

Product Summary

BV_{DSS}	$R_{DS(ON)}$	I_D $T_c = +25^\circ C$ (Note 9)
60V	8mΩ @ $V_{GS} = 10V$	100A
	12mΩ @ $V_{GS} = 4.5V$	85A

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:

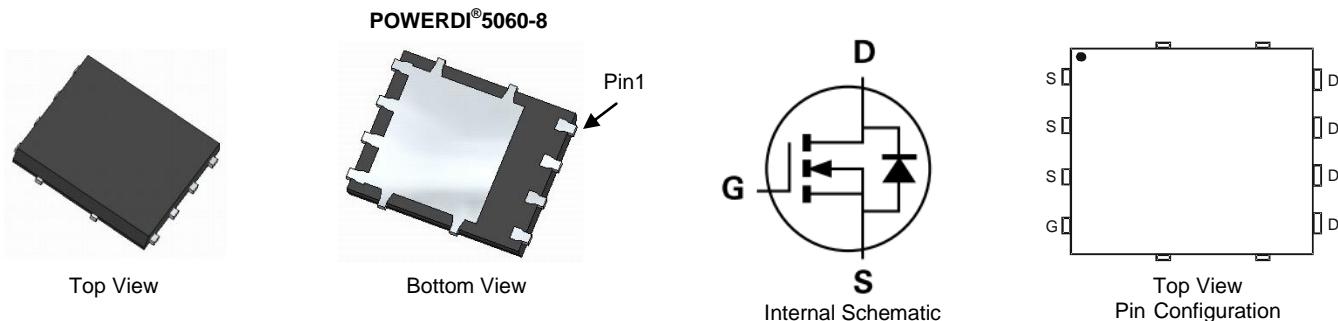
- Engine Management Systems
- Body Control Electronics
- DC-DC Converters

Features

- Rated to +175°C – Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switching – Ensures More Reliable and Robust End Application
- Low $R_{DS(ON)}$ – Minimizes On State Losses
- Low Input Capacitance
- 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
- PPAP Capable (Note 4)

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)



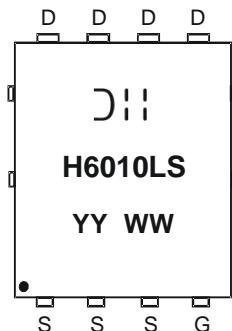
Ordering Information (Note 5)

Part Number	Case	Packaging
DMTH6010LPSQ-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. Automotive products are AEC-Q101 qualified and are PPAP capable. For more information, please refer to http://www.diodes.com/product_compliance_definitions.html.
5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



DII = Manufacturer's Marking
H6010LS = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 14 = 2014)
WW = Week Code (01 to 53)

POWERDI is a registered trademark of Diodes Incorporated.

DMTH6010LPSQ

Document number: DS38161 Rev. 1 - 2

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

Characteristic	Symbol	Value	Unit	
Drain-Source Voltage	V_{DSS}	60	V	
Gate-Source Voltage	V_{GSS}	± 20	V	
Continuous Drain Current (Note 6)	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	13.5 10.4	A
Continuous Drain Current (Note 7)	$T_C = +25^\circ\text{C}$ (Note 9) $T_C = +100^\circ\text{C}$	I_D	100 75	A
Maximum Continuous Body Diode Forward Current (Note 7)	I_S	100	A	
Pulsed Drain Current (10 μs Pulse, Duty Cycle = 1%)	I_{DM}	140	A	
Avalanche Current, L=0.1mH	I_{AS}	20	A	
Avalanche Energy, L=0.1mH	E_{AS}	20	mJ	

Thermal Characteristics

Characteristic	Symbol	Value	Unit	
Total Power Dissipation (Note 6)	$T_A = +25^\circ\text{C}$	P_D	2.6	W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	57	°C/W	
Total Power Dissipation (Note 7)	$T_C = +25^\circ\text{C}$	P_D	136	W
Thermal Resistance, Junction to Case (Note 7)	$R_{\theta JC}$	1.1	°C/W	
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +175	°C	

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
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	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	1	—	3	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	6.4	8	mΩ	$V_{GS} = 10\text{V}, I_D = 20\text{A}$
		—	8.3	12		$V_{GS} = 4.5\text{V}, I_D = 20\text{A}$
Diode Forward Voltage	V_{SD}	—	0.8	1.2	V	$V_{GS} = 0\text{V}, I_S = 20\text{A}$
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	2,090	—	pF	$V_{DS} = 30\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Output Capacitance	C_{oss}	—	746	—		
Reverse Transfer Capacitance	C_{rss}	—	38.5	—		
Gate Resistance	R_g	0.2	0.59	1.5	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge ($V_{GS} = 4.5\text{V}$)	Q_g	—	19.3	—	nC	$V_{DS} = 30\text{V}, I_D = 20\text{A}$
Total Gate Charge ($V_{GS} = 10\text{V}$)	Q_g	—	41.3	—		
Gate-Source Charge	Q_{gs}	—	6	—		
Gate-Drain Charge	Q_{gd}	—	8.8	—		
Turn-On Delay Time	$t_{D(ON)}$	—	5.7	—	ns	$V_{DD} = 30\text{V}, V_{GS} = 10\text{V}, I_D = 20\text{A}, R_g = 3\Omega$
Turn-On Rise Time	t_R	—	4.3	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	23.4	—		
Turn-Off Fall Time	t_F	—	9.7	—		
Body Diode Reverse Recovery Time	t_{RR}	—	35.4	—	ns	$I_F = 20\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Body Diode Reverse Recovery Charge	Q_{RR}	—	38.2	—	nC	

Notes: 6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.

7. Thermal resistance from junction to soldering point (on the exposed drain pad).

8. Short duration pulse test used to minimize self-heating effect.

9. Guaranteed by design. Not subject to product testing.

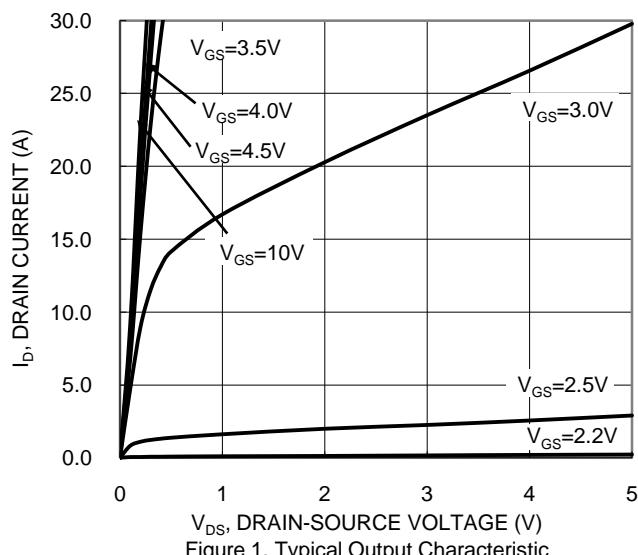


Figure 1. Typical Output Characteristic

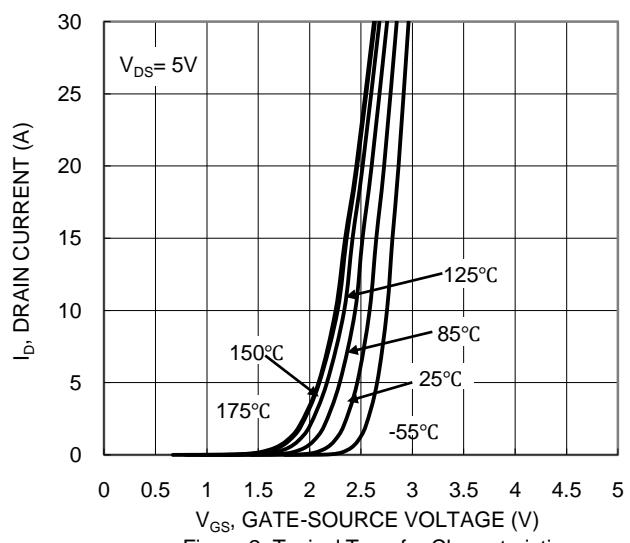


Figure 2. Typical Transfer Characteristic

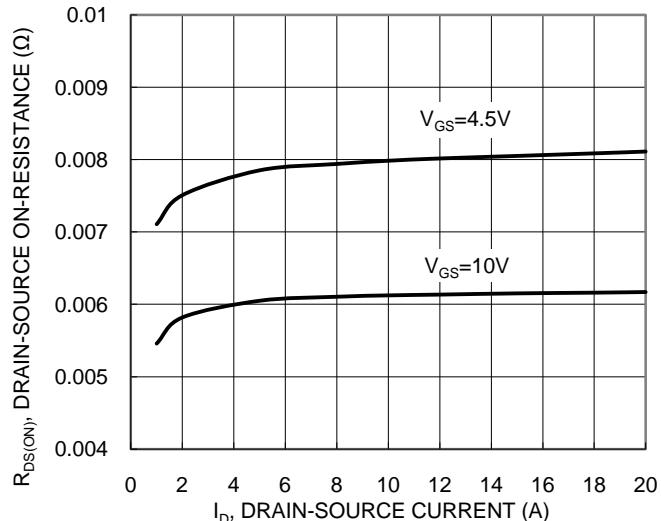


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

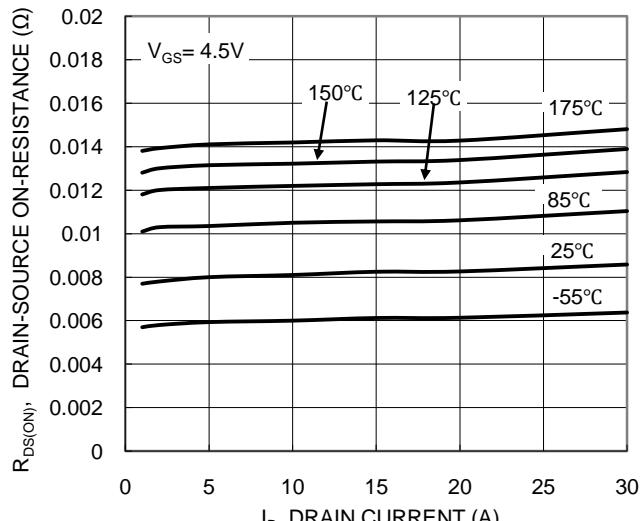


Figure 4. Typical On-Resistance vs. Drain Current and Temperature

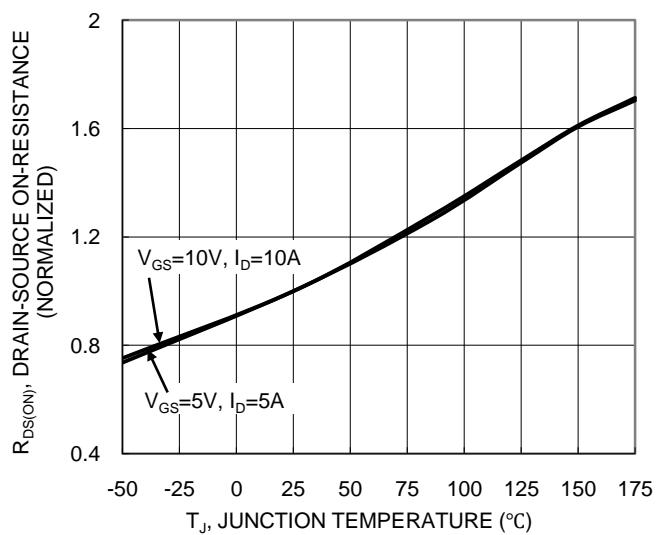


Figure 5. On-Resistance Variation with Temperature

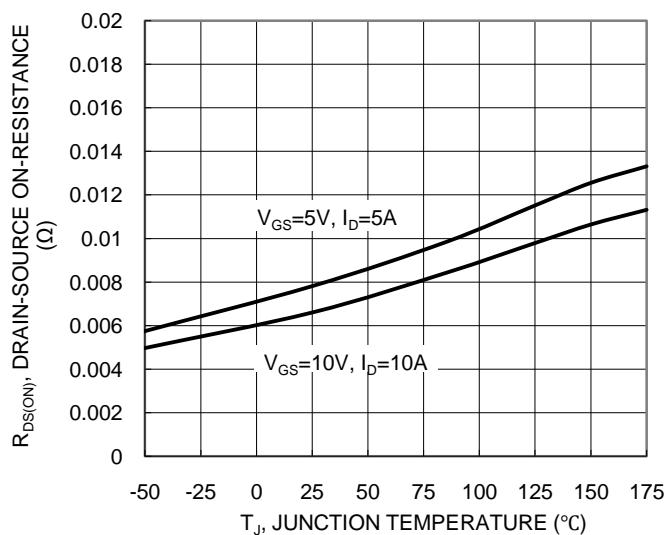
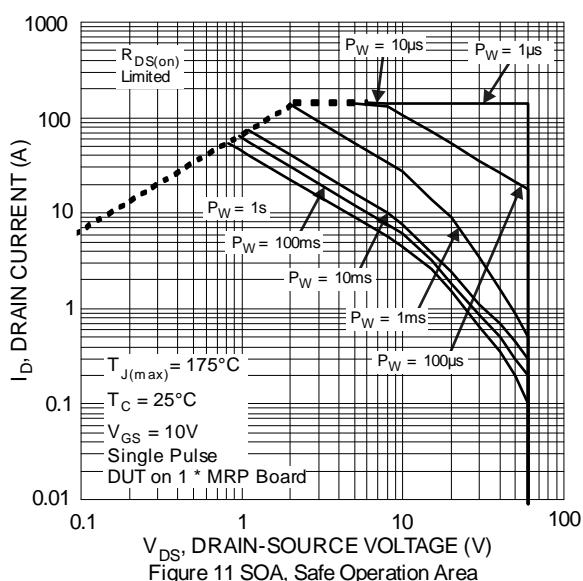
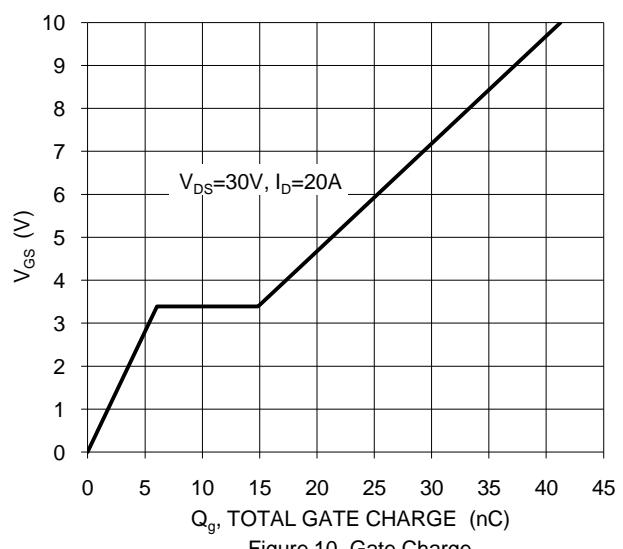
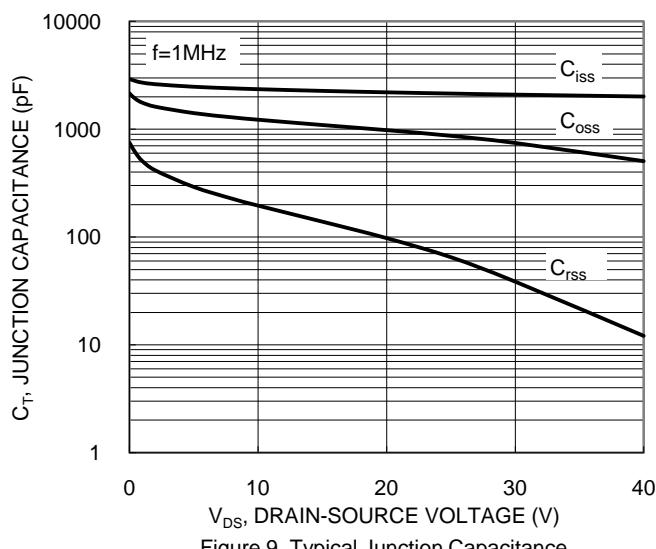
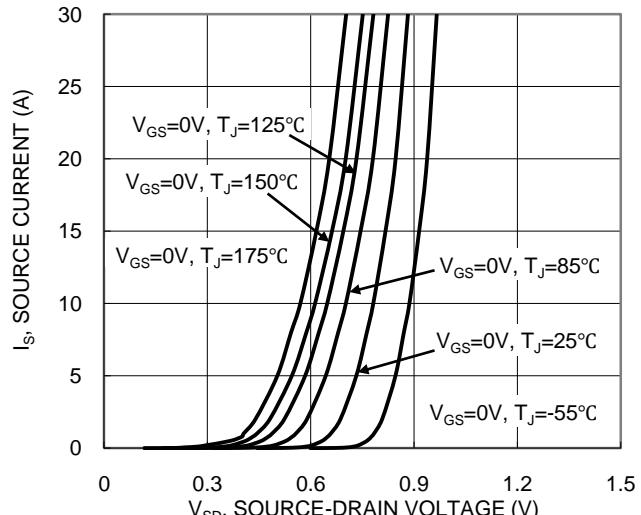
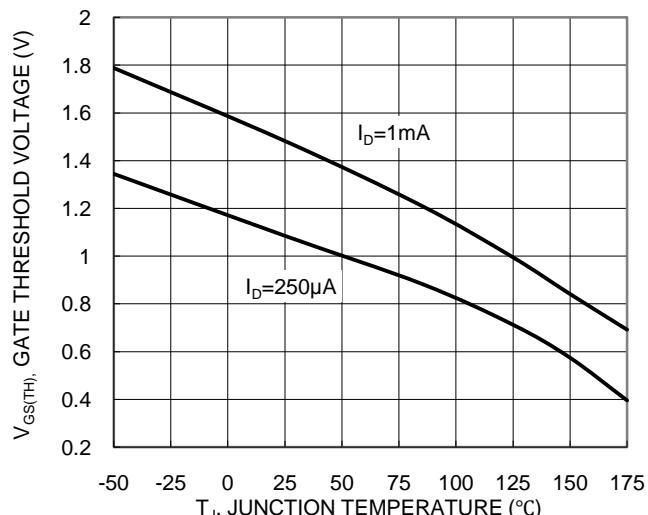


Figure 6. On-Resistance Variation with Temperature



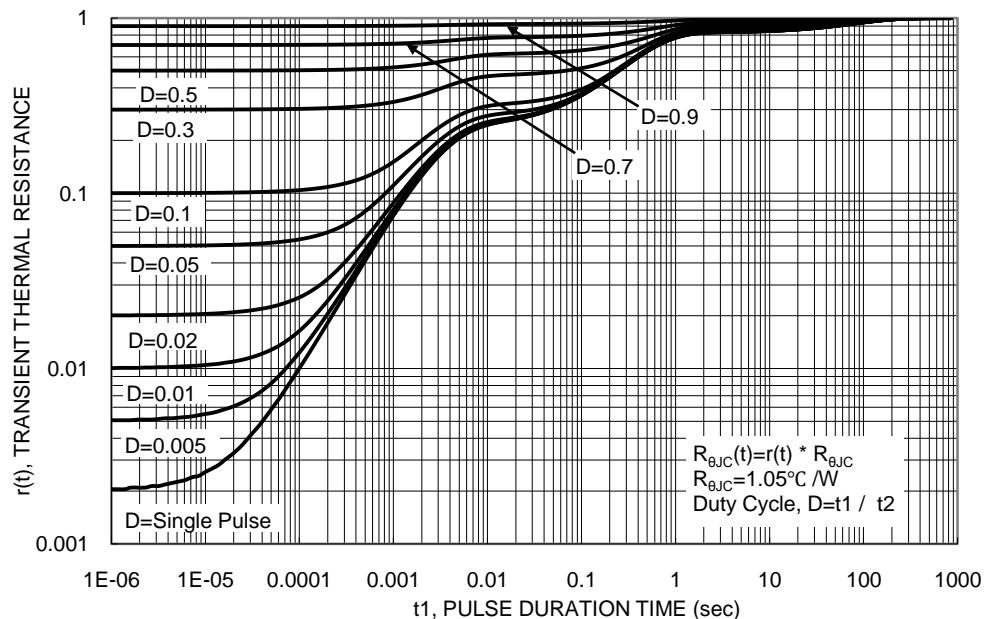
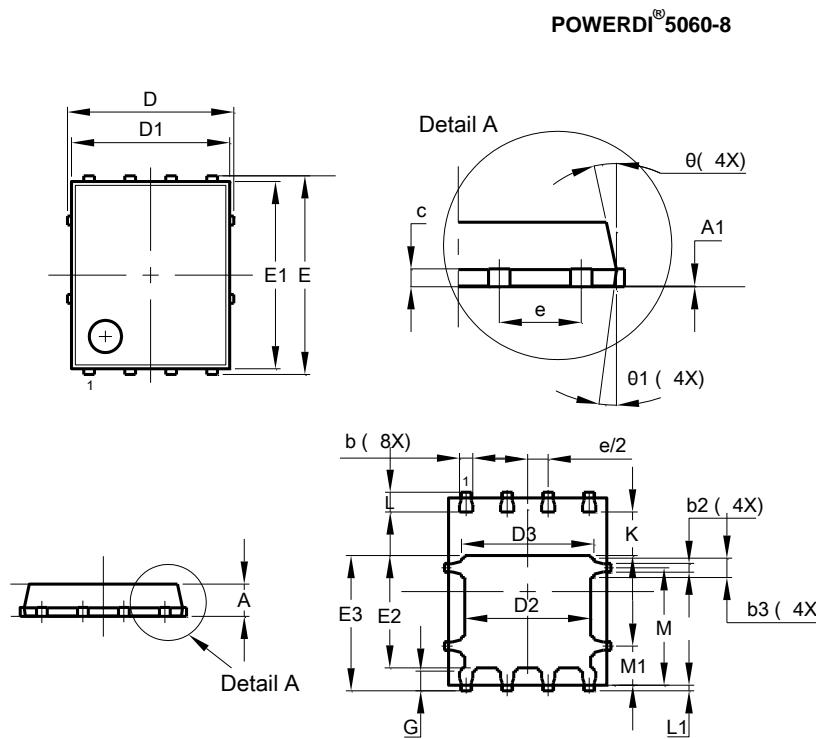


Figure 12. Transient Thermal Resistance

Package Outline Dimensions

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

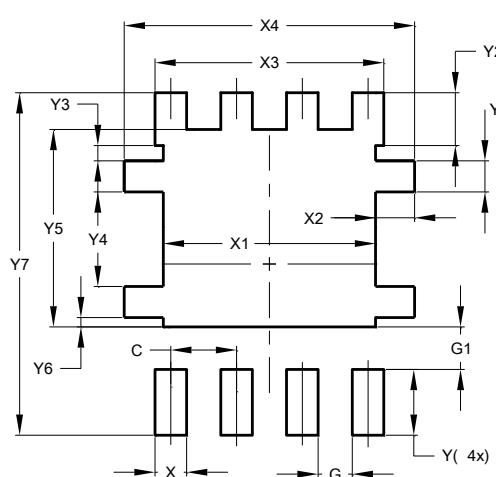


POWERDI®5060-8			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0.00	0.05	-
b	0.33	0.51	0.41
b2	0.200	0.350	0.273
b3	0.40	0.80	0.60
c	0.230	0.330	0.277
D	5.15 BSC		
D1	4.70	5.10	4.90
D2	3.70	4.10	3.90
D3	3.90	4.30	4.10
E	6.15 BSC		
E1	5.60	6.00	5.80
E2	3.28	3.68	3.48
E3	3.99	4.39	4.19
e	1.27 BSC		
G	0.51	0.71	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
theta	10°	12°	11°
theta1	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.



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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