



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}	$R_{DS(ON)}$	I_D $T_c = +25^\circ C$
-30V	$7.5m\Omega @ V_{GS} = -10V$	-92A
	$11m\Omega @ V_{GS} = -4.5V$	-76A

Description

This new generation 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

- Notebook battery power-managements
- DC-DC converters
- Load switches

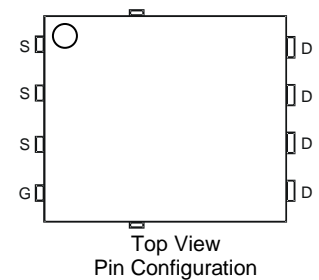
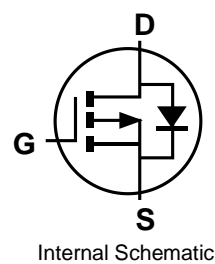
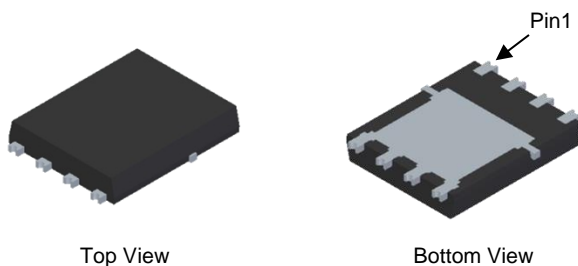
Features

- Thermally Efficient Package – Cooler Running Applications
- High Conversion Efficiency
- Low $R_{DS(ON)}$ – Minimizes On-State Losses
- Low Input Capacitance
- Fast Switching Speed
- <1.1mm Package Profile – Ideal for Thin Applications
- ESD HBM Protected up to 1kV

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 – 100% Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.097 grams (Approximate)

PowerDI5060-8 (SWP) (Type UX)



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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	-30	V
Gate-Source Voltage			V _{GSS}	±20	V
Continuous Drain Current (Note 7) V _{GS} = -10V	Steady State	T _C = +25°C	I _D	-92	A
		T _C = +70°C		-74	
Continuous Drain Current (Note 6) V _{GS} = -10V	Steady State	T _A = +25°C	I _D	-15	A
		T _A = +70°C		-12	
Pulsed Drain Current (380µs Pulse, Duty Cycle = 1%)			I _{DM}	-359	A
Maximum Continuous Body Diode Forward Current (Note 6)			I _S	-76	A
Pulsed Body Diode Forward Current (380µs Pulse, Duty Cycle = 1%)			I _{SM}	-359	A
Avalanche Current, L = 0.1mH (Note 8)			I _{AS}	-55	A
Avalanche Energy, L = 0.1mH (Note 8)			E _{AS}	153	mJ

Thermal Characteristics

Characteristic			Symbol	Value	Unit
Total Power Dissipation (Note 5)			P _D	1.6	W
Thermal Resistance, Junction to Ambient (Note 5)		Steady State	R _{θJA}	77.9	°C/W
Total Power Dissipation (Note 6)			P _D	2.4	W
Thermal Resistance, Junction to Ambient (Note 6)		Steady State	R _{θJA}	50.5	°C/W
Thermal Resistance, Junction to Case (Note 7)			R _{θJC}	1.3	°C/W
Operating and Storage Temperature Range			T _J , T _{STG}	-55 to +150	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 9)						
Drain-Source Breakdown Voltage	BV _{DSS}	-30	—	—	V	V _{GS} = 0V, I _D = -250µA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-1.0	µA	V _{DS} = -30V, 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)}	-1.1	—	-2.1	V	V _{DS} = V _{GS} , I _D = -250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	6	7.5	mΩ	V _{GS} = -10V, I _D = -10A
		—	8.8	11		V _{GS} = -4.5V, I _D = -10A
Diode Forward Voltage	V _{SD}	—	-0.7	-1.0	V	V _{GS} = 0V, I _S = -1A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C _{iss}	—	5639	—	pF	V _{DS} = -15V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	500	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	394	—	pF	
Gate Resistance	R _g	—	6.4	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = -10V)	Q _g	—	106	—	nC	V _{DS} = -11.5V, I _D = -10A
Total Gate Charge (V _{GS} = -4.5V)	Q _g	—	51	—	nC	V _{DS} = -15V, V _{GS} = -4.5V, I _D = -11.5A
Gate-Source Charge	Q _{gs}	—	15	—	nC	
Gate-Drain Charge	Q _{gd}	—	20	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	6.3	—	ns	V _{DS} = -15V, V _{GEN} = -10V, R _G = 6Ω, I _D = -11.5A
Turn-On Rise Time	t _r	—	7.8	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	226.7	—	ns	
Turn-Off Fall Time	t _f	—	93	—	ns	

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 - Thermal resistance from junction to soldering point (on the exposed drain pad).
 - I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

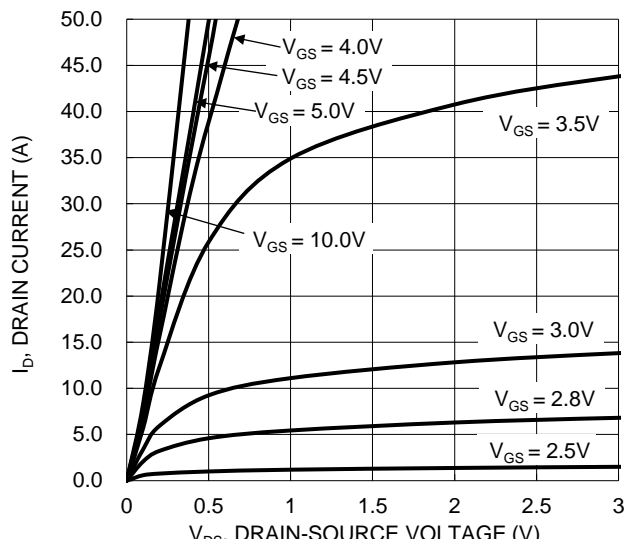


Figure 1. Typical Output Characteristic

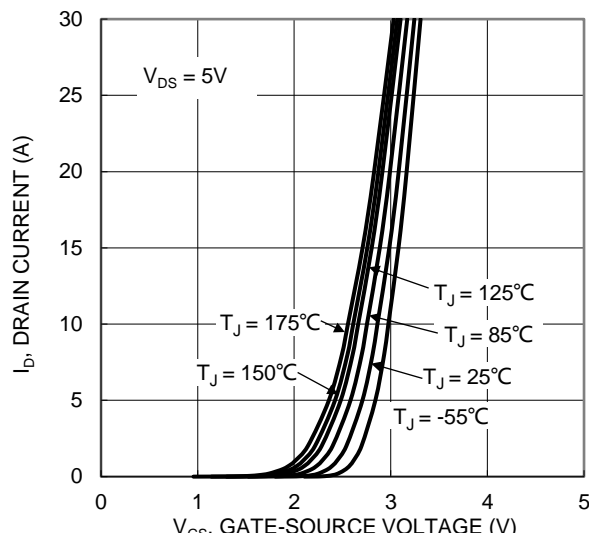


Figure 2. Typical Transfer Characteristic

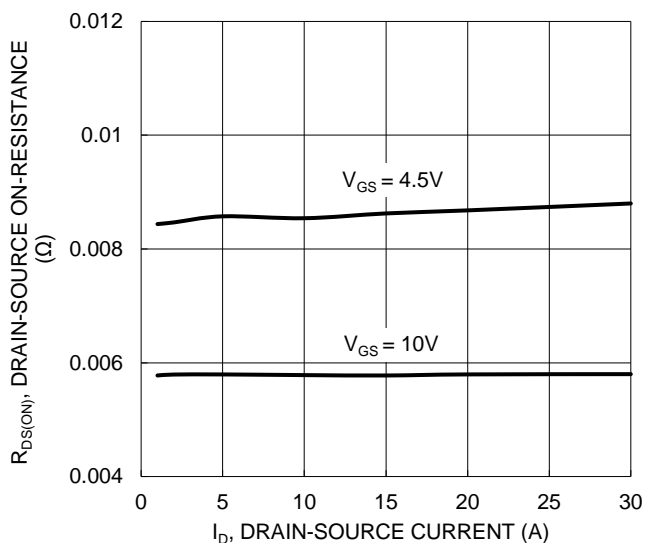


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

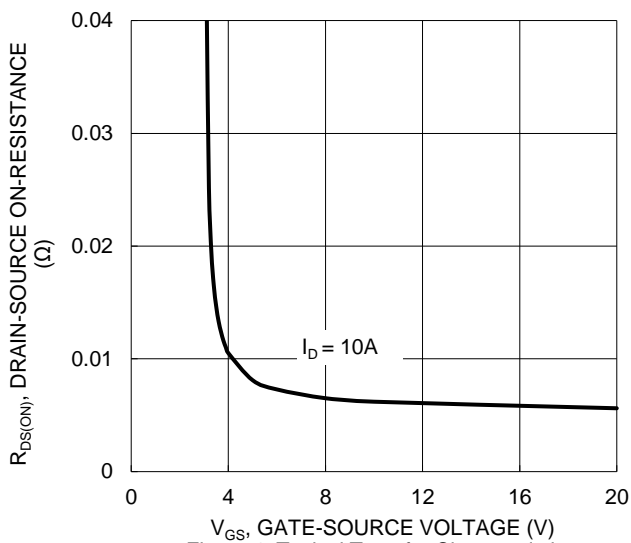


Figure 4. Typical Transfer Characteristic

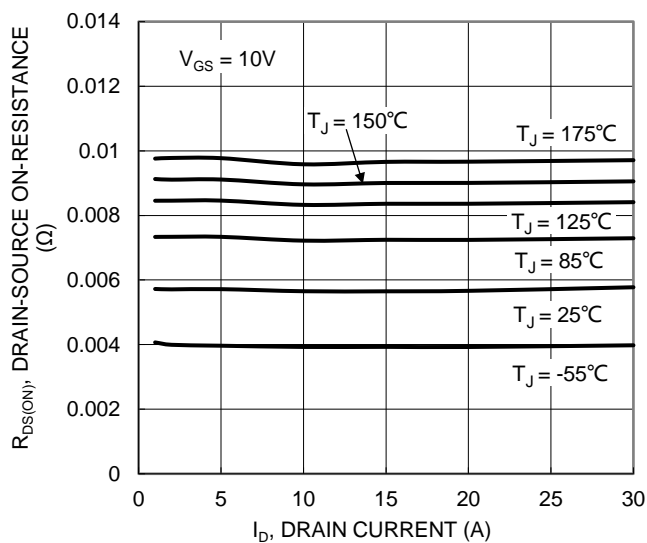


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

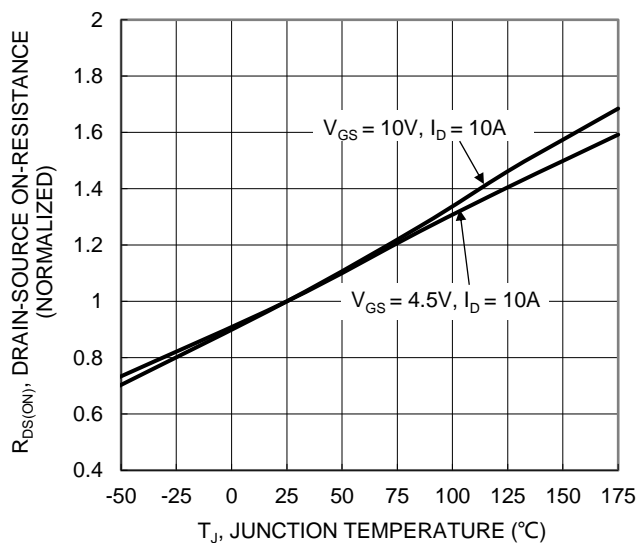


Figure 6. On-Resistance Variation with Junction Temperature

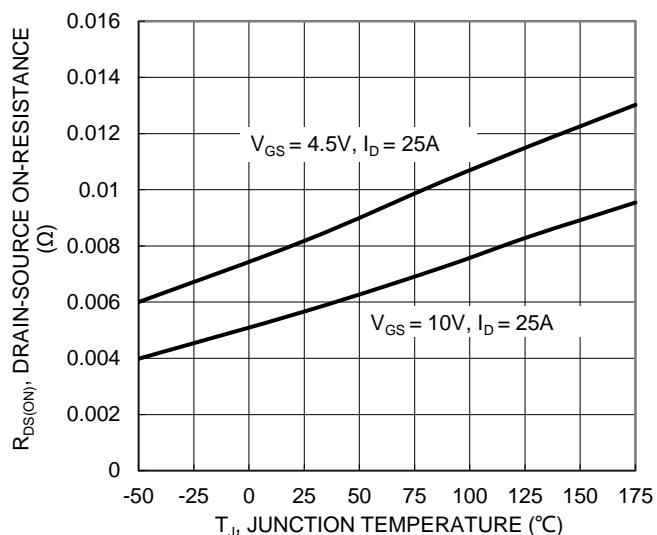


Figure 7. On-Resistance Variation with Junction Temperature

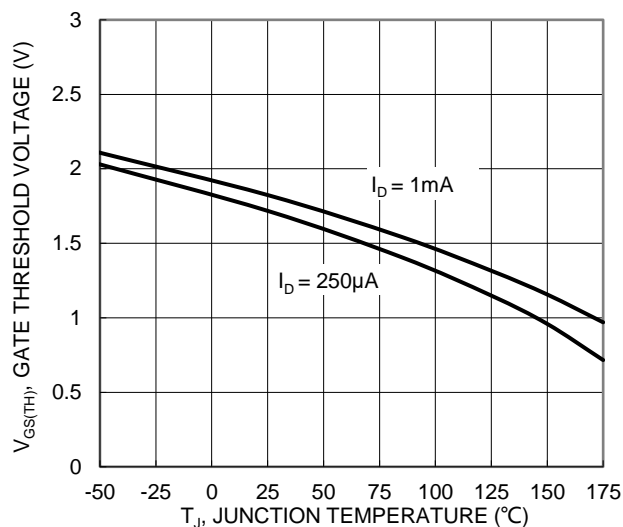


Figure 8. Gate Threshold Variation vs. Junction Temperature

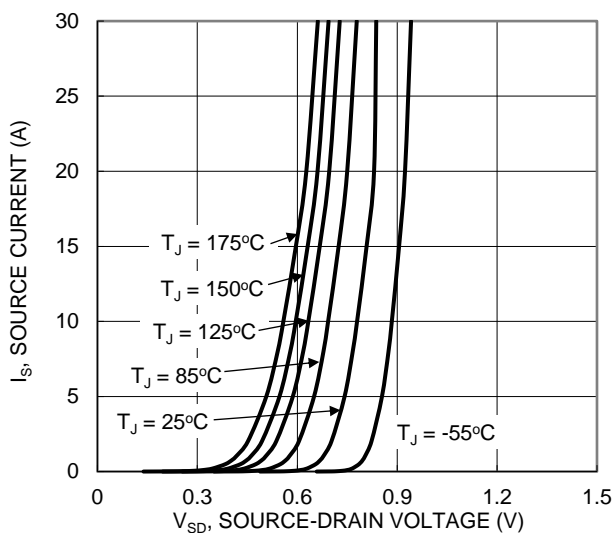


Figure 9. Diode Forward Voltage vs. Current

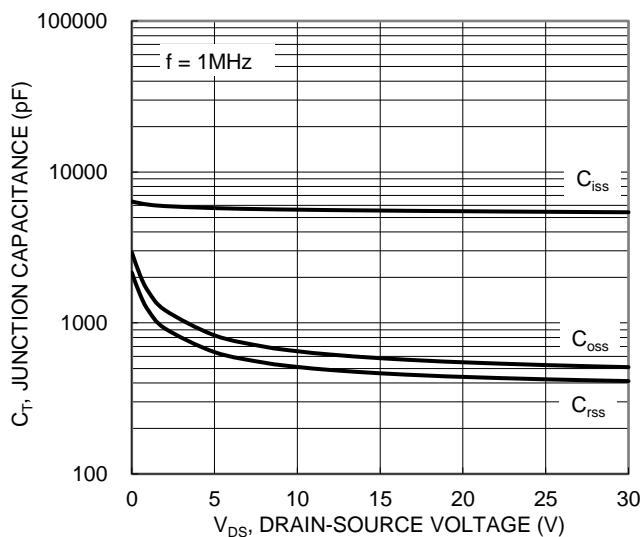


Figure 10. Typical Junction Capacitance

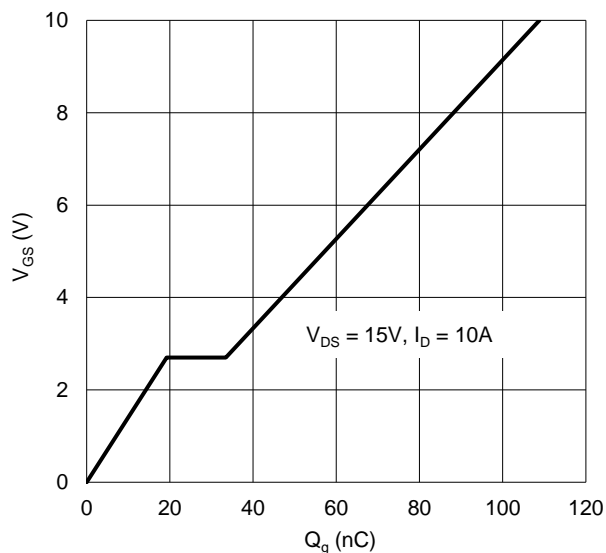


Figure 11. Gate Charge

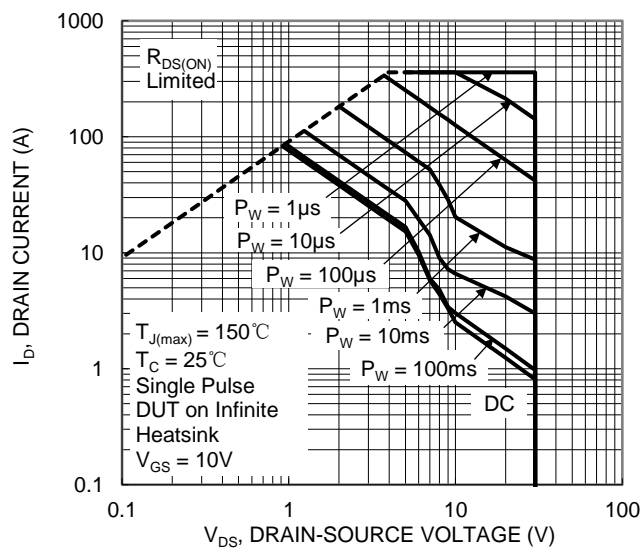


Figure 12. SOA, Safe Operation Area

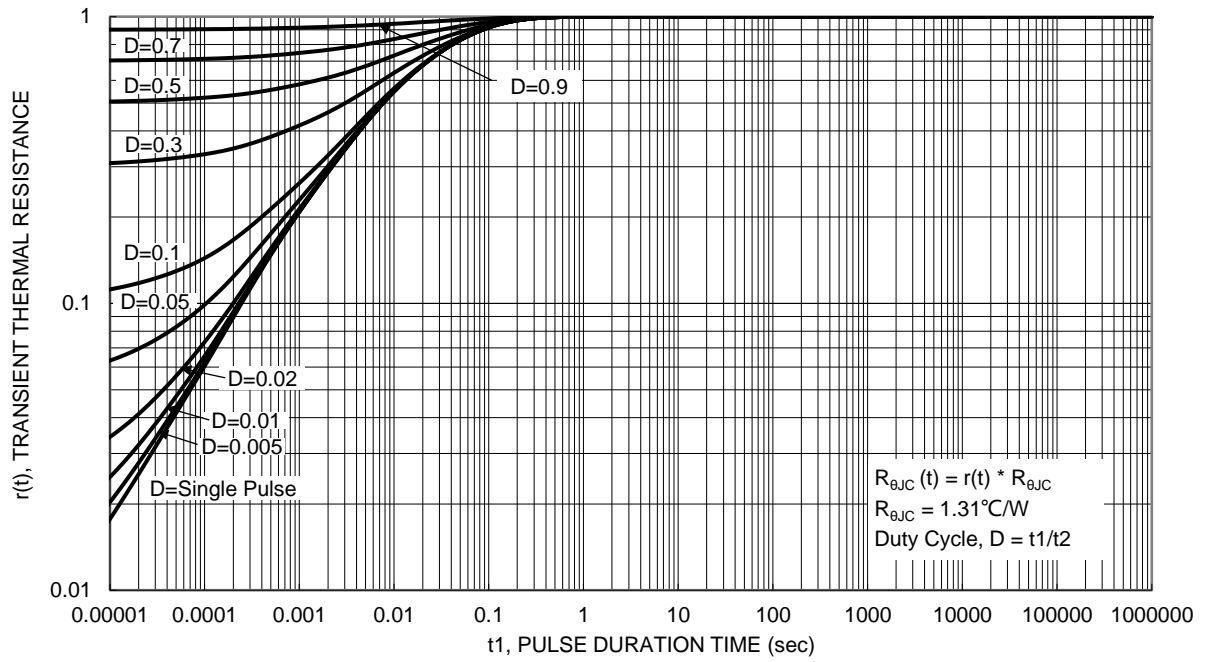
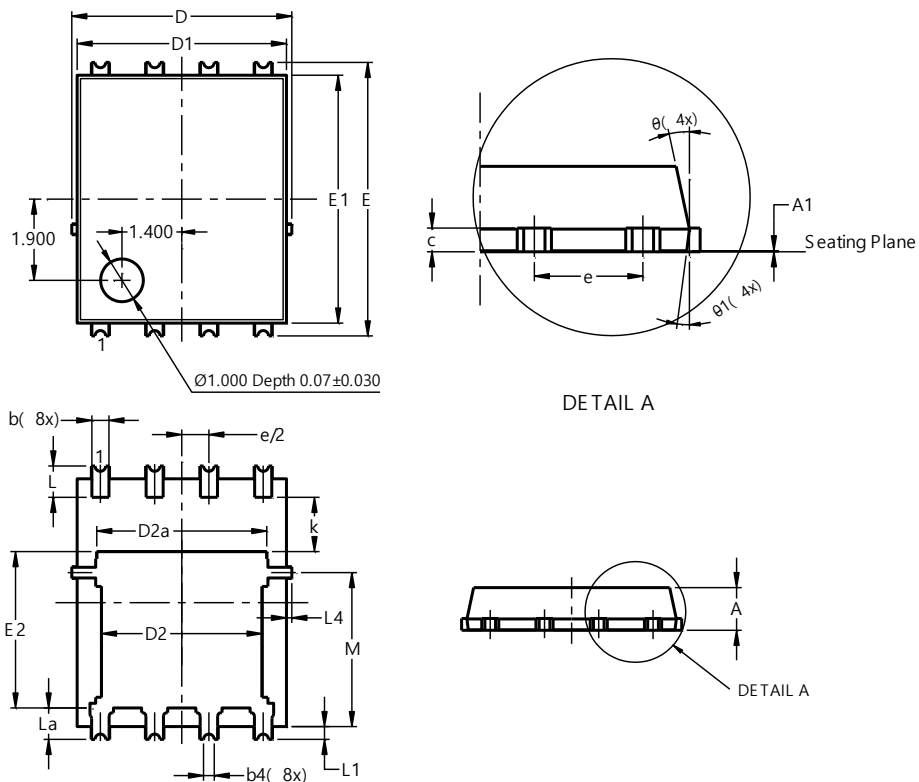


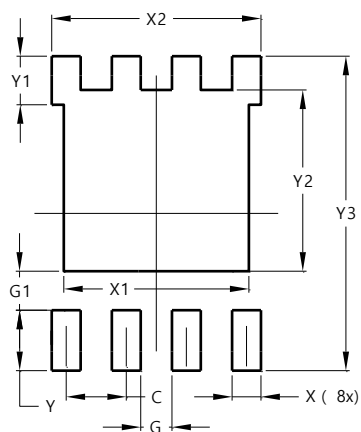
Figure 13. Transient Thermal Resistance

Package Outline Dimensions

PowerDI5060-8 (SWP) (Type 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
theta	10°	12°	11°
theta1	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	4.420
Y	1.270
Y1	1.020
Y2	3.810
Y3	6.610