



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 Max T _c = +25°C
100V	17.4mΩ @ V _{GS} = 10V	59A
	30.3mΩ @ V _{GS} = 4.5V	45A

Description and Applications

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

- Synchronous rectifiers
- DC-DC converters
- Primary side switching

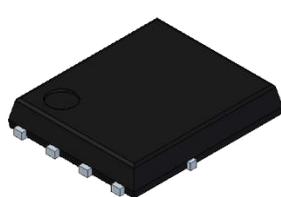
Features and Benefits

- 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
- High Conversion Efficiency
- Low R_{DS(ON)} – Minimizes On State Losses
- Low Input Capacitance
- Fast Switching Speed

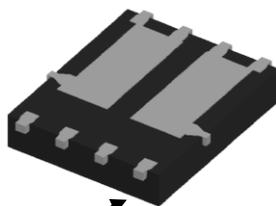
Mechanical Data

- 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 [Ⓔ]
- Weight: 0.097 grams (Approximate)

PowerDI5060-8 (Type E)

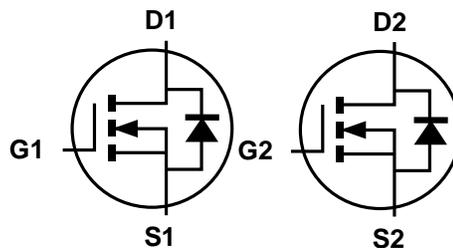


Top View

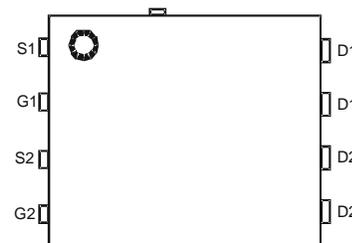


Pin1

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}	100	V
Gate-Source Voltage	V _{GSS}	±20	V
Continuous Drain Current, V _{GS} = 10V (Note 6)	I _D	T _C = +25°C	59
		T _C = +100°C	42
Maximum Body Diode Forward Current (Note 6)	I _S	59	A
Pulsed Drain Current (10μs Pulse, T _C = +25°C, Package Limited)	I _{DM}	236	A
Pulsed Body Diode Forward Current (10μs Pulse, T _C = +25°C, Package Limited)	I _{SM}	236	A
Avalanche Current, L = 3mH (Note 8)	I _{AS}	10	A
Avalanche Energy, L = 3mH (Note 8)	E _{AS}	150	mJ
Avalanche Current, L = 1mH	I _{AS}	10	A
Avalanche Energy, L = 1mH	E _{AS}	50	mJ

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation	P _D	2.6	W
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	56	°C/W
Total Power Dissipation	P _D	93	W
Thermal Resistance, Junction to Case (Note 6)	R _{θJC}	1.6	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +175	°C

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}	100	—	—	V	V _{GS} = 0V, I _D = 1mA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	μA	V _{DS} = 80V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±16V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(TH)}	1	—	3	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	13.7	17.4	mΩ	V _{GS} = 10V, I _D = 17A
		—	23.8	30.3		V _{GS} = 4.5V, I _D = 10A
Diode Forward Voltage	V _{SD}	—	—	1.3	V	V _{GS} = 0V, I _S = 17A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	1986	—	pF	V _{DS} = 50V, V _{GS} = 0V, f = 1MHz
Output Capacitance	C _{oss}	—	333	—		
Reverse Transfer Capacitance	C _{rss}	—	20	—		
Gate Resistance	R _g	—	1.17	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	14.4	—	nC	V _{DS} = 50V, I _D = 20A
Total Gate Charge (V _{GS} = 10V)	Q _g	—	28.6	—		
Gate-Source Charge	Q _{gs}	—	5.2	—		
Gate-Drain Charge	Q _{gd}	—	8.2	—		
Turn-On Delay Time	t _{D(ON)}	—	9.8	—	ns	V _{DD} = 50V, V _{GS} = 10V, R _G = 11Ω, I _D = 20A
Turn-On Rise Time	t _R	—	16.3	—		
Turn-Off Delay Time	t _{D(OFF)}	—	32.6	—		
Turn-Off Fall Time	t _F	—	21.6	—		
Body Diode Reverse-Recovery Time	t _{RR}	—	40.6	—	ns	I _F = 17A, di/dt = 100A/μs
Body Diode Reverse-Recovery Charge	Q _{RR}	—	58.1	—	nC	I _F = 17A, di/dt = 100A/μs

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 - Thermal resistance from junction to solder point (on the exposed drain pin).
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

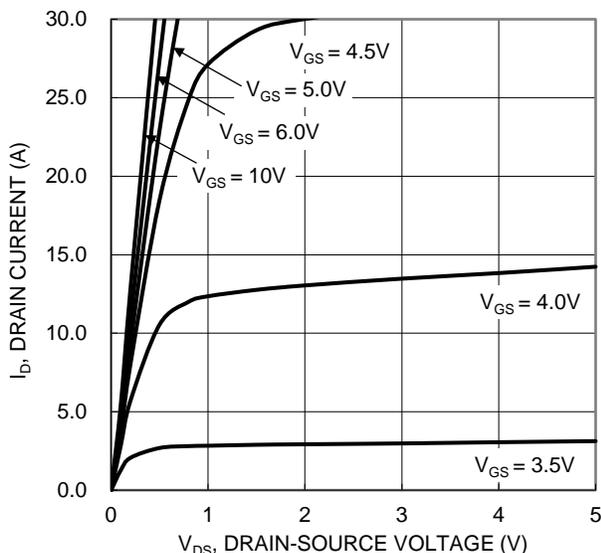


Figure 1. Typical Output Characteristic

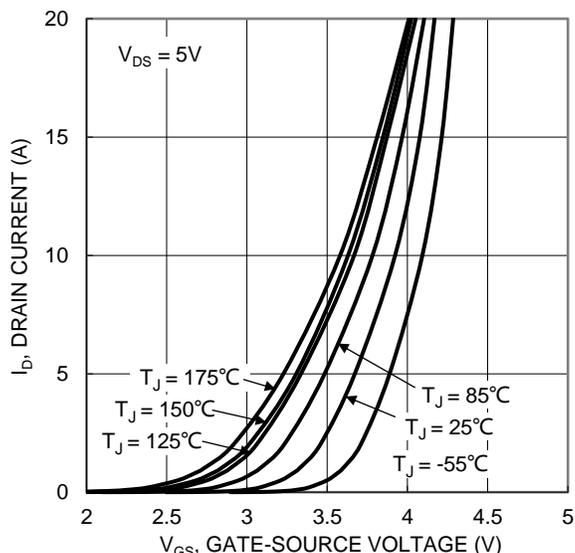


Figure 2. Typical Transfer Characteristic

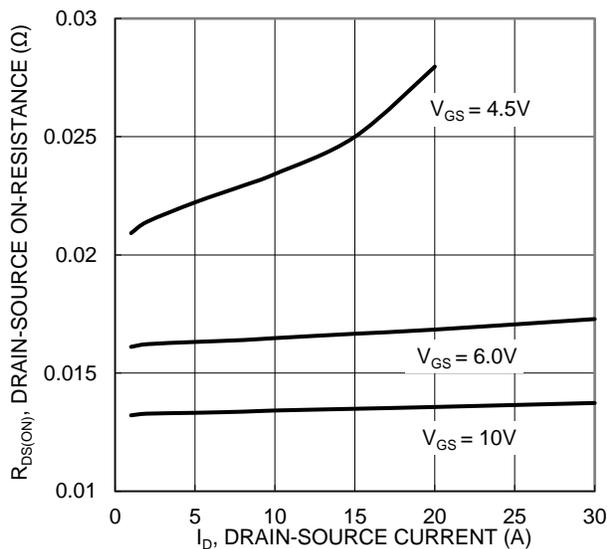


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

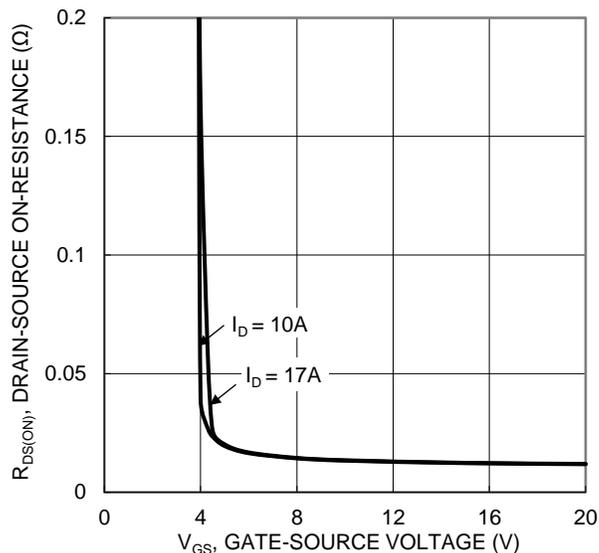


Figure 4. Typical Transfer Characteristic

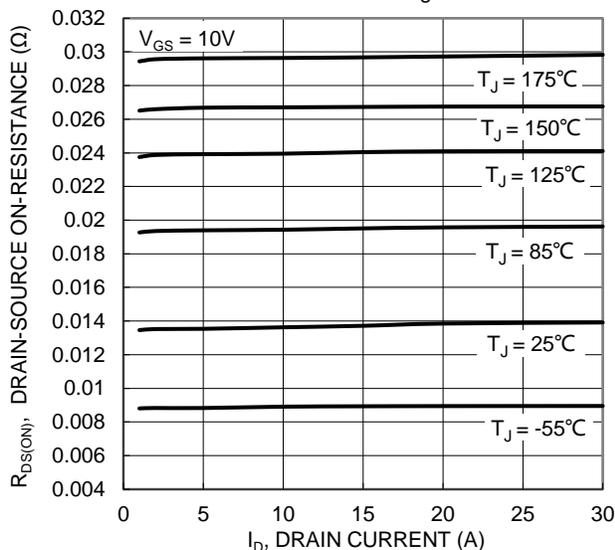


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

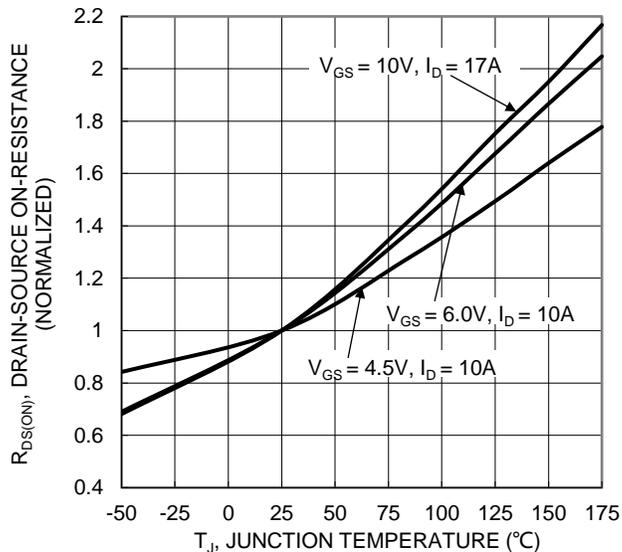


Figure 6. On-Resistance Variation with Temperature

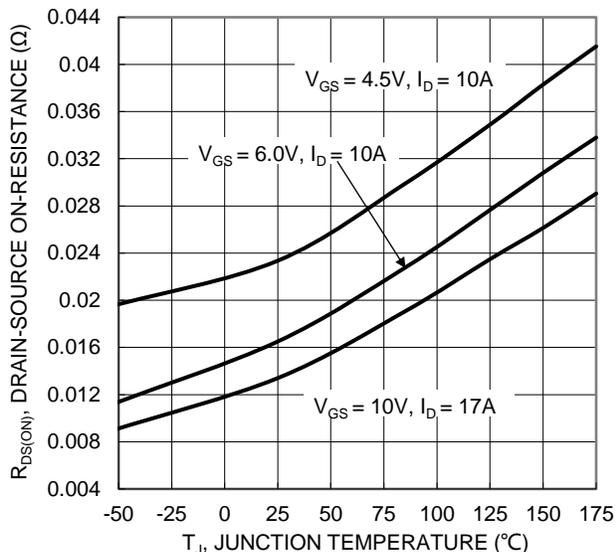


Figure 7. On-Resistance Variation with Temperature

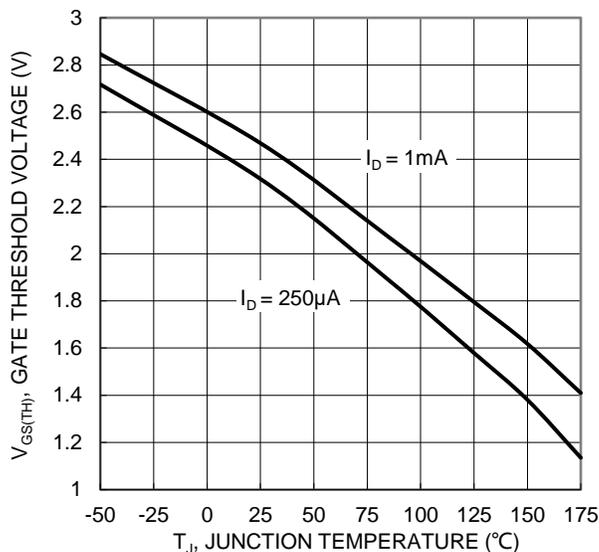


Figure 8. Gate Threshold Variation vs. Junction Temperature

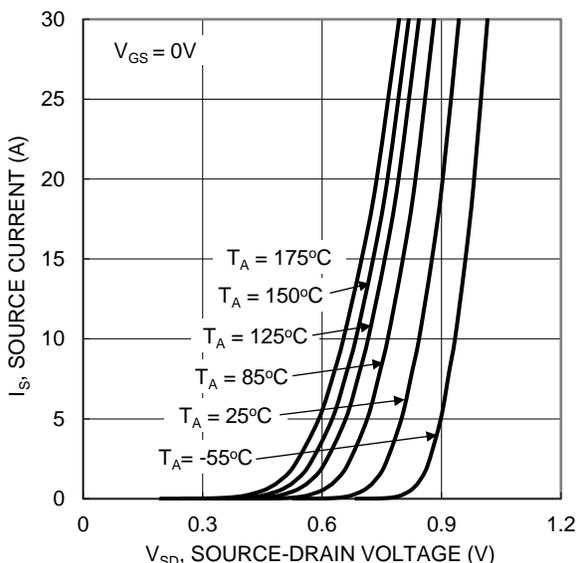


Figure 9. Diode Forward Voltage vs. Current

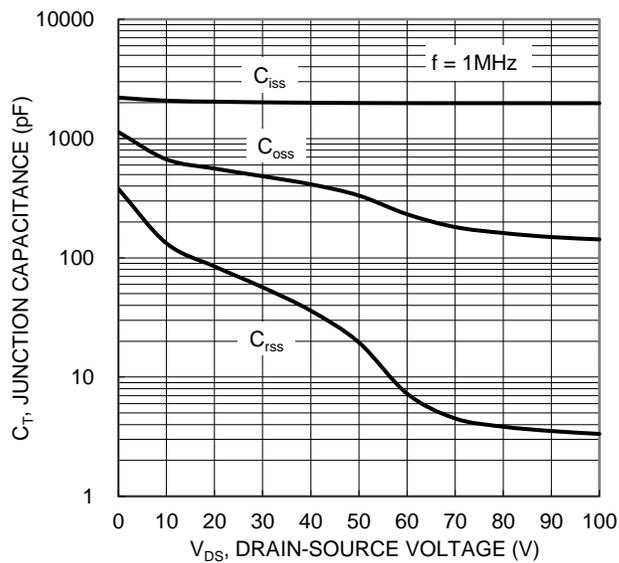


Figure 10. Typical Junction Capacitance

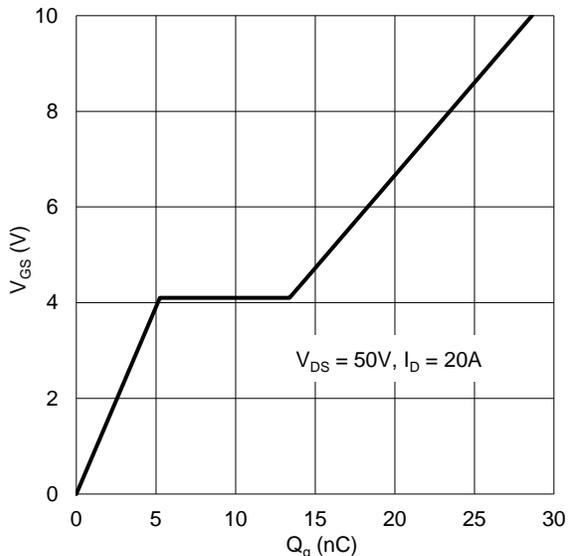


Figure 11. Gate Charge

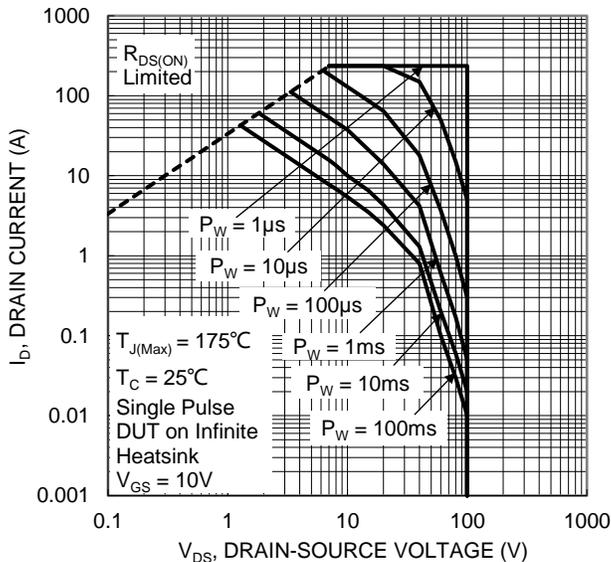


Figure 12. SOA, Safe Operation Area

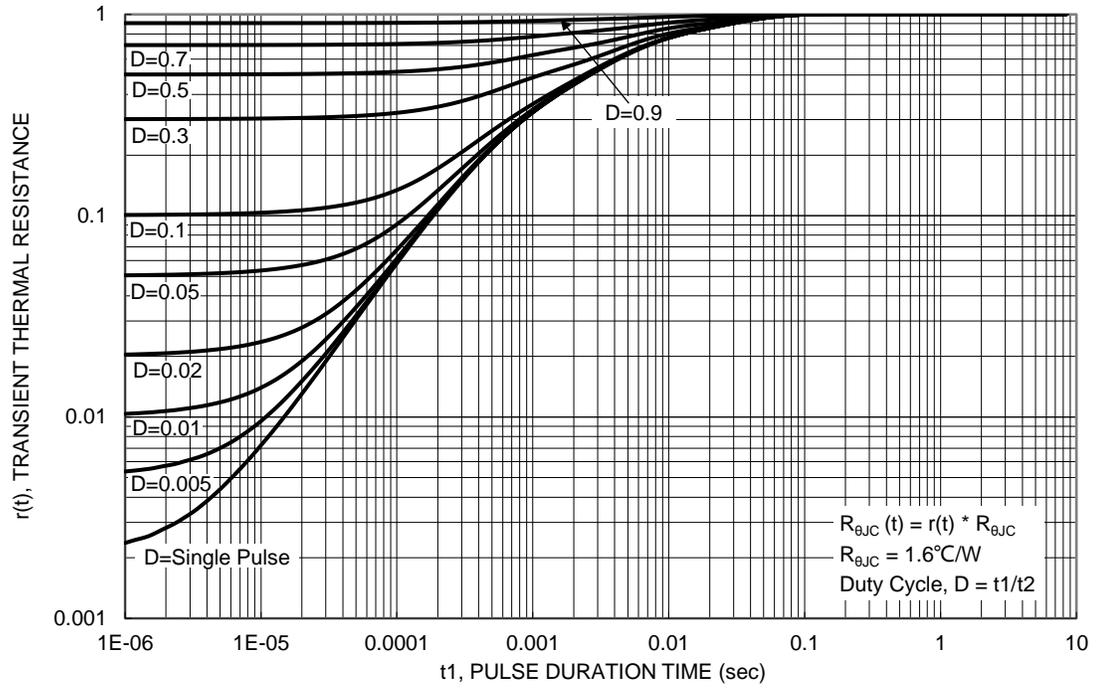
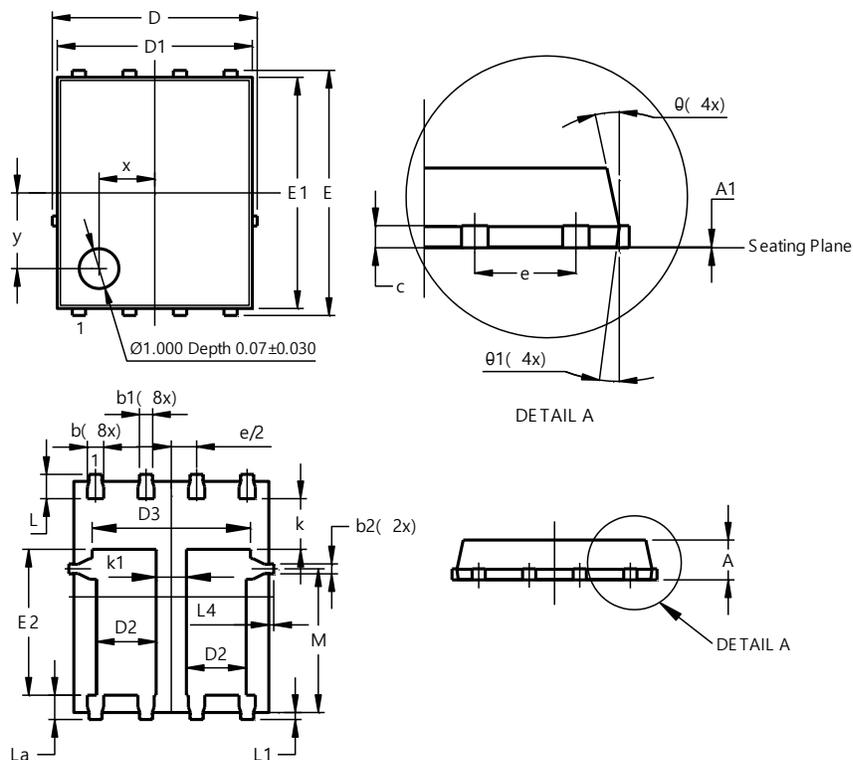


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

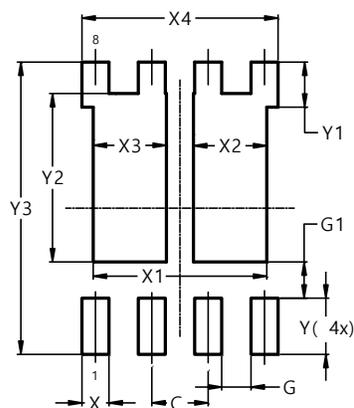
PowerDI5060-8 (Type E)



PowerDI5060-8 (Type E)			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0	0.05	0.02
b	0.33	0.51	0.41
b1	0.300	0.366	0.333
b2	0.20	0.35	0.25
c	0.23	0.33	0.277
D	5.15 BSC		
D1	4.85	4.95	4.90
D2	1.40	1.60	1.50
D3	-	-	3.98
E	6.15 BSC		
E1	5.75	5.85	5.80
E2	3.56	3.76	3.66
e	1.27BSC		
k	-	-	1.27
k1	0.56	-	-
L	0.51	0.71	0.61
La	0.51	0.71	0.61
L1	0.05	0.20	0.175
L4	-	-	0.125
M	3.50	3.71	3.605
x	-	-	1.400
y	-	-	1.900
θ	10°	12°	11°
θ1	6°	8°	7°
All Dimensions in mm			

Suggested Pad Layout

PowerDI5060-8 (Type E)



Dimensions	Value (in mm)
C	1.270
G	0.660
G1	0.820
X	0.610
X1	3.910
X2	1.650
X3	1.650
X4	4.420
Y	1.270
Y1	1.020
Y2	3.810
Y3	6.610