



# 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.

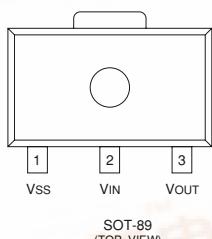
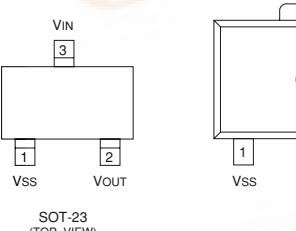
### ■ Applications

- 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<sub>OUT</sub>= 1.54V
- Maximum input voltage** : Max. 7V (max)
- Ultra small package** : SOT-23 (150mW) mini-mold  
: SOT-89 (500mW) power mini-mold

### ■ Pin Configuration



### ■ Pin Assignment

PIN NUMBER		PIN NAME	FUNCTION
SOT-23	SOT-89		
3	2	V <sub>IN</sub>	Supply voltage input
1	1	V <sub>SS</sub>	Ground
2	3	V <sub>OUT</sub>	Regulated voltage output

## ■ Product Classification

### ● Ordering Information

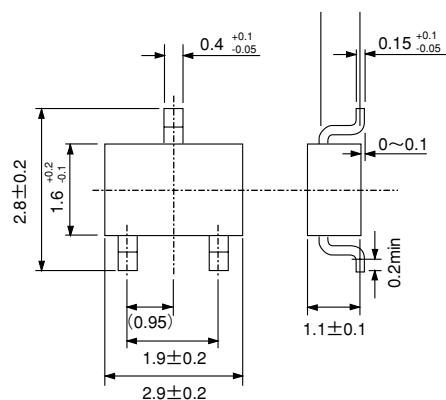
XC31Pxxxxxx

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

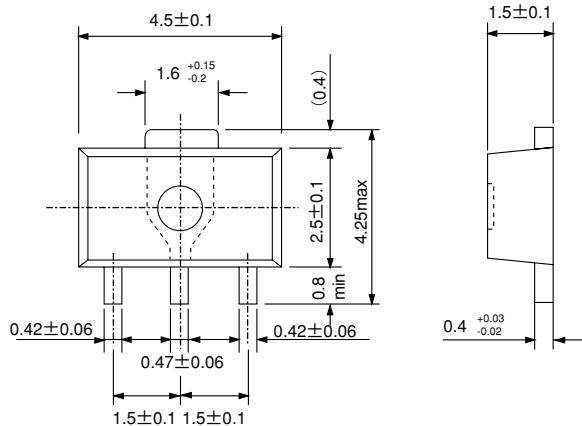
DESIGNATOR	DESCRIPTION	DESIGNATOR	DESCRIPTION
a	<u>Polarity of Output Voltage</u> P=Positive	f	<u>Revision Character</u> A ~
b	<u>Temperature Coefficient</u> P=Positive N=Negative	g	<u>Package Type</u> M=SOT-23 P=SOT-89
c	Indicates the following two digits (d) are control reference numbers.  S		<u>Device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

## ■ Packaging Information

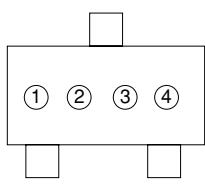
### ● SOT-23



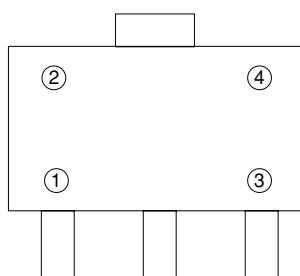
●SOT-89



■Marking



SOT-23  
(TOP VIEW)

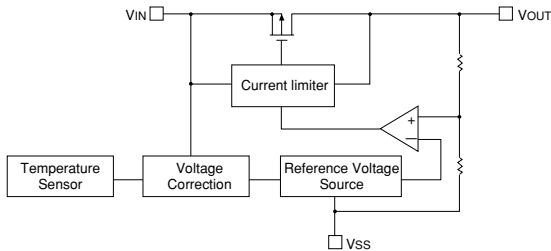


SOT-89  
(TOP VIEW)

- 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 <sub>IN</sub>	9	V
Output Current		I <sub>OUT</sub>	50	mA
Output Voltage		V <sub>OUT</sub>	V <sub>SS</sub> -0.3 ~ V <sub>IN</sub> +0.3	V
Power Dissipation	SOT-23	Pd	150	mW
	SOT-89		500	
Operating Ambient Temperature		T <sub>OPR</sub>	-30 ~ +80	°C
Storage Temperature		T <sub>STG</sub>	-40 ~ +125	°C

Note: I<sub>OUT</sub> must be less than Pd/(V<sub>IN</sub>-V<sub>OUT</sub>)

## ■ Electrical Characteristics

### XC31PN500AM

Ta=25°C, C<sub>L</sub>=0.1μF

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	V <sub>OUT</sub> 1	I <sub>OUT</sub> =10μA, V <sub>IN</sub> =5.0V	1.44	1.5	1.64	V
Load Stability	ΔV <sub>OUT</sub>	V <sub>IN</sub> =5.0V 1μA ≤ I <sub>OUT</sub> ≤ 10μA		30		mV
Input Stability	V <sub>OUT</sub> 2	I <sub>OUT</sub> =10μA, C <sub>L</sub> =0.1μF 3.0V ≤ V <sub>IN</sub> ≤ 7.0V	1.39		1.69	V
Detectable Temperature Range	T <sub>D</sub>		-20		60	°C
Output Voltage Temperature Coefficient	ΔV <sub>OUT</sub> / ΔT <sub>a</sub> • V <sub>OUT</sub> 1	I <sub>OUT</sub> =10μA -20°C ≤ T <sub>a</sub> ≤ 60°C		-3328		ppm/°C
Input Voltage	V <sub>IN</sub>				7	V
Supply Current	I <sub>SS</sub>	V <sub>IN</sub> =5.0V		1.0	3.0	μA