

Product Summary

BV _{DSS}	R _{DS(ON)}	I _D T _c = +25°C
100V	28mΩ @ V _{GS} = 10V	58A

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.

- Power Management Functions
- DC-DC Converters

Features and Benefits

- Rated to +175°C — Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switch (UIS) Test in Production
- Thermally Efficient Package-Cooler Running Applications
- High Conversion Efficiency
- Low R_{DS(ON)} – Minimizes On State Losses
- Low Input Capacitance
- Fast Switching Speed
- Wettable Flank for Improved Optical Inspections
- **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_us) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

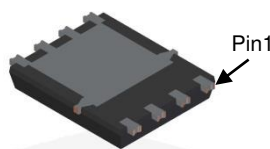
Mechanical Data

- 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 @3
- Weight: 0.097 grams (Approximate)

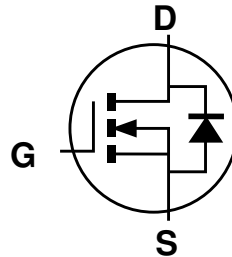
PowerDI5060-8 (SWP) (Type UX)



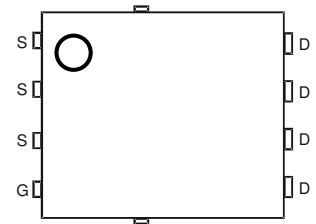
Top View



Bottom View



Internal Schematic



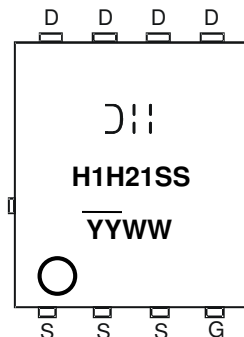
Top View
Pin Configuration

Ordering Information (Note 4)

Part Number	Case	Packaging
DMNH10H021SPSW-13	PowerDI5060-8 (SWP) (Type UX)	2, 500 / 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



- **DII** = Manufacturer's Marking
- **H1H21SS** = Product Type Marking Code
- **YYWW** = Date Code Marking
- **YY** = Last Two Digits of Year (ex: 21 = 2021)
- **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 7) V _{GS} = 10V	Steady State	T _C = +25°C	I _D	58	A
		T _C = +100°C		41	
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I _{DM}	232	A
Maximum Continuous Body Diode Forward Current (Note 7)			I _S	58	A
Pulsed Source Current (10µs Pulse, Duty Cycle = 1%)			I _{SM}	232	A
Avalanche Current, L = 0.1mH			I _{AS}	56	A
Avalanche Energy, L = 0.1mH			E _{AS}	157	mJ

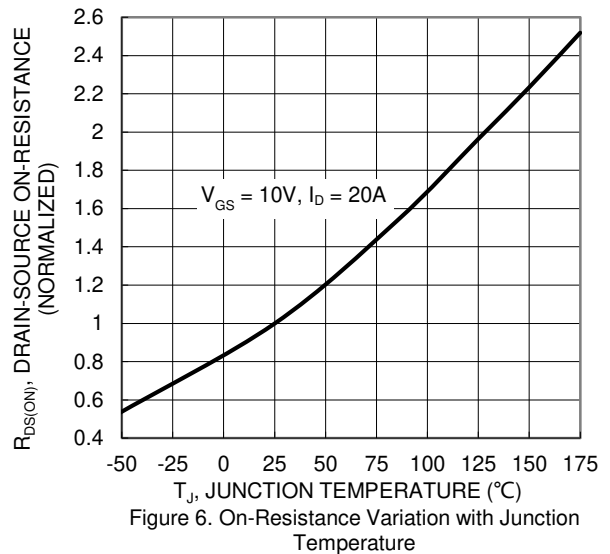
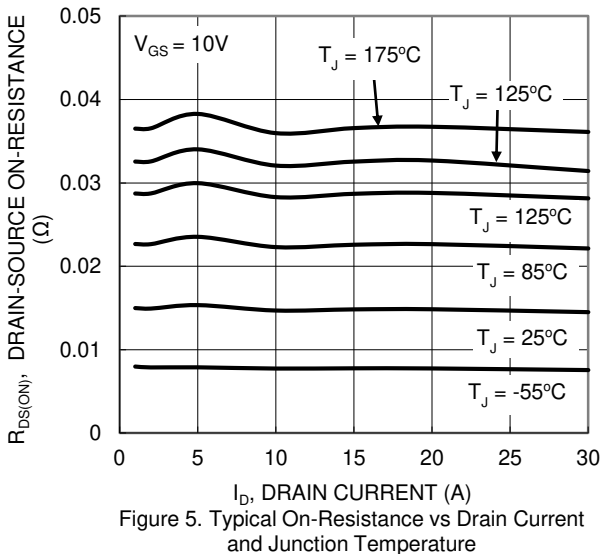
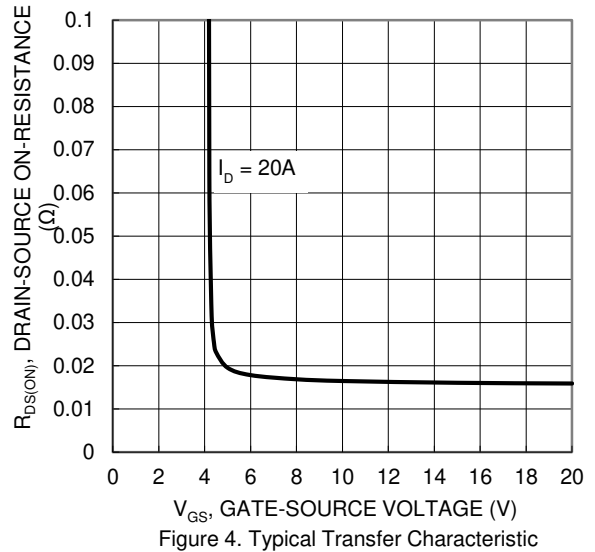
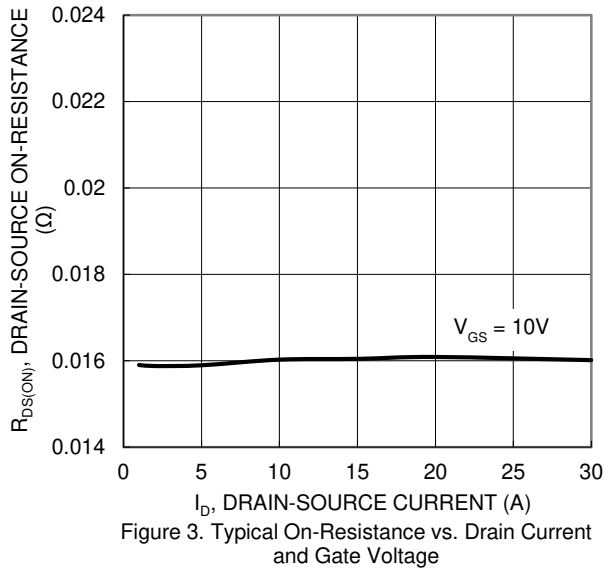
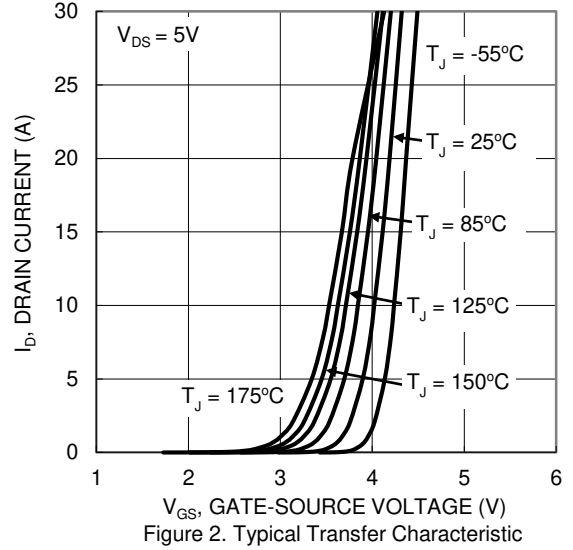
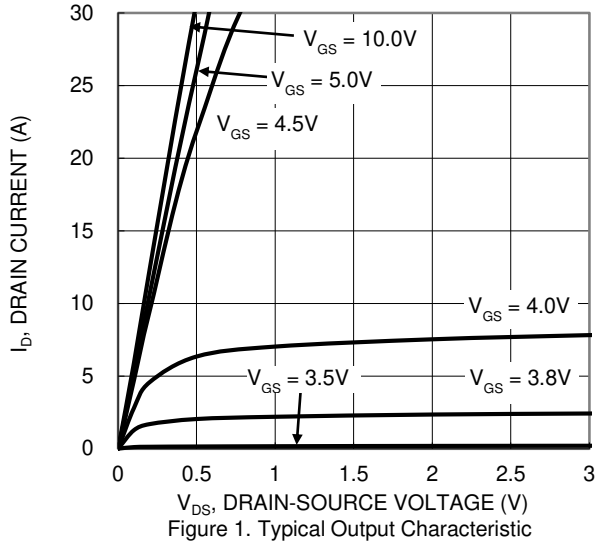
Thermal Characteristics

Characteristic			Symbol	Value	Unit
Total Power Dissipation (Note 5)			P _D	1.8	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State		R _{θJA}	80	°C/W
Total Power Dissipation (Note 6)			P _D	4.4	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State		R _{θJA}	34	°C/W
Thermal Resistance, Junction to Case (Note 7)			R _{θJC}	1.05	
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 8)						
Drain-Source Breakdown Voltage	BV _{DSS}	100	—	—	V	V _{GS} = 0V, I _D = 250µA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1.0	µA	V _{DS} = 100V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	2.0	—	4.0	V	V _{DS} = V _{GS} , I _D = 250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	16	28	mΩ	V _{GS} = 10V, I _D = 20A
Diode Forward Voltage	V _{SD}	—	0.7	1.2	V	V _{GS} = 0V, I _S = 1.0A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	3789	—	pF	V _{DS} = 50V, V _{GS} = 0V f = 1.0MHz
Output Capacitance	C _{oss}	—	223	—		
Reverse Transfer Capacitance	C _{rss}	—	91	—		
Gate Resistance	R _G	—	0.95	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge	Q _g	—	71	—	nC	V _{GS} = 10V, V _{DD} = 50V, I _D = 3.3A
Gate-Source Charge	Q _{gs}	—	13	—		
Gate-Drain Charge	Q _{gd}	—	18	—		
Turn-On Delay Time	t _{D(ON)}	—	17	—	ns	V _{GS} = 10V, V _{DS} = 50V, R _G = 6.0Ω, I _D = 3.3A
Turn-On Rise Time	t _r	—	10	—		
Turn-Off Delay Time	t _{D(OFF)}	—	65	—		
Turn-Off Fall Time	t _f	—	24	—		
Reverse Recovery Time	t _{RR}	—	46	—	ns	I _F = 3.3A, di/dt = 100A/µs
Reverse Recovery Charge	Q _{RR}	—	73	—	nC	I _F = 3.3A, di/dt = 100A/µs

- Notes:
5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1 inch square copper plate.
 7. Thermal resistance from junction to soldering point (on the exposed drain pad).
 8. Short duration pulse test used to minimize self-heating effect.
 9. Guaranteed by design. Not subject to product testing.



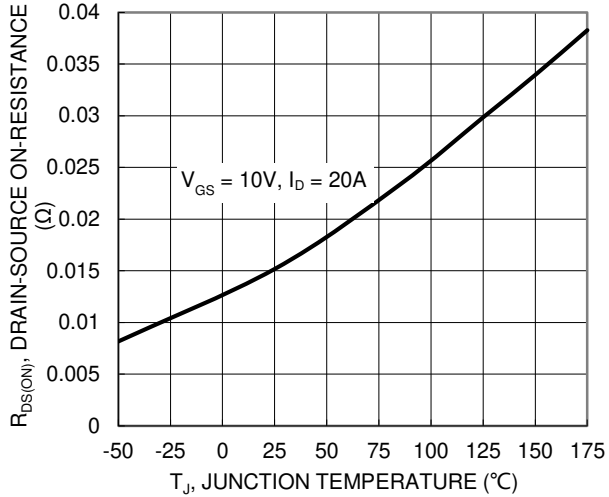


Figure 7. On-Resistance Variation with Junction Temperature

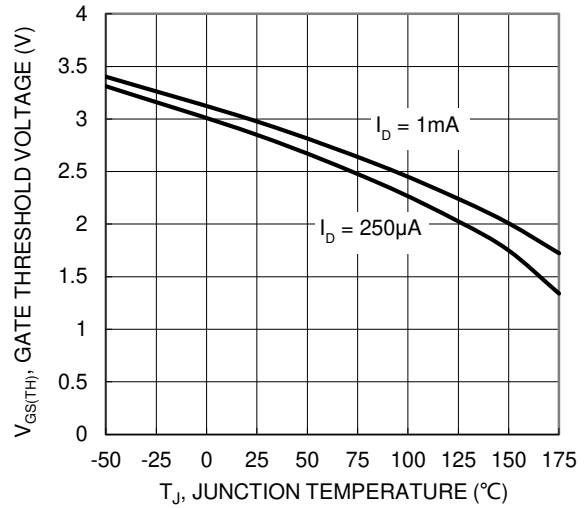


Figure 8. Gate Threshold Variation vs Junction Temperature

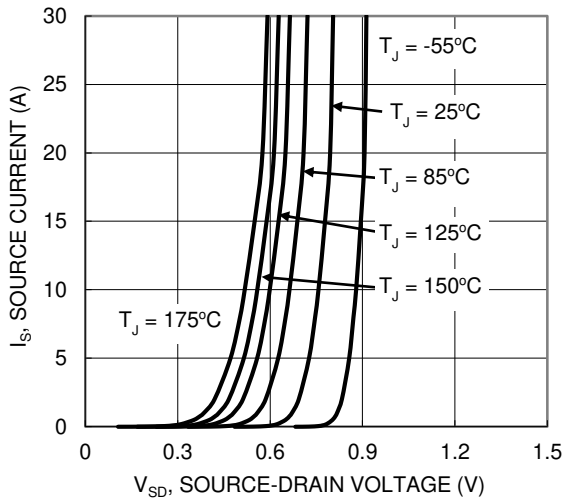


Figure 9. Diode Forward Voltage vs. Current

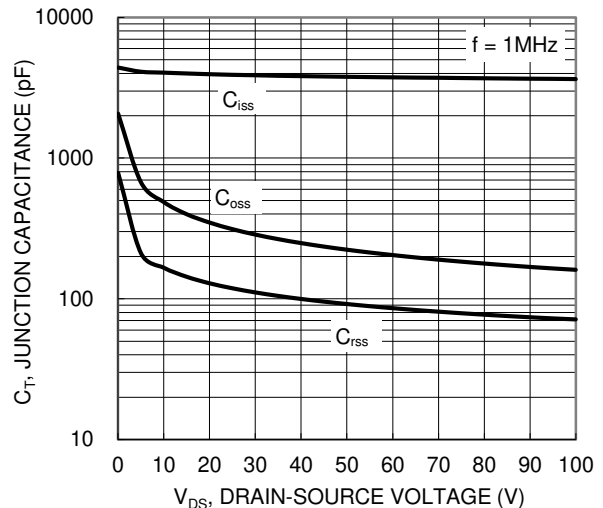


Figure 10. Typical Junction Capacitance

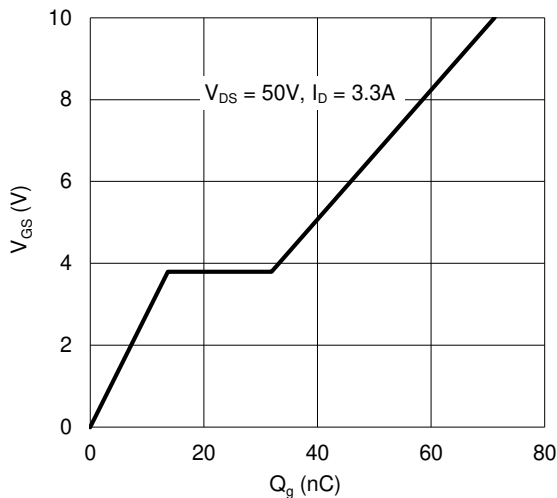


Figure 11. Gate Charge

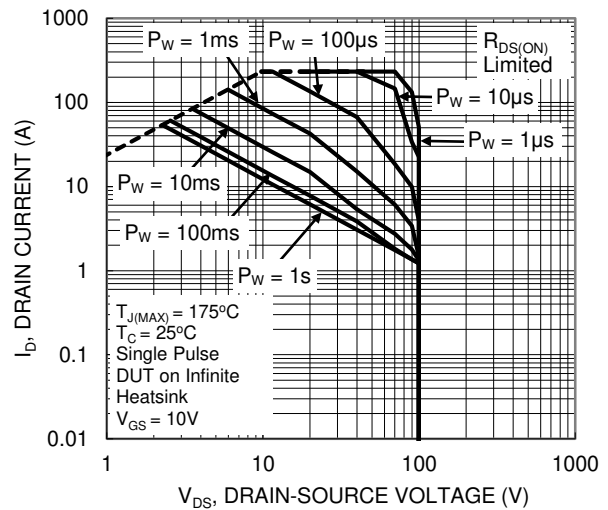


Figure 12. SOA, Safe Operation Area

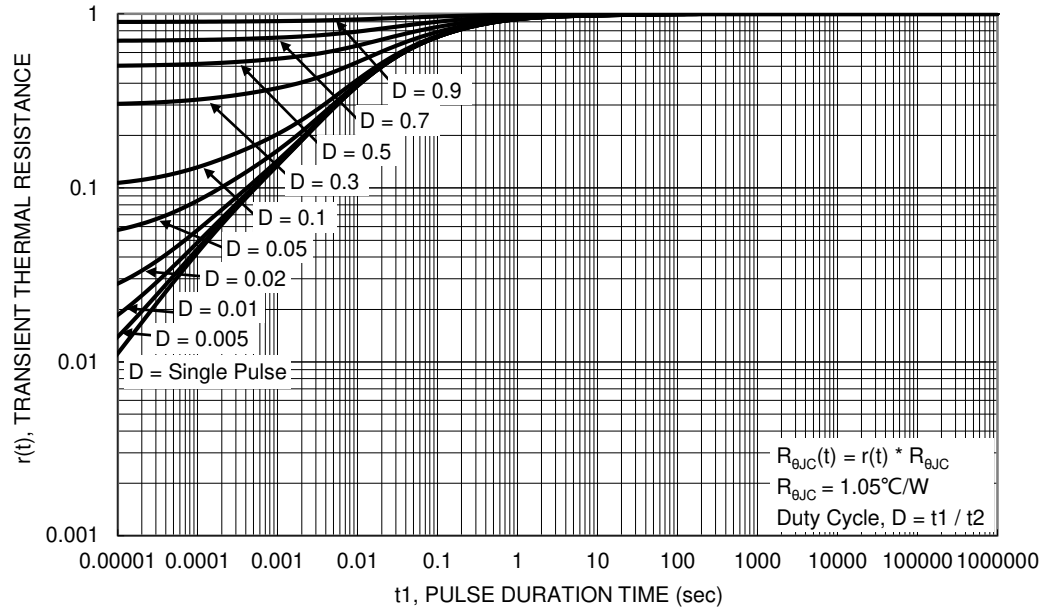
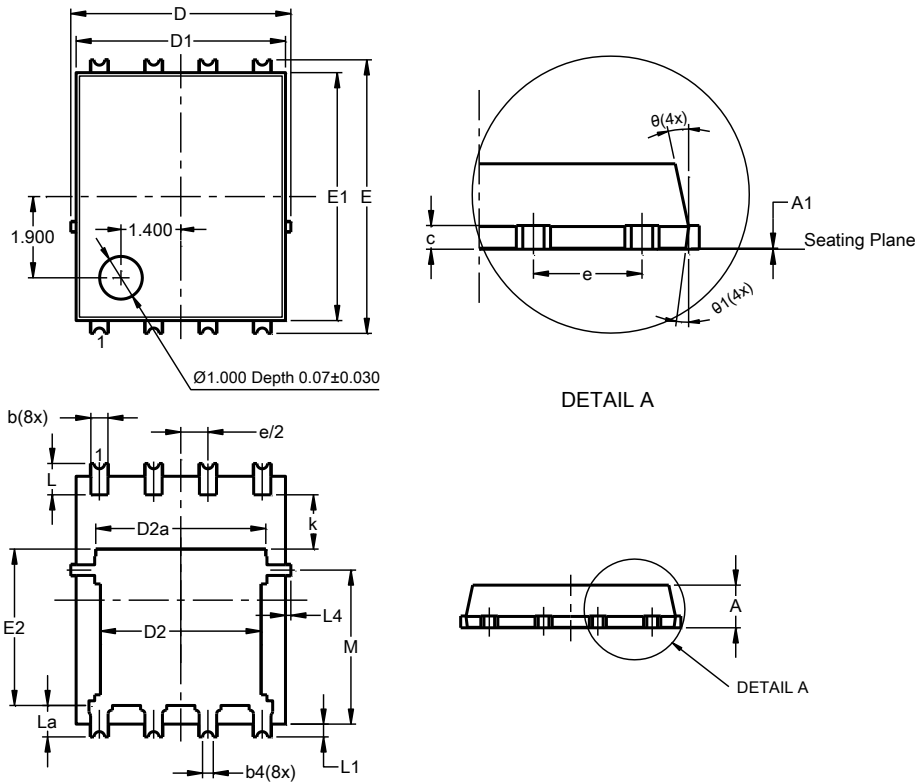


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI5060-8 (SWP) (Type UX)

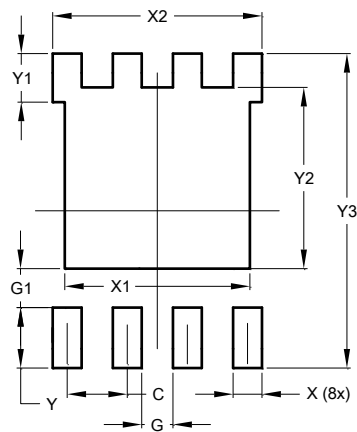


PowerDI5060-8 (SWP) (Type UX)			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0	0.05	--
b	0.30	0.50	0.41
b2	0.20	0.35	0.25
b4	0.25REF		
c	0.230	0.330	0.277
D	5.15 BSC		
D1	4.70	5.10	4.90
D2	3.56	3.96	3.76
D2a	3.78	4.18	3.98
E	6.40 BSC		
E1	5.60	6.00	5.80
E2	3.46	3.86	3.66
E2a	4.195	4.595	4.395
e	1.27BSC		
k	1.05	--	--
L	0.635	0.835	0.735
La	0.635	0.835	0.735
L1	0.200	0.400	0.300
L1a	0.050REF		
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) (Type UX)



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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