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

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Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ max	I_D T_A = +25°C (Note 6)
-100V	150mΩ@ V_{GS} = -10V	-5.9A
	190mΩ@ V_{GS} =-6V	-5.1A

Description

This new generation trench MOSFET from Zetex features a unique structure combining the benefits of low on-resistance and fast switching, making it ideal for high efficiency power management applications.

Applications

- DC-DC Converters
- Power Management Functions
- Disconnect Switches
- Motor Control

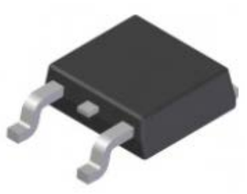
Features and Benefits

- Low On-Resistance
- Fast Switching Speed
- Low Threshold
- Low Gate Drive
- DPAK Package

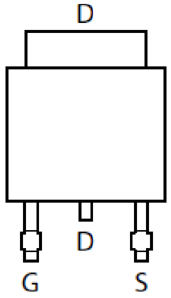
Mechanical Data

- Case: TO252 (DPAK)
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0 (Note 1)
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See diagram below
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.315 grams (Approximate)

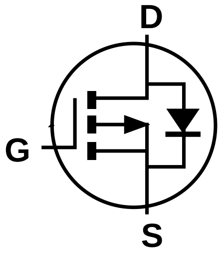
TO252



Top View



Top View
Pin Out



Equivalent circuit

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

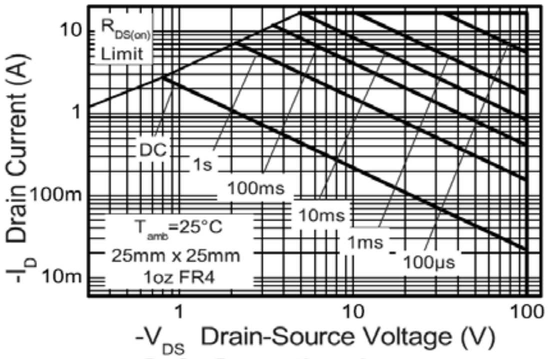
Characteristic		Symbol	Value	Units
Drain-Source Voltage		V_{DSS}	-100	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current	T_A = +25°C (Note 6)	I_D	-5.9	A
	T_A = +70°C (Note 6)		-4.7	
	T_A = +25°C (Note 5)		-3.8	
Pulsed Drain Current (Note 7)		I_{DM}	-21.1	A
Continuous Source Current (Body Diode) (Note 6)		I_S	-10	A
Pulsed Source Current (Body Diode) (Note 7)		I_{SM}	-21.1	A

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

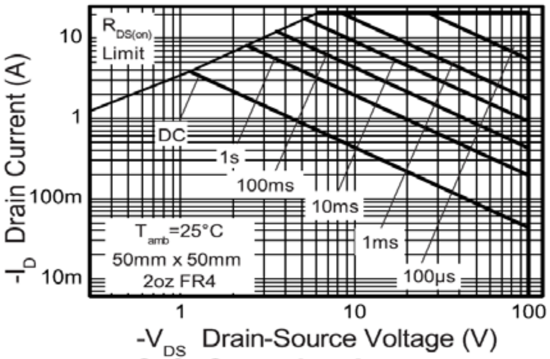
Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5) Linear Derating Factor	T_A = +25°C (Note 5)	P_D	4.3	W
			34.4	mW/°C
	T_A = +25°C (Note 6)		10.2	W
			81.3	mW/°C
	T_A = +25°C (Note 8)		2.17	W
			17.4	mW/°C
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	29	°C/W
	(Note 6)		12.3	
	(Note 8)		57.6	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Notes:
5. For a device surface mounted on 50mm x 50mm x 1.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions.
6. For a device surface mounted on FR4 PCB measured at t ≤10 sec.
7. Repetitive rating on 50mm x 50mm x 1.6mm FR4 PCB, D=0.02, pulse width=300μs – pulse width limited by maximum junction temperature.
8. For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

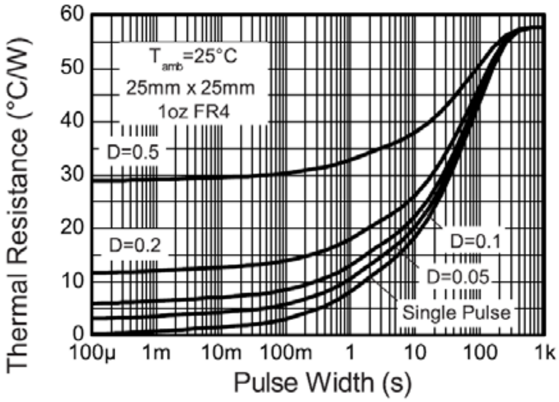
Thermal characteristics



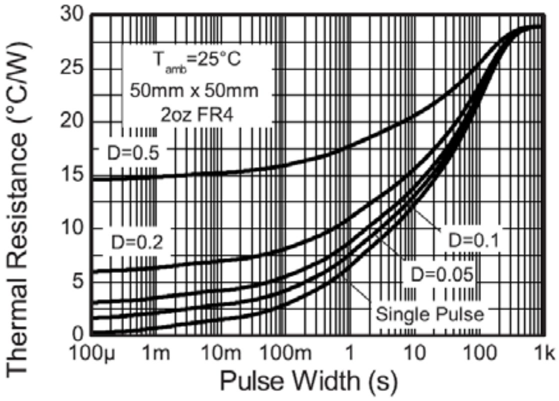
Safe Operating Area



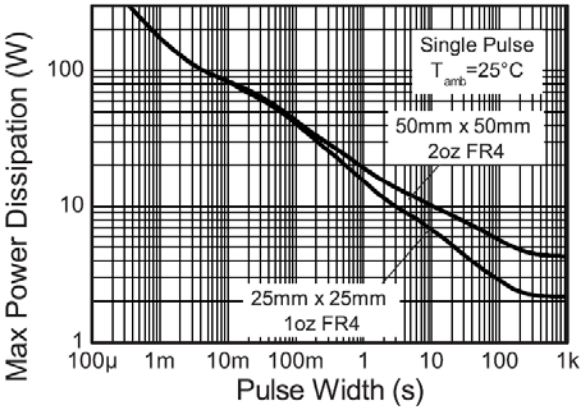
Safe Operating Area



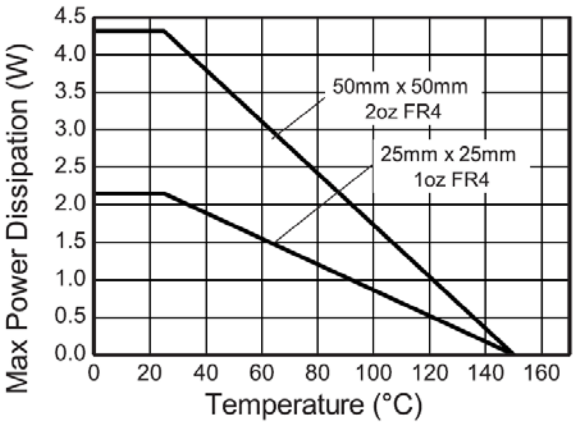
Transient Thermal Impedance



Transient Thermal Impedance



Pulse Power Dissipation



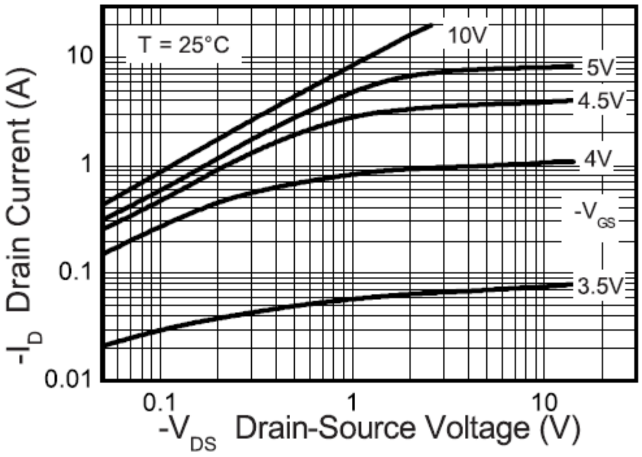
Derating Curve

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

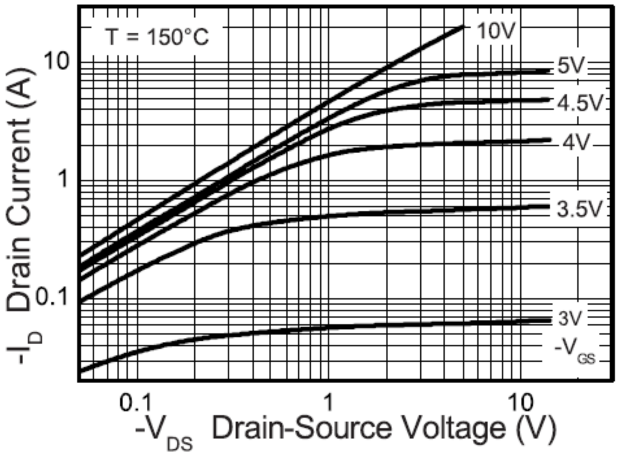
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	-100	—	—	V	V_{GS} = 0V, I_D = -250µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	µA	V_{DS} = -100V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(th)}$	-2	—	-4	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance (Note 9)	$R_{DS\ (ON)}$	—	—	150	mΩ	V_{GS} = -10V, I_D = -2.8A
				190		V_{GS} = -6V, I_D = -2.4A
Forward Transconductance (Notes 9 & 11)	g_{fs}	—	6	—	S	V_{DS} = -15V, I_D = -2.8A
DYNAMIC CHARACTERISTICS (Note 11)						
Input Capacitance	C_{iss}	—	1055	—	pF	V_{DS} = -50V, V_{GS} = 0V, f = 1MHz
Output Capacitance	C_{oss}	—	90	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	76	—	pF	
SWITCHING CHARACTERISTICS (Notes 10 & 11)						
Turn-On Delay Time	$t_{d(on)}$	—	4.9	—	ns	V_{DS} = -50V, V_{GS} = -10V, I_D = -1A, R_G = 6Ω
Rise Time	t_r	—	6.8	—		
Turn-On Delay Time	$t_{d(off)}$	—	33.9	—		
Rise Time	t_f	—	17.9	—		
Total Gate Charge	Q_g	—	26.9	—	nC	V_{DS} = -50V, V_{GS} = -10V, I_D = -2.8A
Gate-Source Charge	Q_{gs}	—	3.9	—		
Gate-Drain Charge	Q_{gd}	—	10.2	—		
SOURCE-DRAIN DIODE CHARACTERISTICS						
Diode Forward Voltage (Note 9)	V_{SD}	—	-0.85	-0.95	V	T_J = +25°C , V_{GS} = 0V, I_S = -3.5A
Reverse Recovery Time (Note 11)	t_{rr}	—	49	—	ns	T_J = +25°C, I_S = -2.8A, di/dt=100A/µs,
Reverse Recovery Charge (Note 11)	Q_{rr}	—	107	—	nC	

Notes: 9. Measured under pulsed conditions. Pulse width ≤ 300µs; duty cycle ≤ 2%.
10. Switching characteristics are independent of operating junction temperature.
11. For design aid only, not subject to production testing.

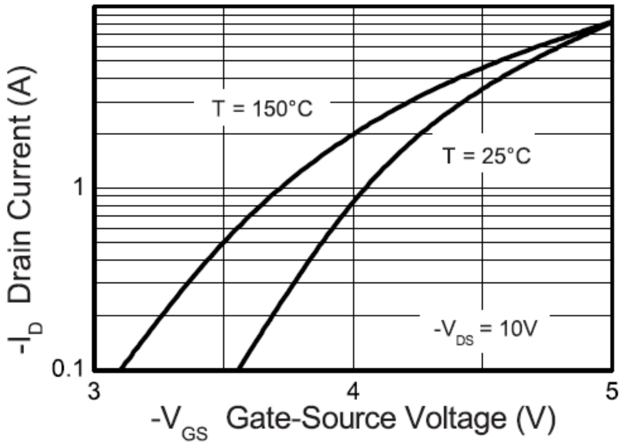
Typical characteristics



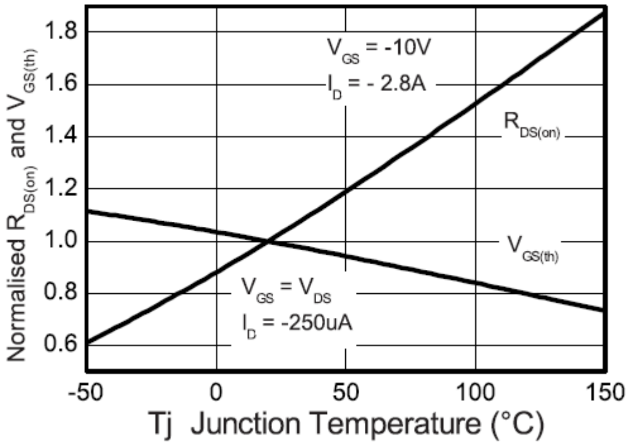
Output Characteristics



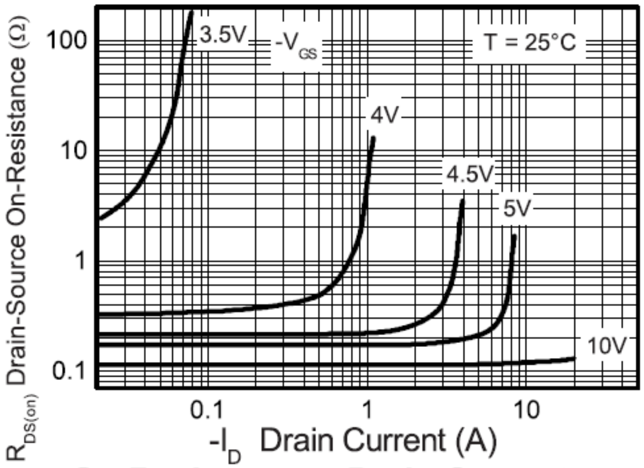
Output Characteristics



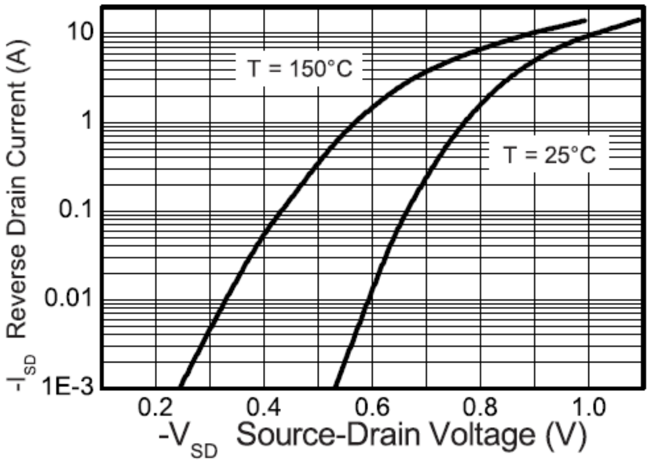
Typical Transfer Characteristics



Normalised Curves v Temperature

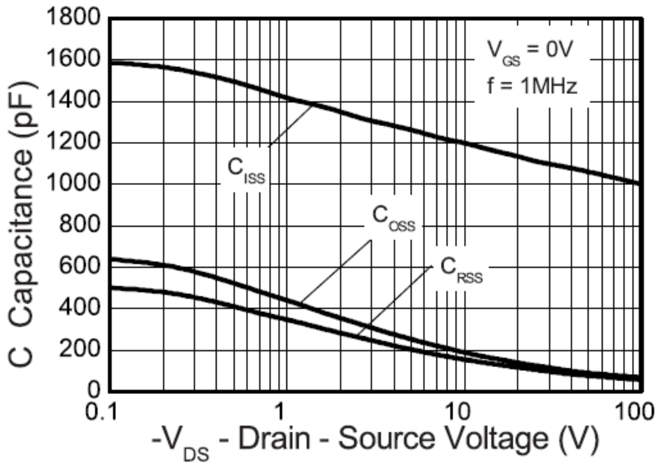


On-Resistance v Drain Current

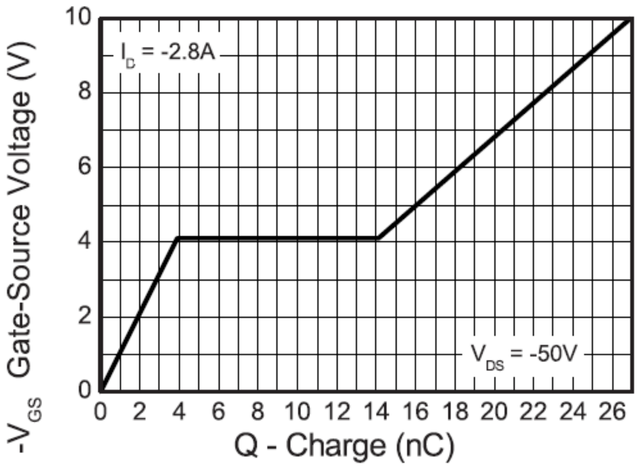


Source-Drain Diode Forward Voltage

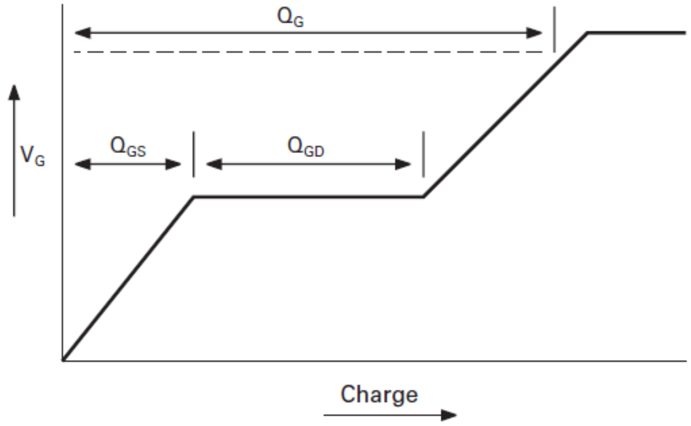
Typical characteristics



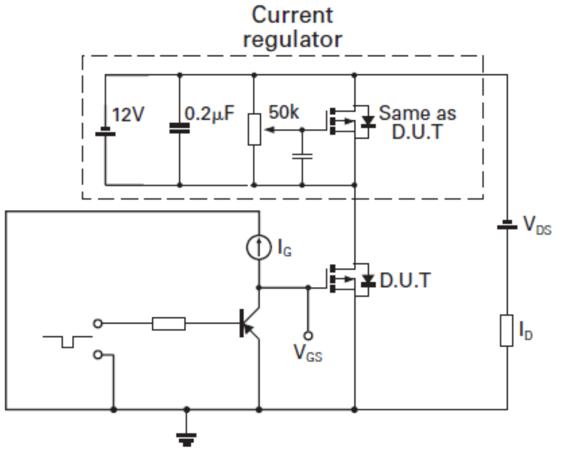
Capacitance v Drain-Source Voltage



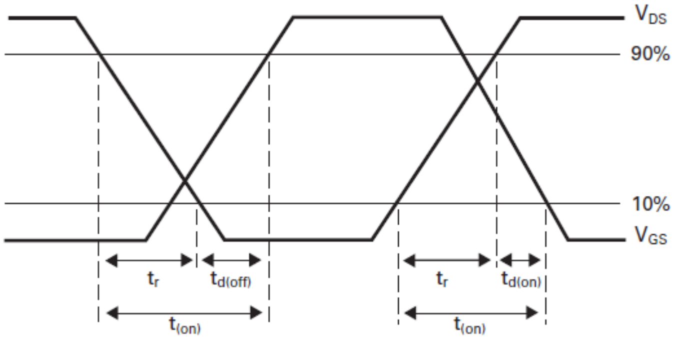
Gate-Source Voltage v Gate Charge



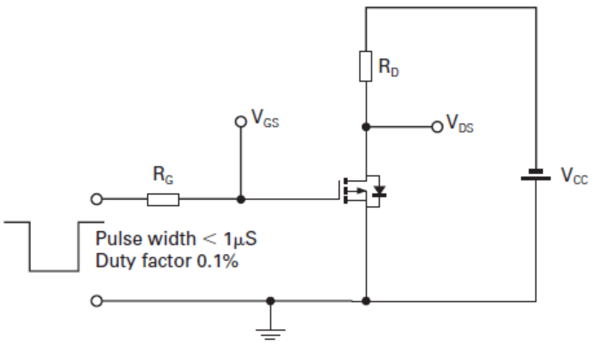
Basic gate charge waveform



Gate charge test circuit

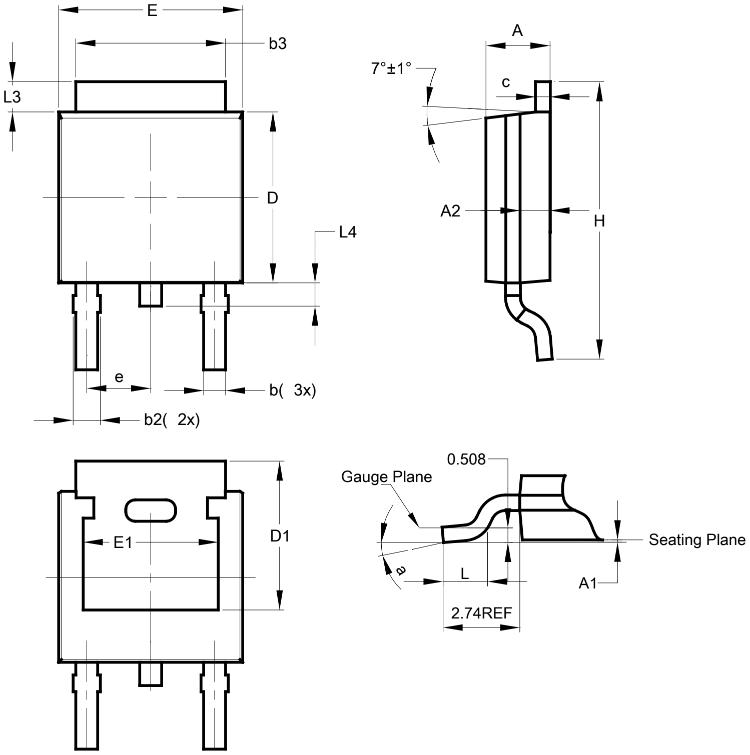


Switching time waveforms



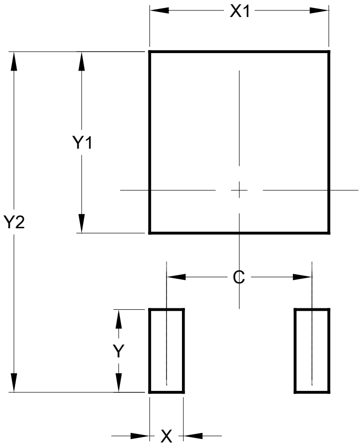
Switching time test circuit

Package Outline Dimensions



TO252 (DPAK)			
Dim	**Min**	**Max**	**Typ**
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.64	0.88	0.783
b2	0.76	1.14	0.95
b3	5.21	5.46	5.33
c	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	-	-
e	-	-	2.286
E	6.45	6.70	6.58
E1	4.32	-	-
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	0.64	1.02	0.83
a	0°	10°	-
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
C	4.572
X	1.060
X1	5.632
Y	2.600
Y1	5.700
Y2	10.700