

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _c = +25°C
60V	1.6mΩ @ V _{GS} = 10V	225A
	2.8mΩ @ V _{GS} = 4.5V	180A

Description and Applications

This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP, and is ideal for use in:

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

Features

- Rated to +175°C – Ideal for High Ambient Temperature Environments
- 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)**
- **The DMTH61M8LPSQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**
<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 Connections: See Diagram Below
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.097 grams (Approximate)

PowerDI5060-8 (Type K)

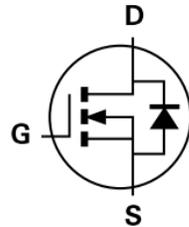


Top View

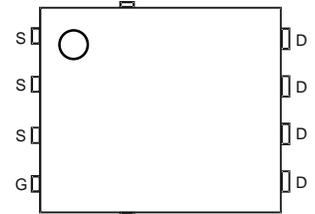


Pin1

Bottom View



Internal Schematic



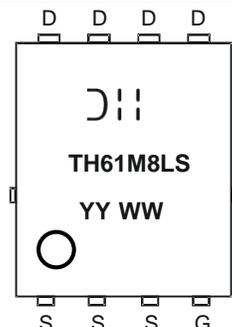
Top View
Pin Configuration

Ordering Information (Note 4)

Part Number	Case	Packaging
DMTH61M8LPSQ-13	PowerDI5060-8 (Type K)	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
 TH61M8LS = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Year (ex: 20 = 2020)
 WW = Week (01 to 53)

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

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V _{DSS}	60	V
Gate-Source Voltage	V _{GSS}	±20	V
Continuous Drain Current, V _{GS} = 10V (Note 6)	I _D	T _C = +25°C	225
		T _C = +100°C	160
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I _{DM}	900	A
Maximum Continuous Body Diode Forward Current (Note 6)	I _S	225	A
Pulsed Body Diode Forward Current (10µs Pulse, Duty Cycle = 1%)	I _{SM}	900	A
Avalanche Current, L = 1mH	I _{AS}	34.8	A
Avalanche Energy, L = 1mH	E _{AS}	605	mJ

Thermal Characteristics (@T_C = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P _D	3.2	W
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	46	°C/W
Total Power Dissipation (Note 6)	P _D	187.5	W
Thermal Resistance, Junction to Case (Note 6)	R _{θJC}	0.8	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +175	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV _{DSS}	60	—	—	V	V _{GS} = 0V, I _D = 250µA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	µA	V _{DS} = 48V, 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)}	—	1.2	1.6	mΩ	V _{GS} = 10V, I _D = 30A
		—	1.9	2.8		V _{GS} = 4.5V, I _D = 20A
Diode Forward Voltage	V _{SD}	—	0.7	1.2	V	V _{GS} = 0V, I _S = 20A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	8320	—	pF	V _{DS} = 30V, V _{GS} = 0V, f = 1MHz
Output Capacitance	C _{oss}	—	2298	—		
Reverse Transfer Capacitance	C _{rss}	—	157	—		
Gate Resistance	R _g	—	3	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	53.3	—	nC	V _{DS} = 30V, I _D = 30A
Total Gate Charge (V _{GS} = 10V)	Q _g	—	115.5	—		
Gate-Source Charge	Q _{gs}	—	27.8	—		
Gate-Drain Charge	Q _{gd}	—	16.5	—		
Turn-On Delay Time	t _{D(ON)}	—	10.3	—	ns	V _{DD} = 30V, V _{GS} = 10V, I _D = 30A, R _g = 3Ω
Turn-On Rise Time	t _R	—	23.9	—		
Turn-Off Delay Time	t _{D(OFF)}	—	108.3	—		
Turn-Off Fall Time	t _F	—	51.7	—		
Body Diode Reverse Recovery Time	t _{RR}	—	64	—	ns	I _F = 30A, di/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q _{RR}	—	124	—	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.

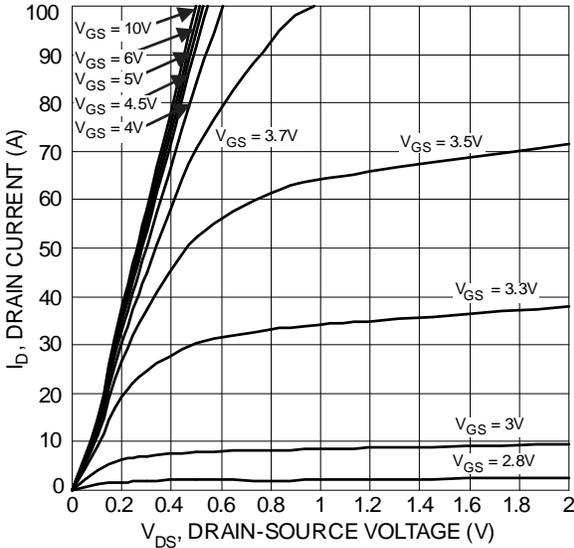


Figure 1 Typical Output Characteristic

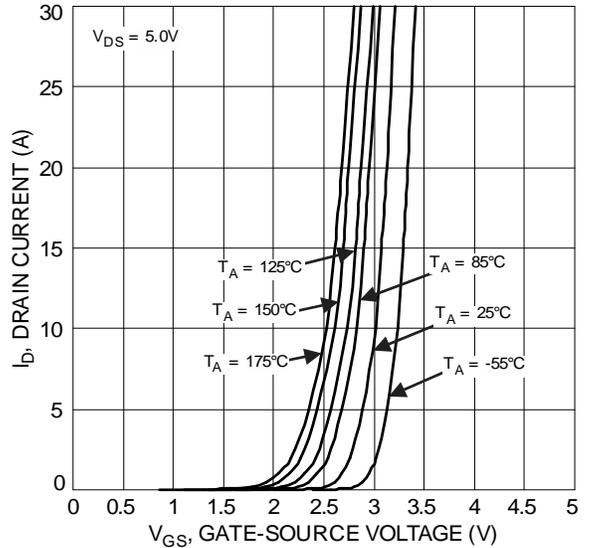


Figure 2 Typical Transfer Characteristics

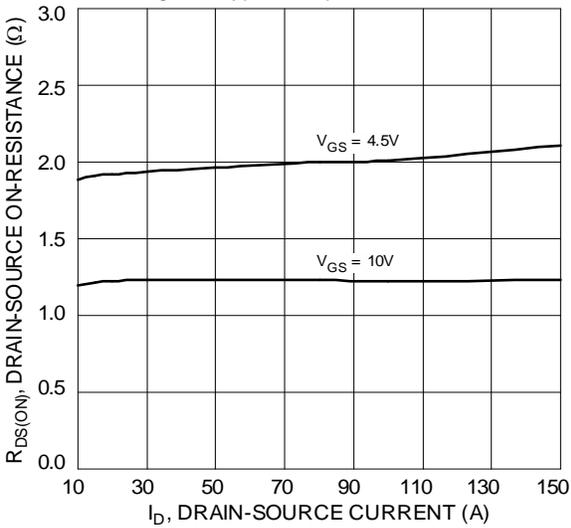


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

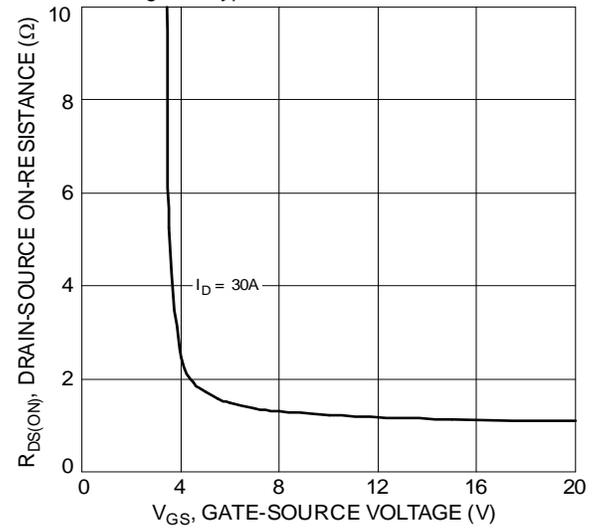


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

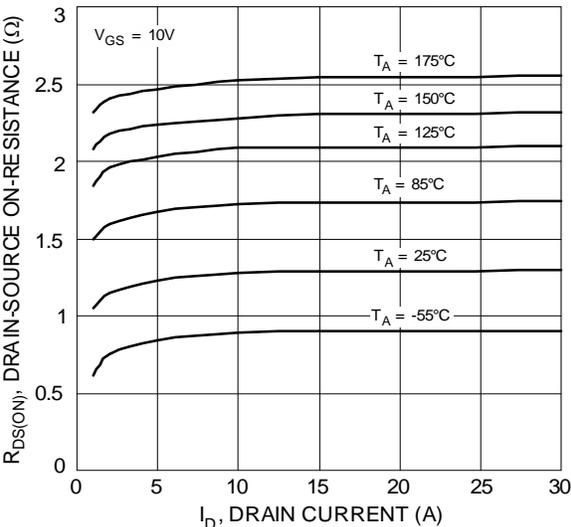


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

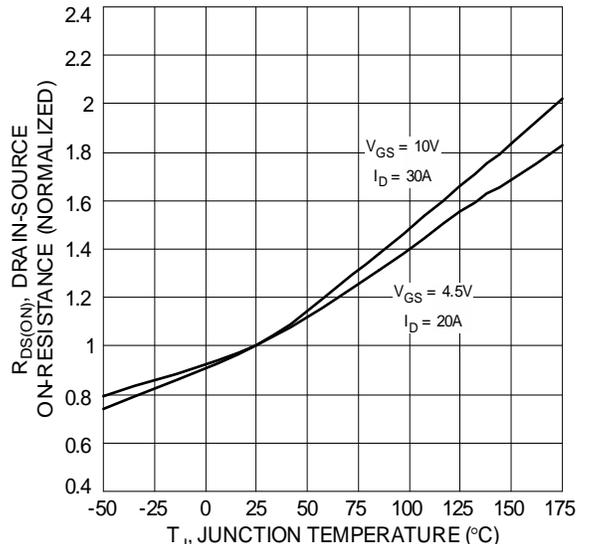


Figure 6 On-Resistance Variation with Temperature

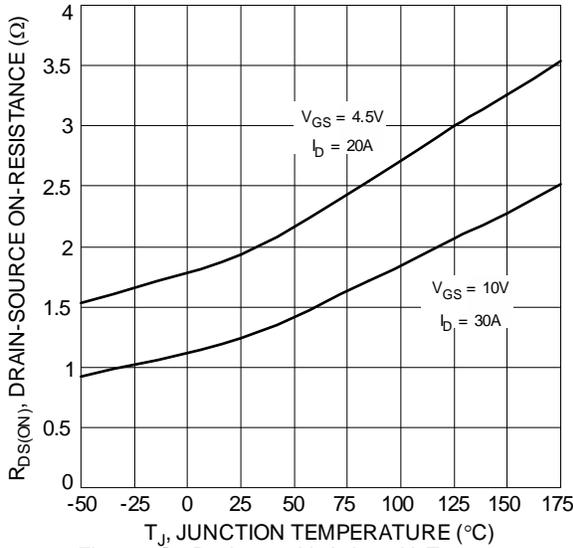


Figure 7 On-Resistance Variation with Temperature

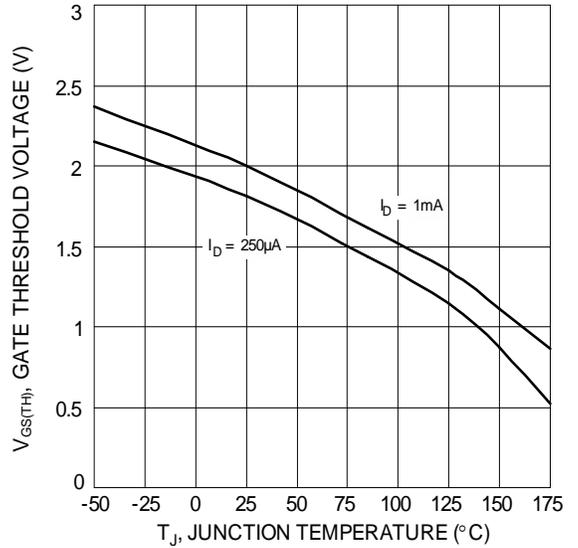


Figure 8 Gate Threshold Variation vs. Junction Temperature

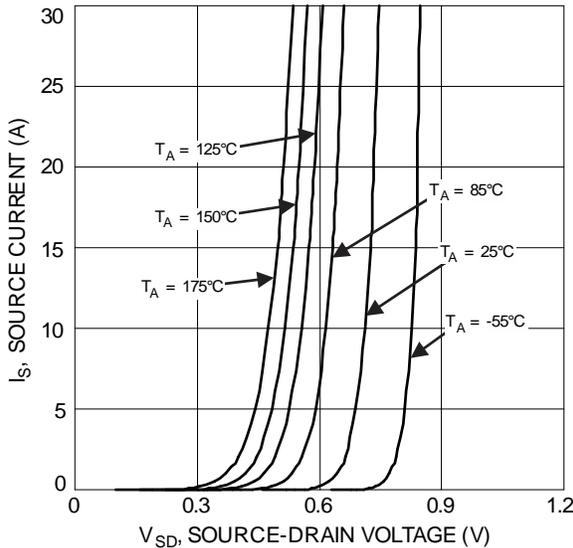


Figure 9 Diode Forward Voltage vs. Current

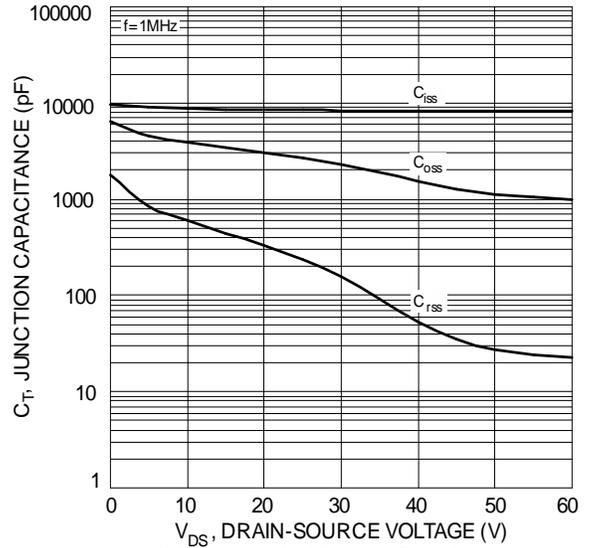


Figure 10 Typical Junction Capacitance

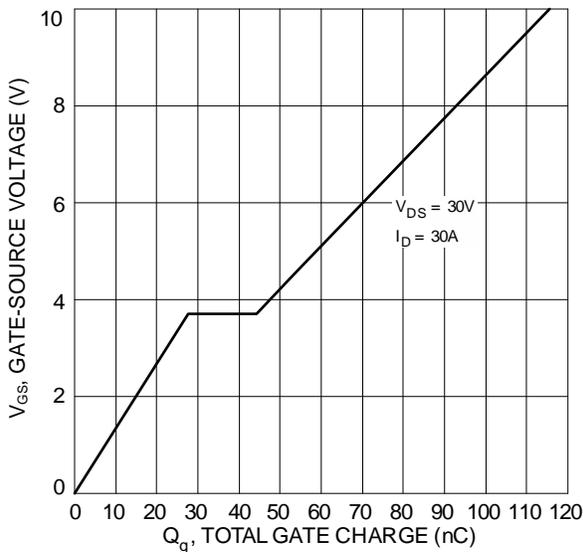


Figure 11 Gate Charge

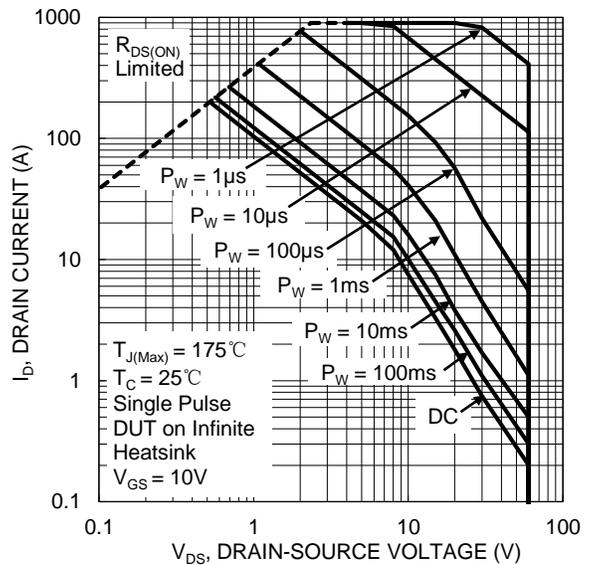
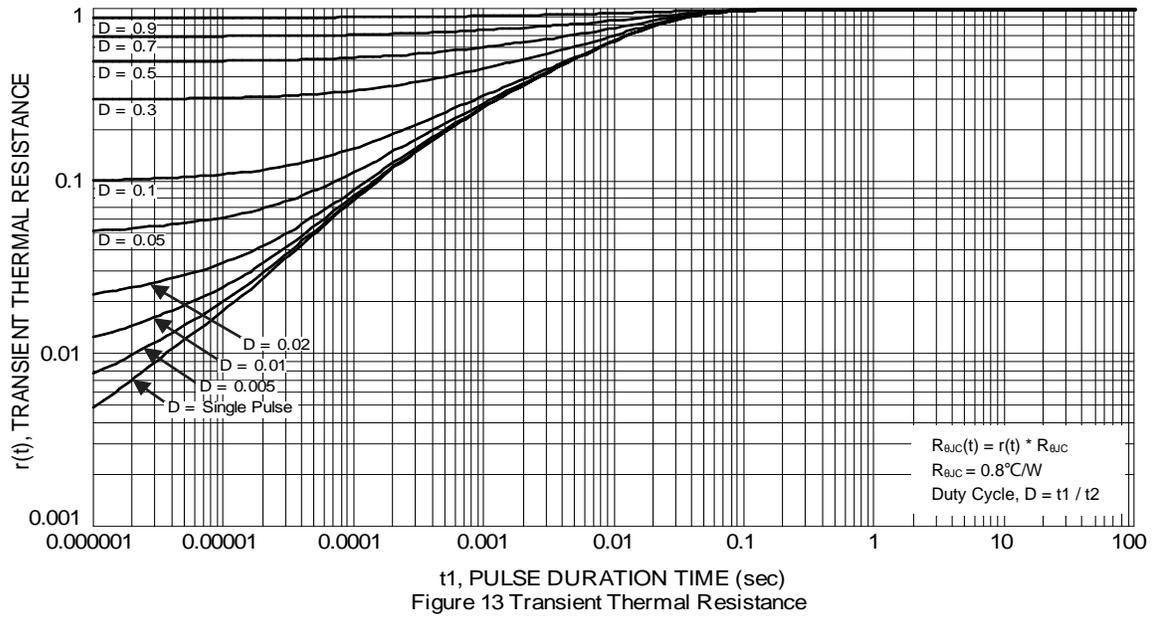


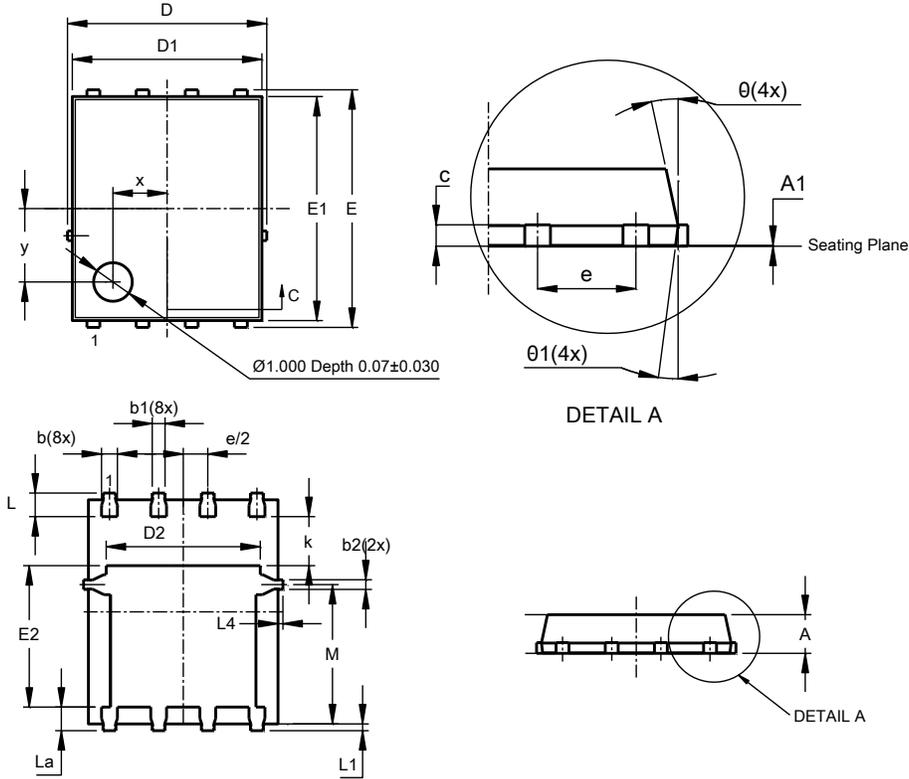
Figure 12. SOA, Safe Operation Area



Package Outline Dimensions

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

PowerDI5060-8 (Type K)

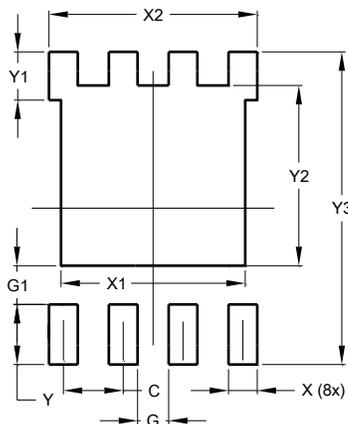


PowerDI5060-8 (Type K)			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0	0.05	0.02
b	0.33	0.51	0.41
b1	0.300	0.366	0.333
b2	0.20	0.35	0.25
c	0.23	0.33	0.277
D	5.15 BSC		
D1	4.85	4.95	4.90
D2	-	-	3.98
E	6.15 BSC		
E1	5.75	5.85	5.80
E2	3.56	3.725	3.66
e	1.27BSC		
k	-	-	1.27
L	0.51	0.71	0.61
La	0.51	0.675	0.61
L1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