



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



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Product Summary

BV_{DSS}	$R_{DS(ON) Max}$	I_D $T_A = +25^\circ C$
-20V	45m Ω @ $V_{GS} = -4.5V$	-4.3A
	58m Ω @ $V_{GS} = -2.5V$	-3.8A
	90m Ω @ $V_{GS} = -1.8V$	-3.1A

Description

This new generation 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.

Applications

- DC-DC Converters
- Power Management Functions

Features

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage

Mechanical Data

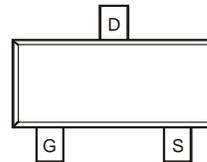
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208^(e3)
- Terminals Connections: See Diagram Below
- Weight: 0.009 grams (Approximate)



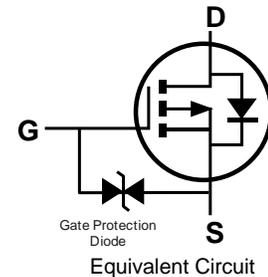
SOT23 (Standard)



Top View



Top View



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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	-20	V
Gate-Source Voltage			V _{GSS}	±8	V
Continuous Drain Current (Note 6) V _{GS} = -4.5V	Steady State	T _A = +25°C T _A = +70°C	I _D	-4.3 -3.5	A
Maximum Continuous Body Diode Forward Current (Note 6)			I _S	-1.2	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)			I _{DM}	-25	A

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

Characteristic			Symbol	Value	Unit
Total Power Dissipation (Note 5)			P _D	0.8	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State		R _{θJA}	154	°C/W
Total Power Dissipation (Note 6)			P _D	1.2	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State		R _{θJA}	98	°C/W
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 7)						
Drain-Source Breakdown Voltage	BV _{DSS}	-20	—	—	V	V _{GS} = 0V, I _D = -250μA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-1	μA	T _J = +25°C V _{DS} = -20V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±10	μA	V _{GS} = ±8.0V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(TH)}	-0.3	—	-1.0	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	32	45	mΩ	V _{GS} = -4.5V, I _D = -4.0A
		—	42	58		V _{GS} = -2.5V, I _D = -3.5A
		—	54	90		V _{GS} = -1.8V, I _D = -1.0A
Diode Forward Voltage	V _{SD}	—	-0.7	-1.2	V	V _{GS} = 0V, I _S = -1.0A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	634	—	pF	V _{DS} = -10V, V _{GS} = 0V f = 1.0MHz
Output Capacitance	C _{oss}	—	81	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	66	—	pF	
Gate Resistance	R _g	—	20	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge	Q _g	—	6.8	—	nC	V _{GS} = -4.5V, V _{DS} = -10V I _D = -4A
Gate-Source Charge	Q _{gs}	—	0.7	—	nC	
Gate-Drain Charge	Q _{gd}	—	1.6	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	4.2	—	ns	V _{DD} = -10V, V _{GS} = -4.5V, R _L = 3.3Ω, R _G = 1Ω
Turn-On Rise Time	t _r	—	3.4	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	23	—	ns	
Turn-Off Fall Time	t _f	—	9.6	—	ns	
Reverse Recovery Time	t _{RR}	—	1.8	—	ns	I _F = -1.0A, di/dt = 100A/μs
Reverse Recovery Charge	Q _{RR}	—	9.4	—	nC	I _F = -1.0A, di/dt = 100A/μs

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

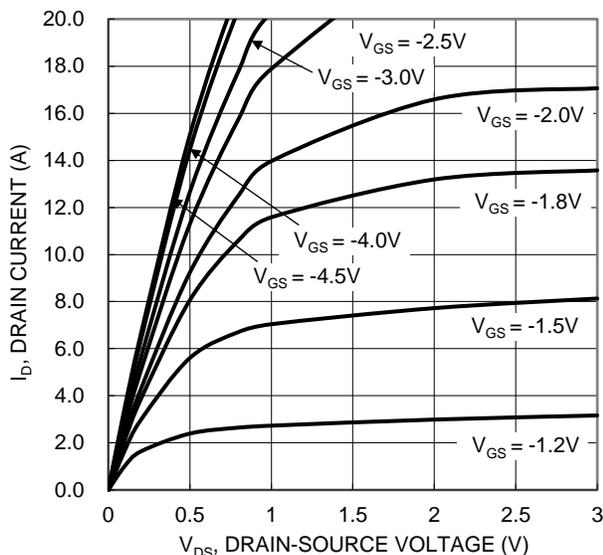


Figure 1. Typical Output Characteristic

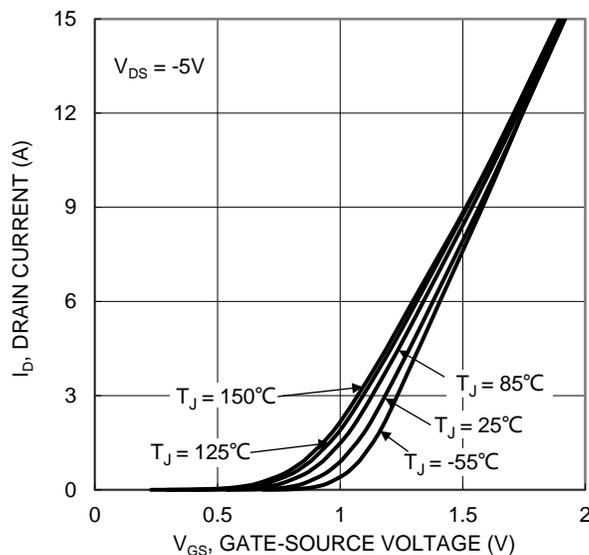


Figure 2. Typical Transfer Characteristic

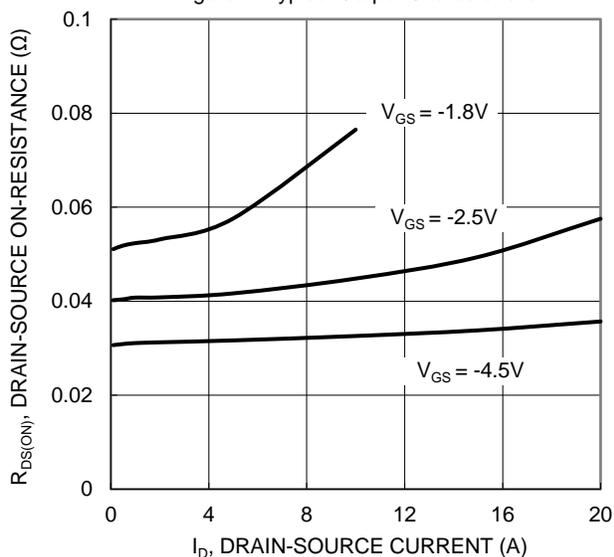


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

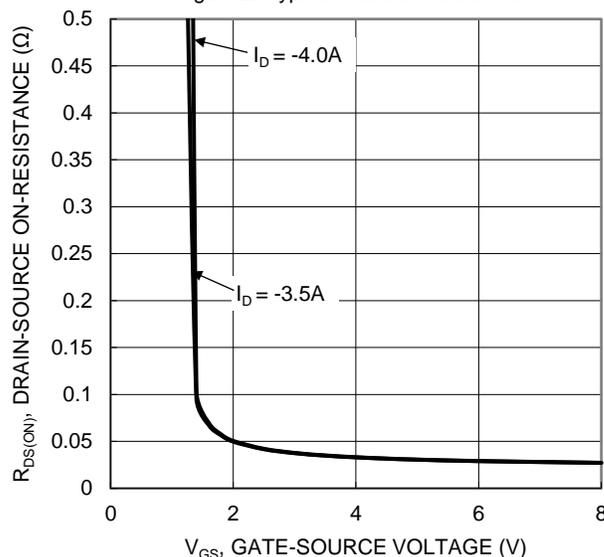


Figure 4. Typical Transfer Characteristic

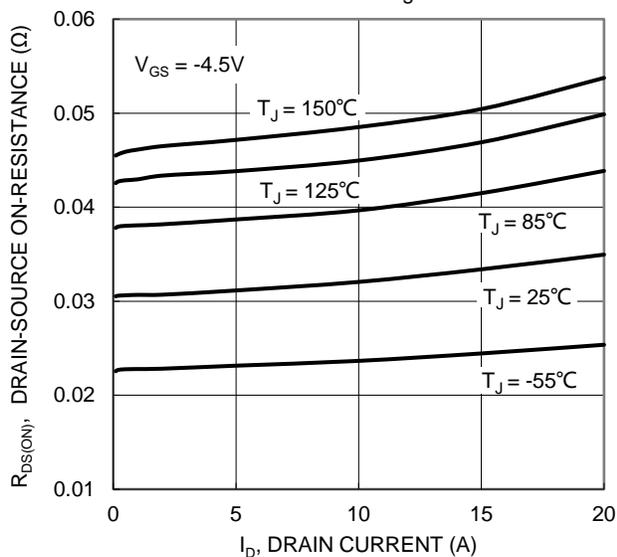


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

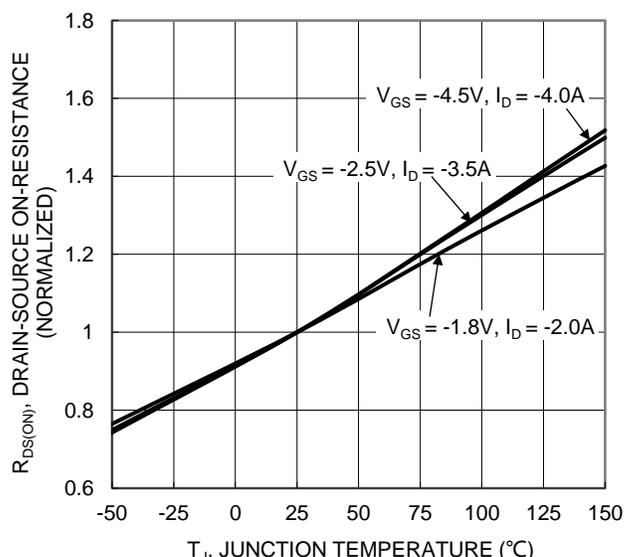


Figure 6. On-Resistance Variation with Junction Temperature

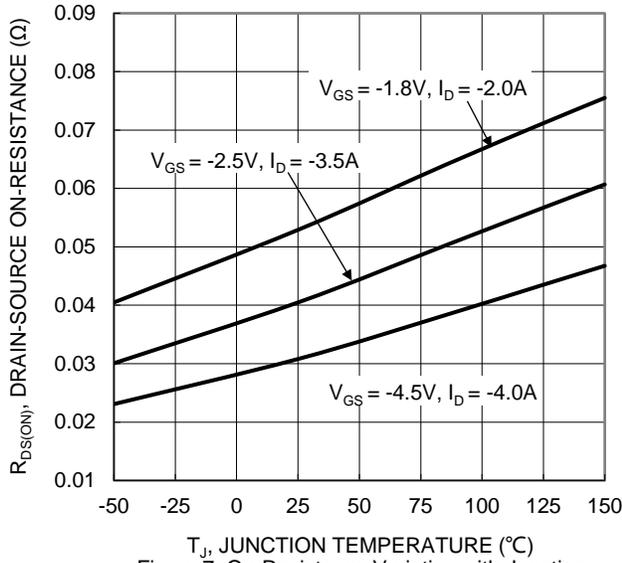


Figure 7. On-Resistance Variation with Junction Temperature

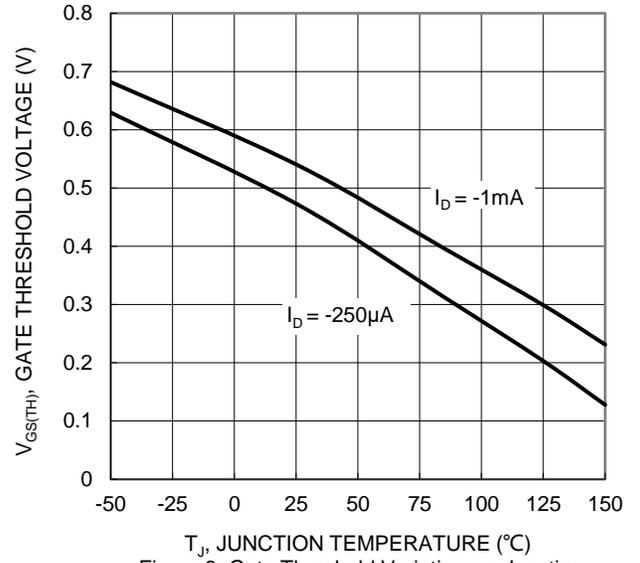


Figure 8. Gate Threshold Variation vs. Junction Temperature

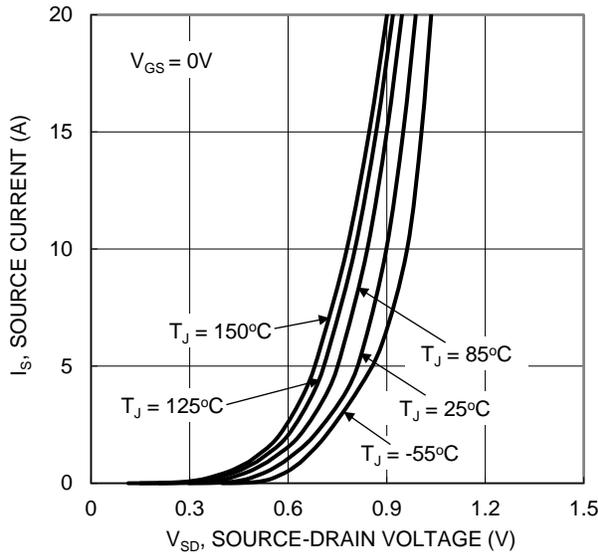


Figure 9. Diode Forward Voltage vs. Current

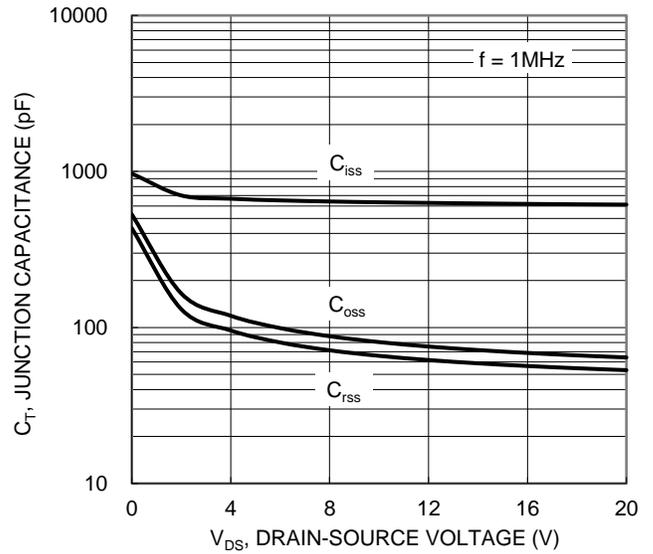


Figure 10. Typical Junction Capacitance

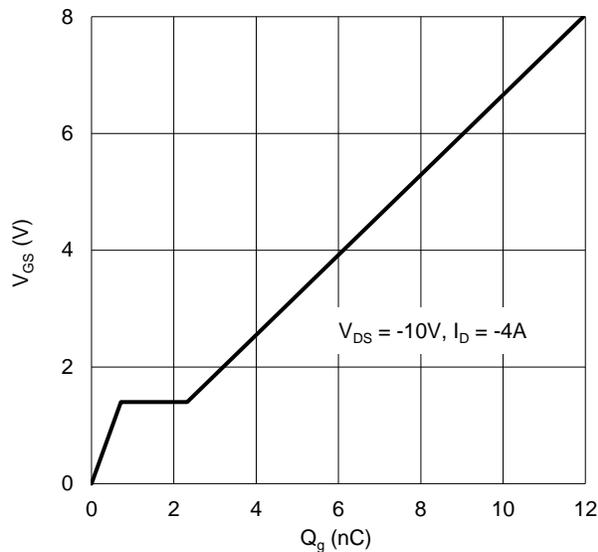


Figure 11. Gate Charge

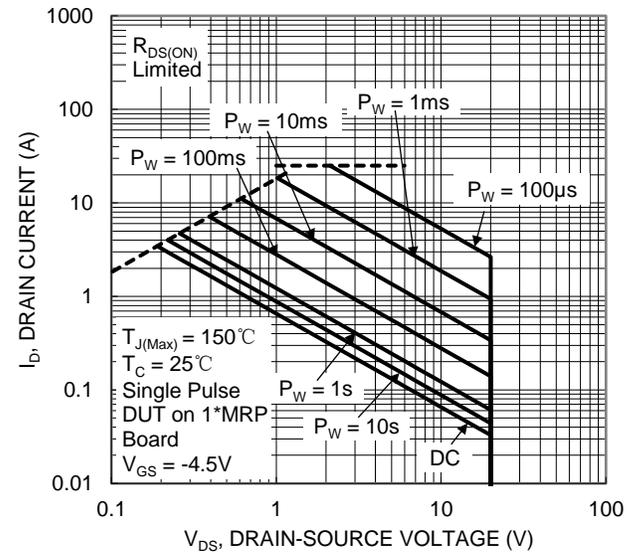


Figure 12. SOA, Safe Operation Area

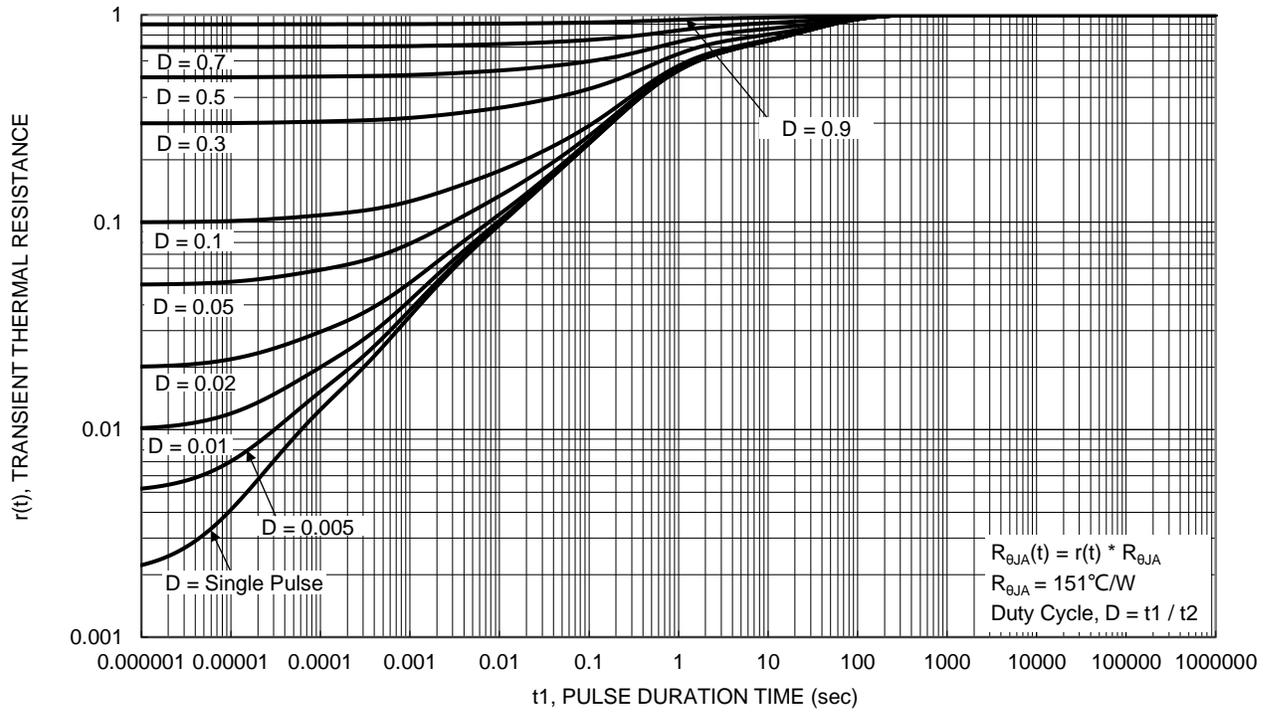
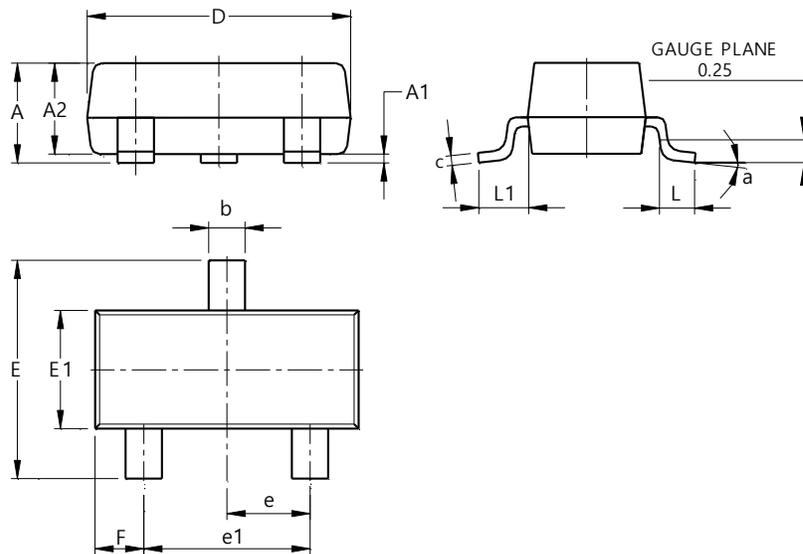


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

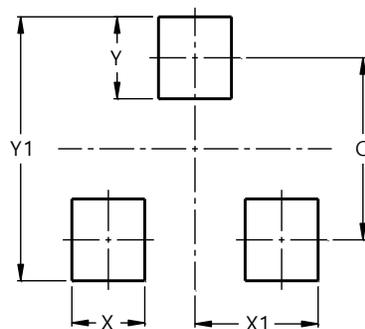
SOT23 (Standard)



SOT23 (Standard)			
Dim	Min	Max	Typ
A	0.90	1.15	1.025
A1	0.00	0.10	0.05
A2	0.85	1.10	0.975
b	0.30	0.51	0.40
c	0.080	0.202	0.11
D	2.80	3.00	2.90
E	2.25	2.55	2.40
E1	1.20	1.40	1.30
e	0.89	1.03	0.915
e1	1.78	2.05	1.83
F	0.40	0.60	0.535
L1	0.45	0.61	0.55
L	0.25	0.55	0.40
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

SOT23 (Standard)



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