



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

0755-83047638

ysbdt@szyoushang.cn

www.szyoushang.cn



企业微信二维码



企业QQ二维码

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _C = +25°C
30V	5.5mΩ @ V _{GS} = 10V	75A
	8.5mΩ @ V _{GS} = 4.5V	50A

Features and Benefits

- Low R_{DS(ON)} — Ensures On-State Losses are Minimized
- Excellent Q_{gd} x R_{DS(ON)} Product (FOM)
- Small Form Factor Thermally Efficient Package Enables Higher-Density End Products
- Occupies just 33% of the Board Area Occupied by SO-8 Enabling Smaller End Product
- 100% UIS (Avalanche) Rated

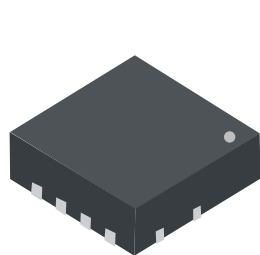
Description and Applications

This MOSFET is designed to minimize the on-state resistance (R_{DS(ON)}) yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

- Engine Management Systems
- Body Control Electronics
- DC-DC Converters

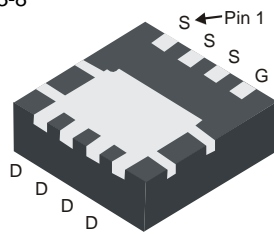
Mechanical Data

- Case: PowerDI[®]3333-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 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)

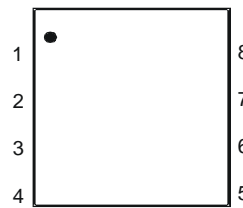


Top View

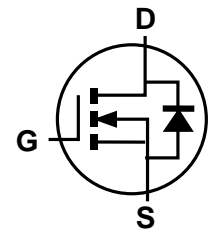
PowerDI3333-8



Bottom View



Top View



Equivalent Circuit

Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	30	V
Gate-Source Voltage	V_{GSS}	± 16	V
Continuous Drain Current (Notes 6 & 9) $V_{GS} = 10\text{V}$	I_D	$T_C = +25^\circ\text{C}$	75
		$T_C = +100^\circ\text{C}$	52
Continuous Drain Current (Note 5) $V_{GS} = 10\text{V}$	I_D	$T_A = +25^\circ\text{C}$	15
		$T_A = +100^\circ\text{C}$	10
Maximum Continuous Body Diode Forward Current (Note 5)	I_S	3	A
Pulsed Drain Current (100 μs Pulse, Duty Cycle = 1%)	I_{DM}	250	A
Pulsed Body Diode Forward Current (100 μs Pulse, Duty Cycle = 1%)	I_{SM}	250	A
Avalanche Current, $L = 0.3\text{mH}$	I_{AS}	27	A
Avalanche Energy, $L = 0.3\text{mH}$	E_{AS}	110	mJ

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 6)	P_D	50	W
Thermal Resistance, Junction to Case (Note 6)	$R_{\theta JC}$	3	$^\circ\text{C/W}$
Total Power Dissipation (Note 5)	P_D	2.5	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	60	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +175	$^\circ\text{C}$

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	$V_{DS} = 24\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 16\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	1	—	3	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	4.1	5.5	m Ω	$V_{GS} = 10\text{V}, I_D = 20\text{A}$
		—	6.2	8.5		$V_{GS} = 4.5\text{V}, I_D = 7\text{A}$
Diode Forward Voltage	V_{SD}	—	0.7	1	V	$V_{GS} = 0\text{V}, I_S = 1\text{A}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	2370	—	pF	$V_{DS} = 15\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Output Capacitance	C_{oss}	—	1360	—		
Reverse Transfer Capacitance	C_{rss}	—	240	—		
Gate Resistance	R_g	—	0.6	—	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge ($V_{GS} = 4.5\text{V}$)	Q_g	—	20	—	nC	$V_{DS} = 15\text{V}, I_D = 20\text{A}$
Total Gate Charge ($V_{GS} = 10\text{V}$)	Q_g	—	44	—		
Gate-Source Charge	Q_{gs}	—	7	—		
Gate-Drain Charge	Q_{gd}	—	8	—		
Turn-On Delay Time	$t_{D(ON)}$	—	6.2	—	ns	$V_{DD} = 15\text{V}, V_{GS} = 10\text{V}, R_L = 0.75\Omega, R_g = 3\Omega, I_D = 20\text{A}$
Turn-On Rise Time	t_R	—	4.3	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	21	—		
Turn-Off Fall Time	t_F	—	8	—		
Body Diode Reverse Recovery Time	t_{RR}	—	25	—	ns	$I_F = 15\text{A}, di/dt = 500\text{A}/\mu\text{s}$
Body Diode Reverse Recovery Charge	Q_{RR}	—	37	—	nC	

- Notes:
- $R_{\theta JA}$ is determined with the device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate. $R_{\theta JC}$ is guaranteed by design while $R_{\theta JA}$ is determined by the user's board design.
 - Thermal resistance from junction to soldering point (on the exposed drain pad).
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.
 - Package limited.

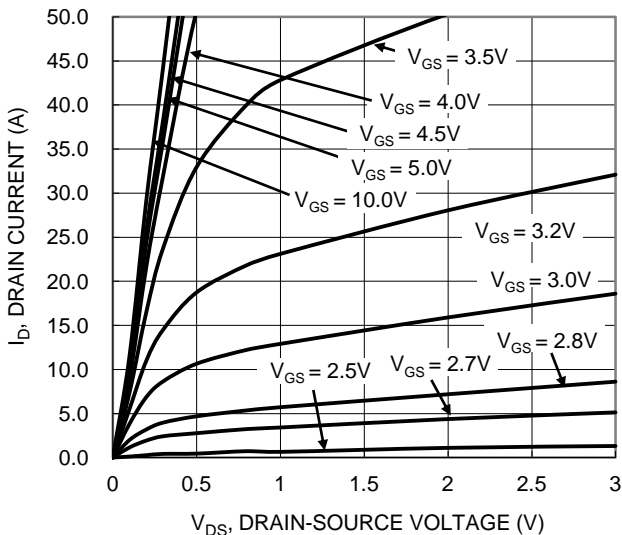


Figure 1. Typical Output Characteristic

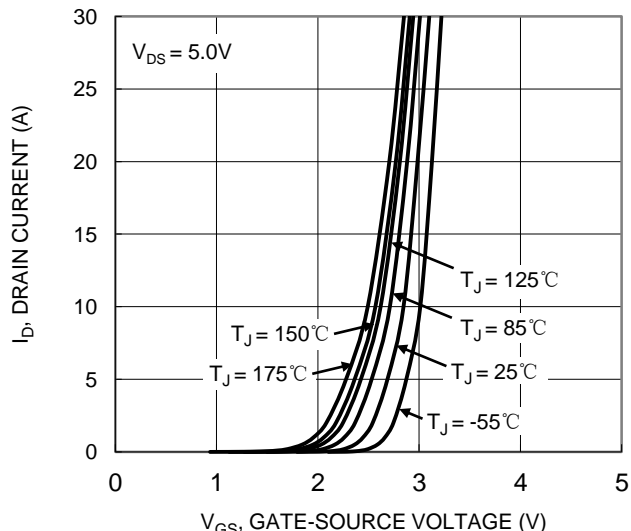


Figure 2. Typical Transfer Characteristic

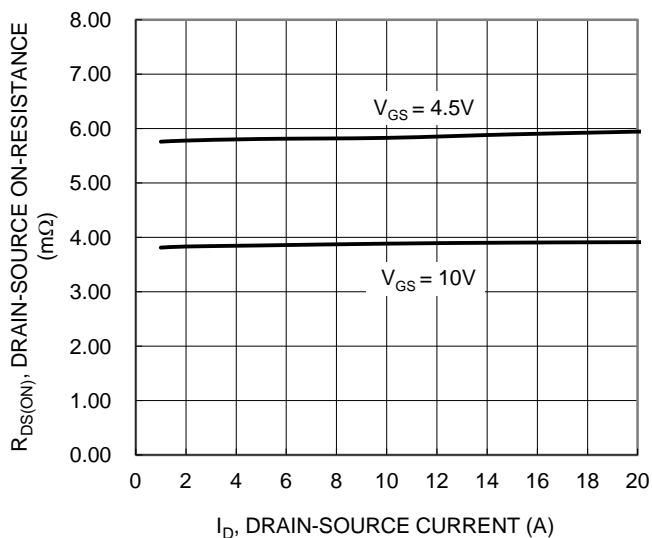


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

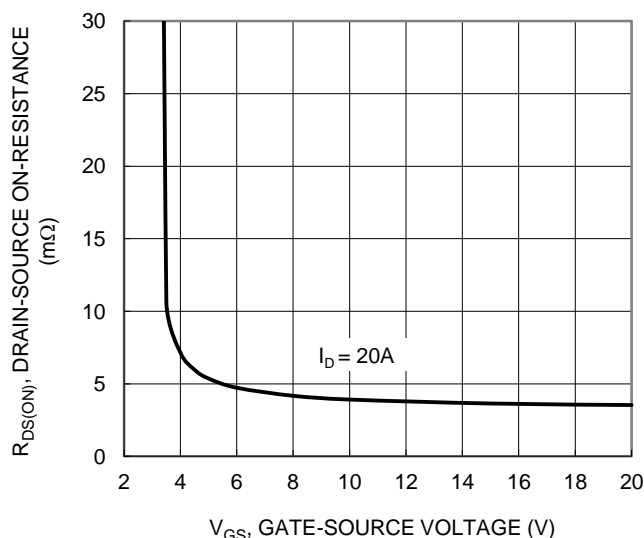


Figure 4. Typical Transfer Characteristic

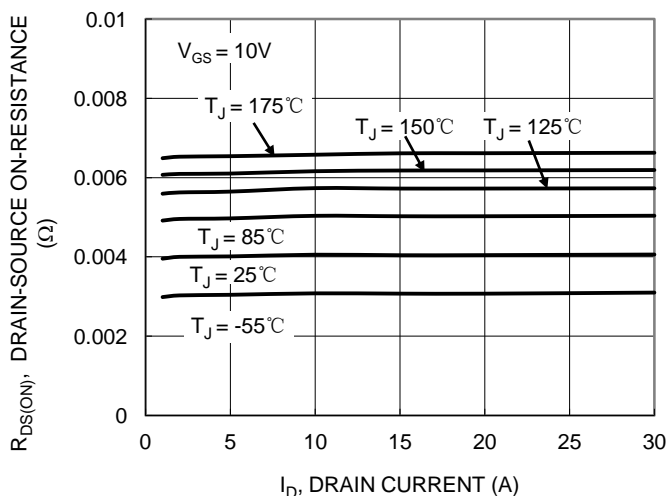


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

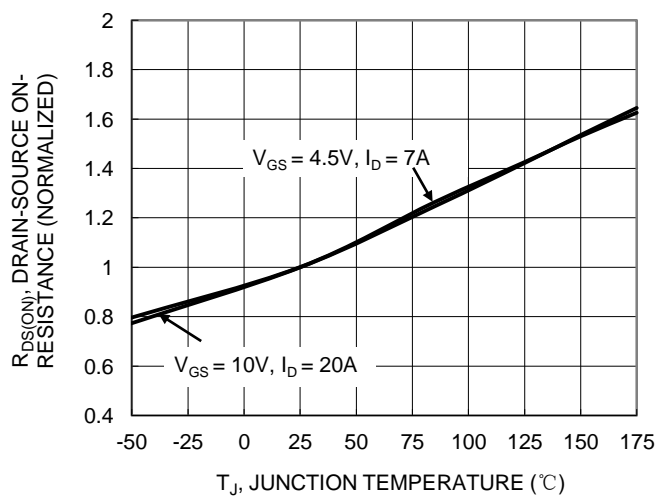


Figure 6. On-Resistance Variation with Temperature

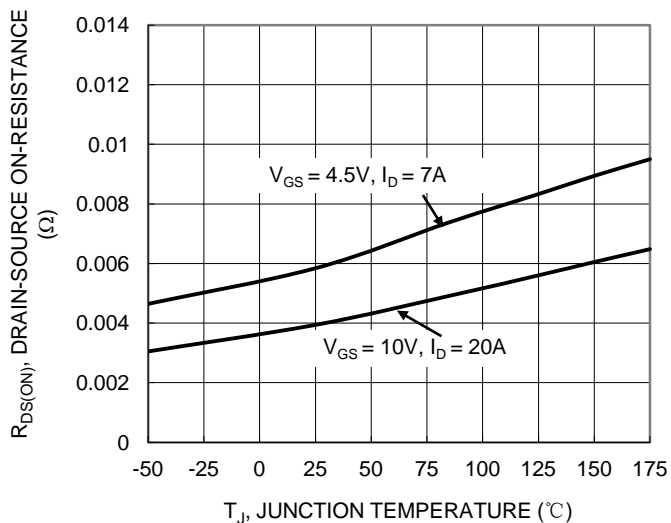


Figure 7. On-Resistance Variation with Temperature

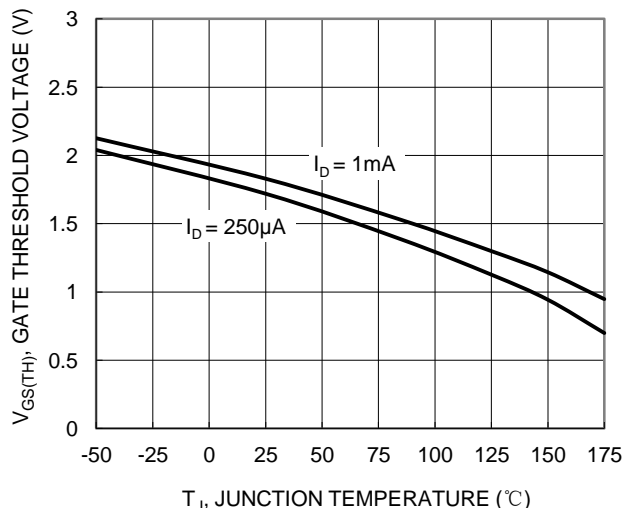


Figure 8. Gate Threshold Variation vs. Junction Temperature

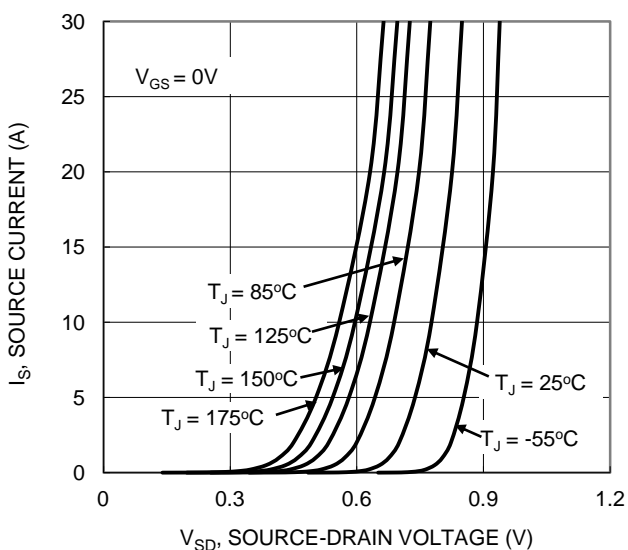


Figure 9. Diode Forward Voltage vs. Current

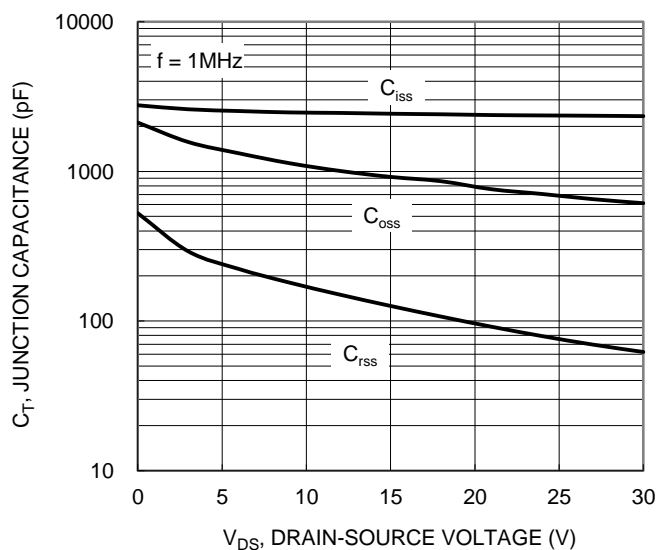


Figure 10. Typical Junction Capacitance

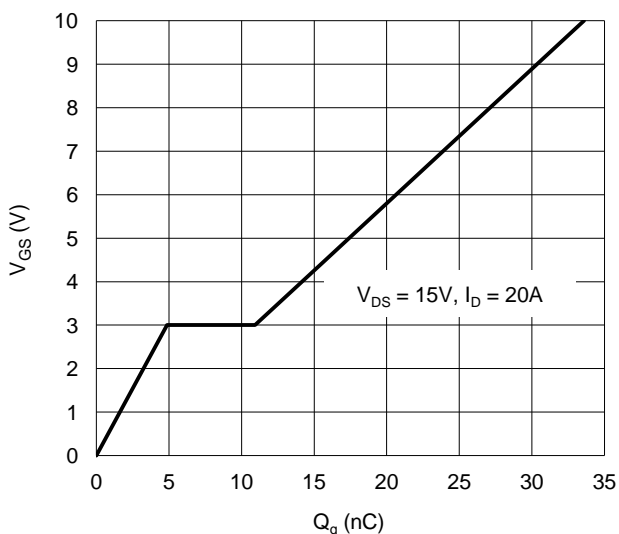


Figure 11. Gate Charge

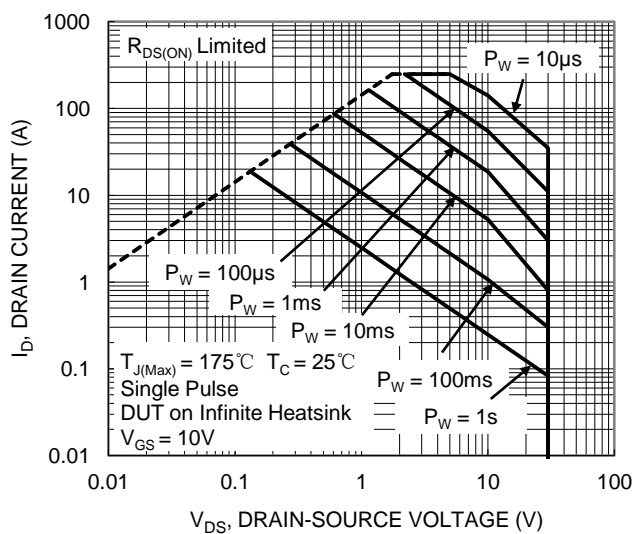


Figure 12. SOA, Safe Operation Area

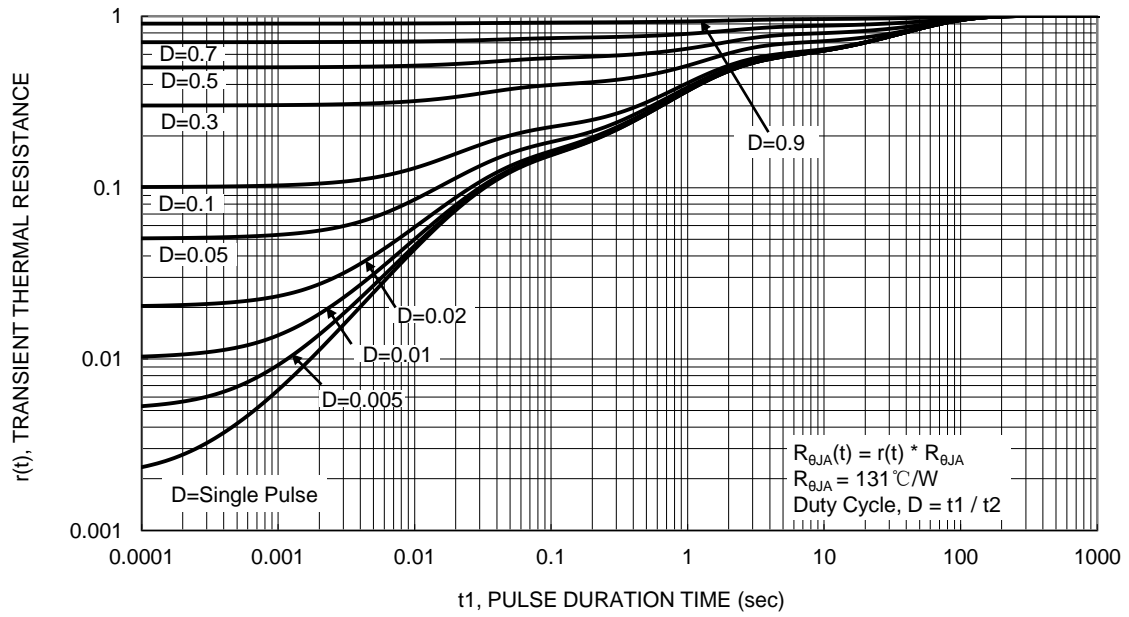
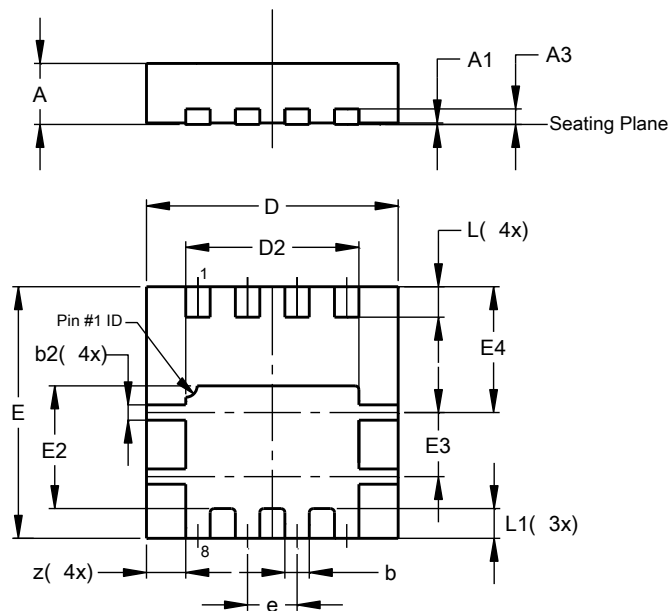


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

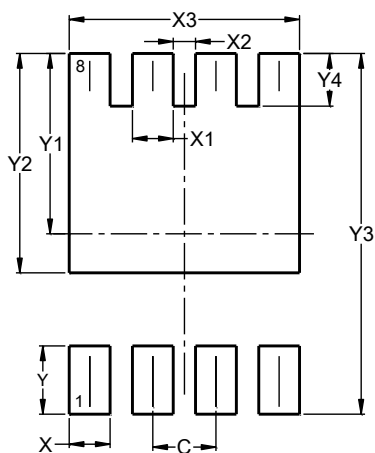
PowerDI3333-8



PowerDI3333-8			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	-	-	0.203
b	0.27	0.37	0.32
b2	0.15	0.25	0.20
D	3.25	3.35	3.30
D2	2.22	2.32	2.27
E	3.25	3.35	3.30
E2	1.56	1.66	1.61
E3	0.79	0.89	0.84
E4	1.60	1.70	1.65
e	-	-	0.65
L	0.35	0.45	0.40
L1	-	-	0.39
z	-	-	0.515
All Dimensions in mm			

Suggested Pad Layout

PowerDI3333-8



Dimensions	Value (in mm)
C	0.650
X	0.420
X1	0.420
X2	0.230
X3	2.370
Y	0.700
Y1	1.850
Y2	2.250
Y3	3.700
Y4	0.540