

Product Summary

BV_{DSS}	R_{DS(ON)} Max	I_D T_C = +25°C (Note 9)
100V	4.3mΩ @ V _{GS} = 10V	100A

Features

- 100% Unclamped Inductive Switching (UIS) Test in Production Ensures More Reliable and Robust End Application
- 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)**

Description

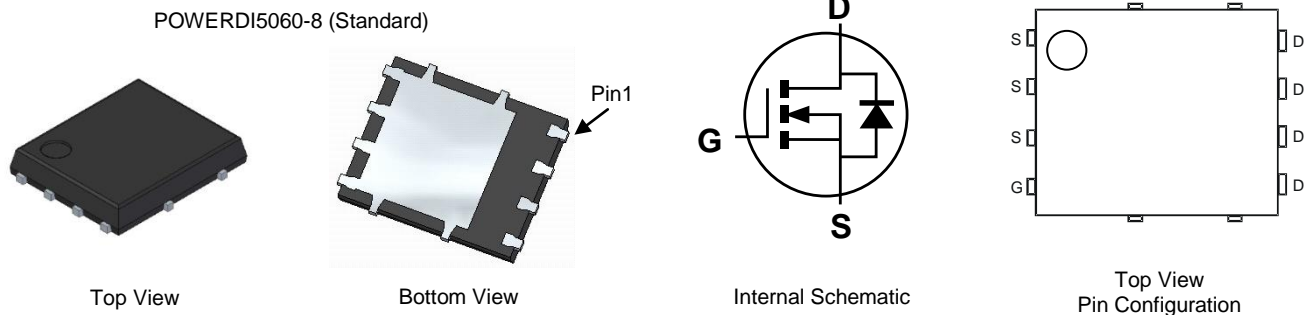
This new generation N-Channel enhancement mode MOSFET is designed to minimize R_{DS(ON)} yet maintain superior switching performance. This device is ideal for use in notebook battery power management and load switch.

Applications

- Motor Control
- DC-DC Converters
- Power Management

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 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)

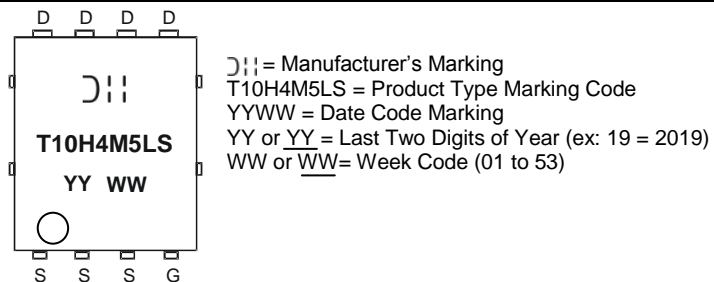


Ordering Information (Note 4)

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_A = +25°C, unless otherwise specified.)

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

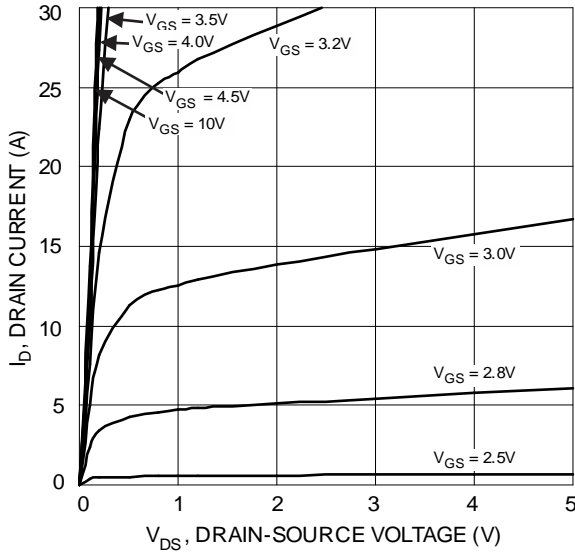
Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T _A = +25°C	P _D	2.7	W
Thermal Resistance, Junction to Ambient (Note 5)		R _{θJA}	54	°C/W
Total Power Dissipation (Note 6)	T _C = +25°C	P _D	136	W
Thermal Resistance, Junction to Case (Note 6)		R _{θJC}	1.1	°C/W
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +175	°C

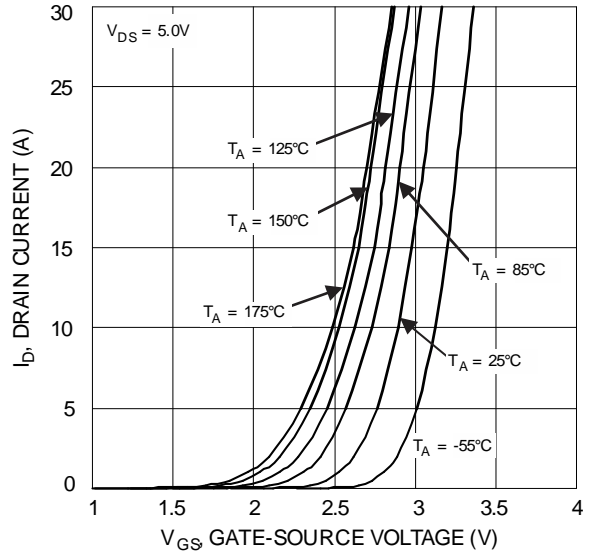
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

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

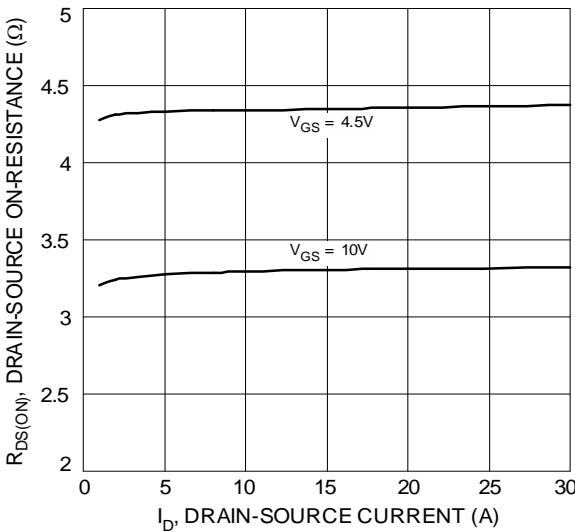
- Notes:
- Device mounted on FR-4 PCB, with minimum recommended pad layout, single sided.
 - Thermal resistance from junction to soldering point (on the exposed drain pad).
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.
 - Package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



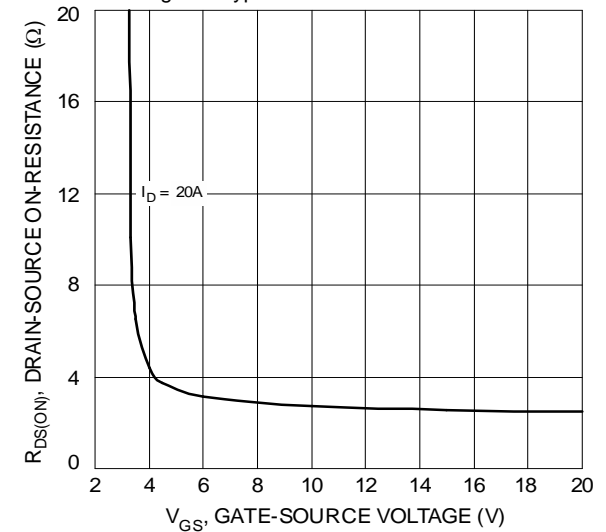
V_{DS} , DRAIN-SOURCE VOLTAGE (V)
Figure 1 Typical Output Characteristic



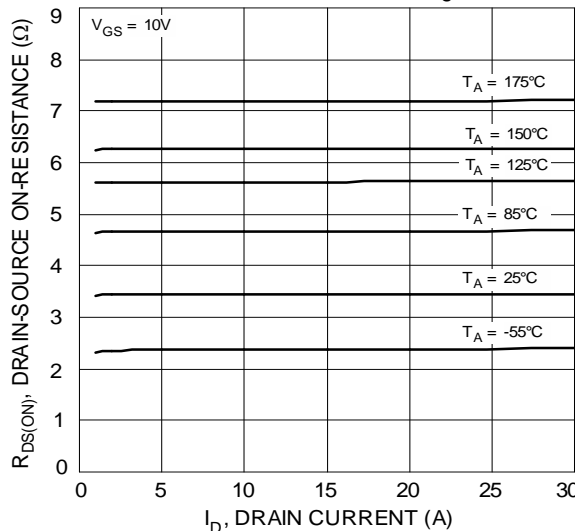
V_{GS} , GATE-SOURCE VOLTAGE (V)
Figure 2 Typical Transfer Characteristics



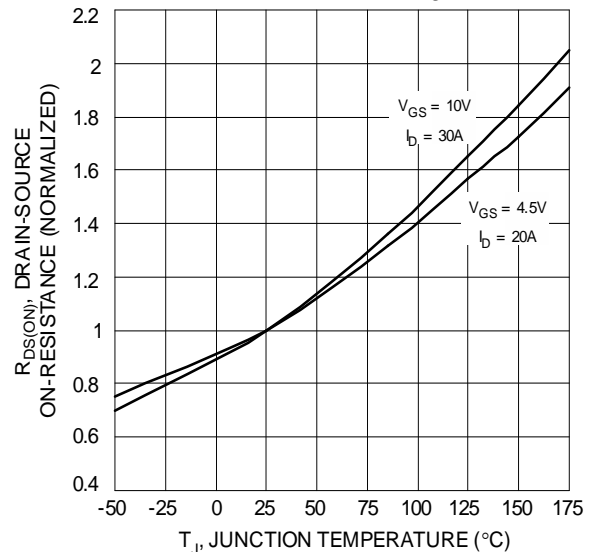
I_D , DRAIN-SOURCE CURRENT (A)
Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage



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

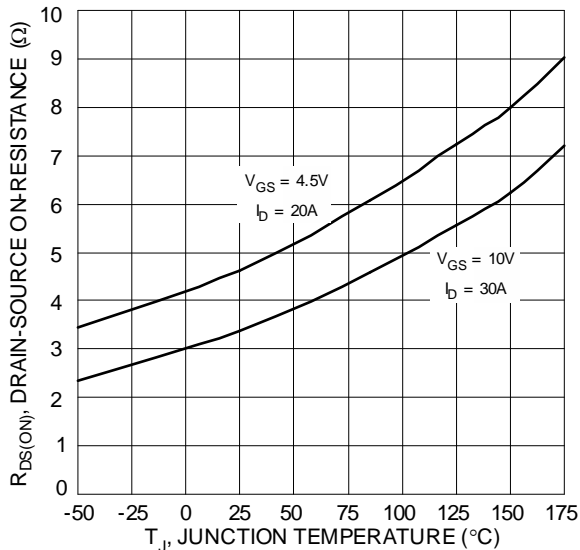


Figure 7 On-Resistance Variation with Temperature

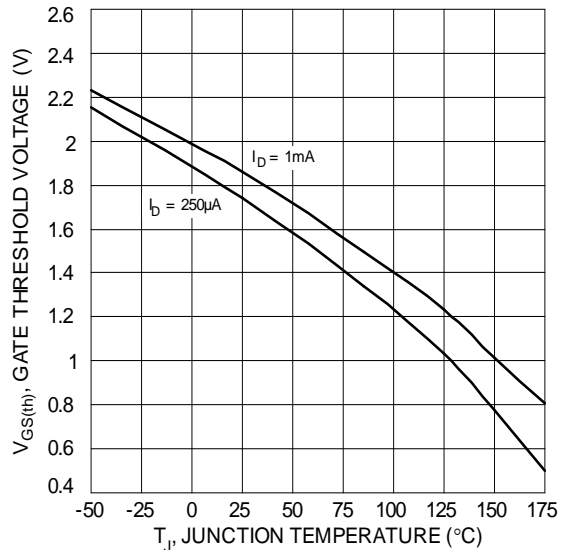


Figure 8 Gate Threshold Variation vs. Junction Temperature

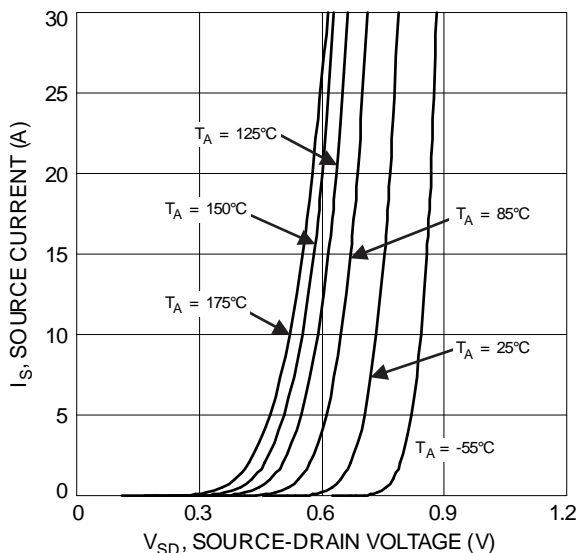


Figure 9 Diode Forward Voltage vs. Current

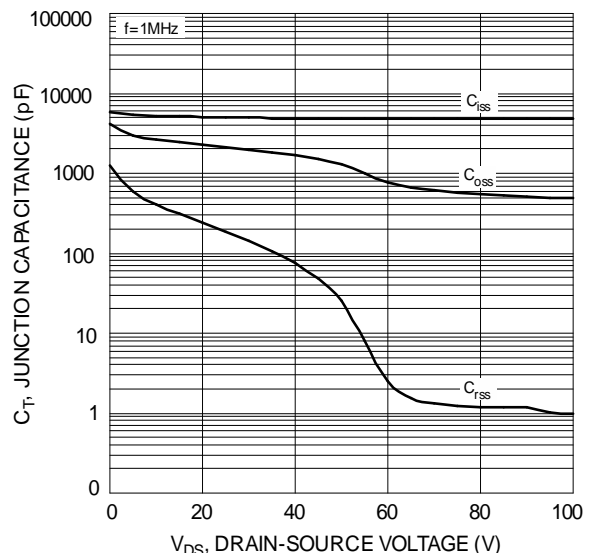


Figure 10 Typical Junction Capacitance

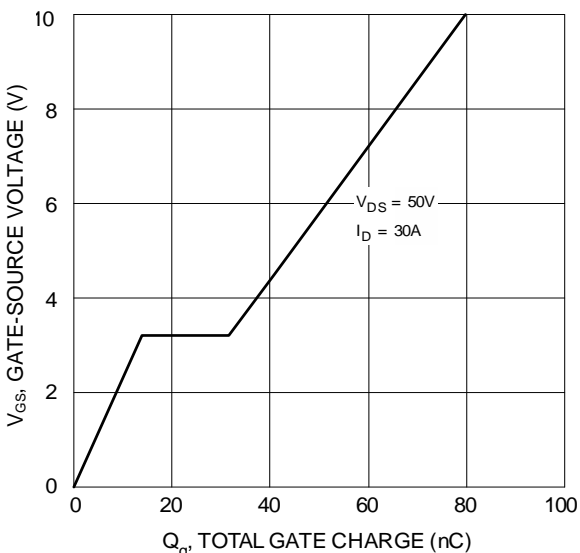


Figure 11 Gate Charge

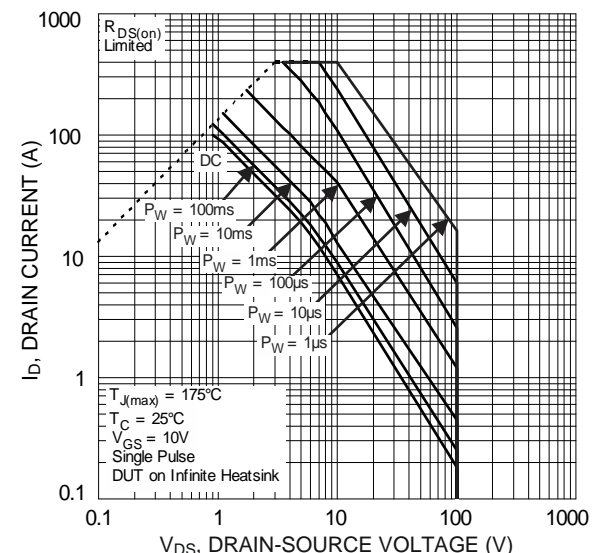
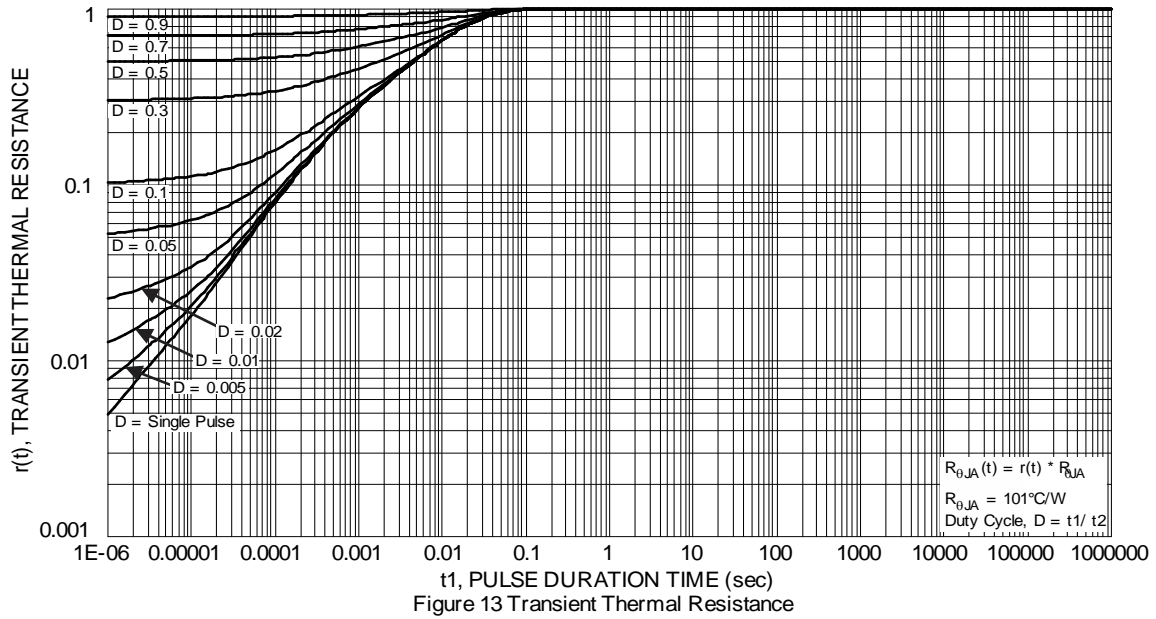


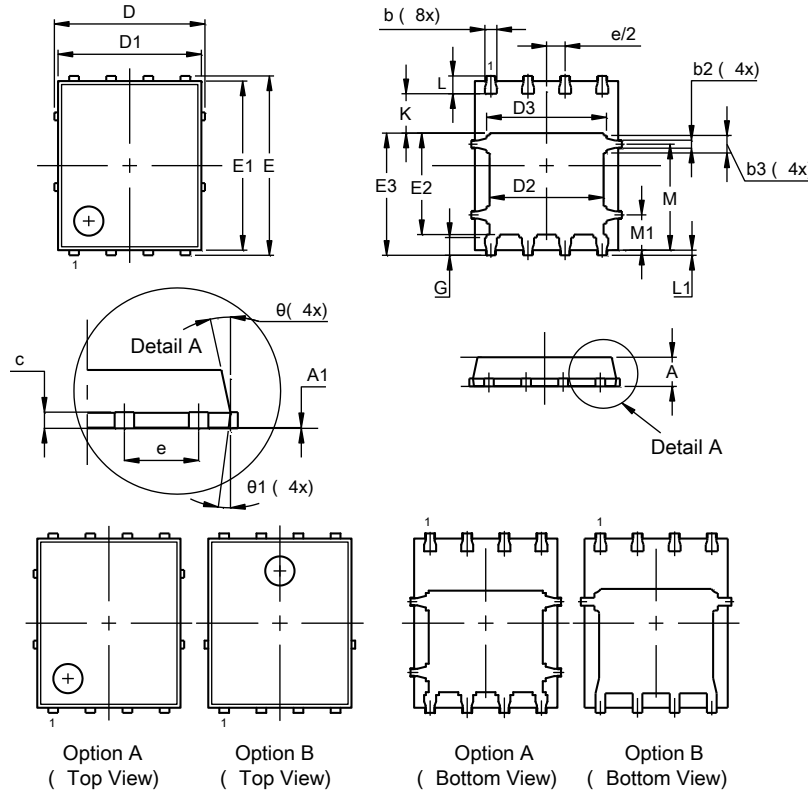
Figure 12 SOA, Safe Operation Area



Package Outline Dimensions

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

POWERDI5060-8 (Standard)

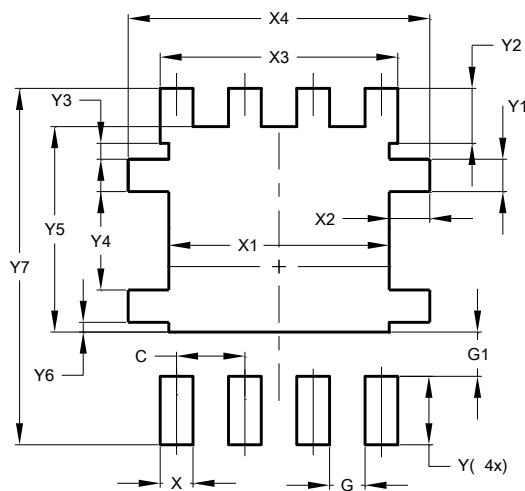


POWERDI5060-8 (Standard)			
Dim	Min	Max	Typ
A	0.90	1.20	--
A1	0.00	0.05	--
b	0.33	0.51	--
b2	0.200	0.350	--
b3	0.40	0.80	0.60
c	0.230	0.354	--
D (Option A)	5.15 BSC		
D (Option B)	5.30 BSC		
D1	4.70	5.40	--
D2	3.70	4.25	--
D3	3.90	4.70	--
E	6.15 BSC		
E1	5.60	6.06	--
E2	3.28	3.92	--
E3	3.99	4.39	--
e	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
theta	8°	12°	--
theta1	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 (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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