



YOUSHANG SEMICONDUCTOR

设计研发新型功率器件

各类小信号开关

中低压及高压大电流等场效应管

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企业微信二维码



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Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D T _C = +25°C (Note 5)
40V	3.3mΩ @ V _{GS} = 10V	100A
	5.0mΩ @ V _{GS} = 5V	95A

Features

- Rated to +175°C – Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switching – Ensures More Reliable and Robust End Application
- Low R_{DS(ON)} – Minimizes On-State Losses
- Low Input Capacitance
- Fast Switching Speed

Description and Applications

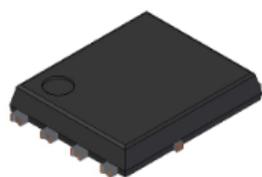
This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

- BLDC motors
- DC-DC converters
- Load switches

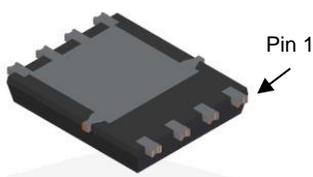
Mechanical Data

- Package: PowerDI[®]5060-8
- Package Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 Ⓔ3
- Weight: 0.097 grams (Approximate)

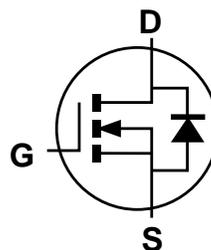
PowerDI5060-8/SWP (Type UX)



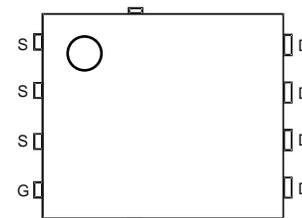
Top View



Bottom View



Internal Schematic



Top View
Pin Configuration

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, V _{GS} = 10V (Note 6)	I _D	T _A = +25°C T _A = +100°C	22 15.5	A
Continuous Drain Current, V _{GS} = 10V (Note 5) (Note 7)		T _C = +25°C T _C = +100°C	100 82	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)	I _{DM}	350	A	
Maximum Continuous Body Diode Forward Current (Note 7)	I _S	69	A	
Pulsed Body Diode Forward Current (10μs Pulse, Duty Cycle = 1%)	I _{SM}	350	A	
Avalanche Current, L = 1mH	I _{AS}	13.2	A	
Avalanche Energy, L = 1mH	E _{AS}	87	mJ	

Thermal Characteristics

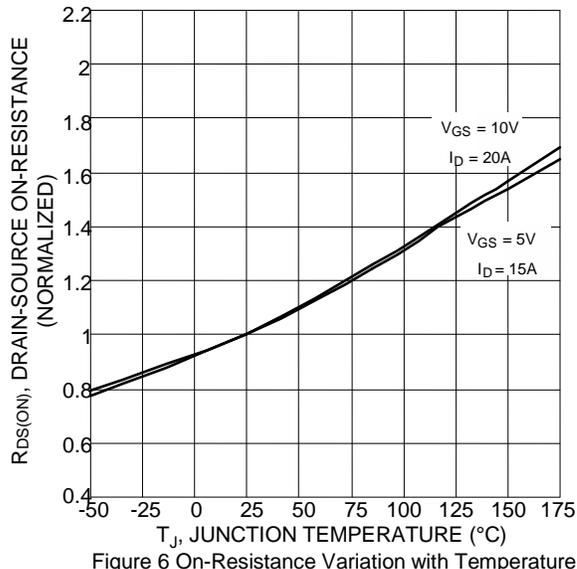
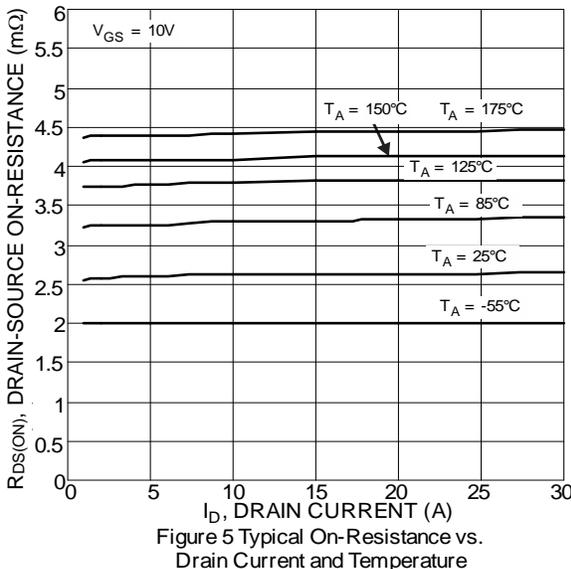
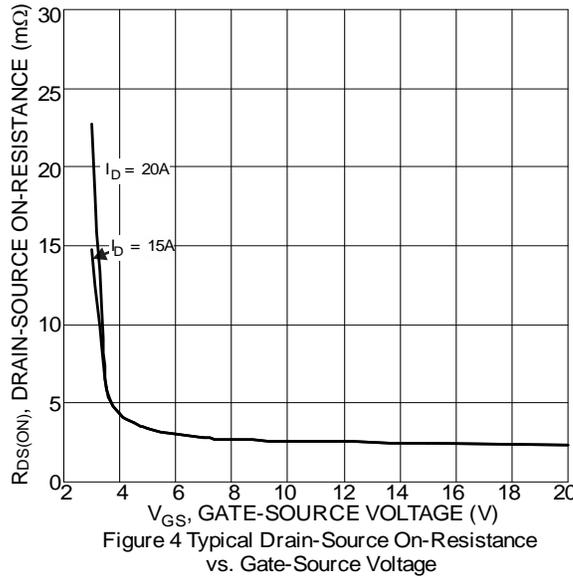
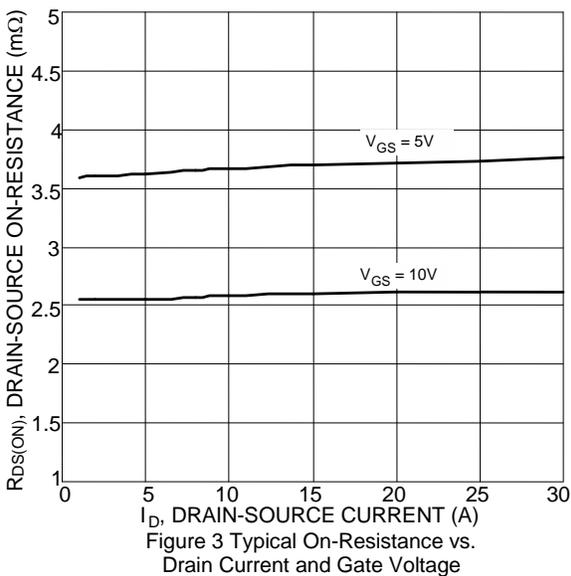
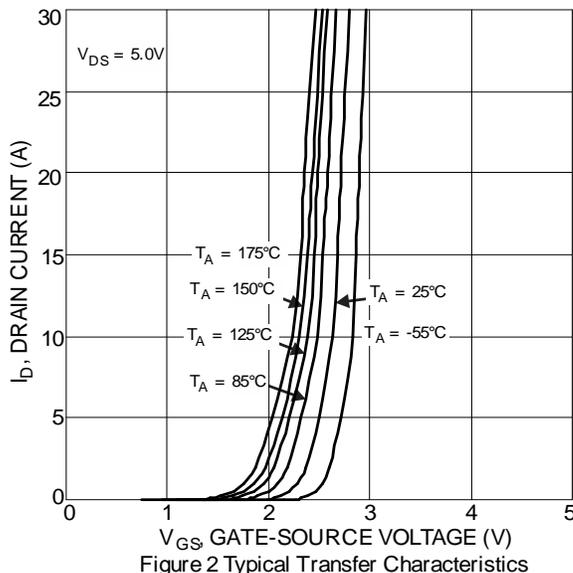
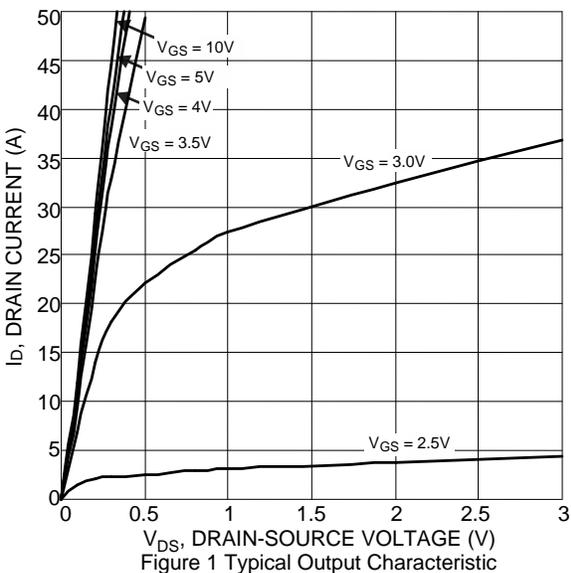
Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 6)	P _D	2.7	W
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	55	°C/W
Total Power Dissipation (Note 7)	P _D	83	W
Thermal Resistance, Junction to Case (Note 7)	R _{θJC}	1.8	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +175	°C

Notes: 5. Package limited.
 6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
 7. Thermal resistance from junction to soldering point (on the exposed drain pad).

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}	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 8)						
Gate Threshold Voltage	V _{GS(TH)}	1	—	2.5	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance (T _C = +25°C)	R _{DS(ON)}	—	2.7	3.3	mΩ	V _{GS} = 10V, I _D = 20A
		—	3.6	5.0		V _{GS} = 5V, I _D = 15A
Static Drain-Source On-Resistance (T _C = +175°C) (Note 9)	R _{DS(ON)}	—	4.7	—	mΩ	V _{GS} = 10V, I _D = 20A
Diode Forward Voltage	V _{SD}	—	—	1.2	V	V _{GS} = 0V, I _S = 20A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	2,693	3,367	pF	V _{DS} = 20V, V _{GS} = 0V f = 1MHz
Output Capacitance	C _{oss}	—	850	1105		
Reverse Transfer Capacitance	C _{rss}	—	52	104		
Gate Resistance	R _G	—	2.54	5.1	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 10V)	Q _g	—	38.5	49	nC	V _{DS} = 20V, I _D = 20A
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	17.6	22		
Gate-Source Charge	Q _{gs}	—	6.9	11		
Gate-Drain Charge	Q _{gd}	—	6.9	11		
Turn-On Delay Time	t _{D(ON)}	—	5.2	10	ns	V _{DD} = 20V, V _{GS} = 10V I _D = 20A, R _G = 1.6Ω
Turn-On Rise Time	t _R	—	5.7	11		
Turn-Off Delay Time	t _{D(OFF)}	—	23.5	46		
Turn-Off Fall Time	t _F	—	11	22		
Body Diode Reverse Recovery Time	t _{RR}	—	35.4	70	ns	I _F = 15A, dI/dt = 100A/μs
Body Diode Reverse Recovery Charge	Q _{RR}	—	32.9	—	nC	

Notes: 8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.



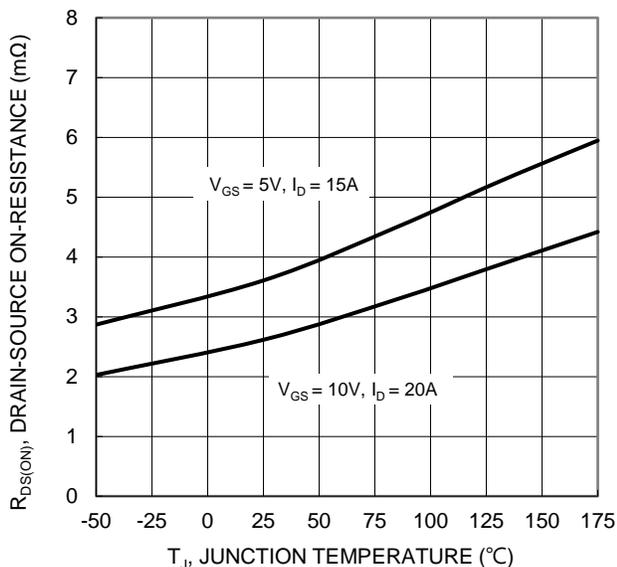


Figure 7. On-Resistance Variation with Temperature

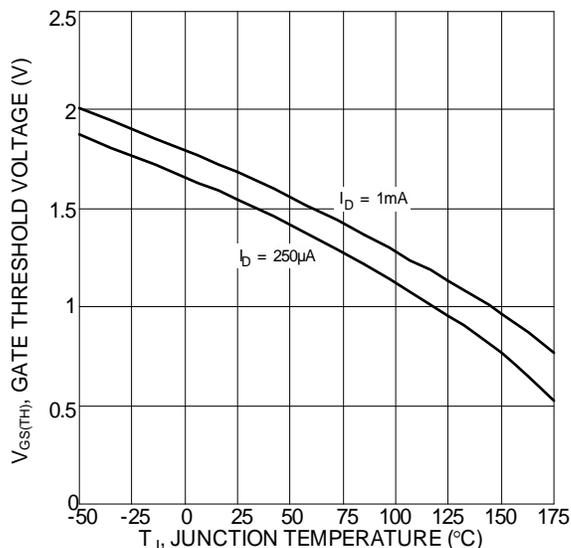


Figure 8 Gate Threshold Variation vs. Temperature

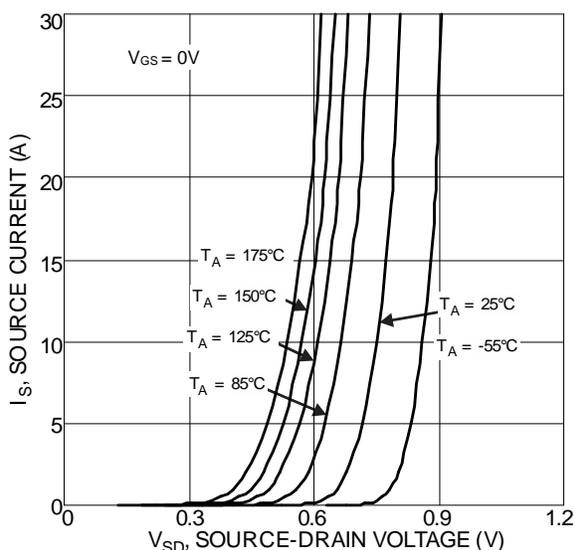


Figure 9 Diode Forward Voltage vs. Current

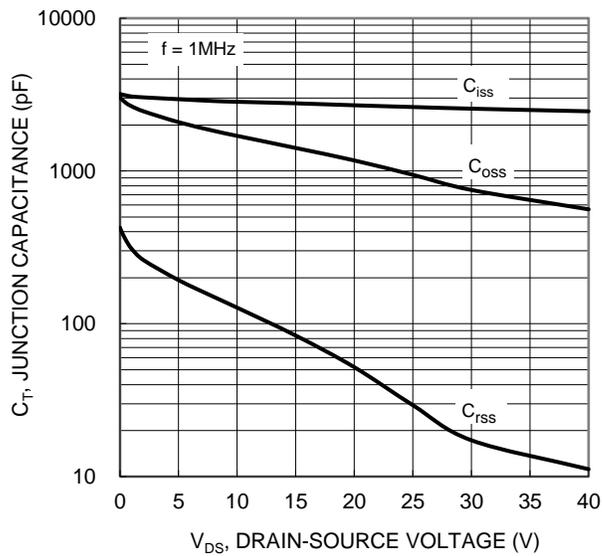


Figure 10. Typical Junction Capacitance

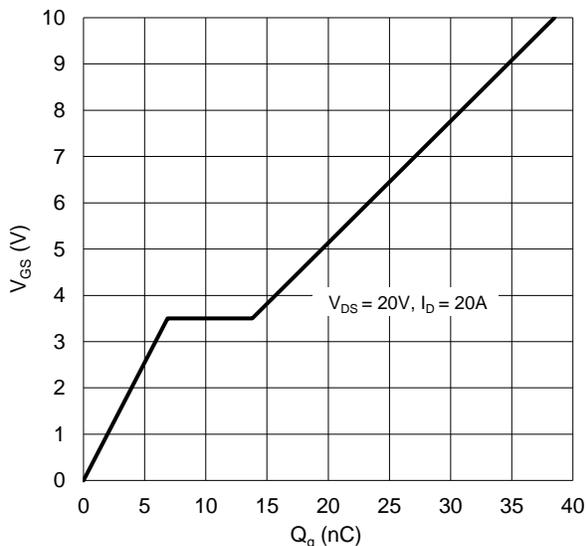


Figure 11. Gate Charge

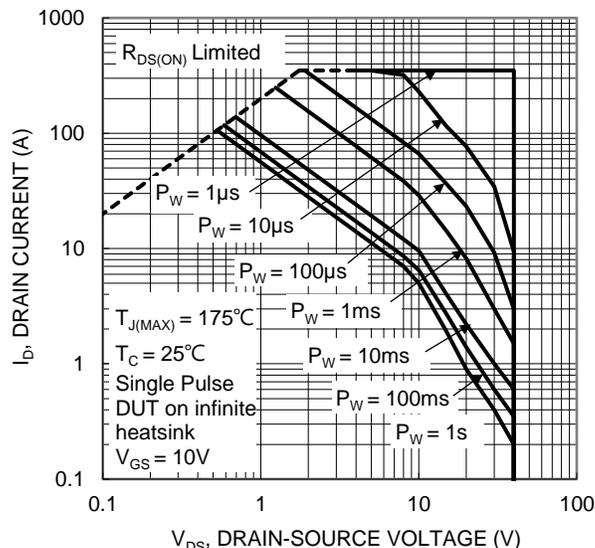
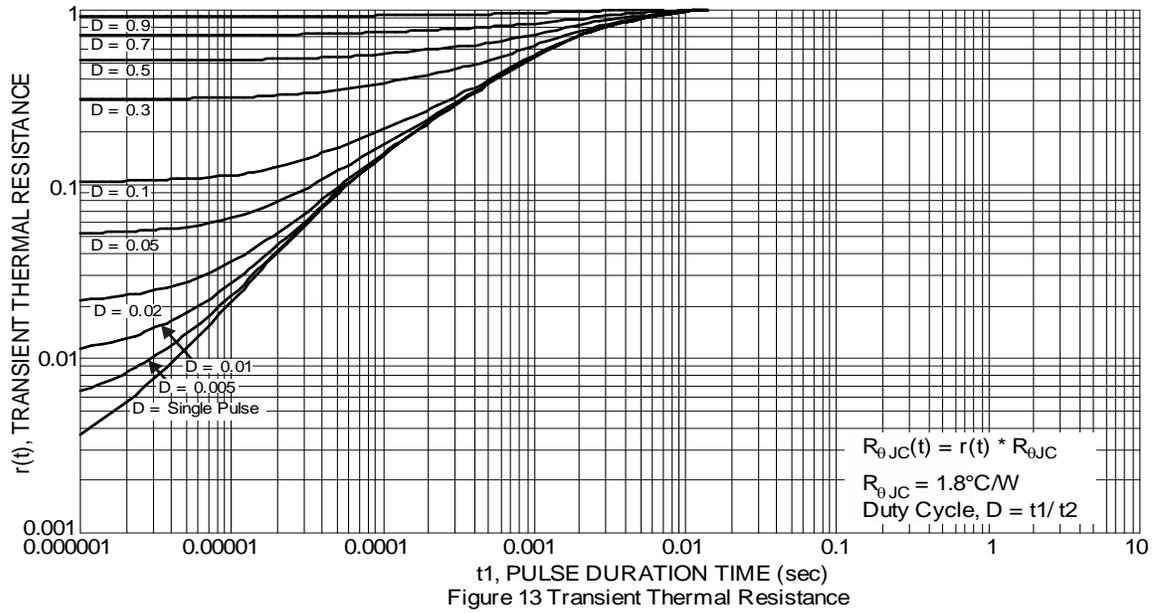
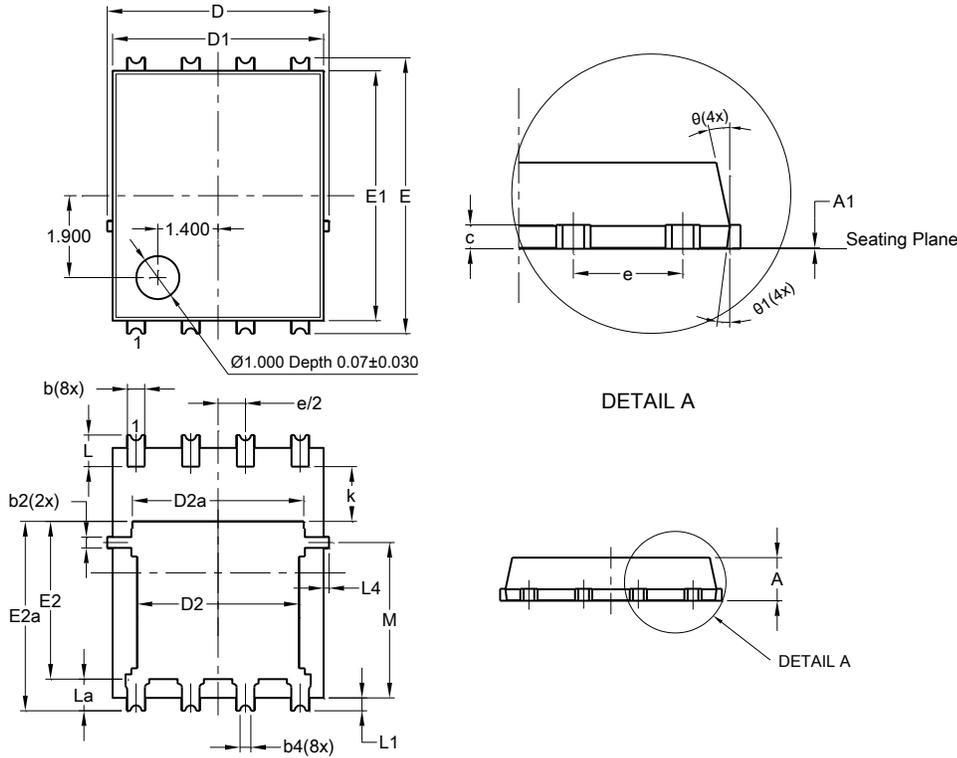


Figure 12. SOA, Safe Operation Area



Package Outline Dimensions

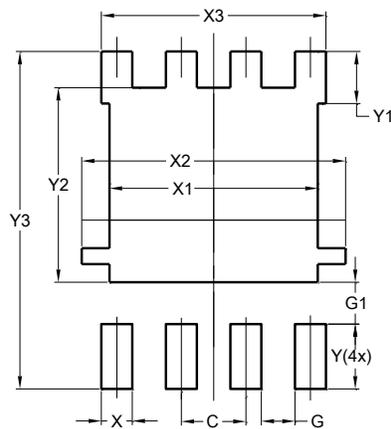
PowerDI5060-8/SWP (Type UX)



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

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	5.190
X3	4.420
Y	1.270
Y1	1.020
Y2	3.810
Y3	6.610