

## Product Summary

<b>BV<sub>DSS</sub></b>	<b>R<sub>DS(ON)</sub> Max</b>	<b>I<sub>D</sub> T<sub>C</sub> = +25°C (Note 9)</b>
100V	4.3mΩ @ V <sub>GS</sub> = 10V	100A

## Features

- 100% Unclamped Inductive Switching (UIS) Test in Production Ensures More Reliable and Robust End Application
- High Conversion Efficiency
- Low R<sub>DS(ON)</sub>—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)**

## Description

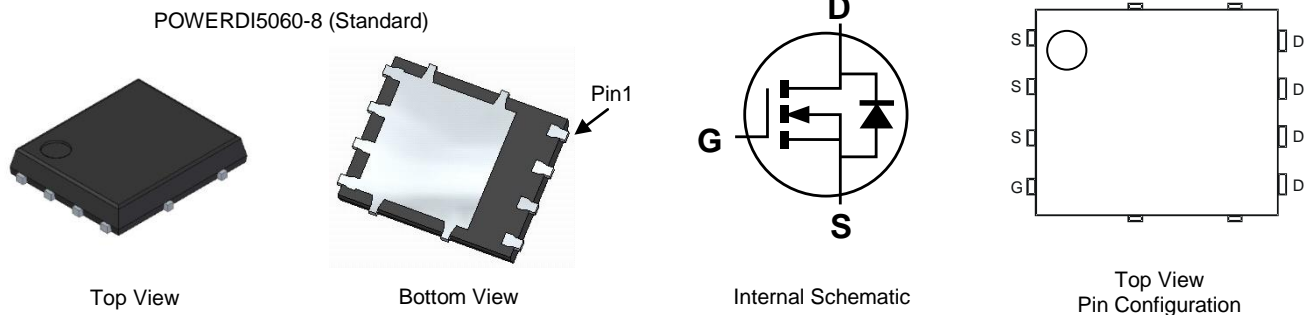
This new generation N-Channel enhancement mode MOSFET is designed to minimize R<sub>DS(ON)</sub> yet maintain superior switching performance. This device is ideal for use in notebook battery power management and load switch.

## Applications

- Motor Control
- DC-DC Converters
- Power Management

## Mechanical Data

- Case: POWERDI<sup>®</sup> 5060-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Diagram
- Terminals: Finish—Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 Ⓜ3
- Weight: 0.097 grams (Approximate)

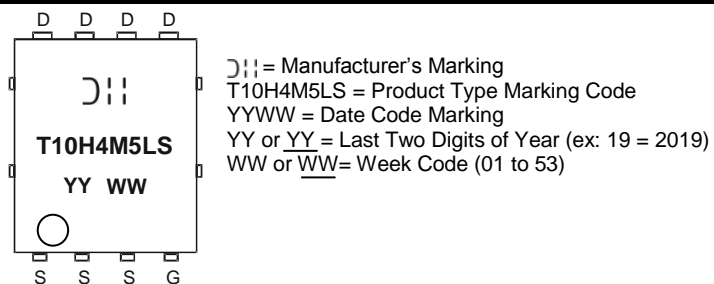


## Ordering Information (Note 4)

Part Number	Case	Packaging
DMTH10H4M5LPS-13	POWERDI5060-8 (Standard)	2500/Tape & Reel

- Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
  2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V <sub>DSS</sub>	100	V
Gate-Source Voltage			V <sub>GSS</sub>	±20	V
Continuous Drain Current, V <sub>GS</sub> = 10V (Note 5)	Steady State	T <sub>A</sub> = +25°C	I <sub>D</sub>	20	A
		T <sub>A</sub> = +100°C		14	
Continuous Drain Current, V <sub>GS</sub> = 10V (Note 6)	Steady State	T <sub>C</sub> = +25°C	I <sub>D</sub>	100	A
		T <sub>C</sub> = +100°C (Note 9)		100	
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I <sub>DM</sub>	400	A
Pulsed Body Diode Forward Current (10µs Pulse, T <sub>C</sub> =+25°C, Package Limited)			I <sub>SM</sub>	400	A
Maximum Continuous Body Diode Forward Current (Note 6)			I <sub>S</sub>	100	A
Avalanche Current (Note 7) L=0.3mH			I <sub>AS</sub>	40	A
Avalanche Energy (Note 7) L=0.3mH			E <sub>AS</sub>	240	mJ

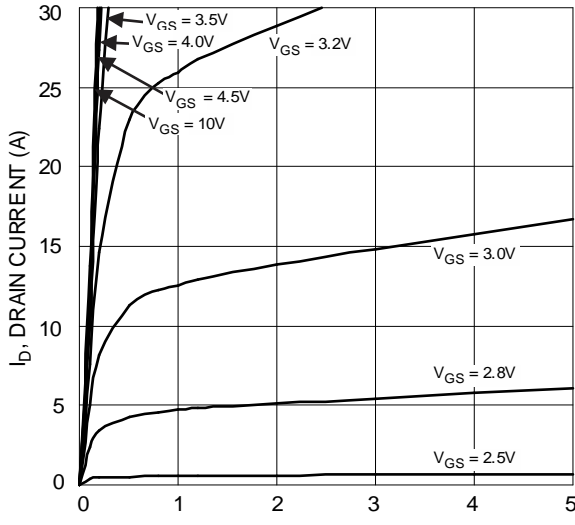
**Thermal Characteristics**

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T <sub>A</sub> = +25°C	P <sub>D</sub>	2.7	W
Thermal Resistance, Junction to Ambient (Note 5)		R <sub>θJA</sub>	54	°C/W
Total Power Dissipation (Note 6)	T <sub>C</sub> = +25°C	P <sub>D</sub>	136	W
Thermal Resistance, Junction to Case (Note 6)		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

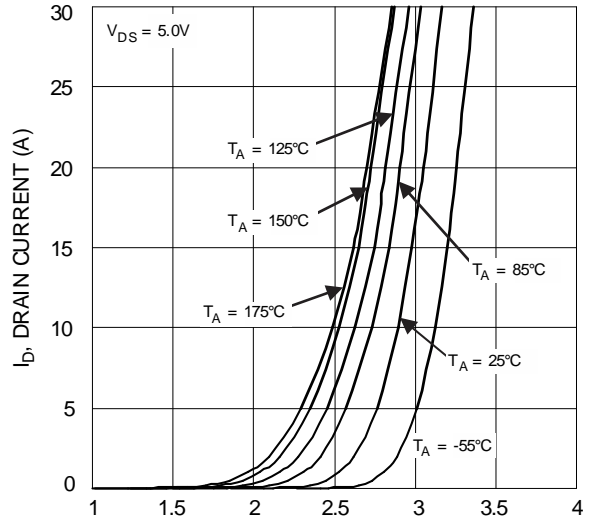
**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b> (Note 7)						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	100	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 10mA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1	µA	V <sub>DS</sub> = 80V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS</b> (Note 7)						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	1.3	—	2.5	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	3.5	4.3	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 30A
		—	4.7	6.2		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 20A
Diode Forward Voltage	V <sub>SD</sub>	—	—	1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 30A
<b>DYNAMIC CHARACTERISTICS</b> (Note 8)						
Input Capacitance	C <sub>ISS</sub>	—	4843	—	pF	V <sub>DS</sub> = 50V, V <sub>GS</sub> = 0V f = 1MHz
Output Capacitance	C <sub>OSS</sub>	—	1302	—		
Reverse Transfer Capacitance	C <sub>RSS</sub>	—	25.5	—		
Gate Resistance	R <sub>G</sub>	—	2.1	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge	Q <sub>G</sub>	—	80	—	nC	V <sub>DD</sub> = 50V, I <sub>D</sub> = 30A, V <sub>GS</sub> = 10V
Gate-Source Charge	Q <sub>GS</sub>	—	14	—		
Gate-Drain Charge	Q <sub>GD</sub>	—	18	—		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	9	—	ns	V <sub>DD</sub> = 50V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 30A, R <sub>G</sub> = 4.7Ω, R <sub>L</sub> = 1.1Ω
Turn-On Rise Time	t <sub>R</sub>	—	26	—		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	76	—		
Turn-Off Fall Time	t <sub>F</sub>	—	50	—		
Reverse Recovery Time	t <sub>RR</sub>	—	63	—	ns	I <sub>F</sub> = 22.5A, di/dt = 100A/µs
Reverse Recovery Charge	Q <sub>RR</sub>	—	133	—	nC	

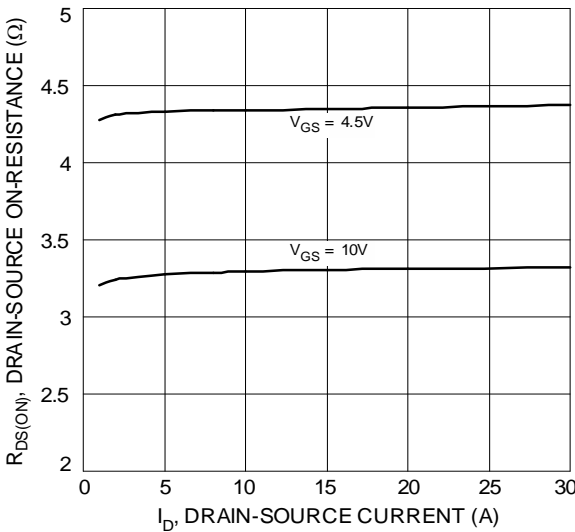
- Notes:
- Device mounted on FR-4 PCB, with minimum recommended pad layout, single sided.
  - Thermal resistance from junction to soldering point (on the exposed drain pad).
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.
  - Package limited.



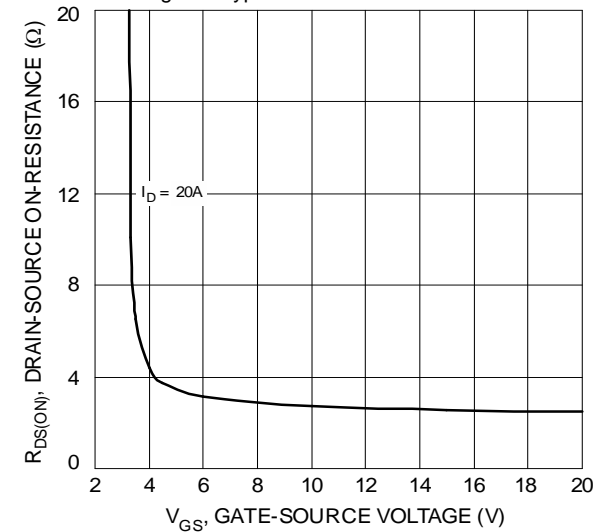
$V_{DS}$ , DRAIN-SOURCE VOLTAGE (V)  
Figure 1 Typical Output Characteristic



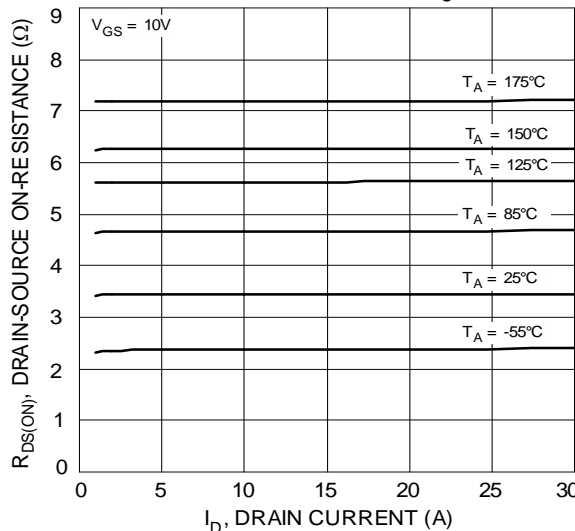
$V_{GS}$ , GATE-SOURCE VOLTAGE (V)  
Figure 2 Typical Transfer Characteristics



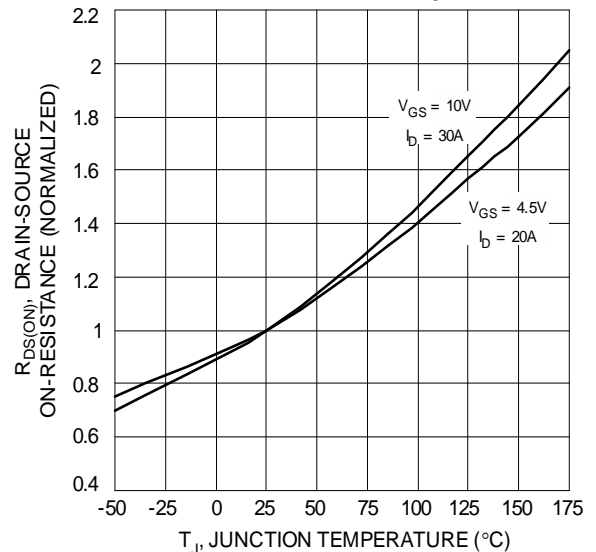
$I_D$ , DRAIN-SOURCE CURRENT (A)  
Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage



$V_{GS}$ , GATE-SOURCE VOLTAGE (V)  
Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage



$I_D$ , DRAIN CURRENT (A)  
Figure 5 Typical On-Resistance vs. Drain Current and Temperature



$T_J$ , JUNCTION TEMPERATURE ( $^{\circ}C$ )  
Figure 6 On-Resistance Variation with Temperature

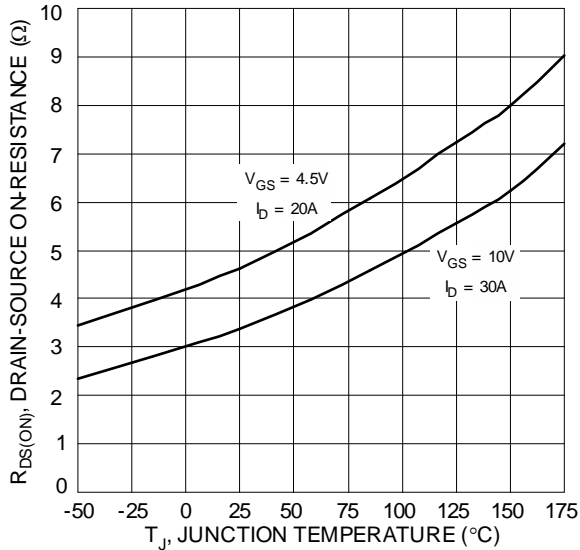


Figure 7 On-Resistance Variation with Temperature

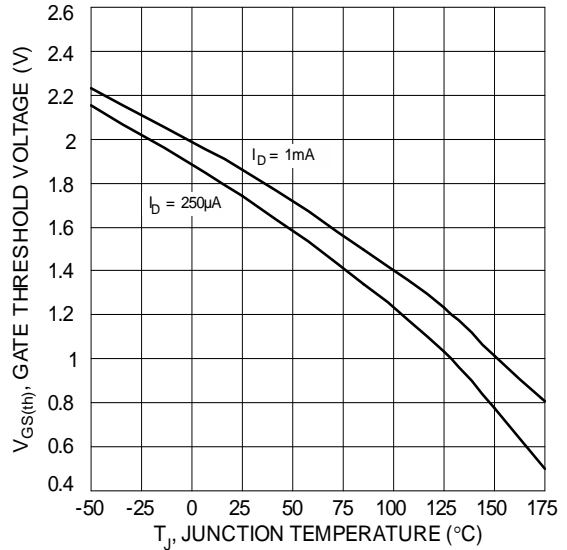


Figure 8 Gate Threshold Variation vs. Junction Temperature

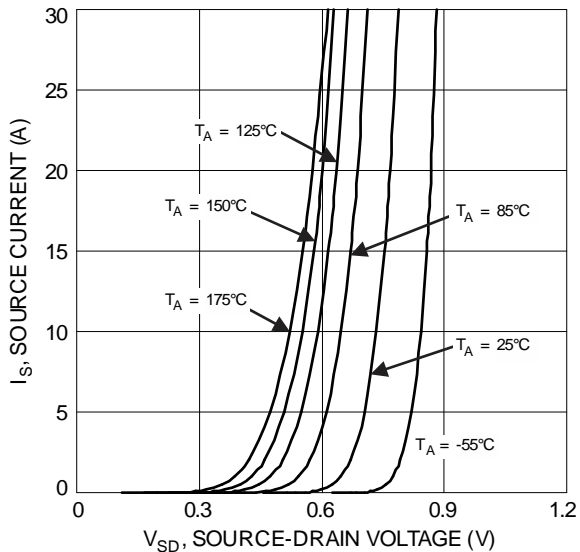


Figure 9 Diode Forward Voltage vs. Current

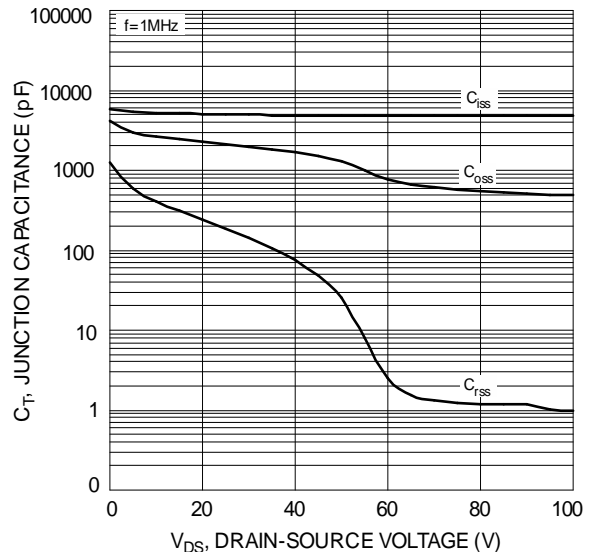


Figure 10 Typical Junction Capacitance

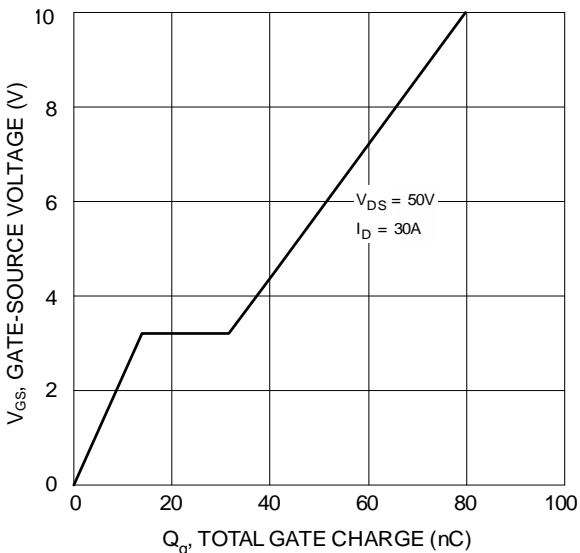


Figure 11 Gate Charge

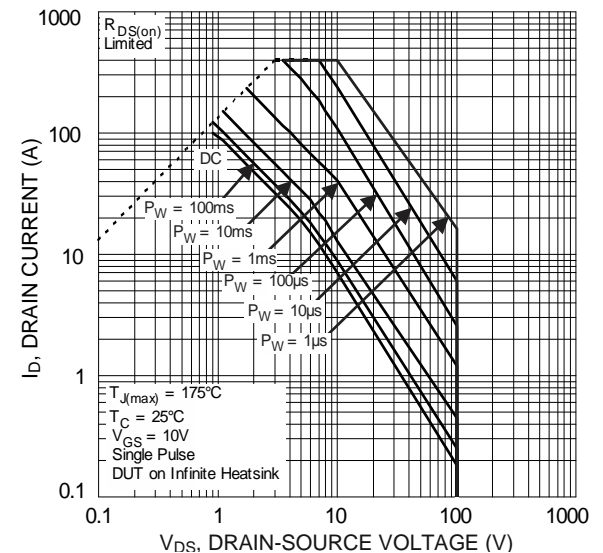
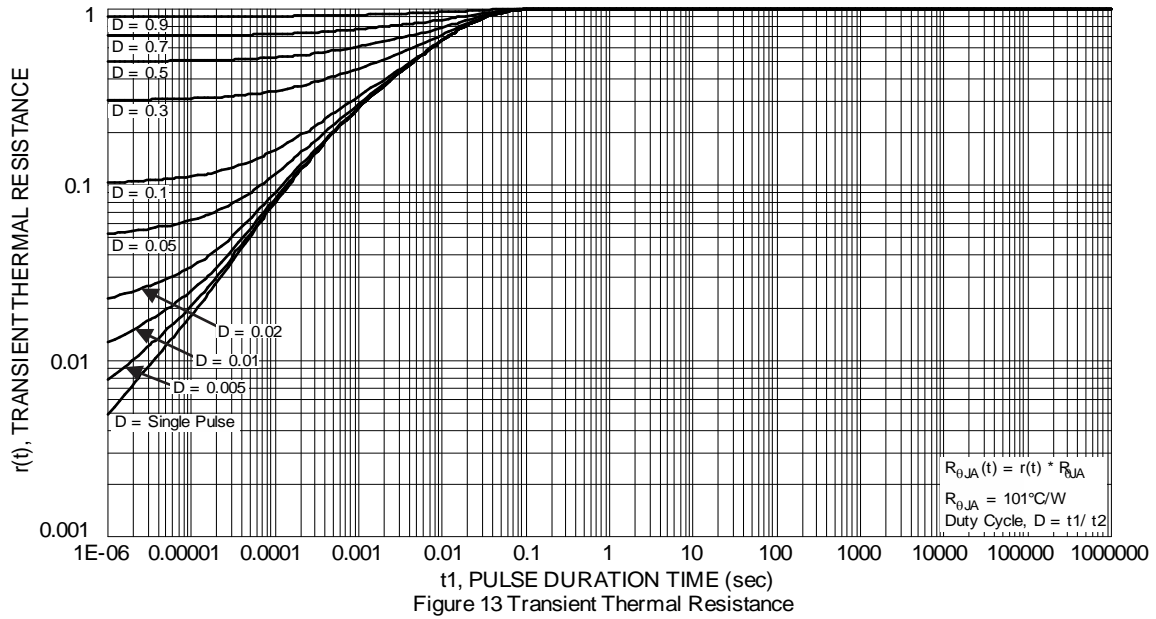


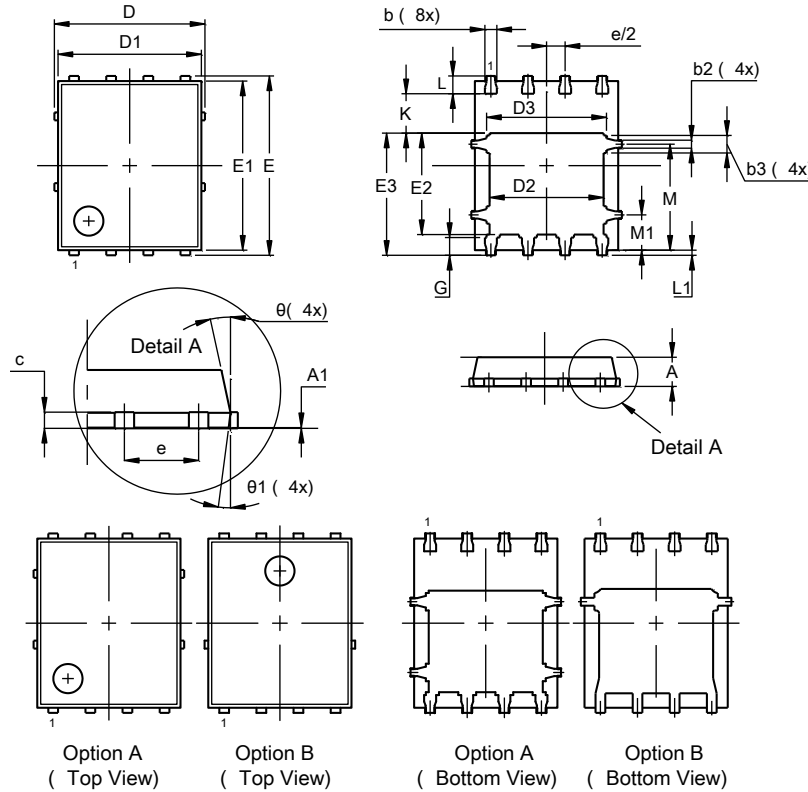
Figure 12 SOA, Safe Operation Area



**Package Outline Dimensions**

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

**POWERDI5060-8 (Standard)**

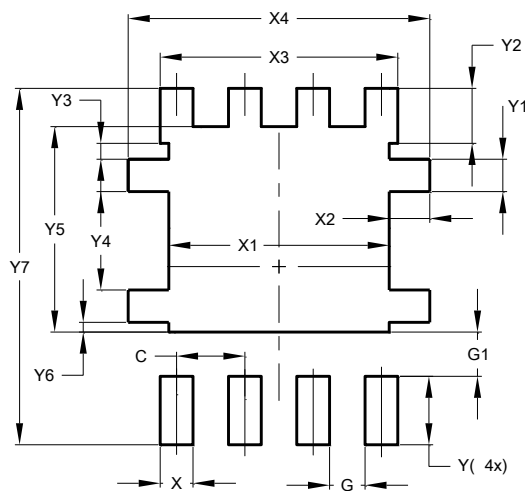


POWERDI5060-8 (Standard)			
Dim	Min	Max	Typ
A	0.90	1.20	--
A1	0.00	0.05	--
b	0.33	0.51	--
b2	0.200	0.350	--
b3	0.40	0.80	0.60
c	0.230	0.354	--
D (Option A)	5.15 BSC		
D (Option B)	5.30 BSC		
D1	4.70	5.40	--
D2	3.70	4.25	--
D3	3.90	4.70	--
E	6.15 BSC		
E1	5.60	6.06	--
E2	3.28	3.92	--
E3	3.99	4.39	--
e	1.27 BSC		
G	0.40	0.71	--
K	0.51	1.45	--
L	0.38	0.71	--
L1	0.100	0.200	--
M	3.235	4.035	--
M1	1.00	1.40	1.21
θ	8°	12°	--
θ1	6°	8°	7°
<b>All Dimensions in mm</b>			

**Suggested Pad Layout**

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

**POWERDI5060-8 (Standard)**



Dimensions	Value (in mm)
C	1.270
G	0.660
G1	0.820
X	0.610
X1	4.300
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	4.100
Y6	0.180
Y7	6.610

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