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 Max T_C = +25°C**
80V	26mΩ @ V_{GS} = 10V	28.5A
	45mΩ @ V_{GS} = 4.5V	21A

Description and Applications

This new generation MOSFET features low on-resistance and fast switching, making it ideal for high efficiency power management applications.

- DC-DC converters
- Motors

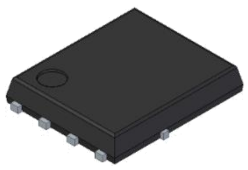
Features and Benefits

- 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
- Low Input Capacitance
- Fast Switching Speed
- Wettable Flank for Improved Optical Inspection
- Additional Tin-Plated on Sidewall Pads for Optical Solder Inspection
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**

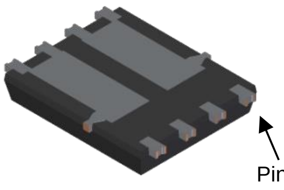
Mechanical Data

- 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)

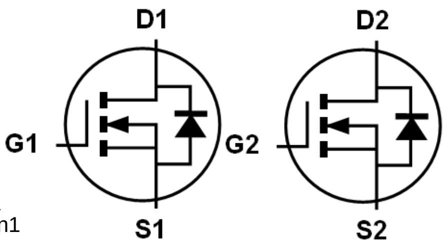
PowerDI5060-8/SWP (Type UXD)



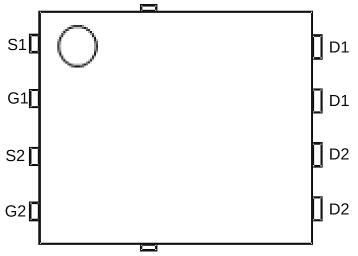
Top View



Bottom View



Equivalent Circuit



Top View
Pin Configuration

Maximum Ratings (@T_A = +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 6)	T_C = +25°C T_C = +100°C	I_D	28.5 20	A
Maximum Body Diode Forward Current		I_S	29	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)		I_{DM}	113.5	A
Pulsed Body Diode Forward Current (10µs Pulse, T_C = +25°C, Package Limited)		I_{SM}	113.5	A
Avalanche Current, L = 0.3mH		I_{AS}	12.5	A
Avalanche Energy, L = 0.3mH		E_{AS}	23.4	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Thermal Resistance, Junction to Ambient (Note 5)		$R_{\theta JA}$	48	°C/W
Total Power Dissipation	T_A = +25°C	P_D	3.1	W
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	3.7	°C/W
Total Power Dissipation	T_C = +25°C	P_D	41	W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +175	°C

Notes:
5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
6. Thermal resistance from junction to solder point (on the exposed drain pin).

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
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 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	1.3	—	2.5	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	20	26	mΩ	V_{GS} = 10V, I_D = 10A
		—	29	45		V_{GS} = 4.5V, I_D = 5A
Diode Forward Voltage	V_{SD}	—	0.9	1.2	V	V_{GS} = 0V, I_S = 10A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	631	—	pF	V_{DS} = 40V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	200	—		
Reverse Transfer Capacitance	C_{rss}	—	19.5	—		
Gate Resistance	R_G	—	1.1	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
Total Gate Charge (V_{GS} = 4.5V)	Q_g	—	5.4	—	nC	V_{DS} = 40V, I_D = 7.5A
Total Gate Charge (V_{GS} = 10V)	Q_g	—	10.4	—		
Gate-Source Charge	Q_{gs}	—	1.8	—		
Gate-Drain Charge	Q_{gd}	—	2.4	—		
Turn-On Delay Time	$t_{D(ON)}$	—	7.1	—	ns	V_{DD} = 40V, V_{GS} = 4.5V, R_G = 2.7Ω, I_D = 10A
Turn-On Rise Time	t_R	—	9.7	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	18.6	—		
Turn-Off Fall Time	t_F	—	8.6	—		
Body Diode Reverse Recovery Time	t_{RR}	—	28.5	—	ns	I_F = 7.5A, di/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q_{RR}	—	21.7	—	nC	I_F = 7.5A, di/dt = 100A/µs

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

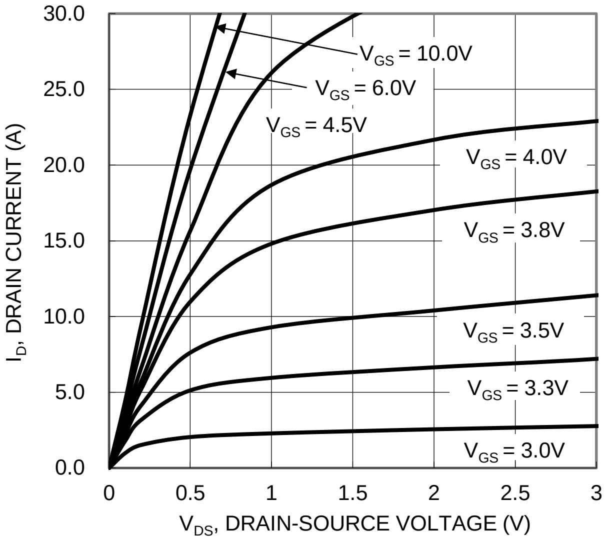


Figure 1. Typical Output Characteristic

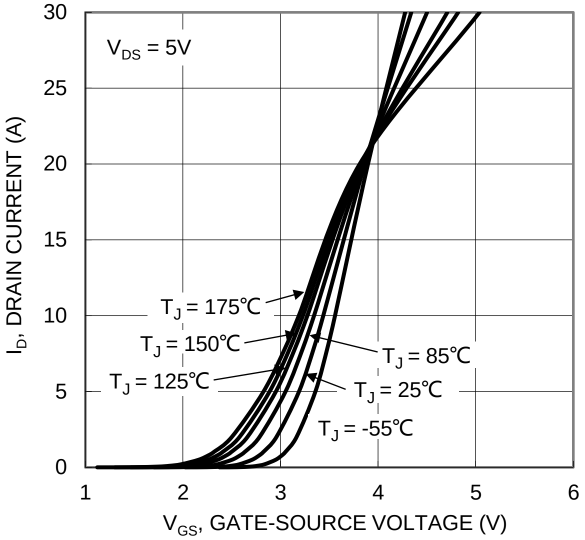


Figure 2. Typical Transfer Characteristic

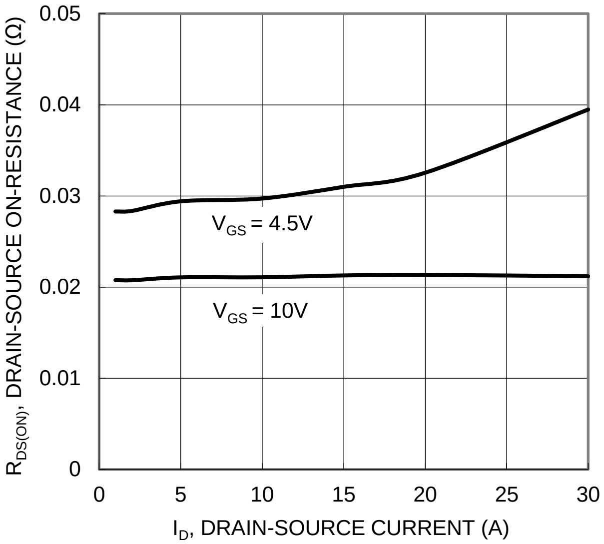


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

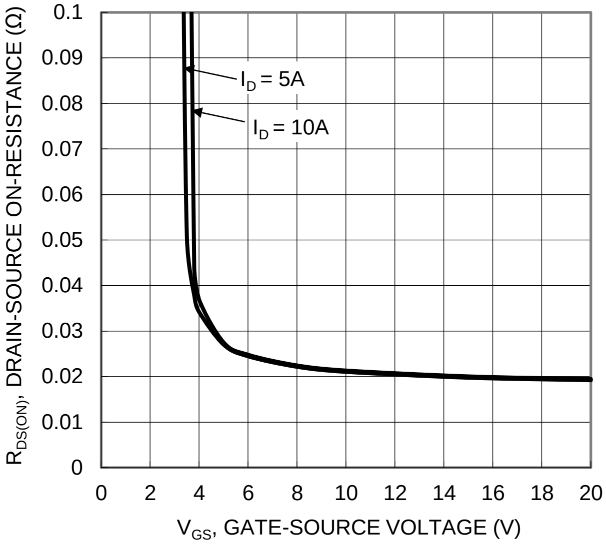


Figure 4. Typical Transfer Characteristic

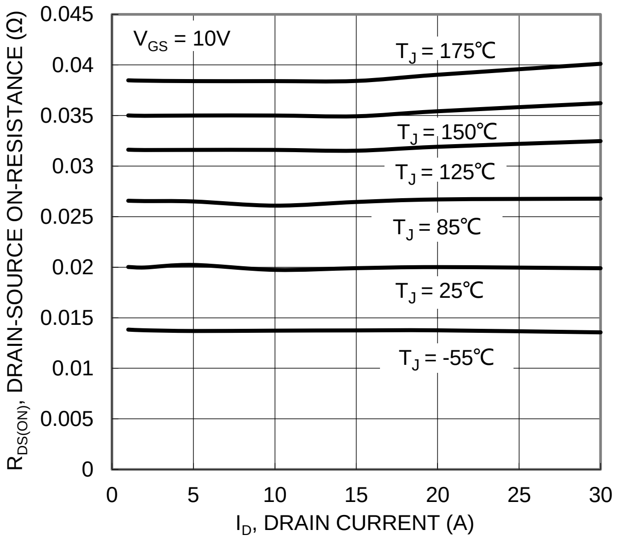


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

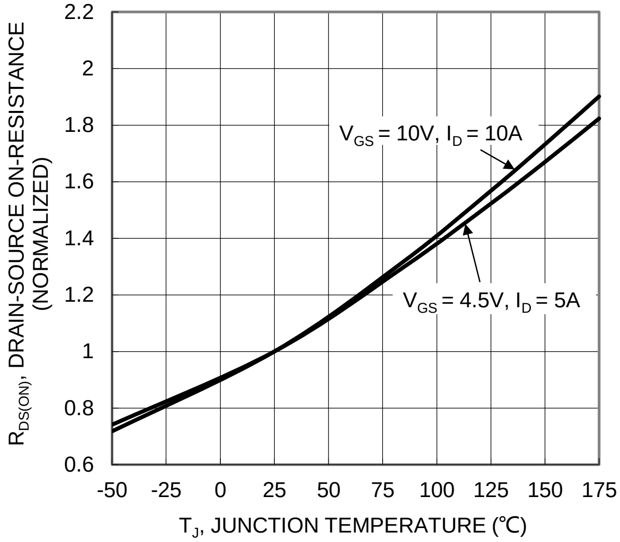


Figure 6. On-Resistance Variation with Junction Temperature

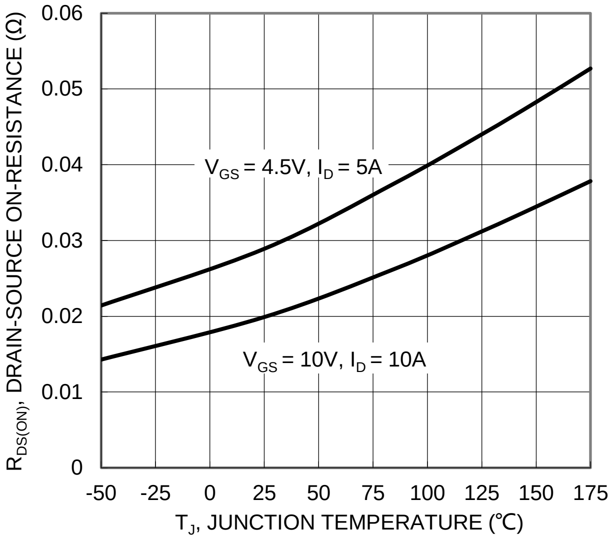


Figure 7. On-Resistance Variation with Junction Temperature

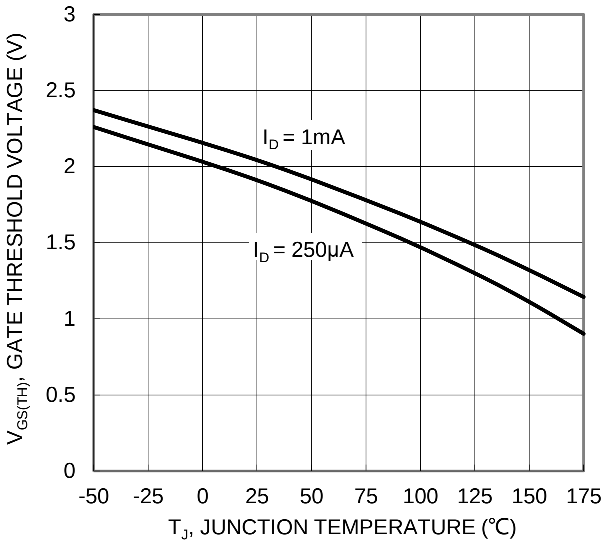


Figure 8. Gate Threshold Variation vs. Junction Temperature

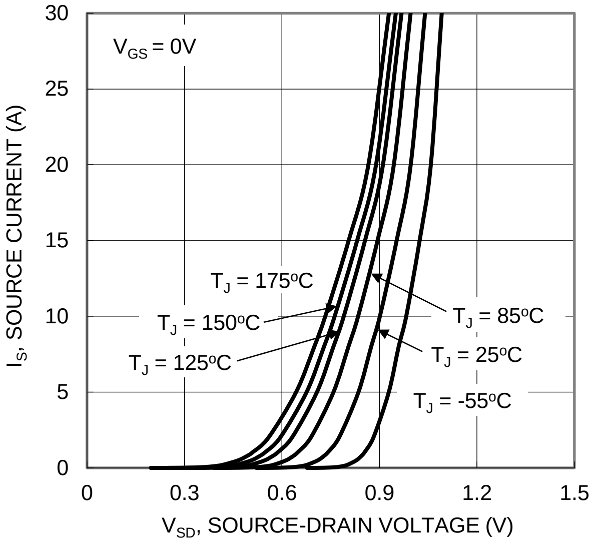


Figure 9. Diode Forward Voltage vs. Current

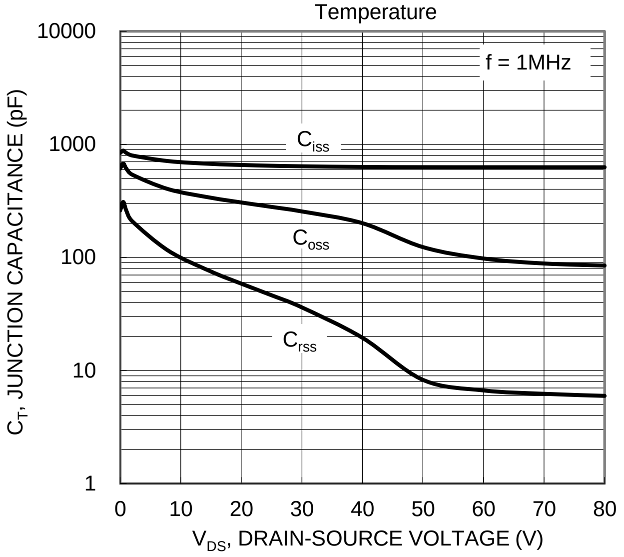


Figure 10. Typical Junction Capacitance

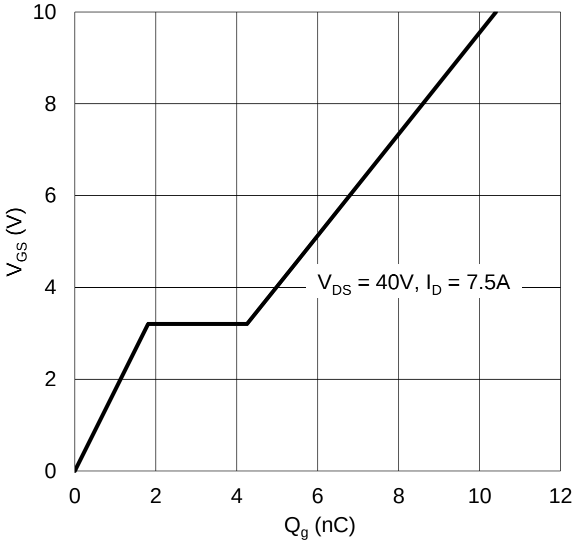


Figure 11. Gate Charge

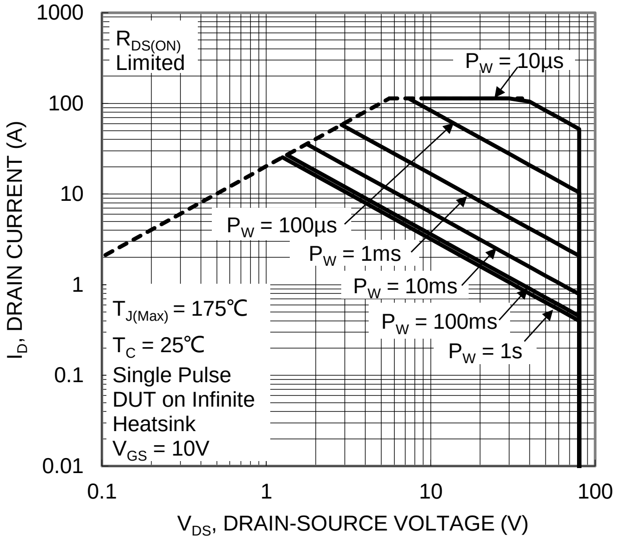


Figure 12. SOA, Safe Operation Area

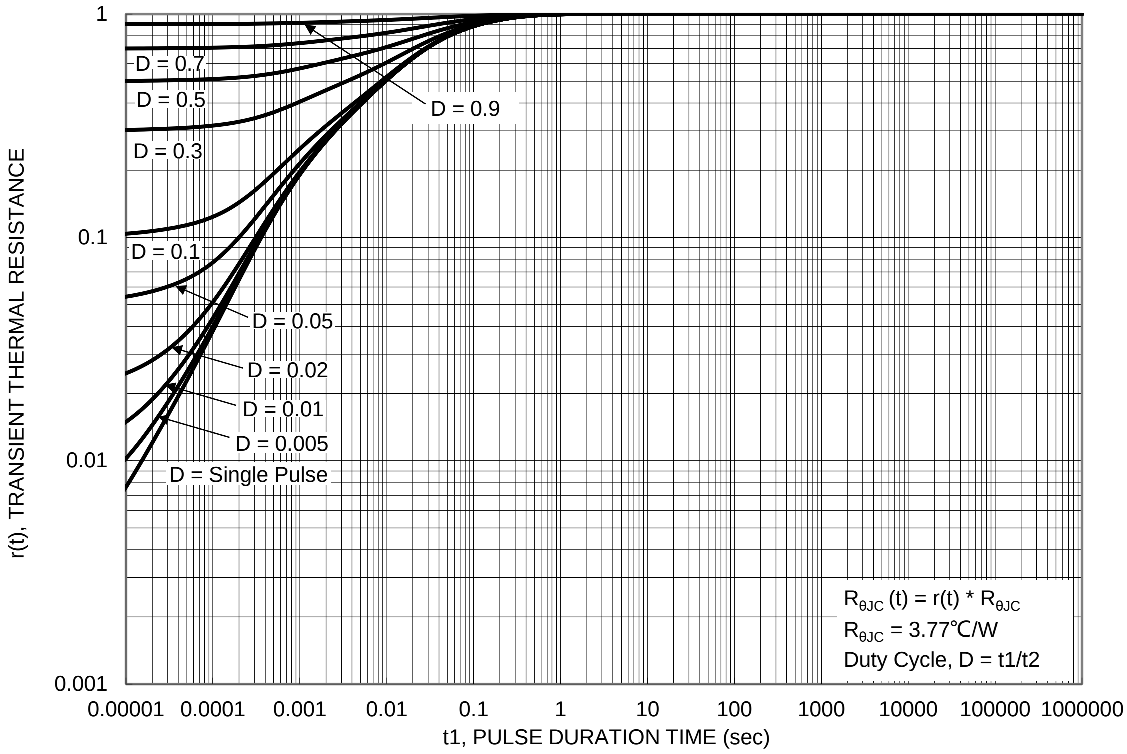
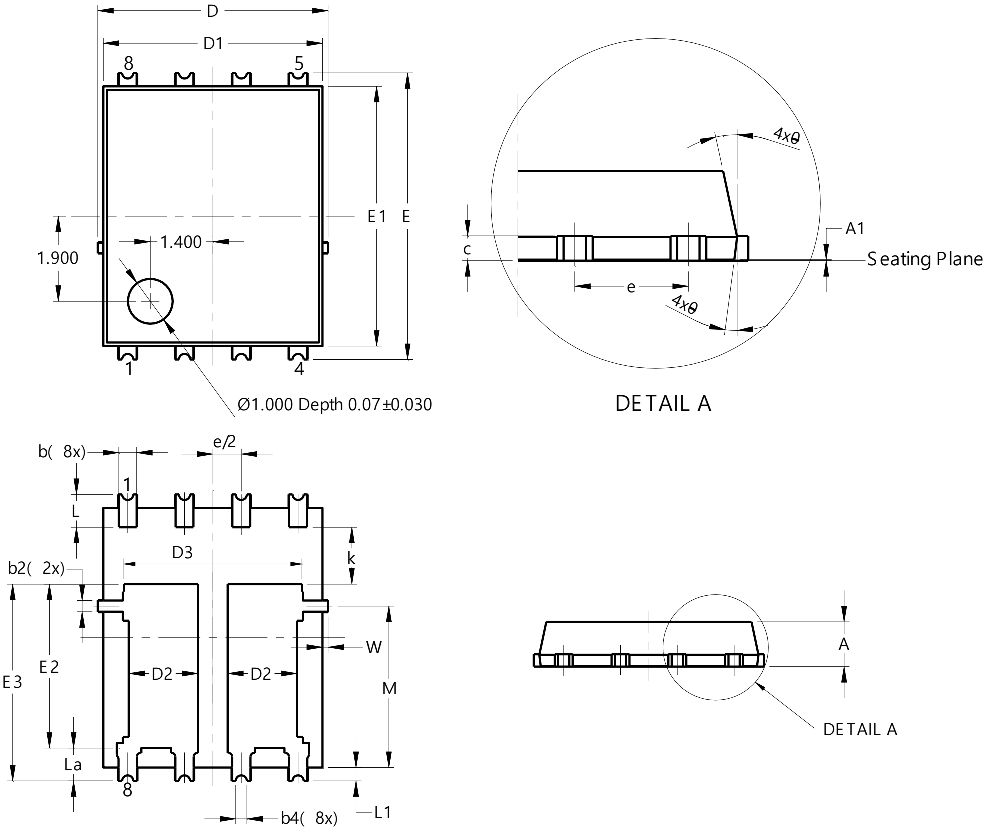


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

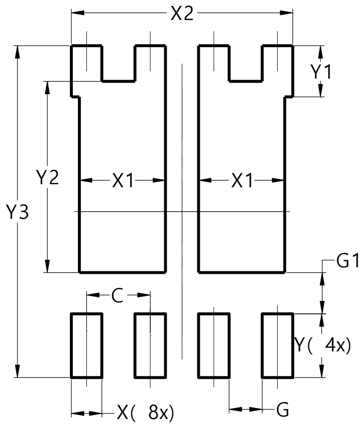
PowerDI5060-8/SWP (Type UXD)



PowerDI5060-8/SWP (Type UXD)			
Dim	**Min**	**Max**	**Typ**
A	0.90	1.10	1.00
A1	0.00	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	1.46	1.66	1.55
D3	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
M	3.205	4.005	3.605
W	0.025	0.225	0.125
θ	10°	12°	11°
θ1	6°	8°	7°
All Dimensions in mm			

Suggested Pad Layout

PowerDI5060-8/SWP (Type UXD)



Dimensions	Value (in mm)
C	1.270
G	0.660
G1	0.820
X	0.610
X1	1.720
X2	4.420
Y	1.270
Y1	1.020
Y2	3.810
Y3	6.610