

VOLTAGE DETECTOR

■ GENERAL DESCRIPTION

The NJU7702/03 is a high precision and low quiescent current voltage detector.

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

The NJU7702/03 are useful for preventing malfunction of microcomputer or DSP etc. through detect a drop in voltage of battery or power supply.

NJU7702 is Nch. Open Drain and NJU7703 is a C-MOS output type.

Small packaging makes NJU7702 and NJU7703 suitable for space conscious applications.

■ PACKAGE OUTLINE



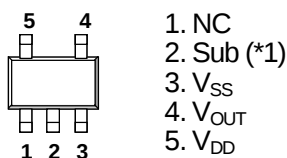
NJU7702/03F

■ 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 $1.3\sim 6.0\text{V}(0.1\text{V Step})$
- Output Configuration
NJU7702: Nch. Open Drain type
NJU7703: C-MOS Output type
- CMOS Technology
- Package Outline SOT-23-5

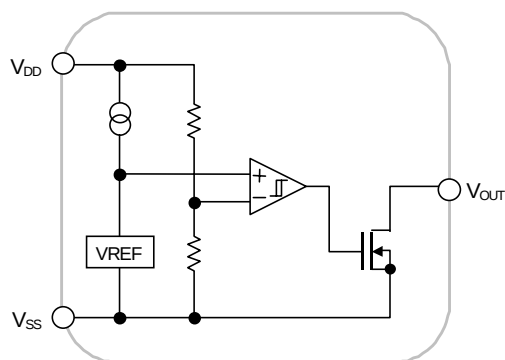
■ PIN CONFIGURATION

NJU7702/03F

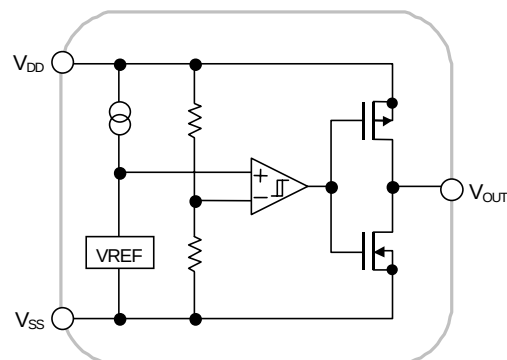


(*1): Connect Sub terminal to GND.

■ EQUIVALENT CIRCUIT



NJU7702



NJU7703

NJU7702/03

■ DETECTION VOLTAGE RANK LIST

3Device Name	V _{DET}
NJU7702/03F13	1.3V
NJU7702/03F27	2.7V
NJU7702/03F28	2.8V
NJU7702/03F03	3.0V
NJU7702/03F31	3.1V
NJU7702/03F42	4.2V
NJU7702/03F06	6.0V

■ NJU7702

■ 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	200(*2)	mW
Operating Temperature	Topr	-40 ~ +85	°C
Storage Temperature	Tstg	-40 ~ +125	°C

(*2) : Device itself

■ ELECTRICAL CHARACTERISTICS

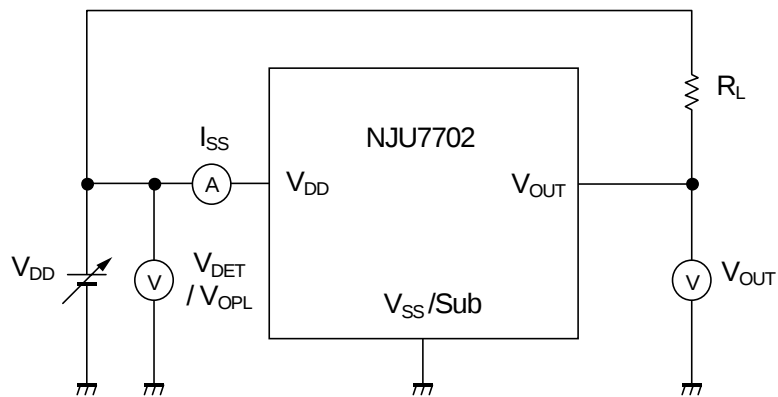
(Ta=25°C)

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

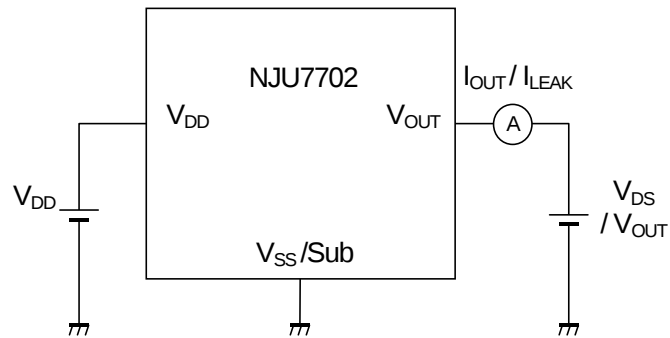
(*3): The minimum Operating Voltage(V_{OPL}) indicates the same value of the input voltage(V_{DD}) on condition that V_{OUT} becomes 10% or less of the input voltage(V_{DD}).

■ TEST CIRCUIT

① COMMON TEST CIRCUIT

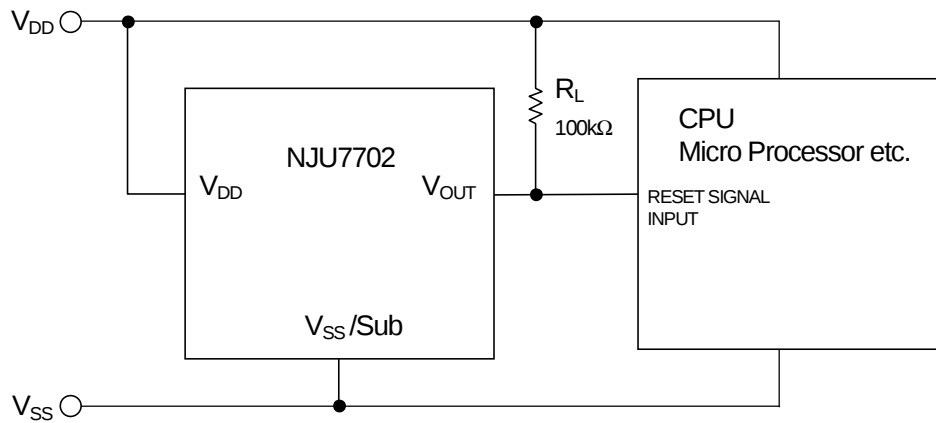


② OUTPUT CURRENT/OUTPUT LEAK CURRENT TEST CIRCUIT

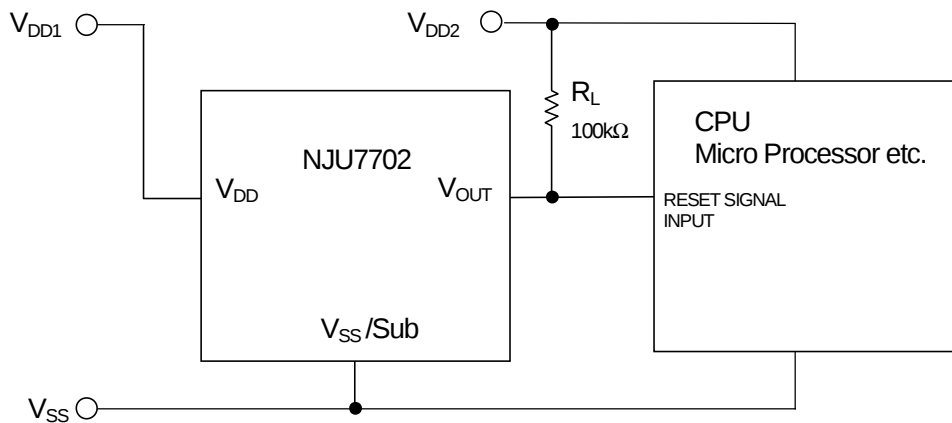


■ TYPICAL APPLICATION

① In case of using one power supply.



② In case of using two power supply.



■ NJU7703

■ 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	200(*4)	mW
Operating Temperature	T_{opr}	-40 ~ +85	°C
Storage Temperature	T_{stg}	-40 ~ +125	°C

(*4) : Device itself

■ ELECTRICAL CHARACTERISTICS

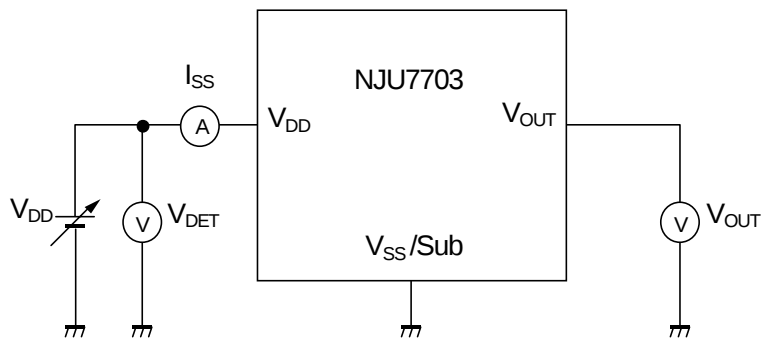
(Ta=25°C)

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	Δ V _{DET} /ΔTa	Ta=0 ~ +85°C		—	±100	—	ppm/°C
Operating Voltage (*5)	V _{DD}	R _L =100kΩ		0.8	—	9	V

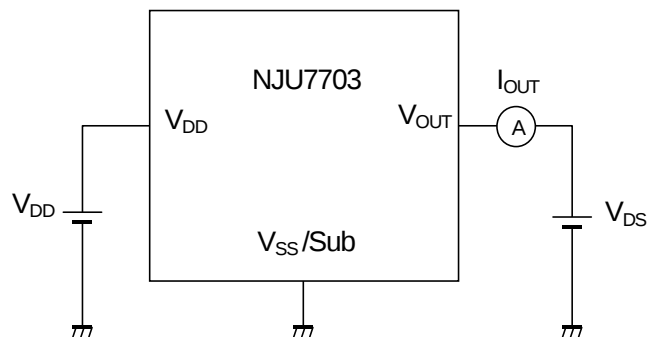
(*5): The minimum Operating Voltage(V_{OPL}) indicates the same value of the input voltage(V_{DD}) on condition that V_{OUT} becomes 10% or less of the input voltage(V_{DD}).

■ TEST CIRCUIT

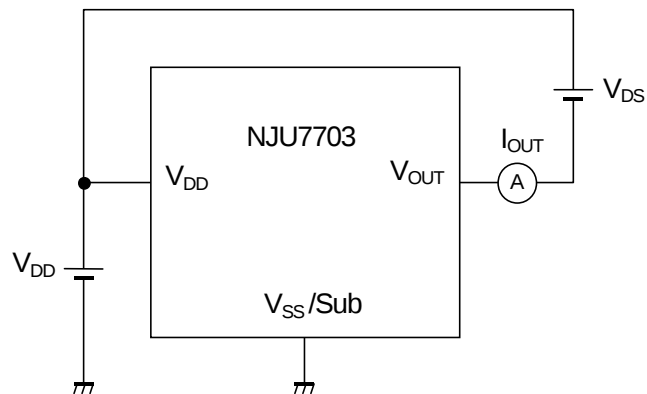
① COMMON TEST CIRCUIT



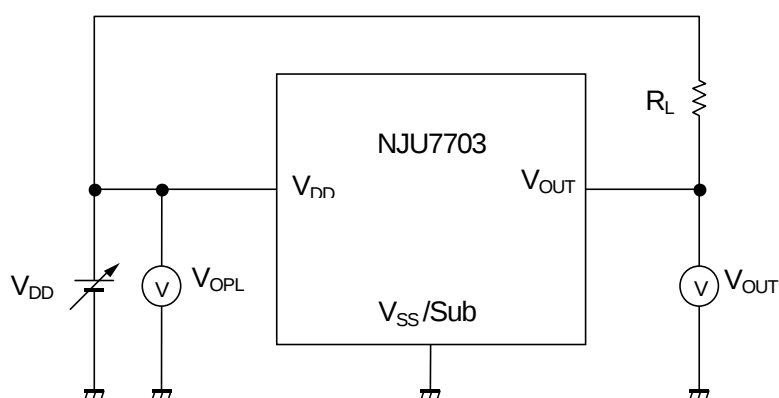
② Nch OUTPUT CURRENT TEST CIRCUIT



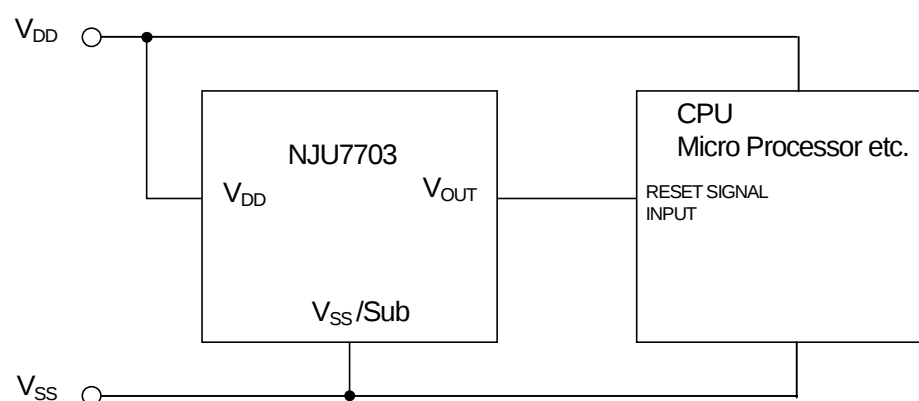
③ Pch OUTPUT CURRENT TEST CIRCUIT



④ MINIMUM OPERATING VOLTAGE TEST CIRCUIT

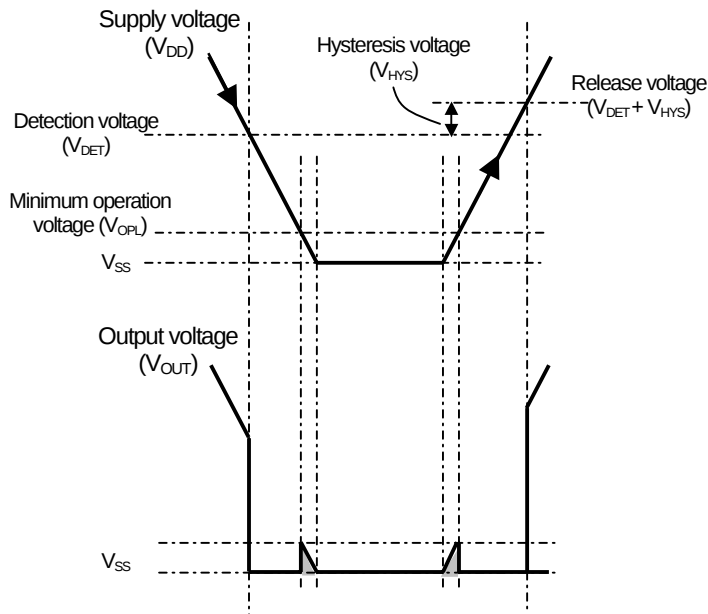


■ TYPICAL APPLICATION



■ 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 (NJU7703) : When V_{DD} less than V_{OPL} , V_{OUT} is free of the shaded region.

[CAUTION]

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