



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
-12V	11.7mΩ @ V _{GS} = -4.5V	-19A
	18.6mΩ @ V _{GS} = -2.5V	-15A

Description

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. It is qualified to AEC-Q101, supported by a PPAP.

Applications

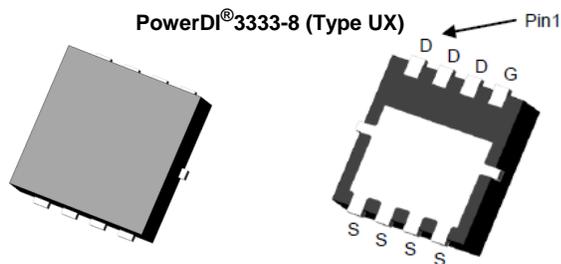
- Backlighting
- Power Management Functions
- DC-DC Converters

Features and Benefits

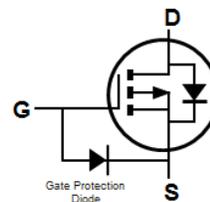
- Low R_{DS(ON)} – Ensures On-State Losses are Minimized
- Small Form Factor Thermally Efficient Package Enables Higher Density End Products
- Occupies just 33% of the Board Area Occupied by SO-8 Enabling Smaller End Product
- ESD Protected Up to 3kV

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 Ⓔ
- Weight: 0.072 grams (Approximate)



Top View

 Bottom View
 Pin Configuration


Equivalent Circuit

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	-12	V
Gate-Source Voltage			V _{GSS}	-6	V
Continuous Drain Current (Note 6) V _{GS} = 4.5V	t < 10s	T _A = +25°C T _A = +70°C	I _D	-13 -10	A
	Steady State	T _C = +25°C T _C = +70°C	I _D	-19 -15	A
Maximum Continuous Body Diode Forward Current (Note 6)			I _S	3	A
Pulsed Drain Current (380μs Pulse, Duty Cycle = 1%)			I _{DM}	70	A
Avalanche Current (Note 7) L = 0.3mH			I _{AS}	24	A
Avalanche Energy (Note 7) L = 0.3mH			E _{AS}	86	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)		P _D	1.05	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R _{θJA}	118	°C/W
	t < 10s		83.5	
Total Power Dissipation (Note 6)		P _D	2.16	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R _{θJA}	57	°C/W
	t < 10s		40.3	
Thermal Resistance, Junction to Case (Note 6)		R _{θJC}	11.7	°C
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV _{DSS}	-12	—	—	V	V _{GS} = 0V, I _D = -250μA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	—	—	-1	μA	V _{DS} = -9.6V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	-100	nA	V _{GS} = -6V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	-0.6	—	-1.2	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	9.8	11.7	mΩ	V _{GS} = -4.5V, I _D = -12A
		—	14.6	18.6		V _{GS} = -2.5V, I _D = -9A
Diode Forward Voltage	V _{SD}	—	-0.8	-1.0	V	V _{GS} = 0V, I _S = -16A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	913	—	pF	V _{DS} = -6V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	458	—		
Reverse Transfer Capacitance	C _{rss}	—	53	—		
Gate Resistance	R _g	—	1.85	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge (V _{GS} = -6V)	Q _g	—	9.5	—	nC	V _{DS} = -6V, I _D = -12A
Total Gate Charge (V _{GS} = -4.5V)	Q _g	—	7.1	—		
Gate-Source Charge	Q _{gs}	—	1.4	—		
Gate-Drain Charge	Q _{gd}	—	1.1	—		
Turn-On Delay Time	t _{D(ON)}	—	6.3	—	ns	V _{DS} = -6V, V _{GS} = -4.5V, R _L = 1Ω, R _g = 4.7Ω, I _D = -12A
Turn-On Rise Time	t _r	—	2.6	—		
Turn-Off Delay Time	t _{D(OFF)}	—	14.4	—		
Turn-Off Fall Time	t _f	—	3.9	—		
Body Diode Reverse Recovery Time	t _{RR}	—	13.5	—	ns	I _F = -12A, dI/dt = 100A/μs
Body Diode Reverse Recovery Charge	Q _{RR}	—	2.5	—	nC	I _F = -12A, dI/dt = 100A/μs

- 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.
 - I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to production testing.

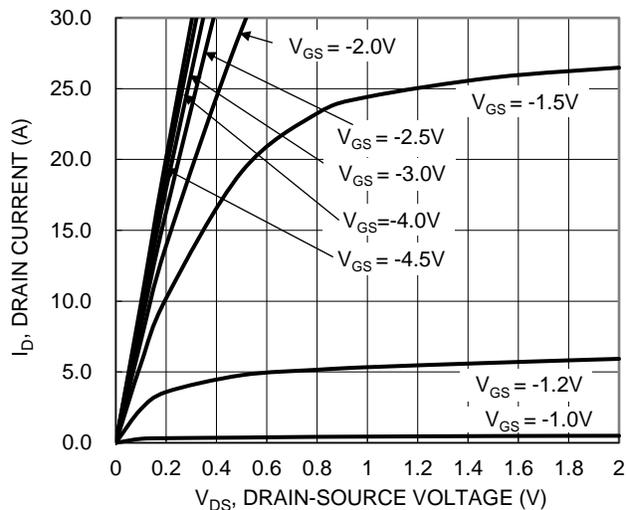


Figure 1. Typical Output Characteristic

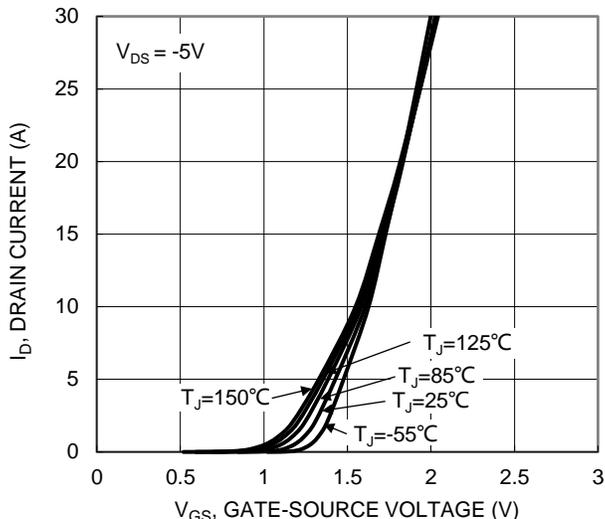


Figure 2. Typical Transfer Characteristic

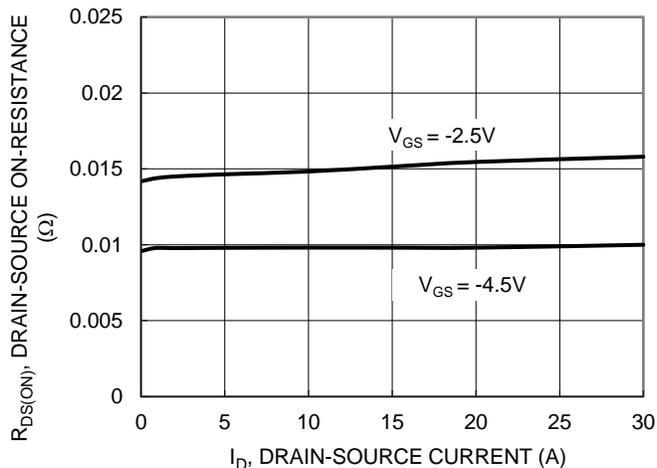


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

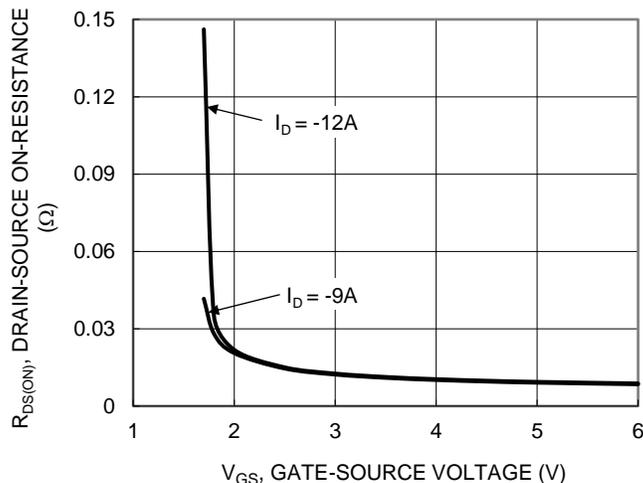


Figure 4. Typical Transfer Characteristic

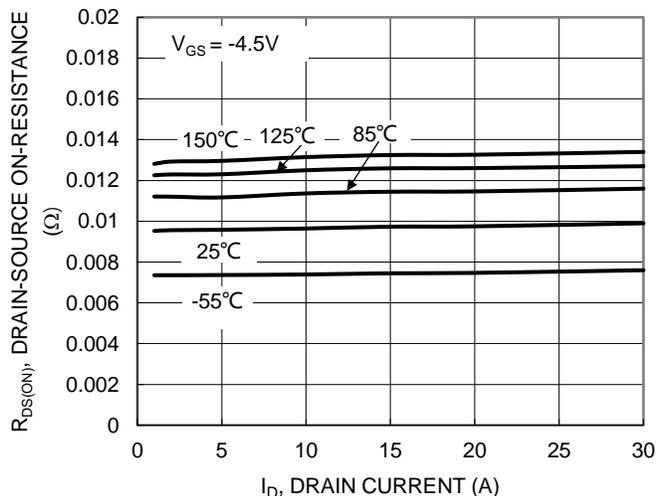


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

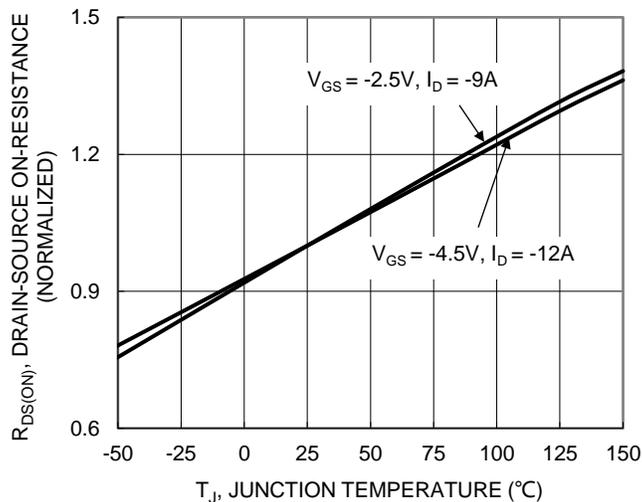


Figure 6. On-Resistance Variation with Temperature

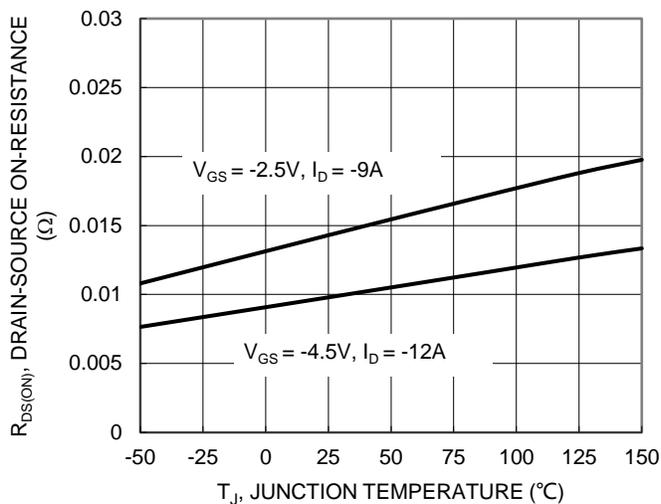


Figure 7. On-Resistance Variation with Temperature

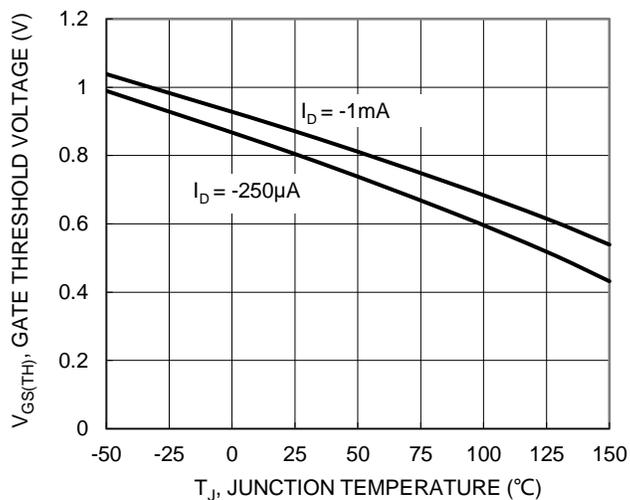


Figure 8. Gate Threshold Variation vs. Junction Temperature

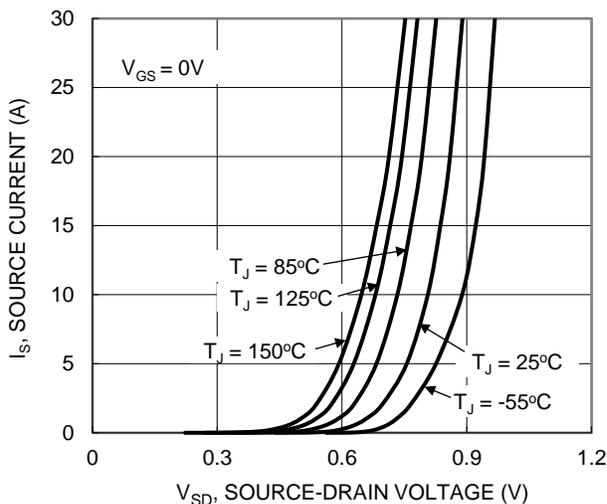


Figure 9. Diode Forward Voltage vs. Current

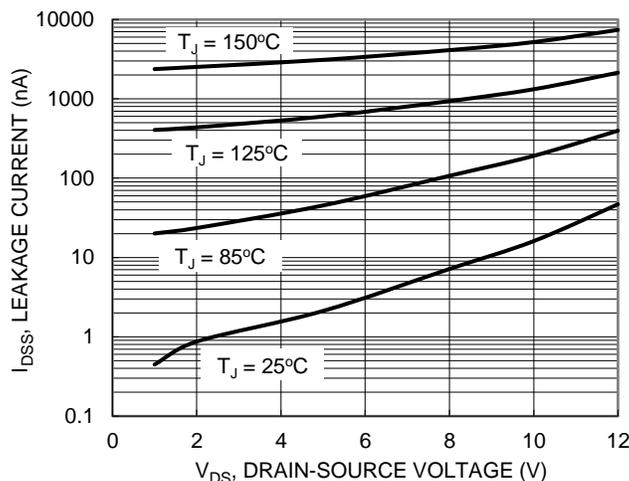


Figure 10. Typical Drain-Source Leakage Current vs. Voltage

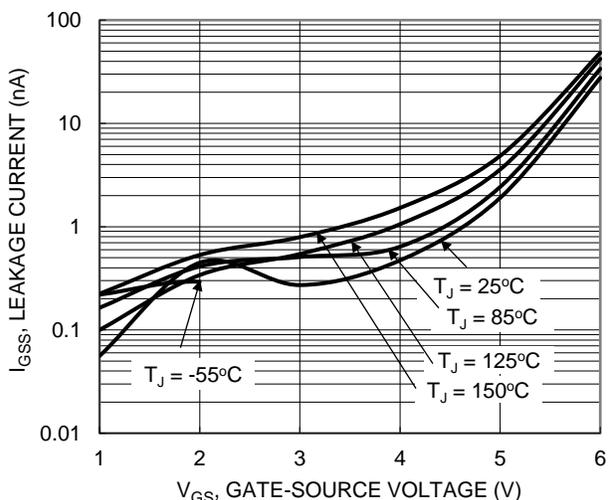


Figure 11. Gate-Source Leakage Current vs. Voltage

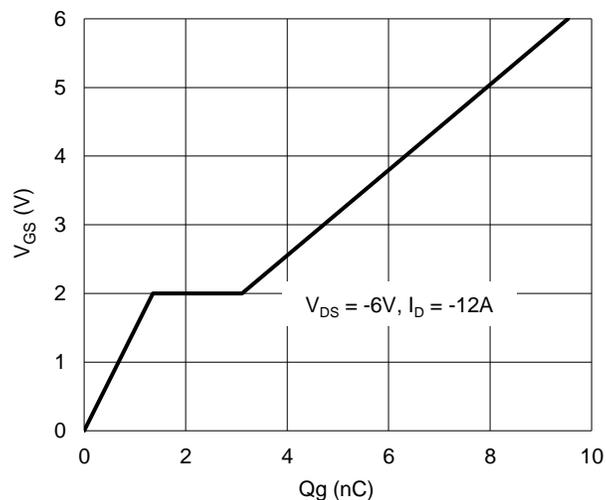


Figure 12. Gate Charge

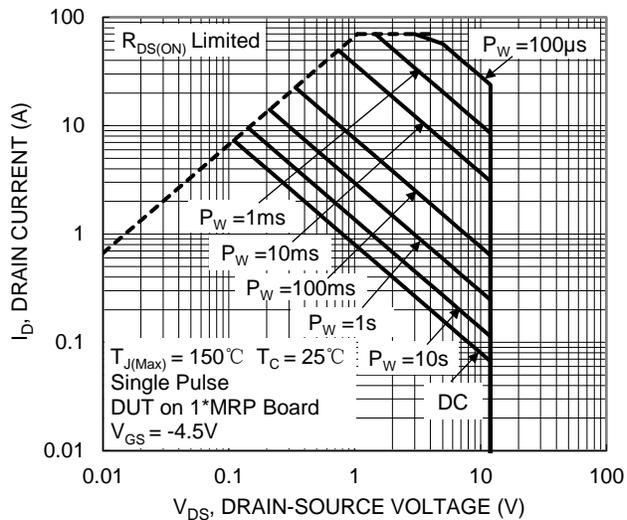


Figure 13. SOA, Safe Operation Area

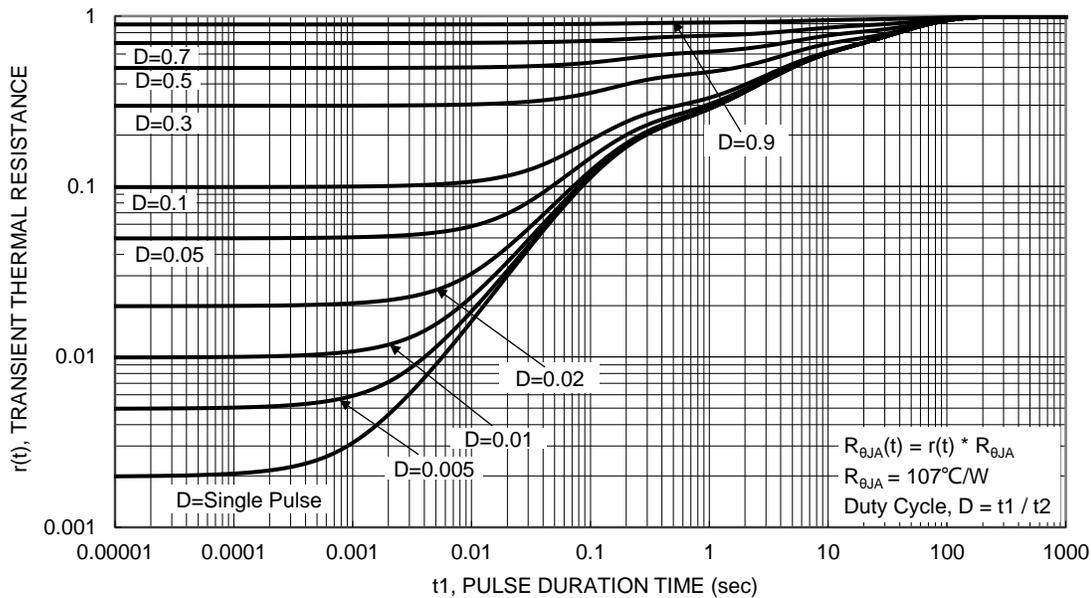
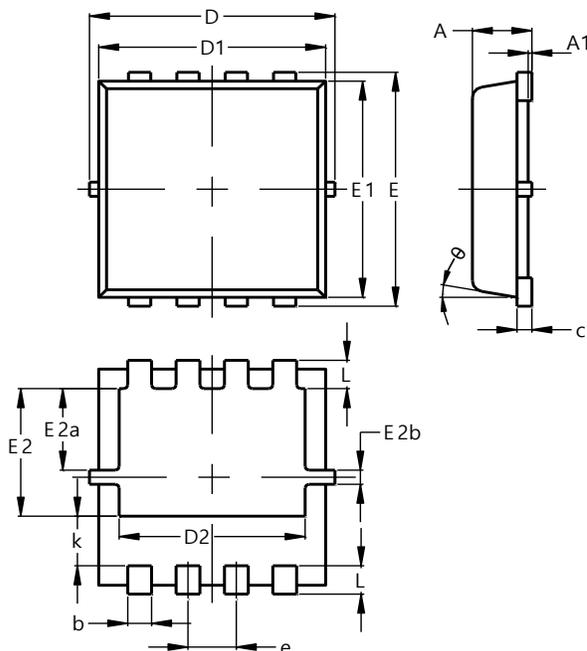


Figure 14. Transient Thermal Resistance

Package Outline Dimensions

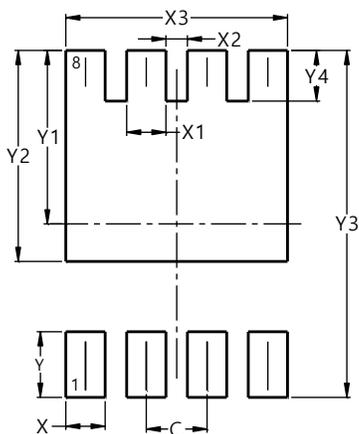
PowerDI@3333-8 (Type UX)



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

PowerDI@3333-8 (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