

XC31P Series



Temperature Controlled Voltage Regulators

- ◆ **CMOS**
- ◆ **Output Voltage Range** : 1.5V~5.5V
- ◆ **Accuracy** : ±5%
- ◆ **Output Voltage Temperature Coefficient**
: Typ. -3000ppm/°C
- ◆ **Detectable Temperature Range**
: -20°C~60°C
- ◆ **No-Load Supply Current: Typ. 1.0μA**

General Description

The XC31P series is a group of temperature sensitive, positive voltage output, three-pin regulators, that provide voltage in response to sensed ambient temperatures. This function is very useful for correcting temperature characteristics of LCD devices etc. It can also be used as a temperature sensor.

The XC31P consists of a temperature sensor, a voltage correction circuit, a high-precision voltage reference source, an error correction circuit, and a current limited output driver.

Laser trimming increases output voltage accuracy and provides output stability against the variations in input voltage and output current. CMOS production technology reduces power consumption.

SOT-23 (150mW) and SOT-89 (500mW) packages are available.

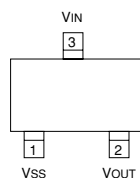
Applications

- Temperature compensation power supply
- Battery-powered equipment
- LCD based systems
- Cameras, Video Recorders, and OA systems

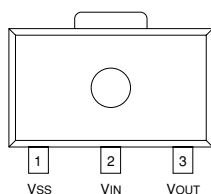
Features

- Set-up output voltage range**
: 1.5V ~ 5.5V in 0.1V increments.
- Highly accurate** : Set-up voltage ±5%
- Output voltage temperature coefficients**
: Typ. -3000ppm/°C
- Detectable temperature range**
: -20°C ~ 60°C
- Maximum output current** : 50mA (within maximum power dissipation)
- Low power consumption** : Typ. 1.0μA at $V_{OUT} = 1.54V$
- Maximum input voltage** : Max. 7V (max)
- Ultra small package** : SOT-23 (150mW) mini-mold
: SOT-89 (500mW) power mini-mold

Pin Configuration



SOT-23
(TOP VIEW)



SOT-89
(TOP VIEW)

Pin Assignment

| PIN NUMBER | | PIN NAME | FUNCTION |
|------------|--------|-----------|--------------------------|
| SOT-23 | SOT-89 | | |
| 3 | 2 | V_{IN} | Supply voltage input |
| 1 | 1 | V_{SS} | Ground |
| 2 | 3 | V_{OUT} | Regulated voltage output |

Product Classification

Ordering Information

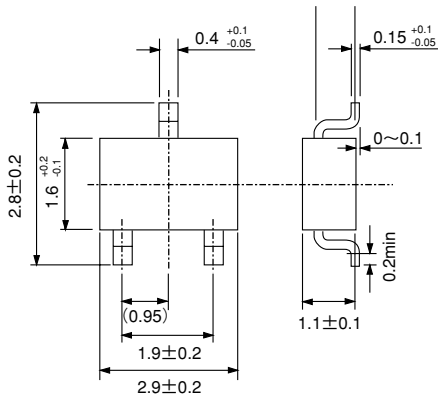
XC31Pxxxxxx
 ||| ||| |||
 a b c d e f g h

| DESIGNATOR | DESCRIPTION | DESIGNATOR | DESCRIPTION |
|------------|--|------------|--|
| a | <u>Polarity of Output Voltage</u> P=Positive | f | <u>Revision Character</u> A ~ |
| b | <u>Temperature Coefficient</u> P=Positive N=Negative | g | <u>Package Type</u> M=SOT-23 P=SOT-89 |
| c | Indicates the following two digits (d) are control reference numbers. S | h | <u>Device Orientation</u> R=Embossed Tape (Standard Feed) L=Embossed Tape (Reverse Feed) |
| d e | <u>Control Reference</u> 00 ~ | | |

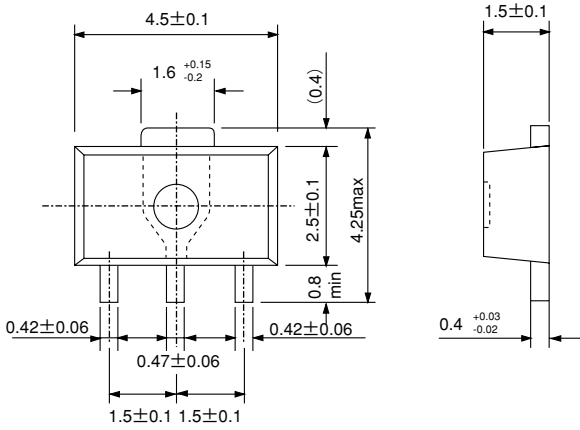
Packaging Information

SOT-23

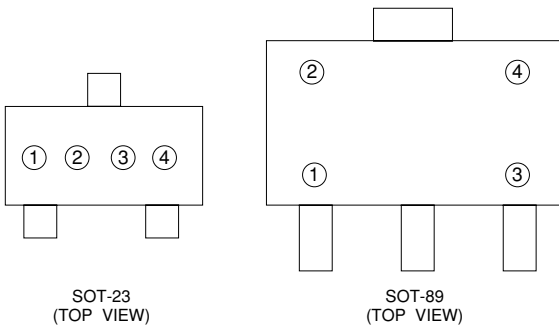
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●SOT-89



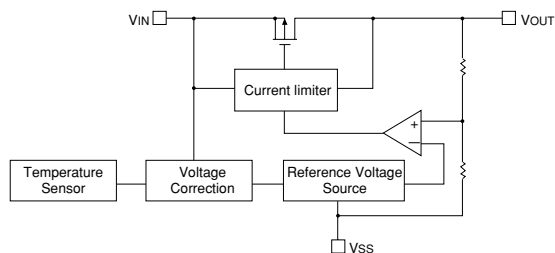
■Marking



- ① "A", which denotes the XC31P Series.
- ② Represents first digit of serial number.
- ③ Represents second digit of serial number.
- ④ Denotes lot number.

Based on internal standards.

Block Diagram



Absolute Maximum Ratings

Ta=25°C

| PARAMETER | SYMBOL | RATINGS | UNITS |
|-------------------------------|------------------|---|-------|
| Input Voltage | V _{IN} | 9 | V |
| Output Current | I _{OUT} | 50 | mA |
| Output Voltage | V _{OUT} | V _{SS} -0.3 ~ V _{IN} +0.3 | V |
| Power Dissipation | SOT-23 | P _d | 150 |
| | SOT-89 | | 500 |
| Operating Ambient Temperature | T _{opr} | -30 ~ +80 | °C |
| Storage Temperature | T _{stg} | -40 ~ +125 | °C |

Note: I_{OUT} must be less than P_d/(V_{IN}-V_{OUT})

Electrical Characteristics

XC31PNS00AM

Ta=25°C, C_L=0.1μF

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNITS |
|--|---|--|------|-------|------|--------|
| Output Voltage | V _{OUT 1} | I _{OUT} =10μA, V _{IN} =5.0V | 1.44 | 1.5 | 1.64 | V |
| Load Stability | ΔV _{OUT} | V _{IN} =5.0V 1μA ≤ I _{OUT} ≤ 10μA | | 30 | | mV |
| Input Stability | V _{OUT 2} | I _{OUT} =10μA, C _L =0.1μF 3.0V ≤ V _{IN} ≤ 7.0V | 1.39 | | 1.69 | V |
| Detectable Temperature Range | T _D | | -20 | | 60 | °C |
| Output Voltage Temperature Coefficient | $\frac{\Delta V_{OUT}}{\Delta T_a} \cdot V_{OUT 1}$ | I _{OUT} =10μA -20°C ≤ T _a ≤ 60°C | | -3328 | | ppm/°C |
| Input Voltage | V _{IN} | | | | 7 | V |
| Supply Current | I _{SS} | V _{IN} =5.0V | | 1.0 | 3.0 | μA |