

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D $T_C = +25^\circ\text{C}$
60V	15m Ω @ $V_{GS} = 10\text{V}$	32 A
	24m Ω @ $V_{GS} = 4.5\text{V}$	24 A

Description

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

Applications

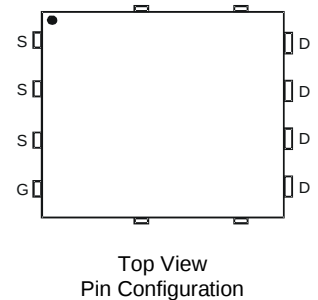
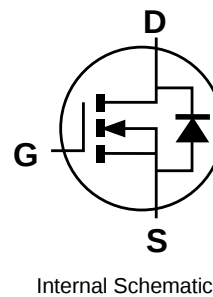
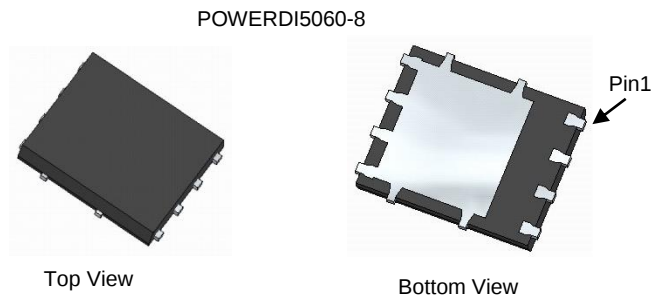
- Load Switch
- Adaptor Switch
- Notebook PC

Features

- Thermally Efficient Package - Cooler Running Applications
- High Conversion Efficiency
- LOW $R_{DS(ON)}$ – Minimizes On-State Losses
- Low Input Capacitance
- Fast Switching Speed
- <1.1mm Package Profile – Ideal for Thin Applications
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Mechanical Data

- Case: POWERDI5060-8
- 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
- Weight: 0.097 grams (Approximate)



Ordering Information (Note 4)

Part Number	Case	Packaging
DMT6016LPS-13	POWERDI5060-8	2,500 / Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 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
T6016LS = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Digit of Year (ex: 14 = 2014)
WW = Week Code (01 to 53)

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

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V _{DSS}	60	V
Gate-Source Voltage			V _{GSS}	±20	V
Continuous Drain Current (Note 6) V _{GS} = 10V	Steady State	T _C = +25°C T _C = +70°C	I _D	32 25	A
	t < 10s	T _A = +25°C T _A = +70°C	I _D	14.8 11.9	A
Pulsed Drain Current (10μs pulse, duty cycle = 1%)			I _{DM}	60	A
Maximum Continuous Body Diode Forward Current (Note 6)			I _S	2	A
Avalanche Current (Note 8) L = 0.1mH			I _{AS}	15.3	A
Avalanche Energy (Note 8) L = 0.1mH			E _{AS}	11.7	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)		P _D	1.23	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R _{θJA}	102	°C/W
	t < 10s		52	
Total Power Dissipation (Note 6)		P _D	2.7	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R _{θJA}	49	°C/W
	t < 10s		24	
Thermal Resistance, Junction to Case (Note 7)		R _{θJC}	4.8	°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 9)						
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 9)						
Gate Threshold Voltage	V _{GS(th)}	1	—	2.5	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(on)}	—	—	15	mΩ	V _{GS} = 10V, I _D = 20A
		—	—	24		V _{GS} = 4.5V, I _D = 18A
Diode Forward Voltage	V _{SD}	—	0.7	1.2	V	V _{GS} = 0V, I _S = 1A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C _{iss}	—	864	—	pF	V _{DS} = 30V, V _{GS} = 0V, f = 1MHz
Output Capacitance	C _{oss}	—	282	—		
Reverse Transfer Capacitance	C _{rss}	—	27	—		
Gate Resistance	R _G	—	1.3	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	8.4	—	nC	V _{DS} = 30V, I _D = 10A
Total Gate Charge (V _{GS} = 10V)	Q _g	—	17	—		
Gate-Source Charge	Q _{gs}	—	3.1	—		
Gate-Drain Charge	Q _{gd}	—	4.3	—		
Turn-On Delay Time	t _{D(on)}	—	3.4	—	ns	V _{GS} = 10V, V _{DS} = 30V, R _G = 6Ω, I _D = 10A
Turn-On Rise Time	t _r	—	5.2	—		
Turn-Off Delay Time	t _{D(off)}	—	13	—		
Turn-Off Fall Time	t _f	—	7	—		
Reverse Recovery Time	t _{rr}	—	22	—	ns	I _F = 10A, di/dt = 100A/μs
Reverse Recovery Charge	Q _{rr}	—	11	—	nC	

- Notes:
- Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1-inch square copper plate.
 - Thermal resistance from junction to soldering point (on the exposed drain pad).
 - I_{AS} and E_{AS} rating are based on low frequency and duty cycles to keep T_J = +25°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

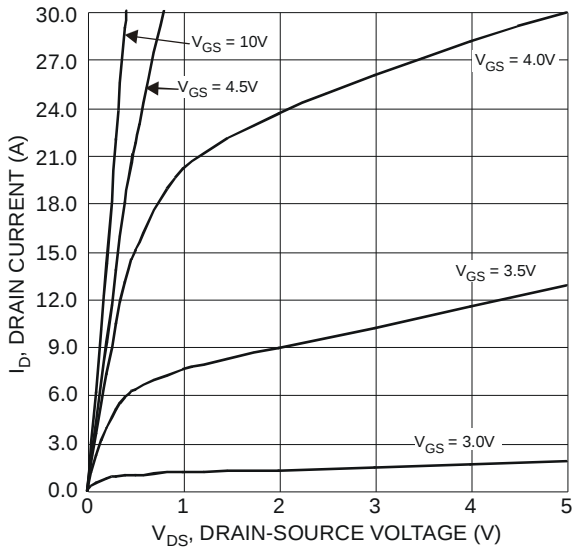


Figure 1 Typical Output Characteristics

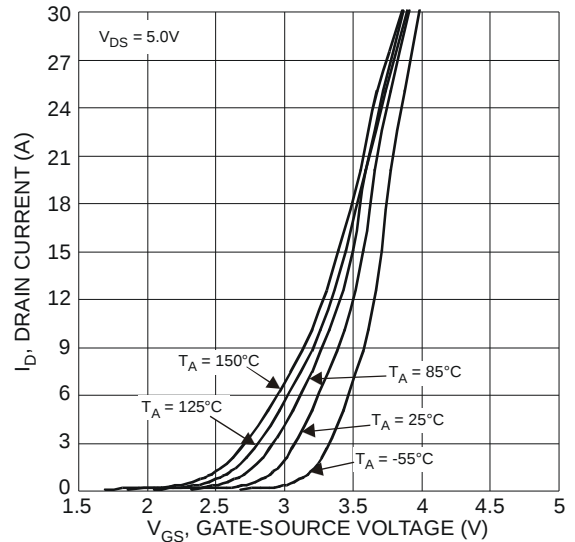


Figure 2 Typical Transfer Characteristics

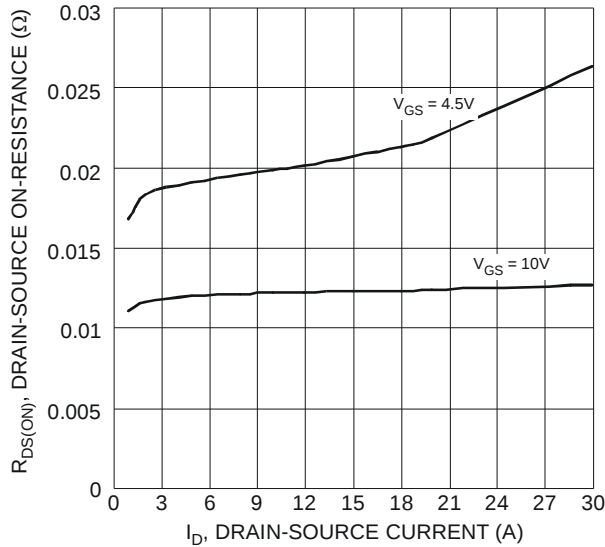


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

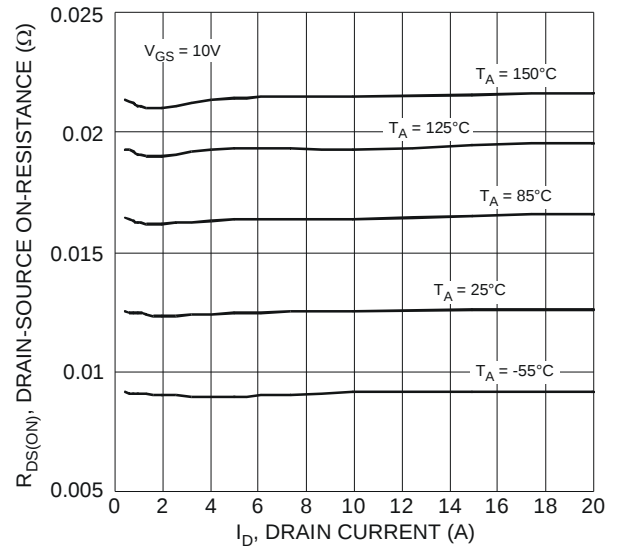


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

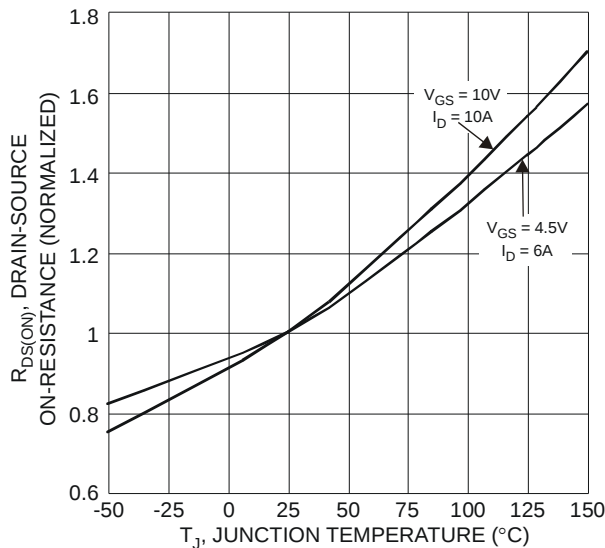


Figure 5 On-Resistance Variation with Temperature

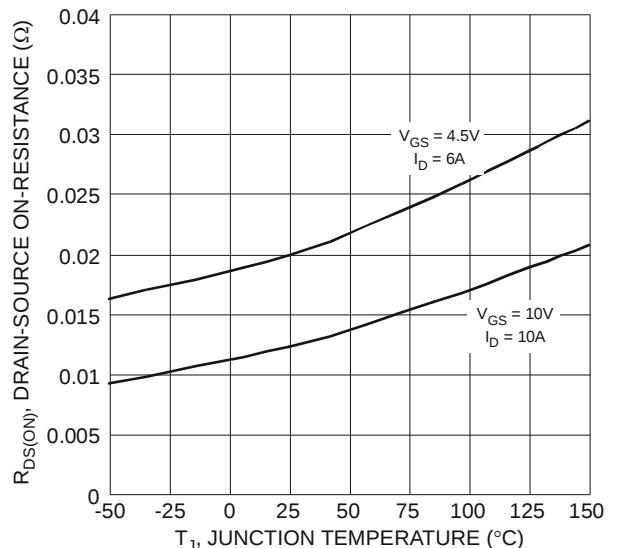


Figure 6 On-Resistance Variation with Temperature

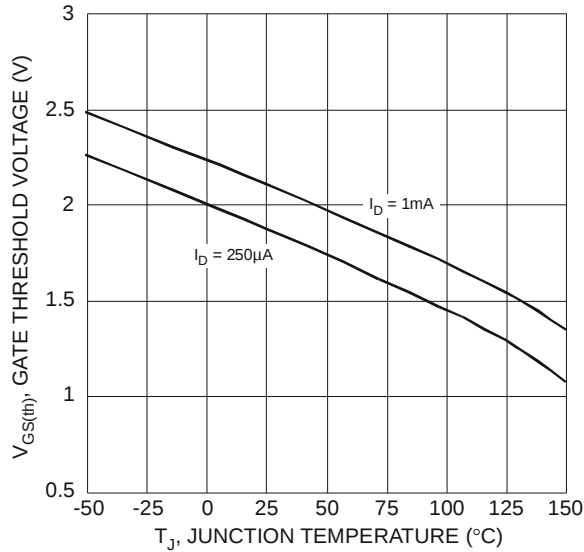


Figure 7 Gate Threshold Variation vs. Ambient Temperature

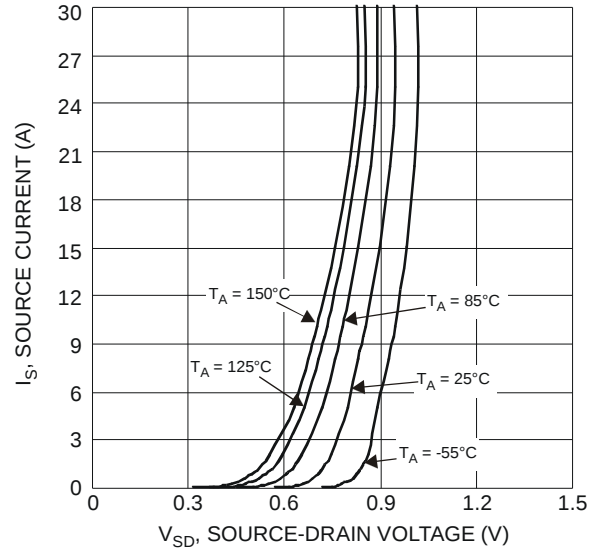


Figure 8 Diode Forward Voltage vs. Current

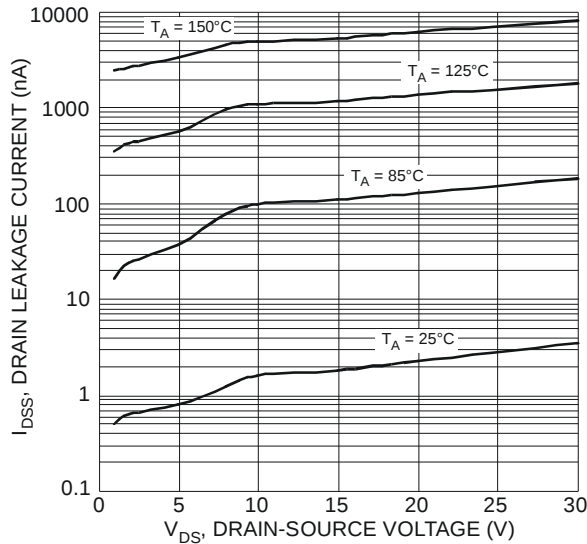


Figure 9 Typical Drain-Source Leakage Current vs. Voltage

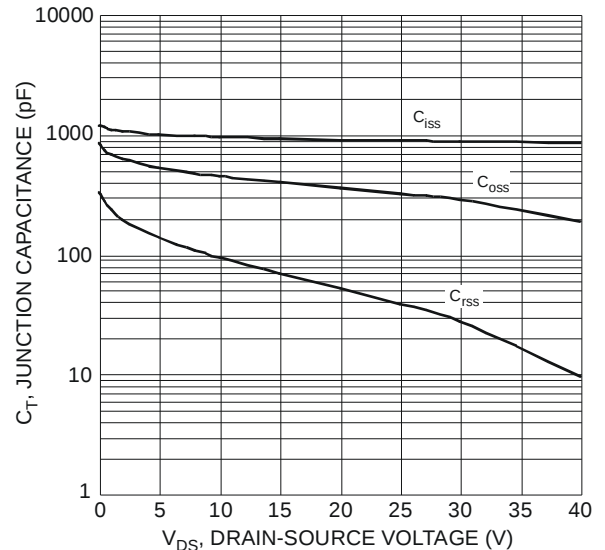


Figure 10 Typical Junction Capacitance

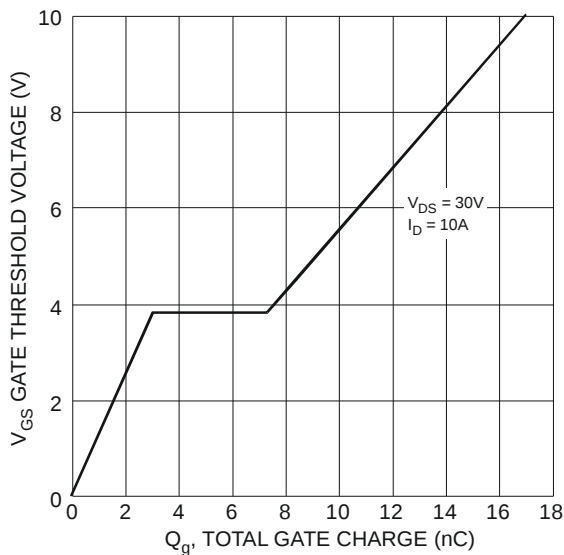


Figure 11 Gate Charge

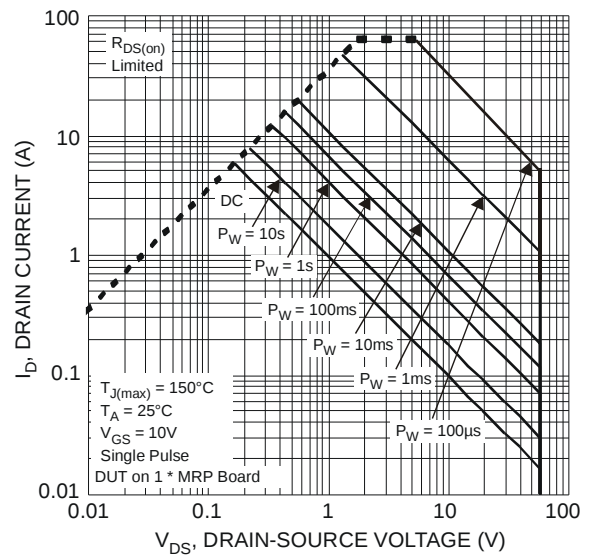
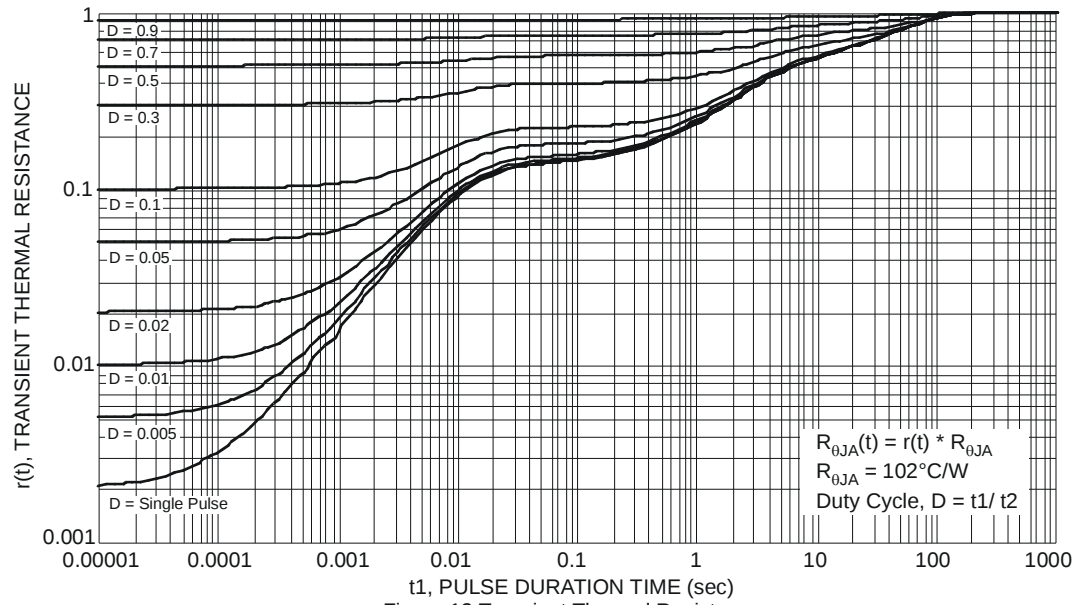


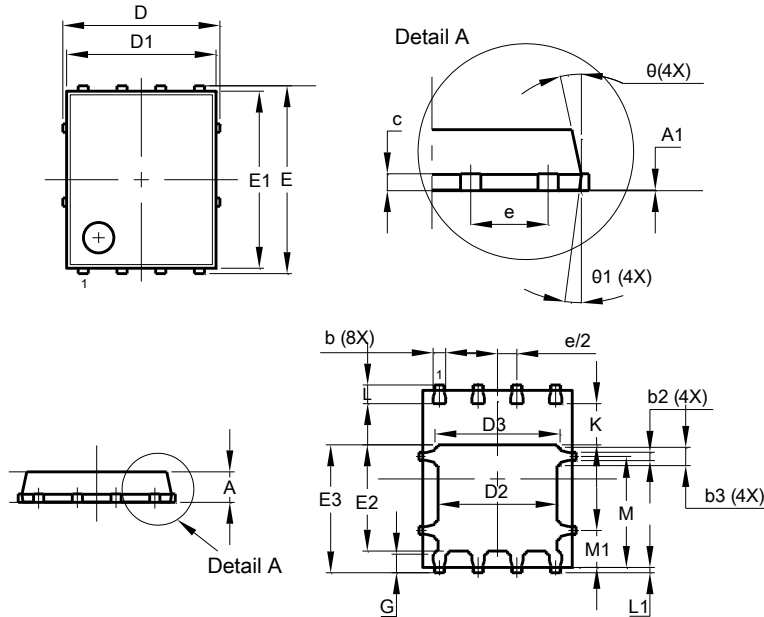
Figure 12 SOA, Safe Operation Area



Package Outline Dimensions

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.

POWERDI®5060-8

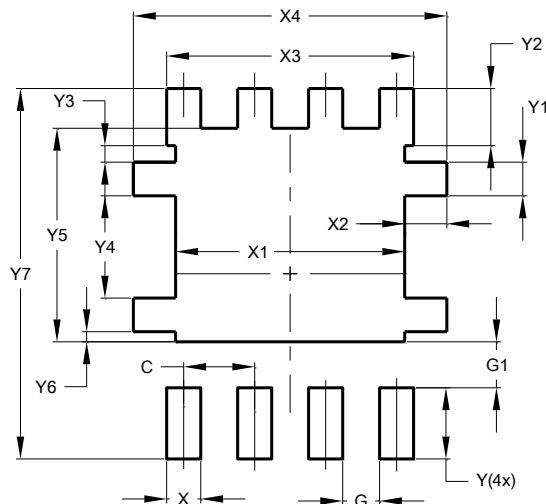


POWERDI®5060-8			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0.00	0.05	□
b	0.33	0.51	0.41
b2	0.200	0.350	0.273
b3	0.40	0.80	0.60
c	0.230	0.330	0.277
D	5.15 BSC		
D1	4.70	5.10	4.90
D2	3.70	4.10	3.90
D3	3.90	4.30	4.10
E	6.15 BSC		
E1	5.60	6.00	5.80
E2	3.28	3.68	3.48
E3	3.99	4.39	4.19
e	1.27 BSC		
G	0.51	0.71	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°
θ1	6°	8°	7°
All Dimensions in mm			

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.

POWERDI®5060-8



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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