

## Product Summary

$BV_{DSS}$	$R_{DS(ON)}$	$I_D$ $T_C = +25^\circ C$
30V	1.6mΩ @ $V_{GS} = 10V$	240A

## Description

This new generation N-Channel Enhancement Mode MOSFET is designed to minimize  $R_{DS(ON)}$ , yet maintain superior switching performance. This device is ideal for use in power management and load switch.

## Applications

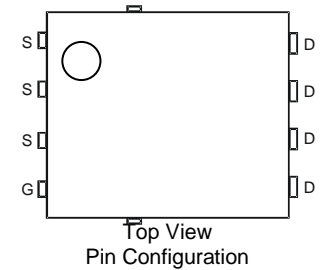
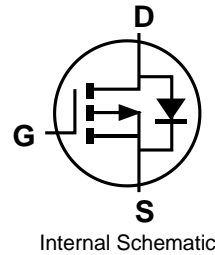
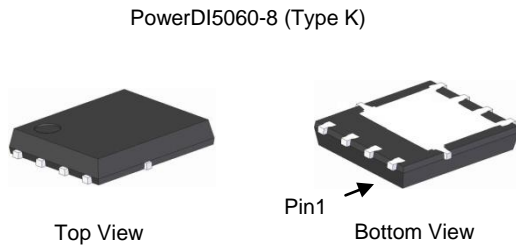
- DC-DC Converters
- Load Switch

## Features

- Thermally Efficient Package – Cooler Running Applications
- <1.1mm Package Profile – Ideal for Thin Applications
- 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**

## 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 208③
- Weight: 0.097 grams (Approximate)



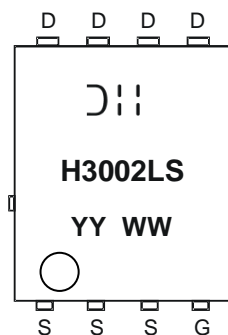
## Ordering Information (Note 4)

Part Number	Case	Packaging
DMTH3002LPS-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](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

PowerDI5060-8 (Type K)



- ☺ = Manufacturer's Marking
- H3002LS = Product Type Marking Code
- YYWW = Date Code Marking
- YY = Last Two Digits of Year (ex: 17 = 2017)
- WW = Week Code (01 to 53)

**Maximum Ratings** (@T<sub>C</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DSS</sub>	30	V
Gate-Source Voltage	V <sub>GSS</sub>	±16	V
Continuous Drain Current, V <sub>GS</sub> = 10V (Note 7)	I <sub>D</sub>	240	A
Steady State		T <sub>C</sub> = +25°C T <sub>C</sub> = +100°C	
Maximum Continuous Body Diode Forward Current (Note 7)	I <sub>S</sub>	100	A
Pulsed Drain Current (380µs Pulse, Duty Cycle = 1%)	I <sub>DM</sub>	400	A
Pulsed Continuous Body Diode Forward Current (380µs Pulse, Duty Cycle = 1%)	I <sub>SM</sub>	400	A
Avalanche Current, L=3mH (Note 8)	I <sub>AS</sub>	15	A
Avalanche Energy, L=3mH (Note 8)	E <sub>AS</sub>	700	mJ

**Thermal Characteristics** (@T<sub>C</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	P <sub>D</sub>	1.2	W
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	103	°C/W
Total Power Dissipation (Note 6)	P <sub>D</sub>	2.5	W
Thermal Resistance, Junction to Ambient (Note 6)	R <sub>θJA</sub>	51	°C/W
Total Power Dissipation (Note 7)	P <sub>D</sub>	136	W
Thermal Resistance, Junction to Case (Note 7)	R <sub>θJC</sub>	1.1	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +175	°C

**Electrical Characteristics** (@T<sub>C</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b> (Note 9)						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	30	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250µA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1	µA	V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±16V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS</b> (Note 9)						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	1	—	2	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 1mA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	1.25	1.6	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 25A
		—	2	2.5		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 25A
Diode Forward Voltage	V <sub>SD</sub>	—	0.8	1.1	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 25A
<b>DYNAMIC CHARACTERISTICS</b> (Note 10)						
Input Capacitance	C <sub>ISS</sub>	—	5,000	—	pF	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V, f = 1MHz
Output Capacitance	C <sub>OSS</sub>	—	2,660	—		
Reverse Transfer Capacitance	C <sub>RSS</sub>	—	300	—		
Gate Resistance	R <sub>G</sub>	—	0.75	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Q <sub>G</sub>	—	37	—	nC	V <sub>DS</sub> = 15V, I <sub>D</sub> = 25A
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>G</sub>	—	77	—		
Gate-Source Charge	Q <sub>GS</sub>	—	10	—		
Gate-Drain Charge	Q <sub>GD</sub>	—	14	—		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	21	—	ns	V <sub>DD</sub> = 15V, V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 25A, R <sub>G</sub> = 4.7Ω
Turn-On Rise Time	t <sub>R</sub>	—	45	—		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	32	—		
Turn-Off Fall Time	t <sub>F</sub>	—	26	—		
Body Diode Reverse Recovery Time	t <sub>RR</sub>	—	44	—	ns	I <sub>S</sub> = 15A, di/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q <sub>RR</sub>	—	52	—		

- 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 1-inch square copper plate.
  - Thermal resistance from junction to soldering point (on the exposed drain pad).
  - I<sub>AS</sub> and E<sub>AS</sub> rating are based on low frequency and duty cycles to keep T<sub>J</sub> = +25°C.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.

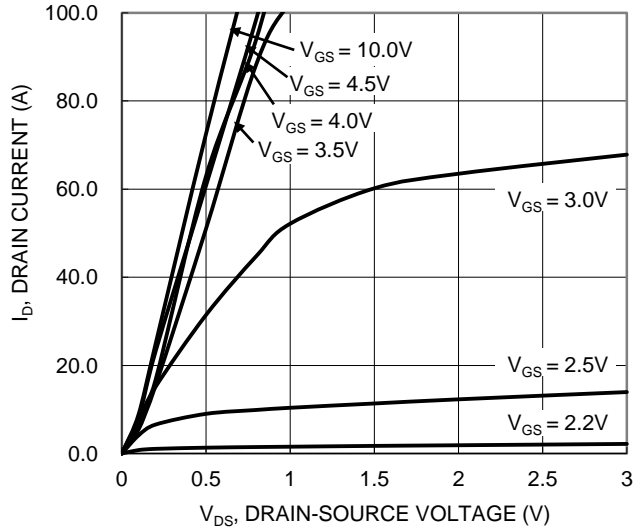


Figure 1. Typical Output Characteristic

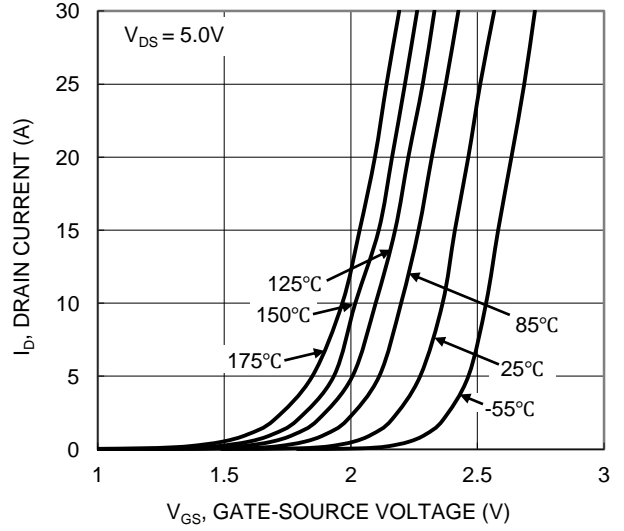


Figure 2. Typical Transfer Characteristic

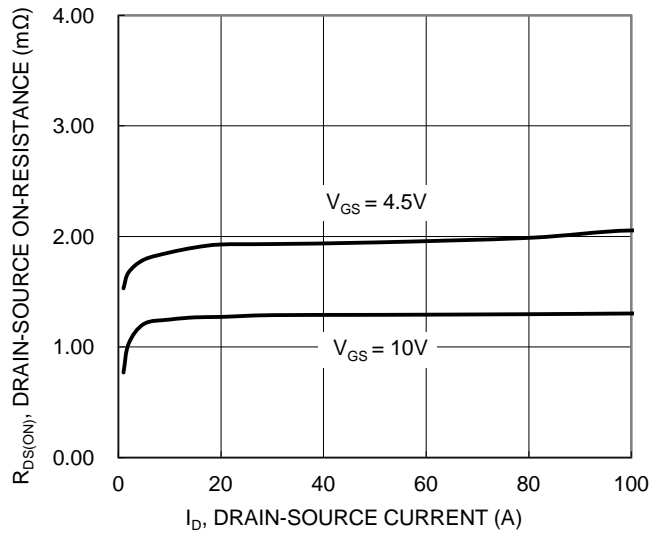


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

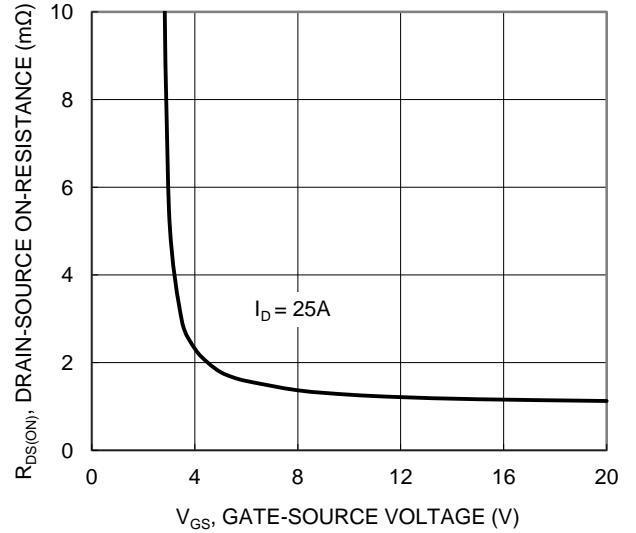


Figure 4. Typical Transfer Characteristic

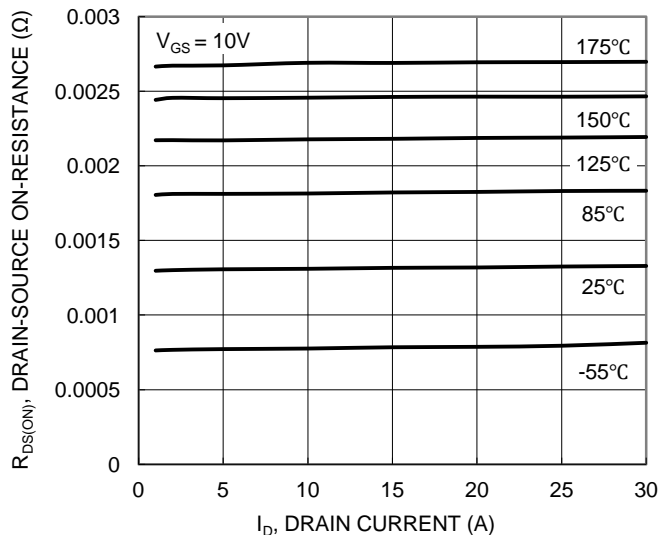


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

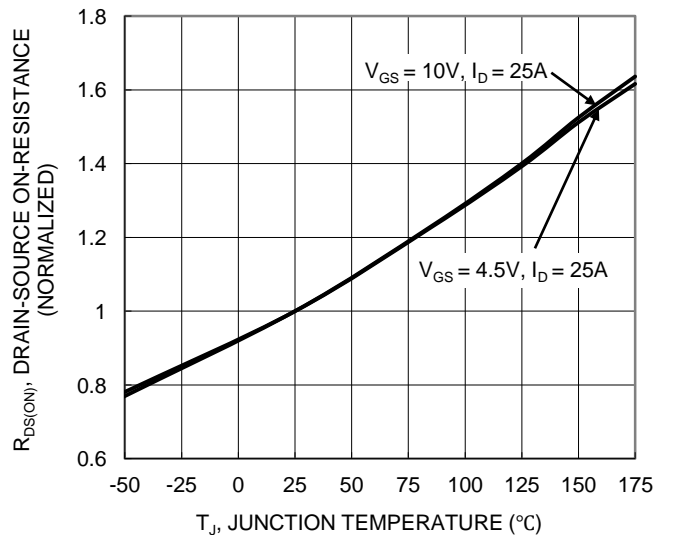
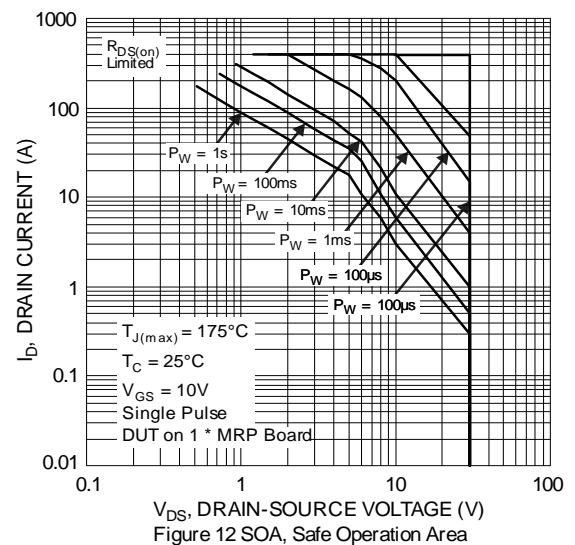
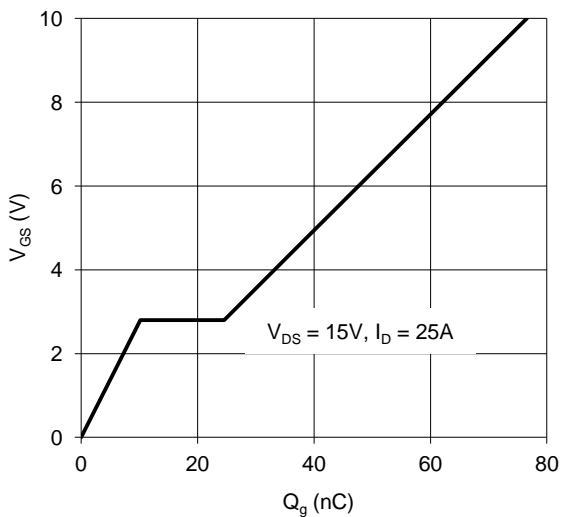
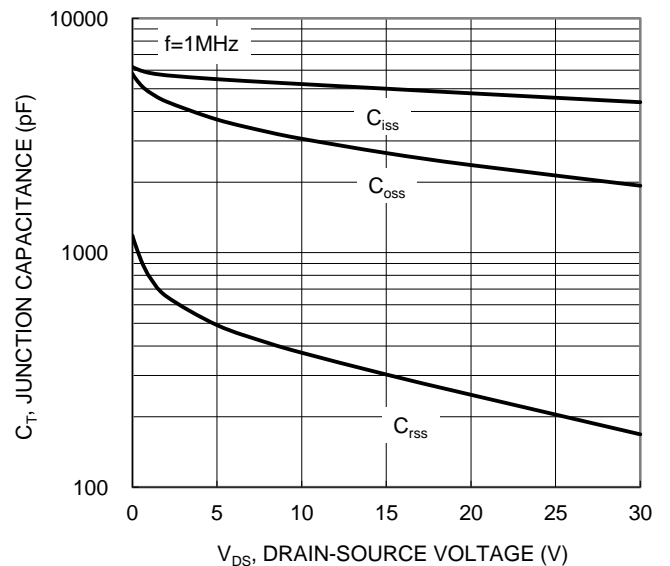
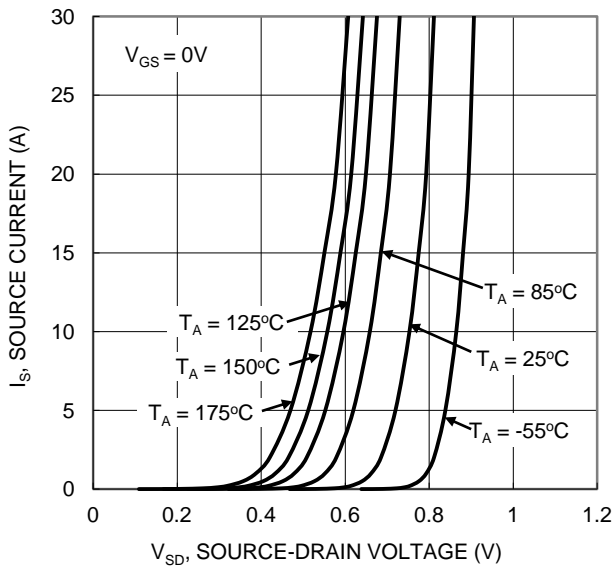
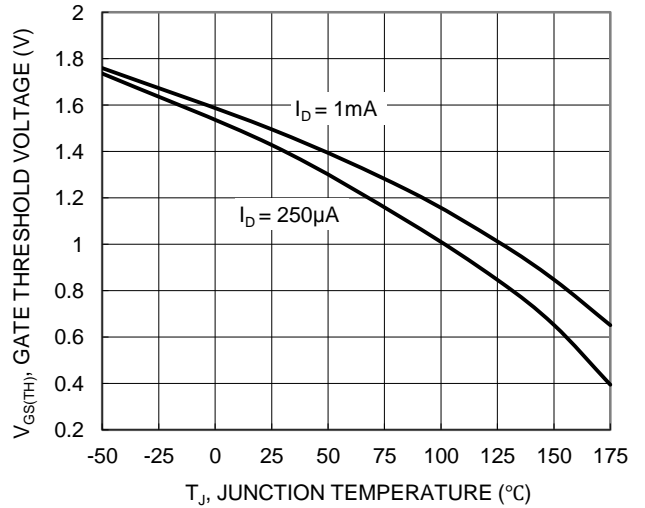
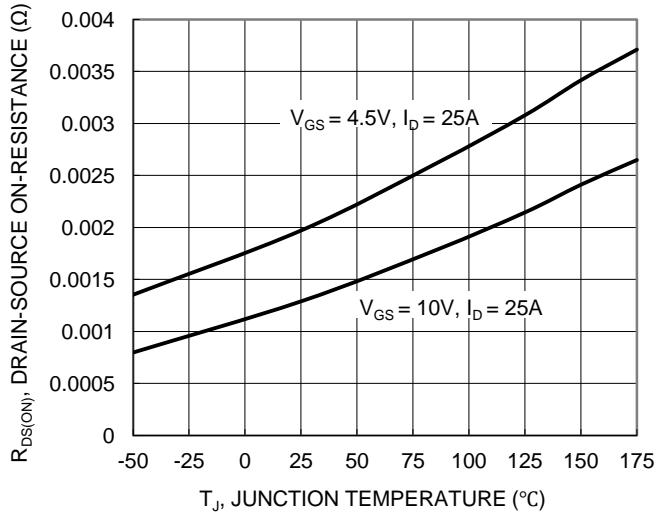


Figure 6. On-Resistance Variation with Temperature



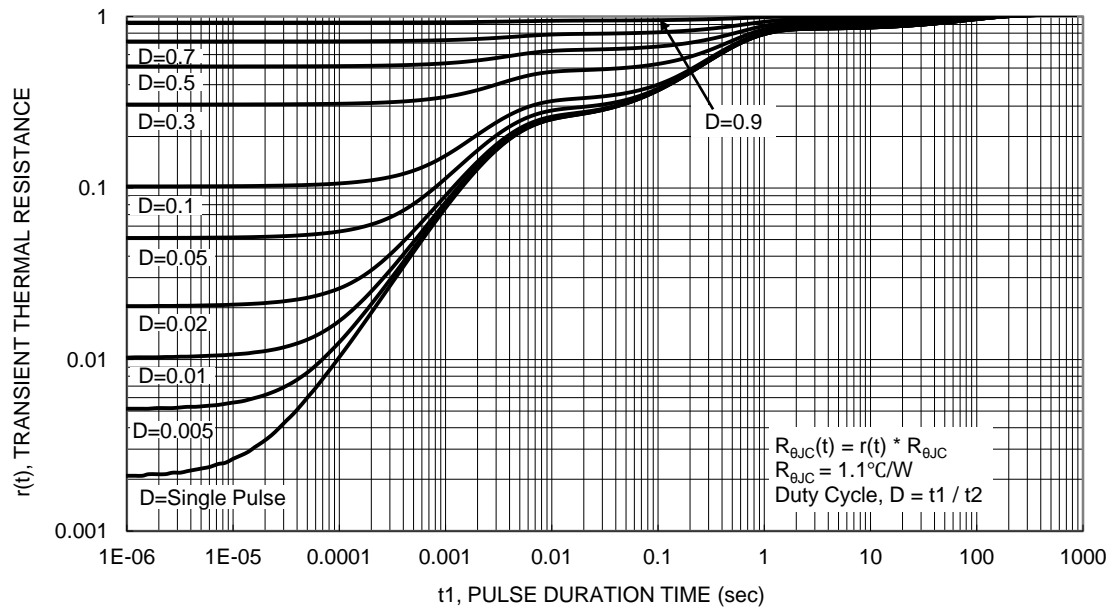
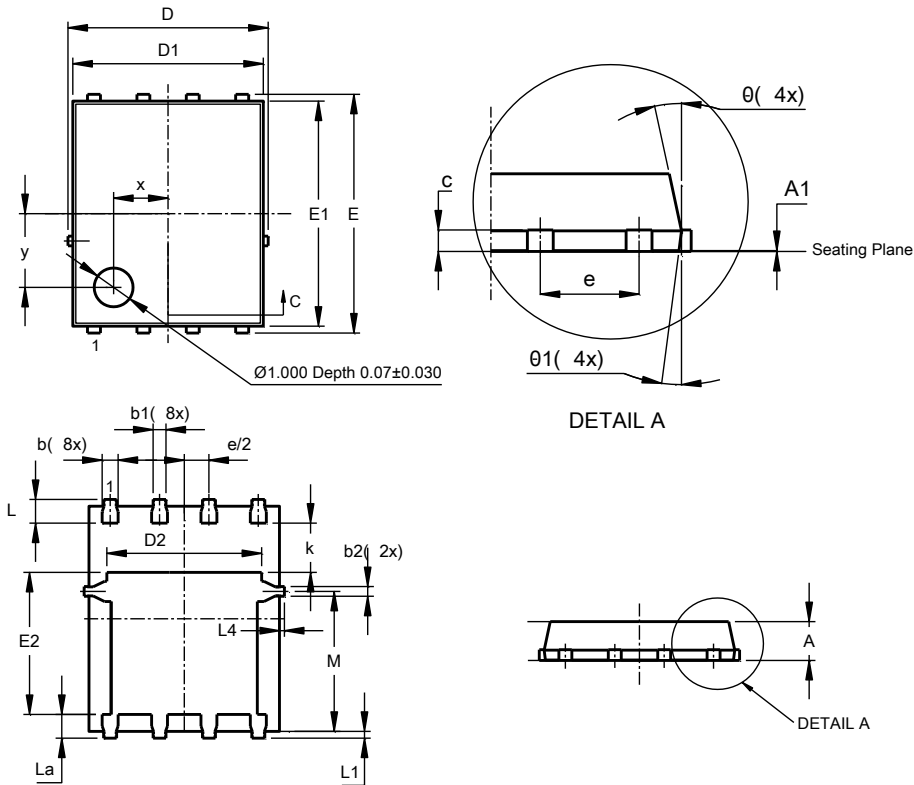


Figure 13. Transient Thermal Resistance

**Package Outline Dimensions**

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

**PowerDI5060-8 (Type K)**

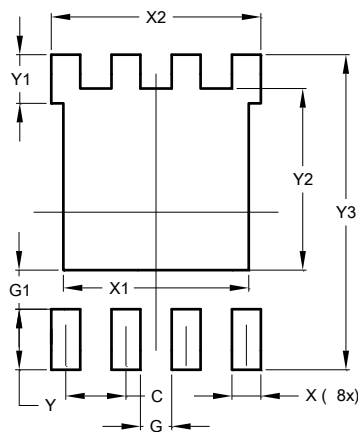


PowerDI5060-8 (Type K)			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0	0.05	0.02
b	0.33	0.51	0.41
b1	0.300	0.366	0.333
b2	0.20	0.35	0.25
c	0.23	0.33	0.277
D	5.15 BSC		
D1	4.85	4.95	4.90
D2	-	-	3.98
E	6.15 BSC		
E1	5.75	5.85	5.80
E2	3.56	3.725	3.66
E	1.27BSC		
k	-	-	1.27
L	0.51	0.71	0.61
La	0.51	0.675	0.61
L1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