



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 _{bss}	R _{DS(ON)} MAX	I _D T _C = +25°C
80V	7.8mΩ @ V _{GS} = 10V	91A
	11mΩ @ V _{GS} = 4.5V	77A

Features

- Rated to +175°C – Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switching (UIS) Test in Production – Ensures More Reliable and Robust End Application
- High Conversion Efficiency
- Low R_{DS(ON)} – Minimizes On-State Losses
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**

Description and Applications

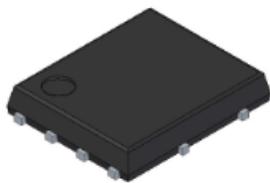
This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

- DC-DC converters
- Load switches

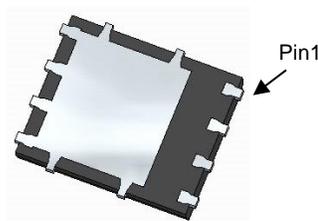
Mechanical Data

- 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
- Terminal Connections: See Diagram Below
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 
- Weight: 0.097 grams (Approximate)

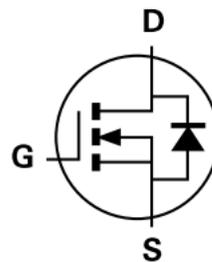
PowerDI5060-8



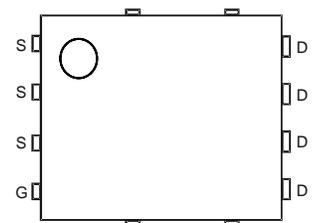
Top View



Bottom View



Internal Schematic



Top View
Pin Configuration

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	80	V
Gate-Source Voltage			V _{GSS}	±20	V
Continuous Drain Current, V _{GS} = 10V (Note 7)	Steady State	T _C = +25°C	I _D	91	A
		T _C = +100°C		64	
Maximum Continuous Body Diode Forward Current (Note 7)			I _S	69	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)			I _{DM}	360	A
Pulsed Body Diode Forward Current (10μs Pulse, Duty Cycle = 1%)			I _{SM}	360	A
Avalanche Current, L = 0.1mH (Note 8)			I _{AS}	23	A
Avalanche Energy, L = 0.1mH (Note 8)			E _{AS}	26.5	mJ

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

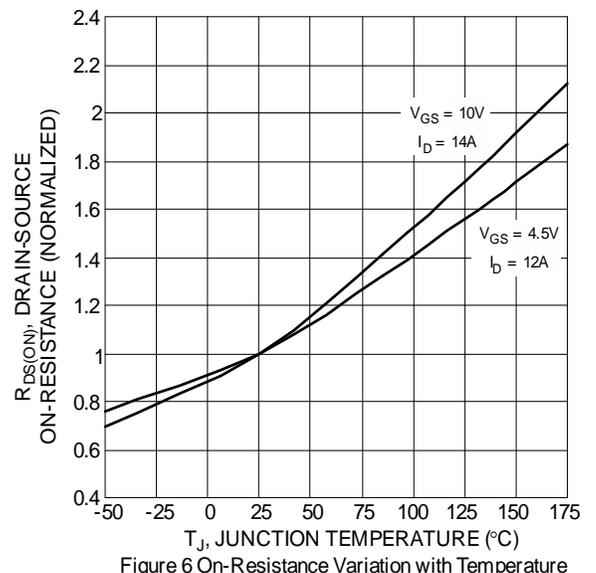
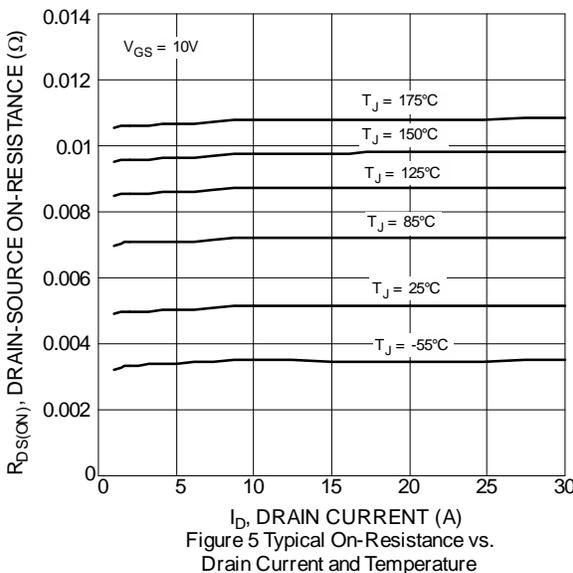
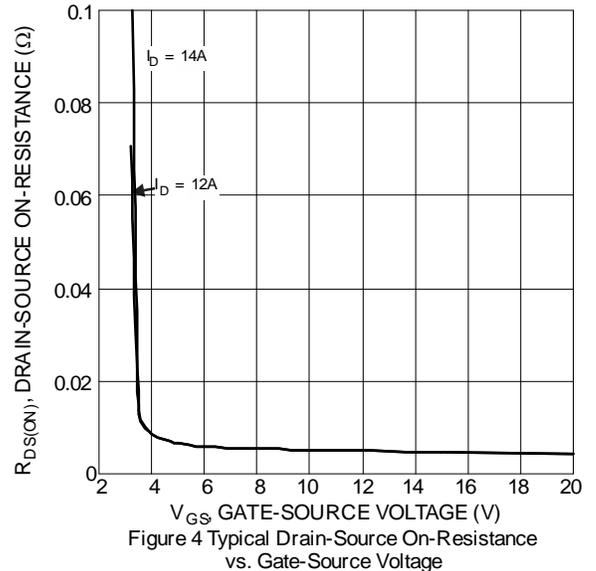
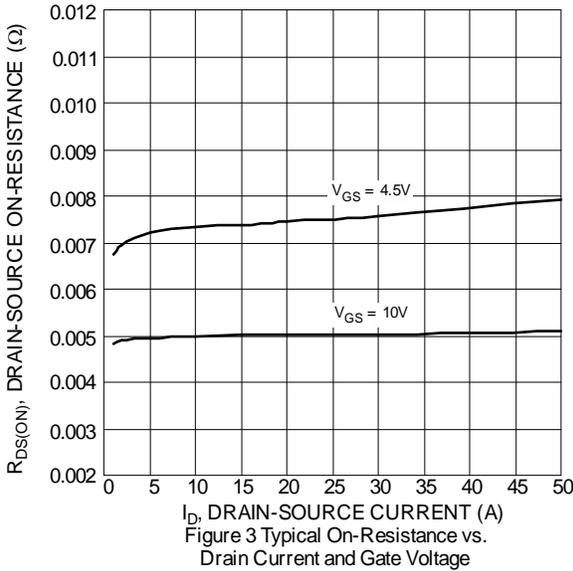
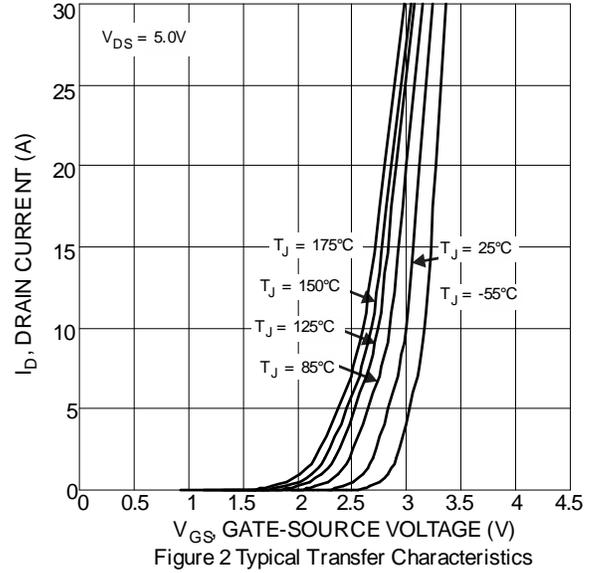
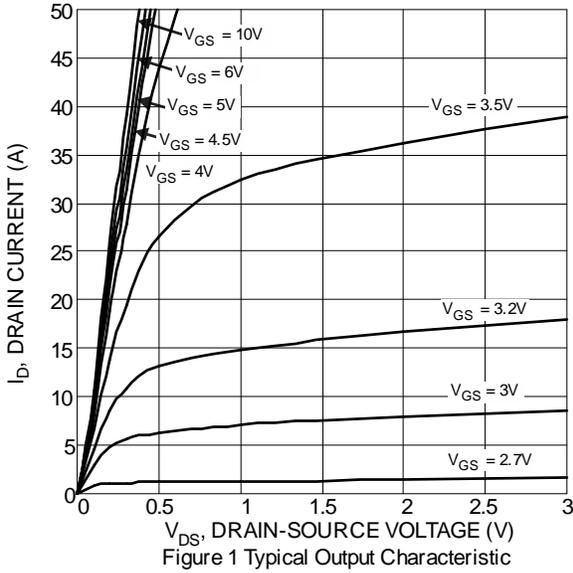
Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T _A = +25°C	P _D	1.6	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R _{θJA}	93	°C/W
Total Power Dissipation (Note 6)	T _A = +25°C	P _D	3.4	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R _{θJA}	44	°C/W
Total Power Dissipation (Note 7)	T _C = +25°C	P _D	100	W
Thermal Resistance, Junction to Case (Note 7)		R _{θJC}	1.5	°C/W
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +175	°C

- Notes:
5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
 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).
 8. I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.

Electrical Characteristics (@T_C = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 9)						
Drain-Source Breakdown Voltage	BV _{DSS}	80	—	—	V	V _{GS} = 0V, I _D = 1mA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	μA	V _{DS} = 64V, 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)}	1.3	—	2.8	V	V _{DS} = V _{GS} , I _D = 1mA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	5	7.8	mΩ	V _{GS} = 10V, I _D = 14A
		—	8	11		V _{GS} = 4.5V, I _D = 12A
Diode Forward Voltage	V _{SD}	—	0.8	1.2	V	V _{GS} = 0V, I _S = 14A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C _{iss}	—	2345	—	pF	V _{DS} = 40V, V _{GS} = 0V, f = 1MHz
Output Capacitance	C _{oss}	—	842	—		
Reverse Transfer Capacitance	C _{rss}	—	51.9	—		
Gate Resistance	R _G	—	1.7	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _G	—	21.7	—	nC	V _{DD} = 40V, I _D = 2A
Total Gate Charge (V _{GS} = 10V)	Q _G	—	41.2	—		
Gate-Source Charge	Q _{GS}	—	5.0	—		
Gate-Drain Charge	Q _{GD}	—	10.6	—		
Turn-On Delay Time	t _{D(ON)}	—	5.8	—	ns	V _{DD} = 40V, V _{GS} = 10V, I _D = 2A, R _G = 1.6Ω
Turn-On Rise Time	t _R	—	5.4	—		
Turn-Off Delay Time	t _{D(OFF)}	—	24.5	—		
Turn-Off Fall Time	t _F	—	43.2	—		
Body Diode Reverse Recovery Time	t _{Rr}	—	61	—	ns	I _F = 2A, di/dt = 100A/μs
Body Diode Reverse Recovery Charge	Q _{Rr}	—	181	—	nC	

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



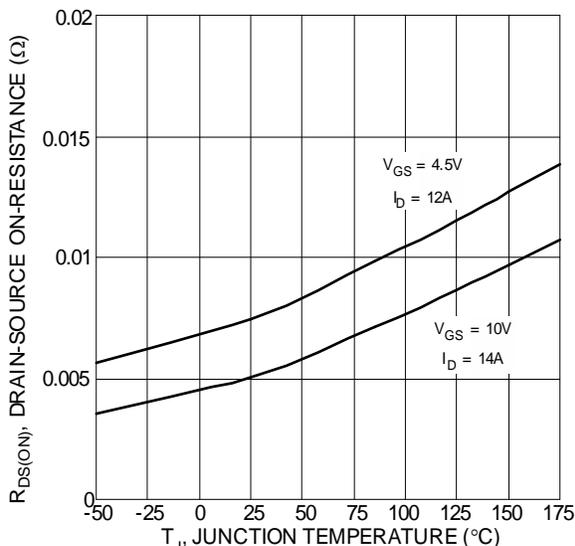


Figure 7 On-Resistance Variation with Temperature

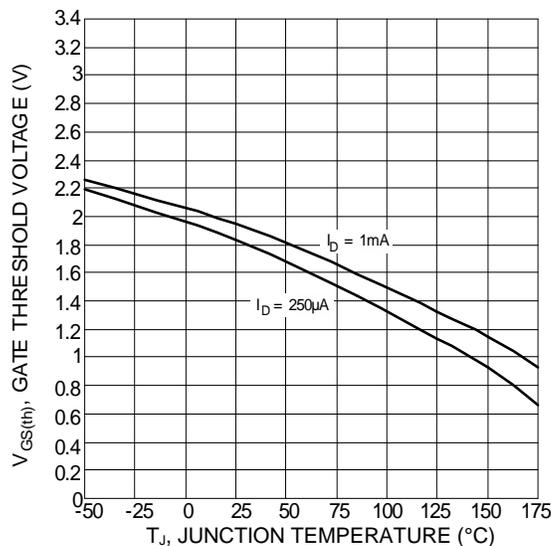


Figure 8 Gate Threshold Variation vs. Junction Temperature

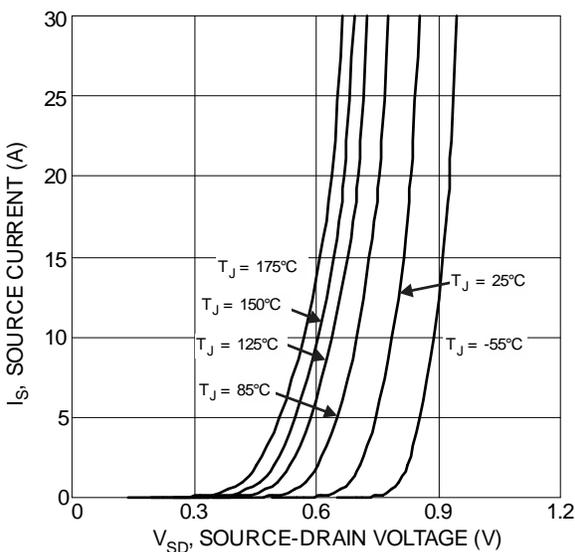


Figure 9 Diode Forward Voltage vs. Current

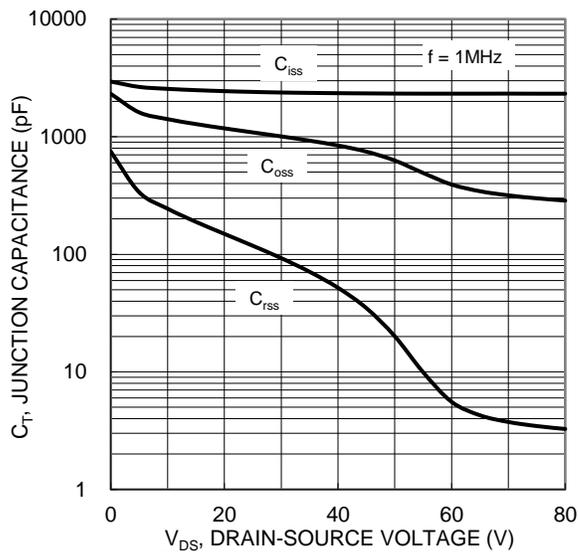


Figure 10 Typical Junction Capacitance

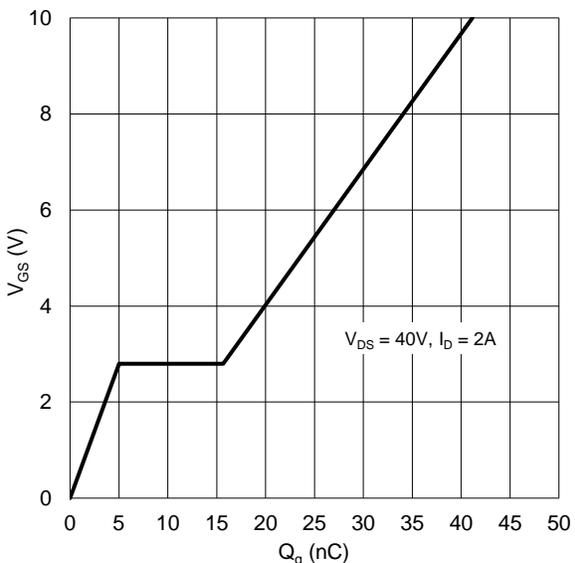


Figure 11 Gate Charge

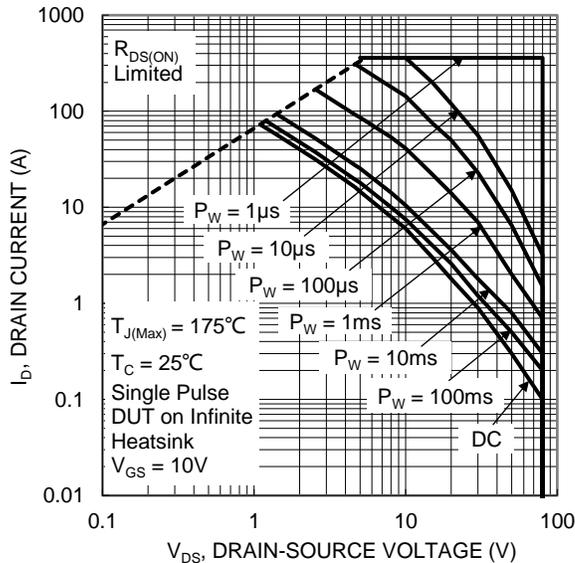
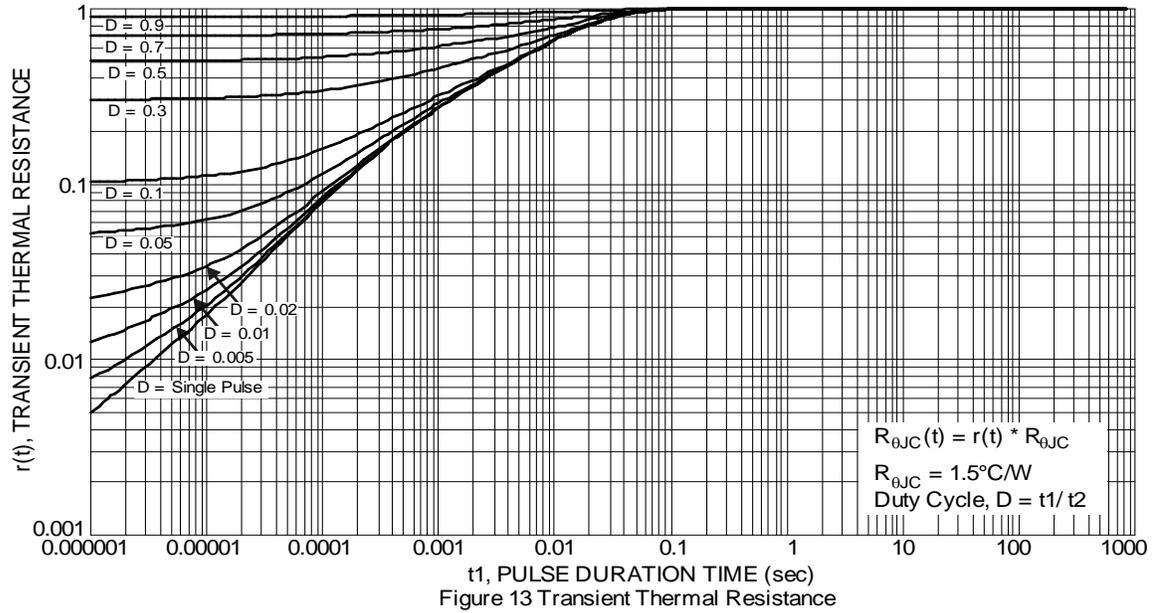
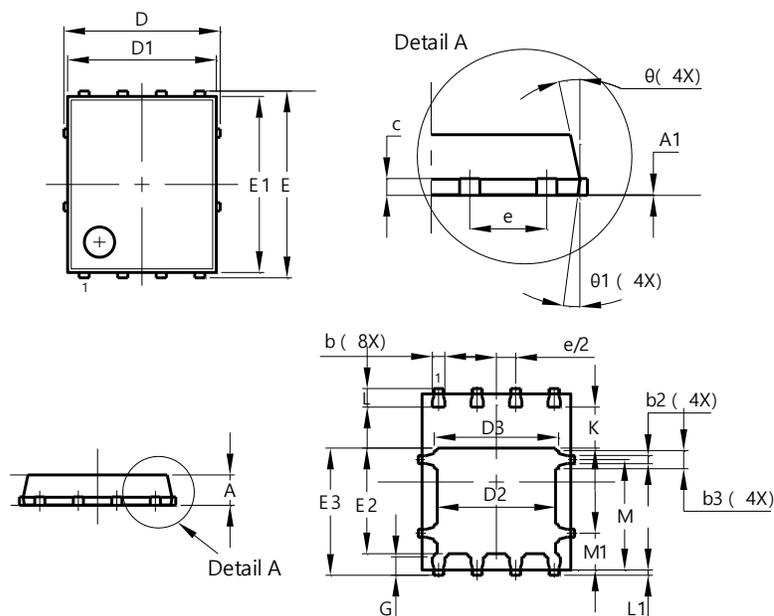


Figure 12. SOA, Safe Operation Area



Package Outline Dimensions

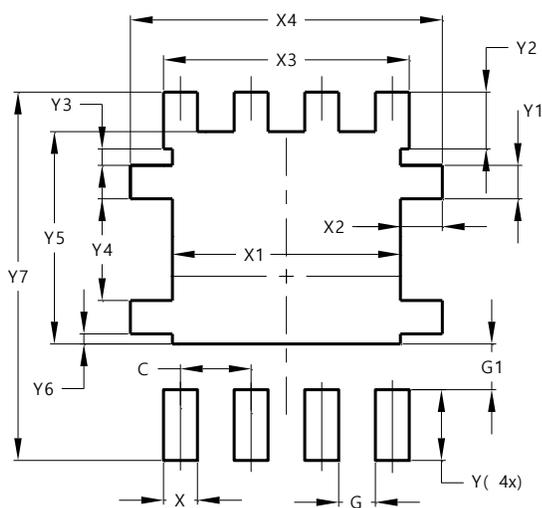
PowerDI5060-8



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°
θ1	6°	8°	7°
All Dimensions in mm			

Suggested Pad Layout

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