



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 $T_c = +25^\circ C$
30V	18m $\Omega$ @ $V_{GS} = 10V$	25A
	30m $\Omega$ @ $V_{GS} = 4.5V$	20A

## Features and Benefits

- Low  $R_{DS(ON)}$  – Ensures On State Losses are Minimized
- 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

## Description and Applications

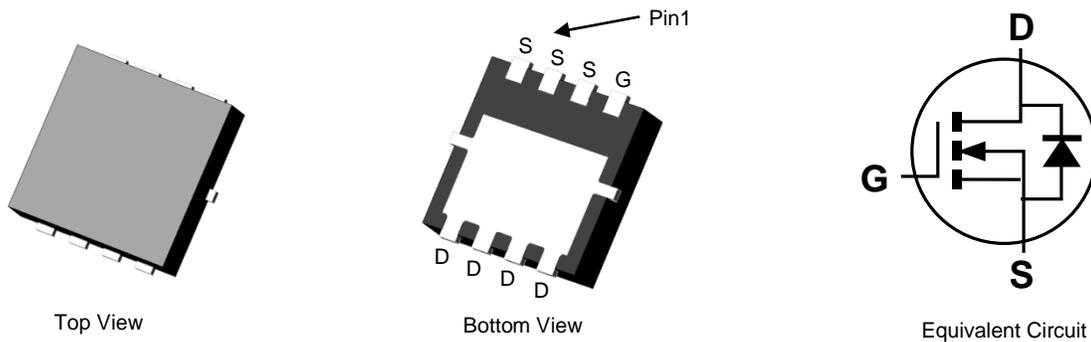
This MOSFET is designed to minimize the on-state resistance ( $R_{DS(ON)}$ ) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- Backlighting
- Power Management Functions
- DC-DC Converters

## Mechanical Data

- Case: PowerDI<sup>®</sup> 3333-8 (Type UX)
- 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)

PowerDI3333-8 (Type UX)



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

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current (Note 7) $V_{GS} = 10\text{V}$	$I_D$	$T_C = +25^\circ\text{C}$ 25	A
		$T_C = +70^\circ\text{C}$ 20	
Pulsed Drain Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%)	$I_{DM}$	55	A
Maximum Continuous Body Diode Forward Current (Note 6)	$I_S$	3	A
Avalanche Current, $L = 0.1\text{mH}$ (Note 8)	$I_{AS}$	14	A
Avalanche Energy, $L = 0.1\text{mH}$ (Note 8)	$E_{AS}$	9.8	mJ

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

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	$P_D$	0.9	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	Steady State	146
		$^\circ\text{C/W}$	
Total Power Dissipation (Note 6)	$P_D$	2.2	W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	Steady State	57
		$^\circ\text{C/W}$	
Thermal Resistance, Junction to Case (Note 7)	$R_{\theta JC}$	4.5	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 9)</b>						
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	$\mu\text{A}$	$V_{DS} = 30\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	-	-	$\pm 100$	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 9)</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	1.0	-	2.0	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	-	13	18	m $\Omega$	$V_{GS} = 10\text{V}, I_D = 7\text{A}$
		-	21	30		$V_{GS} = 4.5\text{V}, I_D = 7\text{A}$
Diode Forward Voltage	$V_{SD}$	-	0.7	1.2	V	$V_{GS} = 0\text{V}, I_S = 1\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 10)</b>						
Input Capacitance	$C_{iss}$	-	500	-	pF	$V_{DS} = 15\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Output Capacitance	$C_{oss}$	-	72	-	pF	
Reverse Transfer Capacitance	$C_{rss}$	-	57	-	pF	
Gate Resistance	$R_g$	-	1.9	-	$\Omega$	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge ( $V_{GS} = 4.5\text{V}$ )	$Q_g$	-	4.6	-	nC	$V_{DS} = 15\text{V}, I_D = 10\text{A}$
Total Gate Charge ( $V_{GS} = 10\text{V}$ )	$Q_g$	-	9.8	-	nC	
Gate-Source Charge	$Q_{gs}$	-	1.6	-	nC	
Gate-Drain Charge	$Q_{gd}$	-	2.0	-	nC	
Turn-On Delay Time	$t_{D(ON)}$	-	3.9	-	ns	$V_{DD} = 15\text{V}, V_{GS} = 10\text{V}, R_g = 6\Omega, I_D = 1\text{A}$
Turn-On Rise Time	$t_R$	-	4.2	-	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	-	16.6	-	ns	
Turn-Off Fall Time	$t_F$	-	5.8	-	ns	$I_F = 12\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Body Diode Reverse Recovery Time	$t_{RR}$	-	5.6	-	ns	
Body Diode Reverse Recovery Charge	$Q_{RR}$	-	2.6	-	nC	

- Notes:
- Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1-inch 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  $T_J = +25^\circ\text{C}$ .
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.

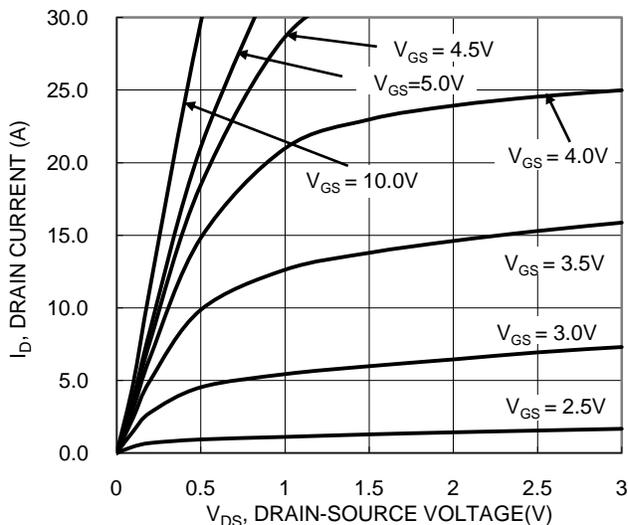


Figure 1. Typical Output Characteristic

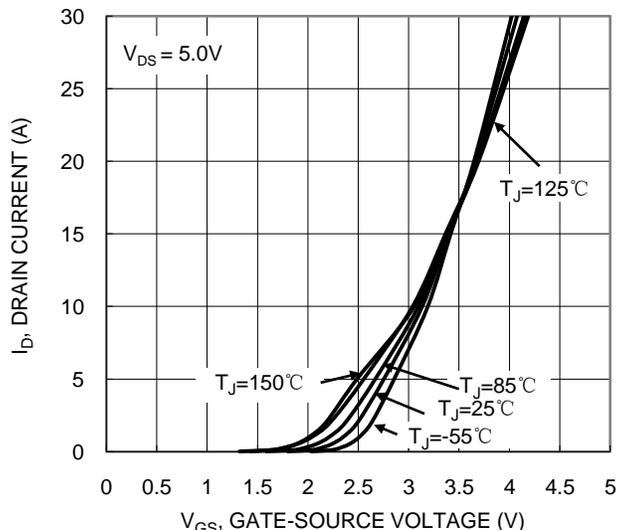


Figure 2. Typical Transfer Characteristic

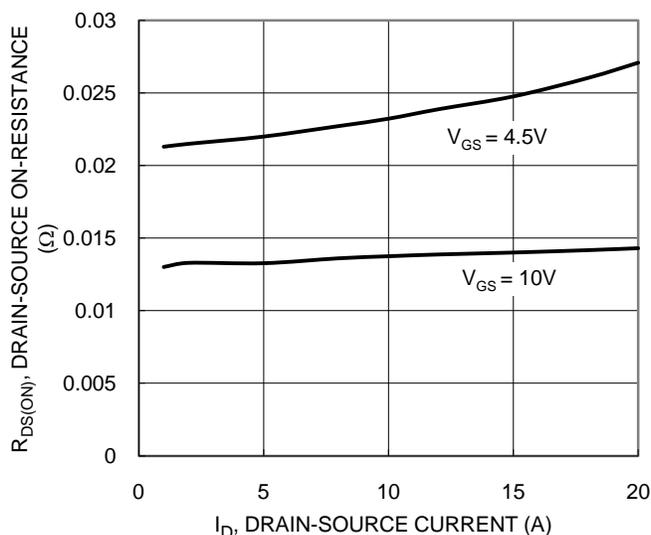


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

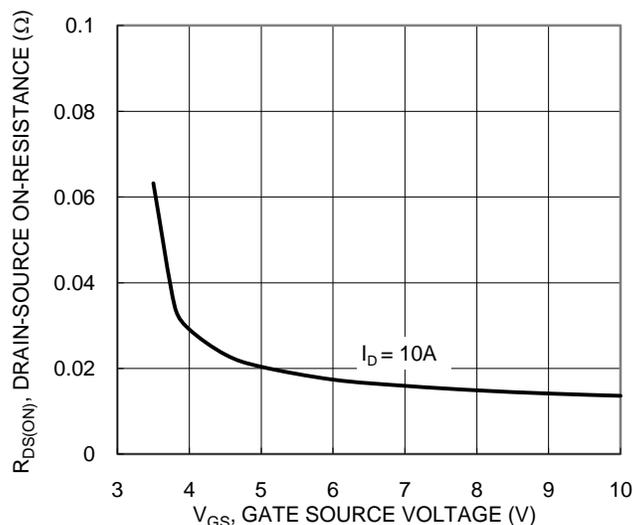


Figure 4. Typical On-Resistance vs. Drain Current and Gate Voltage

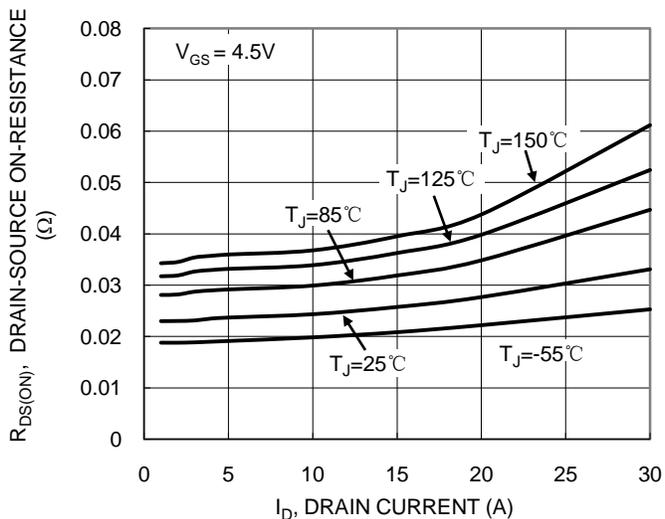


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

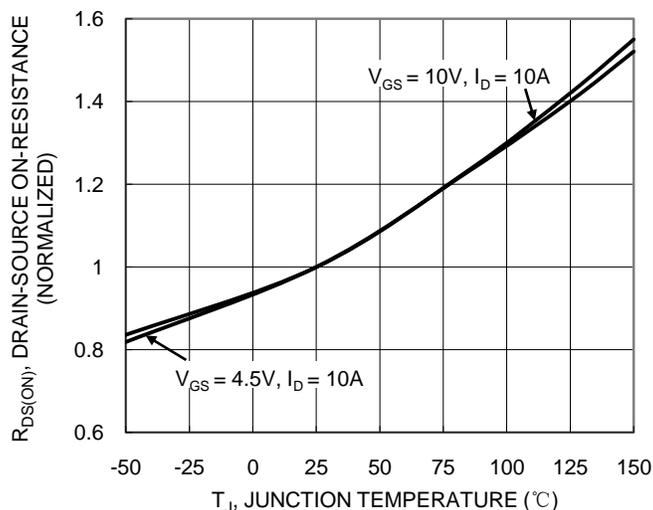


Figure 6. On-Resistance Variation with Temperature

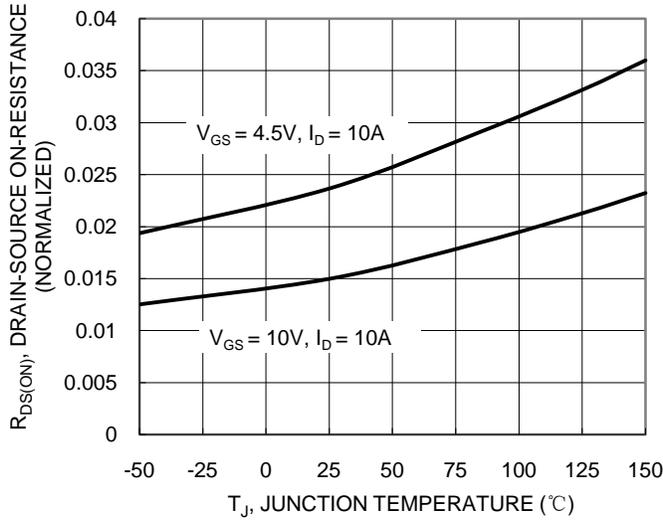


Figure 7. On-Resistance Variation with Temperature

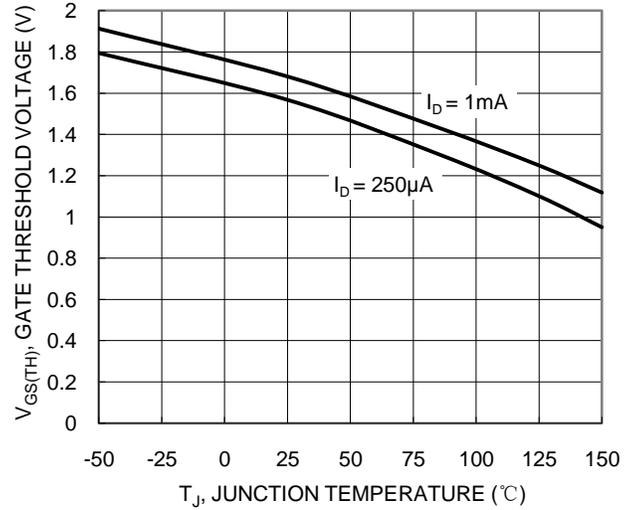


Figure 8. Gate Threshold Variation vs. Junction Temperature

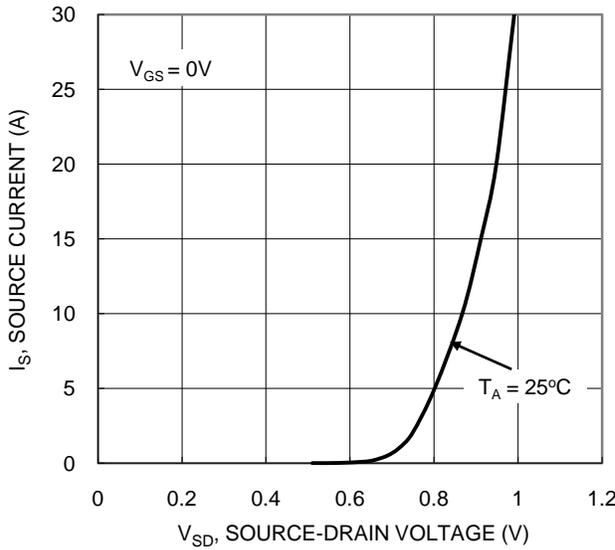


Figure 9. Diode Forward Voltage vs. Current

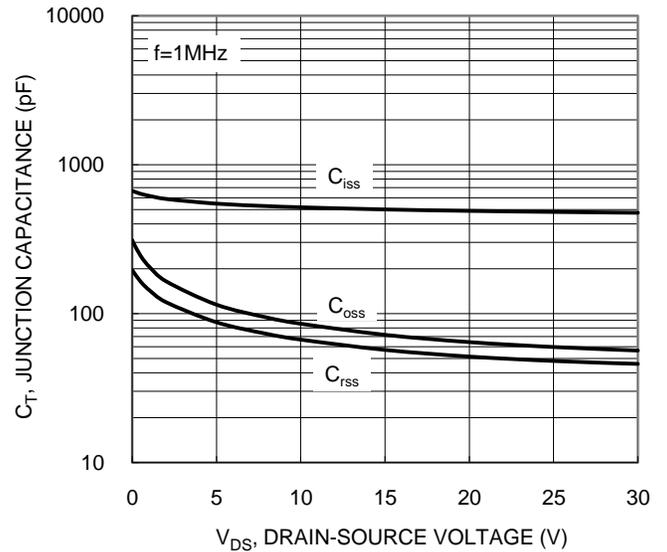


Figure 10. Typical Junction Capacitance

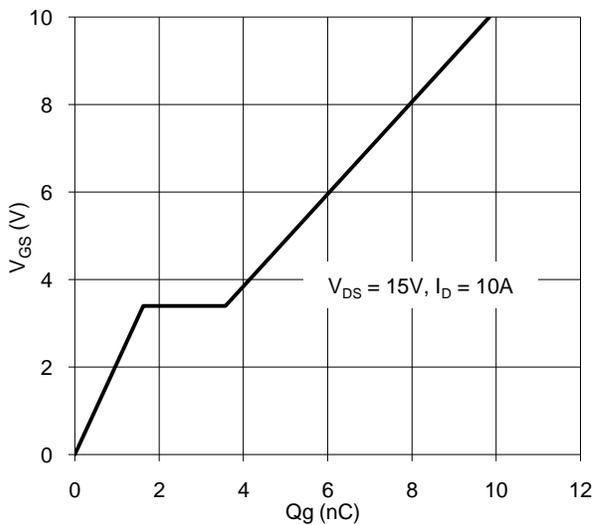


Figure 11. Gate Charge

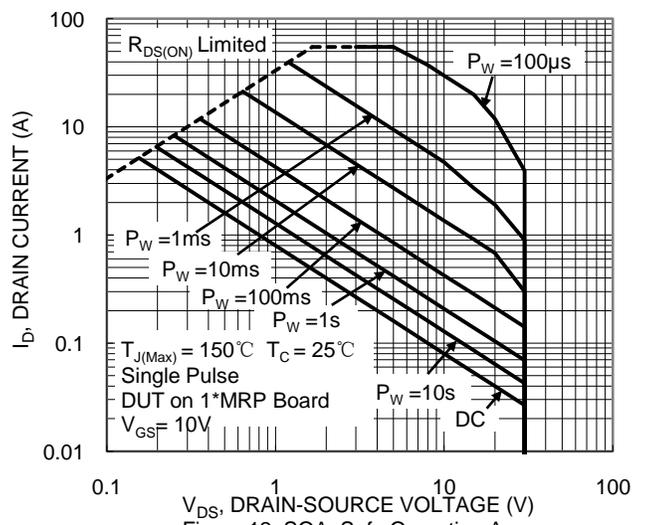


Figure 12. SOA, Safe Operation Area

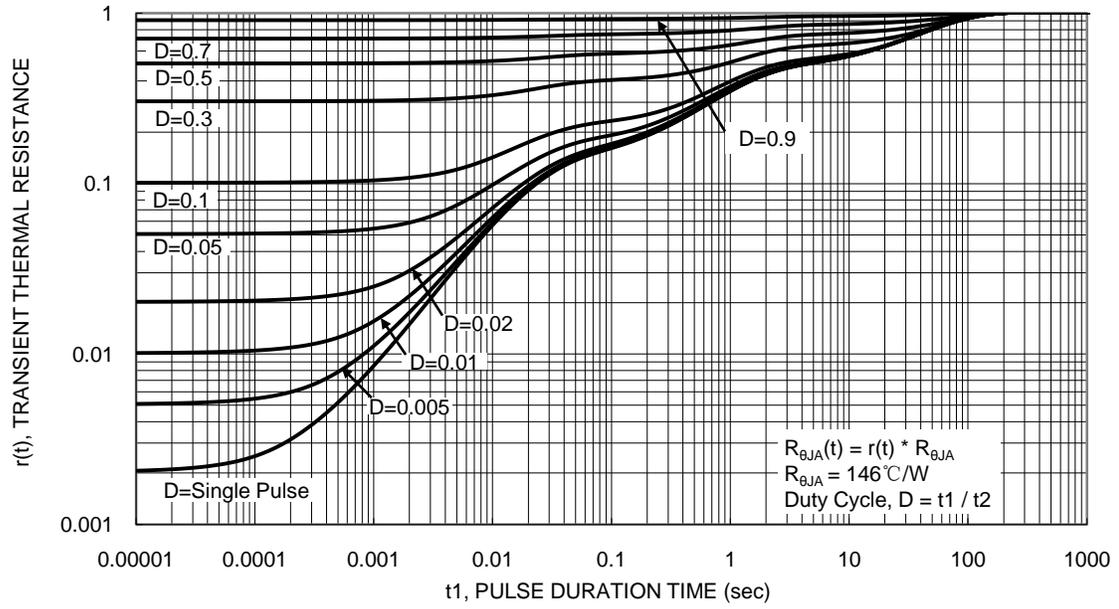
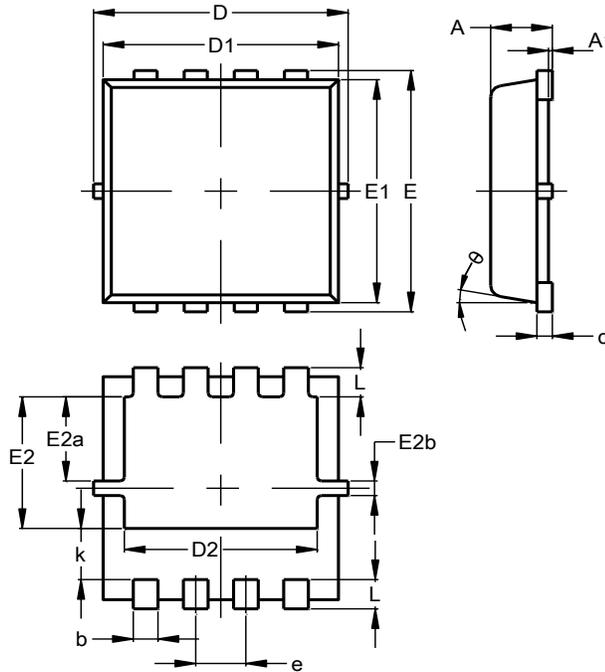


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

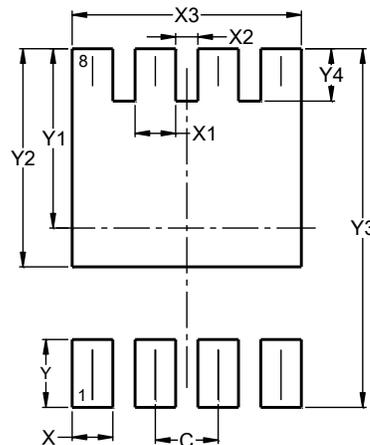
PowerDI3333-8 (Type UX)



PowerDI3333-8 (Type UX)			
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	2.30	2.70	2.50
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	1.60	2.00	1.80
E2a	0.95	1.35	1.15
E2b	0.10	0.30	0.20
e	0.65 BSC		
k	0.50	0.90	0.70
L	0.30	0.50	0.40
θ	0°	12°	10°
All Dimensions in mm			

Suggested Pad Layout

PowerDI3333-8 (Type UX)



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