



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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企业微信二维码



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Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ Max	I_D Max $T_A = +25^\circ\text{C}$
20V	90m Ω @ $V_{GS} = 4.5\text{V}$	2.8A
	120m Ω @ $V_{GS} = 2.5\text{V}$	2.4A

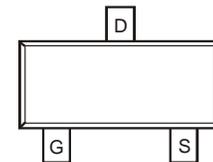
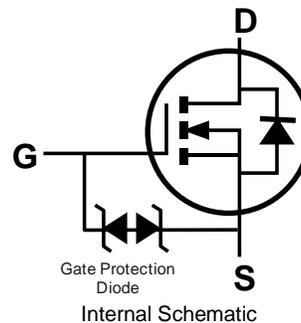
Description and Applications

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.

- Backlighting
- Power Management Functions
- DC-DC Converters
- Motor Control



Top View



Top View

Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed

Mechanical Data

- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Terminals Connections: See Diagram Below
- Weight: 0.009 grams (Approximate)

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

Characteristic	Symbol	Value	Units
Drain-Source Voltage	V_{DSS}	20	V
Gate-Source Voltage	V_{GSS}	± 12	V
Continuous Drain Current (Note 6) $V_{GS} = 4.5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$	2.8
		$T_A = +70^\circ\text{C}$	2.2
Maximum Continuous Body Diode Forward Current (Note 6)	I_S	1.1	A
Pulsed Drain Current (10 μs Pulse, Duty Cycle = 1%)	I_{DM}	12	A

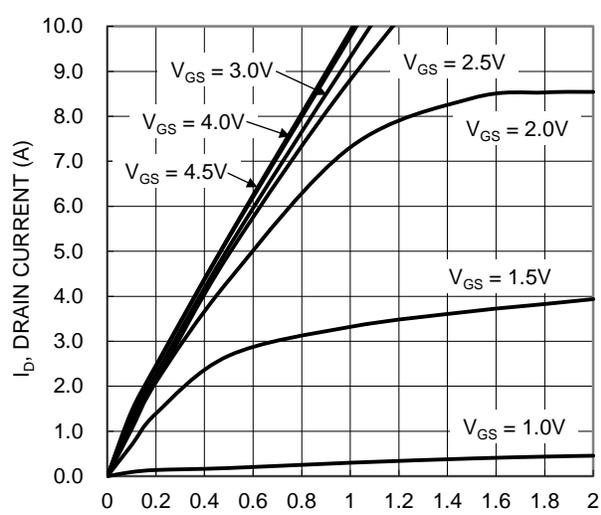
Thermal Characteristics

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	P_D	0.66	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State $R_{\theta JA}$	192	$^\circ\text{C/W}$
Total Power Dissipation (Note 6)	P_D	1.1	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State $R_{\theta JA}$	115	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

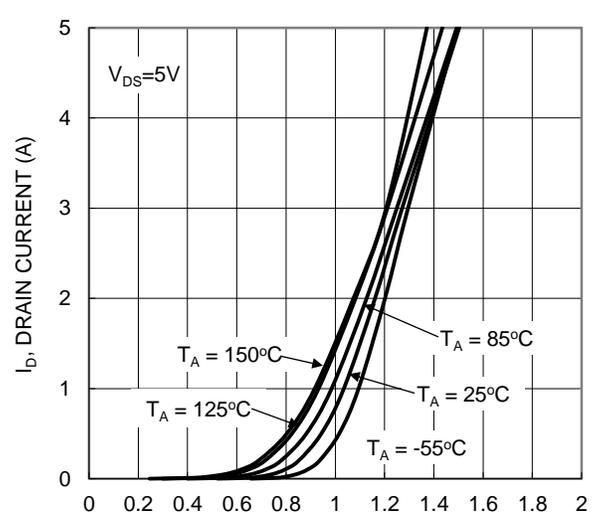
Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	20	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	10	μA	$T_J = +25^\circ\text{C}, V_{DS} = 16\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 10	μA	$V_{GS} = \pm 10\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.3	0.6	1.0	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	61	90	m Ω	$V_{GS} = 4.5\text{V}, I_D = 3.6\text{A}$
			80	120		$V_{GS} = 2.5\text{V}, I_D = 3.1\text{A}$
Diode Forward Voltage	V_{SD}	—	0.7	1.2	V	$V_{GS} = 0\text{V}, I_S = 1.0\text{A}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{ISS}	—	130	—	pF	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	C_{OSS}	—	26	—	pF	
Reverse Transfer Capacitance	C_{RSS}	—	18	—	pF	
Gate Resistance	R_G	—	2.7	—	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	—	1.4	—	nC	$V_{DS} = 10\text{V}, I_D = 3.6\text{A}$
Total Gate Charge ($V_{GS} = 10\text{V}$)	Q_G	—	2.8	—	nC	
Gate-Source Charge	Q_{GS}	—	0.1	—	nC	
Gate-Drain Charge	Q_{GD}	—	0.5	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	0.6	—	ns	$V_{DS} = 10\text{V}, V_{GS} = 4.5\text{V},$ $R_G = 1\Omega, R_L = 2.78\Omega$
Turn-On Rise Time	t_R	—	2.7	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	4.2	—	ns	
Turn-Off Fall Time	t_F	—	1.7	—	ns	
Reverse Recovery Time	t_{RR}	—	5.3	—	ns	$I_F = 3.6\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge	Q_{RR}	—	0.5	—	nC	$I_F = 3.6\text{A}, di/dt = 100\text{A}/\mu\text{s}$

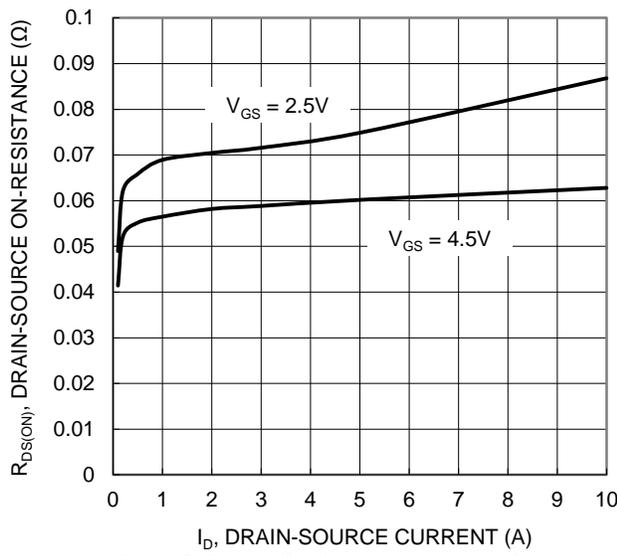
- Notes:
- Device mounted on FR-4 PCB, with minimum recommended pad layout.
 - Device mounted on 1" x 1" FR-4 PCB with high coverage 2oz. Copper, single sided.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.



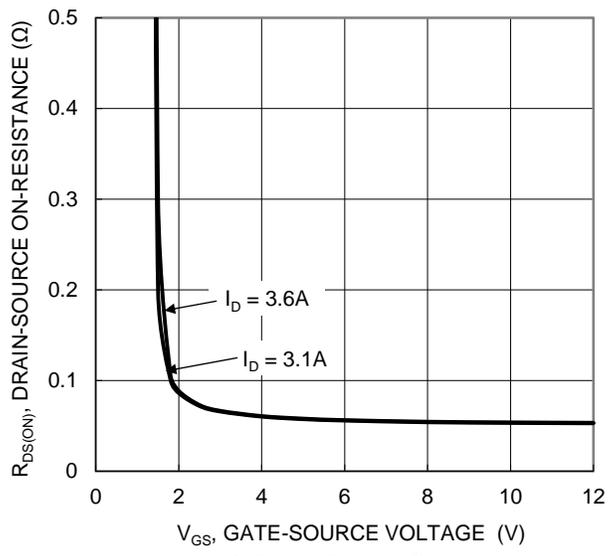
V_{DS} , DRAIN-SOURCE VOLTAGE (V)
Figure 1. Typical Output Characteristic



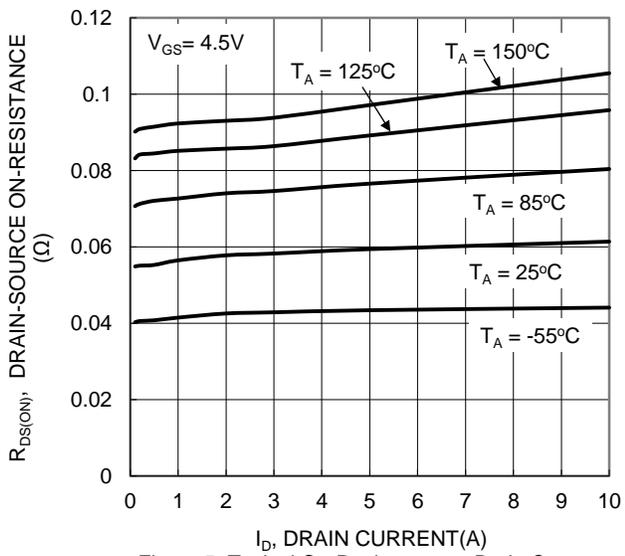
V_{GS} , GATE-SOURCE VOLTAGE (V)
Figure 2. Typical Transfer Characteristic



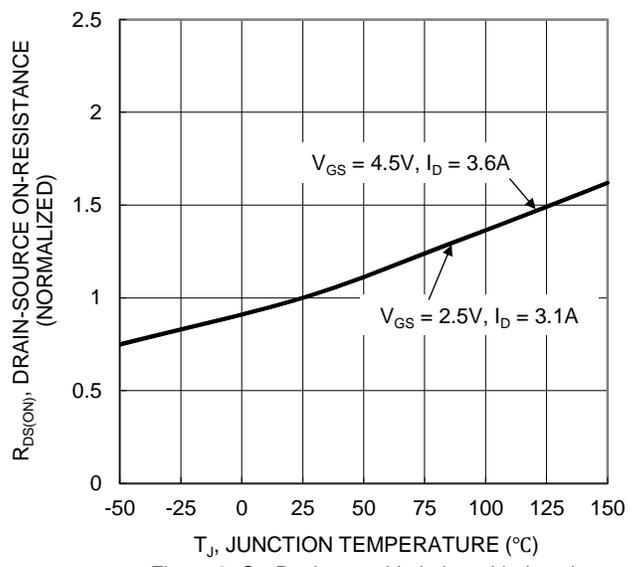
I_D , DRAIN-SOURCE CURRENT (A)
Figure 3. Typical On-Resistance vs Drain Current and Gate Voltage



V_{GS} , GATE-SOURCE VOLTAGE (V)
Figure 4. Typical Transfer Characteristic



I_D , DRAIN CURRENT (A)
Figure 5. Typical On-Resistance vs Drain Current and Junction Temperature



T_J , JUNCTION TEMPERATURE ($^{\circ}C$)
Figure 6. On-Resistance Variation with Junction Temperature

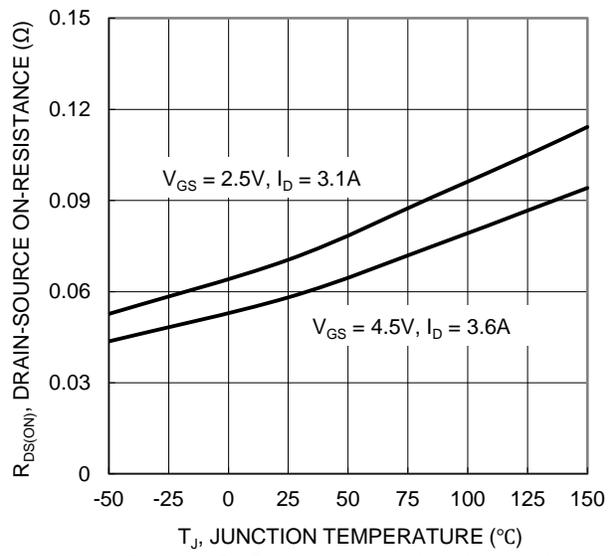


Figure 7. On-Resistance Variation with Junction Temperature

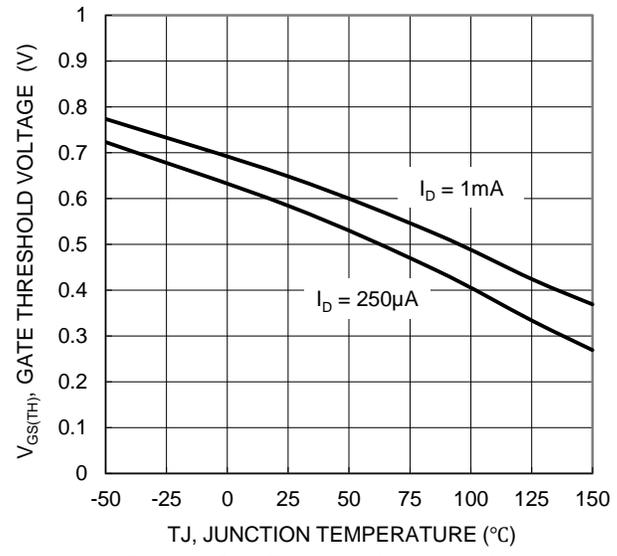


Figure 8. Gate Threshold Variation vs Junction Temperature

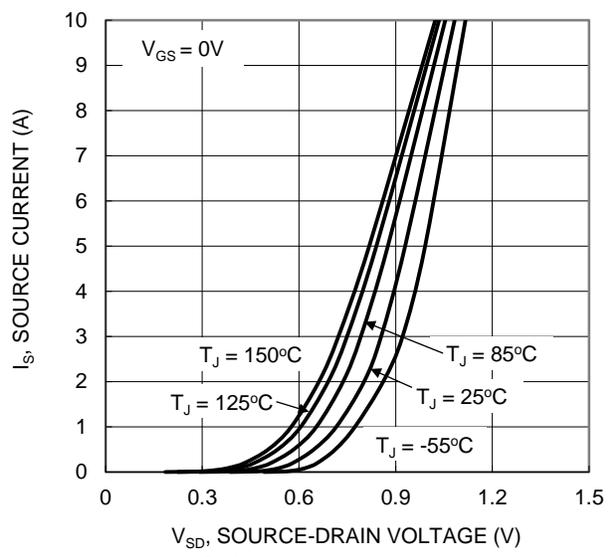


Figure 9. Diode Forward Voltage vs. Current

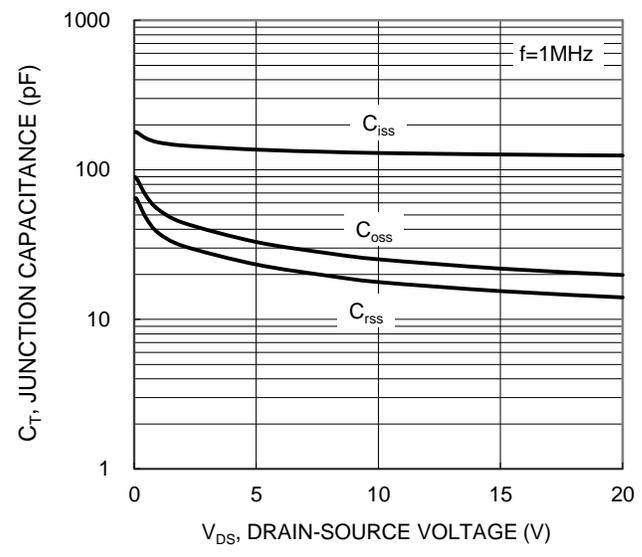


Figure 10. Typical Junction Capacitance

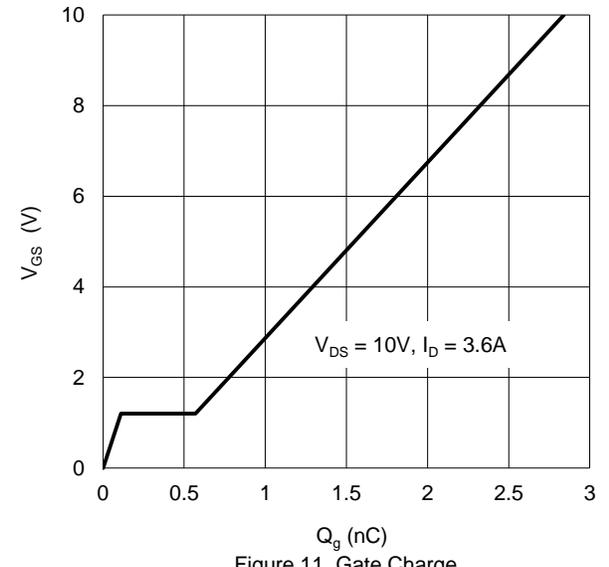


Figure 11. Gate Charge

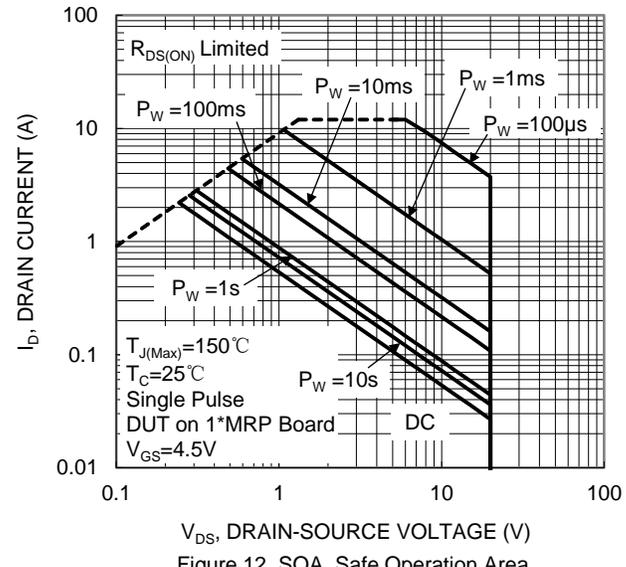
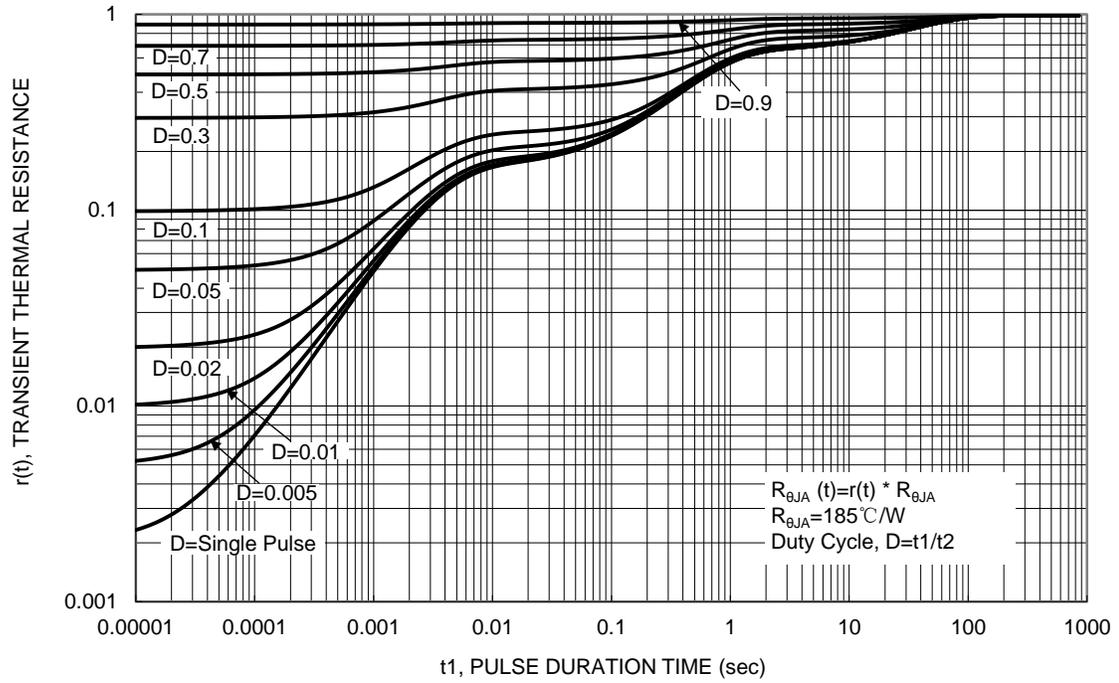
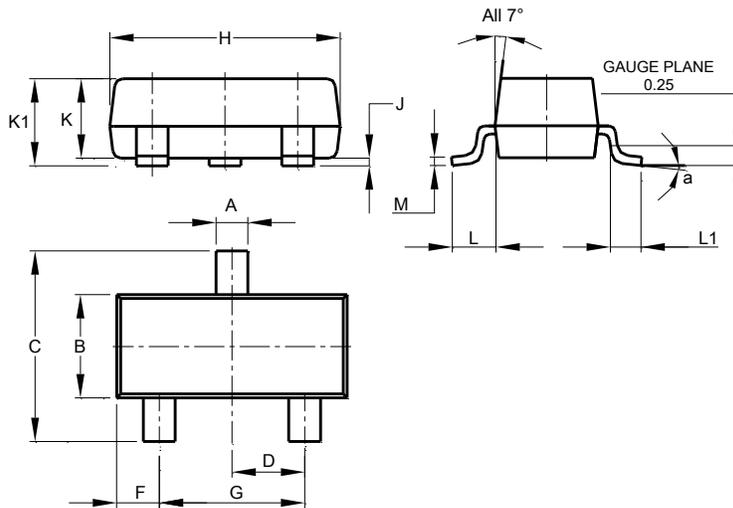


Figure 12. SOA, Safe Operation Area



Package Outline Dimensions

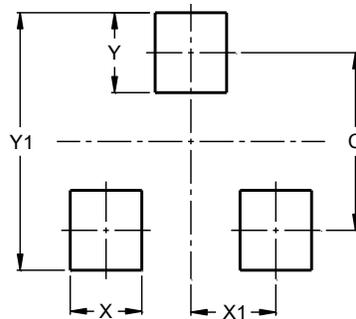
SOT23



SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	-
All Dimensions in mm			

Suggested Pad Layout

SOT23



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9