

## Product Summary

BV <sub>DSS</sub>	R <sub>DS(ON)</sub> Max	I <sub>D</sub> T <sub>C</sub> = +25°C
60V	4.4mΩ @ V <sub>GS</sub> = 10V	100A
	6.4mΩ @ V <sub>GS</sub> = 4.5V	85A

## Description and Applications

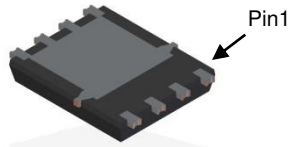
This MOSFET is designed to minimize the on-state resistance (R<sub>DS(ON)</sub>) yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

- High Frequency Switching
- Synchronous Rectification
- DC-DC Converters

PowerDI5060-8 (SWP) (Standard)



Top View



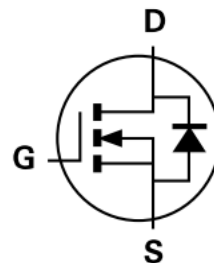
Bottom View

## Features

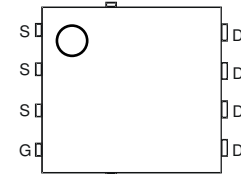
- 100% Unclamped Inductive Switching (UIS) Test in Production — Ensures More Reliable and Robust End Application
- High Conversion Efficiency
- Low R<sub>DS(ON)</sub> — Minimizes Power Losses
- Low Q<sub>G</sub> — Minimizes Switching Losses
- Wettable Flank for Improved Optical Inspection
- Fast Switching Speed
- Low Input Capacitance
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

## 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 Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.097 grams (Approximate)



Internal Schematic



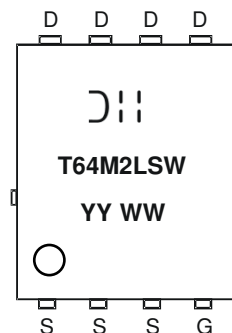
Top View  
Pin Configuration

## Ordering Information (Note 4)

Part Number	Case	Packaging
DMT64M2LPSW-13	PowerDI5060-8 (SWP) (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



☺|| = Manufacturer's Marking  
 T64M2LSW = Product Type Marking Code  
 YYWW or YYWW = Date Code Marking  
 YY or YY = Year (ex: 20 = 2020)  
 WW = Week (01 to 53)

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V <sub>DSS</sub>	60	V
Gate-Source Voltage			V <sub>GSS</sub>	±20	V
Continuous Drain Current (Note 5)	Steady State	T <sub>A</sub> = +25°C	I <sub>D</sub>	20.7	A
		T <sub>A</sub> = +70°C		16.6	
Continuous Drain Current (Note 6)		T <sub>C</sub> = +25°C	I <sub>D</sub>	100	A
		T <sub>C</sub> = +70°C		82	
Maximum Continuous Body Diode Forward Current (Note 6)			I <sub>S</sub>	100	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I <sub>DM</sub>	400	A
Pulsed Body Diode Forward Current (10µs Pulse, Duty Cycle = 1%)			I <sub>SM</sub>	400	A
Avalanche Current, L = 1mH			I <sub>AS</sub>	18.2	A
Avalanche Energy, L = 1mH			E <sub>AS</sub>	165.6	mJ

**Thermal Characteristics**

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T <sub>A</sub> = +25°C	P <sub>D</sub>	2.8	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R <sub>θJA</sub>	44	°C/W
Total Power Dissipation (Note 6)	T <sub>C</sub> = +25°C	P <sub>D</sub>	83.3	W
Thermal Resistance, Junction to Case (Note 6)		R <sub>θJC</sub>	1.5	°C/W
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°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>	60	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 1mA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1	µA	V <sub>DS</sub> = 48V, 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>	1.2	—	2.5	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA
Static Drain-Source On-Resistance	R <sub>DSON</sub>	—	3.3	4.4	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 50A
		—	4.7	6.4		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 12.5A
Diode Forward Voltage	V <sub>SD</sub>	—	0.8	1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 50A
<b>DYNAMIC CHARACTERISTICS</b> (Note 8)						
Input Capacitance	C <sub>ISS</sub>	—	2799	—	pF	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V, f = 1MHz
Output Capacitance	C <sub>OSS</sub>	—	950	—		
Reverse Transfer Capacitance	C <sub>RSS</sub>	—	79	—		
Gate Resistance	R <sub>G</sub>	—	0.63	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>G</sub>	—	46.7	—	nC	V <sub>DD</sub> = 30V, I <sub>D</sub> = 50A
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Q <sub>G</sub>	—	24.1	—		
Gate-Source Charge	Q <sub>GS</sub>	—	8.2	—		
Gate-Drain Charge	Q <sub>GD</sub>	—	11.0	—		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	6.5	—	ns	V <sub>DD</sub> = 30V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 30A, R <sub>G</sub> = 3.3Ω
Turn-On Rise Time	t <sub>R</sub>	—	6.9	—		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	26.1	—		
Turn-Off Fall Time	t <sub>F</sub>	—	11.2	—		
Body Diode Reverse Recovery Time	t <sub>RR</sub>	—	40.1	—	ns	I <sub>F</sub> = 30A, di/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q <sub>RR</sub>	—	51.1	—	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.

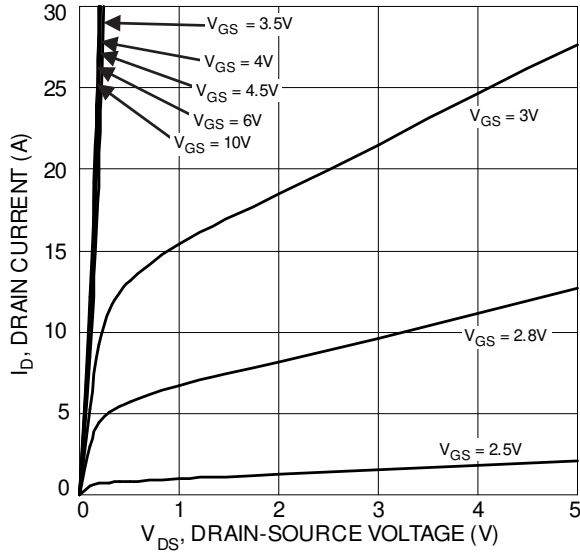


Figure 1 Typical Output Characteristic

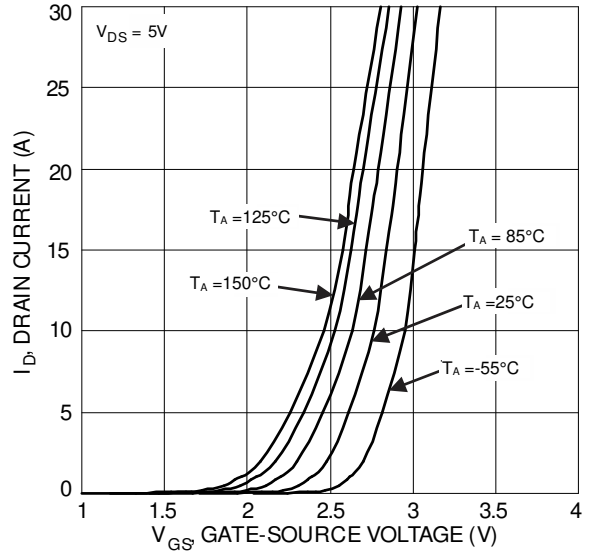


Figure 2 Typical Transfer Characteristics

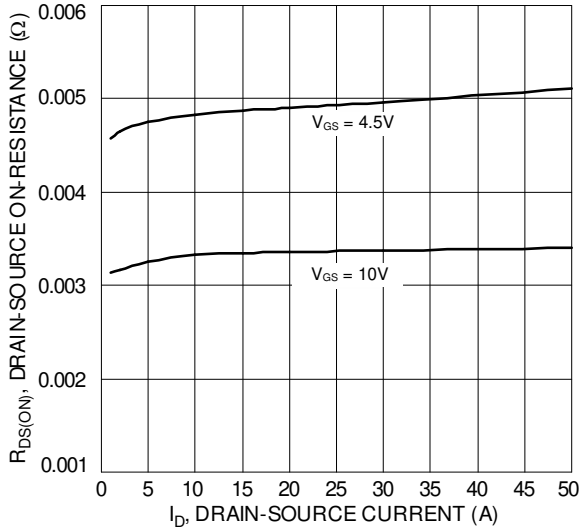


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

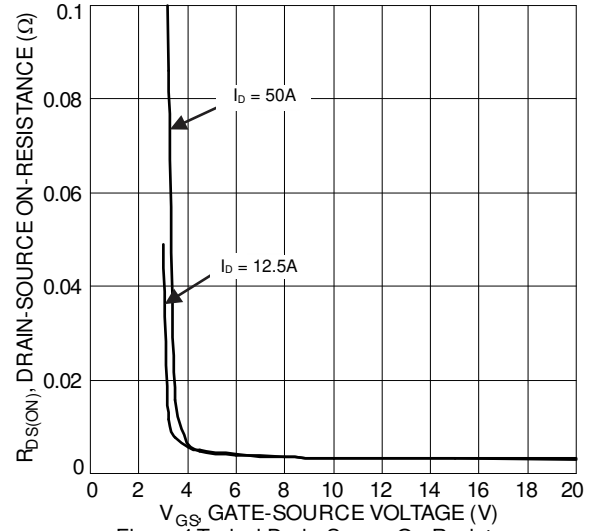


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

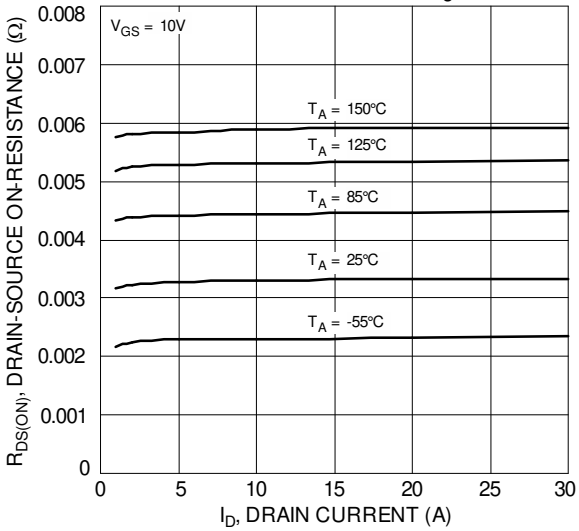


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

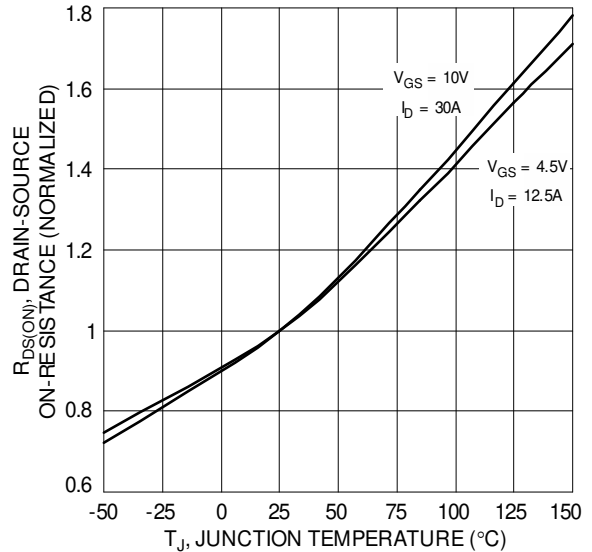


Figure 6 On-Resistance Variation with Temperature

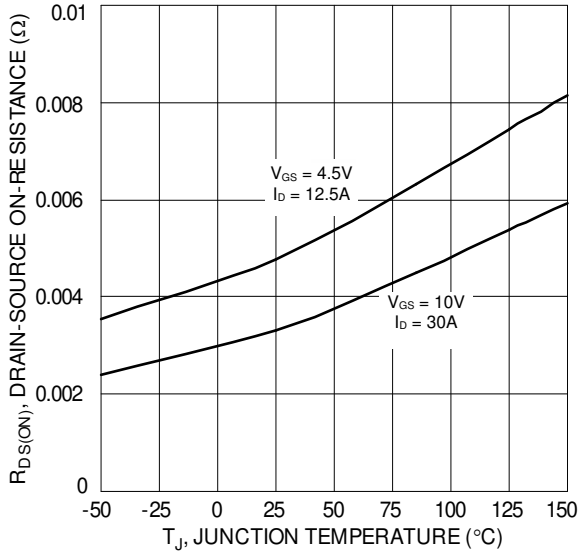


Figure 7 On-Resistance Variation with Temperature

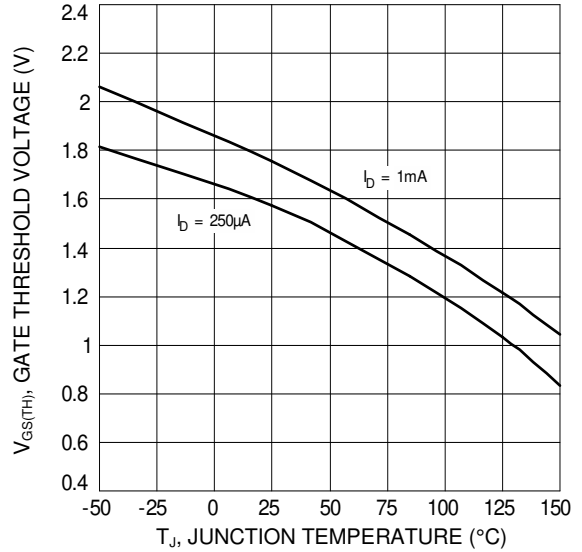


Figure 8 Gate Threshold Variation vs. Junction Temperature

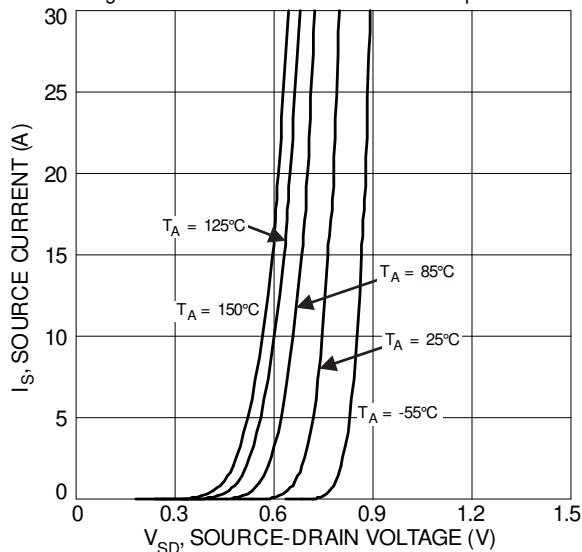


Figure 9 Diode Forward Voltage vs. Current

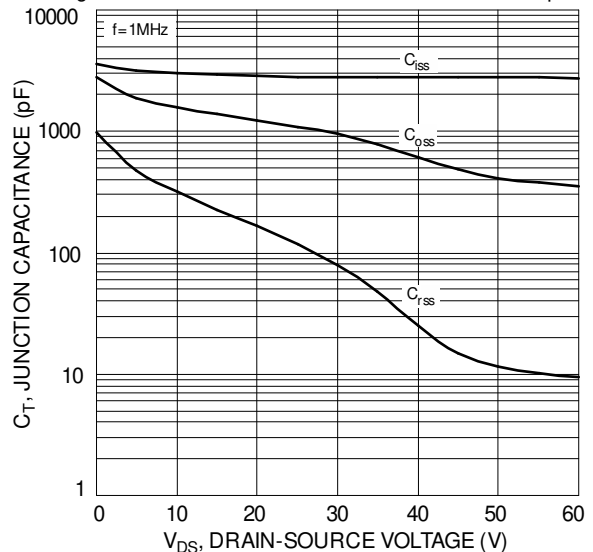


Figure 10 Typical Junction Capacitance

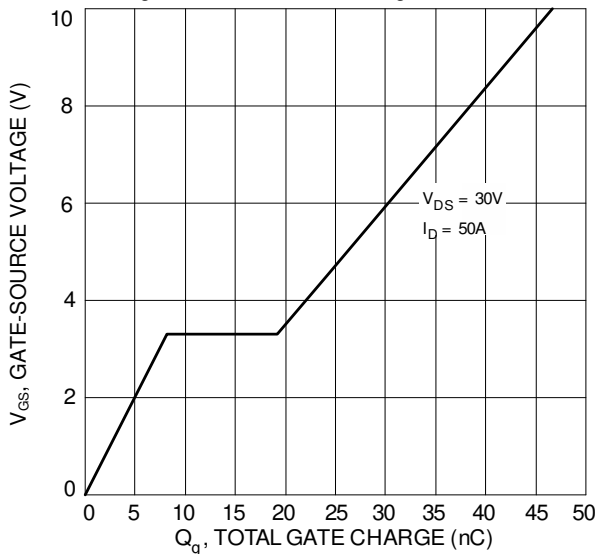


Figure 11 Gate Charge

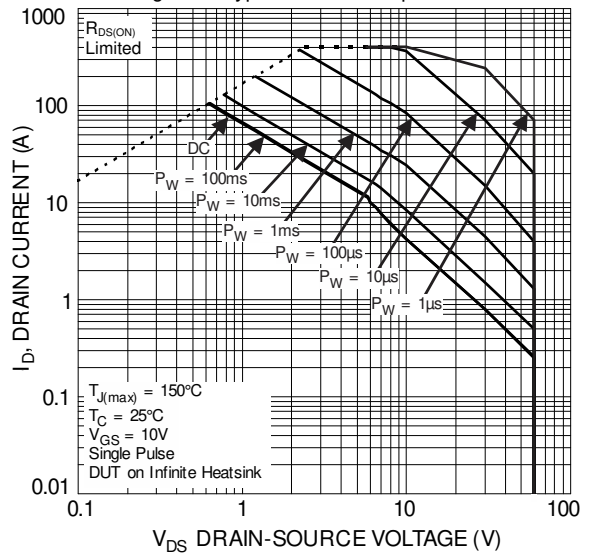
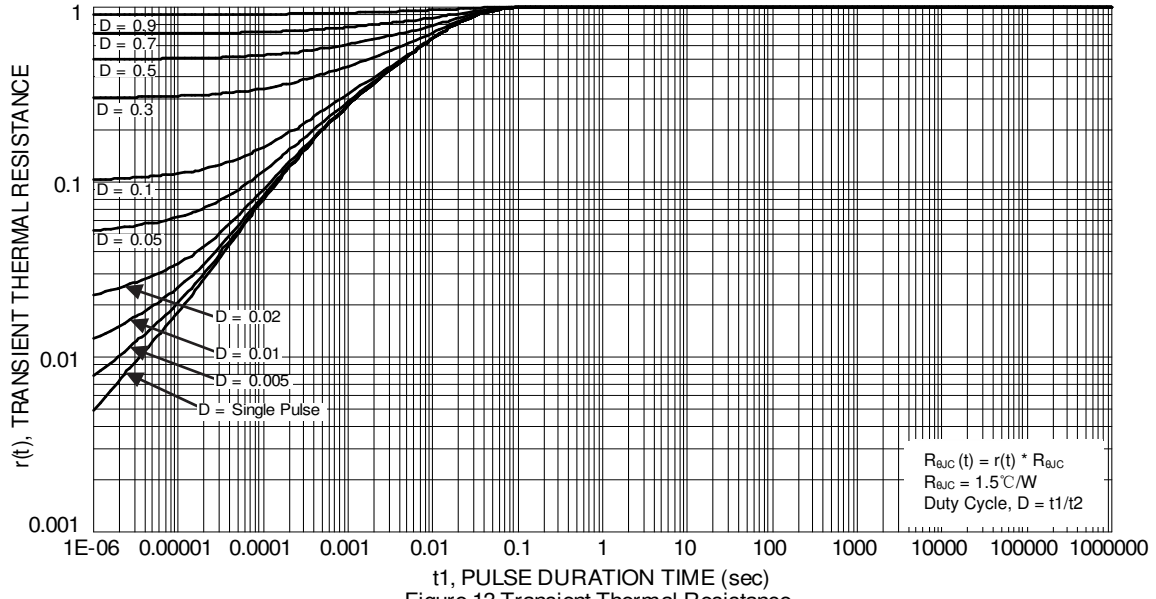


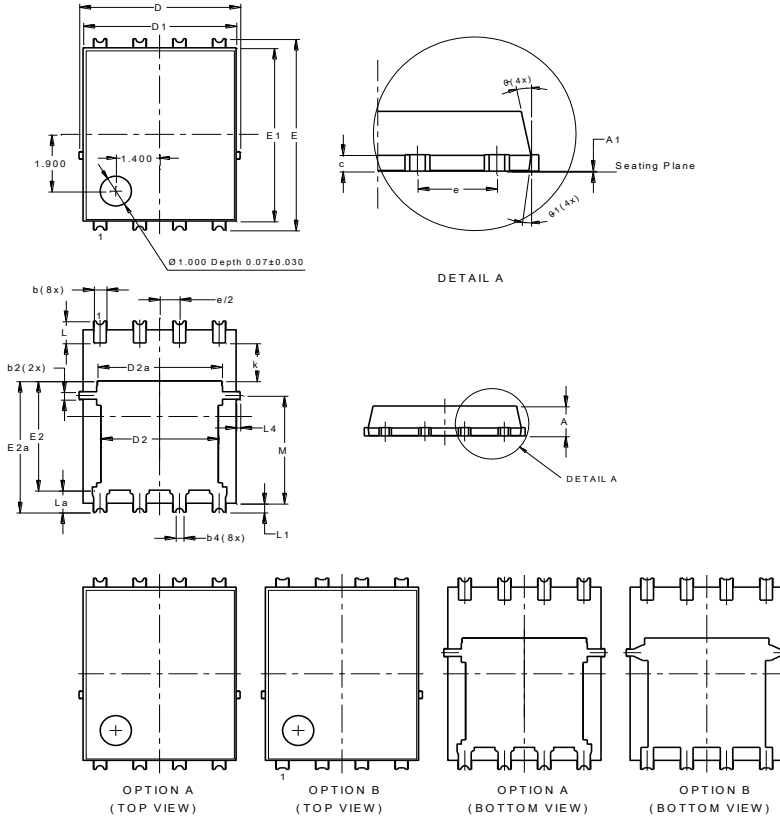
Figure 12 SOA, Safe Operation Area



**Package Outline Dimensions**

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

**PowerDI5060-8 (SWP) (Standard)**

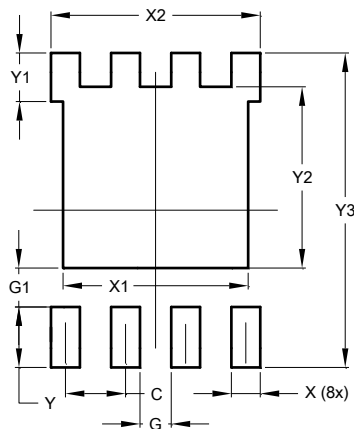


PowerDI5060-8 (SWP) (Standard)			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0	0.05	--
b	0.30	0.50	0.41
b2	0.20	0.35	0.25
b4	0.25REF		
c	0.230	0.330	0.277
D	5.15 BSC		
D1	4.70	5.10	4.90
D2	3.56	3.96	3.76
D2a	3.78	4.18	3.98
E	6.40 BSC		
E1	5.60	6.00	5.80
E2	3.46	3.86	3.66
E2a	4.195	4.595	4.395
e	1.27BSC		
k	1.05	--	--
L	0.635	0.835	0.735
La	0.635	0.835	0.735
L1	0.200	0.400	0.300
L4	0.025	0.225	0.125
M	3.205	4.005	3.605
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 (SWP) (Standard)**



Dimensions	Value (in mm)
C	1.270
G	0.660
G1	0.820
X	0.610
X1	4.100
X2	4.420
Y	1.270
Y1	1.020
Y2	3.810
Y3	6.610

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