

VOLTAGE DETECTOR

■ GENERAL DESCRIPTION

The NJU7704/05 is a low quiescent current voltage detector featuring high precision detection voltage.

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

The NJU7704/05 are useful for preventing malfunction of microcomputer or DSP etc. through detect a drop in voltage of battery or power supply.

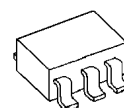
The delay function achieves set wait time when supply voltage is unstable. Moreover, the delay function can make a sequence that other devices in application work and stabilize before microcomputer or DSP works.

Delay time can be set by an external capacitor. Manual reset function can output reset signal irrespective of detection voltage.

NJU7704 is Nch. Open Drain and NJU7705 is a C-MOS output type.

Small packaging makes NJU7704 and NJU7705 suitable for space conscious applications.

■ PACKAGE OUTLINE



NJU7704/05F

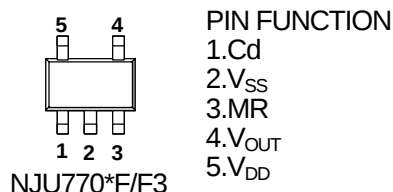


NJU7704/05F3

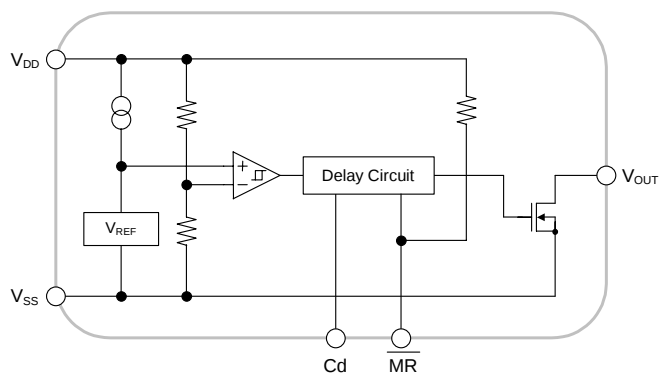
■ FEATURES

- High Precision Detection Voltage $\pm 1.0\%$
- Low Quiescent Current $0.9\mu\text{A typ.}$
- Detection Voltage Range $1.5\sim 6.0\text{V}(0.1\text{V Step})$
- Adjustable delay time with external capacitor
- Manual Reset
Active "L" : NJU770****A
Active "H" : NJU770****B
- Output Configuration
NJU7704: Nch. Open Drain type
NJU7705: C-MOS Output type
- Package Outline
SOT-23-5: NJU770*F
SC88A : NJU770*F3

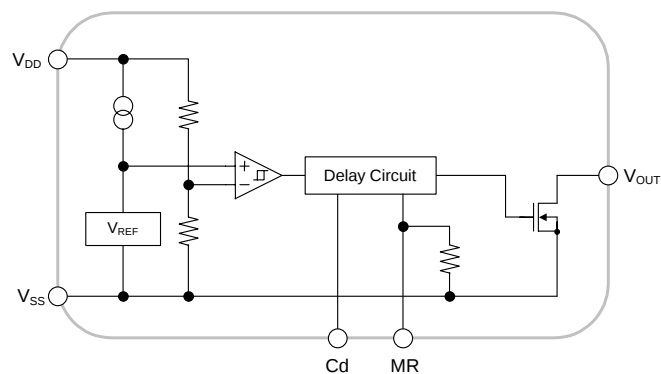
■ PIN CONFIGURATION



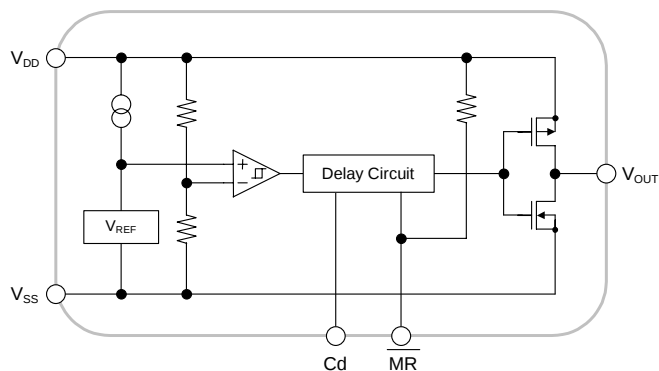
■ EQUIVALENT CIRCUIT



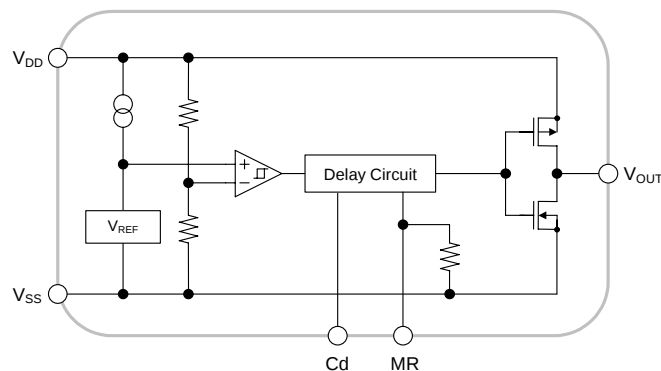
NJU7704***A



NJU7704F**B



NJU7705***A



NJU7705***B

■ DETECTION VOLTAGE RANK LIST

Device Name	V _{DET}	MR Logic
NJU770*F3-/F15A	1.5V	Active "L"
NJU770*F3-/F19A	1.9V	
NJU770*F3-/F02A	2.0V	
NJU770*F3-/F21A	2.1V	
NJU770*F3-/F22A	2.2V	
NJU770*F3-/F23A	2.3V	
NJU770*F3-/F25A	2.5V	
NJU770*F3-/F27A	2.7V	
NJU770*F3-/F28A	2.8V	
NJU770*F3-/F29A	2.9V	
NJU770*F3-/F03A	3.0V	
NJU770*F3-/F32A	3.2V	
NJU770*F3-/F39A	3.9V	
NJU770*F3-/F42A	4.2V	
NJU770*F3-/F43A	4.3V	
NJU770*F3-/F44A	4.4V	
NJU770*F3-/F45A	4.5V	
NJU770*F3-/F48A	4.8V	
NJU770*F3-/F06A	6.0V	
NJU770*F3-/F19B	1.9V	Active "H"
NJU770*F3-/F27B	2.7V	
NJU770*F3-/F28B	2.8V	
NJU770*F3-/F03B	3.0V	
NJU770*F3-/F42B	4.2V	

■ NJU7704

■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{DD}	+10	V
Output Voltage	V_{OUT}	$V_{SS}-0.3 \sim +10$	V
Input Voltage of Cd pin	V_{Cd}	$V_{SS}-0.3 \sim V_{DD}+0.3$	V
Input Voltage of MR pin	V_{MR}	$V_{SS}-0.3 \sim V_{DD}+0.3$	V
Output Current	I_{OUT}	50	mA
Power Dissipation	P_D	SOT-23-5	350(*1)
			200(*2)
		SC88A	250(*1)
Operating Temperature	T_{opr}	-40 ~ +85	°C
Storage Temperature	T_{stg}	-40 ~ +125	°C

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

(*2) : Device itself

■ ELECTRICAL CHARACTERISTICS

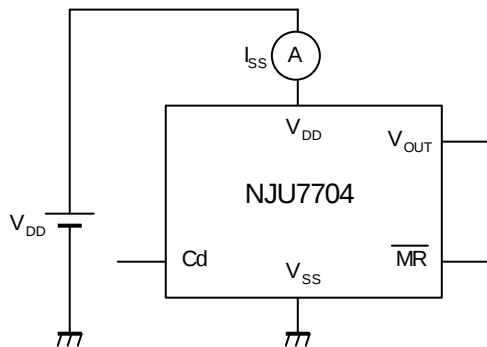
(Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Detection Voltage	V_{DET}		-1.0%	-	+1.0%	V
Hysteresis Voltage	V_{HYS}		70	90	130	mV
Quiescent Current	I_{SS}	$V_{DD}=V_{DET}+1V$	$V_{DET}=1.5V \sim 1.9V$ Version	0.7	1.5	μA
			$V_{DET}=2.0V \sim 6.0V$ Version	0.9	2.0	
Output Current	I_{OUT}	$N_{ch}, V_{DS}=0.5V$	$V_{DD}=1.2V$	0.75	2.0	mA
			$V_{DD}=2.4V$ ($\geq 2.7V$ Version)	4.5	7.0	
Output Leak Current	I_{LEAK}	$V_{DD}=V_{OUT}=9V$	-	-	0.1	μA
Detection Voltage Temperature Coefficient	$\Delta V_{DET} / \Delta T_a$	$T_a=0 \sim +85^\circ C$	-	± 100	-	ppm/°C
Delay Time	t_d	$V_{DD}=V_{DET}+1V, C_d=4.7nF$	8	10	12	ms
Input Voltage of MR pin (Active "L")	V_{MR_H}		1.5	-	V_{DD}	V
	V_{MR_L}		0	-	0.3	
Input Voltage of MR pin (Active "H")	V_{MR_H}		$V_{DD}-0.3$	-	V_{DD}	V
	V_{MR_L}		0	-	$V_{DD}-1.5$	
Impedance of MR pin	R_{MR}		1.0	2.0	3.0	M Ω
Operating Voltage (*3)	V_{DD}	$R_L=100k\Omega$	0.8	-	9	V

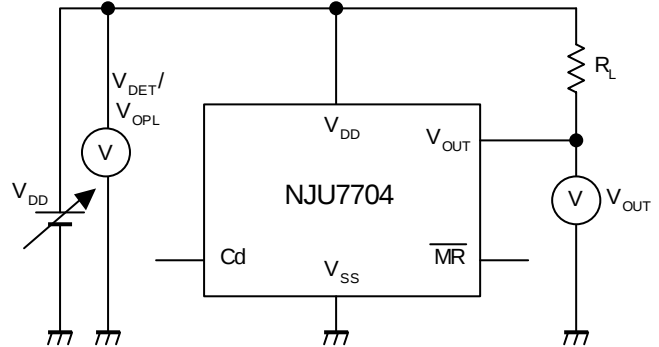
(*3): The minimum operating voltage(V_{OPL}) indicates the same value of the input voltage(V_{DD}) on condition that V_{OUT} becomes 10% or less of the input voltage(V_{DD}).

■ TEST CIRCUIT

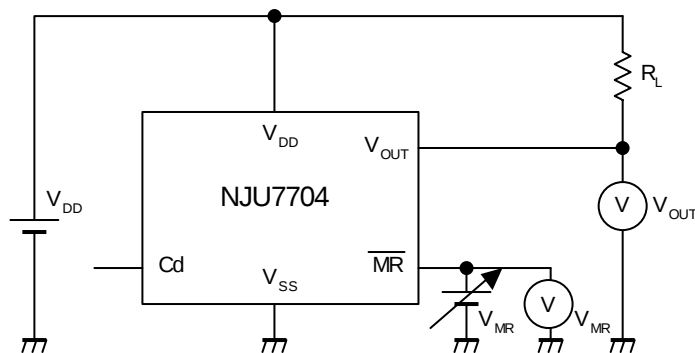
● Circuit Operating Current TEST CIRCUIT



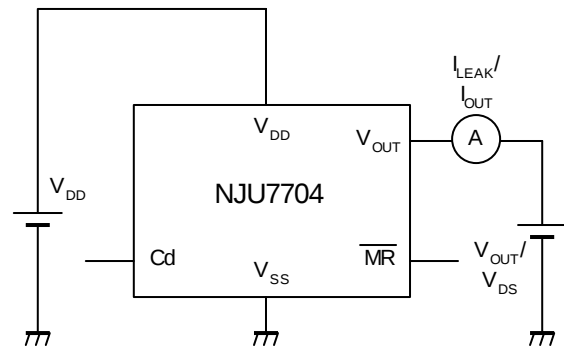
● Detection voltage/Minimum operating voltage



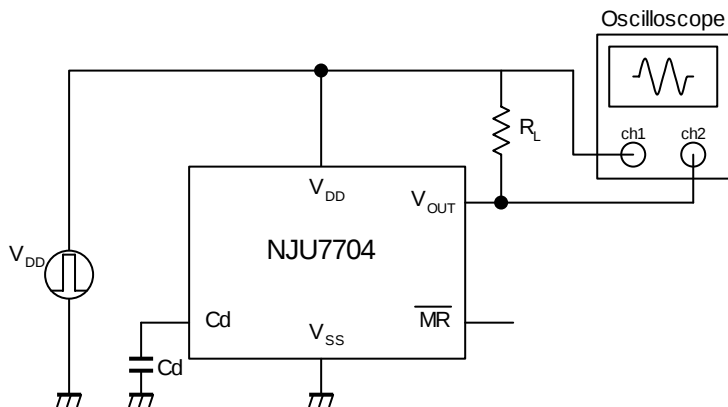
● MR pin Input voltage TEST CIRCUIT



● Leak current / Output current TEST CIRCUIT

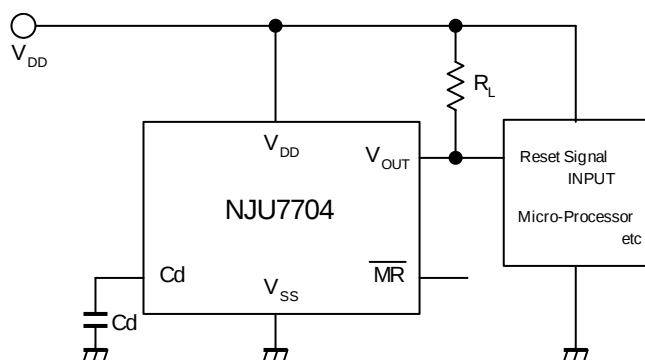


● Delay time TEST CIRCUIT

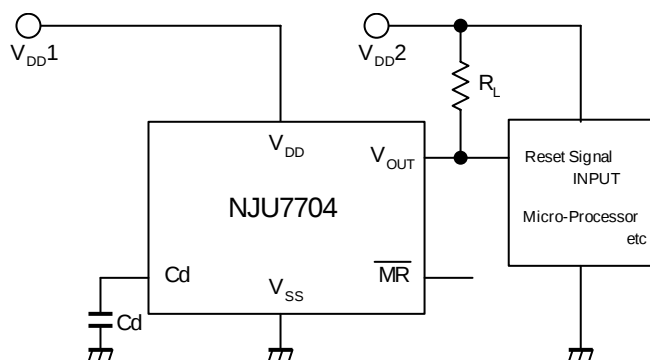


■ TYPICAL APPLICATION

① Power Supply Monitor Circuit (V_{DD} line COMMON)



② Power Supply Monitor Circuit (V_{DD} line SEPARATE)



■ NJU7705

■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{DD}	+10	V
Output Voltage	V_{OUT}	$V_{SS}-0.3 \sim +10$	V
Input Voltage of Cd pin	V_{Cd}	$V_{SS}-0.3 \sim V_{DD}+0.3$	V
Input Voltage of MR pin	V_{MR}	$V_{SS}-0.3 \sim V_{DD}+0.3$	V
Output Current	I_{OUT}	50	mA
Power Dissipation	P_D	SOT-23-5	350(*4)
			200(*5)
		SC88A	250(*4)
Operating Temperature	T_{opr}	-40~+85	°C
Storage Temperature	T_{stg}	-40~+125	°C

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

(*5) : Device itself

■ ELECTRICAL CHARACTERISTICS

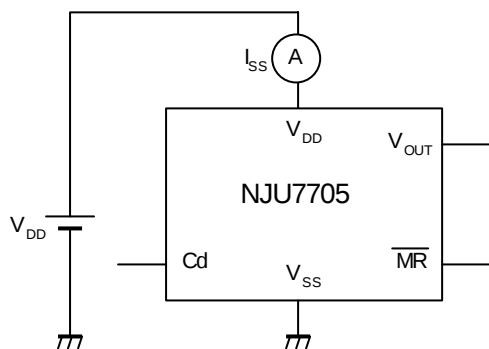
(Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Detection Voltage	V_{DET}		-1.0%	-	+1.0%	V
Hysteresis Voltage	V_{HYS}		70	90	130	mV
Quiescent Current	I_{SS}	$V_{DD}=V_{DET}+1V$	$V_{DET}=1.5V \sim 2.9V$ Version	-	0.7	1.5
			$V_{DET}=2.6V \sim 6.0V$ Version	-	0.9	2.0
Output Current	I_{OUT}	$Nch, V_{DS}=0.5V$	$V_{DD}=1.2V$	0.75	2.0	-
			$V_{DD}=2.4V$ ($\geq 2.7V$ Version)	4.5	7.0	-
		$Pch, V_{DS}=0.5V$	$V_{DD}=4.8V$ ($\leq 3.9V$ Version)	2.0	3.5	-
			$V_{DD}=6.0V$ (4.0~5.6V Version)	2.5	4.0	-
			$V_{DD}=8.4V$ ($\geq 5.7V$ Version)	3.0	5.0	-
Detection Voltage Temperature Coefficient	$\Delta V_{DET} / \Delta Ta$	$Ta=0 \sim +85^\circ C$	-	± 100	-	ppm/°C
Delay Time	t_d	$V_{DD}=V_{DET}+1V, Cd=4.7nF$	8	10	12	ms
Input Voltage of MR pin (Active "L")	V_{MR_H}		1.5	-	V_{DD}	V
	V_{MR_L}		0	-	0.3	
Input Voltage of MR pin (Active "H")	V_{MR_H}		$V_{DD}-0.3$	-	V_{DD}	V
	V_{MR_L}		0	-	$V_{DD}-1.5$	
Impedance of MR pin	R_{MR}		1.0	2.0	3.0	MΩ
Operating Voltage (*6)	V_{DD}	$R_L=100k\Omega$	0.8	-	9	V

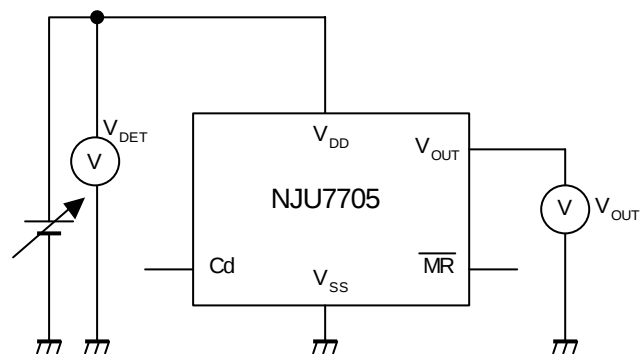
(*6): The minimum operating voltage(V_{OPL}) indicates the same value of the input voltage(V_{DD}) on condition that V_{OUT} becomes 10% or less of the input voltage(V_{DD}).

■ TEST CIRCUIT

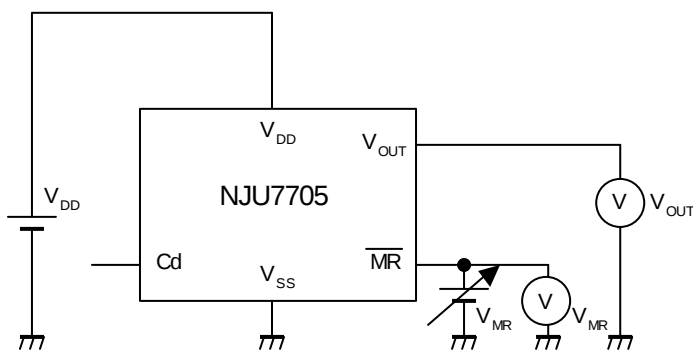
● Circuit Operating Current TEST CIRCUIT



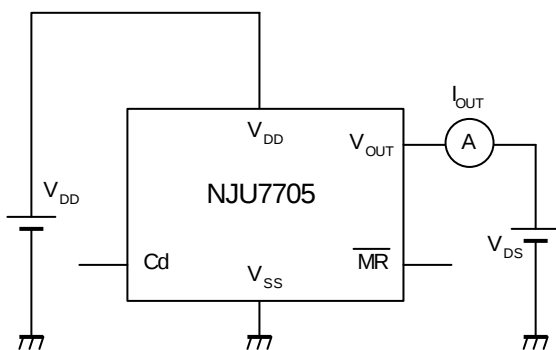
● Detection voltage TEST CIRCUIT



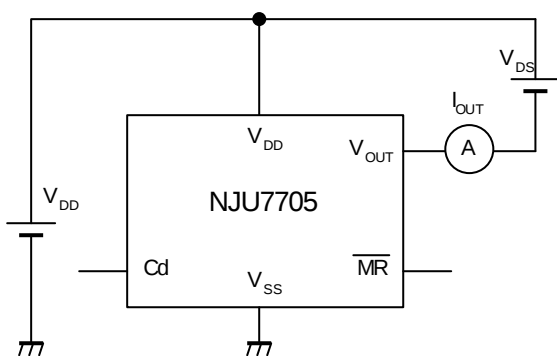
● MR pin Input voltage TEST CIRCUIT



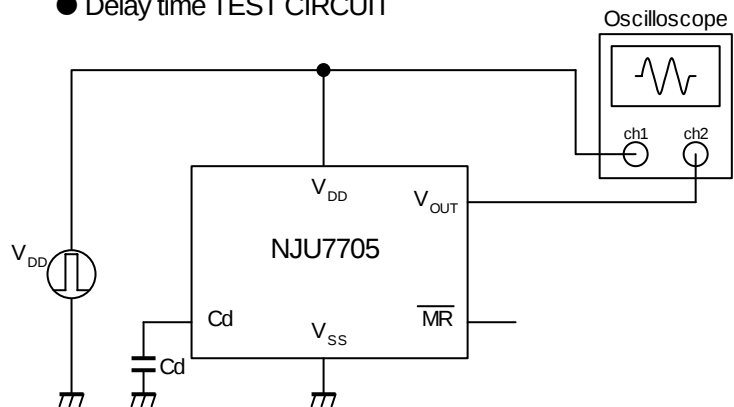
● Nch Output current TEST CIRCUIT



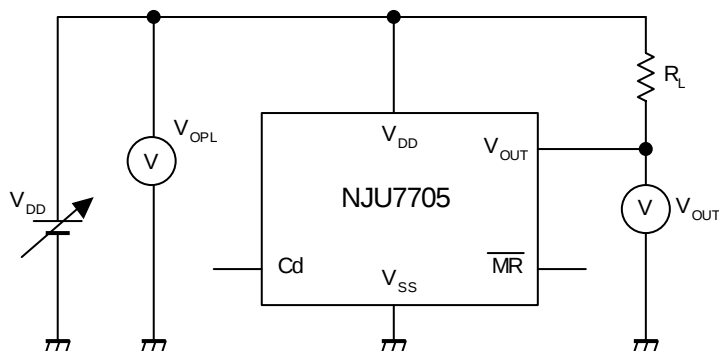
● Pch Output current TEST CIRCUIT



● Delay time TEST CIRCUIT



● Minimum operating voltage TEST CIRCUIT



■ TYPICAL APPLICATION

① Power Supply Monitor Circuit (V_{DD} line COMMON)

