# XC61A Series

## Low Voltage Detectors (VDF=0.8V)

TOREX

2

◆**CMOS**
◆**Highly Accurate : ± 2%**
◆**Low Power Consumption : 1.0μA (VIN = 2.0V)**
◆**Ultra small Mini Mold Package**

## ■Applications

- ●Microprocessor reset circuitry
- ●Memory battery back-up circuits
- ●Power-on reset circuits
- ●Power failure detection
- ●System battery life and charge voltage monitors

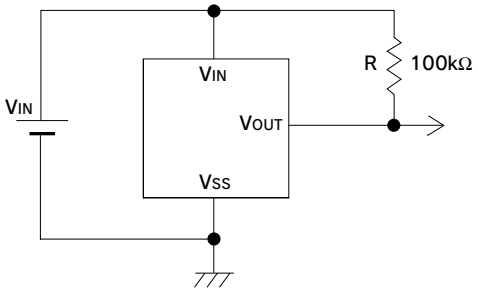
## ■General Description

The XC61A series are highly precise, low power consumption voltage detectors, manufactured using CMOS and laser trimming technologies. Detect voltage is extremely accurate with minimal temperature drift.
N channel open drain output configurations is available.

## ■Features

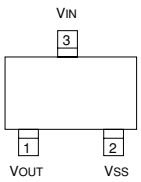
**Highly accurate** : ± 2%
**Low power consumption** : TYP 1.0 μA [ VIN=2.0V ]
**Detect voltage range** : 0.8V (N-ch open drain)
**Operating voltage range** : 0.7V ~ 6.0V
**Detect voltage temperature characteristics**
: TYP± 100ppm/°C
**Output configuration** : N-channel open drain
**Ultra small package** : SOT-23 (150mW) mini-mold
: SOT-89 (500mW) mini-mold
: TO-92 (300mW)

## ■Typical Application Circuit

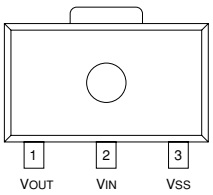



N-ch Open Drain Output

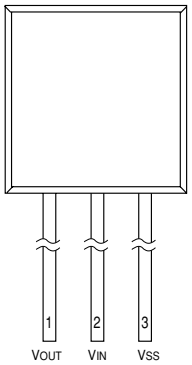
## ■Pin Configuration



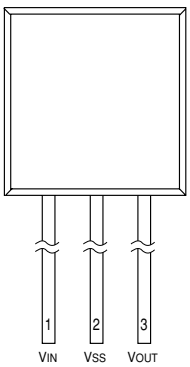

SOT-23
(TOP VIEW)




SOT-89
(TOP VIEW)




TO-92 (T Type)
(TOP VIEW)




TO-92 (L Type)
(TOP VIEW)

## ■Pin Assignment

| PIN NUMBER | | | | PIN NAME | FUNCTION |
|---|---|---|---|---|---|
| SOT-23 | SOT-89 | TO-92 (T) | TO-92 (L) | | |
| 3 | 2 | 2 | 1 | VIN | Supply Voltage Input |
| 2 | 3 | 3 | 2 | VSS | Ground |
| 1 | 1 | 1 | 3 | VOUT | Output |

## ■Product Classification

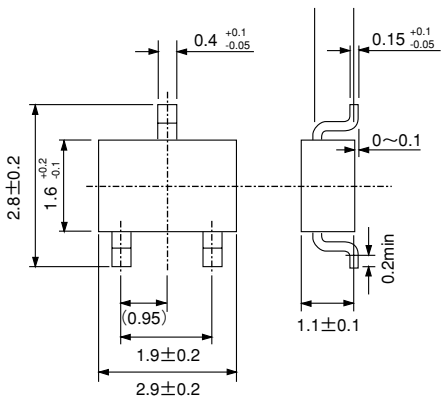
●Ordering Information

**XC61A x xx x x x x**
a b c d e f

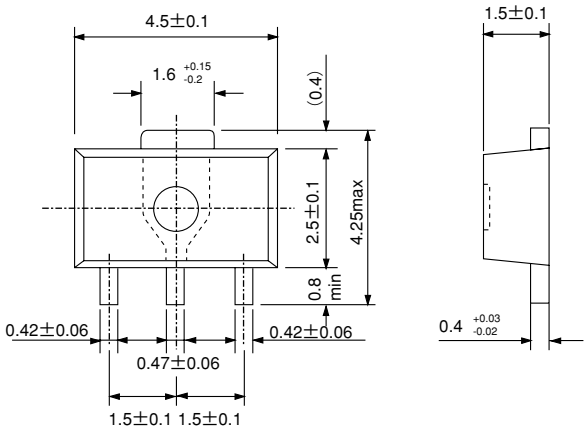
| DESIGNATOR | DESCRIPTION | DESIGNATOR | DESCRIPTION |
|---|---|---|---|
| a | Output Configuration :<br>N = N-ch open drain | e | PackageType :<br>M = SOT-23<br>P = SOT-89<br>T = TO-92 ( regular )<br>L = TO-92 ( Custom pin Configuration) |
| b | Detect Voltage :<br>08 = 0.8V | | |
| c | Output Delay :<br>0 = No delay | f | Device Orientation :<br>R = Embossed Tape ( Right )<br>L = Embossed Tape ( Left )<br>H = Paper Tape (TO-92)<br>B = Bag (TO-92) |
| d | Detect Accuracy :<br>2 = within ± 2.0% | | |

## ■Packaging Information

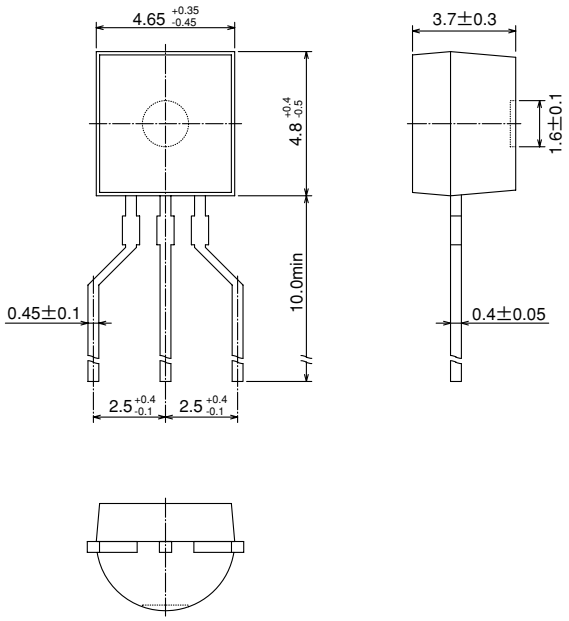
●SOT-23



●SOT-89

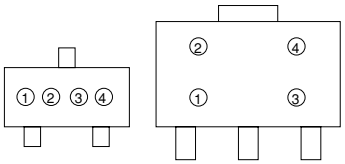

4.5±0.1
1.6 +0.15 -0.2
(0.4)
2.5±0.1
4.25max
0.8 min
0.42±0.06
0.42±0.06
0.47±0.06
1.5±0.1 1.5±0.1
1.5±0.1
0.4 +0.03 -0.02

●TO-92


4.65 +0.35 -0.45
4.8 +0.4 -0.5
10.0min
0.45±0.1
2.5 +0.4 -0.1
2.5 +0.4 -0.1
3.7±0.3
1.6±0.1
0.4±0.05

## ■Marking

●SOT-23, SOT-89




SOT-23 (TOP VIEW)　SOT-89 (TOP VIEW)

① Represents the integer of the Output Voltage and Detect Voltage

| DESIGNATOR | CONFIGURATION | VOLTAGE |
|---|---|---|
| K | N-ch | 0.②(V) |

② Represents the decimal point of the Detect Voltage

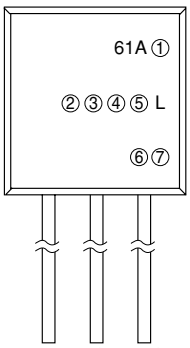
| DESIGNATOR | VOLTAGE |
|---|---|
| 8 | ①.8(V) |

③ Indicates 'Delay Time'

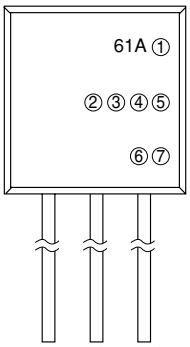
| DESIGNATOR | DELAY TIME |
|---|---|
| 0 | No Delay |

④ Represents the assembly lot no.
Based on internal standards

●TO-92




TO-92（L Type）
(TOP VIEW)




TO-92（T Type）
(TOP VIEW)

① Represents the output configuration

| DESIGNATOR | OUTPUT CONFIGURATION |
|---|---|
| N | N-ch |

② Represents the Detect Voltage

| DESIGNATOR | | VOLTAGE（V） |
|---|---|---|
| ② | ③ | |
| 0 | 8 | 0.8 |

④ Indicates Delay Time

| DESIGNATOR | DELAY TIME |
|---|---|
| 0 | No delay |

⑤ Represents the Detect Voltage Accuracy

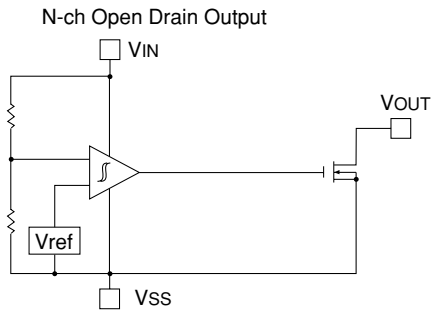
| DESIGNATOR | DETECT VOLTAGE ACCURACY |
|---|---|
| 2 | within ±2% |

⑥ Represents a least significant digit of the produced year

| DESIGNATOR | Produced year |
|---|---|
| 0 | 2000 |
| 1 | 2001 |

⑦ Denotes the production lot number
0 to 9, A to Z repeated(G.I.J.O.Q.W excepted)

## ■Block Diagram




## ■Absolute Maximum Ratings

Ta = 25℃

| PARAMETER | | SYMBOL | RATINGS | UNITS |
|---|---|---|---|---|
| Input Voltage | | VIN | 9 | V |
| Output Current | | IOUT | 50 | mA |
| Output Voltage | N-ch open drain | VOUT | VSS -0.3 ～ 9 | V |
| Power Dissipation | SOT-23 | Pd | 150 | mW |
| | SOT-89 | | 500 | |
| | TO-92 | | 300 | |
| Operating Ambient Temperature | | Topr | -30 ～ +80 | ℃ |
| Storage Temperature | | Tstg | -40 ～ +125 | ℃ |

## ■Electrical Characteristics

Ta = 25°C

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|---|
| Detect Voltage | VDF | | VDF x 0.98 | VDF | VDF x 1.02 | V |
| Hysteresis Range | VHYS | | VDF x 0.02 | VDF x 0.05 | VDF x 0.08 | V |
| Supply Current | ISS | VIN = 1.5V | | 0.9 | 2.6 | μA |
| | | = 2.0V | | 1.0 | 3.0 | |
| | | = 3.0V | | 1.3 | 3.4 | |
| | | = 4.0V | | 1.6 | 3.8 | |
| | | = 5.0V | | 2.0 | 4.2 | |
| Operating Voltage | VIN | VDF = 0.8V to 2.0V | 0.7 | | 6.0 | V |
| Output Current | IOUT | N-ch VDS= 0.5V<br>VIN= 0.7V | | 0.35 | | mA |
| | | = 1.0V | | 2.2 | | |
| Temperature Characteristics | $\frac{\Delta VDF}{\Delta Topr \cdot VDF}$ | -30°C ≤ Topr ≤ 80°C | | ±100 | | ppm/°C |
| Delay Time (VDR→VOUT inversion) | tDLY | | | | 0.2 | ms |

Note :
When a resistor is connected between the VIN pin and the input, VDR will increase and it may be the case that the establis hed characteristics cannot be achieved.

## ■Functional Description

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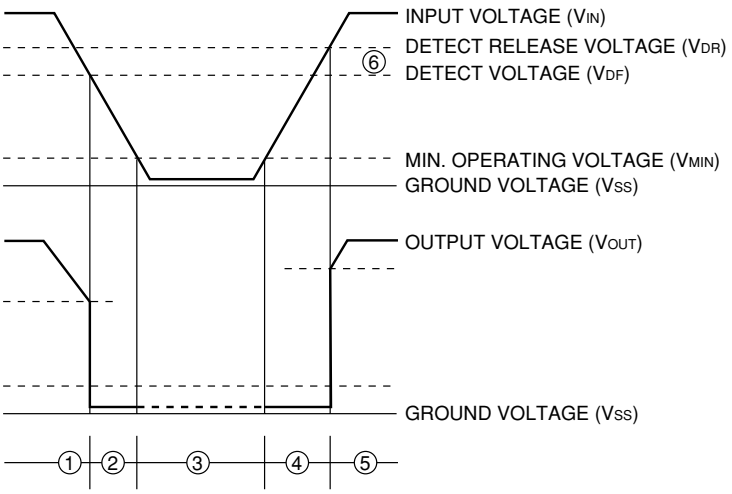
① When input voltage ($V_{IN}$) rises above detect voltage ($V_{DF}$), output voltage ($V_{OUT}$) will be equal to $V_{IN}$.
( A condition of high impedance exists with Nch open drain output configurations. )
② When input voltage ($V_{IN}$) falls below detect voltage ($V_{DF}$), output voltage ($V_{OUT}$) will be equal to the ground voltage ($V_{SS}$) level.
③ When input voltage ($V_{IN}$) falls to a level below that of the minimum operating voltage ($V_{MIN}$), output will become unstable. In this condition, $V_{IN}$ will equal the pulled-up output ( should output be pulled-up.)
④ When input voltage ($V_{IN}$) rises above the ground voltage ($V_{SS}$) level, output will be unstable at levels below the minimum operating voltage ($V_{MIN}$). Between the $V_{MIN}$ and detect release voltage ($V_{DR}$) levels, the ground voltage ($V_{SS}$) level will be maintained.
⑤ When input voltage ($V_{IN}$) rises above detect release voltage ($V_{DR}$), output voltage ($V_{OUT}$) will be equal to $V_{IN}$.
( A condition of high impedance exists with Nch open drain output configurations. )
⑥ The difference between $V_{DR}$ and $V_{DF}$ represents the hysteresis range.

●Timing Chart




## ■Directions for use

●Notes on Use

When a resistor is connected between the $V_{IN}$ pin and the input with N-channel open drain output configurations, we suggest that a resistor with an $R_{IN}$ value of less than 1k Ω and a capacitor with a value of more than 0.1 μF be used in order to avoid oscillation.

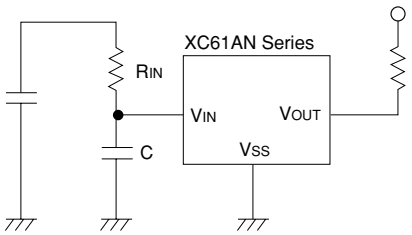



Diagram: Circuit using an input resistor