

VOLTAGE DETECTOR

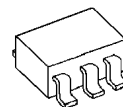
■ GENERAL DESCRIPTION

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%. A time delayed reset can be accomplished with an external capacitor.

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

■ PACKAGE OUTLINE



NJU7704/05F

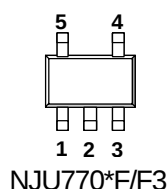


NJU7704/05F3

■ FEATURES

- High Precision Detection Voltage $\pm 1.0\%$
- Low Quiescent Current 0.9 μ A typ.
- Detection Voltage Range 1.5~6.0V(0.1V 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 (MTP5) : NJU770*F
 - SC88A : NJU770*F3

■ PIN CONFIGURATION



PIN FUNCTION

- 1.Cd
- 2.V_{SS}
- 3.MR
- 4.V_{OUT}
- 5.V_{DD}

NJU7704/05

■ DETECTION VOLTAGE RANK LIST

Device Name	V _{DET}	MR Logic	Package
NJU7704/05F15A	1.5V	Active "L"	SOT-23-5 (MTP5)
NJU7704/05F19A	1.9V		
NJU7704/05F02A	2.0V		
NJU7704/05F21A	2.1V		
NJU7704/05F22A	2.2V		
NJU7704/05F25A	2.5V		
NJU7704/05F27A	2.7V		
NJU7704/05F28A	2.8V		
NJU7704/05F29A	2.9V		
NJU7704/05F03A	3.0V		
NJU7704/05F42A	4.2V		
NJU7704/05F43A	4.3V		
NJU7704/05F45A	4.5V		
NJU7704/05F06A	6.0V		
NJU7704/05F19B	1.9V	Active "H"	
NJU7704/05F27B	2.7V		
NJU7704/05F28B	2.8V		

Device Name	V _{DET}	MR Logic	Package
NJU7704/05F3-15A	1.5V	Active "L"	SC88A
NJU7704/05F3-19A	1.9V		
NJU7704/05F3-02A	2.0V		
NJU7704/05F3-21A	2.1V		
NJU7704/05F3-22A	2.2V		
NJU7704/05F3-25A	2.5V		
NJU7704/05F3-27A	2.7V		
NJU7704/05F3-28A	2.8V		
NJU7704/05F3-29A	2.9V		
NJU7704/05F3-03A	3.0V		
NJU7704/05F3-42A	4.2V		
NJU7704/05F3-43A	4.3V		
NJU7704/05F3-45A	4.5V		
NJU7704/05F3-06A	6.0V		
NJU7704/05F3-19B	1.9V	Active "H"	
NJU7704/05F3-27B	2.7V		
NJU7704/05F3-28B	2.8V		

■ 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
Output Current	I_{OUT}	50	mA
Power Dissipation	P_D	SOT-23-5	200
		SC88A	250(*note 1)
Operating Temperature	T_{opr}	-40 ~ +85	°C
Storage Temperature	T_{stg}	-40 ~ +125	°C

(*note 1): On board, 114.3mm×76.2mm×1.6mm 2layers FR-4

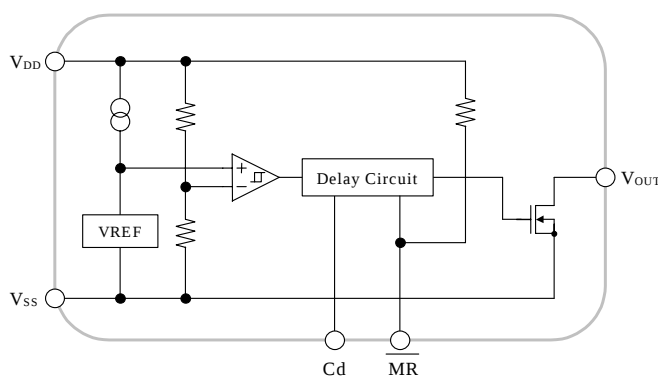
■ ELECTRICAL CHARACTERISTICS

(Ta=25°C)

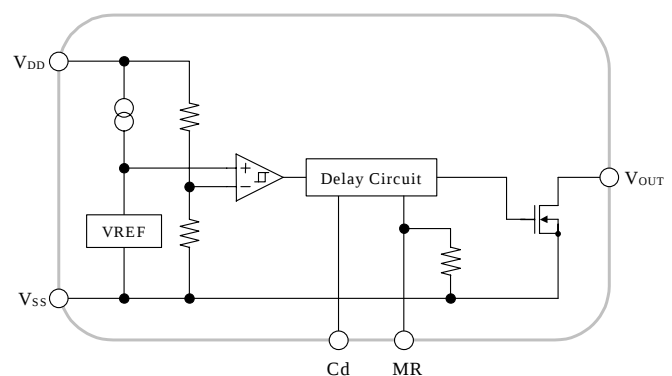
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Detection Voltage	V_{DET}		-1.0%	-	+1.0%	V
Hysteresis Voltage	V_{HYS}		70	90	130	mV
Quiescent Current	I_{SS}	$V_{DD}=V_{DET}+1V$	$V_{DET}=1.5V \sim 1.9V$ Version	-	0.7	μA
			$V_{DET}=2.0V \sim 6.0V$ Version	-	0.9	
Output Current	I_{OUT}	$N_{ch}, V_{DS}=0.5V$	$V_{DD}=1.2V$	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	MΩ
Operating Voltage (*note 2)	V_{DD}	$R_L=100k\Omega$	0.8	-	9	V

(*note 2): The minimum Operating Voltage(V_{OPL}) indicates the same value of the output voltage(V_{OUT}) on condition that V_{OUT} becomes 10% or less of the input voltage(V_{DD}).

■ EQUIVALENT CIRCUIT



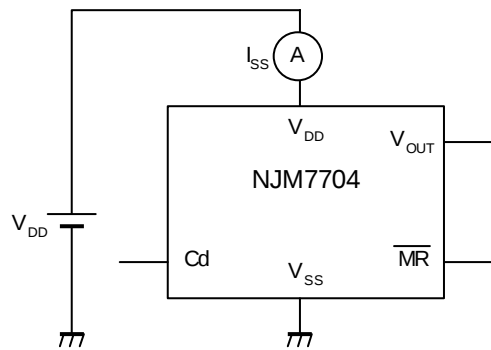
NJU7704***A



NJU7704F**B

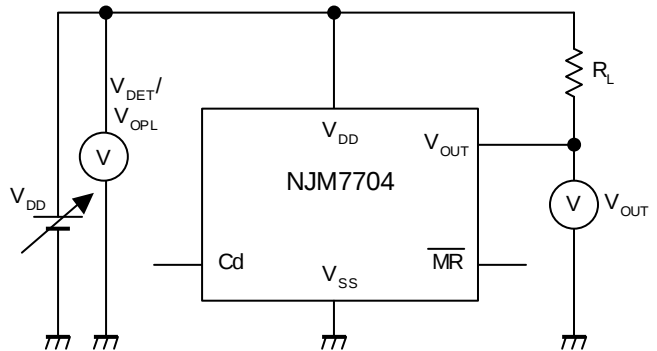
■ TEST CIRCUIT

● Circuit Operating Current TEST CIRCUIT

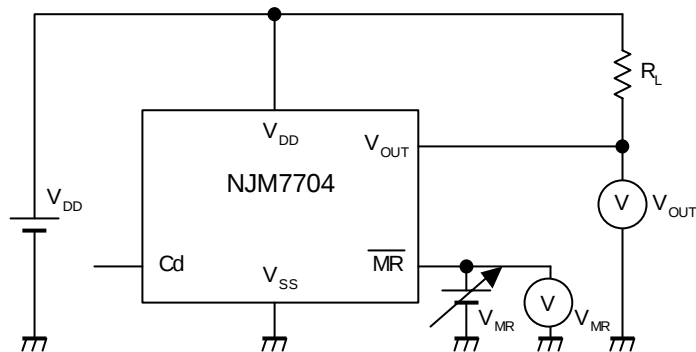


● Detection voltage/Minimum operating voltage TEST CIRCUIT

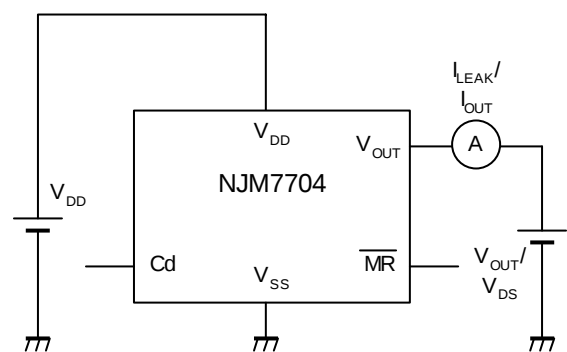
TEST CIRCUIT



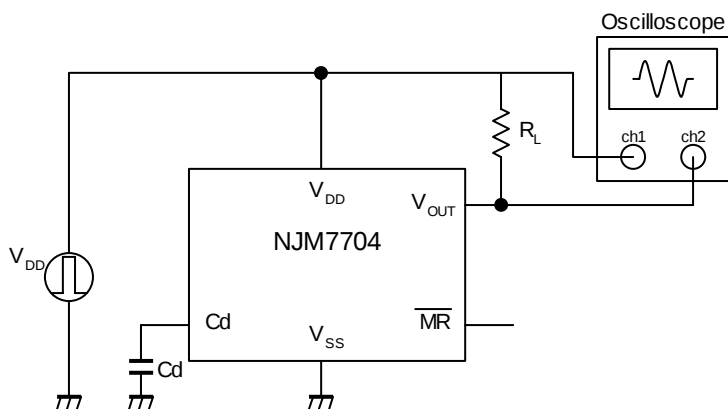
● MR pin Input voltage TEST CIRCUIT



● Leak current / Output current TEST CIRCUIT

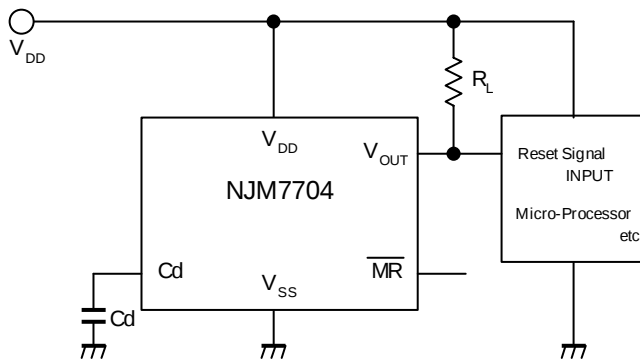


● Delay time TEST CIRCUIT

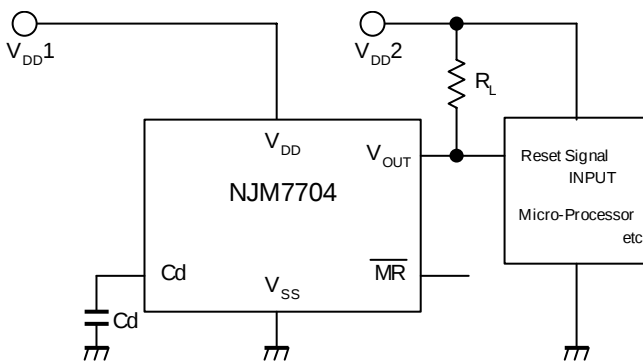


■ TYPICAL APPLICATION

① Power Supply Monitor Circuit (VDD line COMMON)



② Power Supply Monitor Circuit (VDD line SEPARATE)



NJU7704/05

■ 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
Output Current	I_{OUT}	50	mA
Power Dissipation	P_D	SOT-23-5	200
		SC88A	250(*note 3)
Operating Temperature	T_{opr}	-40~+85	°C
Storage Temperature	T_{stg}	-40~+125	°C

(*note 3): On board, 114.3mm×76.2mm×1.6mm 2layers FR-4

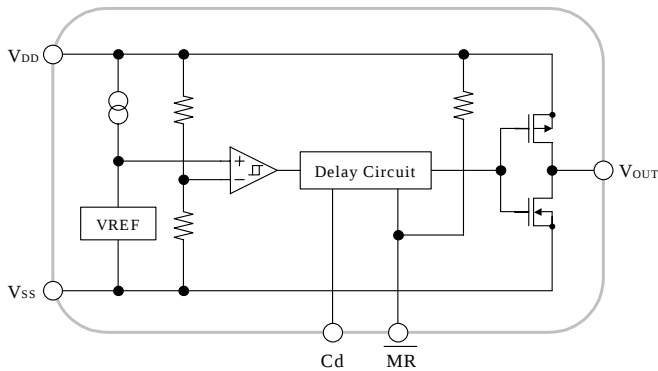
■ ELECTRICAL CHARACTERISTICS

(Ta=25°C)

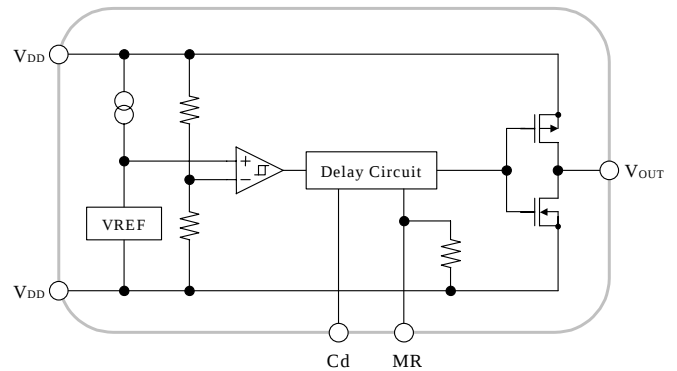
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Detection Voltage	V_{DET}		-1.0%	-	+1.0%	V
Hysteresis Voltage	V_{HYS}		70	90	130	mV
Quiescent Current	I_{SS}	$V_{DD}=V_{DET}+1V$	$V_{DET}=1.5V\sim2.9V$ Version	-	0.7	1.5
			$V_{DET}=2.6V\sim6.0V$ Version	-	0.9	2.0
Output Current	I_{OUT}	$N_{ch}, V_{DS}=0.5V$	$V_{DD}=1.2V$	0.75	2.0	-
			$V_{DD}=2.4V$ ($\geq 2.7V$ Version)	4.5	7.0	-
			$V_{DD}=4.8V$ ($\leq 3.9V$ Version)	2.0	3.5	-
		$P_{ch}, V_{DS}=0.5V$	$V_{DD}=6.0V$ (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	$\Delta V_{DET} / \Delta T_a$	$T_a=0\sim+85^\circ C$	-	± 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	MΩ
Operating Voltage (*note 4)	V_{DD}	$R_L=100k\Omega$	0.8	-	9	V

(*note 4): The minimum Operating Voltage(VOPL) indicates the same value of the output voltage(VOUT) on condition that VOUT becomes 10% or less of the input voltage(VDD).

■ EQUIVALENT CIRCUIT



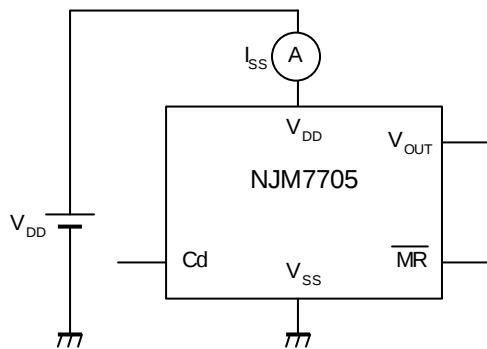
NJU7705***A



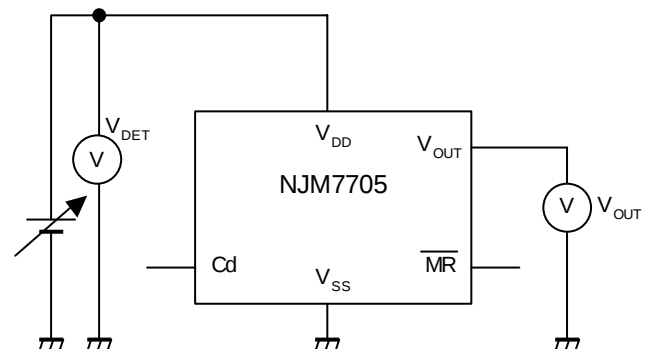
NJU7705***B

■ TEST CIRCUIT

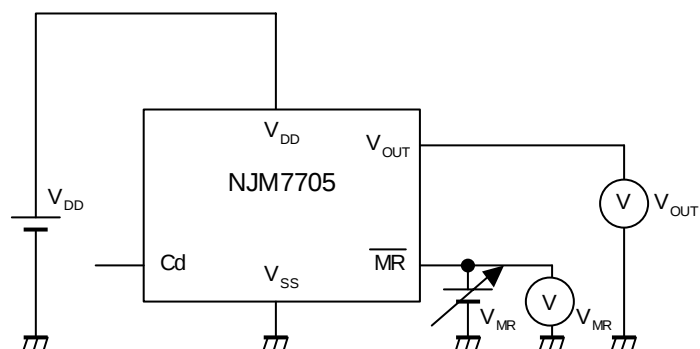
● Circuit Operating Current TEST CIRCUIT



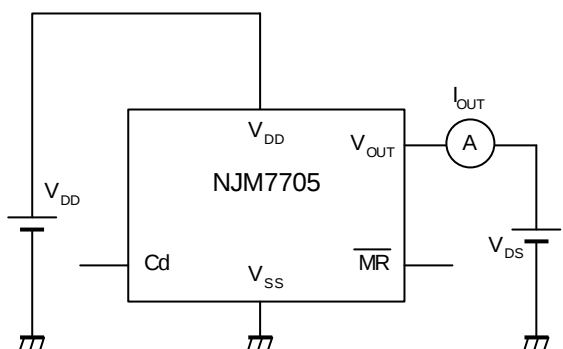
● Detection voltage TEST CIRCUIT



● MR pin Input voltage TEST CIRCUIT

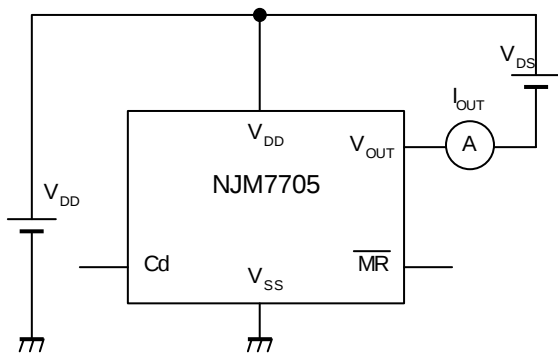


● Nch Output current TEST CIRCUIT

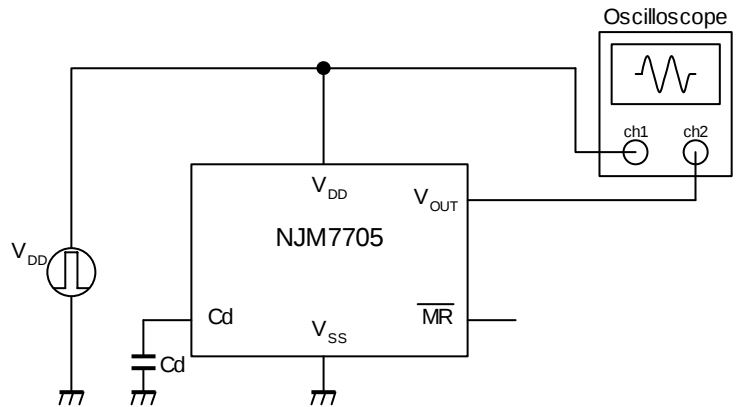


■ TEST CIRCUIT

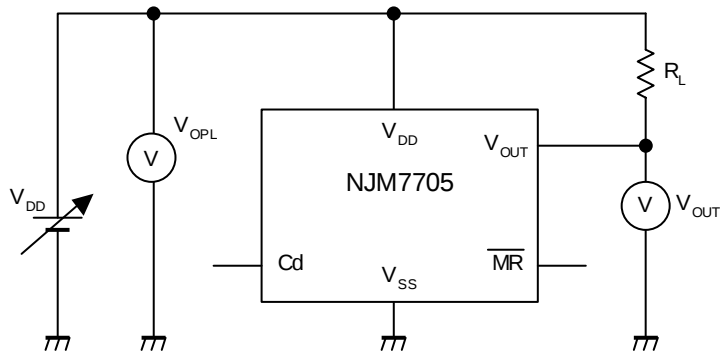
● Pch Output current TEST CIRCUIT



● Delay time TEST CIRCUIT

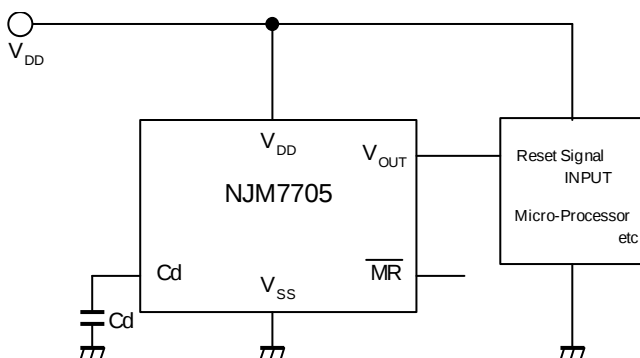


● Minimum operating voltage TEST CIRCUIT



■ TYPICAL APPLICATION

① Power Supply Monitor Circuit (VDD line COMMON)



[CAUTION]

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