



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
60V	20.5mΩ @ V _{GS} = 10V	24.5A
	27mΩ @ V _{GS} = 4.5V	21.5A

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 R_{DS(ON)} – Ensures On-State Losses are Minimized
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- ESD Protected Gate
- Wettable Flank for Improved Optical Inspection

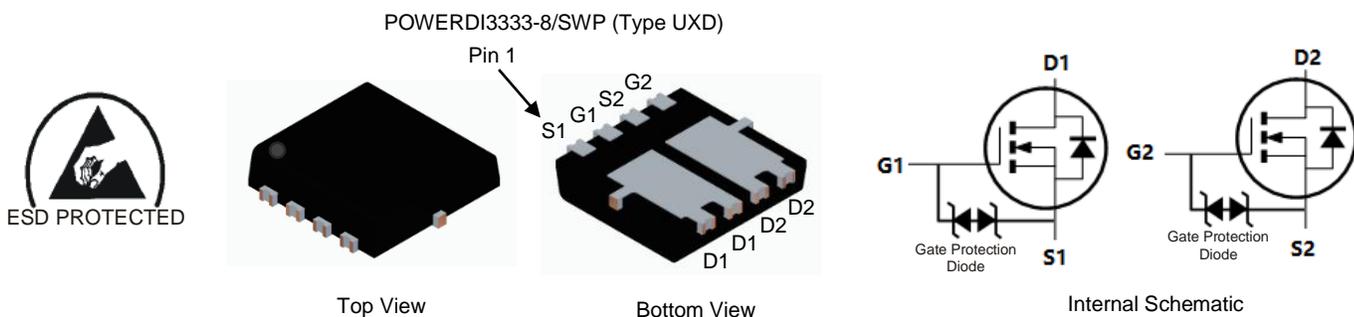
Description and Applications

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 power management and load switch.

- Wireless Charging
- DC-DC Converters
- Power Management

Mechanical Data

- Case: POWERDI[®]3333-8
- 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: 0.072 grams (Approximate)



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

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V _{DSS}	60	V
Gate-Source Voltage		V _{GSS}	±16	V
Continuous Drain Current, V _{GS} = 10V (Note 6)	T _C = +25°C	I _D	24.5	A
	T _C = +100°C		17.4	
Continuous Drain Current, V _{GS} = 10V (Note 6)	Steady State	I _D	T _A = +25°C	A
			T _A = +100°C	
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)		I _{DM}	98	A
Maximum Continuous Body Diode Forward Current (Note 6)		I _S	3	A
Pulsed Body Diode Forward Current (10μs Pulse, Duty Cycle = 1%)		I _{SM}	98	A
Avalanche Current, L = 0.1mH		I _{AS}	20.4	A
Avalanche Energy, L = 0.1mH		E _{AS}	20.8	mJ

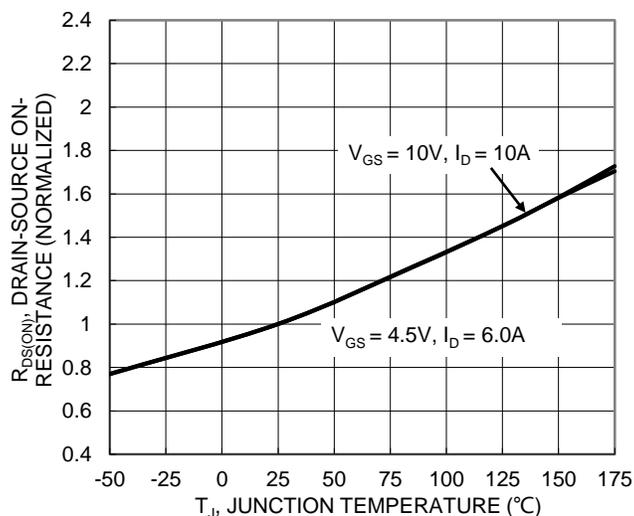
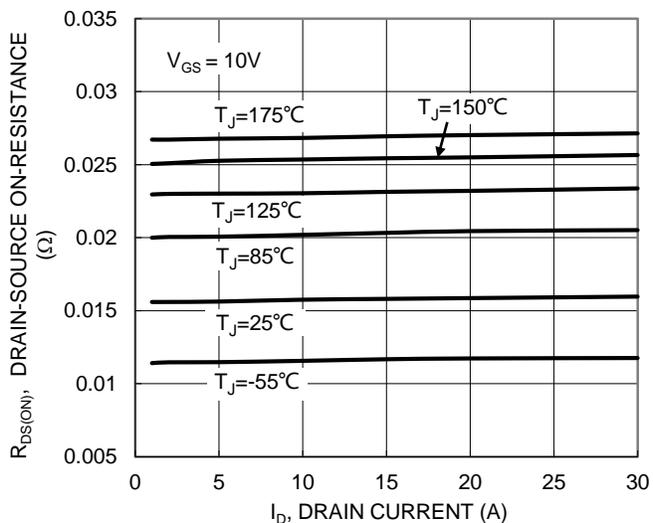
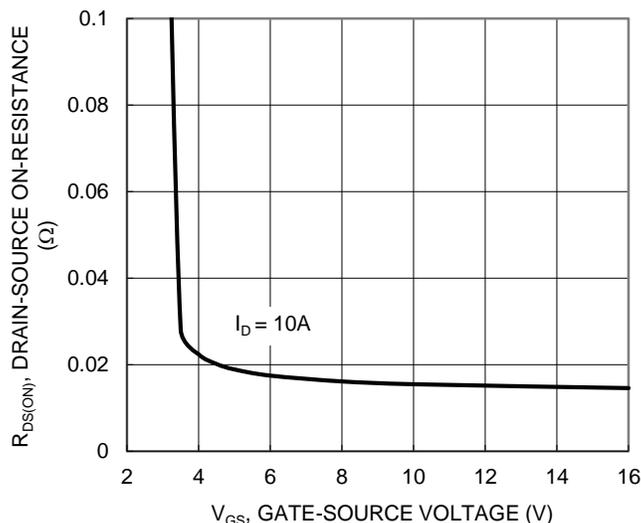
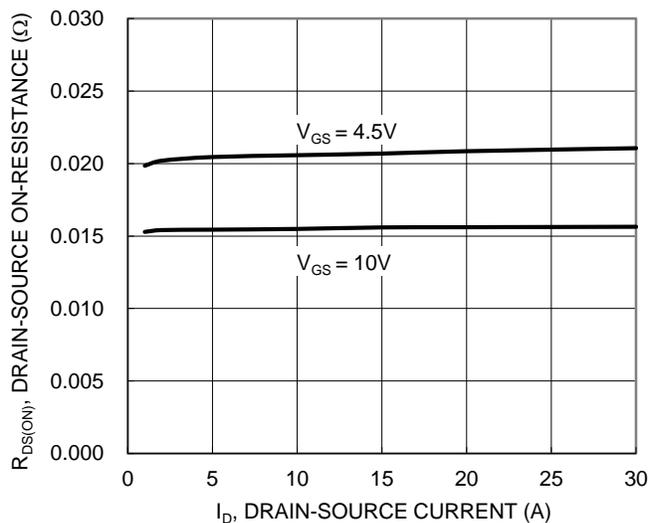
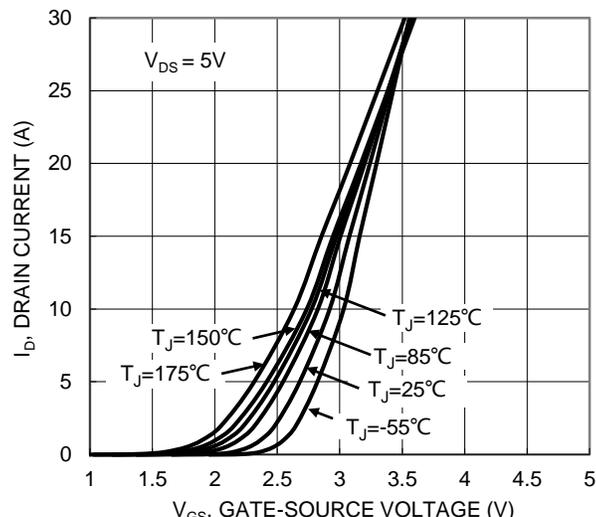
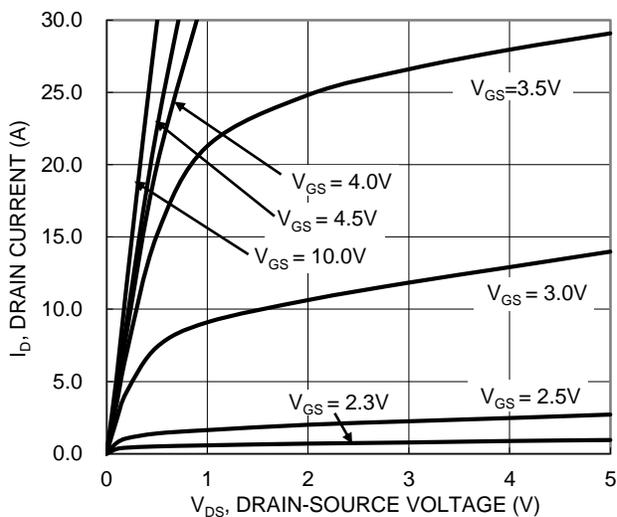
Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T _A = +25°C	P _D	1.46	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R _{θJA}	103	°C/W
Total Power Dissipation (Note 6)	T _A = +25°C	P _D	3	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R _{θJA}	50	°C/W
Thermal Resistance, Junction to Case (Note 6)		R _{θJC}	7	°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}	60	—	—	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	μA	V _{DS} = 48V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±10	μA	V _{GS} = ±16V, 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)}	—	15.6	20.5	mΩ	V _{GS} = 10V, I _D = 10A
		—	21	27		V _{GS} = 4.5V, I _D = 6A
Diode Forward Voltage	V _{SD}	—	0.7	1.2	V	V _{GS} = 0V, I _S = 1A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	825	—	pF	V _{DS} = 30V, V _{GS} = 0V, f = 1MHz
Output Capacitance	C _{oss}	—	244	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	20.5	—	pF	
Gate Resistance	R _g	—	1.5	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	7.1	—	nC	V _{DS} = 30V, I _D = 10A
Total Gate Charge (V _{GS} = 10V)	Q _g	—	14.3	—	nC	
Gate-Source Charge	Q _{gs}	—	2.1	—	nC	
Gate-Drain Charge	Q _{gd}	—	2.8	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	4.0	—	ns	
Turn-On Rise Time	t _R	—	5.3	—	ns	V _{GS} = 10V, V _{DS} = 30V, R _g = 6Ω, I _D = 10A
Turn-Off Delay Time	t _{D(OFF)}	—	18.5	—	ns	
Turn-Off Fall Time	t _F	—	8.0	—	ns	
Body Diode Reverse Recovery Time	t _{RR}	—	22.7	—	ns	I _F = 6A, di/dt = 100A/μs
Body Diode Reverse Recovery Charge	Q _{RR}	—	12.8	—	nC	

- Notes:
- Device mounted on FR-4 PCB, with minimum recommended pad layout, single sided.
 - Device mounted on FR-4 substrate PCB, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.



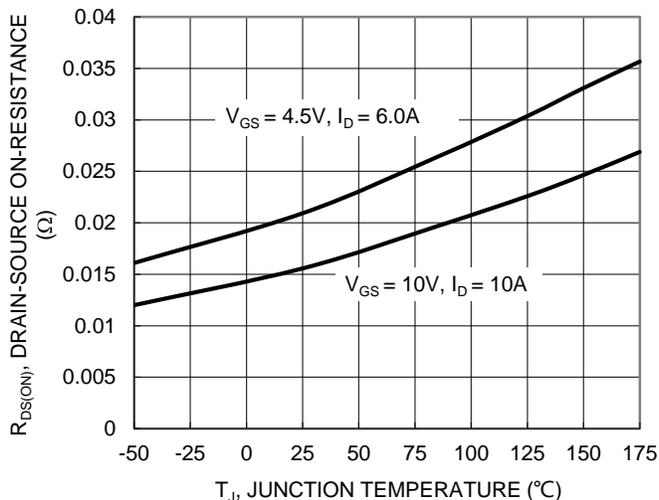


Figure 7. On-Resistance Variation with Temperature

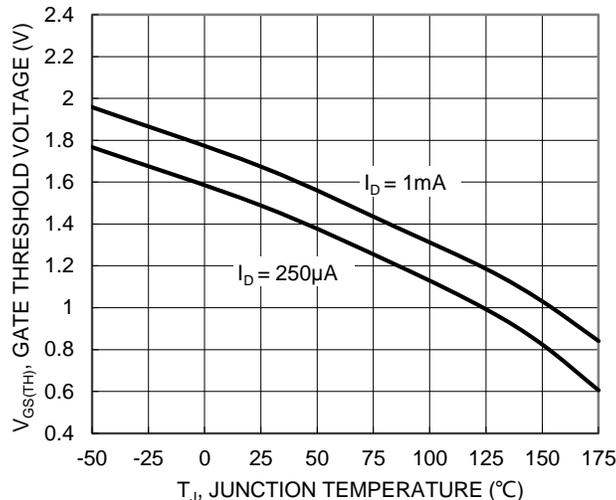


Figure 8. Gate Threshold Variation vs. Junction Temperature

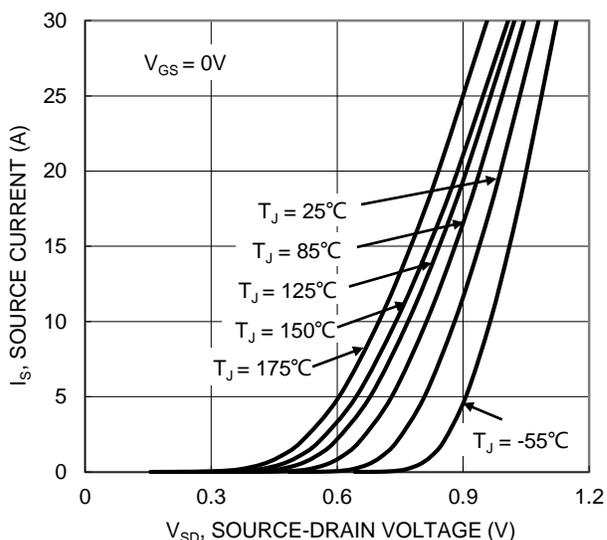


Figure 9. Diode Forward Voltage vs. Current

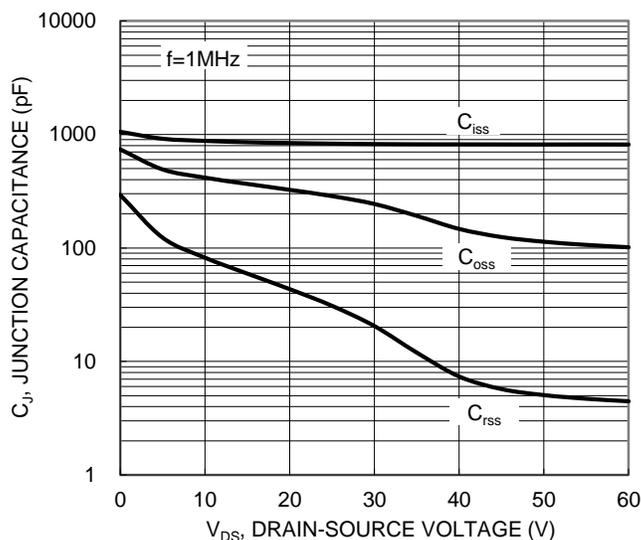


Figure 10. Typical Junction Capacitance

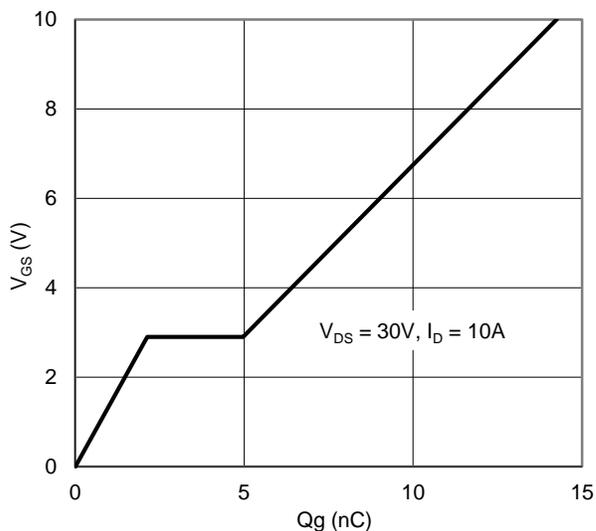


Figure 11. Gate Charge

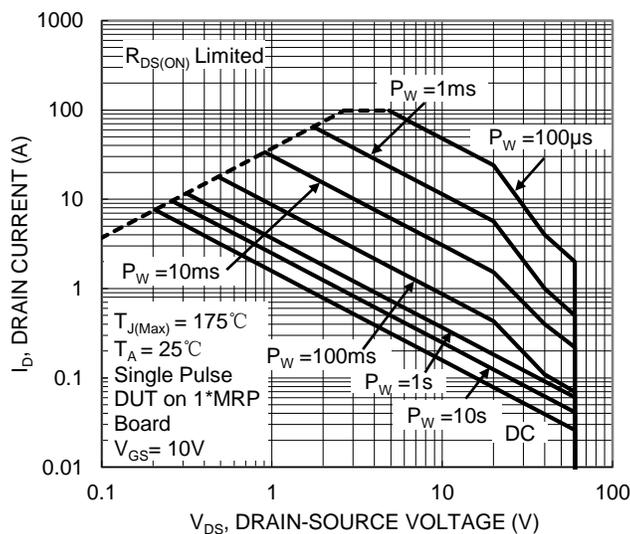


Figure 12. SOA, Safe Operation Area

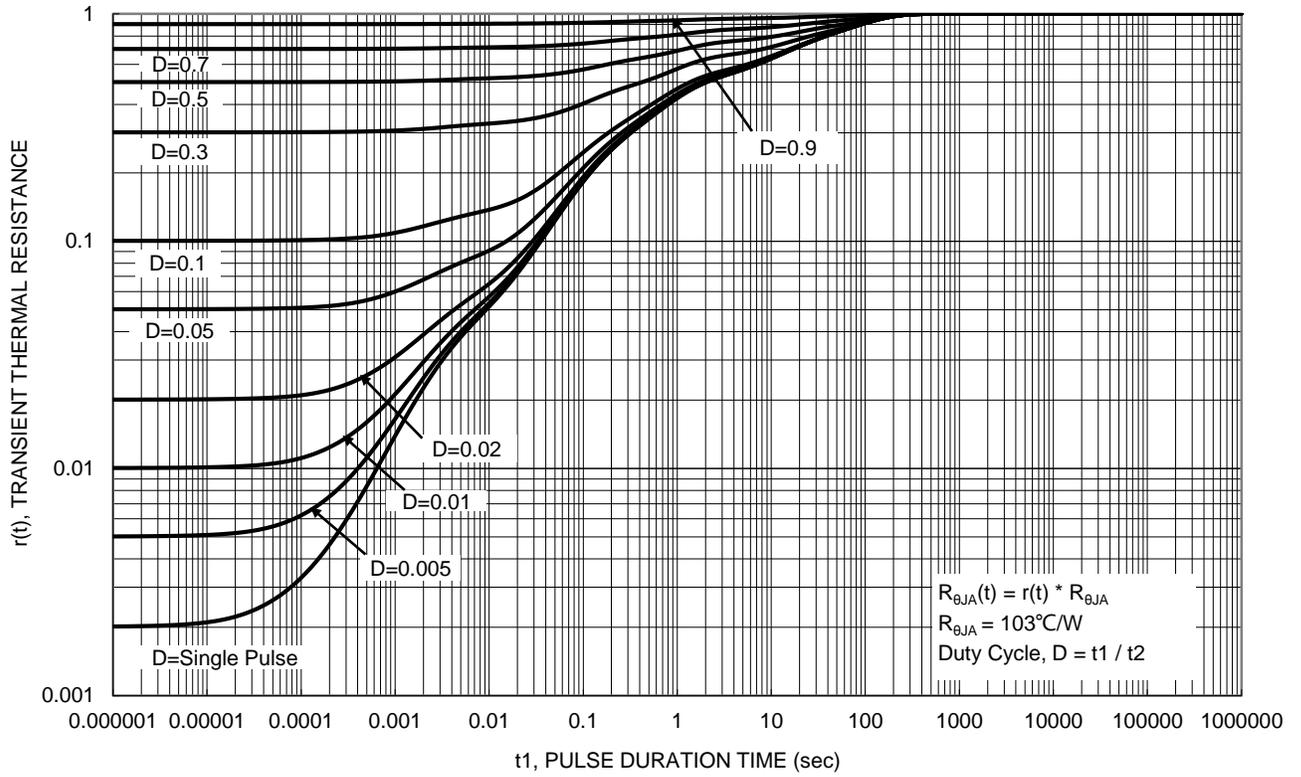
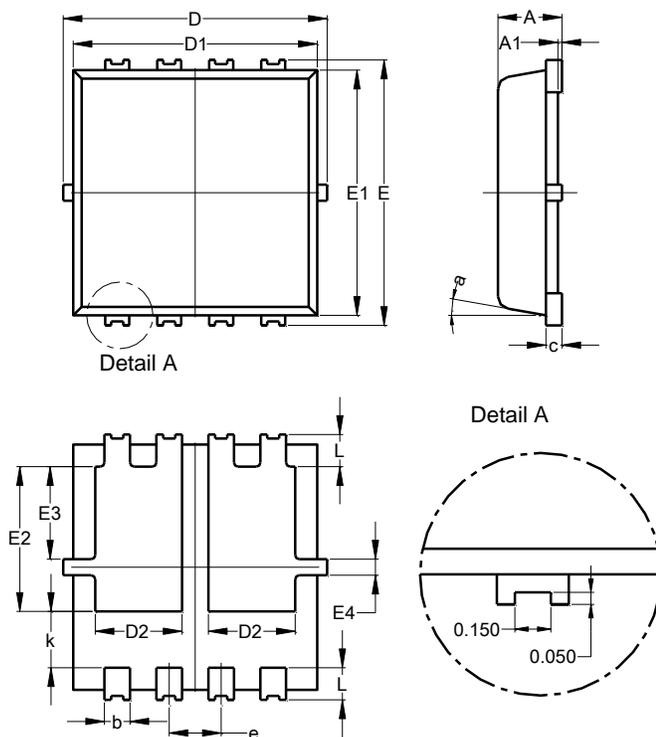


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

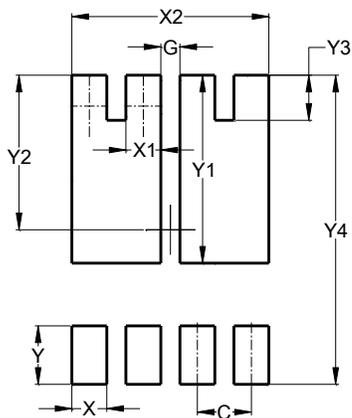
POWERDI®3333-8/SWP (Type UXD)



POWERDI®3333-8/SWP (Type UXD)			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	–
b	0.25	0.40	0.32
c	0.10	0.25	0.15
D	3.20	3.40	3.30
D1	2.95	3.15	3.05
D2	1.00	1.20	1.10
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	1.60	2.00	1.80
E3	0.95	1.35	1.15
E4	0.10	0.30	0.20
e	–	–	0.65
L	0.30	0.50	0.40
k	0.50	0.90	0.70
a	0°	12°	10°
All Dimensions in mm			

Suggested Pad Layout

POWERDI®3333-8/SWP (Type UXD)



Dimensions	Value (in mm)
C	0.650
G	0.230
X	0.420
X1	0.420
X2	2.370
Y	0.700
Y1	2.250
Y2	1.850
Y3	0.540
Y4	3.700