



88NXX

Preliminary

CMOS IC

BUILT-IN DELAY CIRCUIT HIGH-PRECISION VOLTAGE DETECTOR

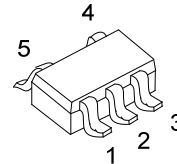
DESCRIPTION

The UTC **88NXX** is a high-precision voltage detector developed basing on CMOS technology. The detection voltage is fixed internally. A time delayed reset can be accomplished with an external capacitor. N-ch open-drain output form is available.

The UTC **88NXX** is generally used for power supply monitor of portable equipment such as notebook PCs, digital still cameras, PDAs, and mobile phones, constant voltage power monitor of cameras, video equipment and communication equipment, and power monitor or reset of CPUs and microcomputers.

FEATURES

- * Extremely Low Current Dissipation :
1.2 μ A Typ. (Detection Voltage \geq 1.5 V @ V_{DD} =3.5 V)
- * \pm 2.0 % Accuracy Detection Voltage
- * Hysteresis Characteristics: 5% TYP
- * Detection Voltage varies from 1.5V to 6.0V with 0.1V step
- * Output Forms: N-ch open-drain output (when it is in Active-Low)



SOT-25

ORDERING INFORMATION

| Ordering Number | Package | Packing |
|-----------------|---------|-----------|
| 88NXXG-AF5-R | SOT-25 | Tape Reel |

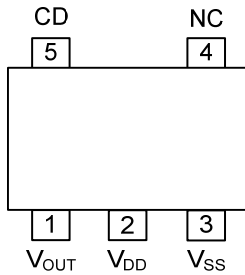
Note: XX: Output Voltage, refer to Marking Information.

| | | |
|--------------|------------------------|--------------------------------------|
| 88NXXG-AF5-R | (1)Packing Type | (1) R: Tape Reel |
| | (2)Package Type | (2) AF5: SOT-25 |
| | (3)Halogen Free | (3) G: Halogen Free |
| | (4)Output Voltage Code | (4) xx: Refer to Marking Information |

MARKING INFORMATION

| PACKAGE | VOLTAGE CODE | MARKING |
|---------|--------------------|---------|
| SOT-25 | 21:2.1V 29:2.9V | |

PIN CONFIGURATION

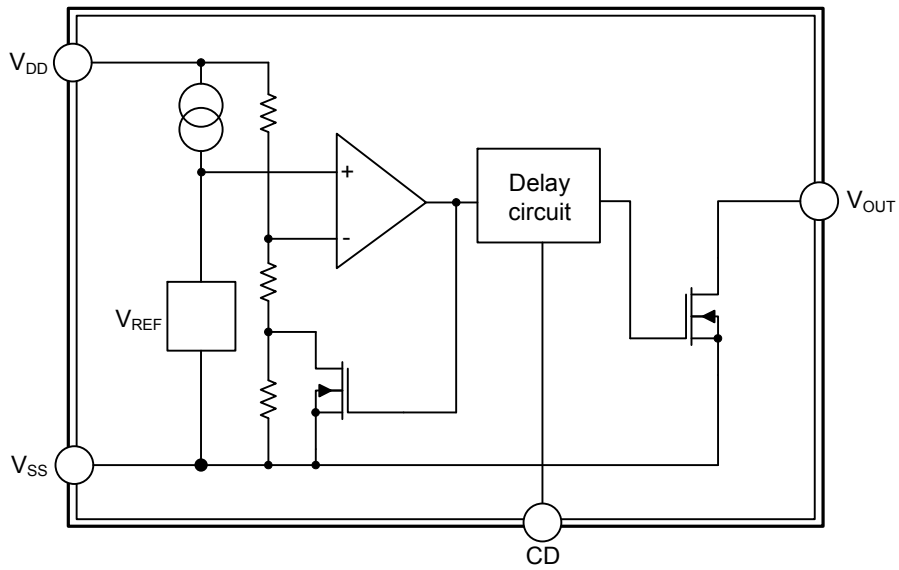


PIN DESCRIPTION

| PIN NO | PIN NAME | DESCRIPTION |
|--------|------------------|------------------------------------|
| 1 | V _{OUT} | Voltage Detection Output Pin |
| 2 | V _{DD} | Voltage Input Pin |
| 3 | V _{SS} | GND Pin |
| 4 | NC | No Connection (Note) |
| 5 | CD | Connection Pin For Delay Capacitor |

Note: The NC pin is electrically open and can be connected to V_{DD} or V_{SS}.

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING (Ta=25°C, unless otherwise specified)

| PARAMETER | SYMBOL | RATINGS | UNIT |
|-----------------------|-----------------------------------|---|------|
| Power Supply Voltage | V _{DD} - V _{SS} | 12 | V |
| CD pin Input Voltage | V _{CD} | V _{SS} -0.3 ~ V _{DD} +0.3 | V |
| Output Voltage | V _{OUT} | V _{SS} -0.3 ~ V _{SS} +12 | V |
| Output Current | I _{OUT} | 50 | mA |
| Power Dissipation | P _D | 250 | mW |
| Operating Temperature | T _{OPR} | -40 ~ +85 | °C |
| Storage Temperature | T _{STG} | -40 ~ +125 | °C |

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ ELECTRICAL CHARACTERISTICS (Ta=25°C unless otherwise specified)

Detection Voltage: 2.1V

| PARAMETER | SYMBOL | TEST CIRCUIT | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--|--|--------------|--|-------------------------------|----------------------------|-------------------------------|--------|
| Detection Voltage (Note 1) | -V _{DET} | 1 | | -V _{DET(S)} ×0.98 | -V _{DET(S)} | -V _{DET(S)} ×1.02 | V |
| Hysteresis Width | V _{HYS} | 1 | | -V _{DET} ×0.03 | -V _{DET} ×0.05 | -V _{DET} ×0.08 | V |
| Current Consumption | I _{SS} | 2 | V _{DD} =3.5 V | | 1.2 | 5 | μA |
| Operating Voltage | V _{DD} | 1 | | 0.95 | | 10.0 | V |
| Output Current | I _{OUT} | 3 | Output transistor Nch, V _{DS} =0.5V, V _{DD} =1.2V | 0.59 | 1.36 | | mA |
| Leakage Current | I _{LEAK} | 3 | Output transistor Nch, V _{DS} =10V, V _{DD} =10V | | | 0.1 | μA |
| Detection Voltage Temperature Coefficient (Note 2) | $\frac{\Delta - V_{DET}}{\Delta Ta \times -V_{DET}}$ | 1 | Ta=-40°C ~ +85°C | | ±100 | ±350 | ppm/°C |
| Delay Time | t _D | 4 | V _{DD} =3.5V, C _D =4.7 nF | 20 | 30 | 34 | ms |

Detection Voltage: 2.9V

| PARAMETER | SYMBOL | TEST CIRCUIT | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--|--|--------------|--|-------------------------------|----------------------------|-------------------------------|--------|
| Detection Voltage (Note 1) | -V _{DET} | 1 | | -V _{DET(S)} ×0.98 | -V _{DET(S)} | -V _{DET(S)} ×1.02 | V |
| Hysteresis Width | V _{HYS} | 1 | | -V _{DET} ×0.03 | -V _{DET} ×0.05 | -V _{DET} ×0.08 | V |
| Current Consumption | I _{SS} | 2 | V _{DD} =4.5 V | | 1.3 | 5 | μA |
| Operating Voltage | V _{DD} | 1 | | 0.95 | | 10.0 | V |
| Output Current | I _{OUT} | 3 | Output transistor Nch, V _{DS} =0.5V, V _{DD} =2.4V | 2.88 | 4.98 | | mA |
| Leakage Current | I _{LEAK} | 3 | Output transistor Nch, V _{DS} =10V, V _{DD} =10V | | | 0.1 | μA |
| Detection Voltage Temperature Coefficient (Note 2) | $\frac{\Delta - V_{DET}}{\Delta Ta \times -V_{DET}}$ | 1 | Ta=-40°C ~ +85°C | | ±100 | ±350 | ppm/°C |
| Delay Time | t _D | 4 | V _{DD} =4.5V, C _D =4.7 nF | 20 | 27 | 34 | ms |

Note: 1. -V_{DET}: Actual detection voltage

-V_{DET(S)}: Specified detection voltage

2. The temperature change ratio in the detection voltage [mV/°C] is calculated by using the following equation:

$$\frac{\Delta - V_{DET}}{\Delta Ta} [\text{mV}/^\circ\text{C}]^{(1)} = -V_{DET}(\text{Typ.})[\text{V}]^{(2)} \times \frac{\Delta - V_{DET}}{\Delta Ta \times -V_{DET}} [\text{ppm}/^\circ\text{C}]^{(3)} \div 1000$$

(1) Temperature change ratio of the detection voltage

(2) Specified detection voltage

(3) Detection voltage temperature coefficient

■ TEST CIRCUITS

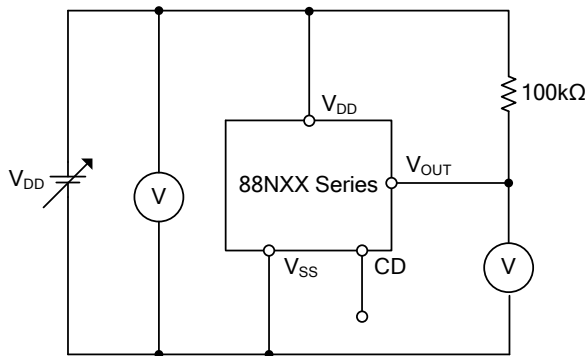


Figure 1

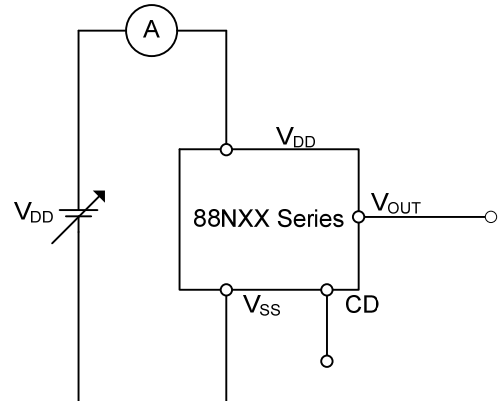


Figure 2

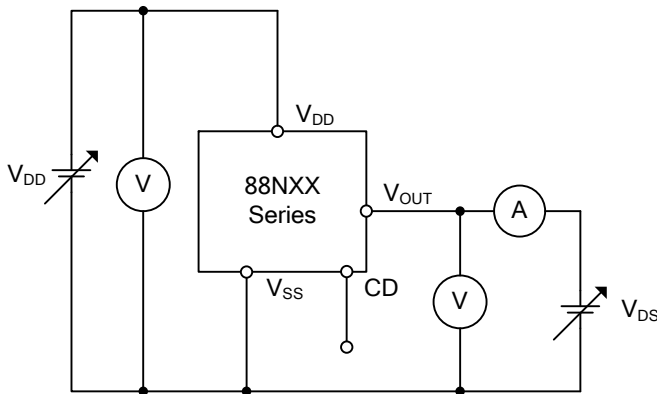


Figure 3

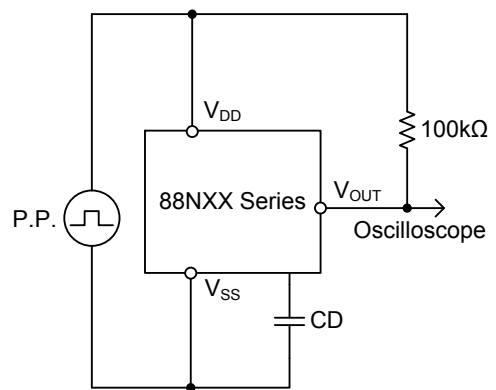


Figure 4

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