优尚

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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Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D T_C = +25°C (Note 9)
100V	4.3mΩ @ V_{GS} = 10V	100A

Features

- 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
- Low Input Capacitance
- Fast Switching Speed

Description

This new generation N-Channel enhancement mode MOSFET is designed to minimize $R_{DS(ON)}$ yet maintain superior switching performance. This device is ideal for use in notebook battery power management and load switch.

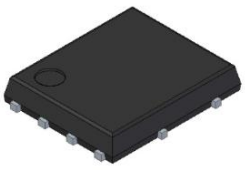
Applications

- Motor Control
- DC-DC Converters
- Power Management

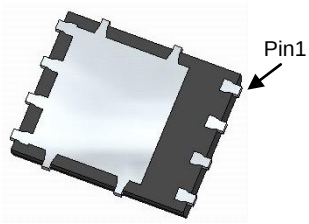
Mechanical Data

- 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 Connections Indicator: See Diagram
- Terminals: Finish—Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.097 grams (Approximate)

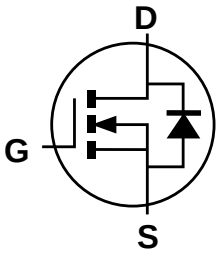
POWERDI5060-8 (Standard)



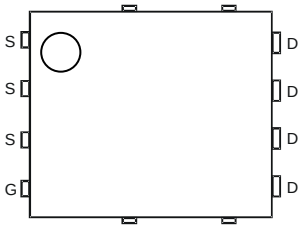
Top View



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}	100	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current, V_{GS} = 10V (Note 5)	Steady State	T_A = +25°C T_A = +100°C	I_D	20 14	A
Continuous Drain Current, V_{GS} = 10V (Note 6)	Steady State	T_C = +25°C T_C = +100°C (Note 9)	I_D	100 100	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I_{DM}	400	A
Pulsed Body Diode Forward Current (10µs Pulse, T_C=+25°C, Package Limited)			I_{SM}	400	A
Maximum Continuous Body Diode Forward Current (Note 6)			I_S	100	A
Avalanche Current (Note 7) L=0.3mH			I_{AS}	40	A
Avalanche Energy (Note 7) L=0.3mH			E_{AS}	240	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T_A = +25°C	P_D	2.7	W
Thermal Resistance, Junction to Ambient (Note 5)		$R_{\Theta JA}$	54	°C/W
Total Power Dissipation (Note 6)	T_C = +25°C	P_D	136	W
Thermal Resistance, Junction to Case (Note 6)		$R_{\Theta JC}$	1.1	°C/W
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 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	100	—	—	V	V_{GS} = 0V, I_D = 10mA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	µA	V_{DS} = 80V, 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	—	2.5	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	3.5	4.3	mΩ	V_{GS} = 10V, I_D = 30A
		—	4.7	6.2		V_{GS} = 4.5V, I_D = 20A
Diode Forward Voltage	V_{SD}	—	—	1.2	V	V_{GS} = 0V, I_S = 30A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{ISS}	—	4843	—	pF	V_{DS} = 50V, V_{GS} = 0V f = 1MHz
Output Capacitance	C_{OSS}	—	1302	—		
Reverse Transfer Capacitance	C_{RSS}	—	25.5	—		
Gate Resistance	R_G	—	2.1	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge	Q_G	—	80	—	nC	V_{DD} = 50V, I_D = 30A, V_{GS} = 10V
Gate-Source Charge	Q_{GS}	—	14	—		
Gate-Drain Charge	Q_{GD}	—	18	—		
Turn-On Delay Time	$t_{D(ON)}$	—	9	—	ns	V_{DD} = 50V, V_{GS} = 10V, I_D = 30A, R_G = 4.7Ω, R_L=1.1Ω
Turn-On Rise Time	t_R	—	26	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	76	—		
Turn-Off Fall Time	t_F	—	50	—		
Reverse Recovery Time	t_{RR}	—	63	—	ns	I_F = 22.5A, di/dt = 100A/µs
Reverse Recovery Charge	Q_{RR}	—	133	—	nC	

Notes:
5. Device mounted on FR-4 PCB, with minimum recommended pad layout, single sided.
6. Thermal resistance from junction to soldering point (on the exposed drain pad).
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to product testing.
9. Package limited.

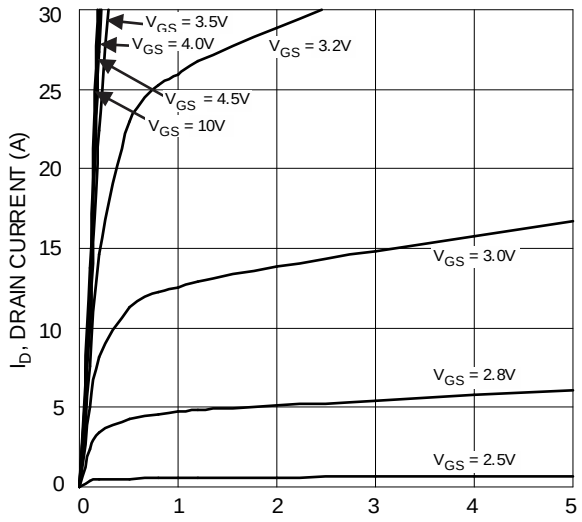


Figure 1 Typical Output Characteristic

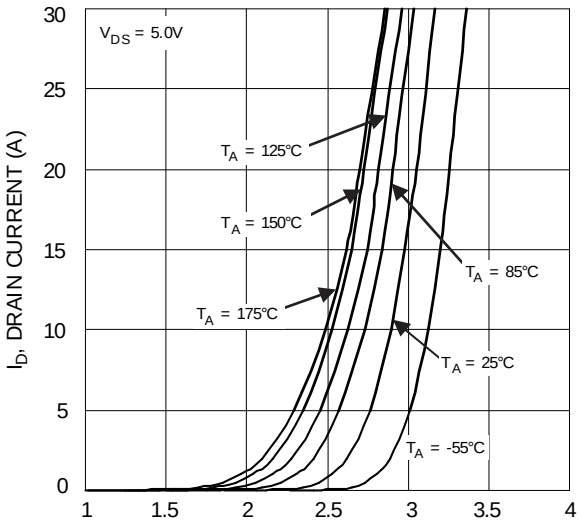


Figure 2 Typical Transfer Characteristics

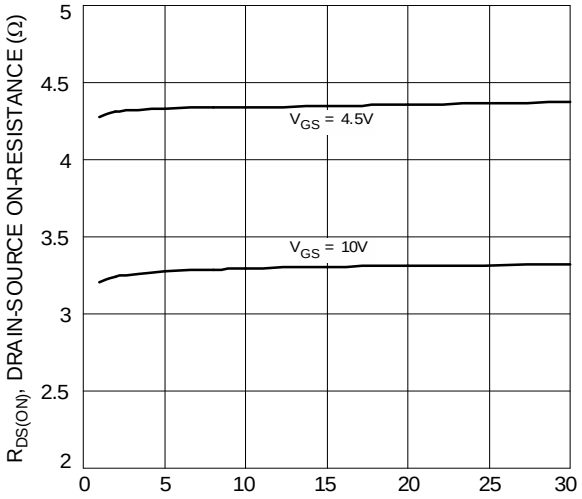


Figure 3 Typical On-Resistance vs.
Drain Current and Gate Voltage

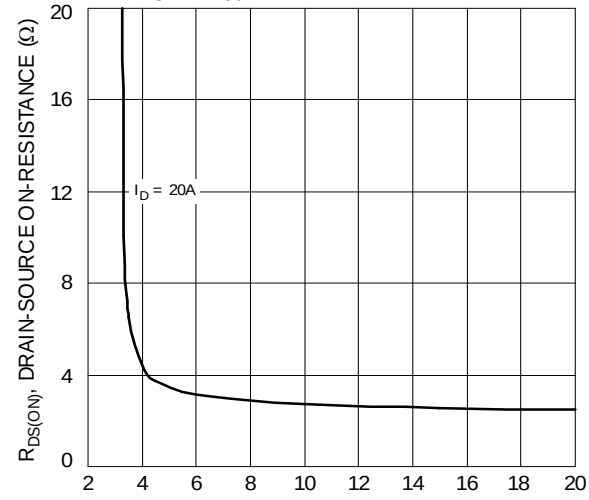


Figure 4 Typical Drain-Source On-Resistance
vs. Gate-Source Voltage

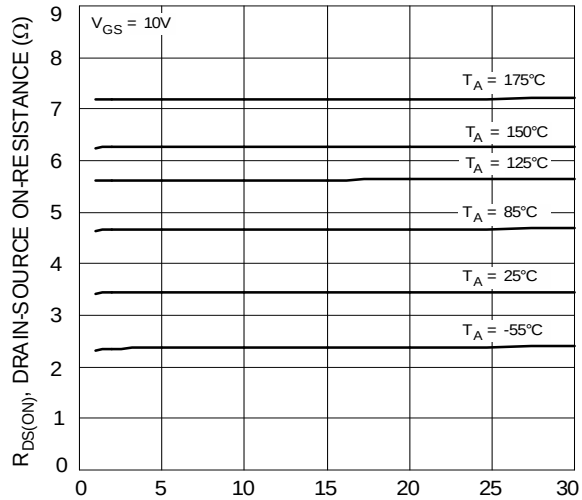


Figure 5 Typical On-Resistance vs.
Drain Current and Temperature

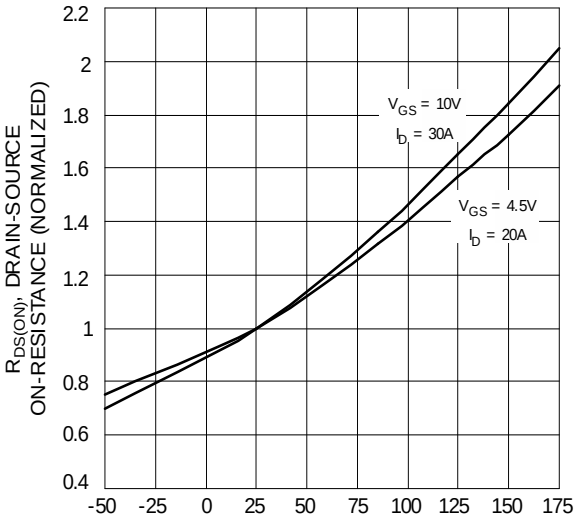


Figure 6 On-Resistance Variation with Temperature

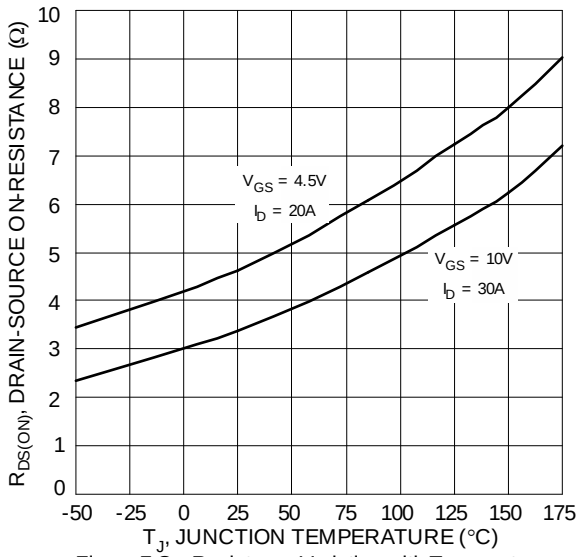


Figure 7 On-Resistance Variation with Temperature

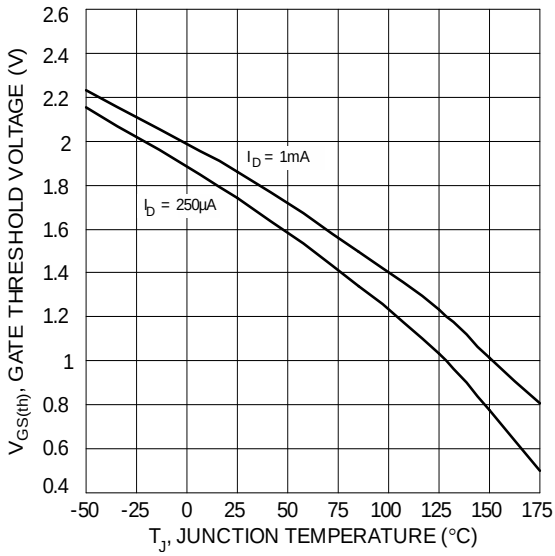


Figure 8 Gate Threshold Variation vs. Junction Temperature

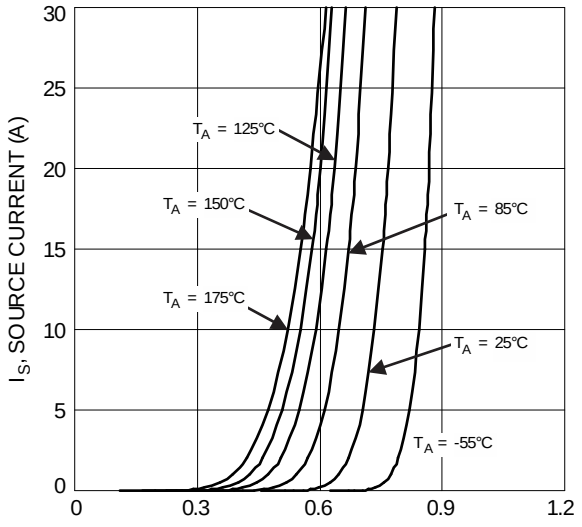


Figure 9 Diode Forward Voltage vs. Current

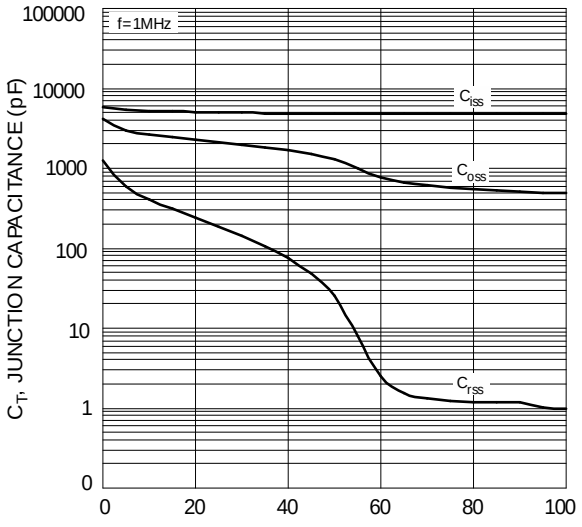


Figure 10 Typical Junction Capacitance

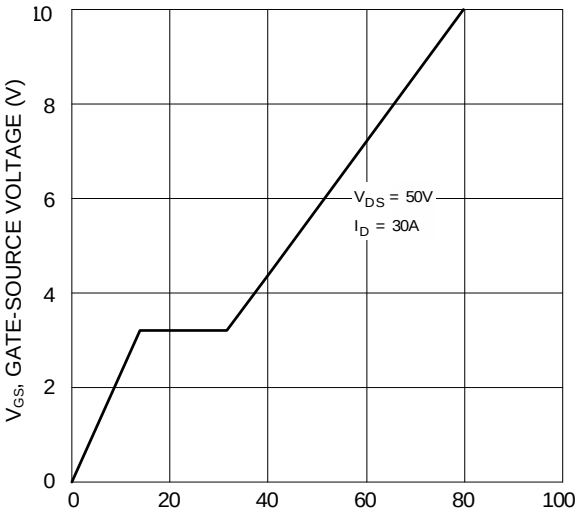


Figure 11 Gate Charge

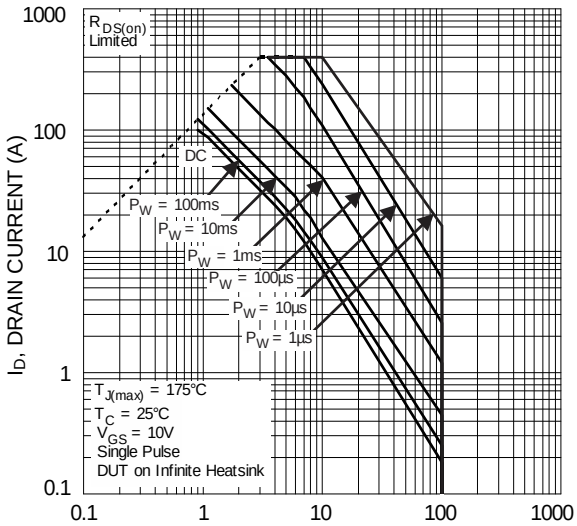


Figure 12 SOA, Safe Operation Area

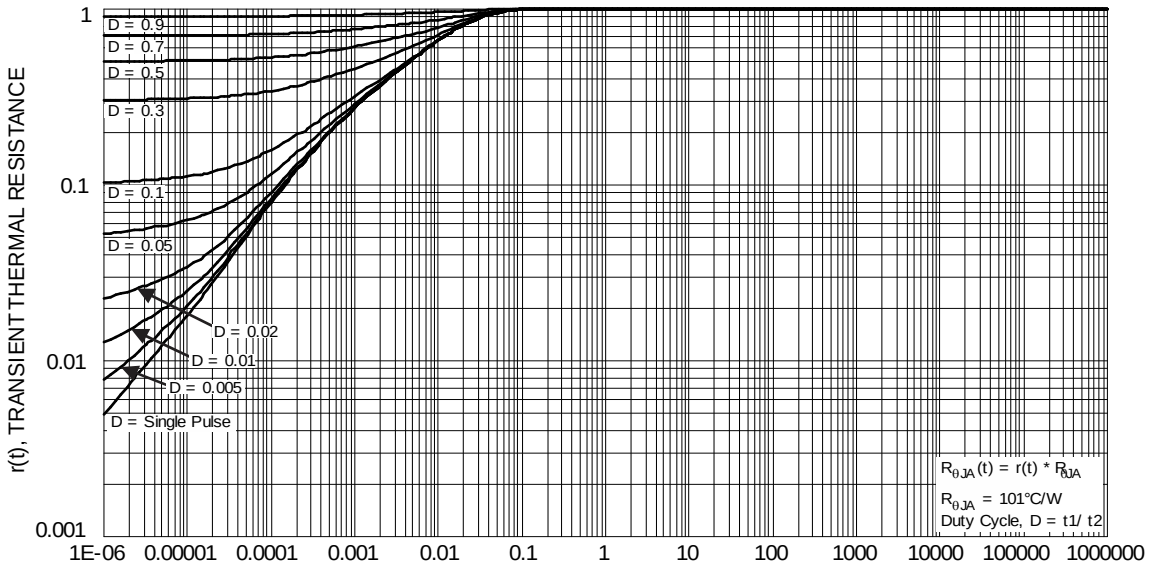
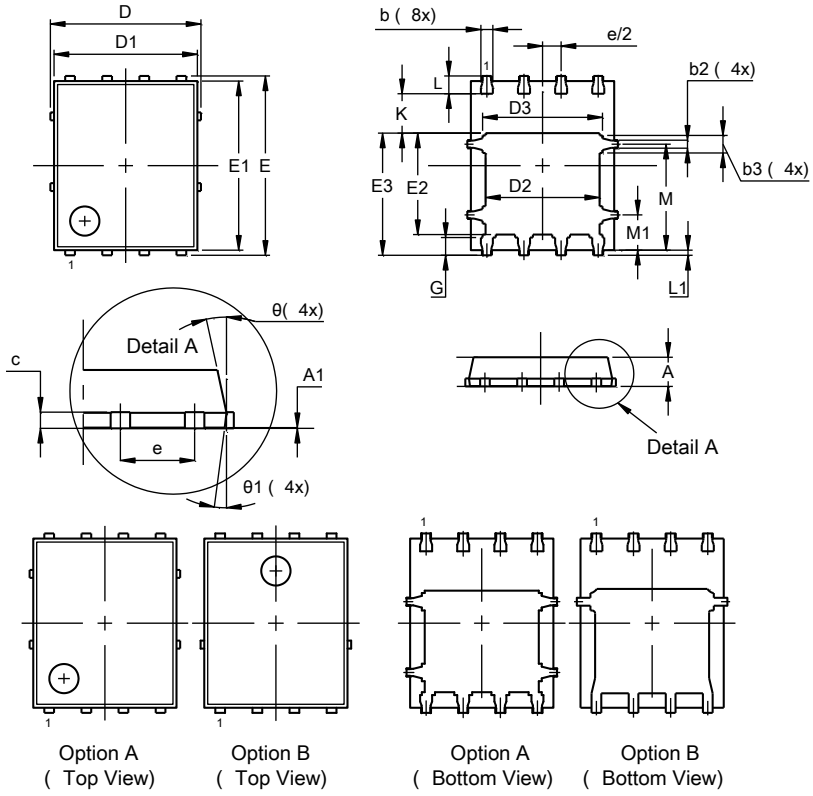


Figure 13 Transient Thermal Resistance

Package Outline Dimensions

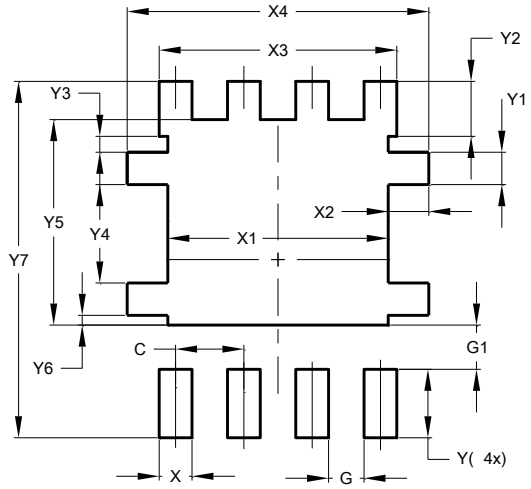
POWERDI5060-8 (Standard)



POWERDI5060-8 (Standard)			
Dim	**Min**	**Max**	**Typ**
A	0.90	1.20	--
A1	0.00	0.05	–
b	0.33	0.51	--
b2	0.200	0.350	--
b3	0.40	0.80	0.60
c	0.230	0.354	--
D (Option A)	5.15 BSC		
D (Option B)	5.30 BSC		
D1	4.70	5.40	--
D2	3.70	4.25	--
D3	3.90	4.70	--
E	6.15 BSC		
E1	5.60	6.06	--
E2	3.28	3.92	--
E3	3.99	4.39	--
e	1.27 BSC		
G	0.40	0.71	--
K	0.51	1.45	–
L	0.38	0.71	--
L1	0.100	0.200	--
M	3.235	4.035	--
M1	1.00	1.40	1.21
θ	8°	12°	--
θ1	6°	8°	7°
All Dimensions in mm			

Suggested Pad Layout

POWERDI5060-8 (Standard)



Dimensions	Value (in mm)
C	1.270
G	0.660
G1	0.820
X	0.610
X1	4.300
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	4.100
Y6	0.180
Y7	6.610