

Product Summary

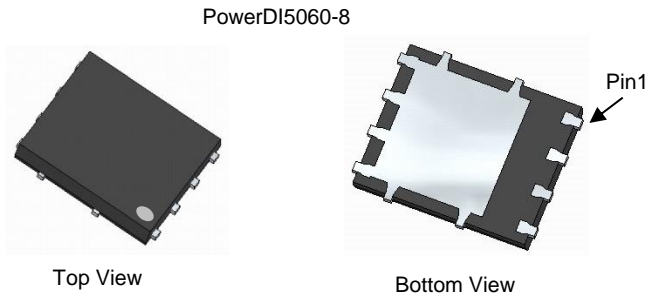
BV _{DSS}	R _{DS(ON)} Max	I _D T _C = +25°C
100V	16mΩ @ V _{GS} = 10V	44A
	18mΩ @ V _{GS} = 6V	41A

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 loadswitch.

Applications

- Motor Control
- DC-DC Converters
- Power Management

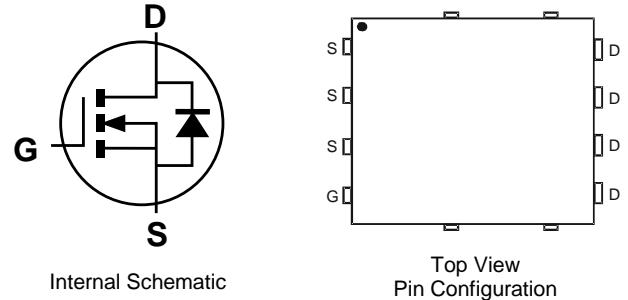


Features

- Rated to +175°C – Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switching – 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)**
- **Qualified to AEC-Q101 Standards for High Reliability**

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 (e3)
- Weight: 0.097 grams (Approximate)

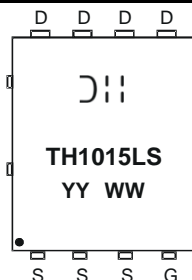


Ordering Information (Note 4)

Part Number	Case	Packaging
DMTH10H015LPS-13	PowerDI5060-8	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 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



- DII = Manufacturer's Marking
 TH1015LS = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Digit of Year (ex: 16 = 2016)
 WW = Week Code (01 to 53)

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 (Note 5) V _{GS} = 10V	Steady State	T _A = +25°C T _A = +70°C	I _D	7.3 5.8	A
	Steady State	T _C = +25°C T _C = +100°C	I _D	44 28	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I _{DM}	120	A
Maximum Continuous Body Diode Forward Current (Note 5)			I _S	1.5	A
Avalanche Current (Note 7) L=3mH			I _{AS}	7.5	A
Avalanche Energy (Note 7) L=3mH			E _{AS}	85	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T _A = +25°C	P _D	1.3	W
Thermal Resistance, Junction to Ambient (Note 5)		R _{θJA}	98	°C/W
Total Power Dissipation	T _C = +25°C	P _D	46	W
Thermal Resistance, Junction to Case		R _{θJC}	2.7	°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 6)						
Drain-Source Breakdown Voltage	BV _{DSS}	100	—	—	V	V _{GS} = 0V, I _D = 1mA
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 6)						
Gate Threshold Voltage	V _{GS(TH)}	1.4	2	3	V	V _{DS} = V _{GS} , I _D = 250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	11	16	mΩ	V _{GS} = 10V, I _D = 20A
		—	13.5	18		V _{GS} = 6V, I _D = 20A
		—	18.4	25		V _{GS} = 4.5V, I _D = 5A
Diode Forward Voltage	V _{SD}	—	0.9	1.3	V	V _{GS} = 0V, I _S = 20A
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C _{ISS}	—	1,871	—	pF	V _{DS} = 50V, V _{GS} = 0V f = 1MHz
Output Capacitance	C _{OSS}	—	261	—		
Reverse Transfer Capacitance	C _{RSS}	—	7	—		
Gate Resistance	R _G	—	0.75	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge	Q _G	—	33.3	—	nC	V _{DD} = 50V, I _D = 10A, V _{GS} = 10V
Gate-Source Charge	Q _{GS}	—	6.9	—		
Gate-Drain Charge	Q _{GD}	—	5.1	—		
Turn-On Delay Time	t _{D(ON)}	—	6.5	—	ns	V _{DD} = 50V, V _{GS} = 10V, I _D = 10A, R _G = 6Ω
Turn-On Rise Time	t _r	—	7	—		
Turn-Off Delay Time	t _{D(OFF)}	—	19.7	—		
Turn-Off Fall Time	t _f	—	8.1	—		
Reverse Recovery Time	t _{RR}	—	37.9	—	ns	I _F = 10A, di/dt = 100A/µs
Reverse Recovery Charge	Q _{RR}	—	51.9	—	nC	

- Notes: 5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
6. Short duration pulse test used to minimize self-heating effect.
7. Guaranteed by design. Not subject to product testing.

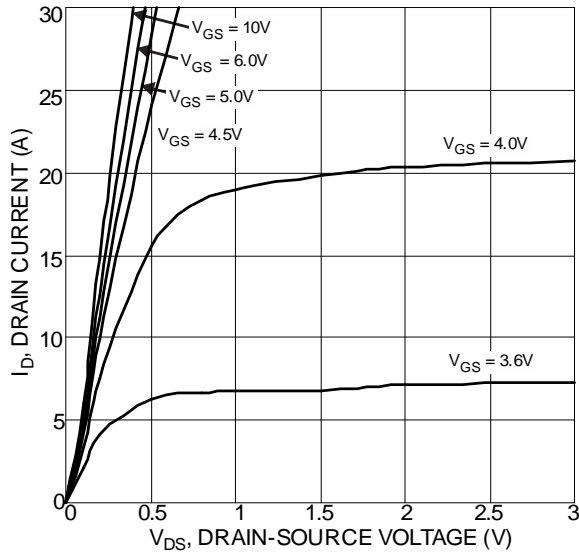


Figure 1 Typical Output Characteristic

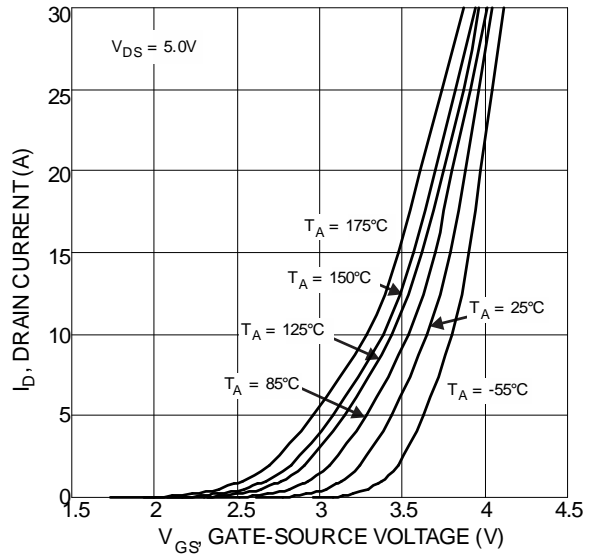


Figure 2 Typical Transfer Characteristics

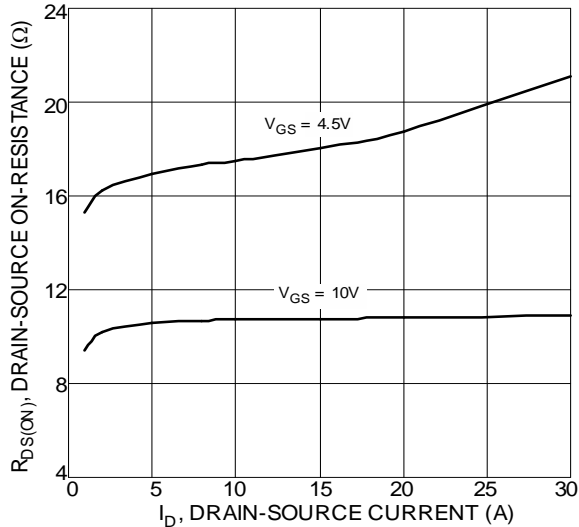


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

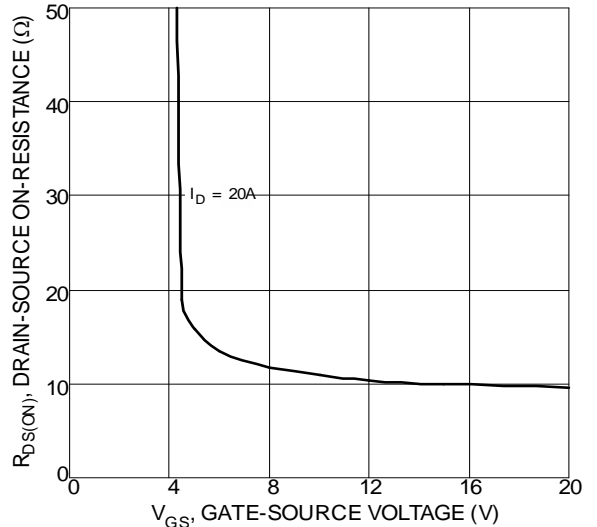


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

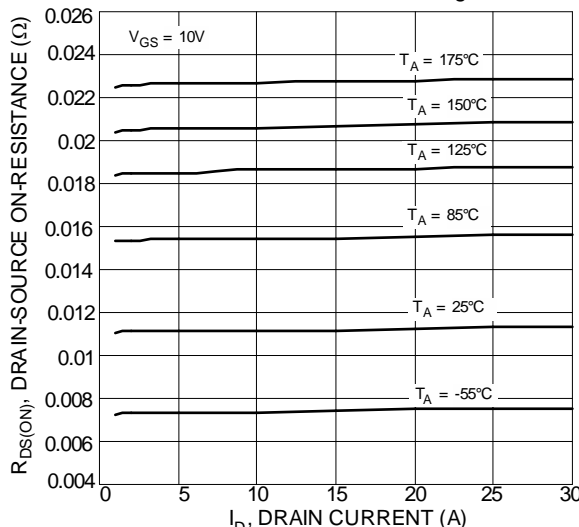


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

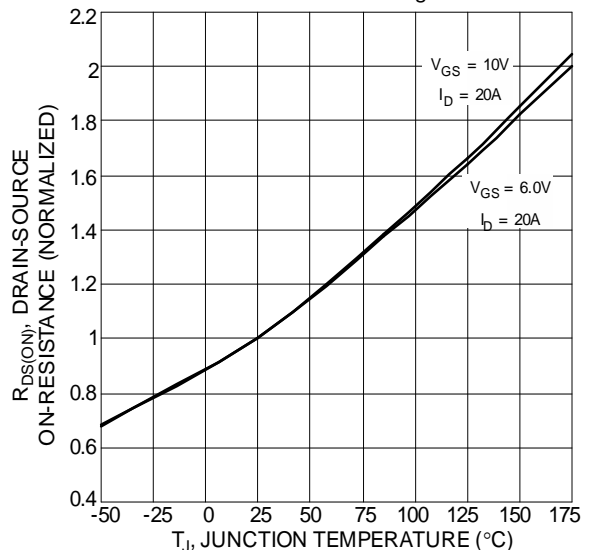


Figure 6 On-Resistance Variation with Temperature

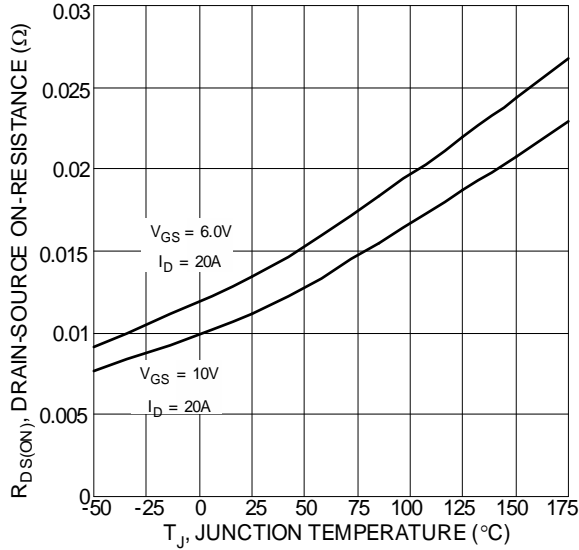


Figure 7 On-Resistance Variation with Temperature

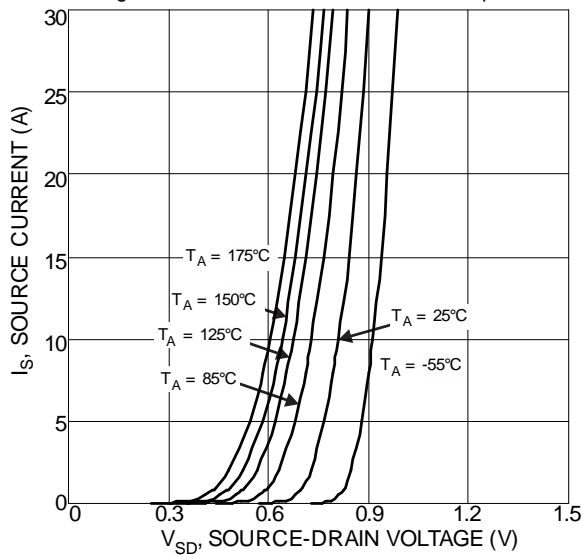


Figure 9 Diode Forward Voltage vs. Current

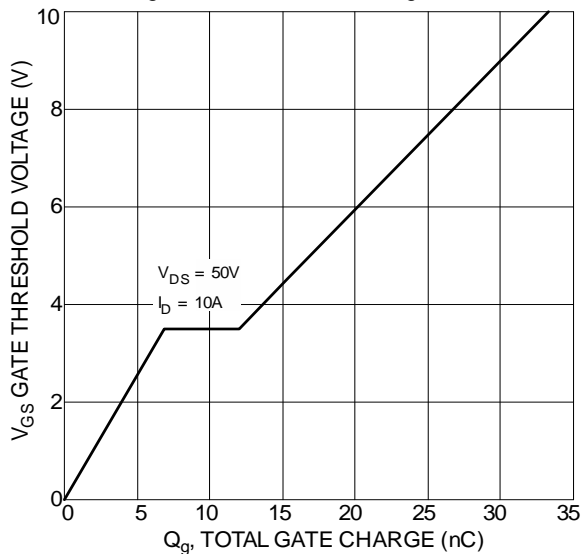


Figure 11 Gate Charge

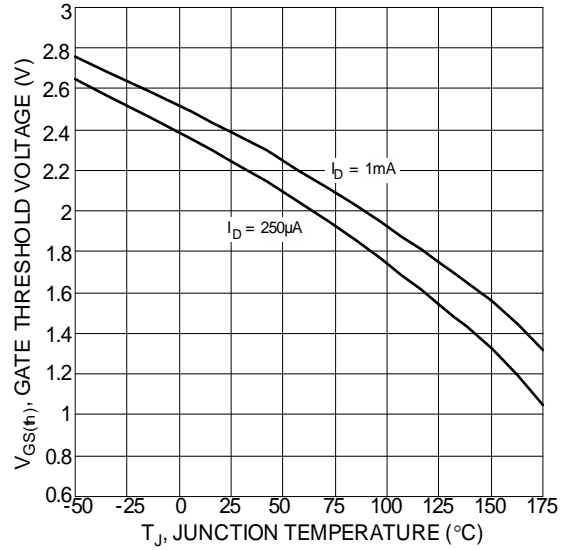


Figure 8 Gate Threshold Variation vs. Ambient Temperature

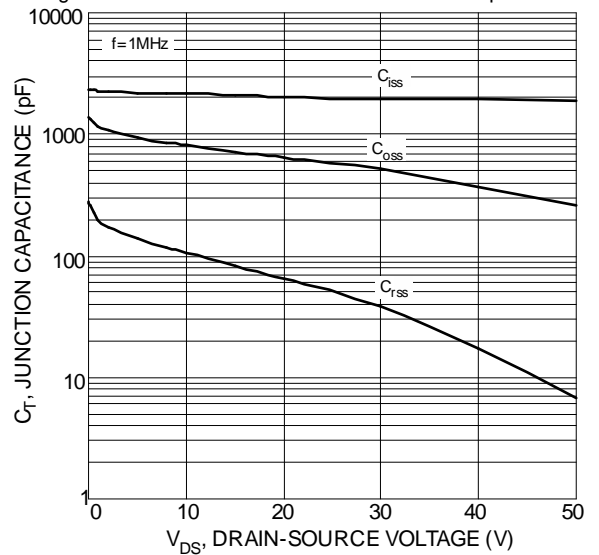


Figure 10 Typical Junction Capacitance

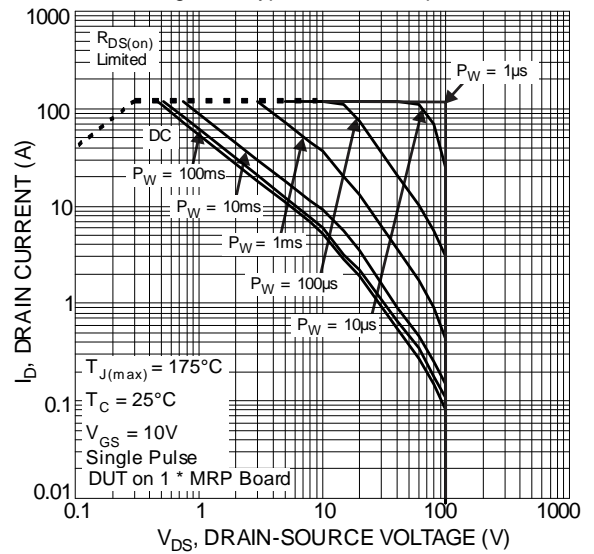


Figure 12 SOA, Safe Operation Area

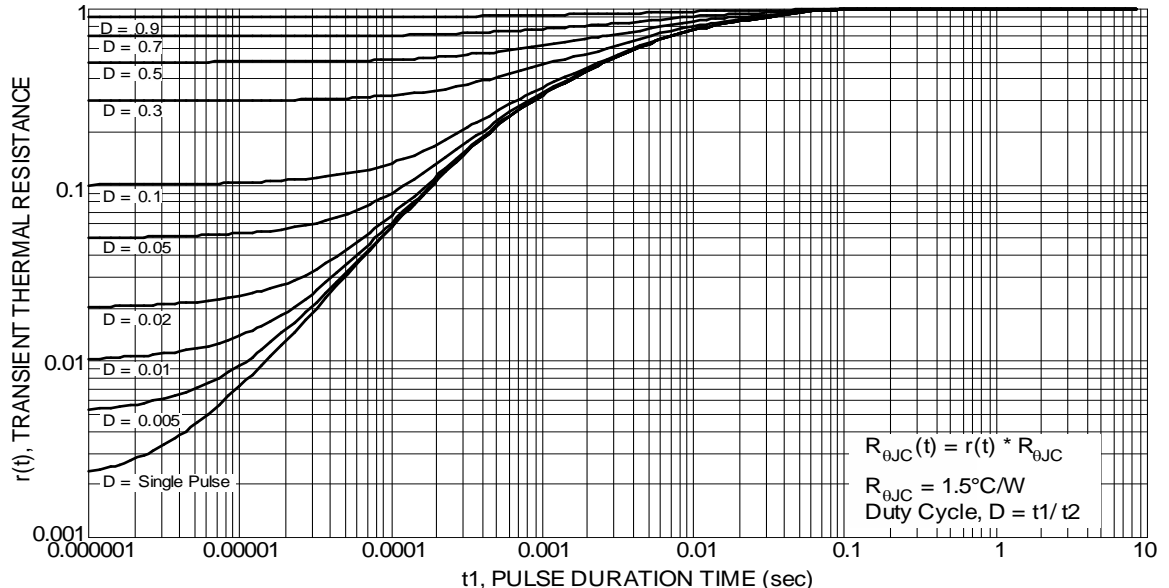
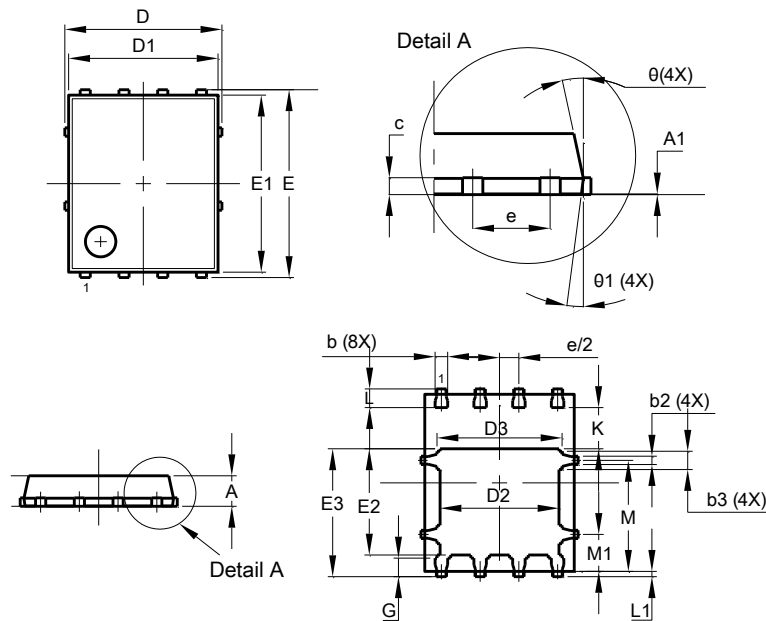


Figure 13 Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI5060-8



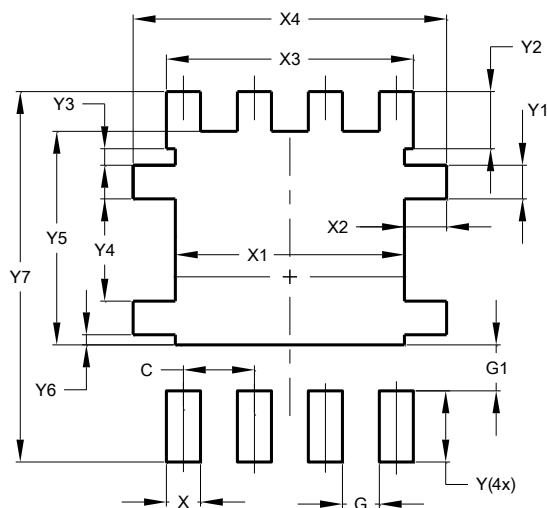
PowerDI5060-8			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0.00	0.05	-
b	0.33	0.51	0.41
b2	0.200	0.350	0.273
b3	0.40	0.80	0.60
c	0.230	0.330	0.277
D	5.15 BSC		
D1	4.70	5.10	4.90
D2	3.70	4.10	3.90
D3	3.90	4.30	4.10
E	6.15 BSC		
E1	5.60	6.00	5.80
E2	3.28	3.68	3.48
E3	3.99	4.39	4.19
e	1.27 BSC		
G	0.51	0.71	0.61
K	0.51	-	-
L	0.51	0.71	0.61
L1	0.100	0.200	0.175
M	3.235	4.035	3.635
M1	1.00	1.40	1.21
θ	10°	12°	11°
$\theta1$	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



Dimensions	Value (in mm)
C	1.270
G	0.660
G1	0.820
X	0.610
X1	4.100
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	3.810
Y6	0.180
Y7	6.610

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