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

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 $T_C = +25°C$
80V	6.9mΩ @ V_{GS} = 10V	70A
	10.4mΩ @ V_{GS} = 4.5V	57A

Description and Applications

This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

- Backlighting
- Power-management functions
- DC-DC converters

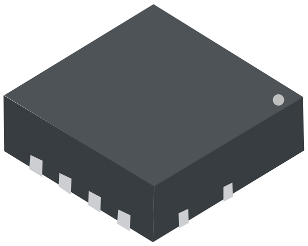
Features and Benefits

- Rated to +175°C – Ideal for High Ambient Temperature Environments
- Low $R_{DS(ON)}$ – Ensures On-State Losses are Minimized
- Excellent Q_{gd} × $R_{DS(ON)}$ Product (FOM)
- Advanced Technology for DC-DC Converters
- 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% Unclamped Inductive Switching (UIS) Test in Production – Ensures More Reliable and Robust End Application

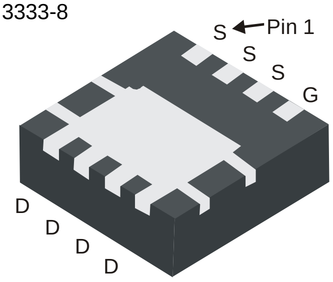
Mechanical Data

- Package: PowerDI®3333-8
- Package 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
- Terminal Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.034 grams (Approximate)

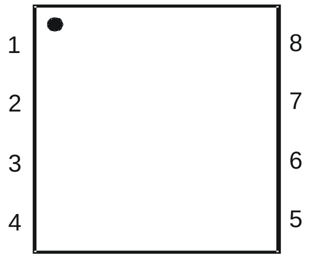
PowerDI3333-8



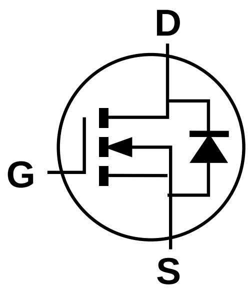
Top View



Bottom View



Top View
Pin-Out



Equivalent Circuit

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 (Note 7) V_{GS} = 10V	T_C = +25°C T_C = +100°C	I_D	70 49	A
Continuous Drain Current (Note 6) V_{GS} = 10V	T_A = +25°C T_A = +100°C	I_D	17 12	A
Maximum Continuous Body Diode Forward Current (Note 6)		I_S	17	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)		I_{DM}	280	A
Pulsed Body Diode Forward Current (10µs Pulse, Duty Cycle = 1%)		I_{SM}	280	A
Avalanche Current, L = 1mH (Note 8)		I_{AS}	18	A
Avalanche Energy, L = 1mH (Note 8)		E_{AS}	162	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T_A = +25°C	P_D	1.2	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	124	°C/W
Total Power Dissipation (Note 6)	T_A = +25°C	P_D	2.8	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	53	°C/W
Total Power Dissipation (Note 7)	T_C = +25°C	P_D	50	W
Thermal Resistance, Junction to Case (Note 7)		$R_{\theta JC}$	3	°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 9)						
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 9)						
Gate Threshold Voltage	$V_{GS(TH)}$	1.2	—	2.5	V	V_{DS} = V_{GS}, I_D = 1mA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	5.3	6.9	mΩ	V_{GS} = 10V, I_D = 20A
		—	7.9	10.4		V_{GS} = 4.5V, I_D = 10A
Diode Forward Voltage	V_{SD}	—	0.8	1.2	V	V_{GS} = 0V, I_S = 20A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{iss}	—	2254	—	pF	V_{DS} = 40V, V_{GS} = 0V, f = 1MHz
Output Capacitance	C_{oss}	—	745	—		
Reverse Transfer Capacitance	C_{rss}	—	31	—		
Gate Resistance	R_g	—	1.98	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (V_{GS} = 4.5V)	Q_g	—	18.3	—	nC	V_{DS} = 40V, I_D = 14A
Total Gate Charge (V_{GS} = 10V)	Q_g	—	37.7	—		
Gate-Source Charge	Q_{gs}	—	5.3	—		
Gate-Drain Charge	Q_{gd}	—	7.8	—		
Turn-On Delay Time	$t_{D(ON)}$	—	6.9	—	ns	V_{DD} = 40V, V_{GS} = 10V, I_D = 14A, R_G = 6Ω
Turn-On Rise Time	t_R	—	12	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	37	—		
Turn-Off Fall Time	t_F	—	21	—		
Body Diode Reverse Recovery Time	t_{RR}	—	42	—	ns	I_S = 14A, di/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q_{RR}	—	53	—	nC	

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

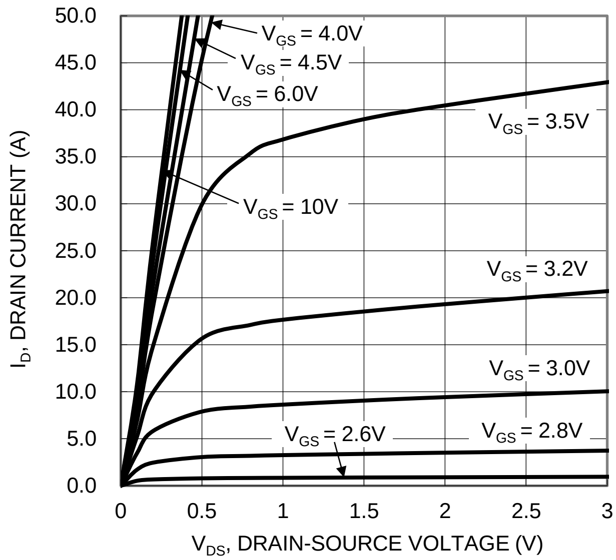


Figure 1. Typical Output Characteristic

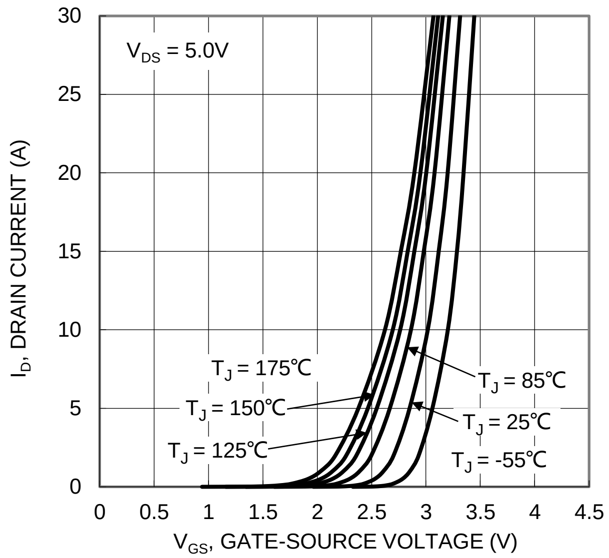


Figure 2. Typical Transfer Characteristic

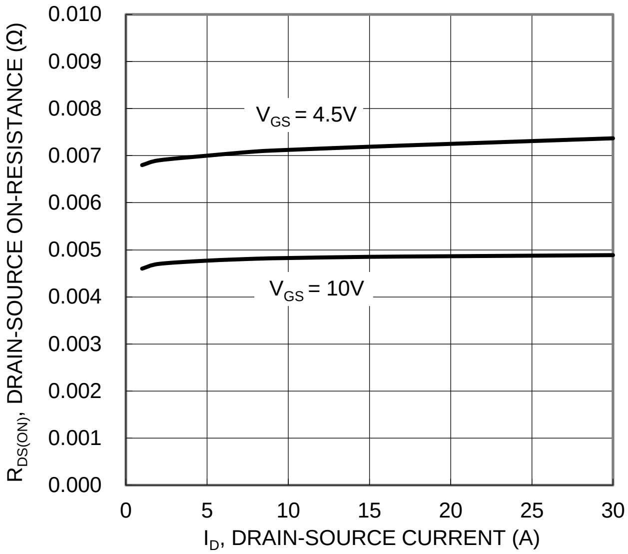


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

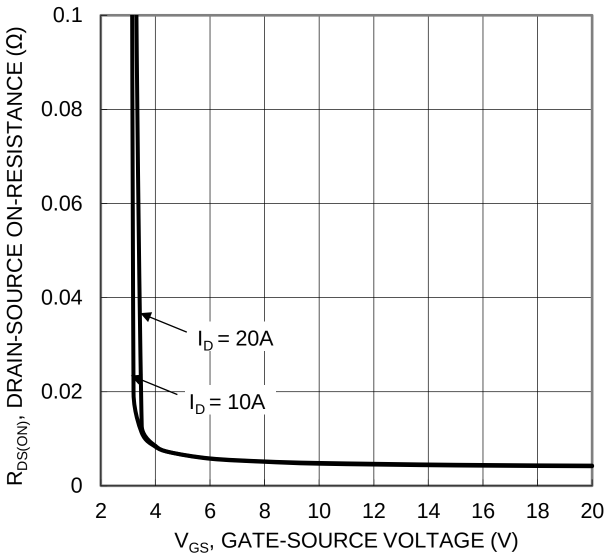


Figure 4. Typical Transfer Characteristic

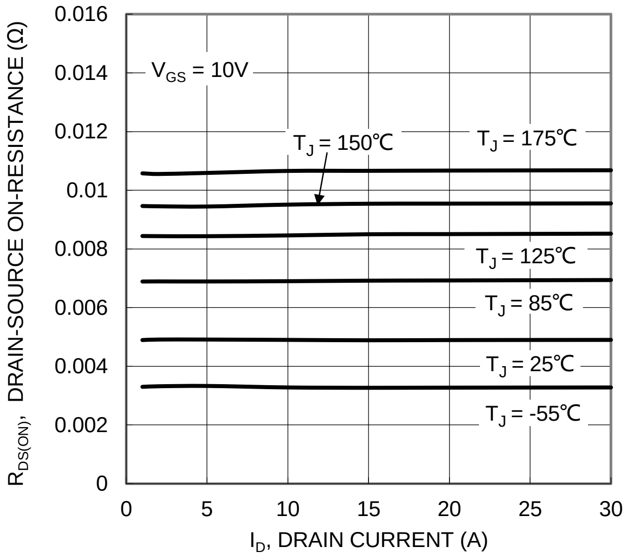


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

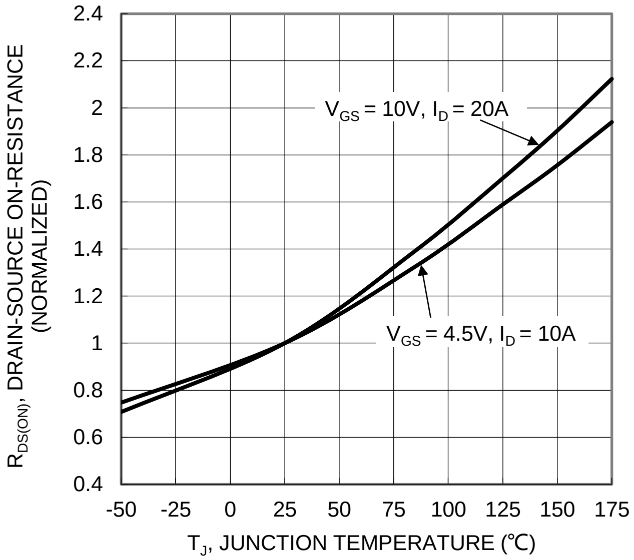


Figure 6. On-Resistance Variation with Temperature

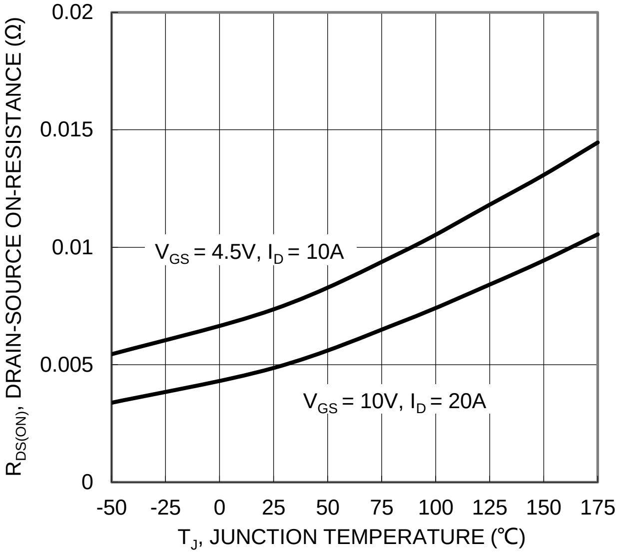


Figure 7. On-Resistance Variation with Temperature

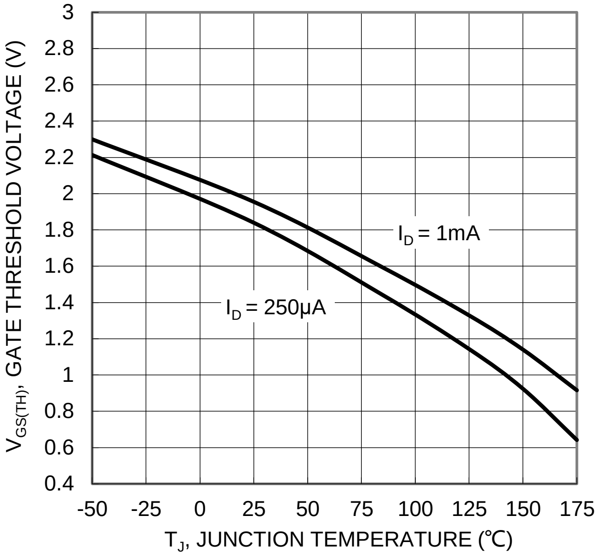


Figure 8. Gate Threshold Variation vs. Junction Temperature

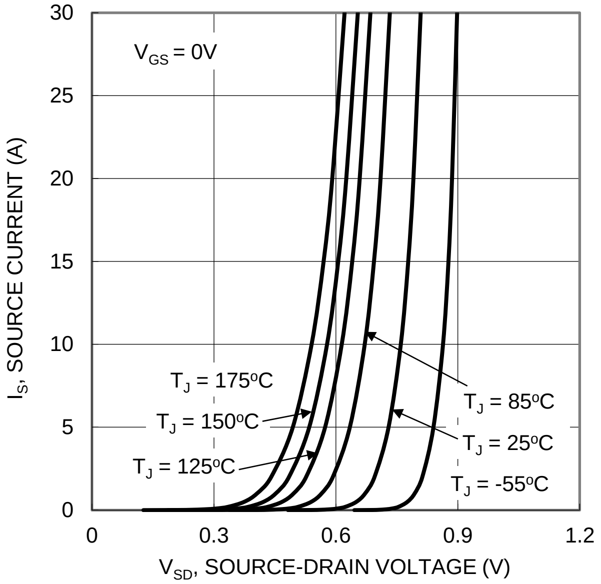


Figure 9. Diode Forward Voltage vs. Current

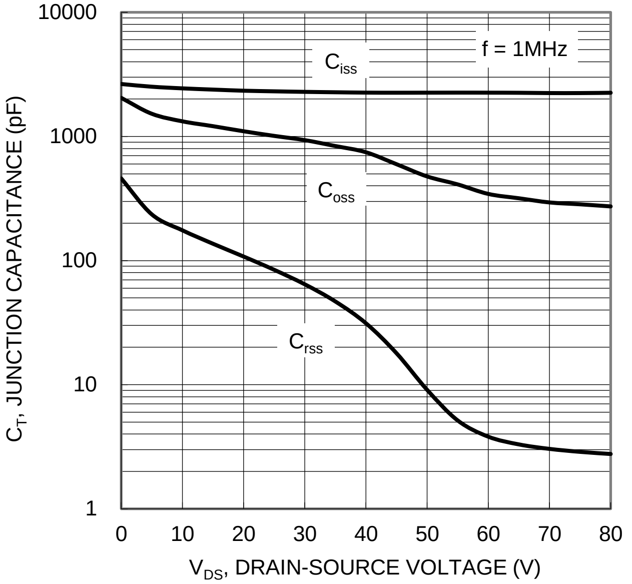


Figure 10. Typical Junction Capacitance

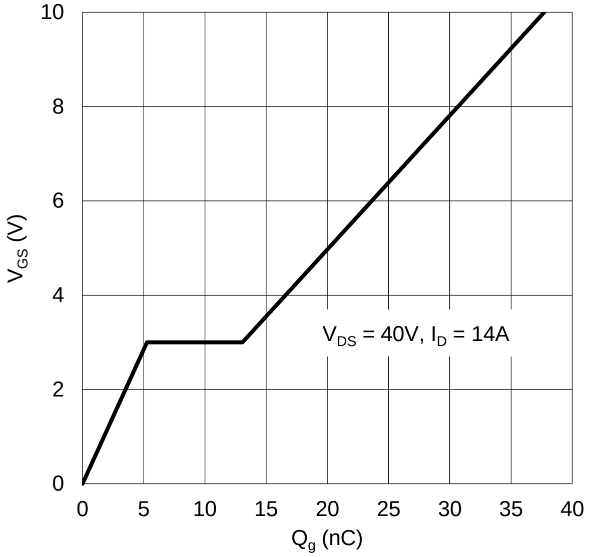


Figure 11. Gate Charge

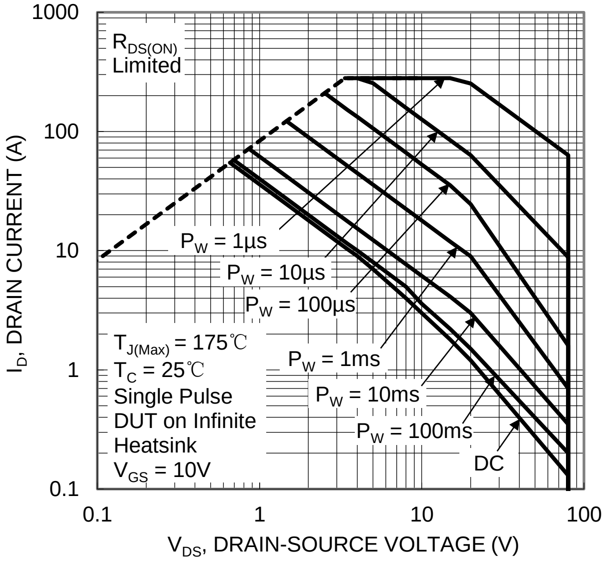


Figure 12. SOA, Safe Operation Area

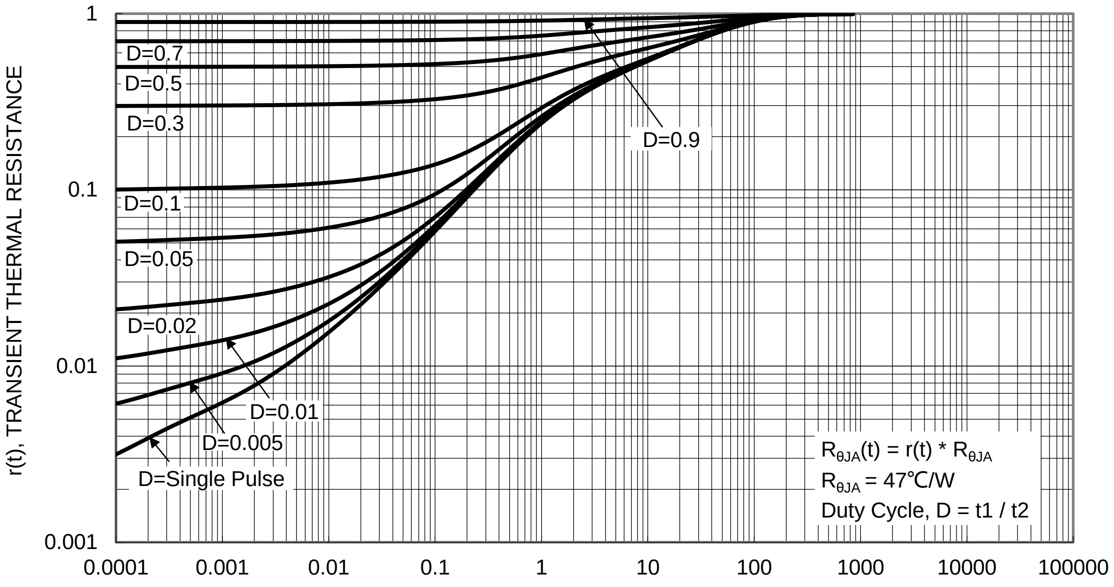
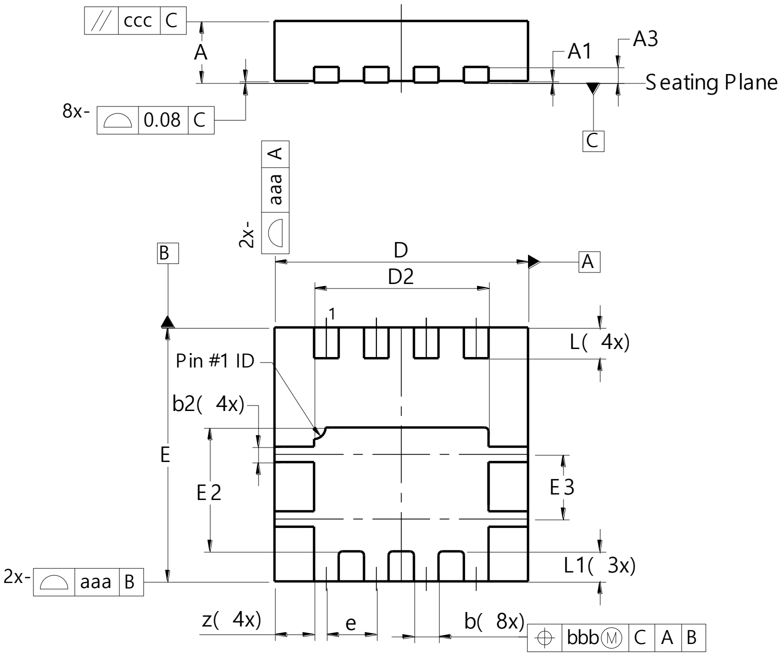


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

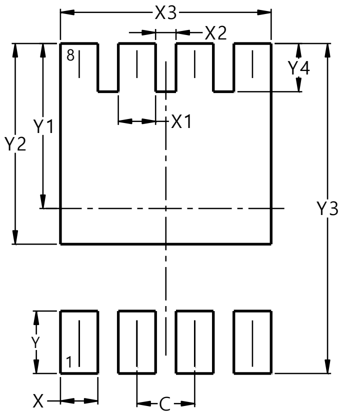
PowerDI3333-8



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	–	–	0.20
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
e	–	–	0.65
L	0.35	0.45	0.40
L1	–	–	0.39
z	–	–	0.515
aaa	0.25		
bbb	0.10		
ccc	0.10		
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