

Product Summary

BV_{DSS}	$R_{DS(ON)}$	I_D $T_C = +25^\circ\text{C}$
80V	17m Ω @ $V_{GS} = 10\text{V}$	72A
	21m Ω @ $V_{GS} = 4.5\text{V}$	62A

Description and Applications

This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AECQ101, supported by a PPAP and is ideal for use in:

- Synchronous Rectifier
- Backlighting
- Power Management Functions
- DC-DC Converters

Features

- Rated to $+175^\circ\text{C}$ – Ideal for High Ambient Temperature Environments
- High Conversion Efficiency
- 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)**

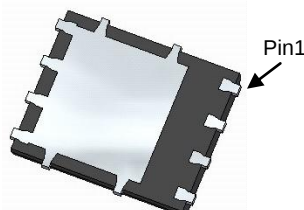
Mechanical Data

- Case: PowerDI5060-8
- 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 **Ⓔ3**
- Weight: 0.097 grams (Approximate)

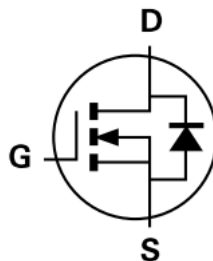
PowerDI5060-8



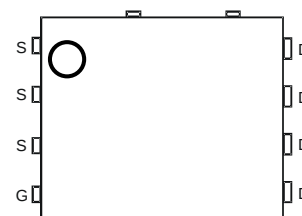
Top View



Bottom View



Internal Schematic

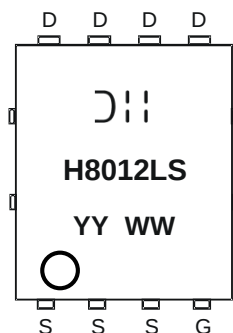

 Top View
 Pin Configuration

Ordering Information (Note 5)

Part Number	Case	Packaging
DMTH8012LPSQ-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. Automotive products are AEC-Q101 qualified and are PPAP capable. 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



 = Manufacturer's Marking
 H8012LS = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year
 (ex: 15 = 2015)
 WW = Week Code (01 to 53)

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V _{DSS}	80	V
Gate-Source Voltage	V _{GSS}	±20	V
Continuous Drain Current, V _{GS} = 10V (Note 6)	I _D	10 8.4	A
Continuous Drain Current, V _{GS} = 10V (Note 7)	I _D	72 60	A
Maximum Continuous Body Diode Forward Current (Note 7)	I _S	90	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)	I _{DM}	80	A
Avalanche Current, L=0.1mH	I _{AS}	11.6	A
Avalanche Energy, L=0.1mH	E _{AS}	10.2	mJ

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 6)	P _D	2.6	W
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	57	°C/W
Total Power Dissipation (Note 7)	P _D	136	W
Thermal Resistance, Junction to Case (Note 7)	R _{θJC}	1.1	°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}	80	-	-	V	V _{GS} = 0V, I _D = 1mA
Zero Gate Voltage Drain Current	I _{DSS}	-	-	1	μA	V _{DS} = 64V, 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	-	3	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	-	12.3	17	mΩ	V _{GS} = 10V, I _D = 12A
		-	15.1	21		V _{GS} = 4.5V, I _D = 6A
Diode Forward Voltage	V _{SD}	-	0.9	1.2	V	V _{GS} = 0V, I _S = 20A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	-	2051	-	pF	V _{DS} = 40V, V _{GS} = 0V, f = 1MHz
Output Capacitance	C _{oss}	-	189.9	-		
Reverse Transfer Capacitance	C _{rss}	-	24.6	-		
Gate Resistance	R _g	-	0.44	-	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	-	24.1	-	nC	V _{DS} = 40V, I _D = 12A
Total Gate Charge (V _{GS} = 10V)	Q _g	-	46.8	-		
Gate-Source Charge	Q _{gs}	-	6.9	-		
Gate-Drain Charge	Q _{gd}	-	12.2	-		
Turn-On Delay Time	t _{D(ON)}	-	5.8	-	ns	V _{DD} = 40V, V _{GS} = 10V, I _D = 12A, R _G = 1.6Ω
Turn-On Rise Time	t _R	-	6.5	-		
Turn-Off Delay Time	t _{D(OFF)}	-	17.3	-		
Turn-Off Fall Time	t _F	-	4.7	-		
Body Diode Reverse Recovery Time	t _{RR}	-	33.5	-	ns	I _F = 12A, di/dt = 100A/μs
Body Diode Reverse Recovery Charge	Q _{RR}	-	38.9	-	nC	

- Notes:
- 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).
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

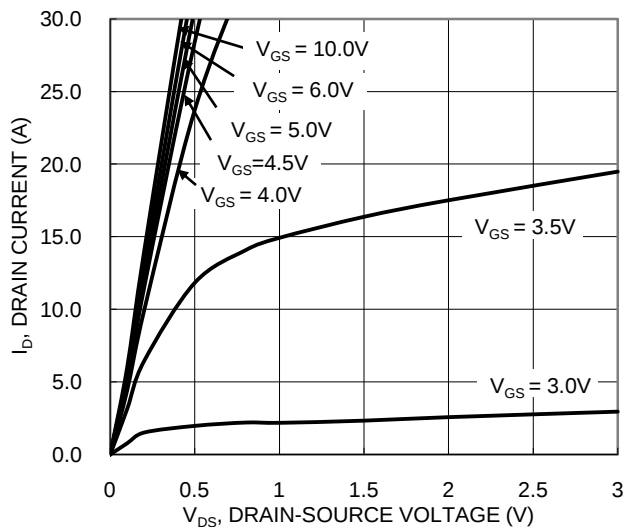


Figure 1. Typical Output Characteristic

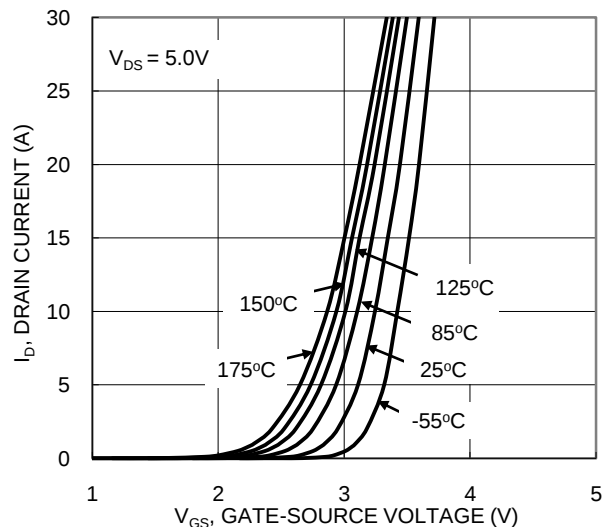


Figure 2. Typical Transfer Characteristic

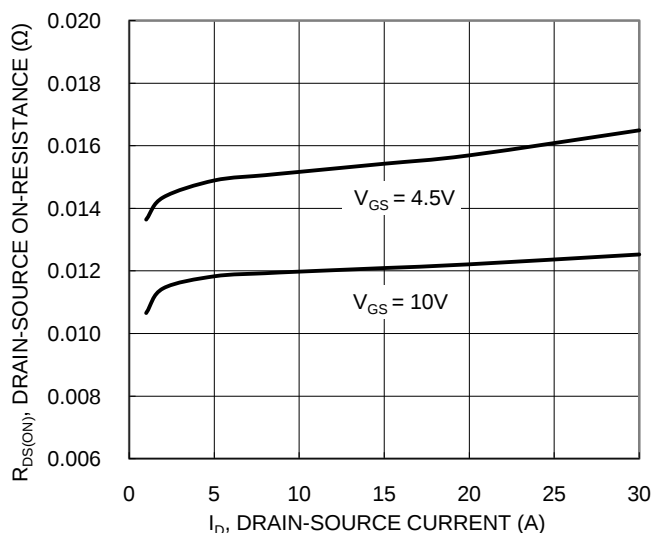


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

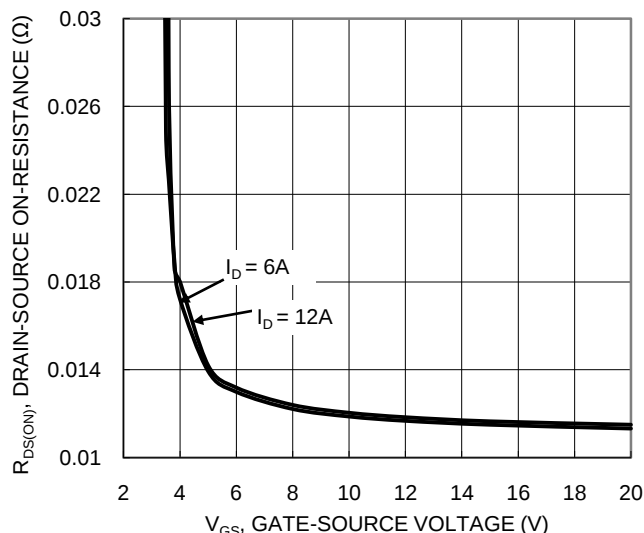


Figure 4. Typical Transfer Characteristic

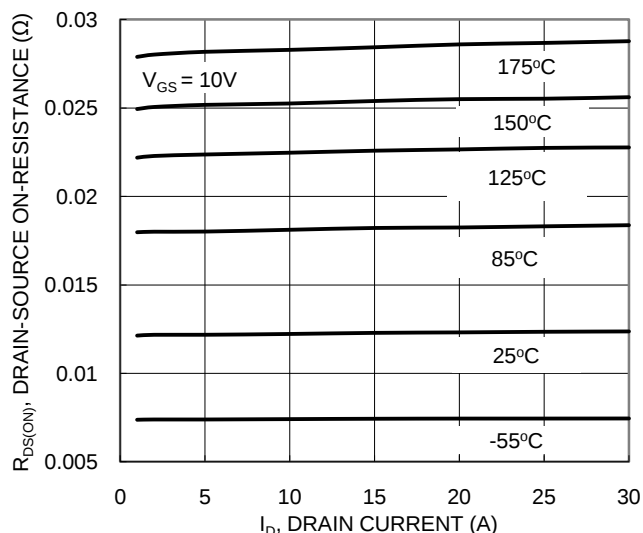


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

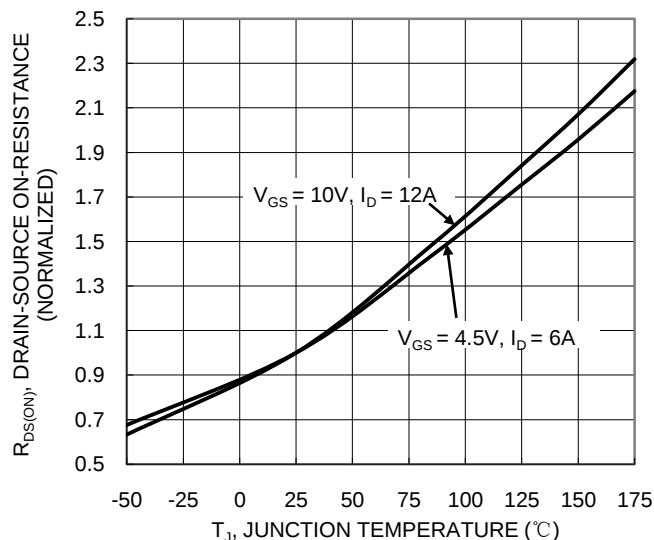
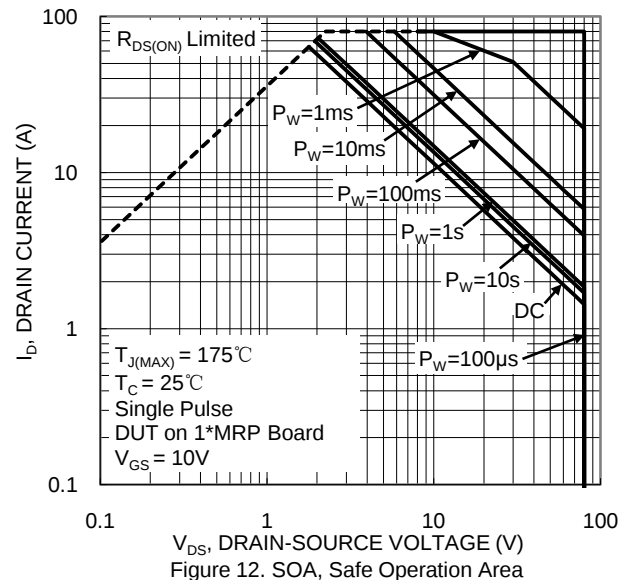
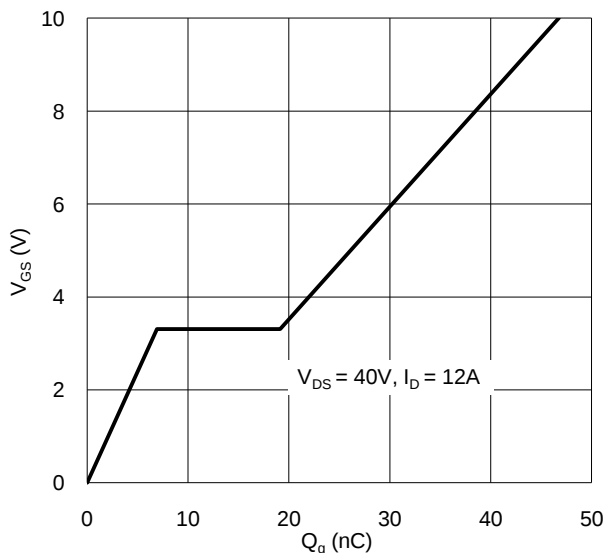
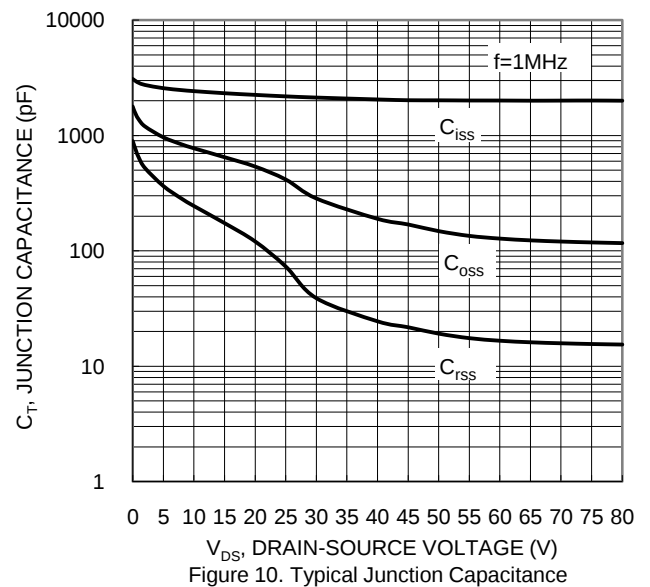
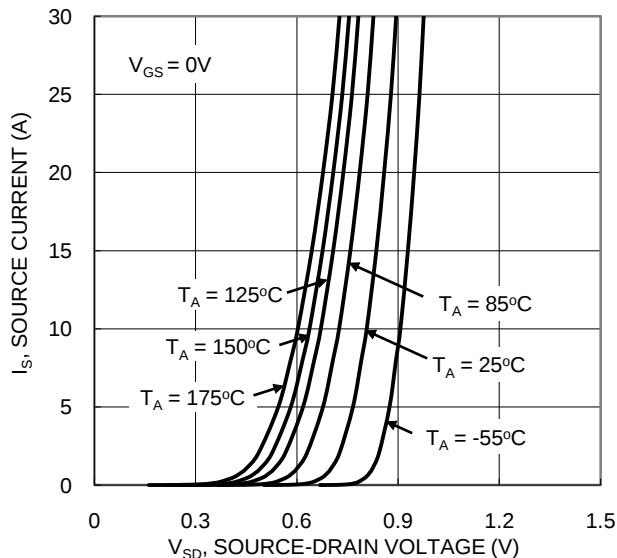
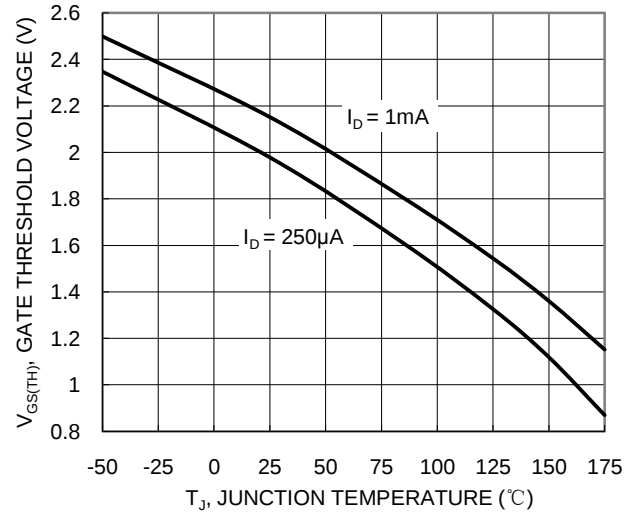
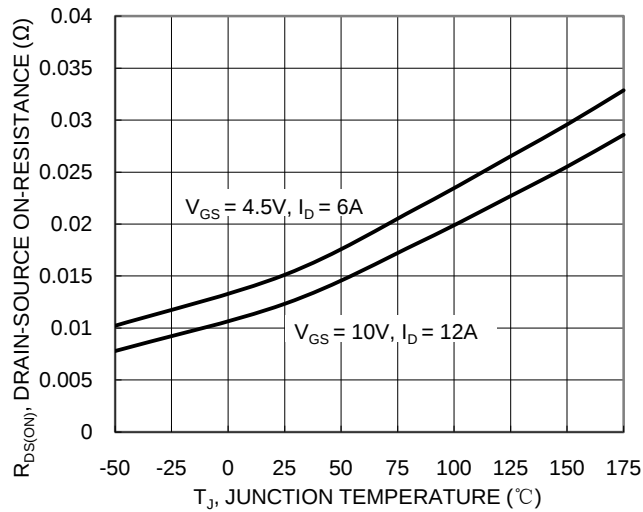


Figure 6. On-Resistance Variation with Temperature



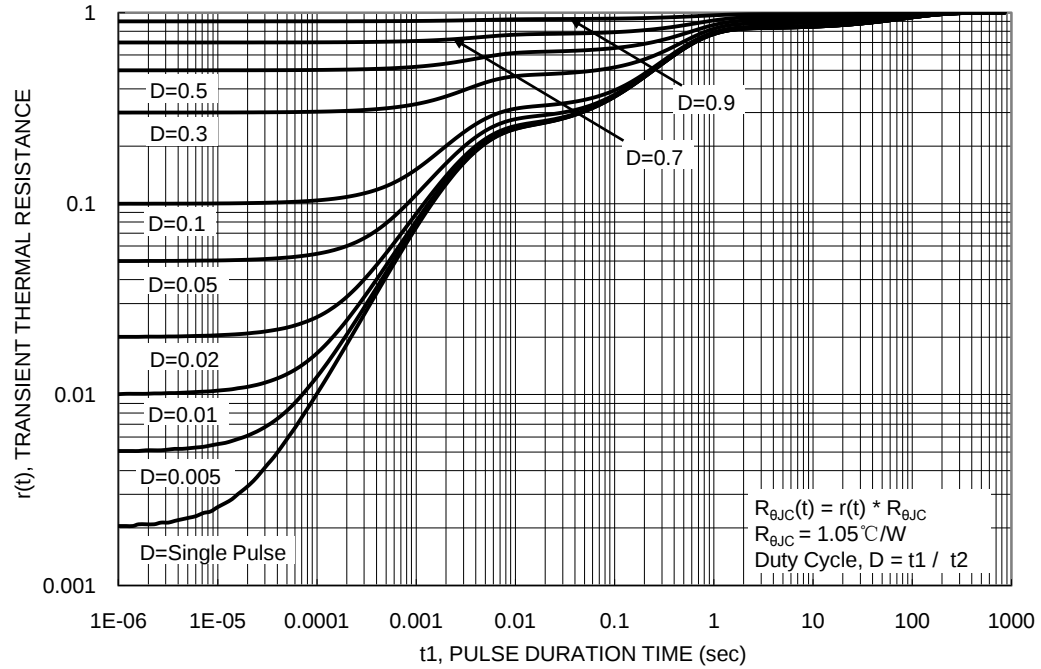
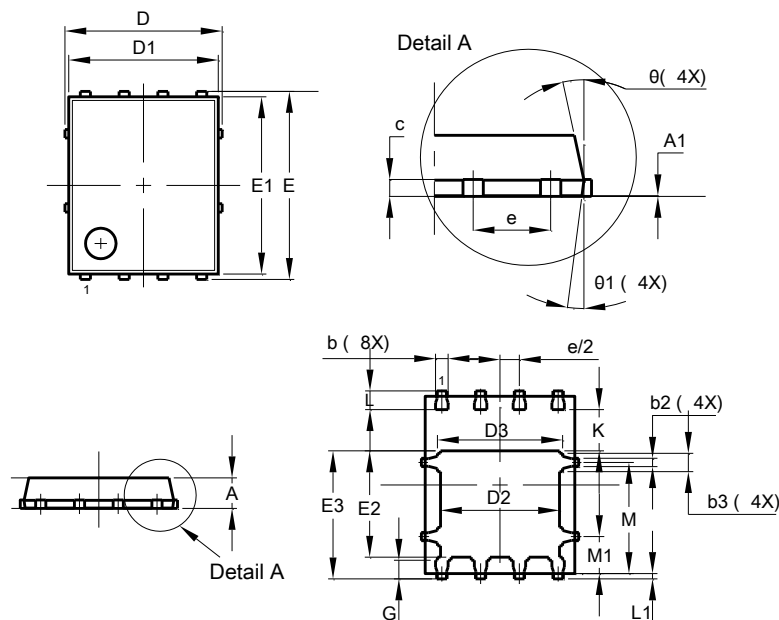


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI5060-8

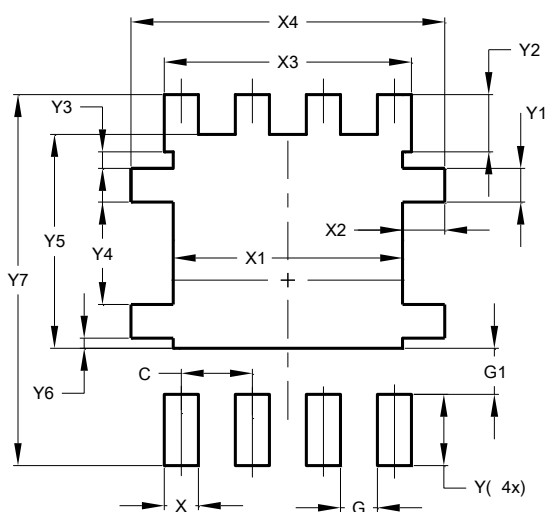


PowerDI5060-8			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0.00	0.05	
b	0.33	0.51	0.41
b2	0.200	0.350	0.273
b3	0.40	0.80	0.60
c	0.230	0.330	0.277
D	5.15 BSC		
D1	4.70	5.10	4.90
D2	3.70	4.10	3.90
D3	3.90	4.30	4.10
E	6.15 BSC		
E1	5.60	6.00	5.80
E2	3.28	3.68	3.48
E3	3.99	4.39	4.19
e	1.27 BSC		
G	0.51	0.71	0.61
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°
$\theta 1$	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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