

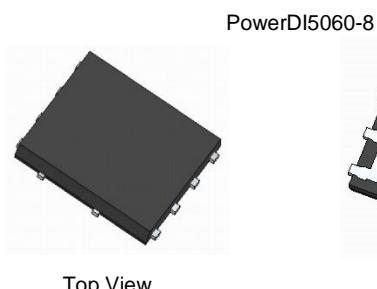
Product Summary

BVDSS	R _{DSON} Max	I _D T _C = +25°C
60V	10mΩ @ V _{GS} = 10V	87A
	12mΩ @ V _{GS} = 4.5V	79A

Description and Applications

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

- High Frequency Switching
- Sync. Rectification
- DC-DC Converters



Top View

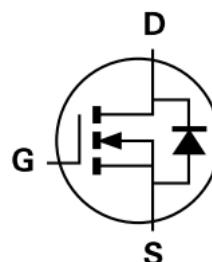
Bottom View

Features

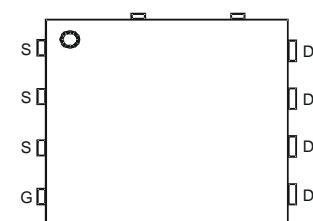
- 100% Unclamped Inductive Switching – Ensures More Reliable and Robust End Application
- Low R_{DSON} – Minimizes Power Losses
- Low Q_G – Minimizes Switching Losses
- Lead-Free Finish; RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards 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 Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.097 grams (Approximate)



Internal Schematic



Top View
Pin Configuration

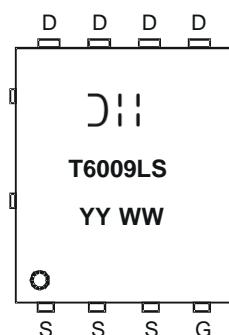
Ordering Information (Note 4)

Part Number	Case	Packaging
DMT6009LPS-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 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



DII = Manufacturer's Marking
T6009LS = Product Type Marking Code
YYWW = Date Code Marking
YY = Year (ex: 16 = 2016)
WW = Week (01 - 53)

Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Units
Drain-Source Voltage	V_{DSS}	60	V
Gate-Source Voltage	V_{GSS}	± 16	V
Continuous Drain Current (Note 5)	I_D	10.6 9.1	A
Continuous Drain Current (Note 6)	I_D	87 69	A
Maximum Continuous Body Diode Forward Current (Note 6)	I_S	100	A
Pulsed Drain Current (10 μs Pulse, Duty Cycle = 1%)	I_{DM}	160	A
Avalanche Current, L=0.1mH	I_{AS}	20.3	A
Avalanche Energy, L=0.1mH	E_{AS}	20.6	mJ

Thermal Characteristics

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	P_D	2.3	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	53	°C/W
Total Power Dissipation (Note 6)	P_D	113	W
Thermal Resistance, Junction to Case (Note 6)	$R_{\theta JC}$	1.1	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	60	—	—	V	$V_{GS} = 0\text{V}, I_D = 1\text{mA}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	$V_{DS} = 48\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 16\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.7	—	2	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	7.2	10	$\text{m}\Omega$	$V_{GS} = 10\text{V}, I_D = 20\text{A}$
		—	8.9	12		$V_{GS} = 4.5\text{V}, I_D = 15\text{A}$
Diode Forward Voltage	V_{SD}	—	0.9	—	V	$V_{GS} = 0\text{V}, I_S = 20\text{A}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{ISS}	—	1,925	—	pF	$V_{DS} = 30\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Output Capacitance	C_{OSS}	—	438	—		
Reverse Transfer Capacitance	C_{RSS}	—	41	—		
Gate Resistance	R_G	—	1.7	—	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge ($V_{GS} = 10\text{V}$)	Q_G	—	33.5	—	nC	$V_{DS} = 30\text{V}, I_D = 13.5\text{A}$
Total Gate Charge ($V_{GS} = 4.5\text{V}$)	Q_G	—	15.6	—		
Gate-Source Charge	Q_{GS}	—	4.7	—		
Gate-Drain Charge	Q_{GD}	—	5.3	—		
Turn-On Delay Time	$t_{D(ON)}$	—	4.5	—	ns	$V_{DD} = 30\text{V}, V_{GS} = 10\text{V}, R_G = 6\Omega, I_D = 13.5\text{A}$
Turn-On Rise Time	t_R	—	8.6	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	35.9	—		
Turn-Off Fall Time	t_F	—	15.7	—		
Body Diode Reverse Recovery Time	t_{RR}	—	18.2	—	ns	$I_F = 13.5\text{A}, di/dt = 400\text{A}/\mu\text{s}$
Body Diode Reverse Recovery Charge	Q_{RR}	—	33.1	—	nC	

Notes:

- Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1-inch 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.

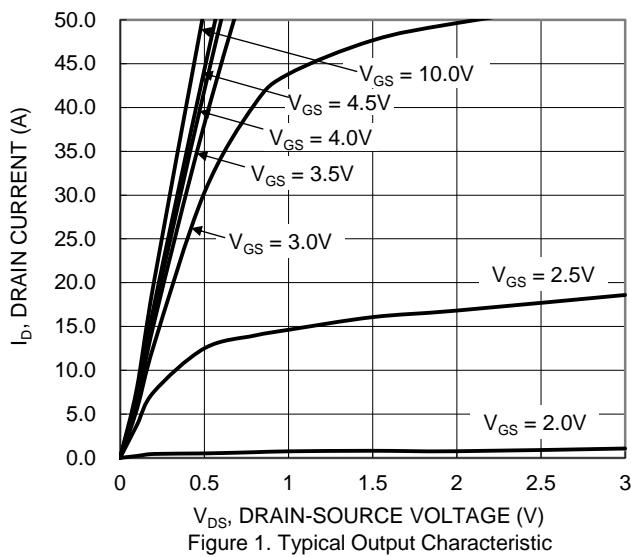


Figure 1. Typical Output Characteristic

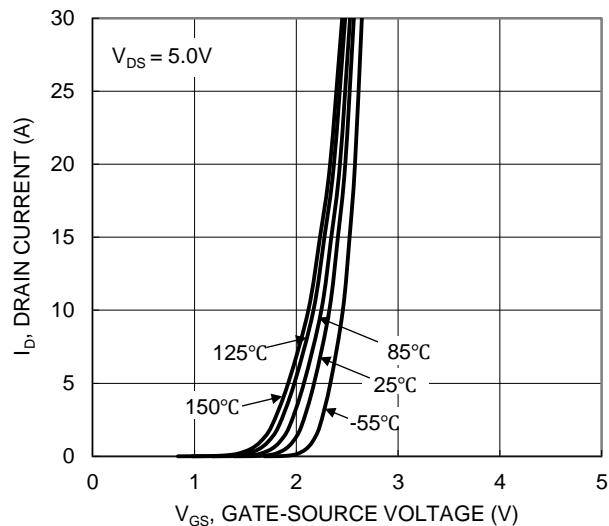


Figure 2. Typical Transfer Characteristic

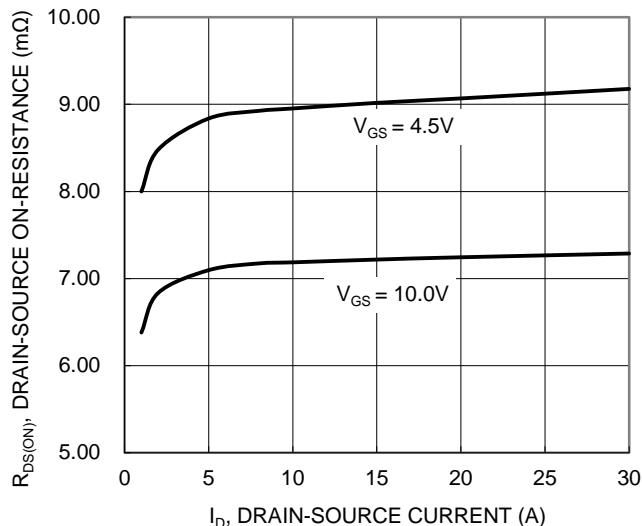


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

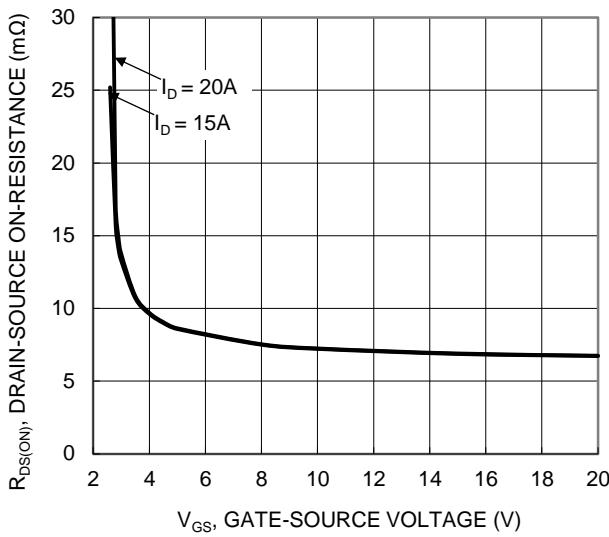


Figure 4. Typical Transfer Characteristic

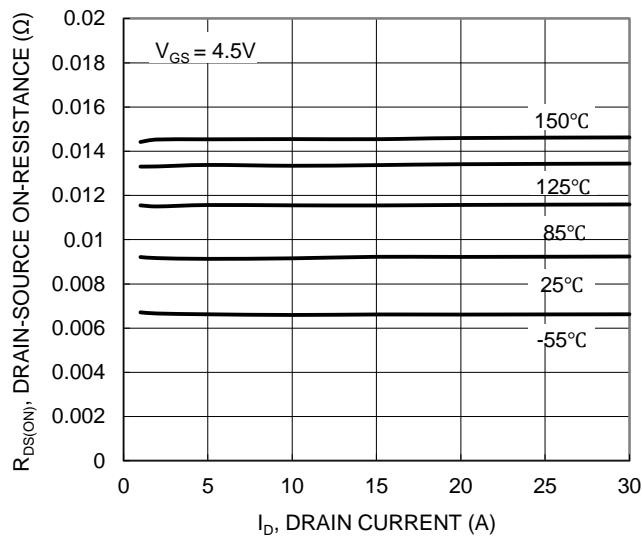


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

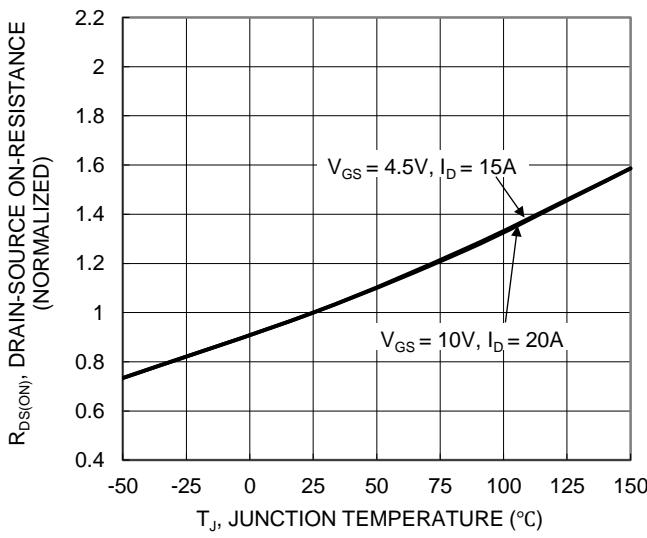
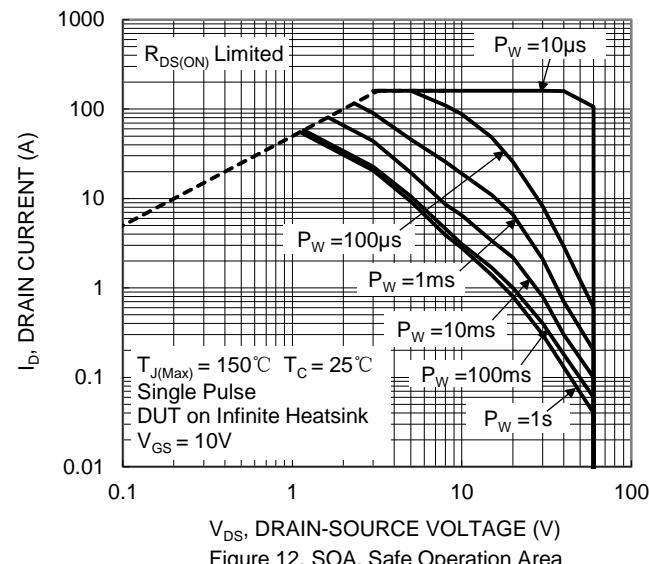
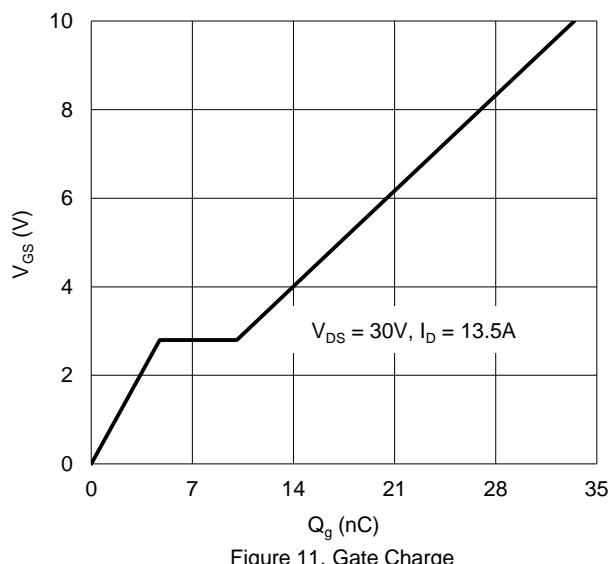
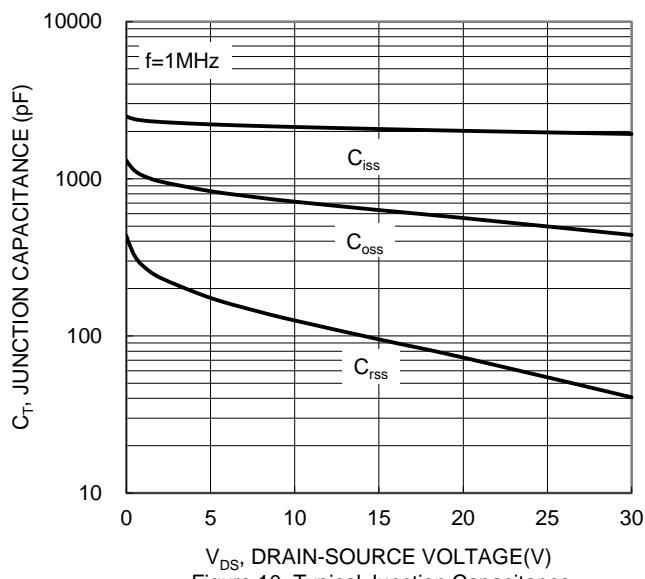
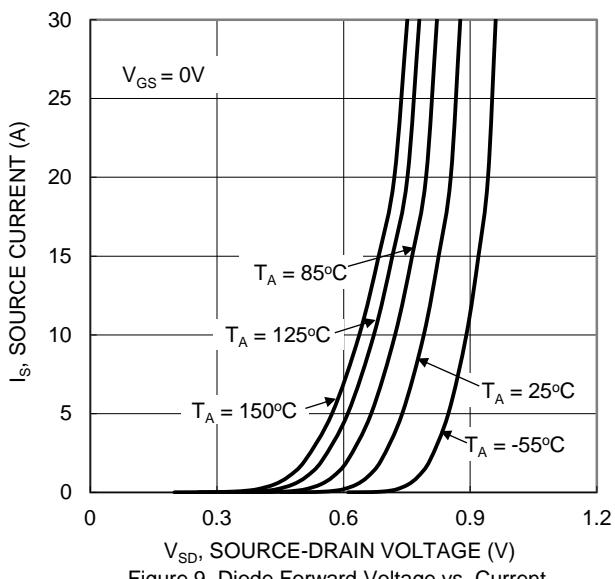
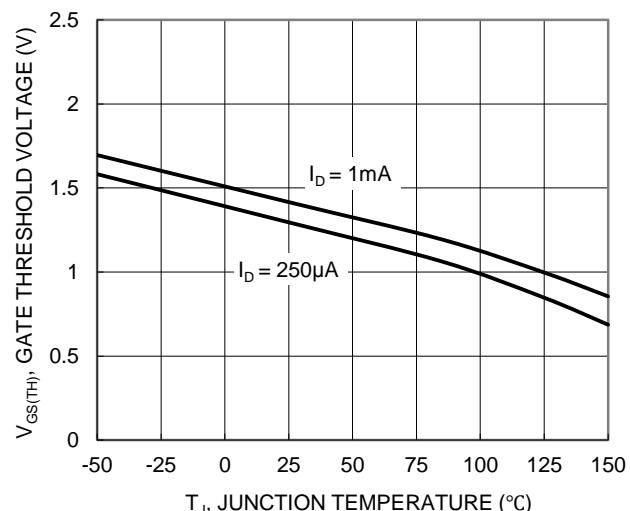
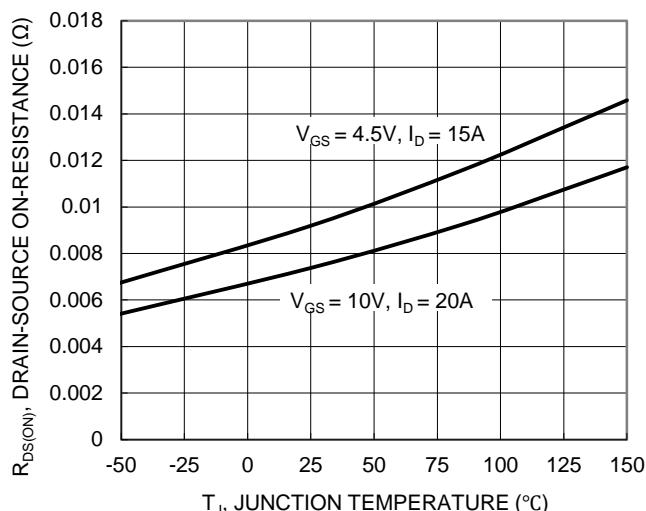


Figure 6. On-Resistance Variation with Temperature



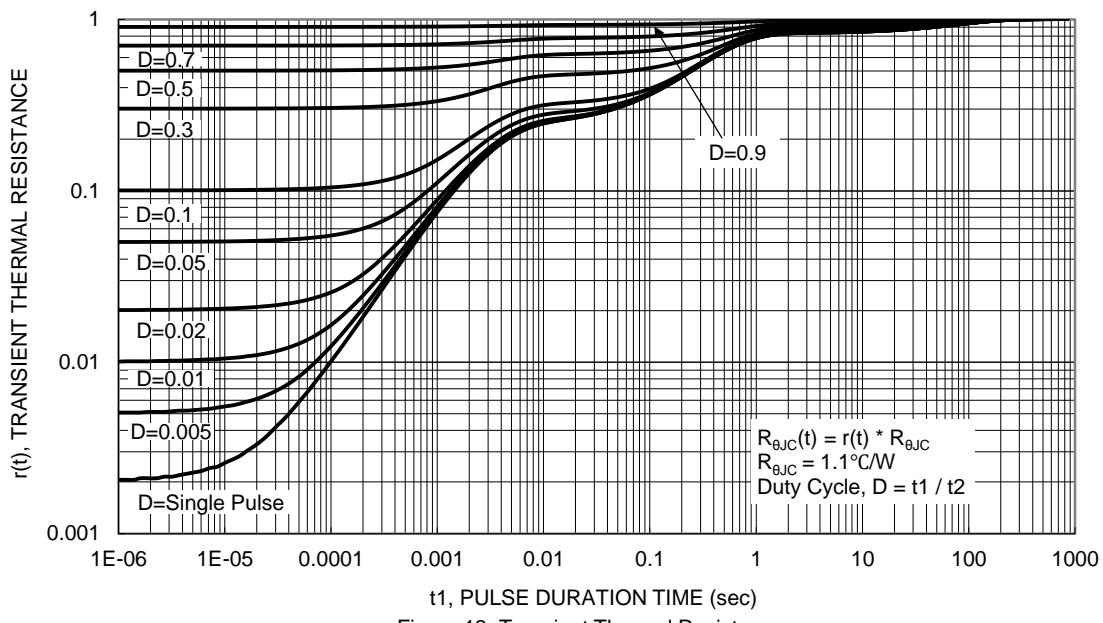
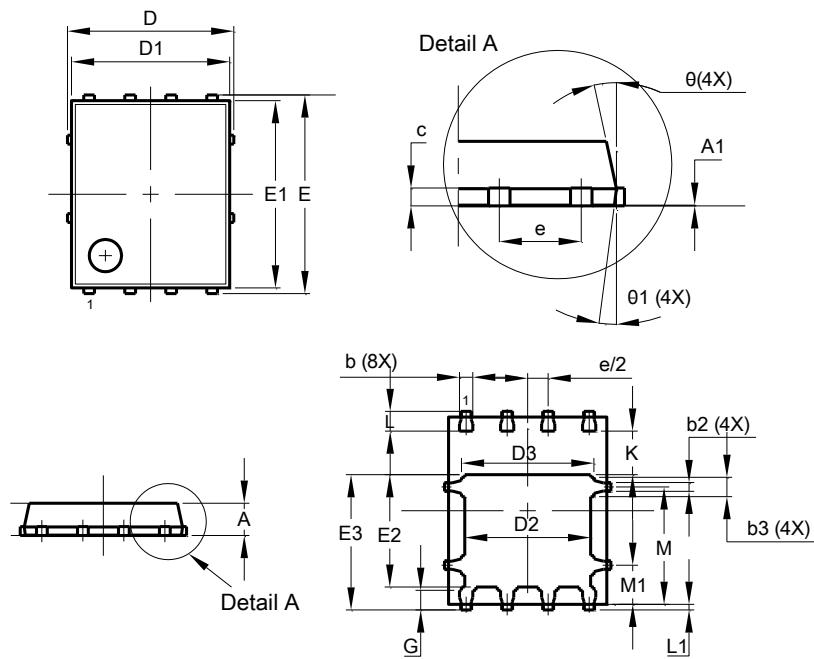


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI5060-8



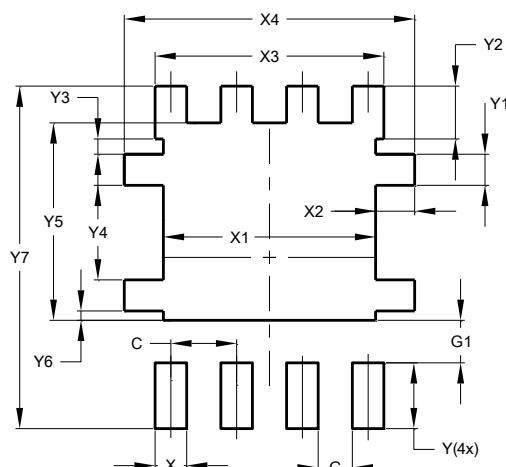
PowerDI5060-8			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0.00	0.05	—
b	0.33	0.51	0.41
b2	0.200	0.350	0.273
b3	0.40	0.80	0.60
c	0.230	0.330	0.277
D	5.15 BSC		
D1	4.70	5.10	4.90
D2	3.70	4.10	3.90
D3	3.90	4.30	4.10
E	6.15 BSC		
E1	5.60	6.00	5.80
E2	3.28	3.68	3.48
E3	3.99	4.39	4.19
e	1.27 BSC		
G	0.51	0.71	0.61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



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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