# VOLTAGE DETECTOR

## ■ GENERAL DESCRIPTION

The NJU7700/01 is a high precision and low quiescent current voltage detector.

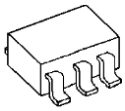
The detection voltage is internally fixed with an accuracy of 1.0%.

The NJU7700/01 are useful for preventing malfunction of microcomputer or DSP etc. through detect a drop in voltage of battery or power supply.

NJU7700 is Nch. Open Drain and NJU7701 is a C-MOS output type.

Small packaging makes NJU7700 and NJU7701 suitable for space conscious applications.

## ■ PACKAGE OUTLINE



NJU7700/01F

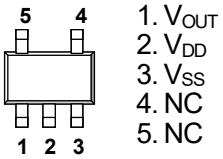
NJU7700/01F4

Discontinued

## ■ FEATURES

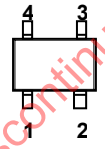
- High Precision Detection Voltage ±1.0%
- Low Quiescent Current 0.8μA typ. ($V_{DET}$ =3V version)
- Detection Voltage Range 1.3~6.0V(0.1V Step)
- Output Configuration NJU7700: Nch. Open Drain type
  NJU7701: C-MOS Output type
- CMOS Technology
- Package Outline SOT-23-5 : NJU7700/01F
  SC-82AB : NJU7700/01F4

## ■ PIN CONFIGURATION




1. $V_{OUT}$
2. $V_{DD}$
3. $V_{SS}$
4. NC
5. NC

NJU7700/01F

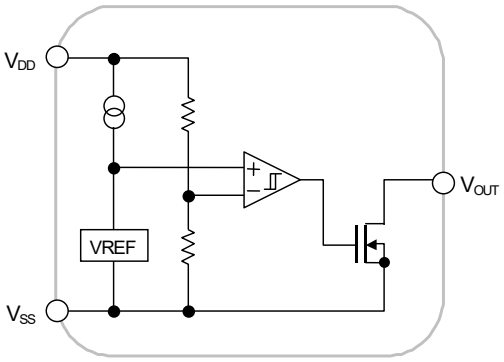



1. $V_{OUT}$
2. $V_{DD}$
3. NC
4. $V_{SS}$

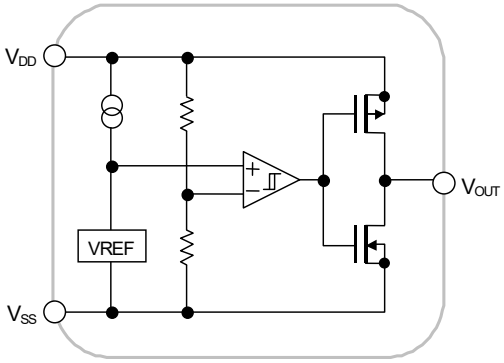
NJU7700/01F4

Discontinued

## ■ EQUIVALENT CIRCUIT




NJU7700




NJU7701

■ DETECTION VOLTAGE RANK LIST

| Device Name | $V_{DET}$ | Device Name | $V_{DET}$ | Device Name | $V_{DET}$ | Device Name | $V_{DET}$ |
|---|---|---|---|---|---|---|---|
| NJU770*F4-/F13 | 1.3V | NJU770*F4-/F23 | 2.3V | NJU770*F4-/F32 | 3.2V | NJU770*F4-/F43 | 4.3V |
| NJU770*F4-/F15 | 1.5V | NJU770*F4-/F24 | 2.4V | NJU770*F4-/F33 | 3.3V | NJU770*F4-/F44 | 4.4V |
| NJU770*F4-/F16 | 1.6V | NJU770*F4-/F25 | 2.5V | NJU770*F4-/F34 | 3.4V | NJU770*F4-/F45 | 4.5V |
| NJU770*F4-/F17 | 1.7V | NJU770*F4-/F26 | 2.6V | NJU770*F4-/F35 | 3.5V | NJU770*F4-/F47 | 4.7V |
| NJU770*F4-/F18 | 1.8V | NJU770*F4-/F27 | 2.7V | NJU770*F4-/F36 | 3.6V | NJU770*F4-/F05 | 5.0V |
| NJU770*F4-/F19 | 1.9V | NJU770*F4-/F28 | 2.8V | NJU770*F4-/F38 | 3.8V | NJU770*F4-/F52 | 5.2V |
| NJU770*F4-/F02 | 2.0V | NJU770*F4-/F29 | 2.9V | NJU770*F4-/F39 | 3.9V | NJU770*F4-/F55 | 5.5V |
| NJU770*F4-/F21 | 2.1V | NJU770*F4-/F03 | 3.0V | NJU770*F4-/F04 | 4.0V | NJU770*F4-/F06 | 6.0V |
| NJU770*F4-/F22 | 2.2V | NJU770*F4-/F31 | 3.1V | NJU770*F4-/F42 | 4.2V | | |

■ NJU7700

■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

| PARAMETER | SYMBOL | RATINGS | | UNIT |
|---|---|---|---|---|
| Input Voltage | $V_{DD}$ | +10 | | V |
| Output Voltage | $V_{OUT}$ | $V_{SS}$-0.3~+10 | | V |
| Output Current | $I_{OUT}$ | 50 | | mA |
| Power Dissipation | $P_D$ | F : SOT-23-5 | 200(*1) | mW |
| | | F4 : SC-82AB | 250(*2) | |
| Operating Temperature | Topr | –40 ~ +85 | | °C |
| Storage Temperature | Tstg | –40 ~ +125 | | °C |

(*1) : Device itself

(*2) : Mounted on glass epoxy board based on EIA/JEDEC. (114.3x76.2x1.6mm: 2Layers)

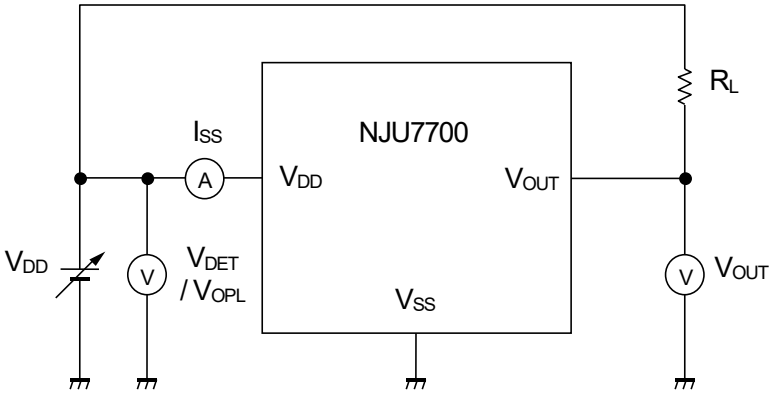
■ ELECTRICAL CHARACTERISTICS (Ta=25°C)

| PARAMETER | SYMBOL | TEST CONDITION | | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| Detection Voltage | $V_{DET}$ | | | -1.0% | – | +1.0% | V |
| Hysteresis Voltage | $V_{HYS}$ | | | $V_{DET}$ ×0.03 | $V_{DET}$ ×0.05 | $V_{DET}$ ×0.08 | V |
| Quiescent Current | $I_{SS}$ | $V_{DD}$=$V_{DET}$+1V | $V_{DET}$=1.3V~1.7V Version | – | 0.5 | 1.0 | µA |
| | | | $V_{DET}$=1.8V~6.0V Version | – | 0.8 | 1.6 | µA |
| Output Current | $I_{OUT}$ | Nch,$V_{DS}$=0.5V | $V_{DD}$=1.2V | 0.75 | 2.0 | – | mA |
| | | | $V_{DD}$=2.4V (≥2.7V Version) | 4.5 | 7.0 | – | mA |
| Output Leak Current | $I_{LEAK}$ | $V_{DD}$=$V_{OUT}$=9V | | – | – | 0.1 | µA |
| Detection Voltage Temperature Coefficient | $\Delta V_{DET}/\Delta Ta$ | Ta=0 ~ +85°C | | – | ±100 | – | ppm/°C |
| Operating Voltage(*3) | $V_{DD}$ | $R_L$=100kΩ | | 0.8 | – | 9 | V |

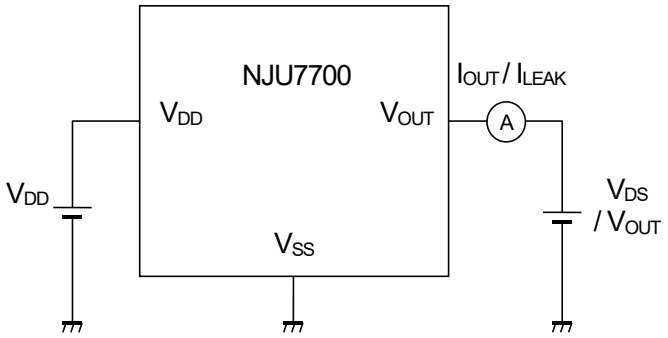
(*3): The minimum Operating Voltage($V_{OPL}$) indicates the same value of the input voltage($V_{DD}$) on condition that $V_{OUT}$ becomes 10% or less of the input voltage($V_{DD}$).

## ■ TEST CIRCUIT

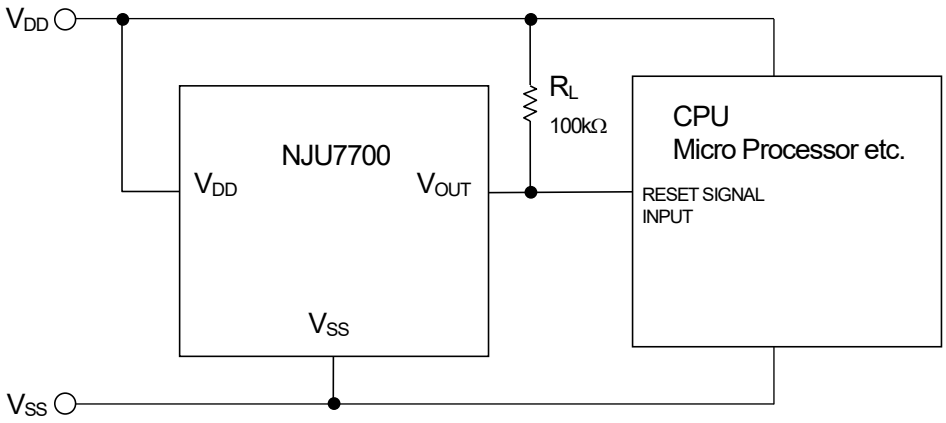
### ① COMMOM TEST CIRCUIT




### ② OUTPUT CURRENT/OUTPUT LEAK CURRENT TEST CIRCUIT




## ■ TYPICAL APPLICATION



## ■ NJU7701

### ■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

| PARAMETER | SYMBOL | RATINGS | | UNIT |
|---|---|---|---|---|
| Input Voltage | $V_{DD}$ | +10 | | V |
| Output Voltage | $V_{OUT}$ | $V_{SS}$-0.3 ~ $V_{DD}$+0.3 | | V |
| Output Current | $I_{OUT}$ | 50 | | mA |
| Power Dissipation | $P_D$ | F : SOT-23-5 | 200(*4) | mW |
| | | F4 : SC-82AB | 250(*5) | |
| Operating Temperature | Topr | –40 ~ +85 | | °C |
| Storage Temperature | Tstg | –40 ~ +125 | | °C |

(*4) : Device itself

(*5) : Mounted on glass epoxy board based on EIA/JEDEC. (114.3x76.2x1.6mm: 2Layers)

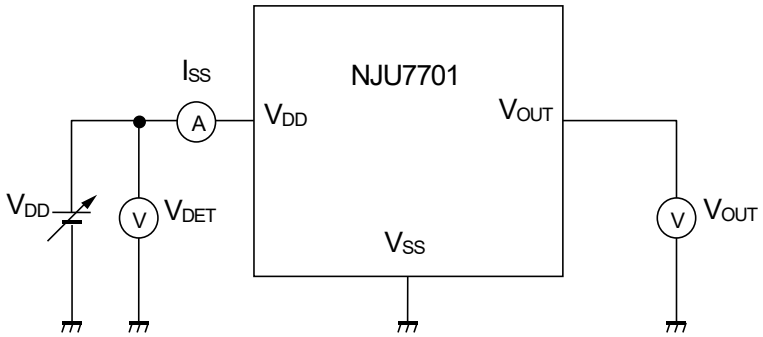
### ■ ELECTRICAL CHARACTERISTICS (Ta=25°C)

| PARAMETER | SYMBOL | TEST CONDITION | | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| Detection Voltage | $V_{DET}$ | | | -1.0% | – | +1.0% | V |
| Hysteresis Voltage | $V_{HYS}$ | | | $V_{DET}$ ×0.03 | $V_{DET}$ ×0.05 | $V_{DET}$ ×0.08 | V |
| Quiescent Current | $I_{SS}$ | $V_{DD}$=$V_{DET}$+1V | $V_{DET}$=1.3V~1.7V Version | – | 0.5 | 1.0 | µA |
| | | | $V_{DET}$=1.8V~6.0V Version | – | 0.8 | 1.6 | µA |
| Output Current | $I_{OUT}$ | Nch,$V_{DS}$=0.5V | $V_{DD}$=1.2V | 0.75 | 2.0 | – | mA |
| | | | $V_{DD}$=2.4V (≥2.7V Version) | 4.5 | 7.0 | – | mA |
| | | Pch,$V_{DS}$=0.5V | $V_{DD}$=4.8V (≤3.9V Version) | 2.0 | 3.5 | – | mA |
| | | | $V_{DD}$=6.0V (4.0V~5.6V Version) | 2.5 | 4.0 | – | mA |
| | | | $V_{DD}$=8.4V (≥5.7V Version) | 3.0 | 5.0 | – | mA |
| Detection Voltage Temperature Coefficient | $\Delta V_{DET}/\Delta Ta$ | Ta=0 ~ +85°C | | – | ±100 | – | ppm/°C |
| Operating Voltage(*6) | $V_{DD}$ | $R_L$=100kΩ | | 0.8 | – | 9 | V |

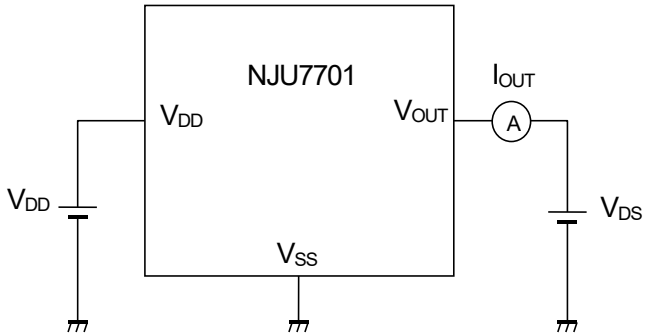
(*6): The minimum Operating Voltage($V_{OPL}$) indicates the same value of the input voltage($V_{DD}$) on condition that $V_{OUT}$ becomes 10% or less of the input voltage($V_{DD}$).

■ TEST CIRCUIT

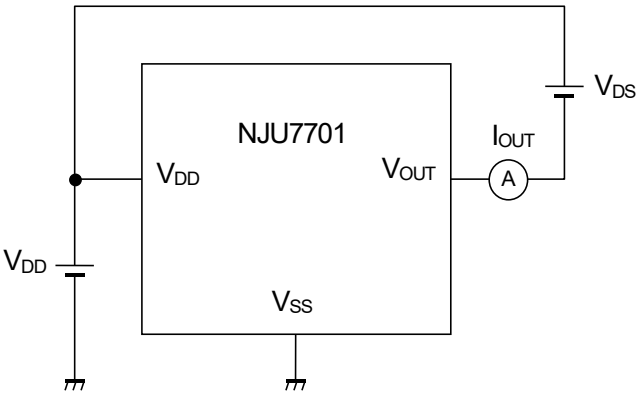
① COMMON TEST CIRCUIT



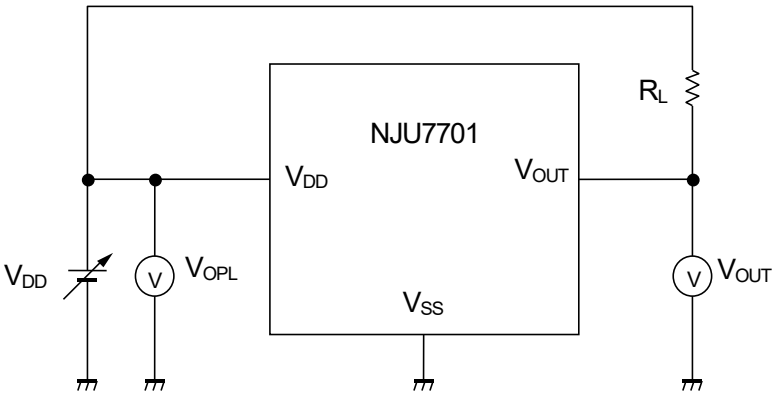

② Nch OUTPUT CURRENT TEST CIRCUIT



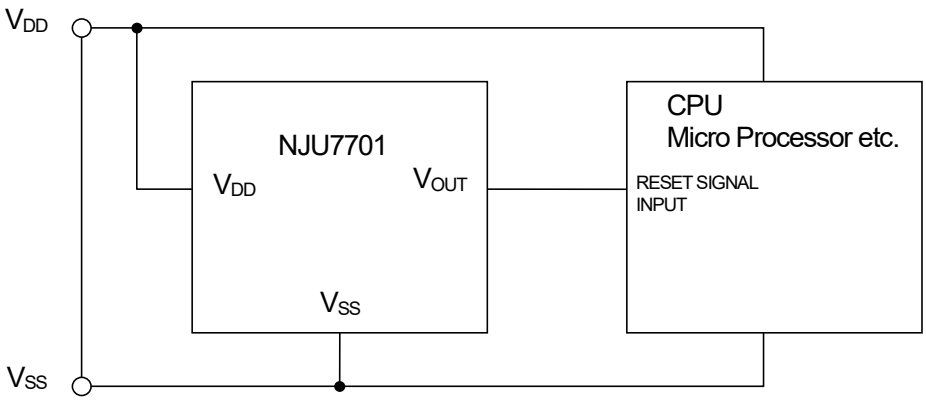

③ Pch OUTPUT CURRENT TEST CIRCUIT



④ MINUMUM OPERATING VOLTAGE TEST CIRCUIT

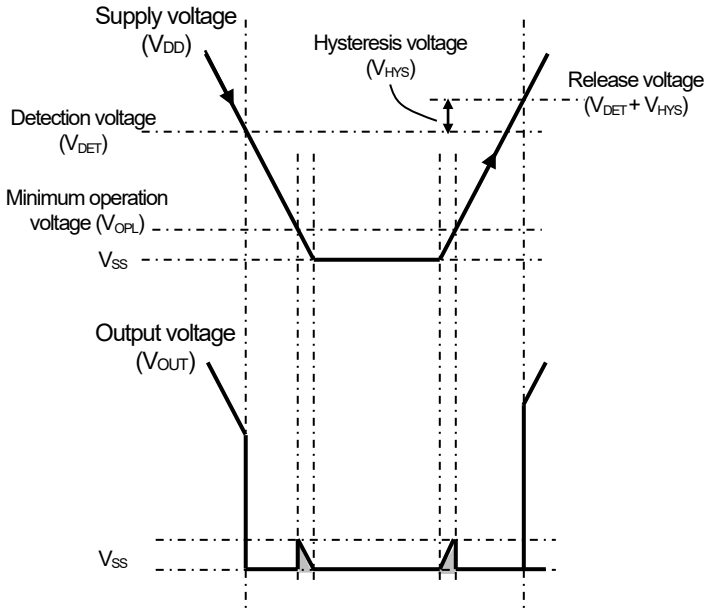



■ TYPICAL APPLICATION



■ FUNCTIONAL DESCRIPTION

(1) Basic operation




(1) When supply voltage($V_{DD}$) drops below detection voltage($V_{DET}$), Output voltage($V_{OUT}$) changes "H" to "L" to alert reset state.

(2) The reset state is kept while $V_{DD}$ is lower than release voltage. The release voltage is a sum of $V_{DET}$ and Hysterisis voltage ($V_{HYS}$). Please refer to the (*7) below.

(3) When $V_{DD}$ becomes higher than the release voltage, then $V_{OUT}$ changes from "L" to "H" to resume normal state.

(*7) $V_{HYS}$ is to avoid unstable $V_{OUT}$ state caused by rapid voltage change at nearby $V_{DET}$.

(*8): C-MOS output product (NJU7701) : When $V_{DD}$ less than $V_{OPL}$, $V_{OUT}$ is free of the shaded region.

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    Note that such delivery or refund is sole and exclusive remedies to your company for the defective product.
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