

VOLTAGE DETECTOR

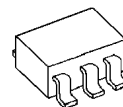
■ GENERAL DESCRIPTION

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

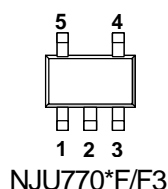


NJU7704/05F3

■ 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

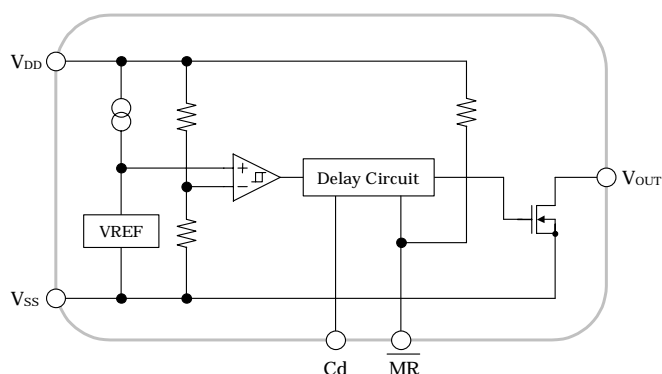
■ ELECTRICAL CHARACTERISTICS

(Ta=25°C)

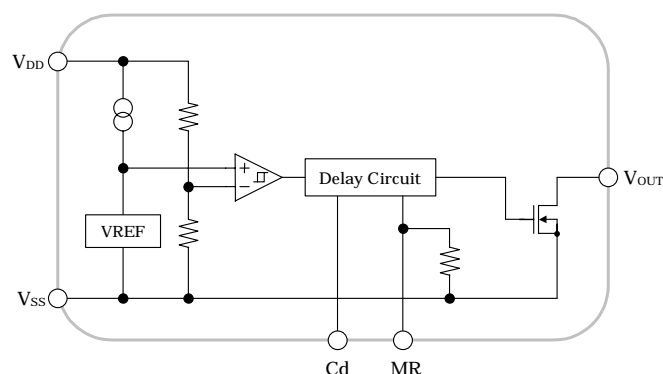
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Detection Voltage	V_{DET}		-1.0%	-	+1.0%	V
Hysteresis Voltage	V_{HYS}		70	90	130	mV
Quiescent Current	I_{SS}	$V_{DD}=V_{DET}+1V$	$V_{DET}=1.5V \sim 1.9V$ Version	-	0.7	μA
			$V_{DET}=2.0V \sim 6.0V$ Version	-	0.9	
Output Current	I_{OUT}	$N_{ch}, V_{DS}=0.5V$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



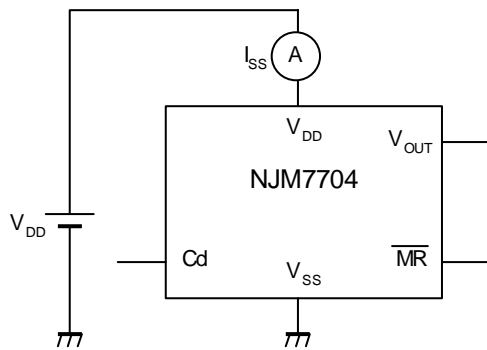
NJU7704***A



NJU7704F**B

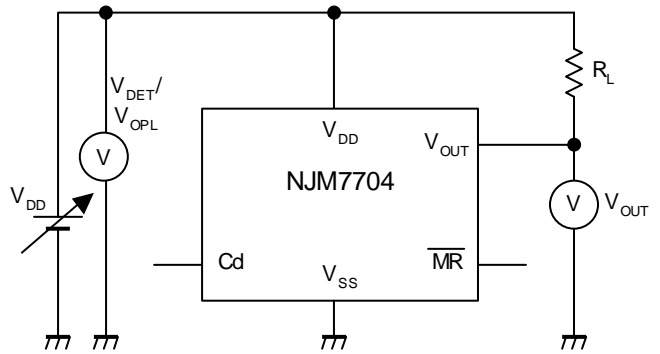
■ TEST CIRCUIT

● Circuit Operating Current TEST CIRCUIT

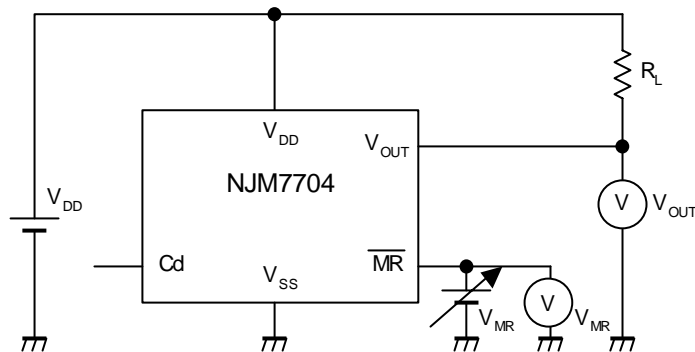


● Detection voltage/Minimum operating voltage TEST CIRCUIT

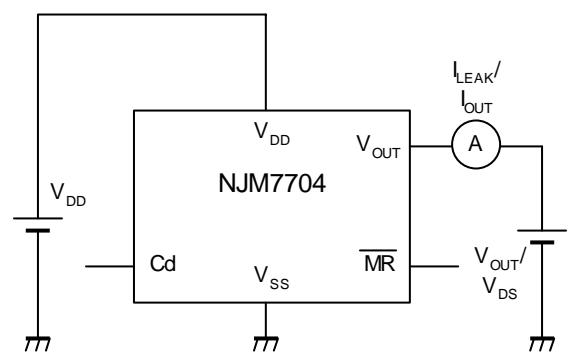
TEST CIRCUIT



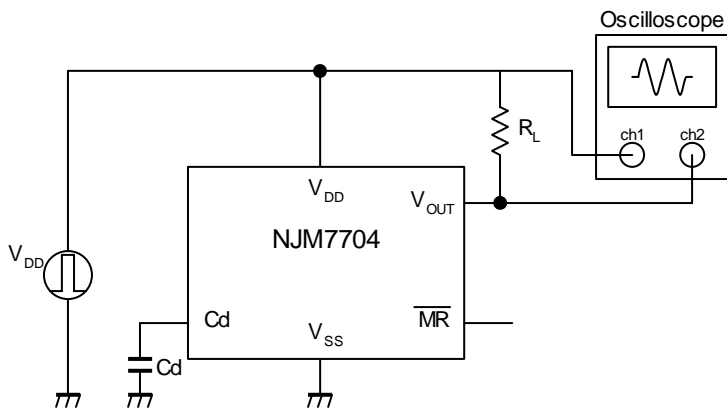
● MR pin Input voltage TEST CIRCUIT



● Leak current / Output current TEST CIRCUIT

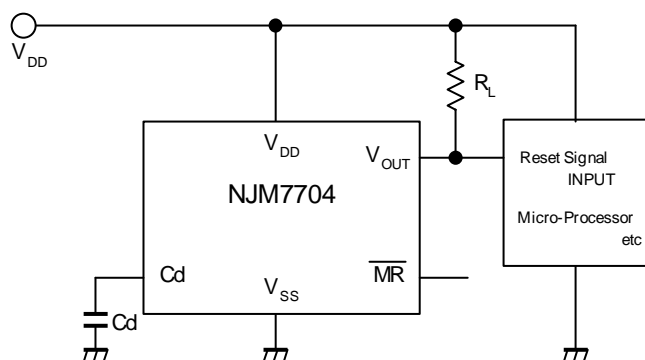


● Delay time TEST CIRCUIT

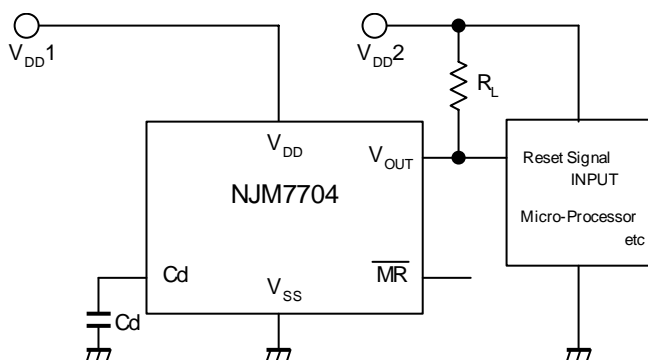


■ TYPICAL APPLICATION

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

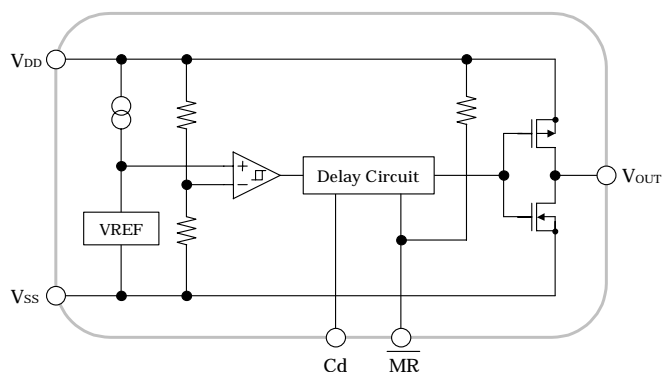
■ ELECTRICAL CHARACTERISTICS

(Ta=25°C)

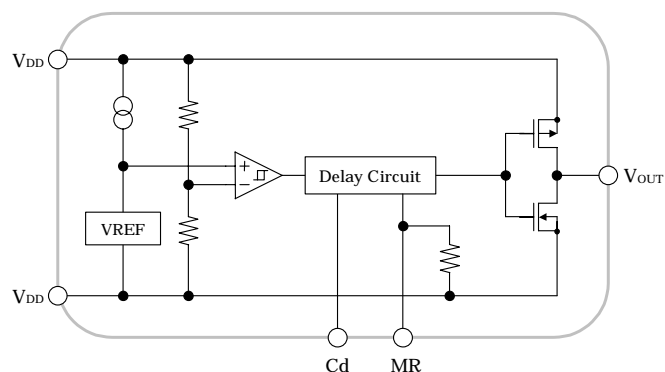
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Detection Voltage	V_{DET}		-1.0%	-	+1.0%	V
Hysteresis Voltage	V_{HYS}		70	90	130	mV
Quiescent Current	I_{SS}	$V_{DD}=V_{DET}+1V$	$V_{DET}=1.5V \sim 2.9V$ Version	-	0.7	1.5
			$V_{DET}=2.6V \sim 6.0V$ Version	-	0.9	2.0
Output Current	I_{OUT}	$N_{ch}, V_{DS}=0.5V$	$V_{DD}=1.2V$	0.75	2.0	-
			$V_{DD}=2.4V$ ($\geq 2.7V$ 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



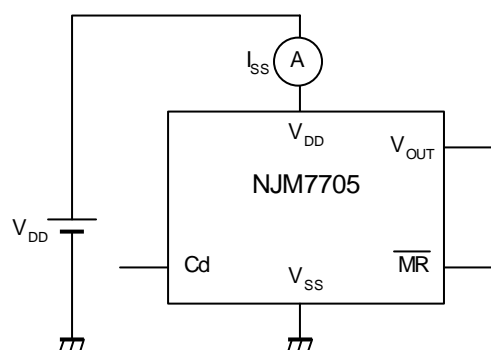
NJU7705***A



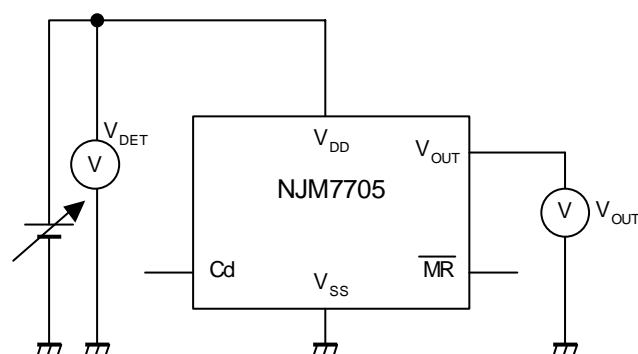
NJU7705***B

■ TEST CIRCUIT

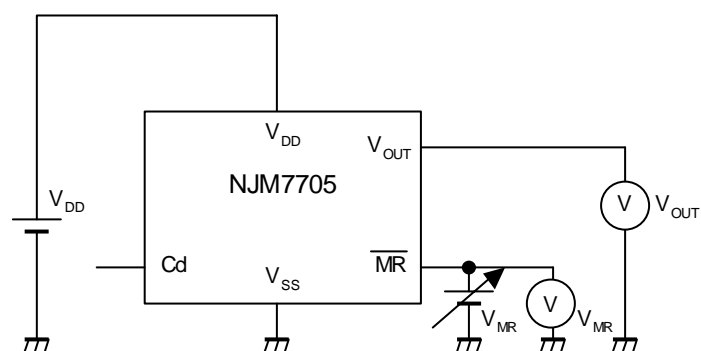
● Circuit Operating Current TEST CIRCUIT



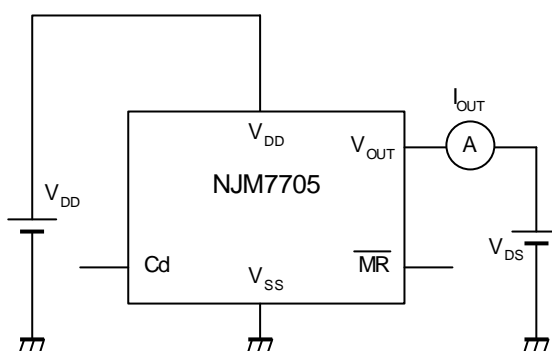
● Detection voltage TEST CIRCUIT



● MR pin Input voltage TEST CIRCUIT



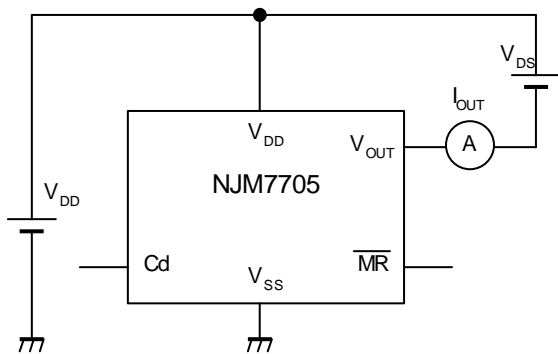
● Nch Output current TEST CIRCUIT



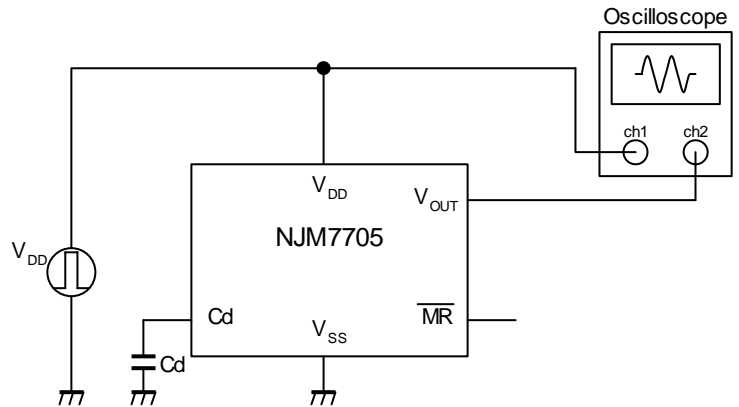
NJU7704/05

■ TEST CIRCUIT

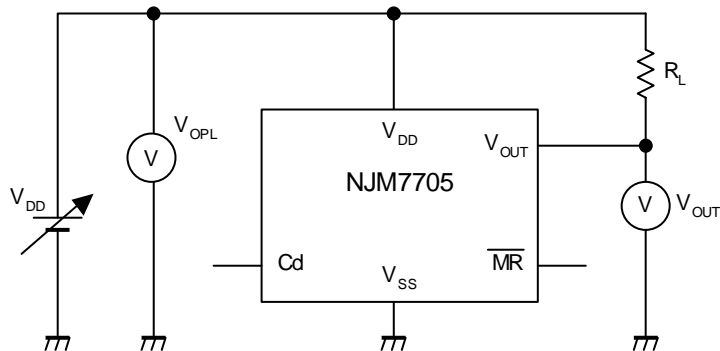
● Pch Output current TEST CIRCUIT



● Delay time TEST CIRCUIT

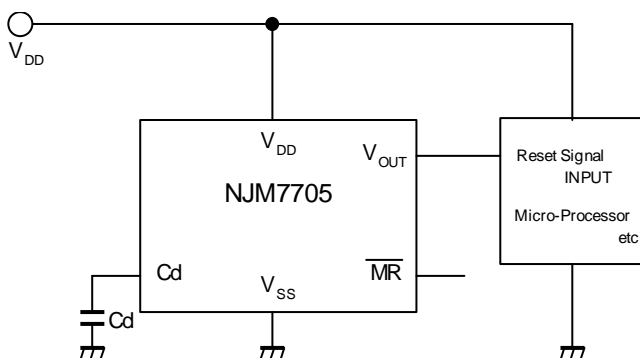


● Minimum operating voltage TEST CIRCUIT



■ TYPICAL APPLICATION

① Power Supply Monitor Circuit (VDD line COMMON)



[CAUTION]

The specifications on this databook are only given for information, without any guarantee as regards either mistakes or omissions. The application circuits in this databook are described only to show representative usages of the product and not intended for the guarantee or permission of any right including the industrial rights.