

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

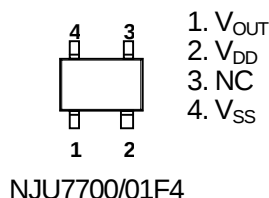
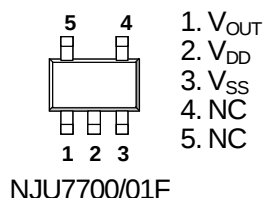


NJU7700/01F4

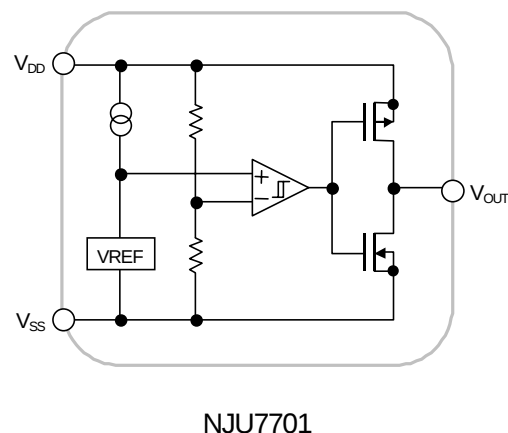
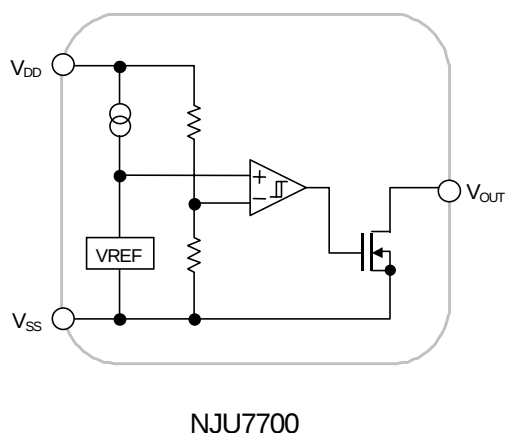
■ FEATURES

- 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 _{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)

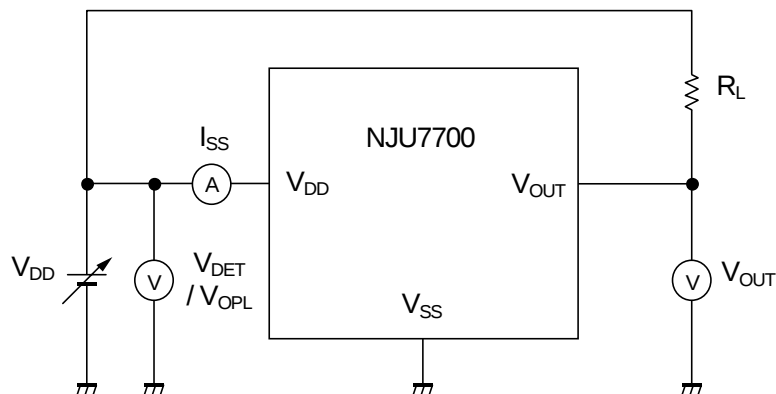
■ ELECTRICAL CHARACTERISTICS (Ta=25°C)

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	Δ V _{DET} /ΔTa	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_{OP1}) 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

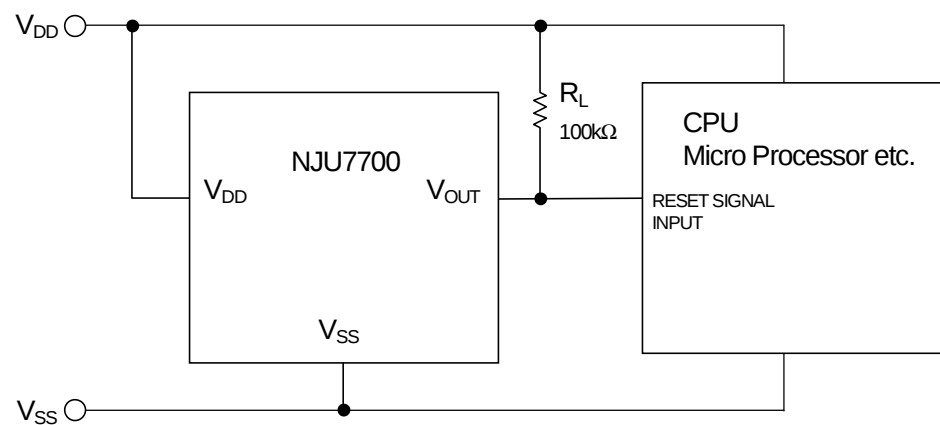
① COMMON TEST CIRCUIT



② 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

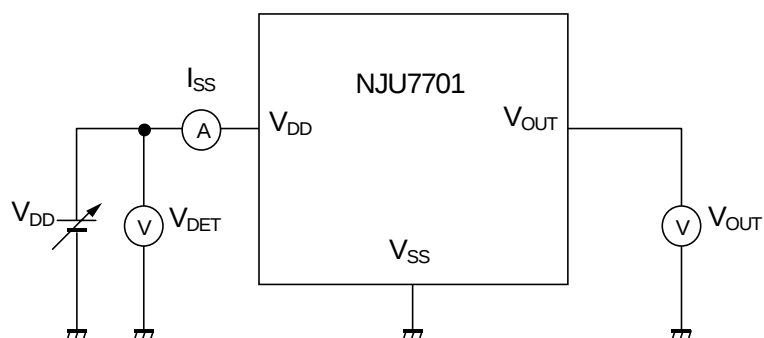
(Ta=25°C)

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	μA
			$V_{DET}=1.8V \sim 6.0V$ Version	—	0.8	1.6	μA
Output Current	I_{OUT}	Nch, $V_{DS}=0.5V$	$V_{DD}=1.2V$	0.75	2.0	—	mA
			$V_{DD}=2.4V$ ($\geq 2.7V$ 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	$\Delta V_{DET} / \Delta T_a$	$T_a=0 \sim +85^\circ C$		—	± 100	—	ppm/°C
Operating Voltage(*6)	V_{DD}	$R_L=100k\Omega$		0.8	—	9	V

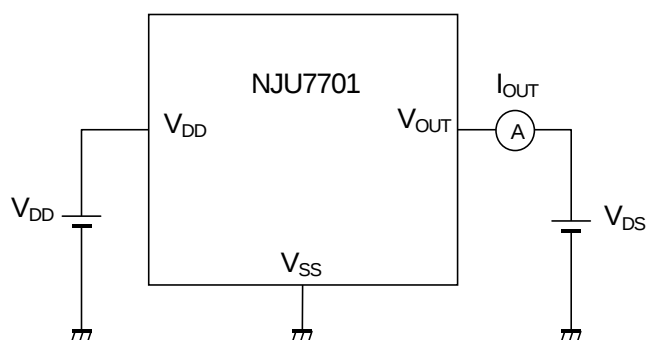
(*6): The minimum Operating Voltage(V_{OPL}) indicates the same value of the input voltage(V_{DD}) on condition that V_{OUT} becomes 10% or less of the input voltage(V_{DD}).

■ TEST CIRCUIT

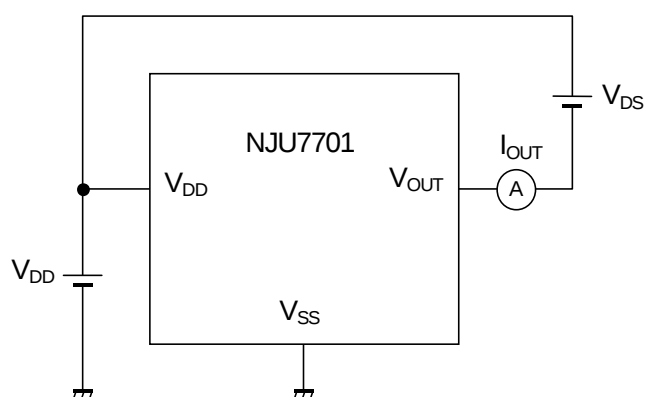
① COMMON TEST CIRCUIT



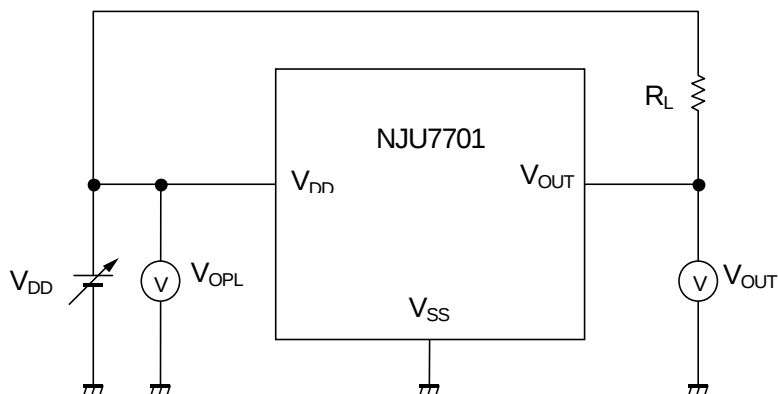
② Nch OUTPUT CURRENT TEST CIRCUIT



③ Pch OUTPUT CURRENT TEST CIRCUIT



④ MINIMUM OPERATING VOLTAGE TEST CIRCUIT

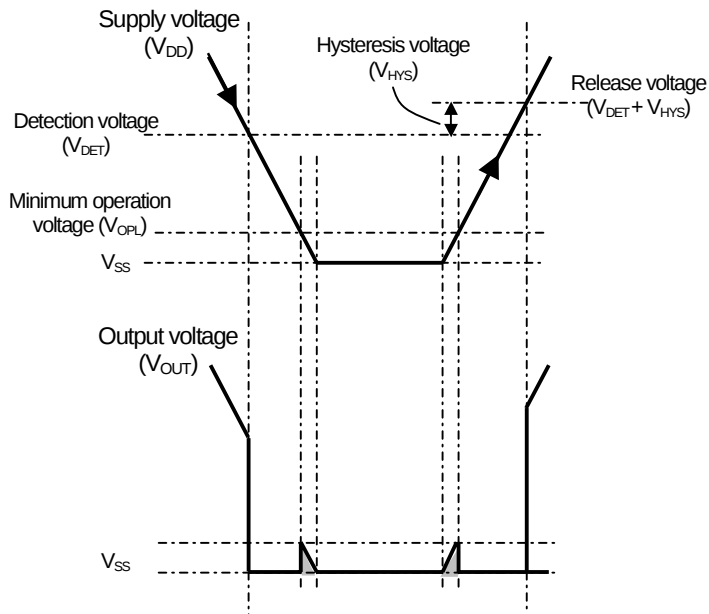


■ TYPICAL APPLICATION



■ 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 Hysteresis 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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