

## VOLTAGE DETECTOR

### ■ GENERAL DESCRIPTION

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

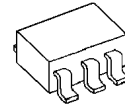
The detection voltage is internally fixed with an accuracy of 1.0%.

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

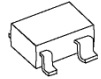
NJU7700 is Nch. Open Drain and NJU7701 is a C-MOS output type.

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

### ■ PACKAGE OUTLINE



NJU7700/01F

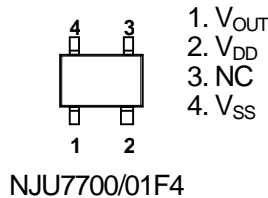
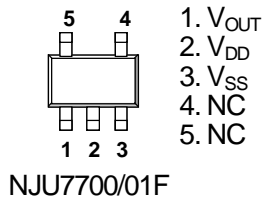


NJU7700/01F4

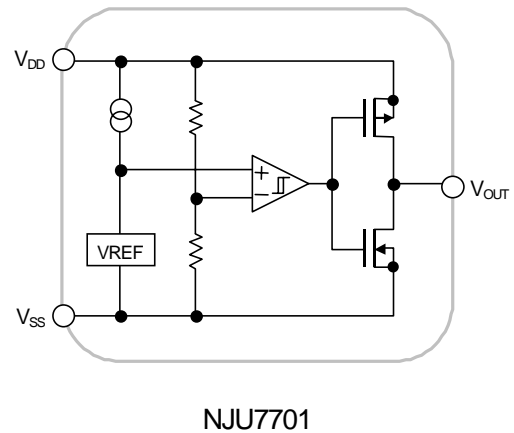
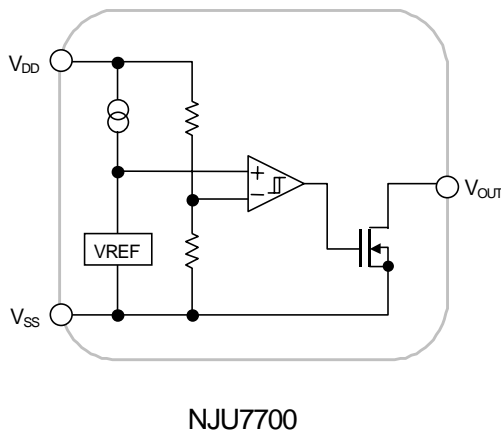
### ■ FEATURES

- High Precision Detection Voltage  $\pm 1.0\%$
- Low Quiescent Current  $0.8\mu\text{A}$  typ. ( $V_{\text{DET}} = 3\text{V}$  version)
- Detection Voltage Range  $1.3\text{--}6.0\text{V}$  (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



### ■ EQUIVALENT CIRCUIT



# NJU7700/01

## ■ DETECTION VOLTAGE RANK LIST

Device Name	V <sub>DET</sub>	Device Name	V <sub>DET</sub>	Device Name	V <sub>DET</sub>	Device Name	V <sub>DET</sub>
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 <sub>DD</sub>	+10	V
Output Voltage	V <sub>OUT</sub>	V <sub>SS</sub> -0.3~+10	V
Output Current	I <sub>OUT</sub>	50	mA
Power Dissipation	P <sub>D</sub>	F : SOT-23-5	200(*1)
		F4 : SC-82AB	250(*2)
Operating Temperature	T <sub>opr</sub>	-40 ~ +85	°C
Storage Temperature	T <sub>stg</sub>	-40 ~ +125	°C

(\*1) : Device itself

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

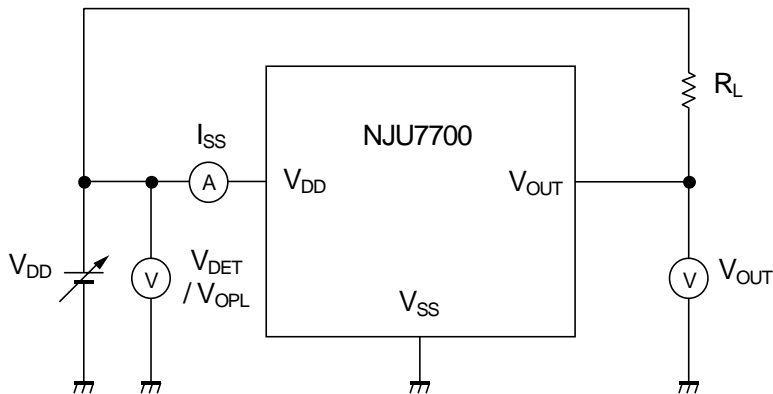
### ■ ELECTRICAL CHARACTERISTICS (Ta=25°C)

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

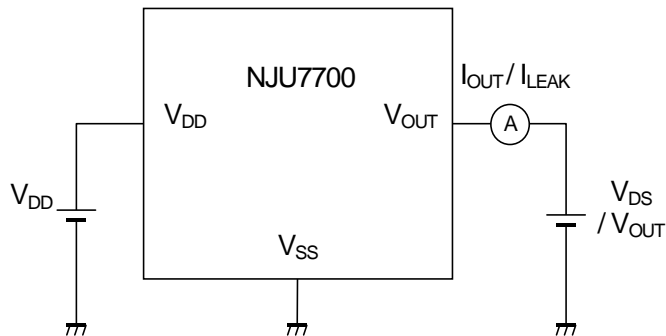
(\*3): The minimum Operating Voltage(V<sub>OP1</sub>) indicates the same value of the input voltage(V<sub>DD</sub>) on condition that V<sub>OUT</sub> becomes 10% or less of the input voltage(V<sub>DD</sub>).

## ■ TEST CIRCUIT

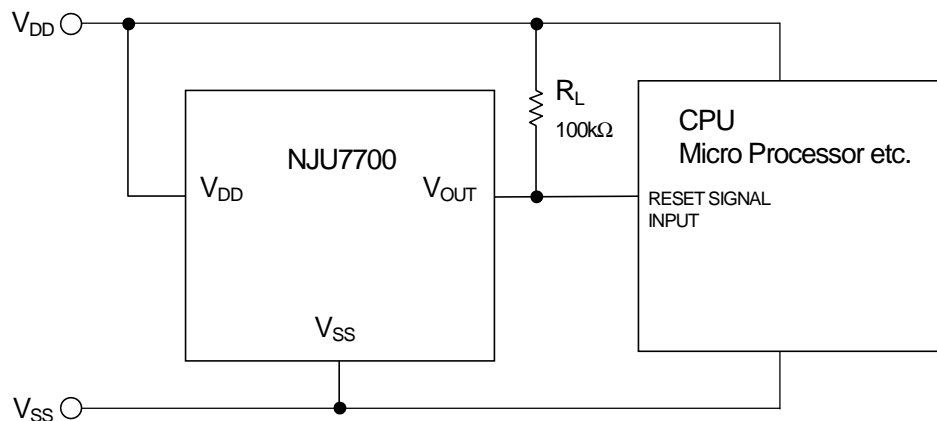
### ① COMMON TEST CIRCUIT



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



## ■ TYPICAL APPLICATION



# NJU7700/01

## ■ NJU7701

### ■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS		UNIT
Input Voltage	$V_{DD}$	+10		V
Output Voltage	$V_{OUT}$	$V_{SS}-0.3 \sim V_{DD}+0.3$		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	$T_{opr}$	-40 ~ +85		°C
Storage Temperature	$T_{stg}$	-40 ~ +125		°C

(\*4) : Device itself

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

### ■ ELECTRICAL CHARACTERISTICS

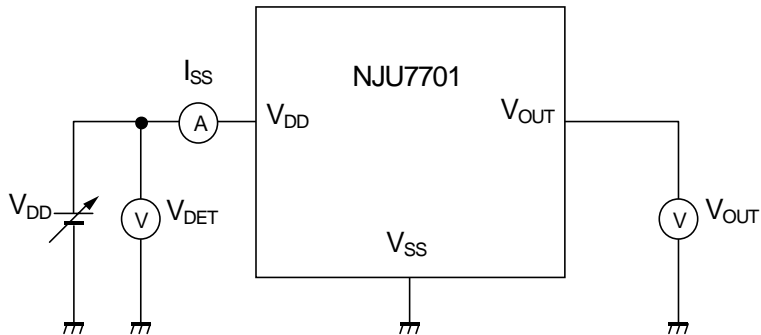
(Ta=25°C)

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

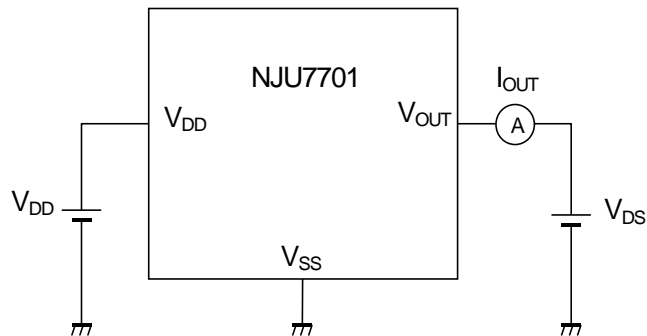
(\*6): The minimum Operating Voltage( $V_{OPL}$ ) indicates the same value of the input voltage( $V_{DD}$ ) on condition that  $V_{OUT}$  becomes 10% or less of the input voltage( $V_{DD}$ ).

## ■ TEST CIRCUIT

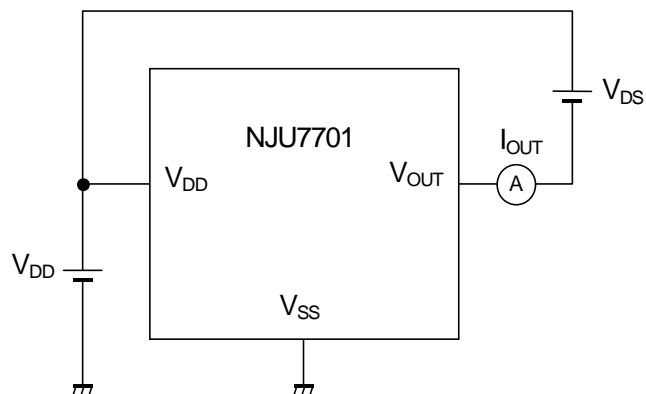
### ① COMMON TEST CIRCUIT



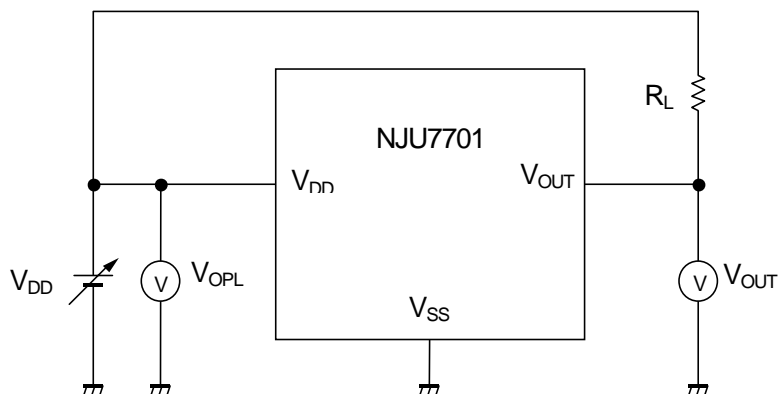
### ② Nch OUTPUT CURRENT TEST CIRCUIT



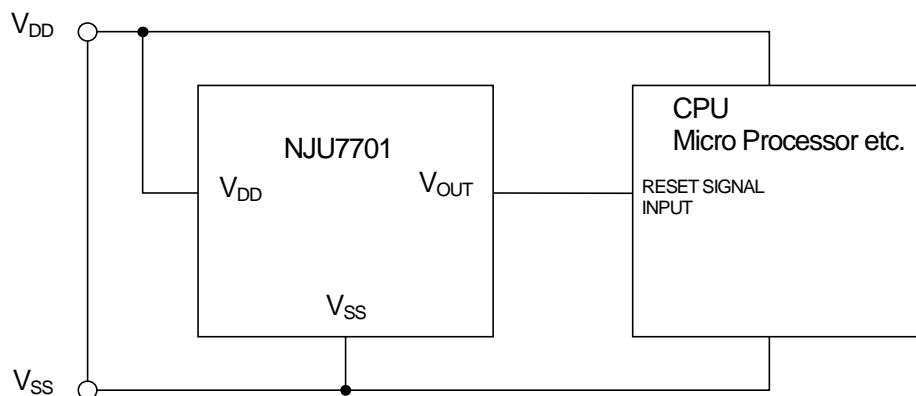
### ③ Pch OUTPUT CURRENT TEST CIRCUIT



## ④ MINIMUM OPERATING VOLTAGE TEST CIRCUIT

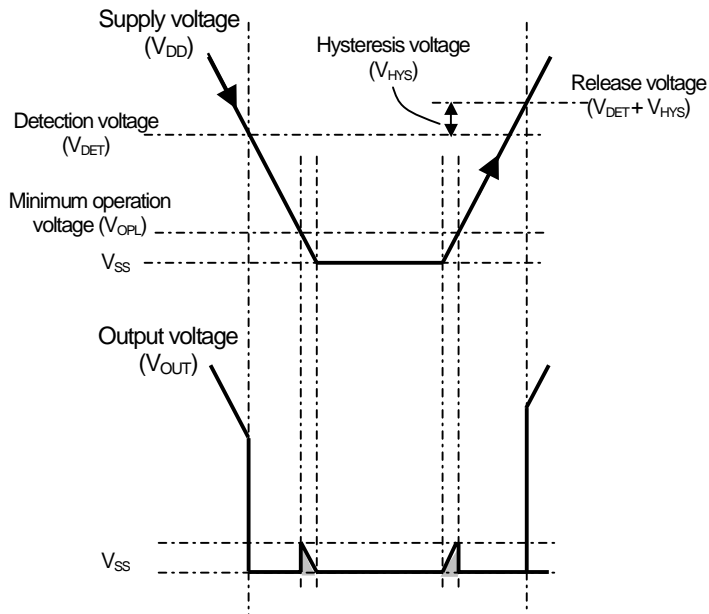


## ■ TYPICAL APPLICATION



## 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.

**[CAUTION]**

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