

Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D $T_C = +25^\circ C$
40V	$2.5m\Omega$ @ $V_{GS} = 10V$	90A
	$4m\Omega$ @ $V_{GS} = 4.5V$	90A

Description and Applications

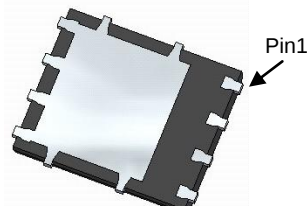
This MOSFET is designed to minimize the on-state resistance ($R_{DS(ON)}$), yet maintain superior switching performance, making it ideal for high efficiency power management applications.

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

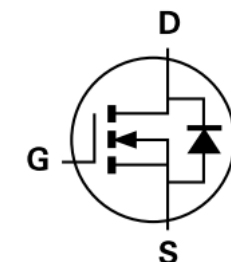
PowerDI5060-8



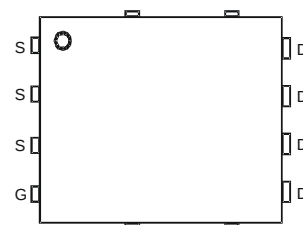
Top View



Bottom View



Internal Schematic

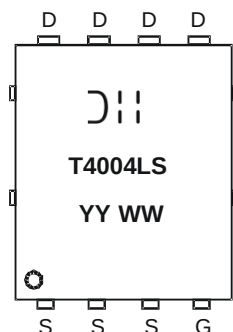

 Top View
 Pin Configuration

Ordering Information (Note 4)

Part Number	Case	Packaging
DMT4004LPS-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



$\text{D}||$ = Manufacturer's Marking
 T4004LS = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Year (ex: 16 = 2016)
 WW = Week (01 to 53)

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

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V _{DSS}	40	V
Gate-Source Voltage	V _{GSS}	±20	V
Continuous Drain Current (Note 5)	I _D	26 21	A
Continuous Drain Current (Note 6)	I _D	90	A
		90	
Maximum Continuous Body Diode Forward Current (Note 6)	I _S	70	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)	I _{DM}	100	A
Avalanche Current, L=0.2mH	I _{AS}	33.3	A
Avalanche Energy, L=0.2mH	E _{AS}	110	mJ

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

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P _D	2.6	W
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	47	°C/W
Total Power Dissipation (Note 6)	P _D	138	W
Thermal Resistance, Junction to Case (Note 6)	R _{θJC}	0.9	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°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}	40	—	—	V	V _{GS} = 0V, I _D = 1mA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	μA	V _{DS} = 32V, 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)}	—	—	2.5	mΩ	V _{GS} = 10V, I _D = 50A
		—	—	4		V _{GS} = 4.5V, I _D = 50A
Diode Forward Voltage	V _{SD}	—	0.9	1.2	V	V _{GS} = 0V, I _S = 50A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	4508	—	pF	V _{DS} = 20V, V _{GS} = 0V, f = 1MHz
Output Capacitance	C _{oss}	—	1648	—		
Reverse Transfer Capacitance	C _{rss}	—	104	—		
Gate resistance	R _g	—	0.7	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	34.6	—	nC	V _{DD} = 20V, I _D = 30A
Total Gate Charge (V _{GS} = 10V)	Q _g	—	82.2	—		
Gate-Source Charge	Q _{gs}	—	9.9	—		
Gate-Drain Charge	Q _{gd}	—	11.2	—		
Turn-On Delay Time	t _{D(ON)}	—	5.9	—	ns	V _{DD} = 20V, V _{GS} = 10V, I _D = 30A, R _G = 1.6Ω
Turn-On Rise Time	t _R	—	13.3	—		
Turn-Off Delay Time	t _{D(OFF)}	—	25.9	—		
Turn-Off Fall Time	t _F	—	7.9	—		
Body Diode Reverse Recovery Time	t _{RR}	—	48.4	—	ns	I _F = 50A, di/dt = 100A/μs
Body Diode Reverse Recovery Charge	Q _{RR}	—	72.4	—	nC	

- Notes:
- Device mounted with exposed drain pad on 25mm by 25mm 2oz copper on a single-sided 1.6mm FR-4 PCB; device is measured under still air conditions whilst operating in a steady state.
 - 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 production testing.

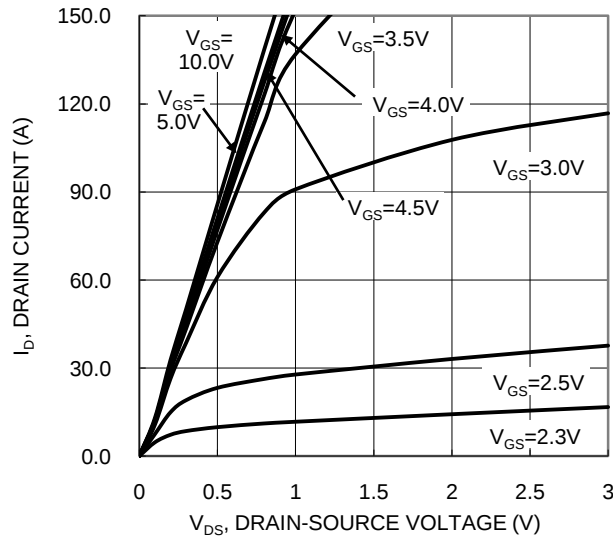


Figure 1. Typical Output Characteristic

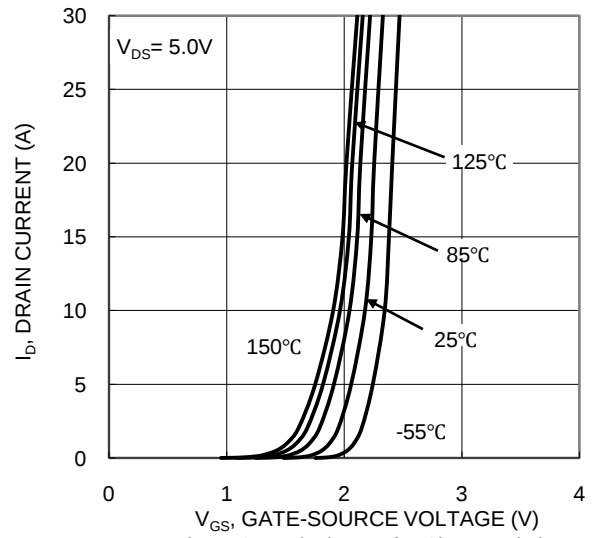


Figure 2. Typical Transfer Characteristic

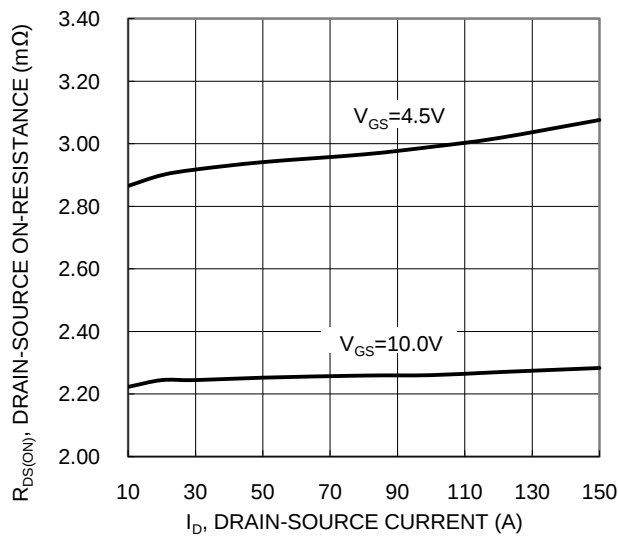


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

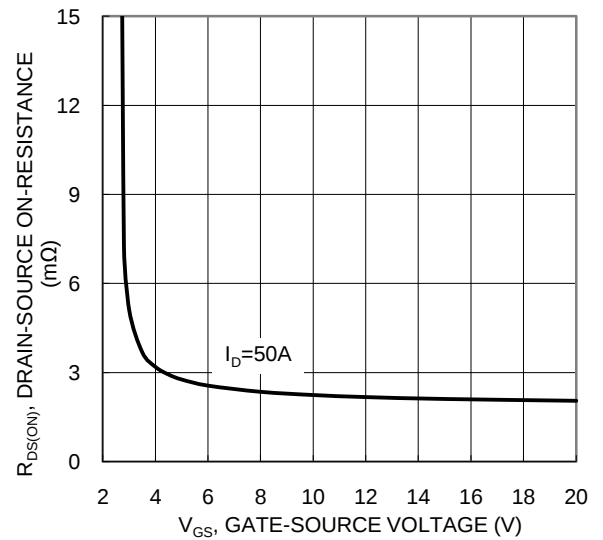


Figure 4. Typical Transfer Characteristic

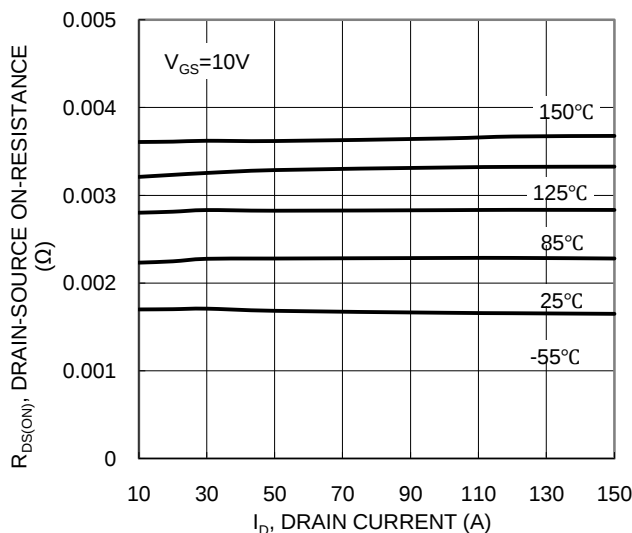


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

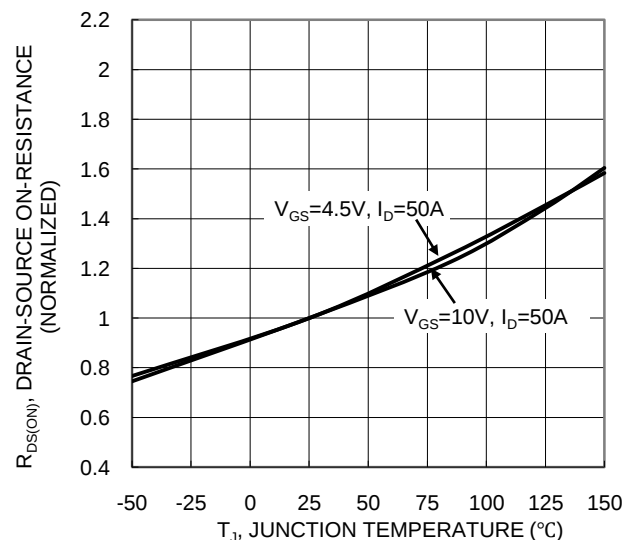
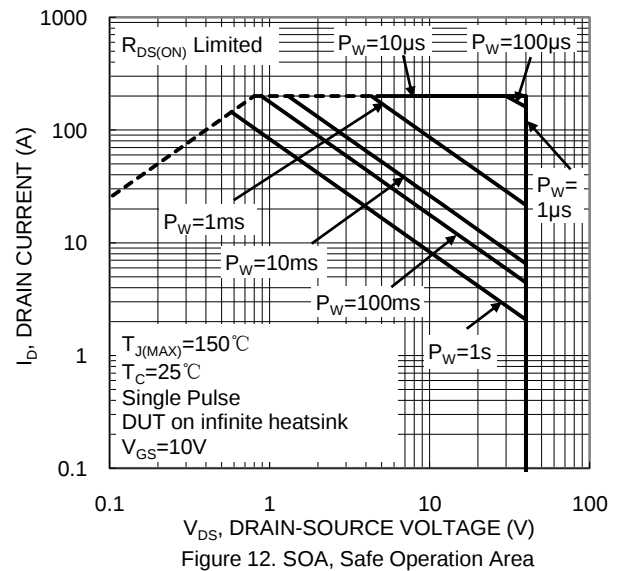
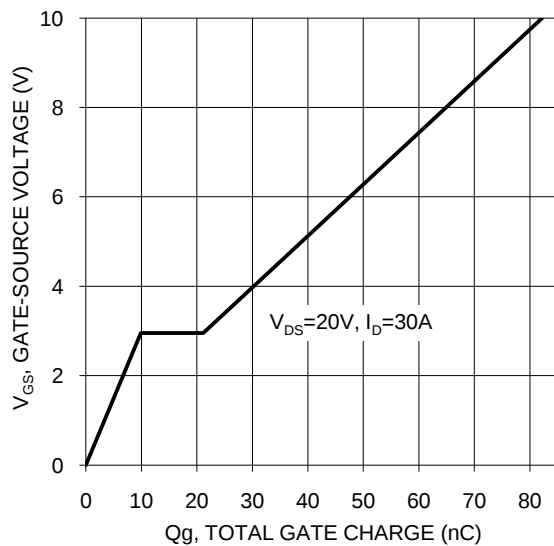
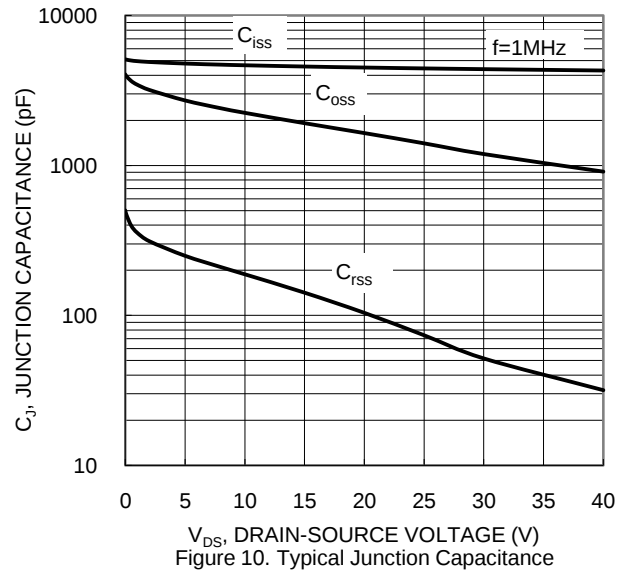
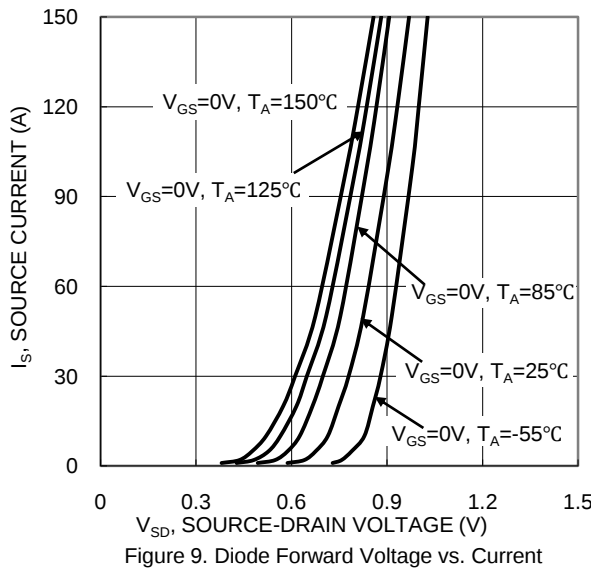
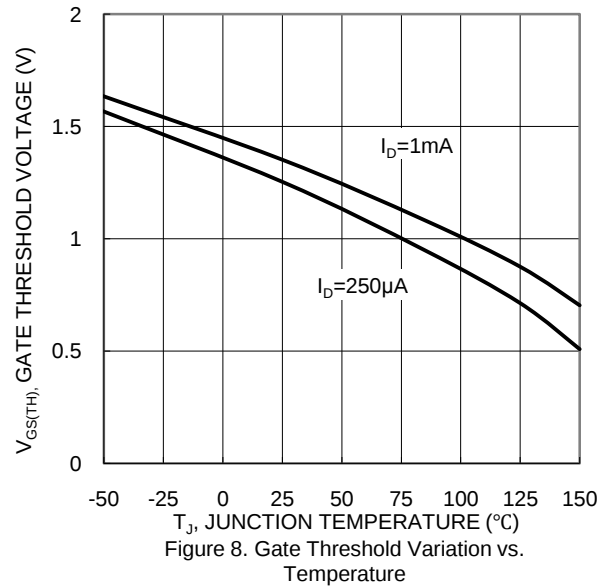
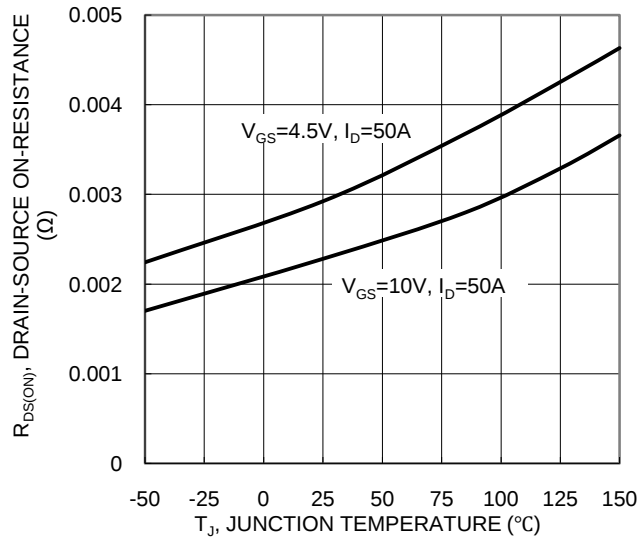
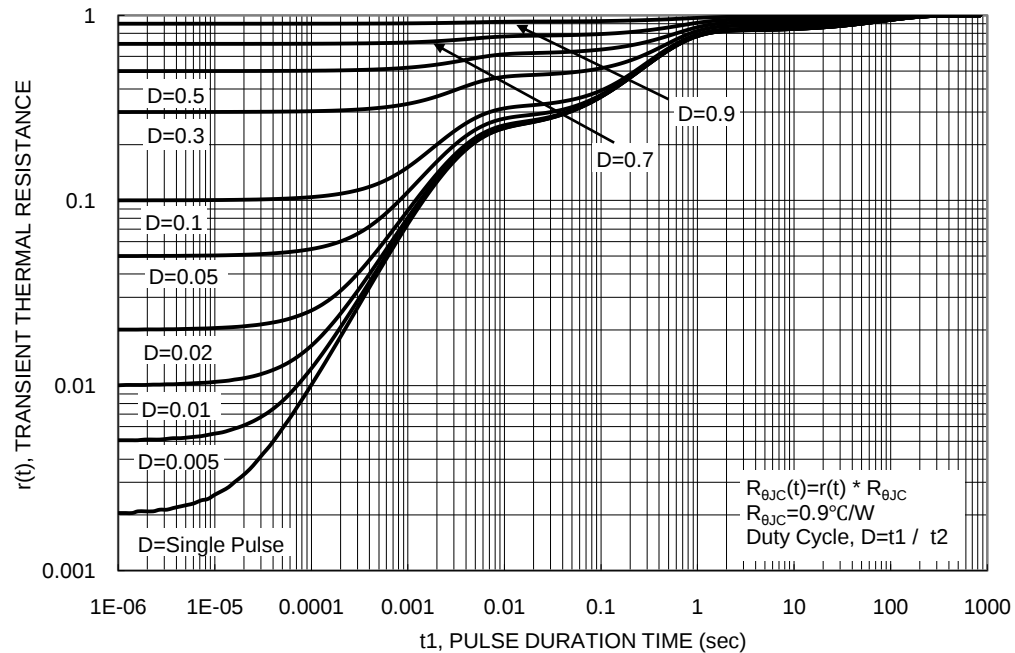


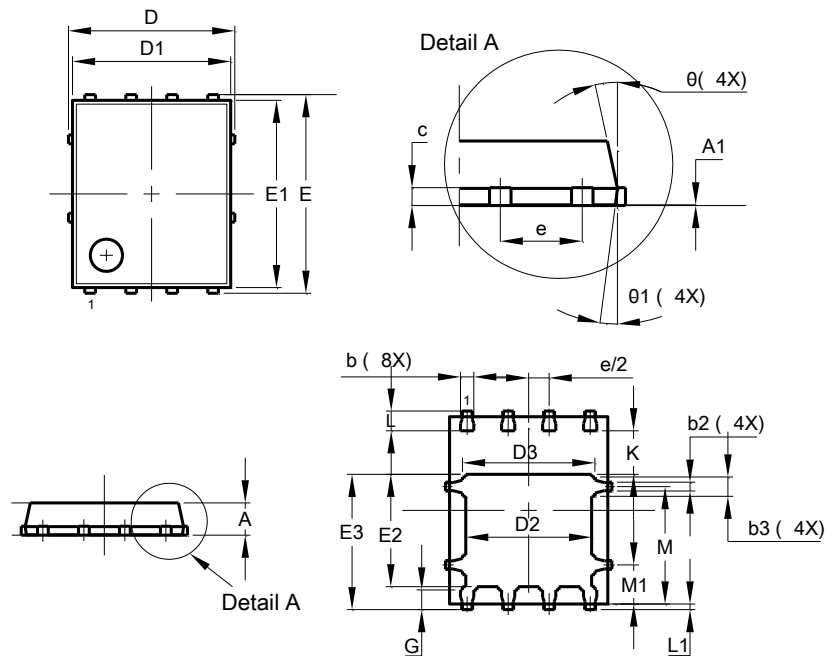
Figure 6. On-Resistance Variation with Temperature





Package Outline Dimensions

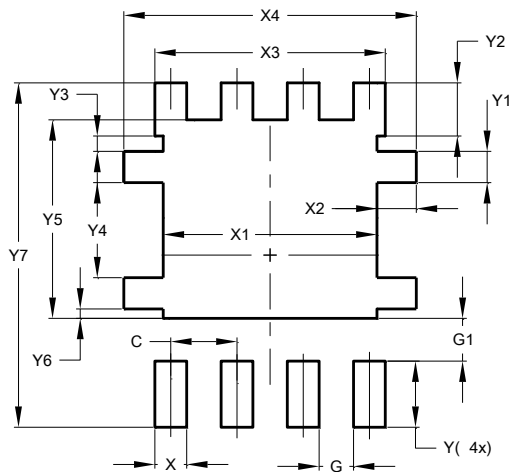
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



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
theta	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.



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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