

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

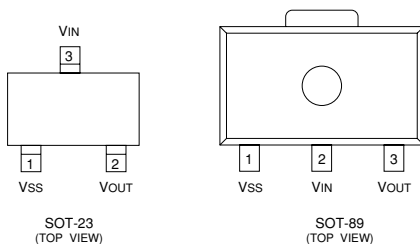
The XC31P series is a group of temperature sensitive, positive voltage output, three-pin regulators, that provide voltage in response to sensed ambient temperatures. This function is very useful for correcting temperature characteristics of LCD devices etc. It can also be used as a temperature sensor.

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.

Pin Configuration



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 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

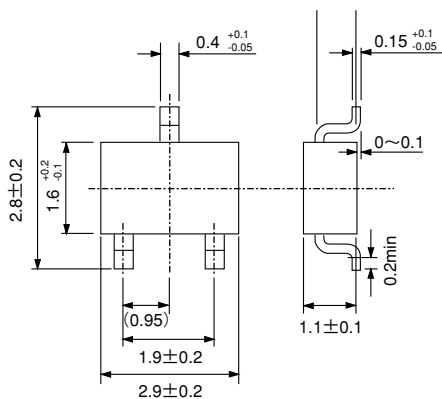
XC31Pxxxxxx

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

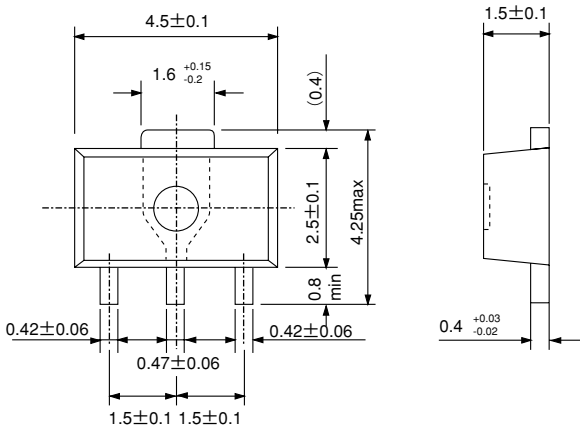
DESIGNATOR	DESCRIPTION	DESIGNATOR	DESCRIPTION
a	<u>Polarity of Output Voltage</u> P=Positive	f	<u>Revision Character</u> A ~
b	<u>Temperature Coefficient</u> P=Positive N=Negative	g	<u>Package Type</u> M=SOT-23 P=SOT-89
c	Indicates the following two digits (d) are control reference numbers. S	h	<u>Device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

Packaging Information

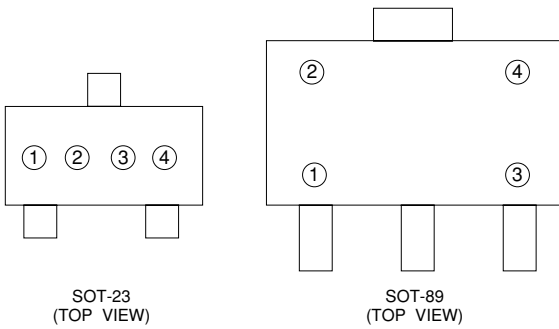
SOT-23



●SOT-89



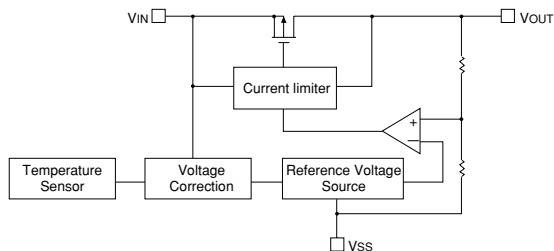
■Marking



- 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

$T_a=25^\circ\text{C}$

PARAMETER	SYMBOL	RATINGS	UNITS
Input Voltage	V_{IN}	9	V
Output Current	I_{OUT}	50	mA
Output Voltage	V_{OUT}	$V_{SS}-0.3 \sim V_{IN}+0.3$	V
Power Dissipation	SOT-23	Pd	mW
	SOT-89		
Operating Ambient Temperature	T_{opr}	$-30 \sim +80$	$^\circ\text{C}$
Storage Temperature	T_{stg}	$-40 \sim +125$	$^\circ\text{C}$

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

Electrical Characteristics

XC31PNSOAM

$T_a=25^\circ\text{C}, C_L=0.1\mu\text{F}$

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	V_{OUT1}	$I_{OUT}=10\mu\text{A}, V_{IN}=5.0\text{V}$	1.44	1.5	1.64	V
Load Stability	ΔV_{OUT}	$V_{IN}=5.0\text{V}$ $1\mu\text{A} \leq I_{OUT} \leq 10\mu\text{A}$		30		mV
Input Stability	V_{OUT2}	$I_{OUT}=10\mu\text{A}, C_L=0.1\mu\text{F}$ $3.0\text{V} \leq V_{IN} \leq 7.0\text{V}$	1.39		1.69	V
Detectable Temperature Range	T_D		-20		60	$^\circ\text{C}$
Output Voltage Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_a} \cdot V_{OUT1}$	$I_{OUT}=10\mu\text{A}$ $-20^\circ\text{C} \leq T_a \leq 60^\circ\text{C}$		-3328		ppm/ $^\circ\text{C}$
Input Voltage	V_{IN}				7	V
Supply Current	I_{SS}	$V_{IN}=5.0\text{V}$		1.0	3.0	μA