# ACE501

## 250mA CMOS Low Dropout Voltage Low consumption Regulator

## Description

ACE501 series is a group of positive voltage output, low power consumption, low dropout voltage, three terminal regulator. It can provide 250mA output current when input / output voltage differential drops to 400mV (Vin=4.0V. Vout=3.0V).The very low power consumption of ACE501 (Iq=3.0uA) can greatly improve natural life of batteries.

ACE501 can provide output value in the range of 1.2V~6.0V in 0.1V steps. It also can customized on command.

ACE501 includes high accuracy voltage reference, error amplifier, current limit circuit and output driver module.

ACE501 has well load transient response and good temperature characteristic, which can assure the stability of chip and power system, And it uses trimming technique to guarantee output voltage accuracy within ±2%.

## Features

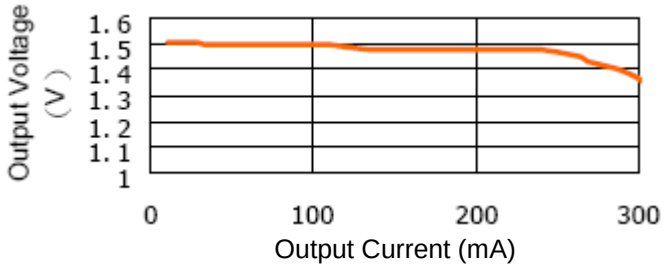
- Low Power Consumption: 3.0uA (Typ)
- Maximum Output Current: 250mA
- Small Dropout Voltage 170mV@100mA (Vout=3.0V) / 400mV@250mA (Vout=3.0V)
- Input Voltage Range: 1.5V~10V
- Output Voltage Range: 1.2V~6.0V (customized on command in 0.1V steps)
- High Accurate: ±2% (±1% customized)e
- Output Current Limit

## Application

- Battery Powered equipment
- Power Management of MP3. PDA. DSC. Mouse. PS2 Games
- Reference Voltage Source
- Regulation after Switching Power

## Typical Performance Characteristic:

Output Voltage vs. Output Current (Vout=1.5V)

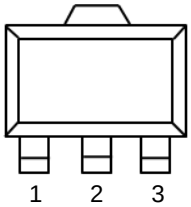


## Absolute Maximum Ratings

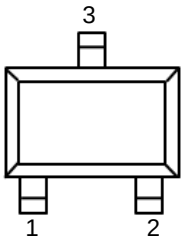
| Parameter | Symbol | Max | Unit |
|---|---|---|---|
| Input supply voltage | $V_{IN}$ | 10 | V |
| Power Dissipation<br>SOT-23-3<br>SOT-89-3 | | <br>250<br>500 | mW |
| Junction temperature | $T_J$ | 125 | °C |
| Storage temperature | $T_S$ | - 45 to 150 | °C |
| Ambient Temperature | $T_A$ | -40 ~85 | °C |

## Packaging Type

SOT-89-3




SOT-23-3




| Description | SOT-89-3 | SOT-23-3 | Function |
|---|---|---|---|
| $V_{SS}$ | 1 | 1 | Ground |
| $V_{IN}$ | 2 | 3 | Supply Voltage Input |
| $V_{OUT}$ | 3 | 2 | Output Voltage |

## Ordering information

ACE501 XX XX + H

- Halogen - free
- Pb - free
- AM : SOT-89-3
  BM: SOT-23-3
- Output Voltage：1.2V/2.1V…..6.0V

## Recommended Work Conditions

| Item | Min | Max | Unit |
|---|---|---|---|
| Input Voltage Range | | 8 | V |
| Ambient Temperature | -40 | +85 | ℃ |

## Electrical Characteristics

(Test Conditions: Cin=1uF, Cout=1uF,$T_A$=25℃, unless otherwise specified.)

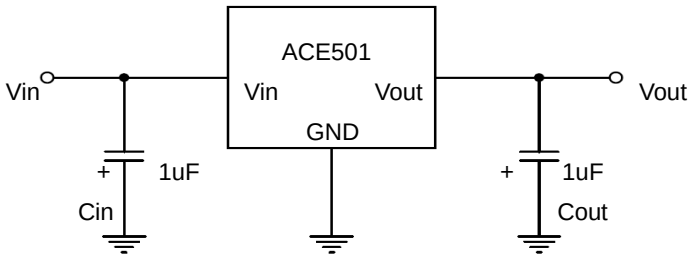
ACE501-1.5V

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| Input Voltage | $V_{IN}$ | | | | 8 | V |
| Output Voltage | $V_{OUT}$ | | 1.47 | 1.5 | 1.53 | V |
| Maximum Output Current | $I_{OUT}$(Max.) | $V_{IN}$=2.5V, $V_{OUT}$>1.47 | 250 | | | mA |
| Input-Output Voltage Differential | Dropout Voltage | $I_{OUT}$=100mA | | 270 | 400 | mV |
| Line Regulation | $\Delta V_{OUT}$ / $\Delta V_{IN} \cdot V_{OUT}$ | $I_{OUT}$=40mA 1.6V≦$V_{IN}$≦8V | | 0.2 | 0.3 | %/V |
| Load Regulation | $\Delta V_{OUT}$ | $V_{IN}$=2.5V 1mA≦$I_{OUT}$≦100mA | | 20 | 40 | mV |
| Quiescent Current | Iq | $V_{IN}$=2.5V | | 3.0 | 5.0 | uA |
| Output Voltage Temperature Coefficient | $\Delta V_{OUT}$ / $\Delta T \cdot V_{OUT}$ | $I_{OUT}$=10mA | | 50 | | ppm/℃ |

ACE501-3.0

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| Input Voltage | $V_{IN}$ | | | | 8 | V |
| Output Voltage | $V_{OUT}$ | | 2.94 | 3.0 | 3.06 | V |
| Maximum Output Current | $I_{OUT}$(Max.) | $V_{IN}$=4V, $V_{OUT}$>2.94 | 250 | | | mA |
| Input-Output Voltage Differential | Dropout Voltage | $I_{OUT}$=100mA | | 170 | 300 | mV |
| | | $I_{OUT}$=200mA | | 320 | 500 | |
| Line Regulation | $\Delta V_{OUT}$ / $\Delta V_{IN} \cdot V_{OUT}$ | $I_{OUT}$=40mA 3.2V≦$V_{IN}$≦8V | | 0.2 | 0.3 | %/V |
| Load Regulation | $\Delta V_{OUT}$ | $V_{IN}$=4.0V 1mA≦$I_{OUT}$≦100mA | | 20 | 40 | mV |
| Quiescent Current | Iq | $V_{IN}$=4V | | 3.0 | 5.0 | uA |
| Output Voltage Temperature Coefficient | $\Delta V_{OUT}$ / $\Delta T \cdot V_{OUT}$ | $I_{OUT}$=10mA | | 50 | | ppm/℃ |

## Typical Application Circuit



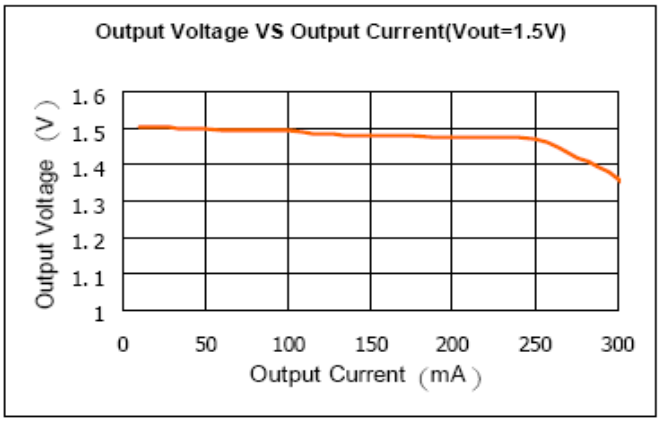

Application hints:

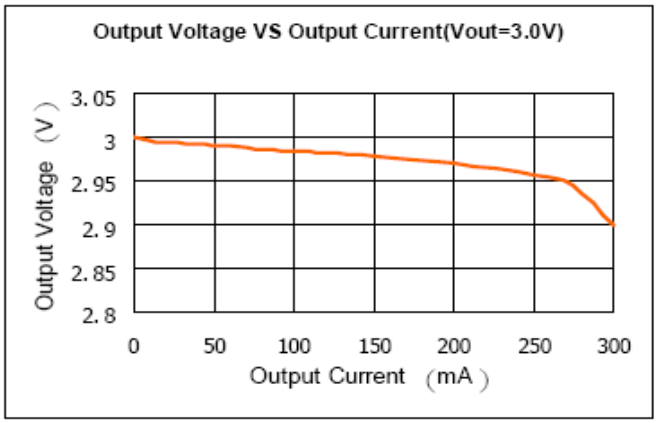
Note 1:Input capacitor (Cin=1uF) is recommended in all application circuit. Tantalum capacitor is recommended.

Note 2:Output capacitor (Cout=1uF) is recommended in all application to assure the stability of circuit. Tantalum capacitor is recommended.

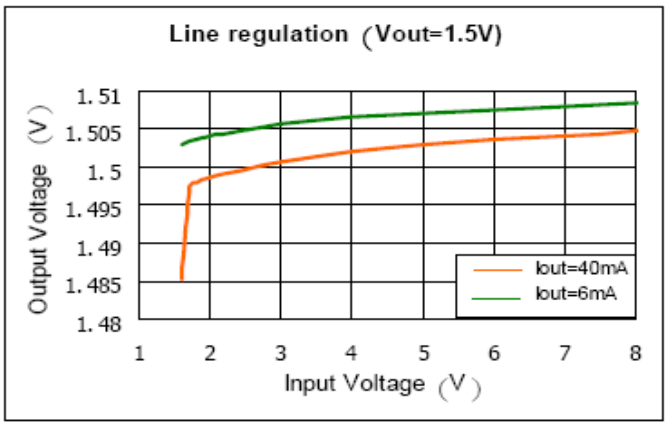
## Typical Performance Characteristics

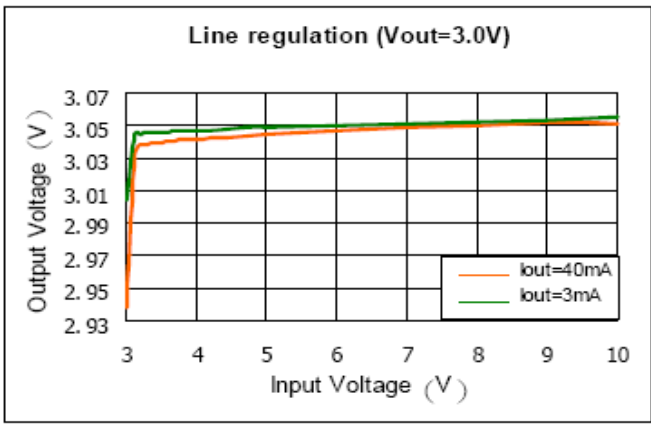
1. Load regulation



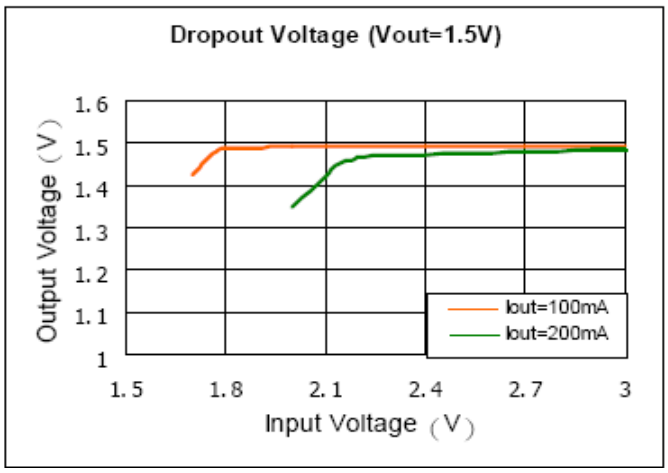



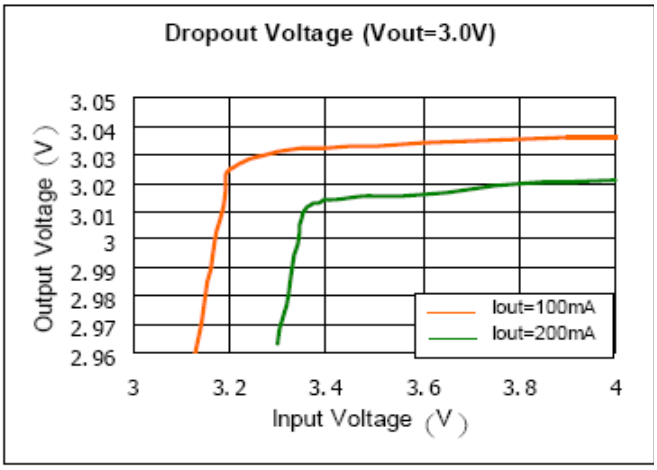

2. Line Regulation



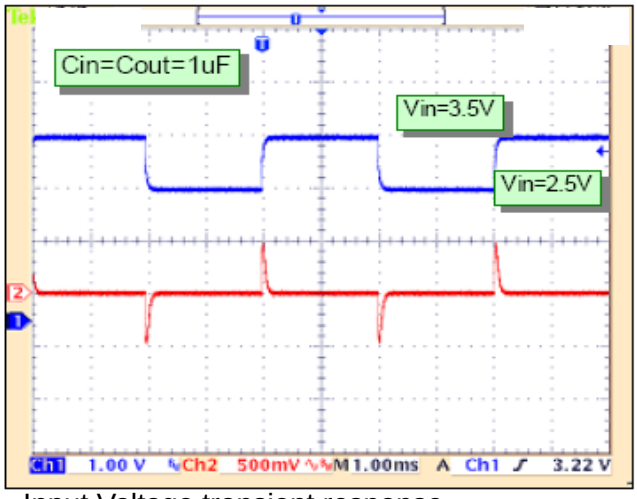



3. Dropout Voltage

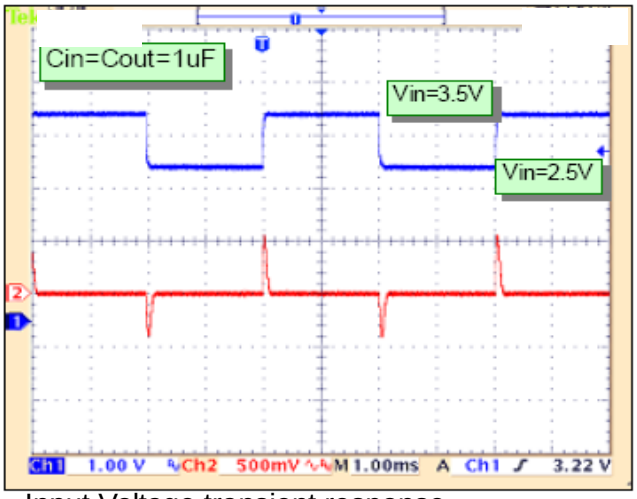


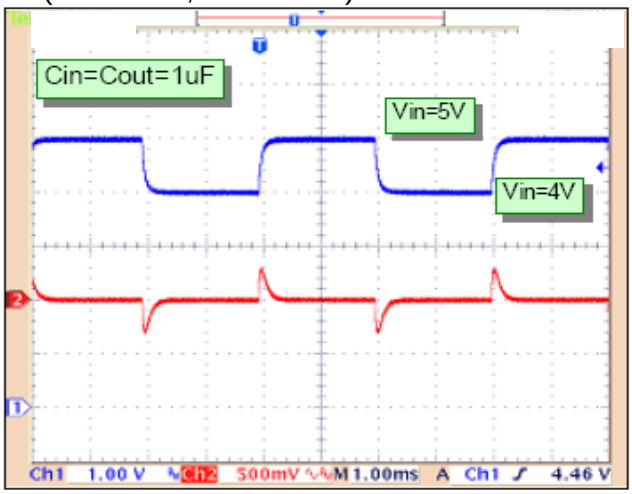

4. Input Voltage transient response
(Vout=1.5V, Iout=10mA)



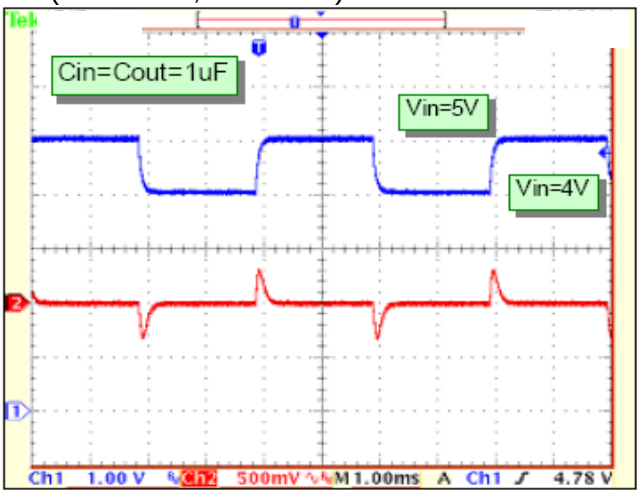

Input Voltage transient response
(Vout=1.5V, Iout=1mA)



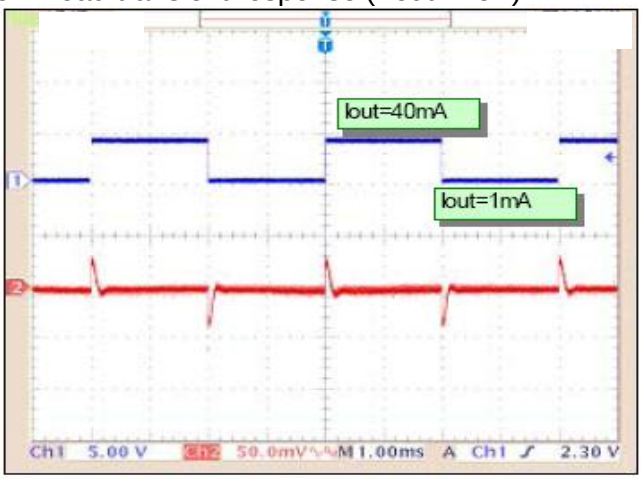

Input Voltage transient response
(Vout=3.0V, Iout=10mA)



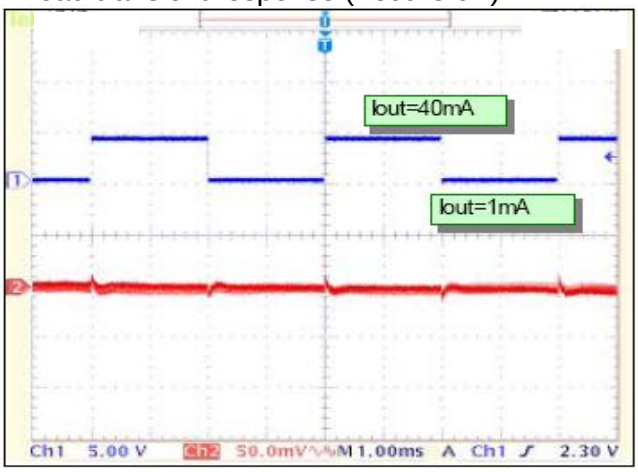

Input Voltage transient response
(Vout=3.0V, Iout=1mA)



5. Load transient response (Vout=1.5V)

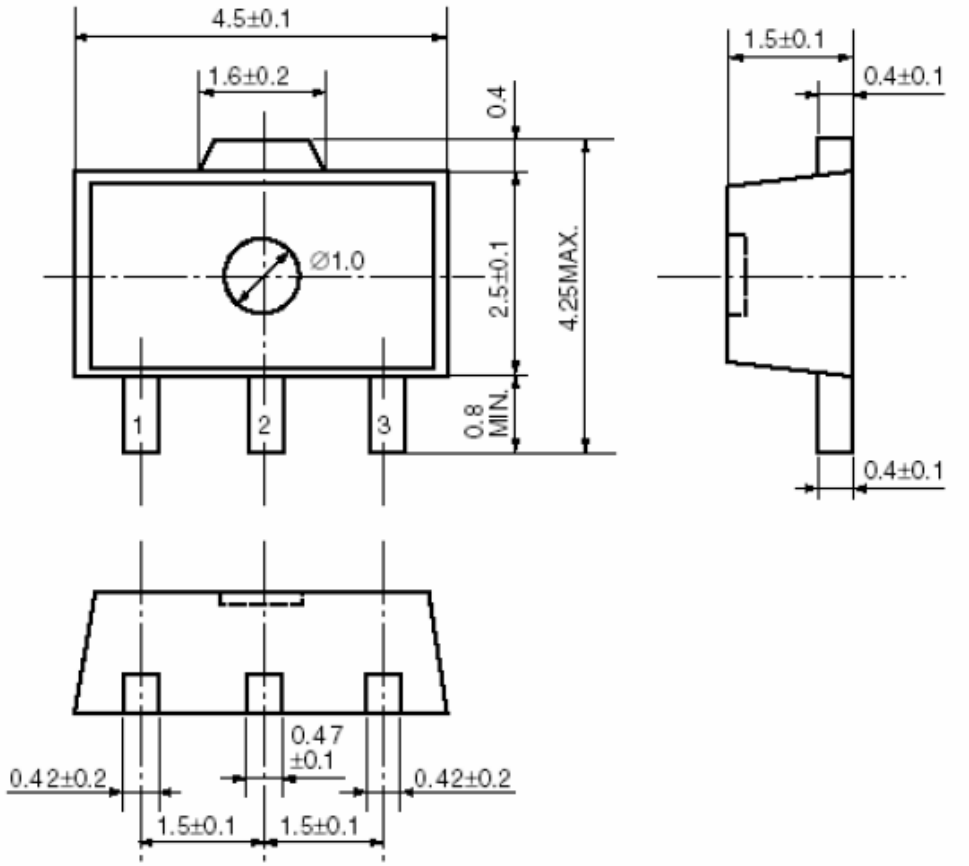


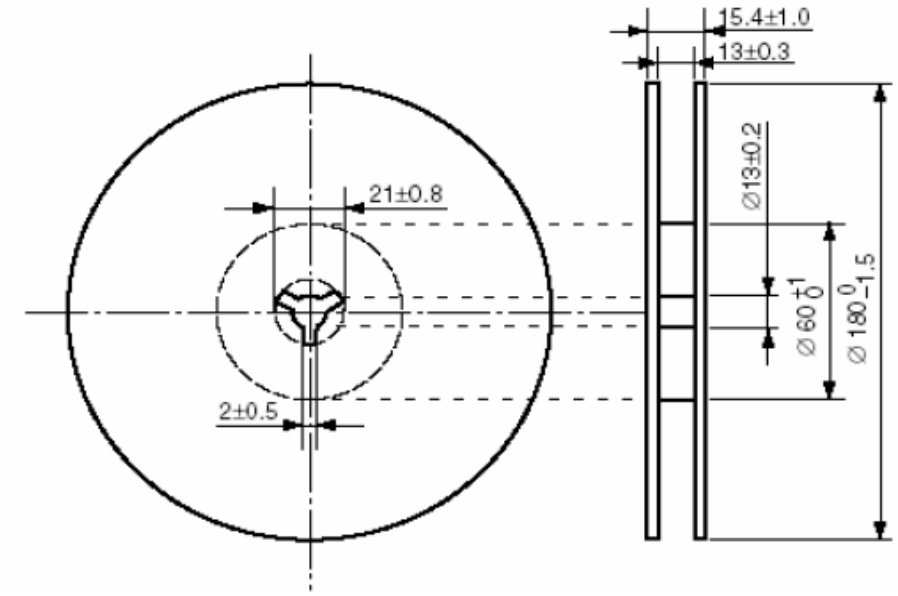

Load transient response (Vout=3.0V)



## Packing Information

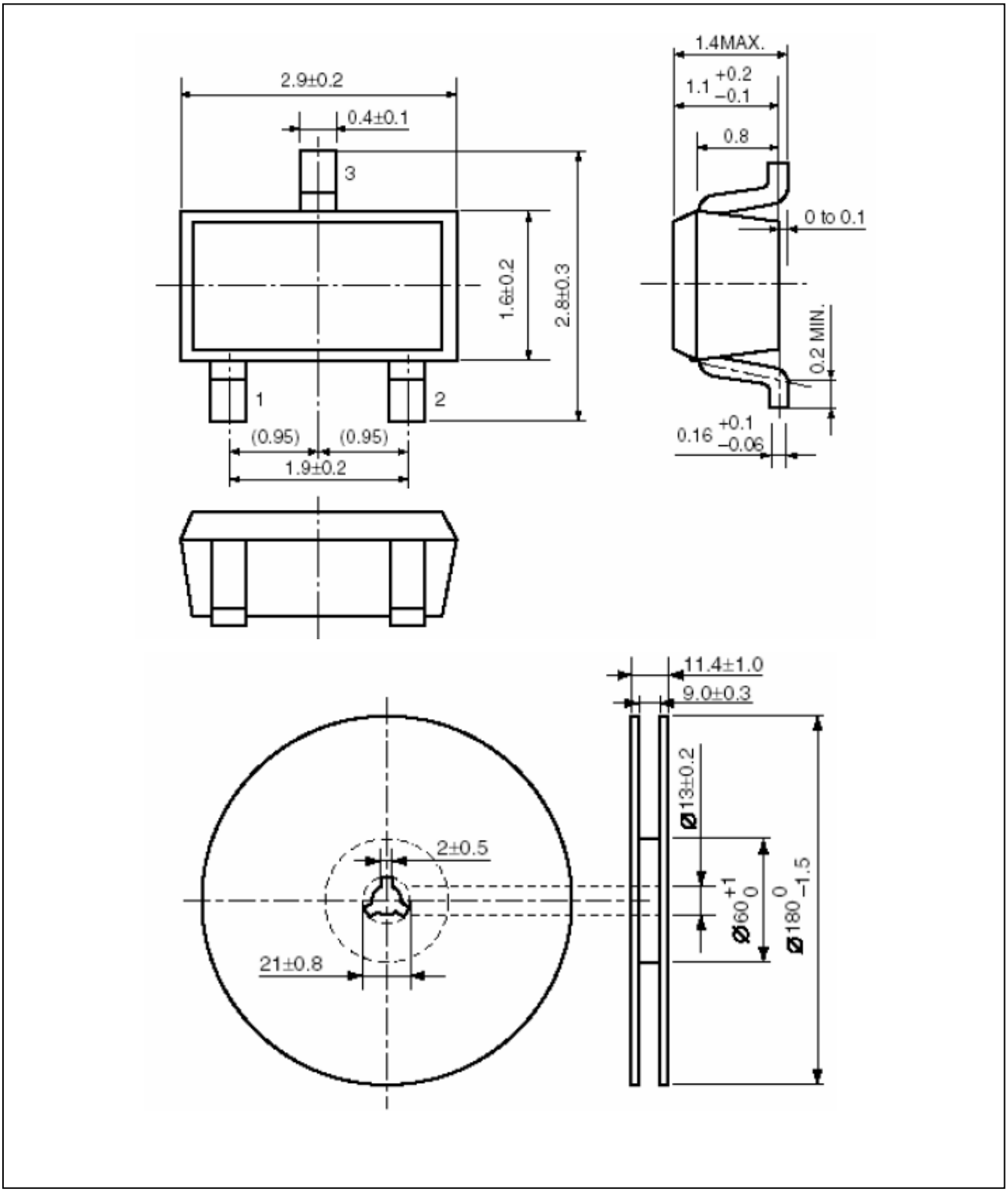
### SOT-89-3



## Packing Information

### SOT-23-3



Notes

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1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and shoes failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.