

## Product Summary

<b>BV<sub>DSS</sub></b>	<b>R<sub>DSON</sub> Max</b>	<b>I<sub>D</sub> Max</b> <b>T<sub>C</sub> = +25°C</b>
30V	6mΩ @ V <sub>GS</sub> = 10V	65A
	9.8mΩ @ V <sub>GS</sub> = 4.5V	55A

## Description and Applications

This MOSFET is designed to minimize the on-state resistance (R<sub>DSON</sub>) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

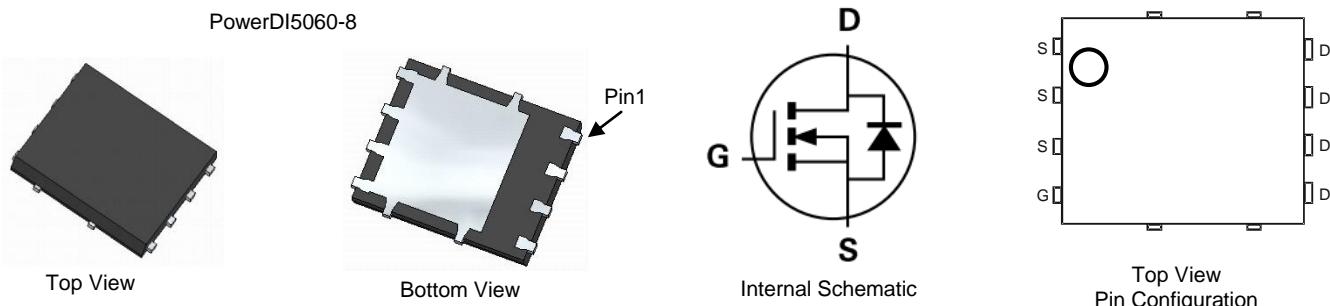
- Backlighting
- Power Management Functions
- DC-DC Converters

## Features and Benefits

- Low R<sub>DSON</sub> – Minimizes On-State Losses
- Excellent Q<sub>gd</sub> x R<sub>DSON</sub> Product (FOM)
- Advanced Technology for DC-DC Converters
- Small Form Factor Thermally Efficient Package Enables Higher Density End Products
- 100% Unclamped Inductive Switching – Ensures More Reliability
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

## 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 Indicator: See Diagram
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 
- Weight: 0.097 grams (Approximate)



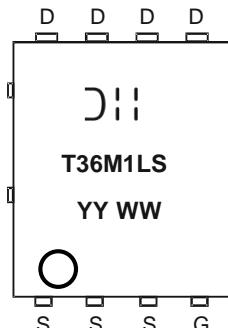
## Ordering Information (Note 4)

Part Number	Case	Packaging
DMT36M1LPS-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



D11 = Manufacturer's Marking  
 T36M1LS = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Year (ex: 17 = 2017)  
 WW = Week (01 to 53)

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	$V_{GSS}$	$\pm 20$	V	
Continuous Drain Current, $V_{GS} = 10\text{V}$ (Note 6)	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	16 12	A
Continuous Drain Current, $V_{GS} = 10\text{V}$ (Note 7)	$T_C = +25^\circ\text{C}$ $T_C = +70^\circ\text{C}$	$I_D$	65 50	A
Pulsed Drain Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%)	$I_{DM}$	100	A	
Maximum Continuous Body Diode Forward Current (Note 6)	$I_S$	3	A	
Pulsed Body Diode Forward Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%)	$I_{SM}$	100	A	
Avalanche Current, $L = 0.1\text{mH}$ (Note 8)	$I_{AS}$	25	A	
Avalanche Energy, $L = 0.1\text{mH}$ (Note 8)	$E_{AS}$	31	mJ	

## Thermal Characteristics

Characteristic	Symbol	Value	Unit	
Total Power Dissipation (Note 5)	$T_A = +25^\circ\text{C}$	$P_D$	1.3	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	99	$^\circ\text{C}/\text{W}$
Total Power Dissipation (Note 6)	$T_A = +25^\circ\text{C}$	$P_D$	2.6	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	50	$^\circ\text{C}/\text{W}$
Total Power Dissipation (Note 7)	$T_C = +25^\circ\text{C}$	$P_D$	42	W
Thermal Resistance, Junction to Case (Note 7)	$R_{\theta JC}$	3	$^\circ\text{C}/\text{W}$	
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$	

 Electrical Characteristics ( $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 9)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	30	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS} = 24\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 100$	nA	$V_{GS} = 20\text{V}, V_{DS} = 0\text{V}$ $V_{GS} = -16\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 9)</b>						
Gate Threshold Voltage	$V_{GS(\text{TH})}$	1.0	—	3.0	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(\text{ON})}$	—	4.8	6	$\text{m}\Omega$	$V_{GS} = 10\text{V}, I_D = 20\text{A}$
		—	6.8	9.8		$V_{GS} = 4.5\text{V}, I_D = 20\text{A}$
Diode Forward Voltage	$V_{SD}$	—	0.7	1.0	V	$V_{GS} = 0\text{V}, I_S = 2\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 10)</b>						
Input Capacitance	$C_{ISS}$	—	1,155	—	pF	$V_{DS} = 15\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	$C_{OSS}$	—	456	—		
Reverse Transfer Capacitance	$C_{RSS}$	—	72	—		
Gate Resistance	$R_g$	—	1.6	—	$\Omega$	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Total Gate Charge ( $V_{GS} = 10\text{V}$ )	$Q_G$	—	16.7	—	nC	$V_{DD} = 15\text{V}, I_D = 9\text{A}$
Total Gate Charge ( $V_{GS} = 4.5\text{V}$ )	$Q_G$	—	8.4	—		
Gate-Source Charge	$Q_{GS}$	—	2.2	—		
Gate-Drain Charge	$Q_{GD}$	—	3.5	—		
Turn-On Delay Time	$t_{D(\text{ON})}$	—	3.5	—	ns	$V_{DD} = 15\text{V}, V_{GS} = 10\text{V}, R_g = 3\Omega, I_D = 9\text{A}$
Turn-On Rise Time	$t_R$	—	5.5	—		
Turn-Off Delay Time	$t_{D(\text{OFF})}$	—	13.5	—		
Turn-Off Fall Time	$t_F$	—	4.6	—		
Reverse Recovery Time	$t_{RR}$	—	19.3	—	ns	$I_F = 1.5\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge	$Q_{RR}$	—	8.6	—	nC	

Notes:

- Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
- Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
- Thermal resistance from junction to soldering point (on the exposed drain pad).
- $I_{AS}$  and  $E_{AS}$  ratings are based on low frequency and duty cycles to keep  $T_J = +25^\circ\text{C}$ .
- Short duration pulse test used to minimize self-heating effect.
- Guaranteed by design. Not subject to product testing.

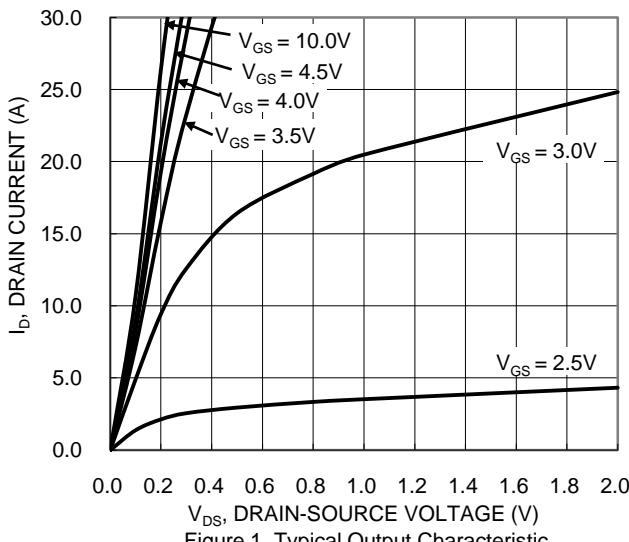


Figure 1. Typical Output Characteristic

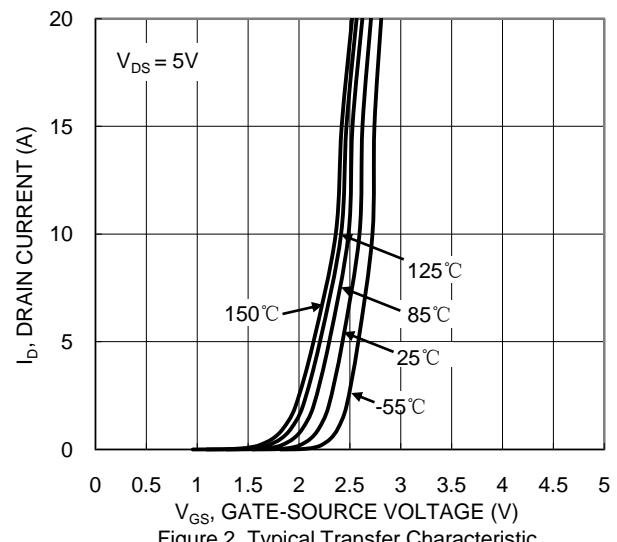


Figure 2. Typical Transfer Characteristic

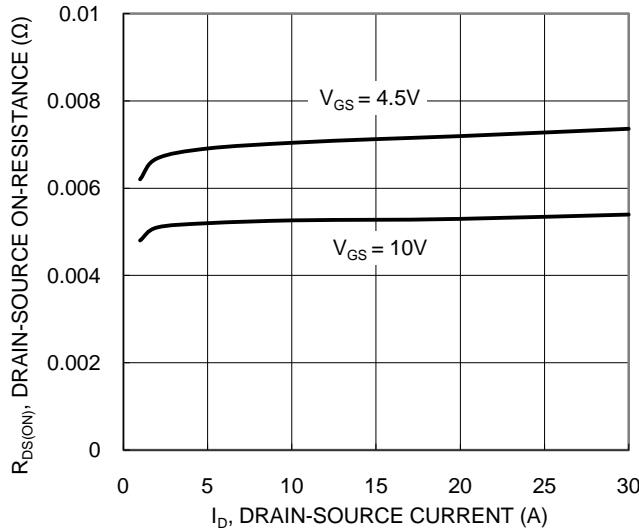


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

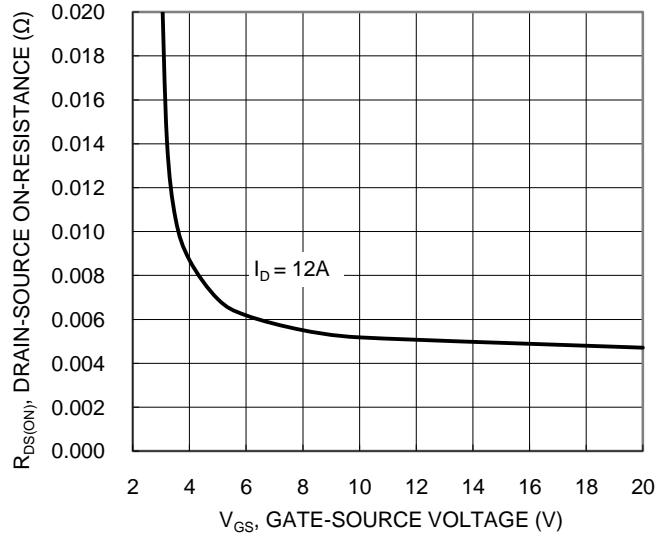


Figure 4. Typical Transfer Characteristic

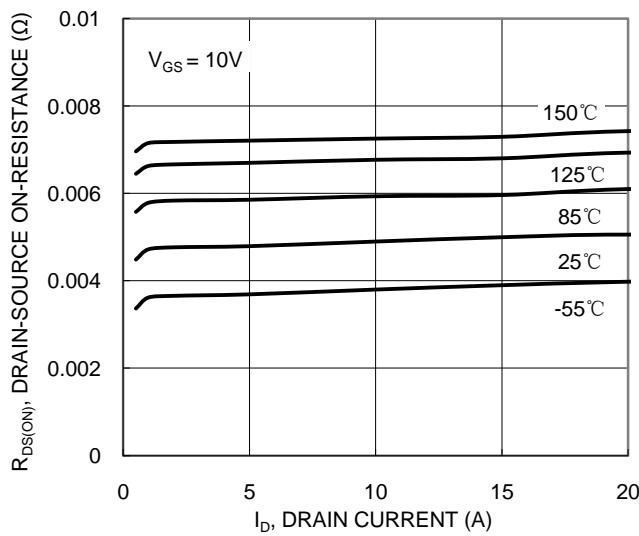


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

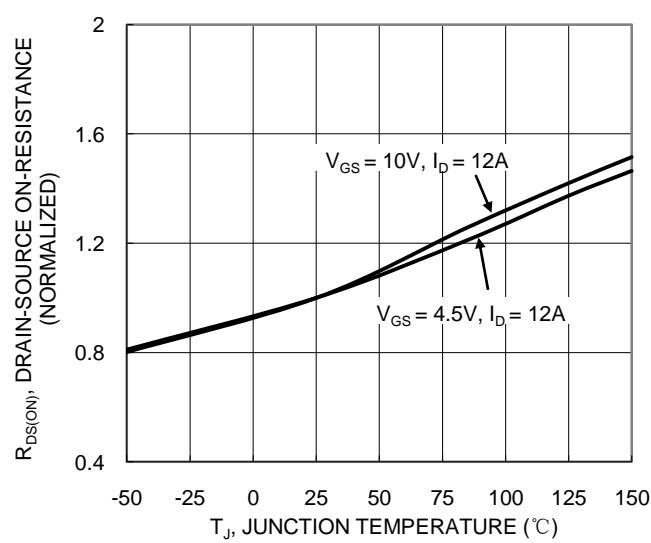
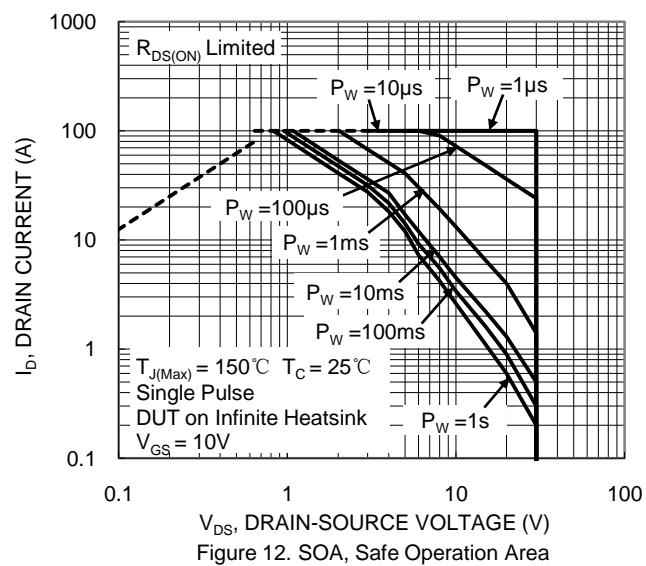
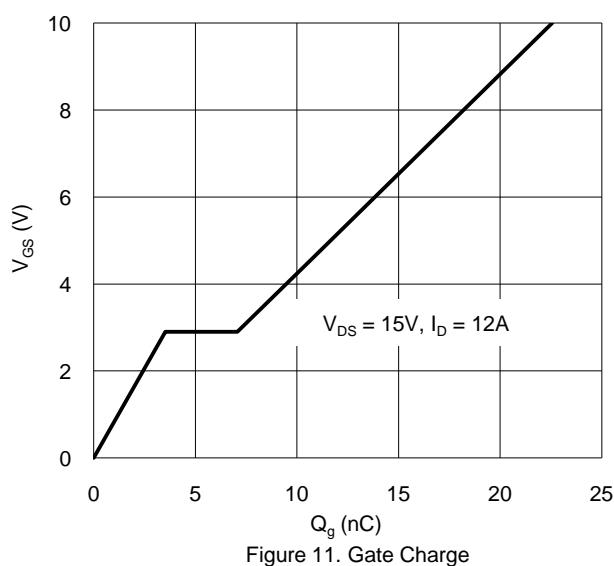
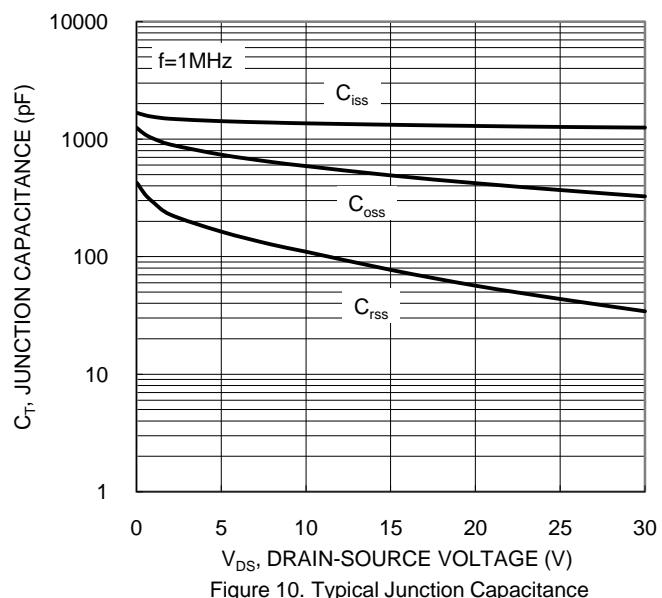
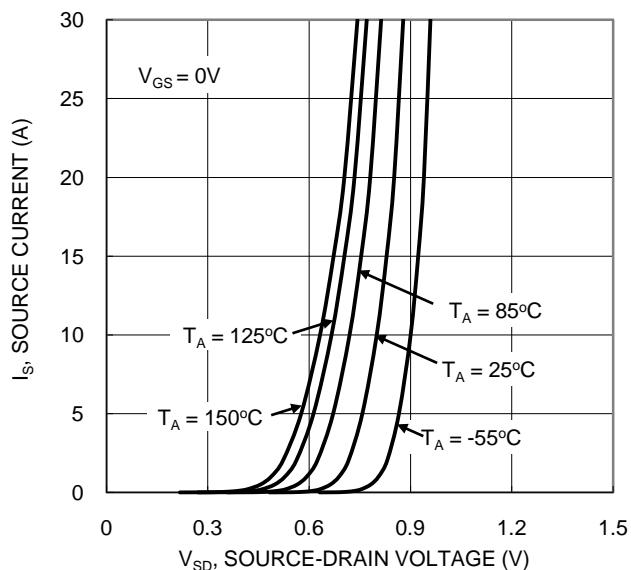
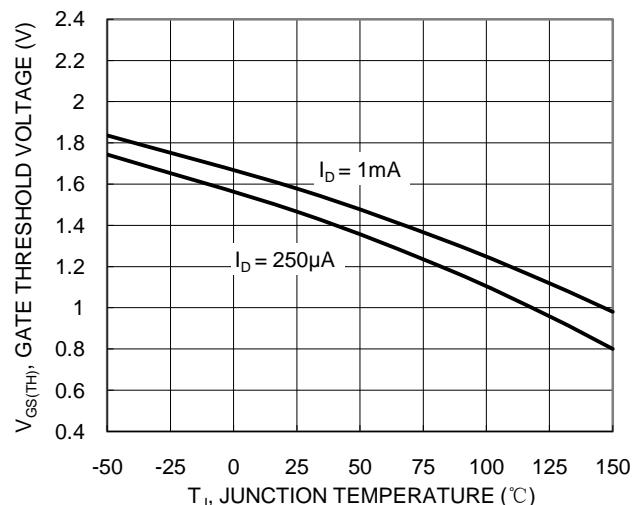
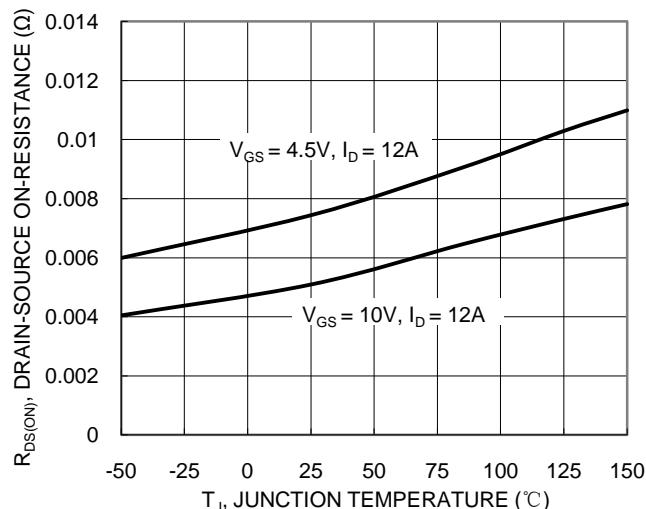


Figure 6. On-Resistance Variation with Temperature



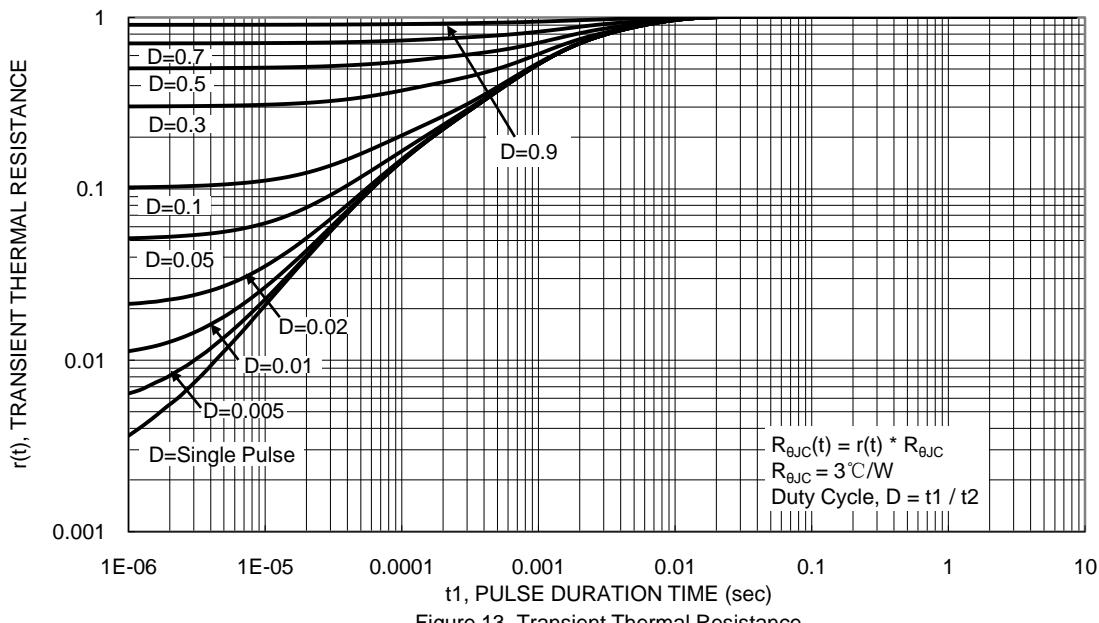
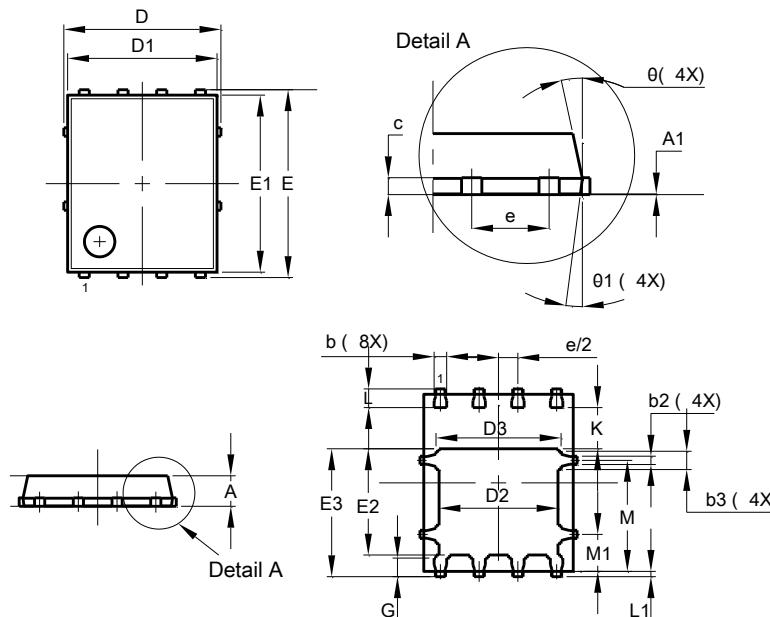


Figure 13. Transient Thermal Resistance

## Package Outline Dimensions

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

PowerDI5060-8



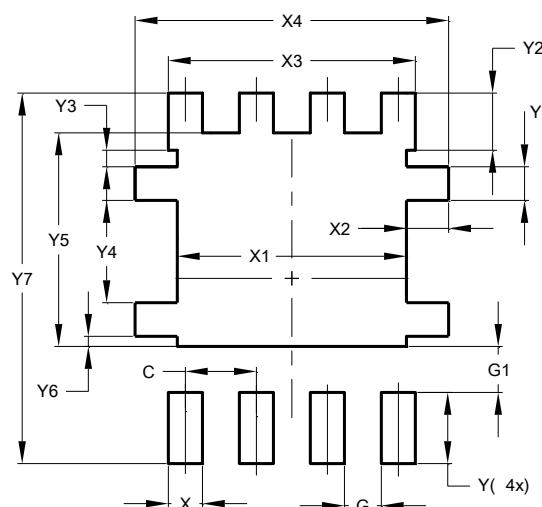
PowerDI5060-8			
Dim	Min	Max	Typ
<b>A</b>	0.90	1.10	1.00
<b>A1</b>	0.00	0.05	—
<b>b</b>	0.33	0.51	0.41
<b>b2</b>	0.200	0.350	0.273
<b>b3</b>	0.40	0.80	0.60
<b>c</b>	0.230	0.330	0.277
<b>D</b>	5.15 BSC		
<b>D1</b>	4.70	5.10	4.90
<b>D2</b>	3.70	4.10	3.90
<b>D3</b>	3.90	4.30	4.10
<b>E</b>	6.15 BSC		
<b>E1</b>	5.60	6.00	5.80
<b>E2</b>	3.28	3.68	3.48
<b>E3</b>	3.99	4.39	4.19
<b>e</b>	1.27 BSC		
<b>G</b>	0.51	0.71	0.61
<b>K</b>	0.51	—	—
<b>L</b>	0.51	0.71	0.61
<b>L1</b>	0.100	0.200	0.175
<b>M</b>	3.235	4.035	3.635
<b>M1</b>	1.00	1.40	1.21
<b>θ</b>	10°	12°	11°
<b>θ1</b>	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)
<b>C</b>	1.270
<b>G</b>	0.660
<b>G1</b>	0.820
<b>X</b>	0.610
<b>X1</b>	4.100
<b>X2</b>	0.755
<b>X3</b>	4.420
<b>X4</b>	5.610
<b>Y</b>	1.270
<b>Y1</b>	0.600
<b>Y2</b>	1.020
<b>Y3</b>	0.295
<b>Y4</b>	1.825
<b>Y5</b>	3.810
<b>Y6</b>	0.180
<b>Y7</b>	6.610

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