

Product Summary

BV _{DSS}	R _{DS(ON)} max	I _D T _C = +25°C (Note 9)
40V	1.8mΩ @ V _{GS} = 10V	100A
	3.1mΩ @ V _{GS} = 4.5V	100A

Description and Applications

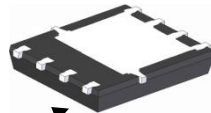
This MOSFET has been designed to minimize the on-state resistance (R_{DS(ON)}) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

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

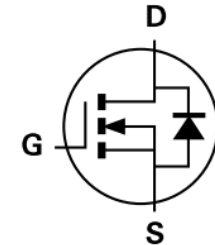
PowerDI5060-8 (Type K)



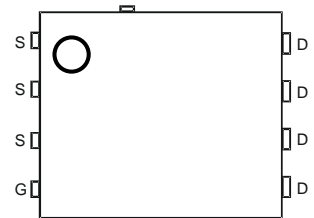
Top View



Bottom View
Pin1



Internal Schematic



Top View
Pin Configuration

Features

- 100% Unclamped Inductive Switching – Ensures More Reliable and Robust End Application
- Thermally Efficient Package-Cooler Running Applications
- High Conversion Efficiency
- Low R_{DS(ON)} – Minimizes On State Losses
- <1.1mm Package Profile – Ideal for Thin Applications
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**

Mechanical Data

- Case: PowerDI5060-8 (Type K)
- 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 4)

Part Number	Case	Packaging
DMT4002LPS-13	PowerDI5060-8 (Type K)	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



- D D D D = Manufacturer's Marking
 T4002LS = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 16 = 2016)
 WW = Week Code (01 to 53)

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

Characteristic	Symbol	Value	Units
Drain-Source Voltage	V _{DSS}	40	V
Gate-Source Voltage	V _{GSS}	±20	V
Continuous Drain Current, V _{GS} = 10V (Notes 6, 9)	I _D	100 100	A
Pulsed Drain Current (10µs pulse, duty cycle = 1%)	I _{DM}	200	A
Continuous Body Diode Forward Current (Note 6)	I _S	85	A
Avalanche Current, L = 0.1mH	I _{AS}	48	A
Avalanche Energy, L = 0.1mH	E _{AS}	115	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 _{θJA}	55	°C/W
Total Power Dissipation (Note 6)	P _D	104	W
Thermal Resistance, Junction to Case (Note 6)	R _{θJC}	1.2	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV _{DSS}	40	—	—	V	V _{GS} = 0V, I _D = 250µA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	µA	V _{DS} = 32V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(TH)}	1	—	3	V	V _{DS} = V _{GS} , I _D = 250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	1.3	1.8	mΩ	V _{GS} = 10V, I _D = 25A
		—	2	3.1		V _{GS} = 4.5V, I _D = 25A
Diode Forward Voltage	V _{SD}	—	—	1.2	V	V _{GS} = 0V, I _S = 20A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{ISS}	—	6771	—	pF	V _{DS} = 20V, V _{GS} = 0V, f = 1MHz
Output Capacitance	C _{OSS}	—	2165	—		
Reverse Transfer Capacitance	C _{rss}	—	176	—		
Gate Resistance	R _G	—	0.85	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 10V)	Q _g	—	116.1	—	nC	V _{DD} = 20V, I _D = 25A, V _{GS} = 10V
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	55.2	—		
Gate-Source Charge	Q _{gs}	—	20.3	—		
Gate-Drain Charge	Q _{gd}	—	22.7	—	ns	V _{DD} = 20V, V _{GS} = 10V, I _D = 25A, R _G = 3Ω
Turn-On Delay Time	t _{D(ON)}	—	11.4	—		
Turn-On Rise Time	t _R	—	22.9	—		
Turn-Off Delay Time	t _{D(OFF)}	—	62.5	—		
Turn-Off Fall Time	t _F	—	28	—	ns	I _F = 25A, di/dt = 100A/µs
Reverse Recovery Time	t _{RR}	—	58.6	—		
Reverse Recovery Charge	Q _{RR}	—	107	—	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.
 - Package limited.

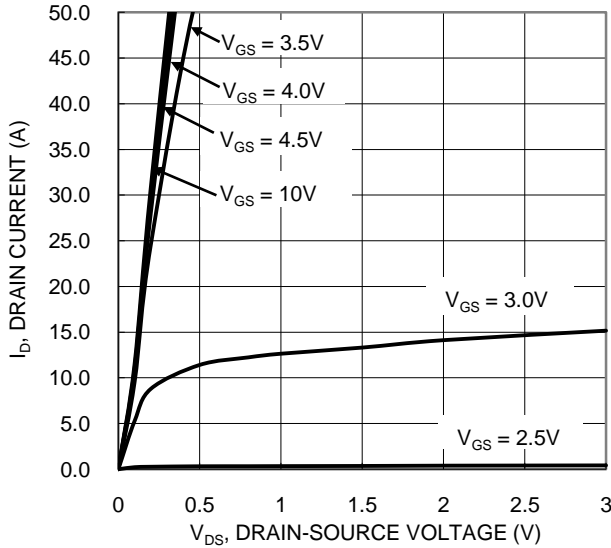


Figure 1. Typical Output Characteristic

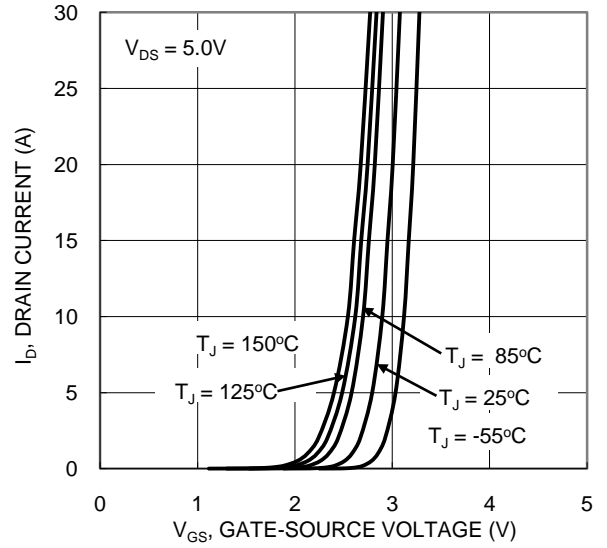


Figure 2. Typical Transfer Characteristic

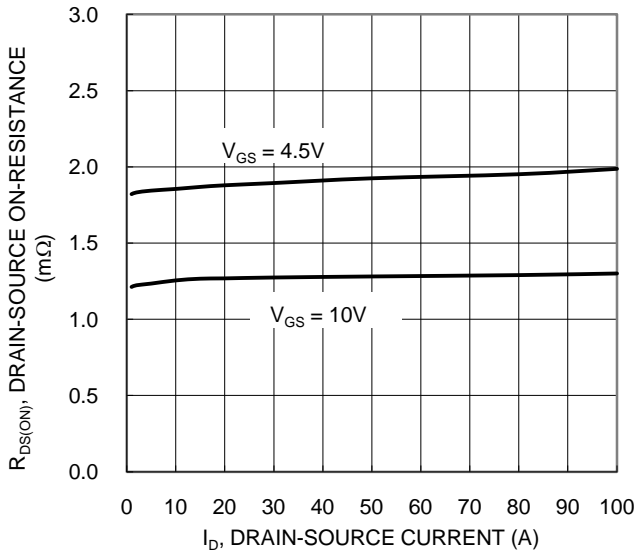


Figure 3. Typical On-Resistance vs Drain Current and Gate Voltage

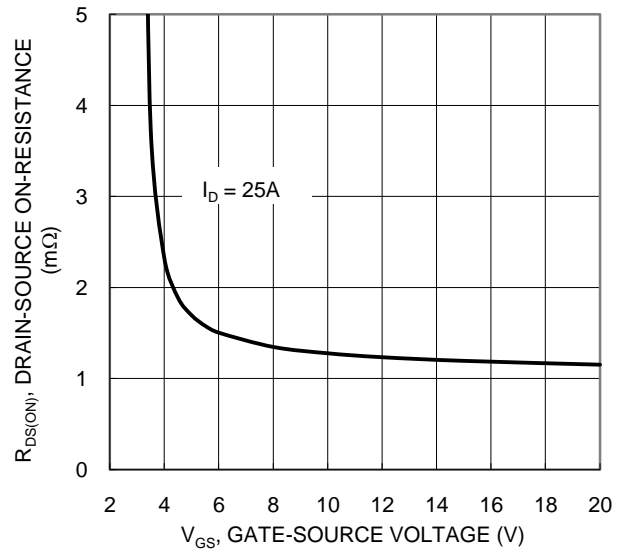


Figure 4. Typical Transfer Characteristic

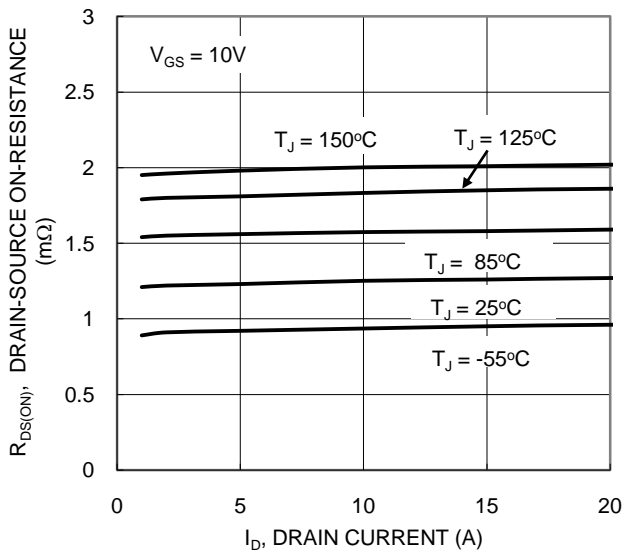


Figure 5. Typical On-Resistance vs Drain Current and Temperature

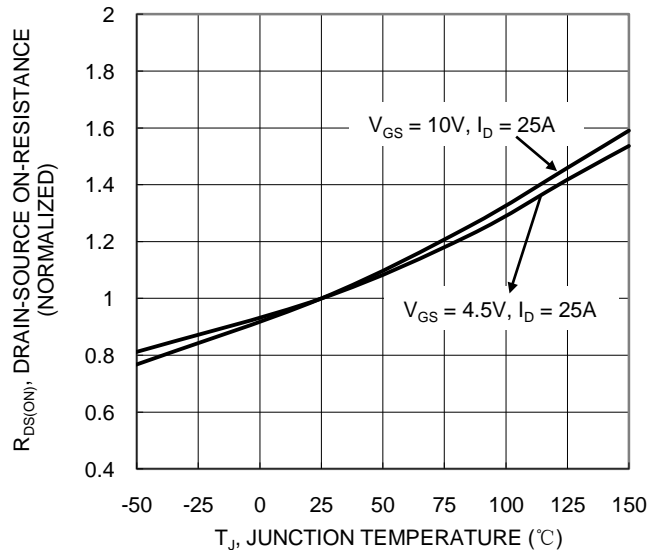
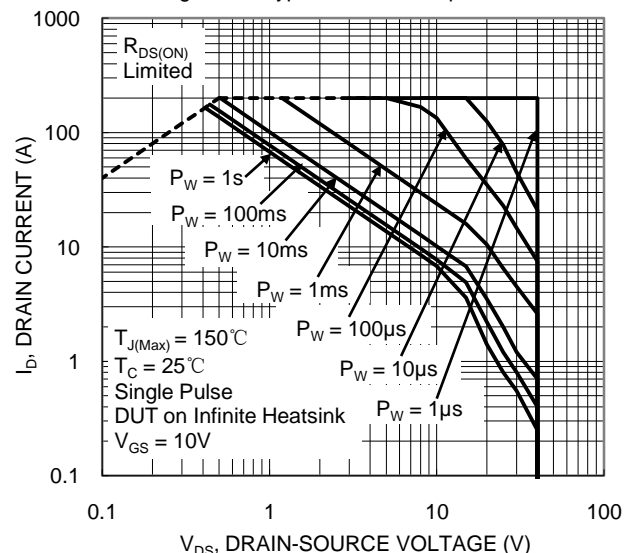
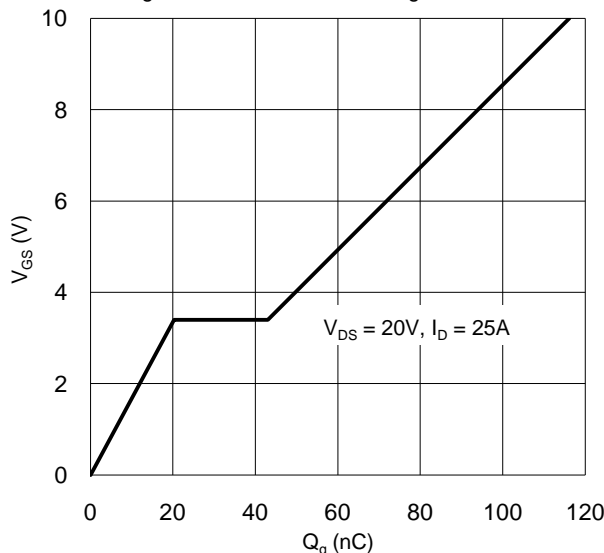
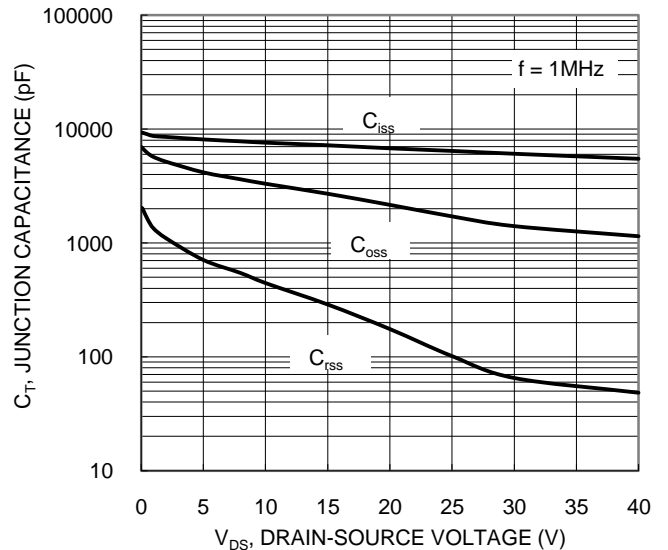
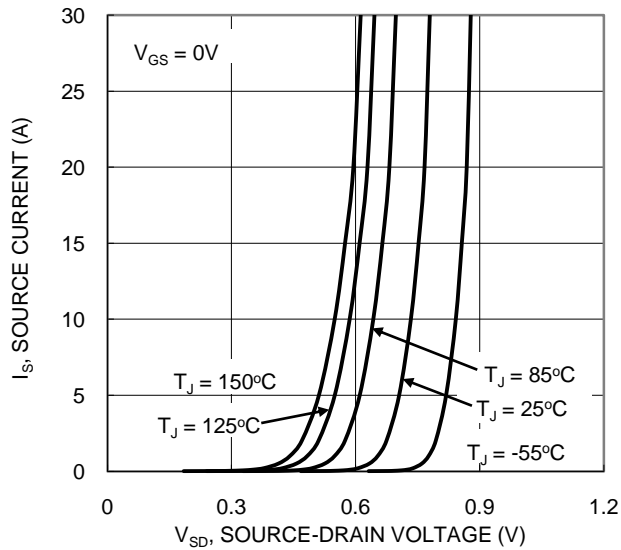
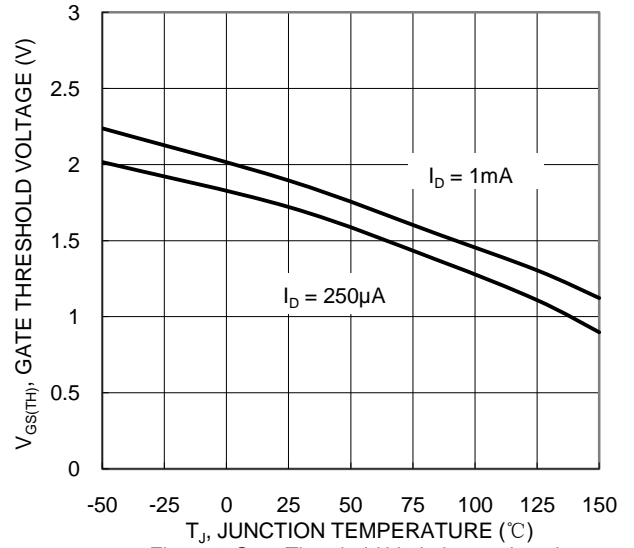
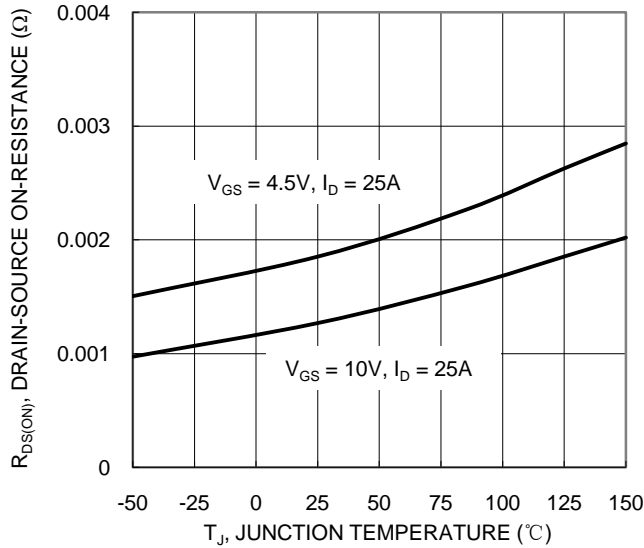


Figure 6. On-Resistance Variation with Temperature



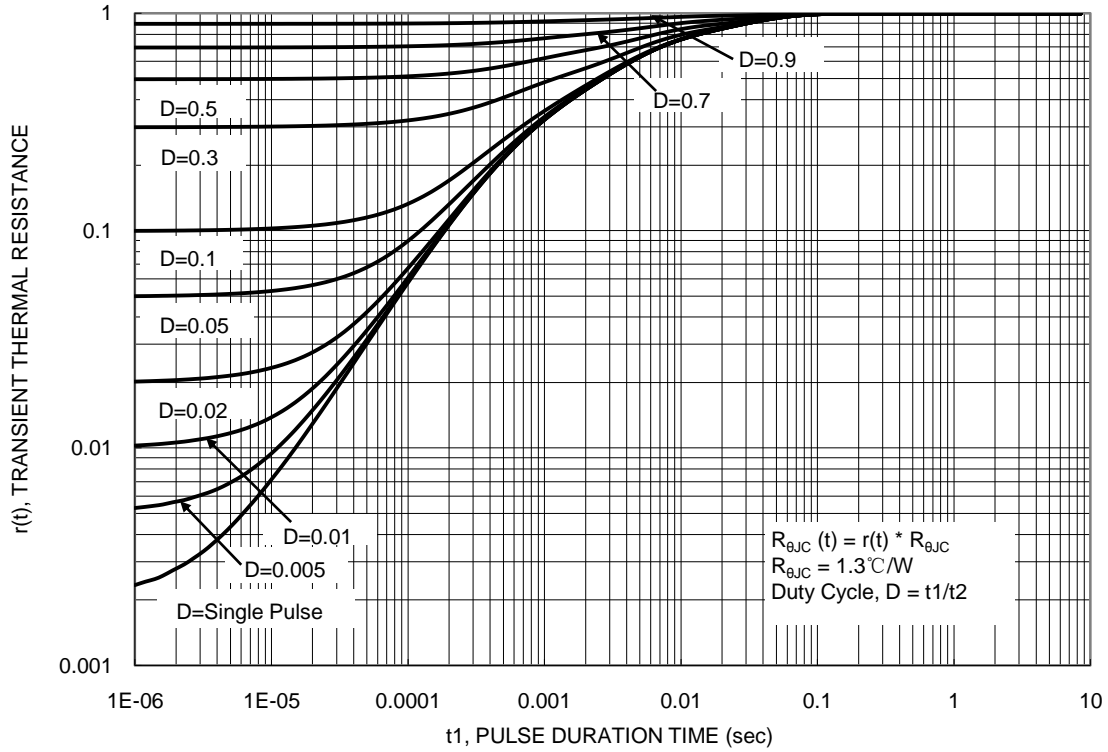
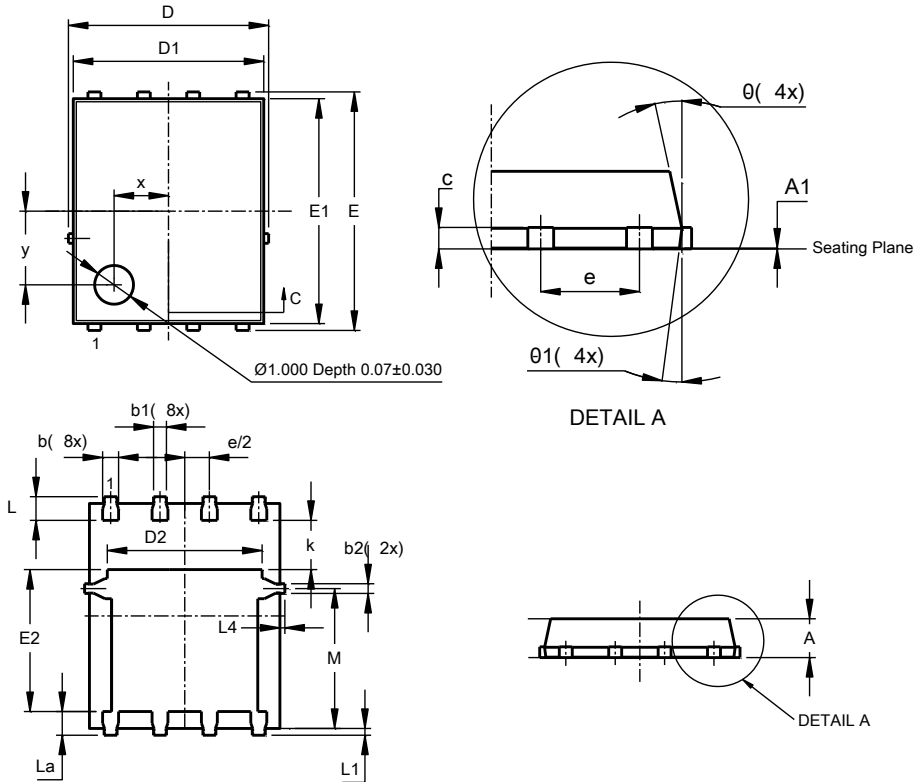


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI5060-8 (Type K)

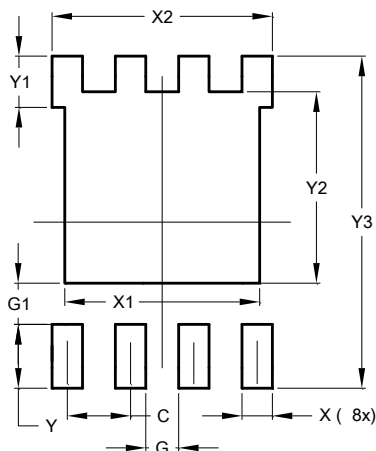


PowerDI5060-8 (Type K)			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0	0.05	0.02
b	0.33	0.51	0.41
b1	0.300	0.366	0.333
b2	0.20	0.35	0.25
c	0.23	0.33	0.277
D	5.15 BSC		
D1	4.85	4.95	4.90
D2	-	-	3.98
E	6.15 BSC		
E1	5.75	5.85	5.80
E2	3.56	3.725	3.66
E	1.27BSC		
k	-	-	1.27
L	0.51	0.71	0.61
La	0.51	0.675	0.61
L1	0.05	0.20	0.175
L4	-	-	0.125
M	3.50	3.71	3.605
x	-	-	1.400
y	-	-	1.900
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 (Type K)



Dimensions	Value (in mm)
C	1.270
G	0.660
G1	0.820
X	0.610
X1	3.910
X2	4.420
Y	1.270
Y1	1.020
Y2	3.810
Y3	6.610

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