



VIC5113



Ultra-Small High-Precision Voltage Detector

● Features

Ultra-low current consumption: 1.0 μ A@3.5V(typ)

High-precision detection voltage: $\pm 2.0\%$

Hysteresis characteristics: -VDET $\times 5\%$ (typ)

Operating voltage range: 0.95 V to 8.0 V

Detection voltage: 1.5V to 6.0 V (0.1 V step)

Output forms:

NMOS open-drain output (Active Low)

CMOS output (Active Low)

● Applications

Memory battery back-up circuits

Power-on reset circuits

Power failure detection

Power monitor for portable equipment such as notebook computers, digital cameras, PDA, and cellular phones.

Constant voltage power monitors for cameras, video equipment and communication devices.

Power monitor for microcomputers and reset for CPUs.

● General Description

The VIC5113 Series is a series of high-precision voltage detectors developed using CMOS process. The detection voltage is fixed internally, with an accuracy of $\pm 2.0\%$. Two output forms, Nch open-drain and CMOS output, are available.

● Ordering Information

VIC5113-①②③④⑤⑥

| DESIGNATOR | SYMBOL | DESCRIPTION |
|------------|--------------------------|---|
| ①②③ | Output Detection Voltage |200=2.0V, 250=2.5V, 263=2.63V 293=2.93V%0.1V step) |
| ④ | Pin Type: | A: Normal; B: B-Type |
| ⑤⑥ | Package Type: | DT:SOT343、DI: SOT23、DM:SOT89、DK:SOT23-5 |



VIC5113



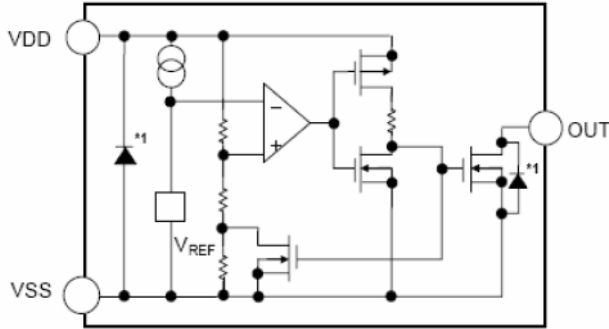
● Absolute Maximum Ratings

| Item | Symbol | Absolute maximum ratings | Unit | |
|-------------------------------|---------------------------------------|--------------------------|------|----|
| Power supply voltage | VDD | VSS-0.3 ~ VSS+10 | V | |
| Output voltage | VOUT | VSS-0.3 ~ VSS+10 | V | |
| Power dissipation | SOT-23-3 SOT-89 TO-92 SOT343 | PD | 250 | mW |
| | | | 500 | mW |
| | | | 500 | mW |
| | | | 250 | mW |
| Operating ambient temperature | Topr | -40 ~ +85 | °C | |
| Storage temperature | Tstg | -40 ~ +125 | °C | |

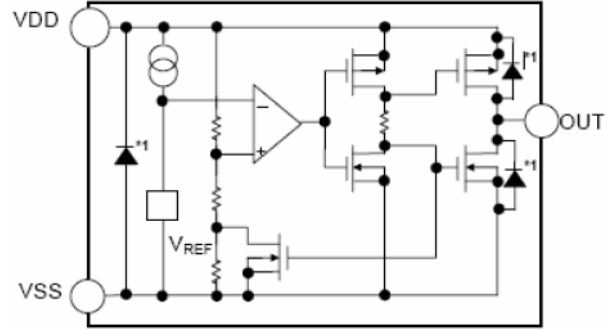
● Electrical Characteristics @ (TA=25°C, unless otherwise specified)

| Item | Symbol | Condition | Min. | Typ. | Max. | Unit | |
|-------------------------|-------------------|---|------------------|----------------|-----------------|--------|----|
| Detection voltage*1 | -VDET | — | -VDET(S) × 0.98 | -VDET(S) | -VDET(S) × 1.02 | V | |
| Hysteresis width | VHYS | — | 0.02× -VDET(S) | 0.05× -VDET(S) | 0.08× -VDET(S) | V | |
| Current consumption | ISS | VDD = -VDET + 0.5V | VIC5113C/N20~26 | — | 1.0 | 2.0 | uA |
| | | | VIC5113C/N 26~39 | — | 1.2 | 2.5 | uA |
| | | | VIC5113C/N 39~60 | — | 1.5 | 3.0 | uA |
| Operating voltage | VDD | — | 0.95 | — | 8 | V | |
| Output current | IOUT | NMOS: VOUT = 0.5 V VDD = -VDET - 0.5 V | VIC5113C/N 20~26 | 3.0 | 13.0 | — | mA |
| | | | VIC5113C/N 26~39 | 3.0 | 15.0 | — | mA |
| | | | VIC5113C/N 39~60 | 3.0 | 18.0 | — | mA |
| | | PMOS: VDD - VOUT = 0.5 V VDD = -VDET + 0.5 V | VIC5113C/N 20~26 | 1.5 | 4.0 | — | mA |
| | | | VIC5113C/N 26~39 | 1.5 | 6.0 | — | mA |
| | | | VIC5113C/N 39~60 | 1.5 | 8.0 | — | mA |
| Leakage current | I _{LEAK} | Only for NMOS open-drain output products, VDD = 8.0 V, VOUT = 8.0 V | — | — | 0.1 | uA | |
| temperature coefficient | | Ta = -40°C ~ +85°C | — | ±120 | ±360 | ppm/°C | |
| Delay time | TD | | | | 200 | uS | |

● **Typical Block Diagram**



Nch open-drain

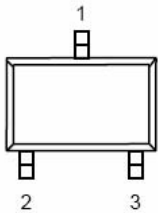


CMOS output

Note:*1-parasitic diode

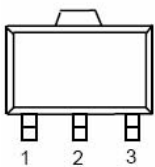
● **Pin Description**

SOT-23-3
Top view



| PIN NO. | A | B | Functions |
|---------|------|------|------------------------------|
| 1 | VDD | VDD | Voltage input pin |
| 2 | VOUT | - | Voltage detection output pin |
| | - | VSS | GND pin |
| 3 | VSS | - | GND pin |
| | - | VOUT | Voltage detection output pin |

SOT-89-3
Top view

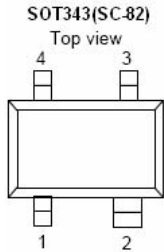


| PIN NO | P | Functions |
|--------|------|------------------------------|
| 1 | VOUT | Voltage detection output pin |
| 2 | VDD | Voltage input pin |
| 3 | VSS | GND pin |

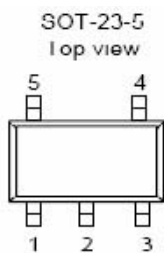
TO-92
Bottom view



| PIN NO | T | TA | Functions |
|--------|------|------|------------------------------|
| 1 | VOUT | - | Voltage detection output pin |
| | - | VDD | Voltage input pin |
| 2 | VDD | - | Voltage input pin |
| | - | VSS | GND pin |
| 3 | VSS | - | GND pin |
| | - | VOUT | Voltage detection output pin |



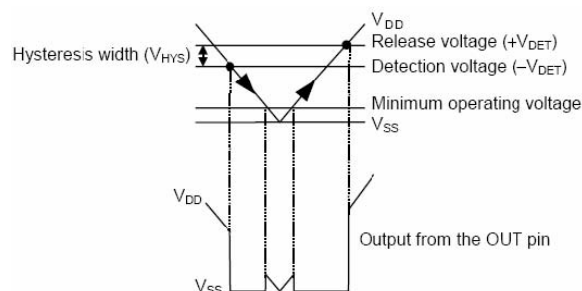
| PIN NO | N | Functions |
|--------|------|------------------------------|
| 1 | VOUT | Voltage detection output pin |
| 2 | VDD | Voltage input pin |
| 3 | NC | No Connection |
| 4 | VSS | GND pin |



| PIN NO. | MR | Functions |
|---------|------|------------------------------|
| 1 | VOUT | Voltage detection output pin |
| 2 | VDD | Voltage input pin |
| 3 | VSS | GND pin |
| 4 | NC | No connection |
| 5 | NC | No connection |

● Function Description

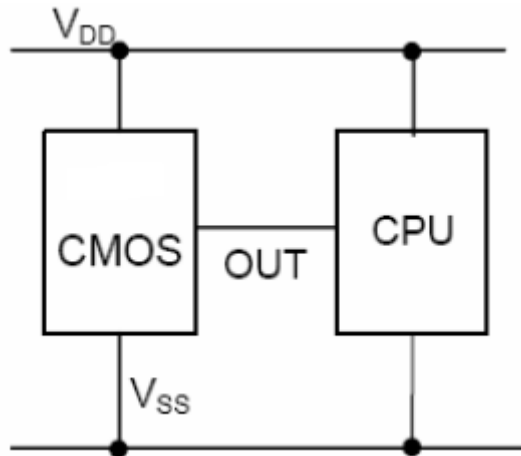
1. When a voltage higher than the release voltage (+V_{DET}) is applied to the voltage input pin (VDD), the voltage will gradually fall. When a voltage higher than the detect voltage (-V_{DET}) is applied to VDD, output (VOUT) will be equal to the input at VDD. Note that high impedance exists at VOUT with the N-channel open drain configuration. If the pin is pulled up, VOUT will be equal to the pull up voltage.
2. When VDD falls below -V_{DET}, VOUT will be equal to the ground voltage (VSS) level (detect state). Note that this also applies to N-channel open drain configurations.
3. When VDD falls to a level below that of the minimum operating voltage (V_{MIN}) output will become unstable. Because the output pin is generally pulled up with N-channel open drain configurations, output will be equal to pull up voltage.
4. When VDD rises above the VSS level (excepting levels lower than minimum operating voltage), VOUT will be equal to VSS until VDD reaches the +V_{DET} level.
5. Although VDD will rise to a level higher than +V_{DET}, VOUT maintains ground voltage level via the delay circuit.
6. Following transient delay time, VDD will be output at VOUT. Note that high impedance exists with the N-channel open drain configuration and that voltage will be dependent on pull up.



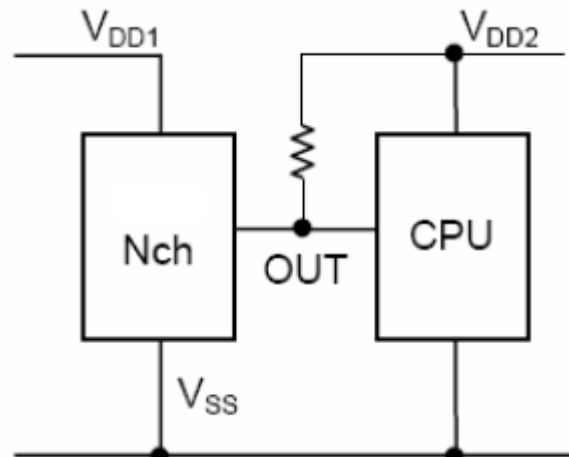
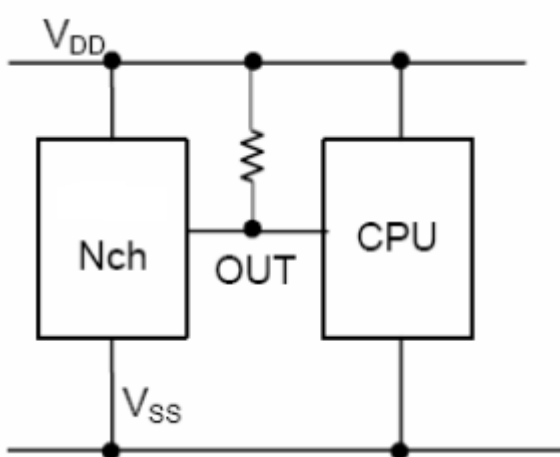
- Typical Application Circuit

1、 CMOS output:

2、



3、 Nch open-drain



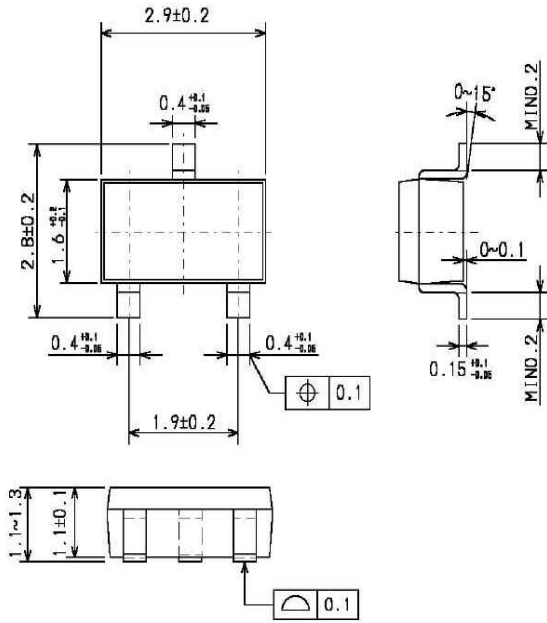


VIC5113

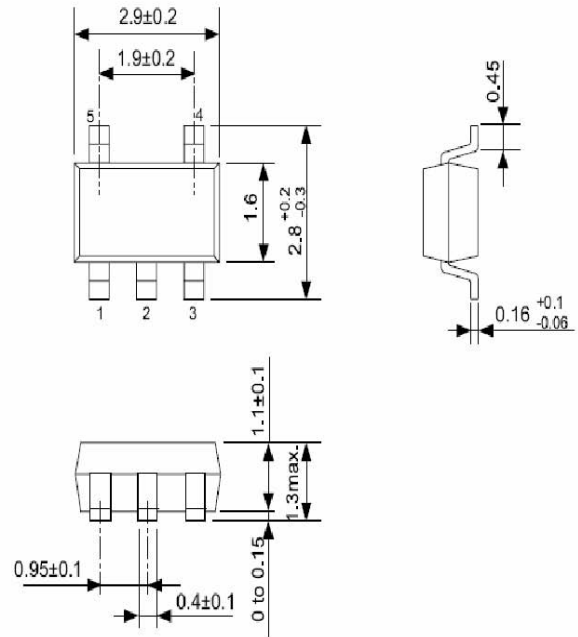


● Package Information

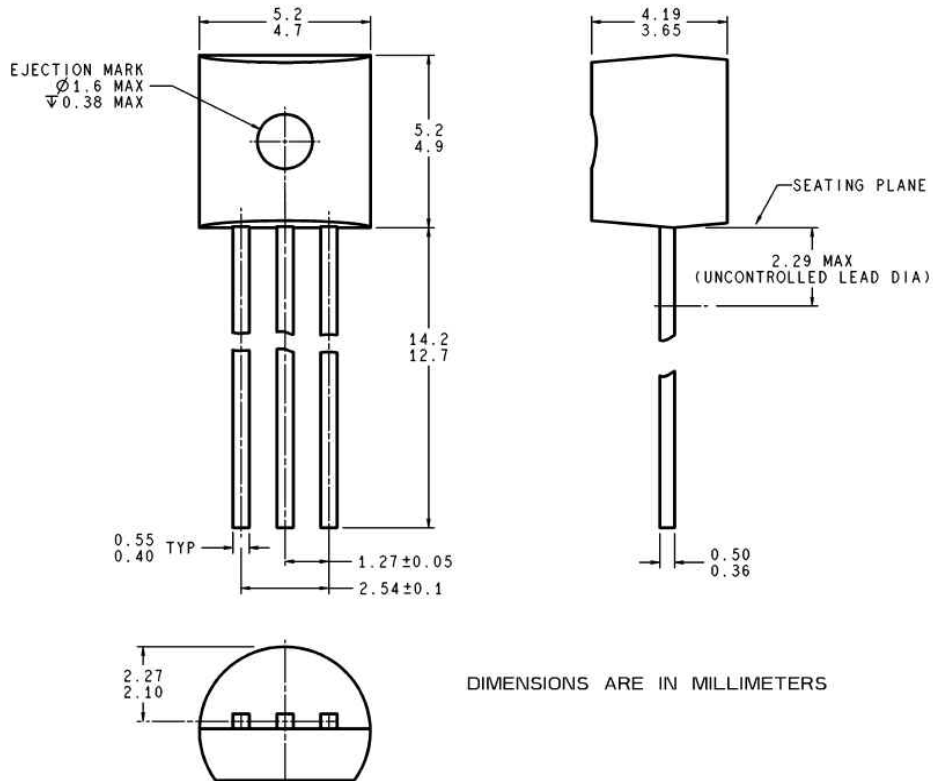
● SOT-23



SOT23-5



● TO-92

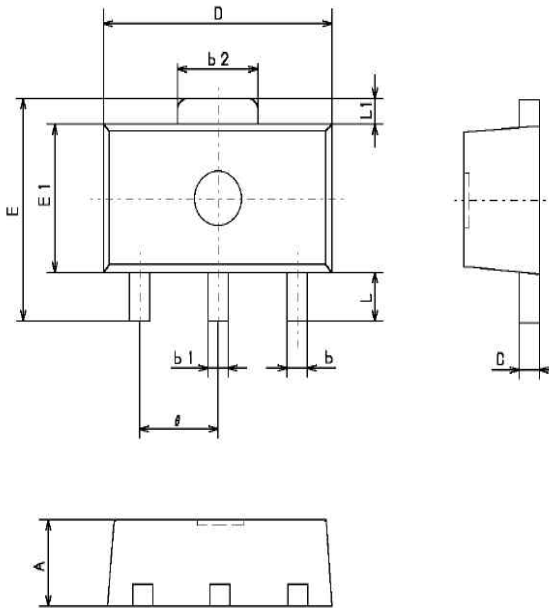


DIMENSIONS ARE IN MILLIMETERS

● SOT-89

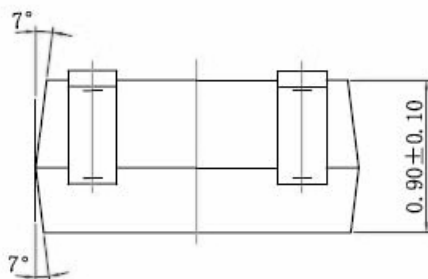
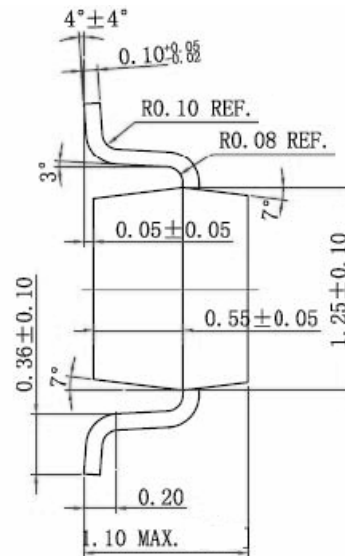
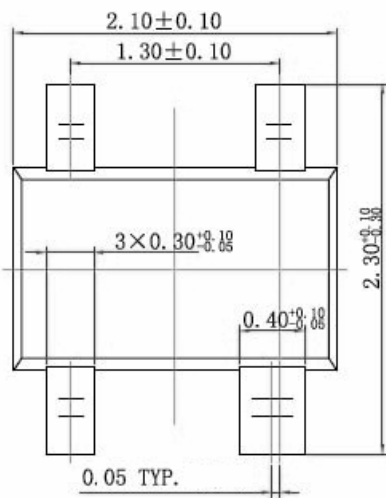


VIC5113



| Symbols | Dimensions in millimeters | | |
|---------|---------------------------|------|------|
| | Min | Nom | Max |
| A | 1.40 | 1.50 | 1.60 |
| b | 0.36 | 0.42 | 0.48 |
| b1 | 0.41 | 0.47 | 0.53 |
| b2 | 1.40 | 1.60 | 1.75 |
| C | 0.38 | 0.40 | 0.43 |
| D | 4.40 | 4.50 | 4.60 |
| E | — | — | 4.25 |
| E1 | 2.40 | 2.50 | 2.60 |
| θ | 1.40 | 1.50 | 1.60 |
| L | 1.80 | — | — |
| L1 | — | 0.40 | — |

• SOT343 (SC-82)





VIC5113



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