



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

| BV_{DSS} | $R_{DS(ON)}$ Max | I_D $T_A = +25^\circ C$ |
|------------|---------------------------------|------------------------------|
| -12V | 31m Ω @ $V_{GS} = -4.5V$ | -5.4A |
| | 45m Ω @ $V_{GS} = -2.5V$ | -4.5A |

Description

This new generation MOSFET is designed to minimize the on-state resistance ($R_{DS(ON)}$) while maintaining superior switching performance, which makes the device ideal for high-efficiency power-management applications.

Applications

- DC-DC Converters
- Power Management Functions
- Analog Switch

Features and Benefits

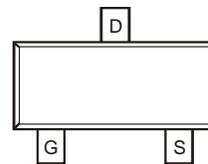
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
-

Mechanical Data

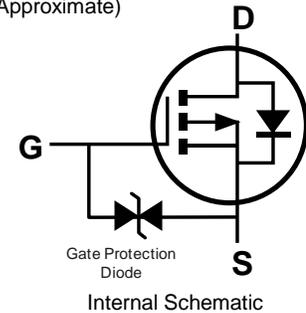
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish—Matte Tin Annealed Over Copper Lead-Frame. Solderable per MIL-STD-202, Method 208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



Top View



Pin Configuration



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

| Characteristic | Symbol | Value | Unit |
|--|-----------|---------------------------|------|
| Drain-Source Voltage | V_{DSS} | -12 | V |
| Gate-Source Voltage | V_{GSS} | ± 8 | V |
| Continuous Drain Current (Note 6) $V_{GS} = -4.5\text{V}$ | I_D | $T_A = +25^\circ\text{C}$ | -5.4 |
| Steady State | | $T_A = +70^\circ\text{C}$ | -4.3 |
| Maximum Continuous Body Diode Forward Current (Note 6) | I_S | -1.8 | A |
| Pulsed Drain Current (10 μs Pulse, Duty Cycle = 1%) | I_{DM} | -33 | A |

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

| Characteristic | Symbol | Value | Unit |
|--|-----------------|-------------|--------------------|
| Total Power Dissipation (Note 5) | P_D | 0.89 | W |
| Thermal Resistance, Junction to Ambient (Note 5) | $R_{\theta JA}$ | 140 | $^\circ\text{C/W}$ |
| Total Power Dissipation (Note 6) | P_D | 1.4 | W |
| Thermal Resistance, Junction to Ambient (Note 6) | $R_{\theta JA}$ | 89 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction to Case (Note 6) | $R_{\theta JC}$ | 17 | $^\circ\text{C/W}$ |
| 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} | -12 | — | — | V | $V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$ |
| Zero Gate Voltage Drain Current ($T_J = +25^\circ\text{C}$) | I_{DSS} | — | — | -1.0 | μA | $V_{DS} = -12\text{V}, V_{GS} = 0\text{V}$ |
| Gate-Source Leakage | I_{GSS} | — | — | ± 10 | μA | $V_{GS} = \pm 8\text{V}, V_{DS} = 0\text{V}$ |
| ON CHARACTERISTICS (Note 7) | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | -0.3 | — | -1.0 | V | $V_{DS} = V_{GS}, I_D = -250\mu\text{A}$ |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | — | 23 | 31 | m Ω | $V_{GS} = -4.5\text{V}, I_D = -4.0\text{A}$ |
| | | | 33 | 45 | | $V_{GS} = -2.5\text{V}, I_D = -3.5\text{A}$ |
| | | | 46 | 75 | | $V_{GS} = -1.8\text{V}, I_D = -2.7\text{A}$ |
| Diode Forward Voltage | V_{SD} | — | -0.6 | -1.0 | V | $V_{GS} = 0\text{V}, I_S = -1\text{A}$ |
| DYNAMIC CHARACTERISTICS (Note 8) | | | | | | |
| Input Capacitance | C_{iss} | — | 143 | — | pF | $V_{DS} = -10\text{V}, V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$ |
| Output Capacitance | C_{oss} | — | 123 | — | pF | |
| Reverse Transfer Capacitance | C_{rss} | — | 16 | — | pF | |
| Gate Resistance | R_G | — | 401 | — | Ω | $V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$ |
| Total Gate Charge | Q_G | — | 11.5 | — | nC | $V_{GS} = -4.5\text{V}, V_{DS} = -10\text{V}, I_D = -4\text{A}$ |
| Gate-Source Charge | Q_{gs} | — | 1.4 | — | nC | |
| Gate-Drain Charge | Q_{gd} | — | 2.9 | — | nC | |
| Turn-On Delay Time | $t_{D(ON)}$ | — | 125 | — | ns | $V_{DS} = -10\text{V}, V_{GS} = -4.5\text{V},$ $R_L = 2.5\Omega, R_G = 3.0\Omega$ |
| Turn-On Rise Time | t_R | — | 192 | — | ns | |
| Turn-Off Delay Time | $t_{D(OFF)}$ | — | 685 | — | ns | |
| Turn-Off Fall Time | t_F | — | 950 | — | ns | |

- 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 production testing.

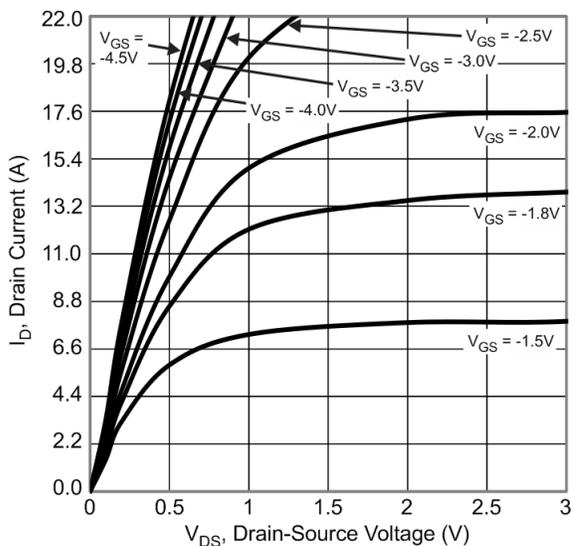


Fig. 1 Typical Output Characteristic

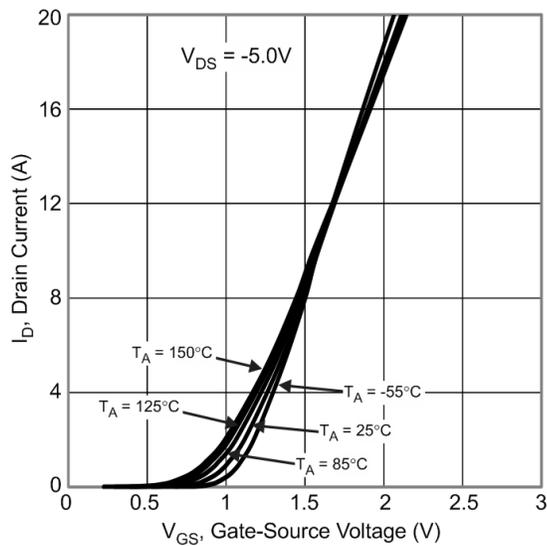


Fig. 2 Typical Transfer Characteristic

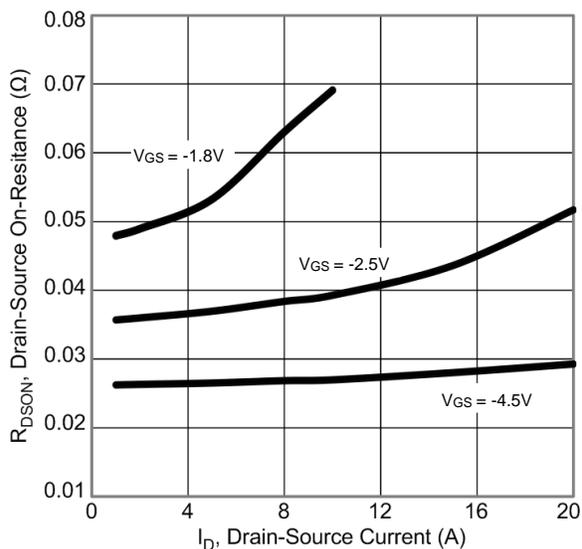


Fig. 3 Typical On-Resistance vs Drain Current and Gate Voltage

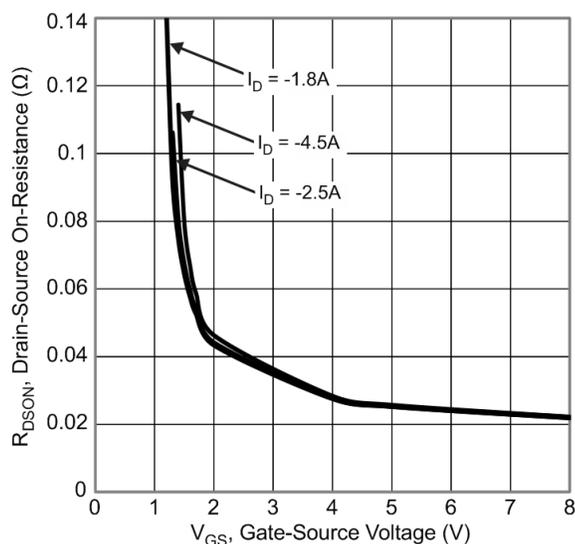


Fig. 4 Typical Transfer Characteristic

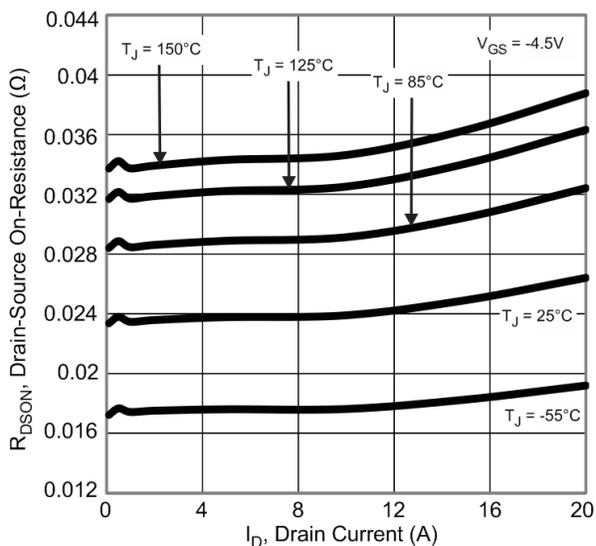


Fig. 5 Typical On-Resistance vs Drain Current and Junction Temperature

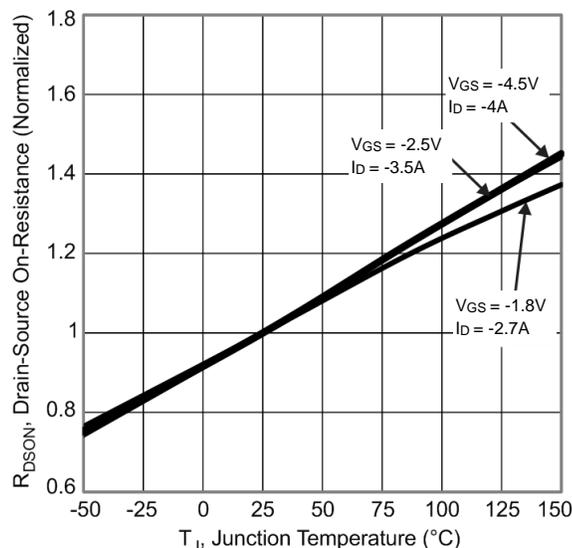


Fig. 6 On-Resistance Variation with Junction Temperature

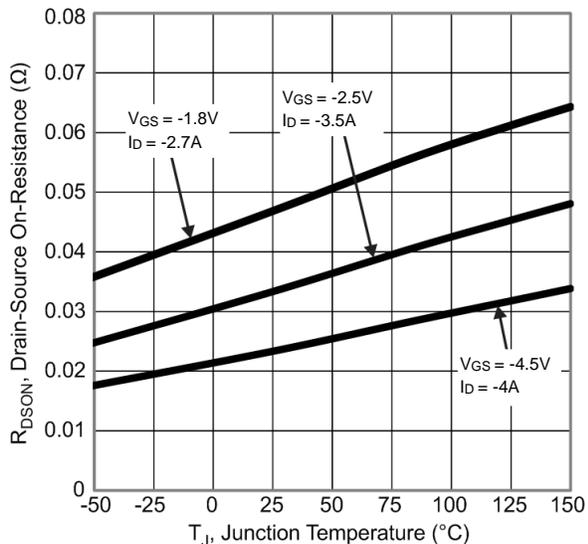


Fig. 7 On-Resistance Variation with Junction Temperature

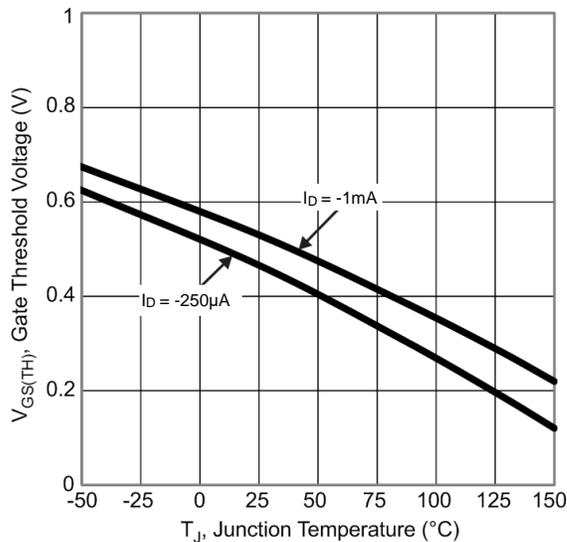


Fig. 8 Gate Threshold Variation vs Junction Temperature

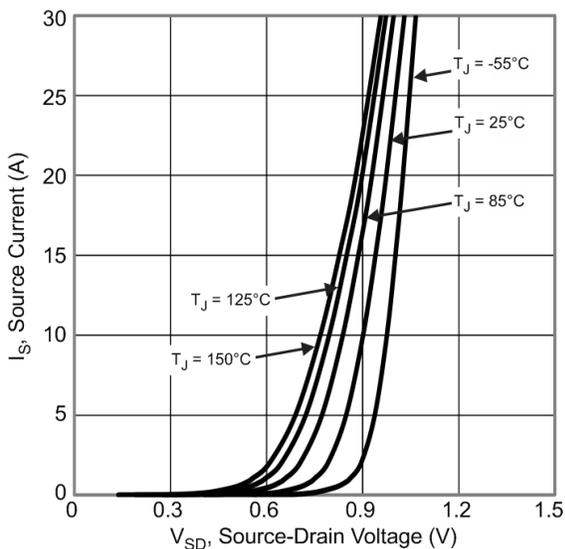


Fig. 9 Diode Forward Voltage vs Current

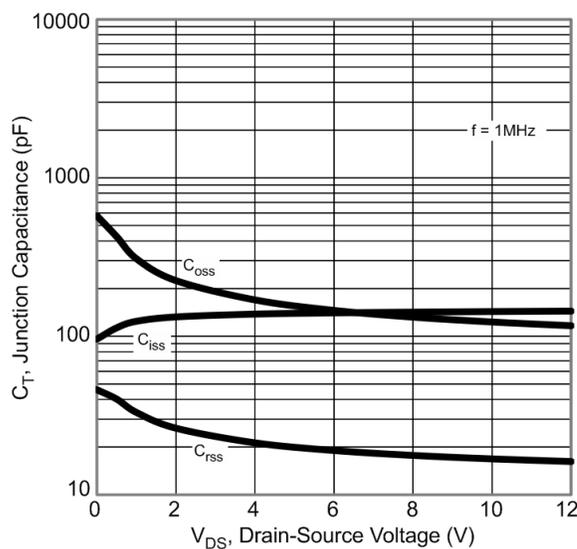


Fig. 10 Typical Junction Capacitance

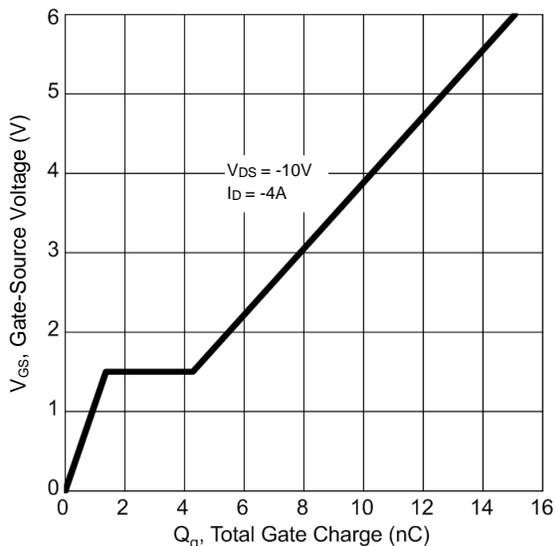


Fig. 11 Gate Charge

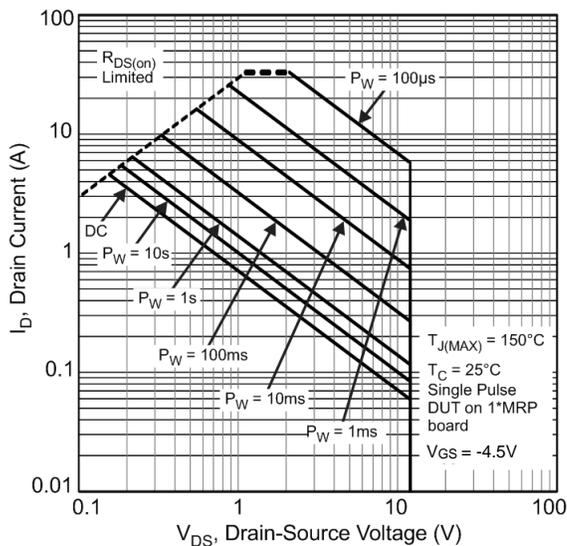


Fig. 12 SOA, Safe Operation Area

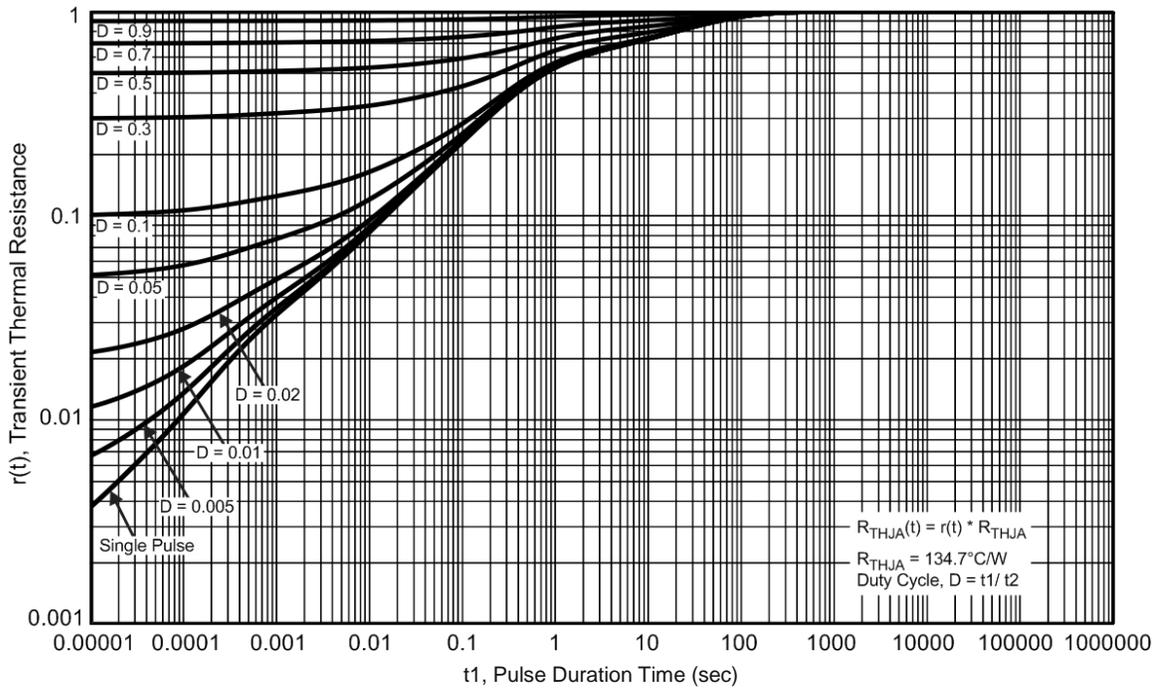
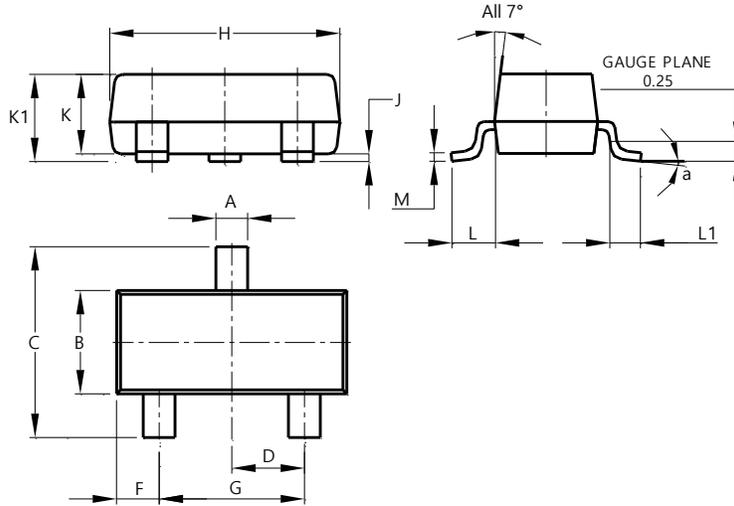


Fig. 13 Transient Thermal Resistance

Package Outline Dimensions

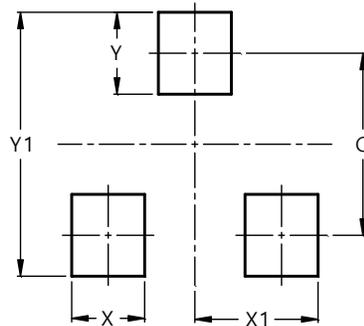
SOT23



| 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 |