## DESCRIPTION

The A6250C series are highly precise, low power consumption, positive voltage regulators manufactured using CMOS and laser trimming technologies. The series provides large currents with a significantly small dropout voltage.

The A6250C consists of a current limiter circuit, a driver transistor, a precision reference voltage and an error correction circuits. The A6250C is compatible with low ESR ceramic capacitors. The current limiter's foldback circuit operates as a short circuit protection as well as the output current limiter for the output pin. Output voltages are internally by laser trimming technologies. It is selectable in 0.1V increments within a range 1.2V to 5.0V.

The A6250C is available in SOT89-3 and SOT-23 packages.

## ORDERING INFORMATION

| Package Type | Part Number | |
|---|---|---|
| SOT89-3<br>SPQ: 1,000pcs/Reel | K3 | A6250CK3R-XX |
| | | A6250CK3VR-XX |
| SOT-23<br>SPQ: 3,000pcs/Reel | E3 | A6250CE3R-XX |
| | | A6250CE3VR-XX |
| Note | XX: Output Voltage<br>30=3.0V; 33=3.3V<br>V: Halogen free Package<br>R: Tape & Reel | |
| AiT provides all RoHS products | | |

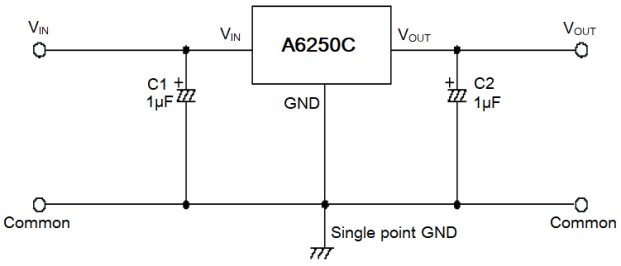
## FEATURES

- Maximum output current: 250mA ($V_{IN}$≥$V_{OUT}$+1V)
- Dropout voltage: 160mV @ 50mA (3.0V type)
- Output voltage range: 1.2V to 5.0V (selectable in 100mV steps)
- Highly optional accurate: ± 2%
- Low power consumption: 2μA (TYP.)
- Internal protector current limiter and short protector
- Available in SOT89-3 and SOT-23 packages

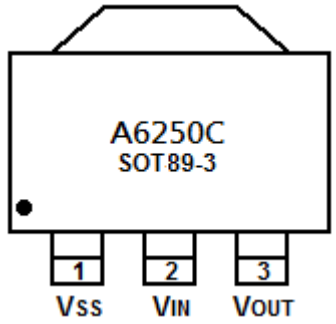
## APPLICATION

- Smart phones/Mobile phones
- Portable game consoles
- Digital still cameras/Camcorders
- Digital audio equipments
- Reference voltage sources
- Multi-function power supplies

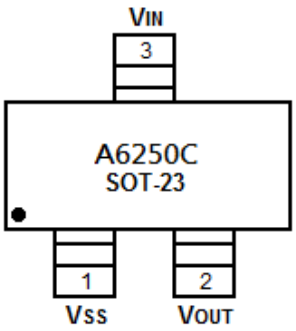
## TYPICAL APPLICATION



## PIN DESCRIPTION




Top View




Top View

| Pin # | | Symbol | Function |
|---|---|---|---|
| SOT89-3 | SOT-23 | | |
| 1 | 1 | $V_{SS}$ | Ground |
| 2 | 3 | $V_{IN}$ | Input |
| 3 | 2 | $V_{OUT}$ | Output |

## ABSOLUTE MAXIMUM RATINGS

| | | |
|---|---|---|
| $V_{IN}$, Input Voltage | | $V_{SS}$-0.3V ~ $V_{SS}$+6V |
| $V_{OUT}$, Output Current | | $V_{SS}$-0.3V ~ $V_{IN}$ +0.3V |
| $P_D$, Power Dissipation | SOT-23 | 250mW |
| | SOT89-3 | 500mW |
| $T_{OPR}$, Operating Ambient Temperature | | -40°C ~ 85°C |
| $T_{STG}$, Storage Temperature | | -40°C ~ 125°C |

Stress beyond above listed "Absolute Maximum Ratings" may lead permanent damage to the device. These are stress ratings only and operations of the device at these or any other conditions beyond those indicated in the operational sections of the specifications are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

## ELECTRICAL CHARACTERISTICS

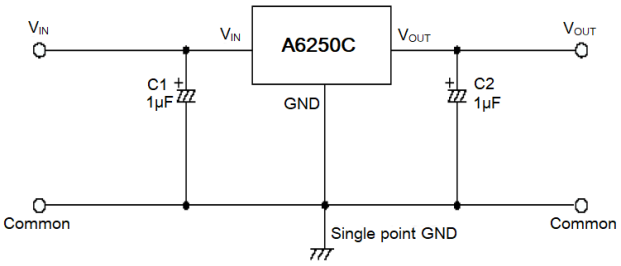
$V_{IN}$=4.0V,$V_{OUT}$=3.0V,T=25℃

| Parameter | Symbol | Conditions | Min | Typ. | Max | Unit | Circuit |
|---|---|---|---|---|---|---|---|
| Output Voltage | $V_{OUT(E)1}$ | $V_{IN}$ =$V_{OUT(S)}$+1.0V, $I_{OUT}$=1mA, ± 2% | $V_{OUT(S)}$ ×0.98 | $V_{OUT(S)}$ | $V_{OUT(S)}$ ×1.02 | V | 1 |
| | | $V_{IN}$ =$V_{OUT(S)}$+1.0V, $I_{OUT}$=1mA, ± 1% | $V_{OUT(S)}$ ×0.99 | $V_{OUT(S)}$ | $V_{OUT(S)}$ ×1.01 | | |
| Output Current | $I_{OUT}$ | $V_{IN}$≥$V_{OUT(S)}$+1.0V | 250 *1 | - | - | mA | 1 |
| Dropout Voltage | $V_{drop}$ | $I_{OUT}$= 50mA, 1.5V ≤$V_{OUT(S)}$≤2.5V | - | 0.20 | 0.28 | V | 1 |
| | | $I_{OUT}$= 50mA, 2.6V ≤$V_{OUT(S)}$≤3.3V | - | 0.16 | 0.24 | | |
| | | $I_{OUT}$= 50mA, 3.4V ≤$V_{OUT(S)}$≤5.0V | - | 0.12 | 0.20 | | |
| Line Regulations | $\frac{\Delta V_{OUT1}}{\Delta V_{IN} \times V_{OUT}}$ | $V_{OUT(S)}$+0.5V ≤$V_{IN}$≤5.5V, $I_{OUT}$=1mA | - | 0.05 | 0.2 | %/V | |
| Input Voltage | $\Delta V_{OUT2}$ | $V_{IN}$=$V_{OUT(S)}$+1.0V, 1.0mA ≤ $I_{OUT}$ ≤50mA | - | 20 | 40 | mV | |
| Output Voltage Temperature Characteristics | $\frac{\Delta V_{OUT}}{\Delta T_A \times V_{OUT}}$ | $V_{IN}$=$V_{OUT(S)}$+1.0V, $I_{OUT}$=10mA, -40°C ≤$T_A$≤85°C | - | ±100 | - | ppm /°C | |
| Supply Current | $I_{SS1}$ | $V_{IN}$=$V_{OUT(S)}$+1.0 V | - | 2 | - | uA | 2 |
| Input Voltage | $V_{IN}$ | | 1.8 | - | 6 | V | - |
| Ripple-Rejection | \|RR\| | $V_{IN}$=$V_{OUT(S)}$+1.0V , f=1.0kHz, $V_{RIP}$=0.5Vrms, $I_{OUT}$=10mA | - | 40 | - | dB | 1 |
| Short current | $I_{SHORT}$ | $V_{IN}$=$V_{OUT(S)}$+1.5V | - | 30 | - | mA | 1 |
| Current Limiter | $I_{LIM}$ | $V_{IN}$=$V_{OUT(S)}$+1.5V | - | 380 | - | mA | 1 |

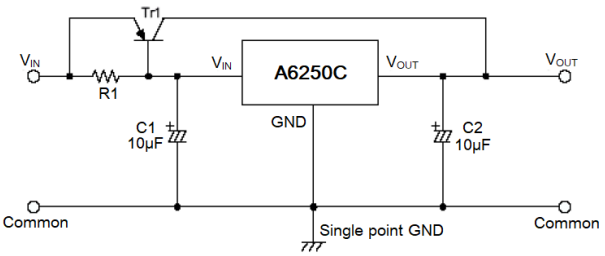
NOTE: Lower input voltage and the output voltage, maximum output current will decrease. Example:
$I_{OUT\ (max)}$=150mA @($V_{IN}$=2.5V,$V_{OUT}$=1.5V)

## TYPICAL PERFORMANCE CHARACTERISTICS

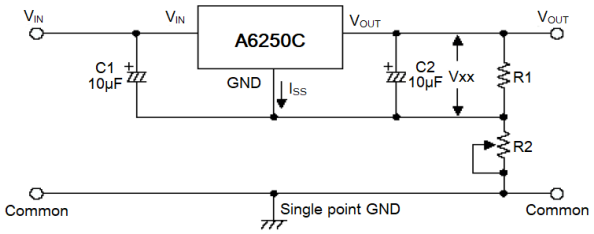
1. Basic circuit




2. High output current positive voltage regulator

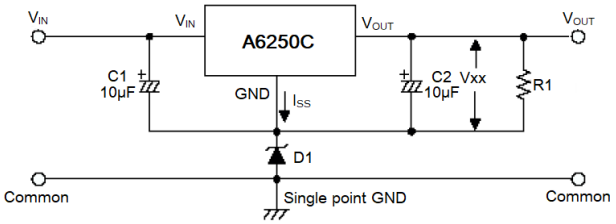



3. Circuit for increasing output voltage



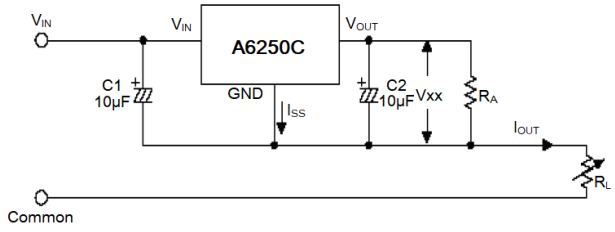

$$V_{OUT} = V_{XX}\left(1+\frac{R1}{R1}\right) + I_{SS}\,R2$$

4. Circuit for increasing output voltage



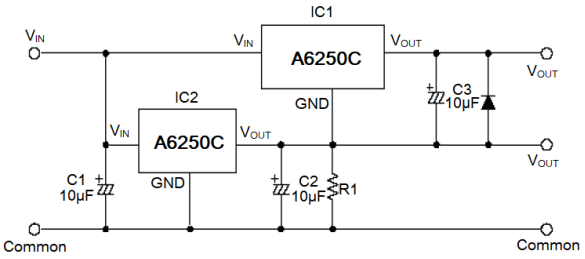

$$V_{OUT} = V_{XX} + V_{D1}$$

5. Constant current regulator




$$I_{OUT} = \frac{V_{XX}}{R_A} + I_{SS}$$

6. Dual supply

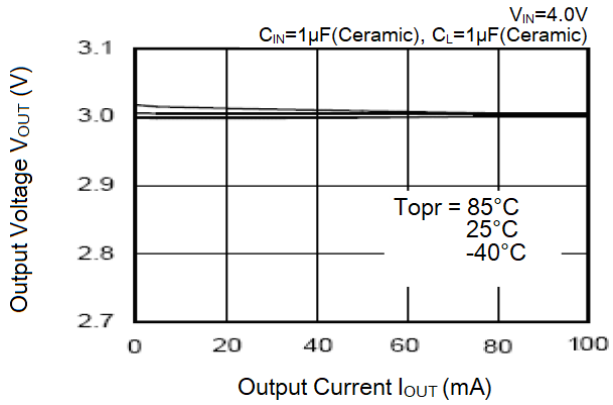



NOTE: The above connection diagram and constant will not guarantee successful operation. Perform thorough evaluation using the actual application to set the constant.

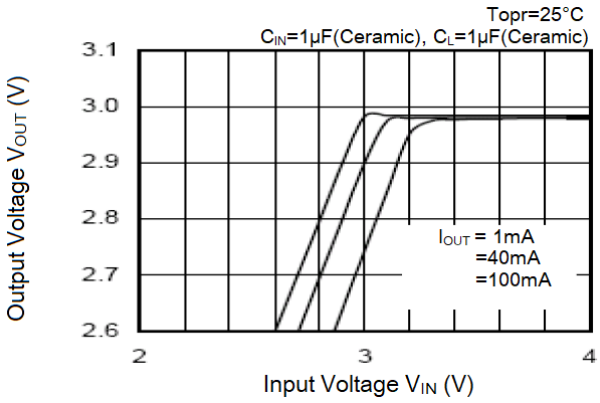
## TYPICAL PERFORMANCE CHARACTERISTICS

3.0V output

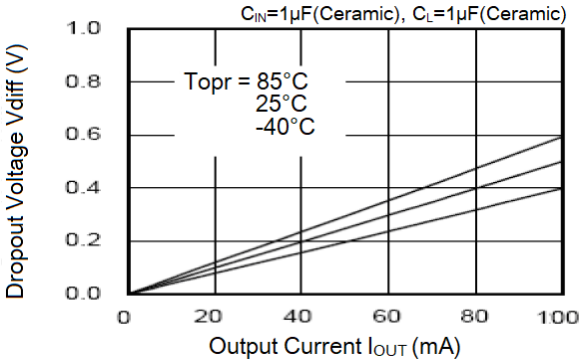
1. Output Voltage vs. Output Current



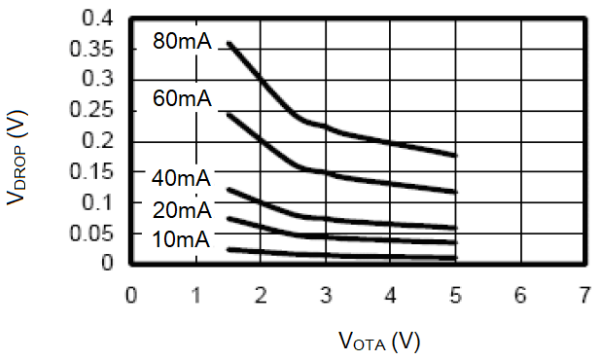

2. Output Voltage vs. Input Voltage



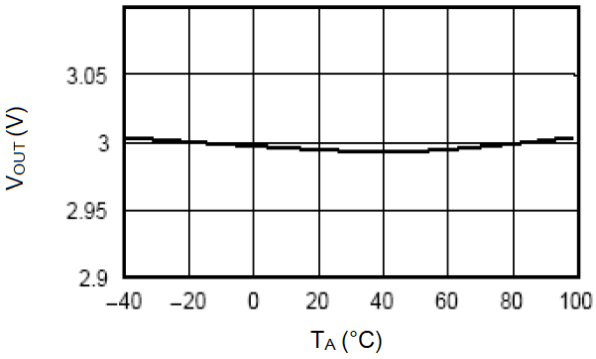

3. Dropout Voltage vs. Output Current



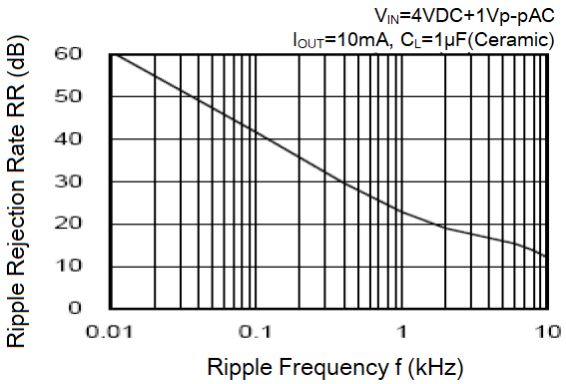

4. Dropout Voltage vs. Output Voltage




5. Output Voltage vs. Ambient Temperature

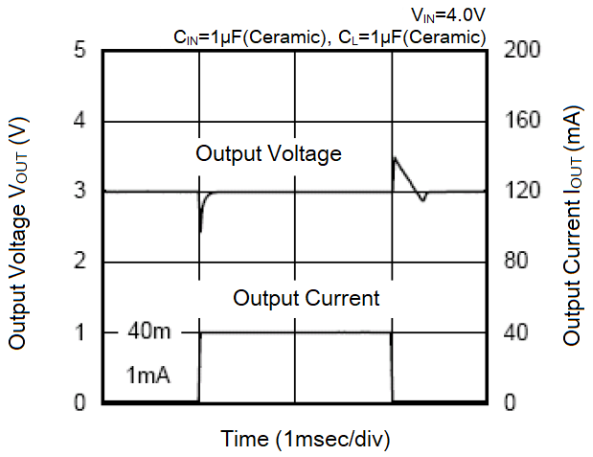



6. Ripple Rejection Rate

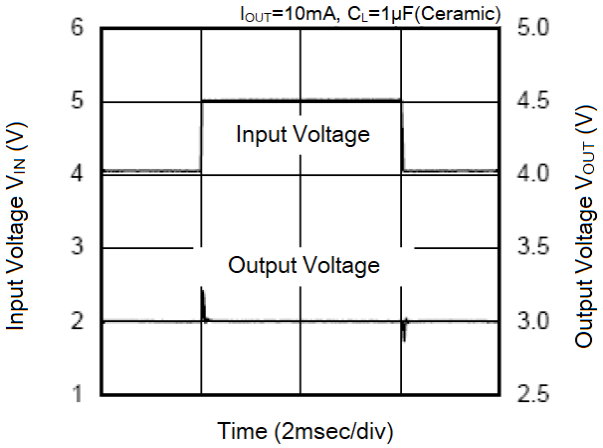


7. Transient Response

Input Transient Response

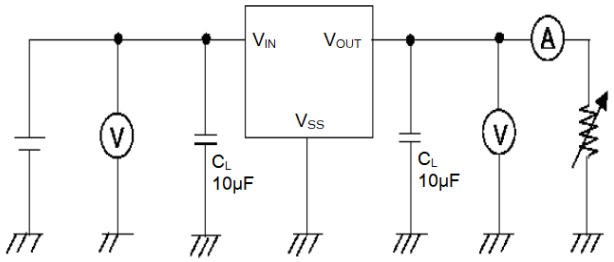



Load Transient Response

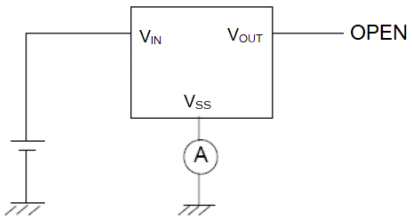



## TEST CIRCUIT

1. Circuit 1




2. Circuit 2



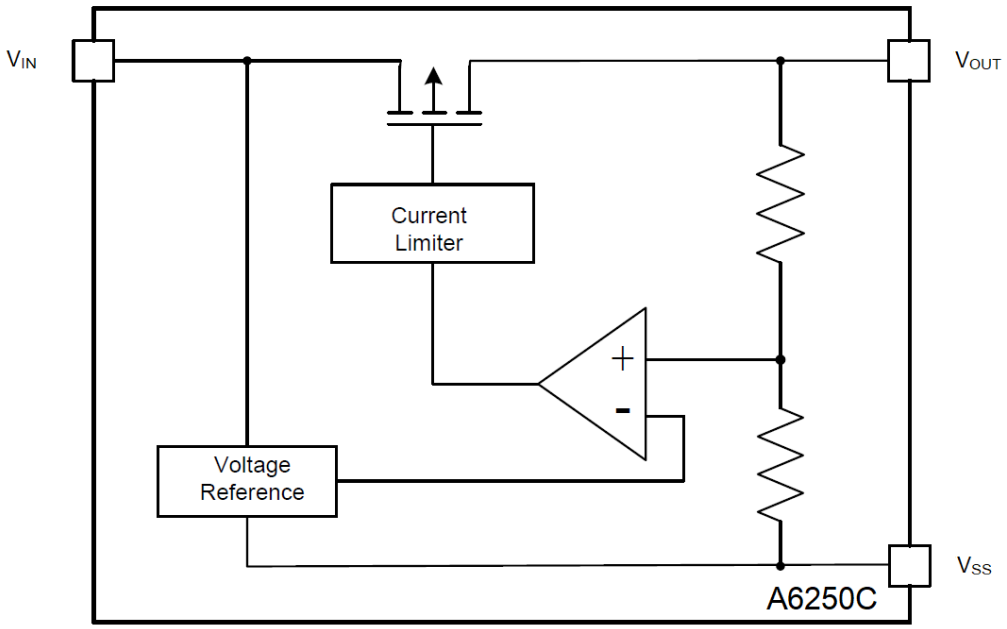

## APPLICATION CONDITIONS

Input capacitor ($C_{IN}$): 1.0μF or more

Output capacitor ($C_L$):0.1μF or more (tantalum capacitor)

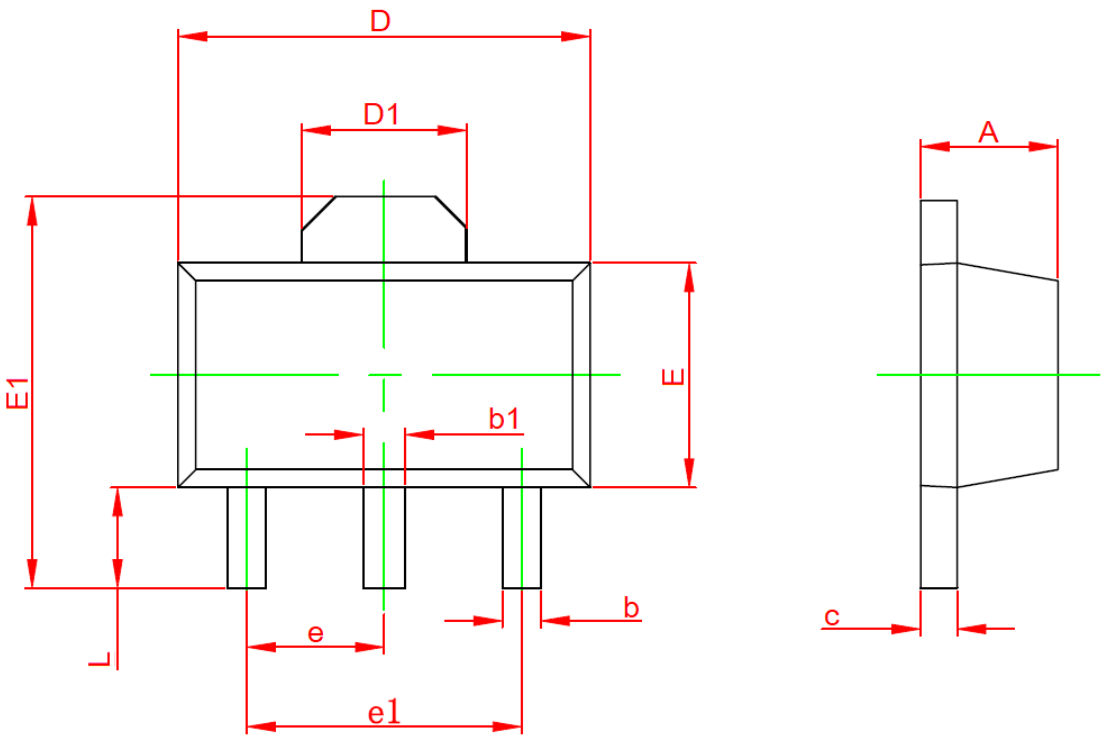
**Caution A general series regulator may oscillate, depending on the external components selected. Check that no oscillation occurs with the application using the above capacitor.**

## BLOCK DIAGRAM



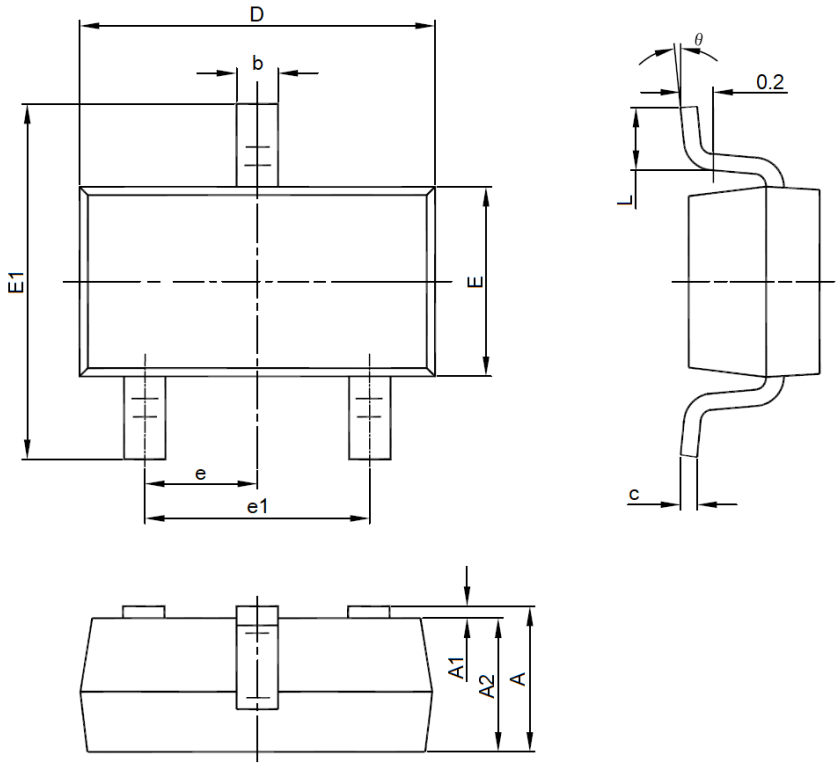
## PACKAGE INFORMATION

Dimension in SOT89-3 (Unit: mm)




| Symbol | Millimeters | | Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 1.400 | 1.600 | 0.055 | 0.063 |
| b | 0.320 | 0.520 | 0.013 | 0.197 |
| b1 | 0.400 | 0.580 | 0.016 | 0.023 |
| c | 0.350 | 0.440 | 0.014 | 0.017 |
| D | 4.400 | 4.600 | 0.173 | 0.181 |
| D1 | 1.550 REF | | 0.061 REF | |
| E | 2.300 | 2.600 | 0.091 | 0.102 |
| E1 | 3.940 | 4.250 | 0.155 | 0.167 |
| e | 1.500 TYP | | 0.060 TYP | |
| e1 | 3.000 TYP | | 0.188 TYP | |
| L | 0.900 | 1.200 | 0.035 | 0.047 |

Dimension in SOT-23 (Unit: mm)




| Symbol | Millimeters | | Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 1.050 | 1.250 | 0.041 | 0.049 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 1.050 | 1.150 | 0.041 | 0.045 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.100 | 0.200 | 0.004 | 0.008 |
| D | 2.820 | 3.020 | 0.111 | 0.119 |
| E | 1.500 | 1.700 | 0.059 | 0.067 |
| E1 | 2.650 | 2.950 | 0.104 | 0.116 |
| e | 0.950 BSC | | 0.037 BSC | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.300 | 0.600 | 0.012 | 0.024 |
| θ | 0° | 8° | 0° | 8° |

## IMPORTANT NOTICE

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