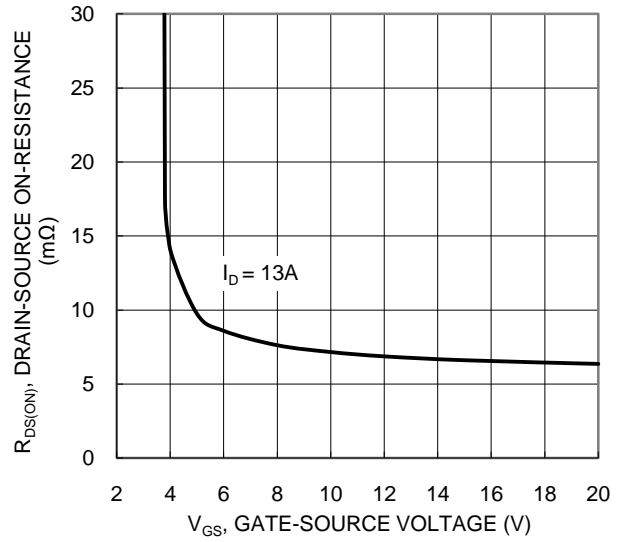


Figure 4. Typical Transfer Characteristic

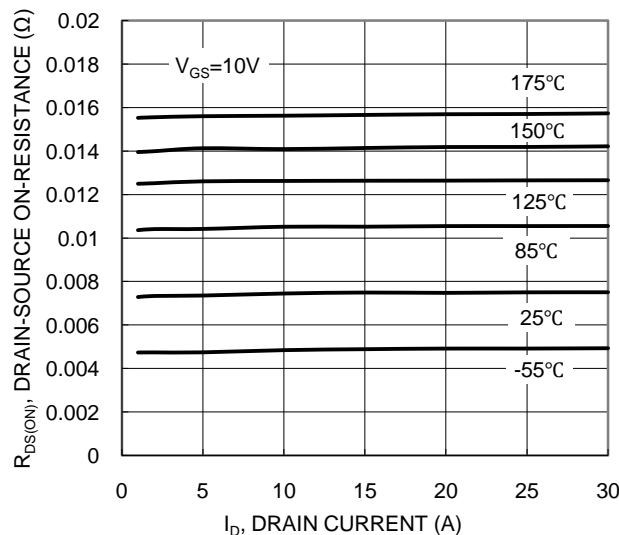


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

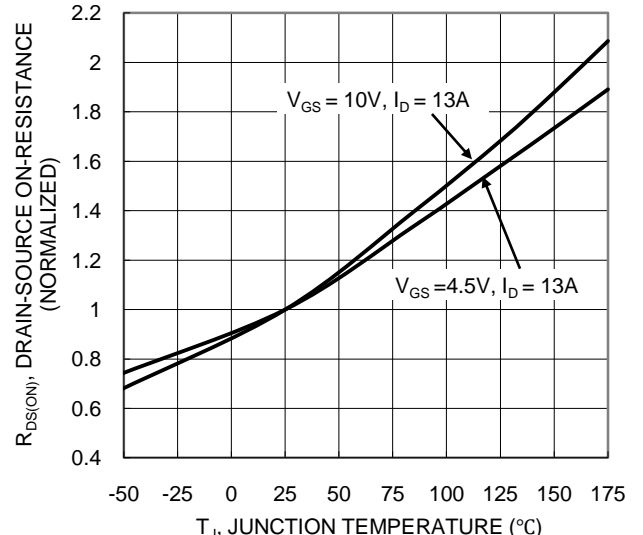
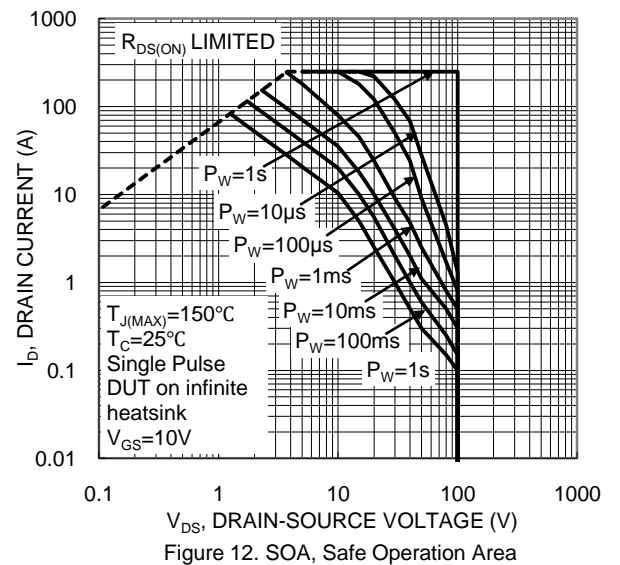
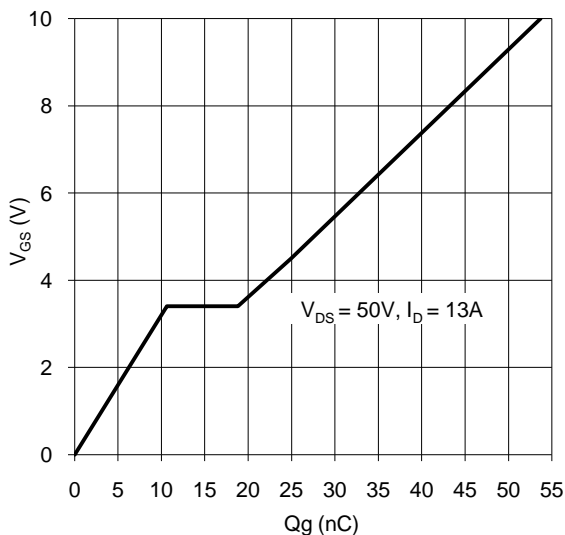
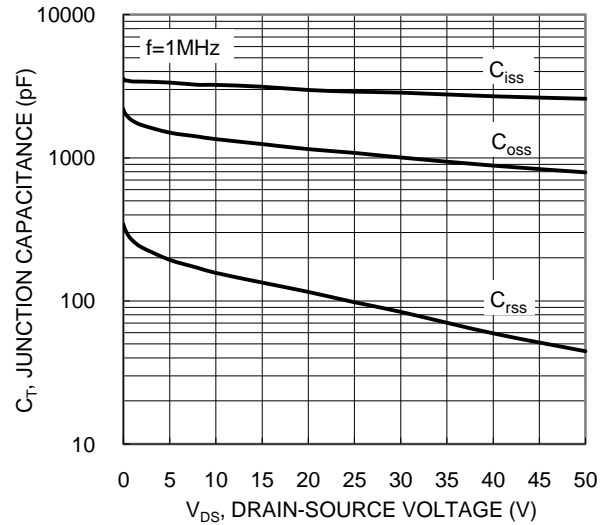
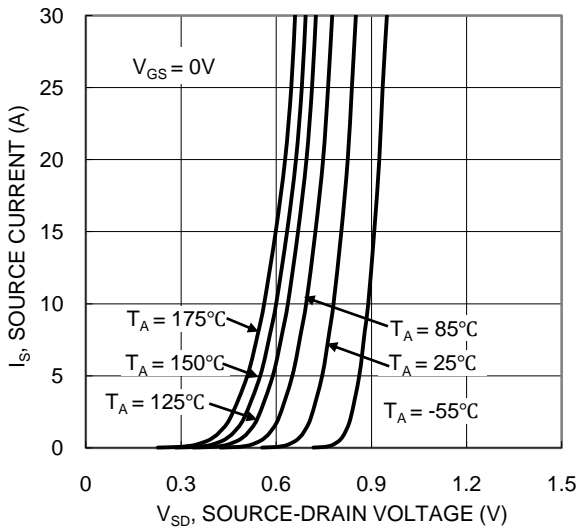
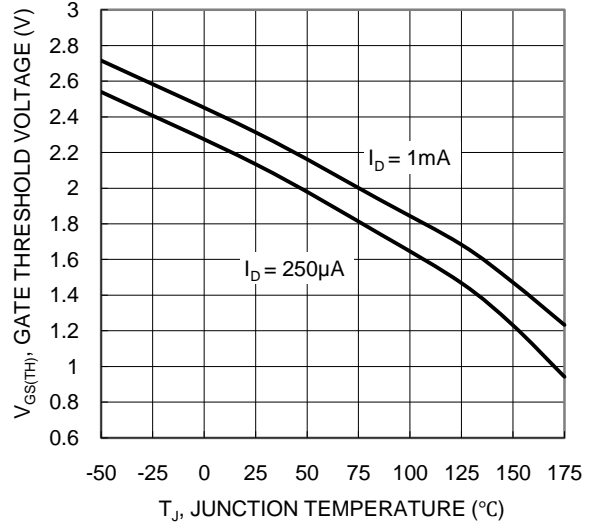
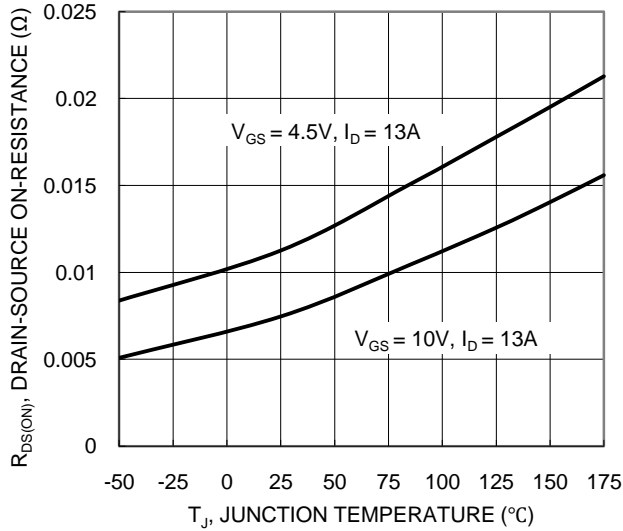


Figure 6. On-Resistance Variation with Temperature



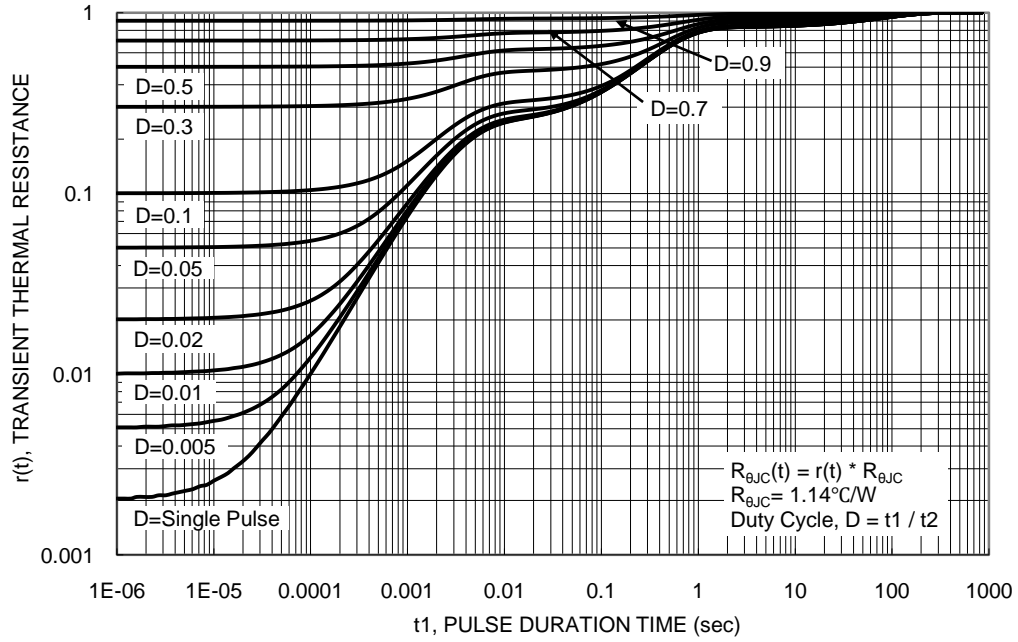
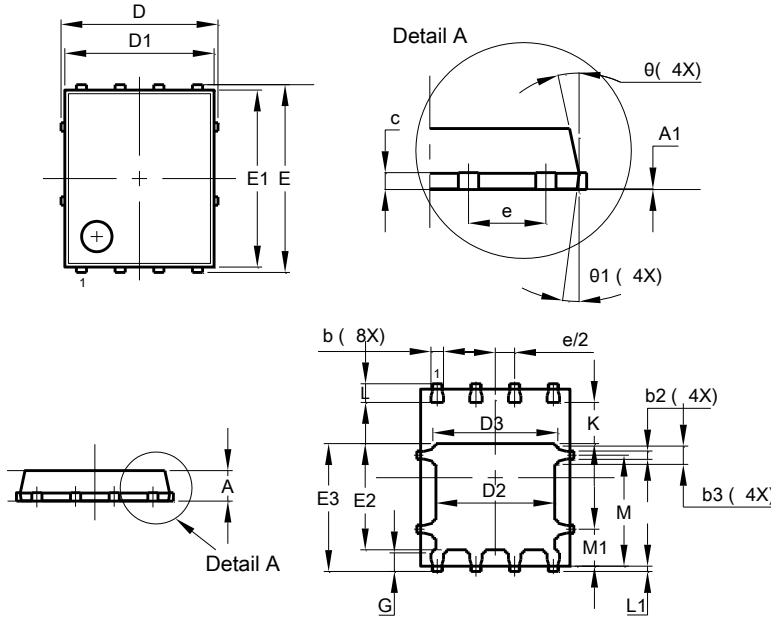


Figure 13. Transient Thermal Resistance

**Package Outline Dimensions**

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

**PowerDI5060-8**

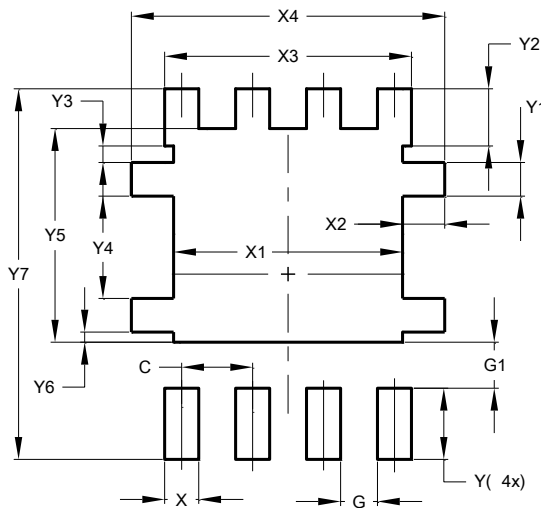


PowerDI5060-8			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0.00	0.05	-
b	0.33	0.51	0.41
b2	0.200	0.350	0.273
b3	0.40	0.80	0.60
c	0.230	0.330	0.277
D	5.15 BSC		
D1	4.70	5.10	4.90
D2	3.70	4.10	3.90
D3	3.90	4.30	4.10
E	6.15 BSC		
E1	5.60	6.00	5.80
E2	3.28	3.68	3.48
E3	3.99	4.39	4.19
e	1.27 BSC		
G	0.51	0.71	0.61
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
$\theta$	10°	12°	11°
$\theta_1$	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**



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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