

VOLTAGE DETECTOR

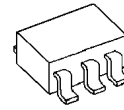
■ GENERAL DESCRIPTION

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

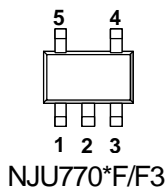


NJU7704/05F3

■ FEATURES

- High Precision Detection Voltage $\pm 1.0\%$
- Low Quiescent Current $0.9\mu\text{A typ.}$
- Detection Voltage Range $1.5\text{--}6.0\text{V}(0.1\text{V Step})$
- 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 (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~+10		V
Output Current	I _{OUT}	50		mA
Power Dissipation	P _D	SOT-23-5	200	mW
		SC88A	250(*note 1)	
Operating Temperature	T _{opr}	-40 ~ +85		°C
Storage Temperature	T _{stg}	-40 ~ +125		°C

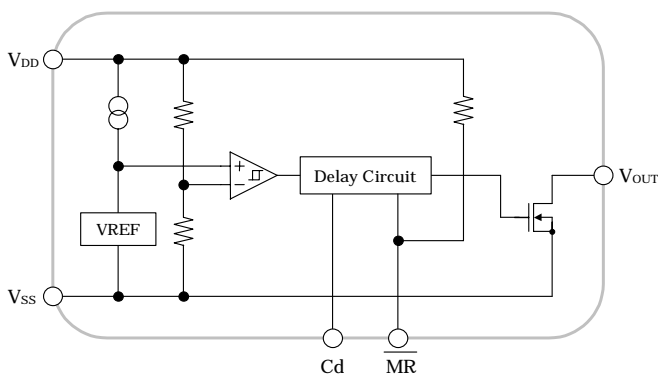
(*note 1): On board, 114.3mm×76.2mm×1.6mm 2layers FR-4

■ ELECTRICAL CHARACTERISTICS (Ta=25°C)

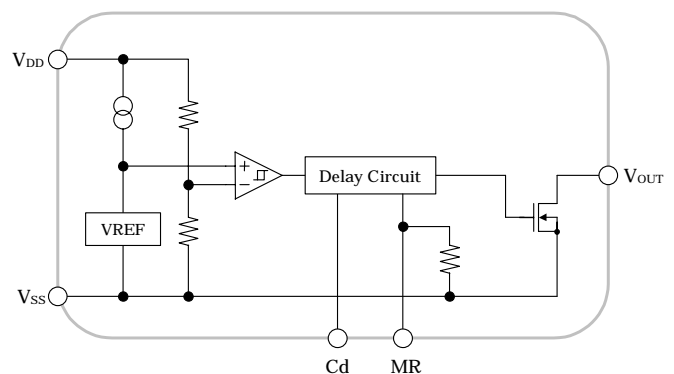
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Detection Voltage	V _{DET}		-1.0%	-	+1.0%	V	
Hysteresis Voltage	V _{HYS}		70	90	130	mV	
Quiescent Current	I _{SS}	V _{DD} =V _{DET} +1V	V _{DET} =1.5V~1.9V Version	-	0.7	1.5	μA
			V _{DET} =2.0V~6.0V Version	-	0.9	2.0	
Output Current	I _{OUT}	Nch, V _{DS} =0.5V	V _{DD} =1.2V	0.75	2.0	-	mA
			V _{DD} =2.4V (≥2.7V Version)	4.5	7.0	-	
Output Leak Current	I _{LEAK}	V _{DD} =V _{OUT} =9V	-	-	0.1	μA	
Detection Voltage Temperature Coefficient	ΔV _{DET} /ΔTa	Ta=0~+85°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 (*note 2)	V _{DD}	R _L =100kΩ	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

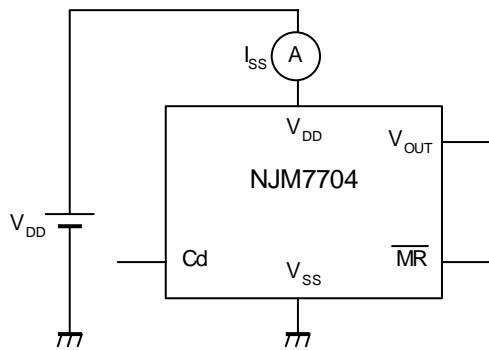


NJU7704F**B

NJU7704/05

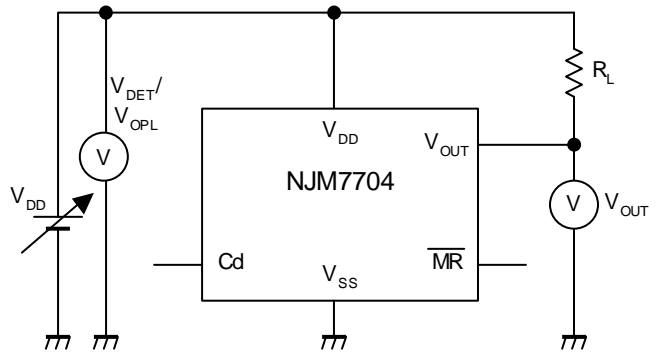
■ TEST CIRCUIT

● Circuit Operating Current TEST CIRCUIT

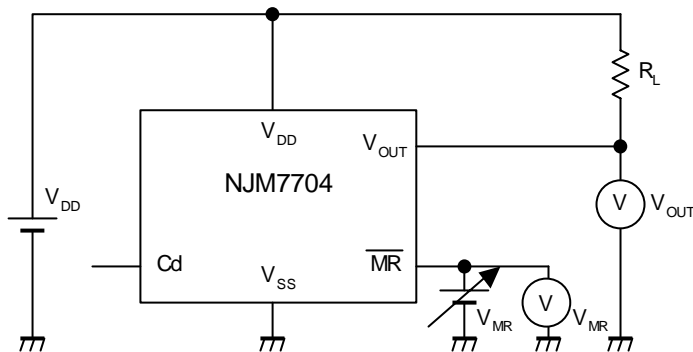


● Detection voltage/Minimum operating voltage TEST CIRCUIT

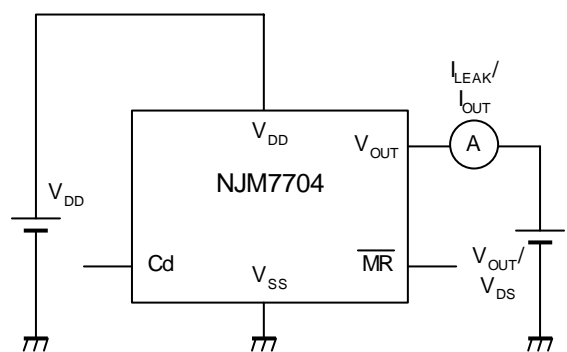
TEST CIRCUIT



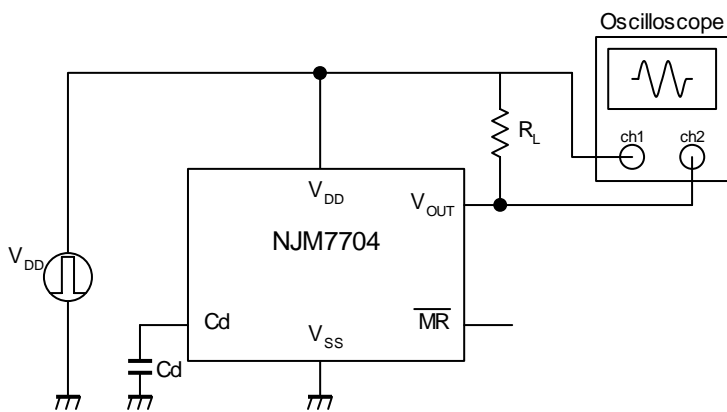
● MR pin Input voltage TEST CIRCUIT



● Leak current / Output current TEST CIRCUIT

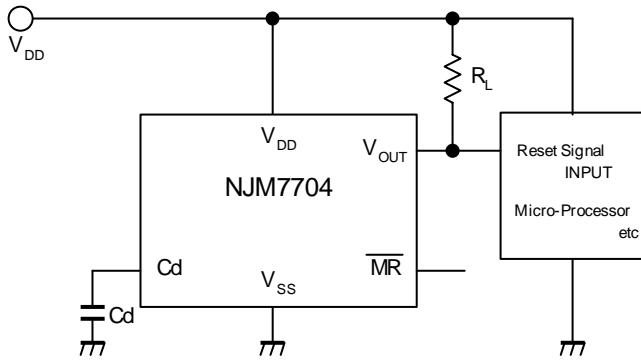


● Delay time TEST CIRCUIT

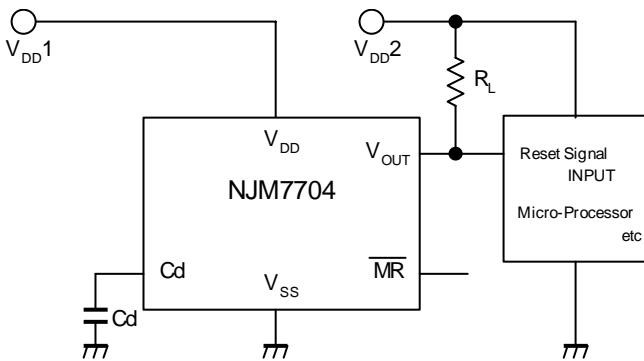


■ TYPICAL APPLICATION

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~+10		V
Output Current	I _{OUT}	50		mA
Power Dissipation	P _D	SOT-23-5	200	mW
		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

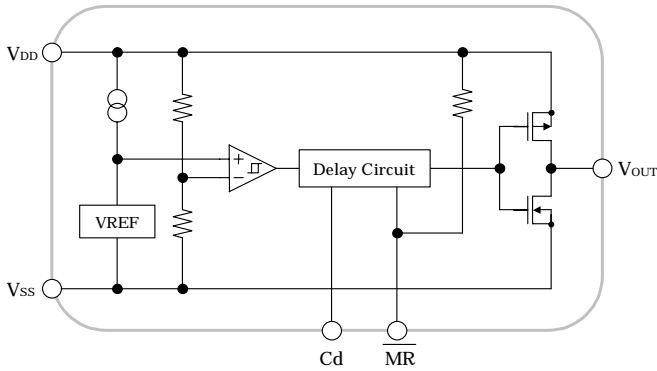
■ ELECTRICAL CHARACTERISTICS

(Ta=25°C)

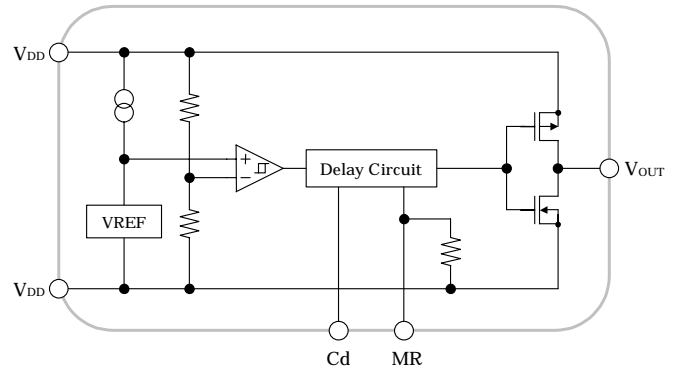
PARAMETER	SYMBOL	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Detection Voltage	V _{DET}			-1.0%	-	+1.0%	V
Hysteresis Voltage	V _{HYS}			70	90	130	mV
Quiescent Current	I _{SS}	V _{DD} =V _{DET} +1V	V _{DET} =1.5V~2.9V Version	-	0.7	1.5	μA
			V _{DET} =2.6V~6.0V Version	-	0.9	2.0	
Output Current	I _{OUT}	Nch, V _{DS} =0.5V	V _{DD} =1.2V	0.75	2.0	-	mA
			V _{DD} =2.4V (≥2.7V Version)	4.5	7.0	-	
			V _{DD} =4.8V (≤3.9V Version)	2.0	3.5	-	
		Pch, V _{DS} =0.5V	V _{DD} =6.0V (4.0~5.6V Version)	2.5	4.0	-	
			V _{DD} =8.4V (≥5.7V Version)	3.0	5.0	-	
Detection Voltage Temperature Coefficient	Δ V _{DET} / ΔTa	Ta=0~+85°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 (*note 4)	V _{DD}	R _L =100kΩ		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



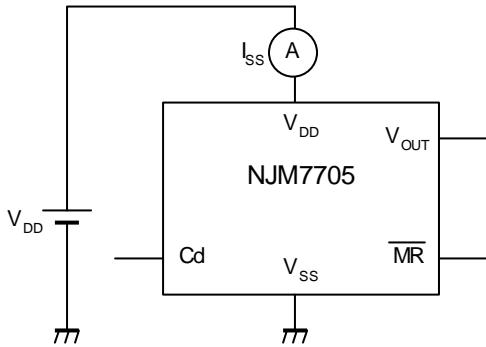
NJU7705***A



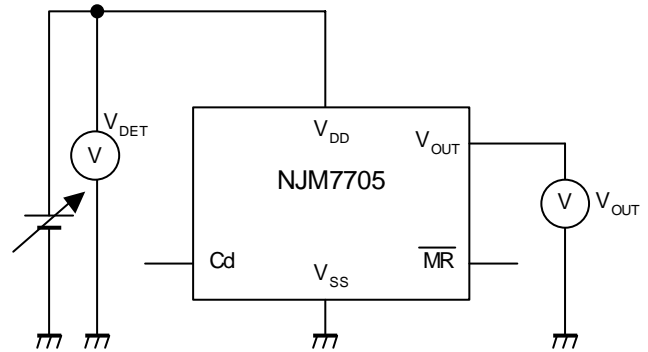
NJU7705***B

■ TEST CIRCUIT

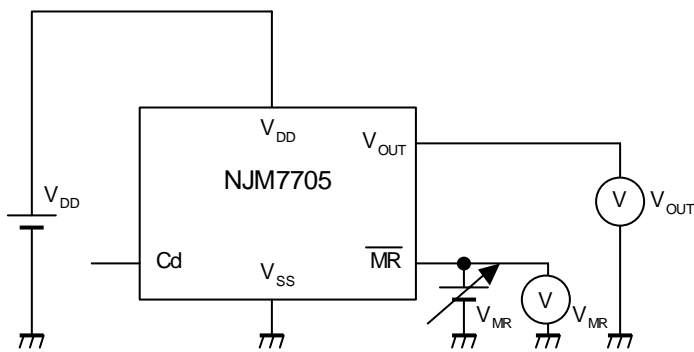
● Circuit Operating Current TEST CIRCUIT



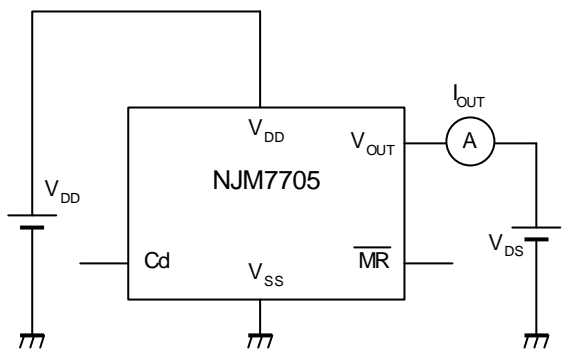
● Detection voltage TEST CIRCUIT



● MR pin Input voltage TEST CIRCUIT



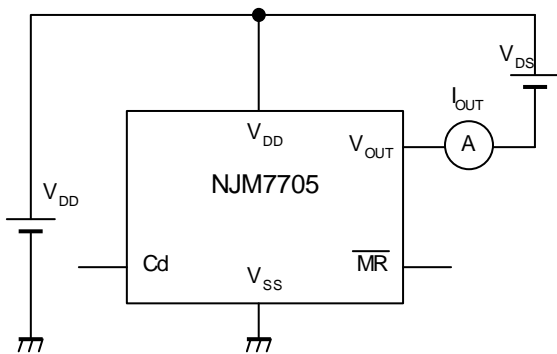
● Nch Output current TEST CIRCUIT



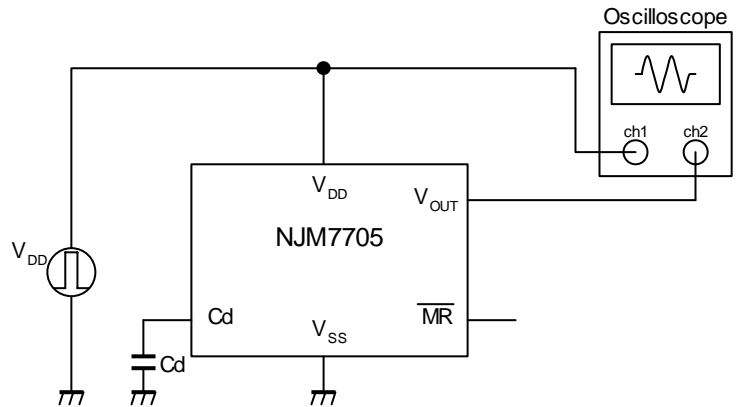
NJU7704/05

■ TEST CIRCUIT

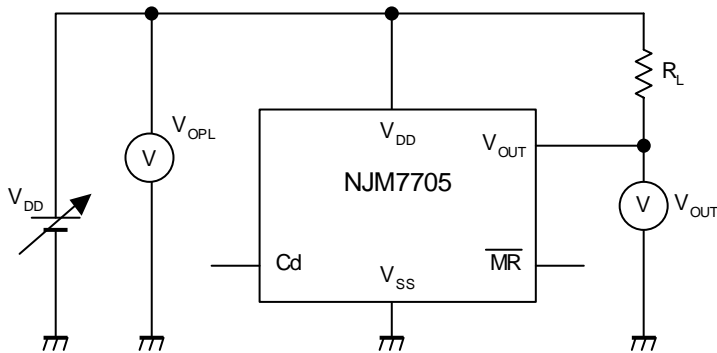
● Pch Output current TEST CIRCUIT



● Delay time TEST CIRCUIT

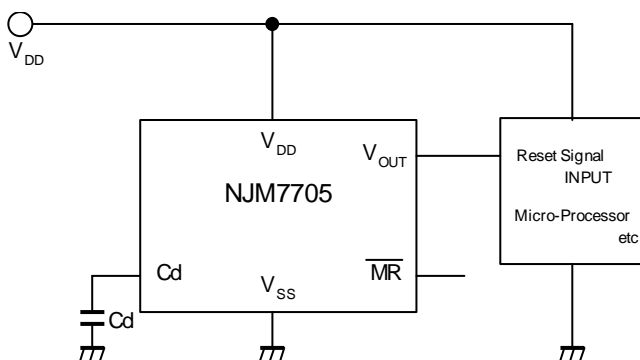


● Minimum operating voltage TEST CIRCUIT



■ TYPICAL APPLICATION

① Power Supply Monitor Circuit (VDD line COMMON)



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