VOLTAGE DETECTOR

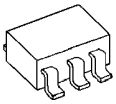
■ GENERAL DESCRIPTION

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



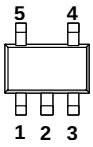
NJU7704/05F

NJU7704/05F3

■ FEATURES

- ● High Precision Detection Voltage ±1.0%
- ● Low Quiescent Current 0.9μA 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



NJU770*F/F3

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

■ 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	Topr	-40 ~ +85		°C
Storage Temperature	Tstg	-40 ~ +125		°C

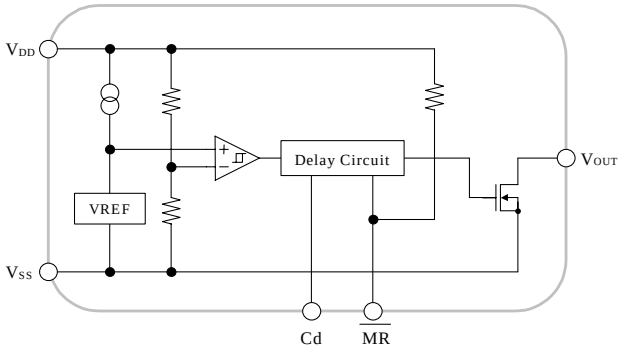
(*note 1): On board, 114.3mm×76.2mm×1.6mm 2layers FR-4

■ ELECTRICAL CHARACTERISTICS (Ta=25°C)

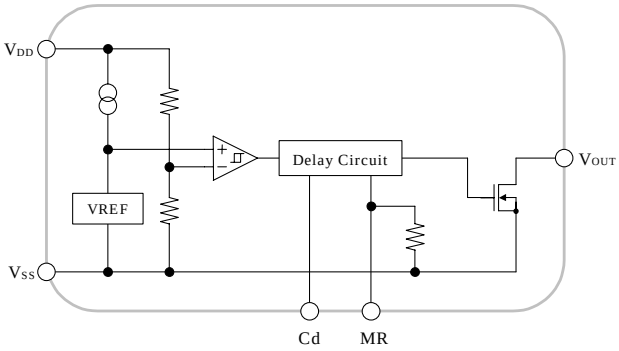
PARAMETER	SYMBOL	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Detection Voltage	V_{DET}			-1.0%	-	+1.0%	V
Hysteresis Voltage	V_{HYS}			70	90	130	mV
Quiescent Current	I_{SS}	$V_{DD}=V_{DET}+1V$	V_{DET}=1.5V~1.9V Version	-	0.7	1.5	µA
			V_{DET}=2.0V~6.0V Version	-	0.9	2.0	
Output Current	I_{OUT}	Nch, V_{DS}=0.5V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



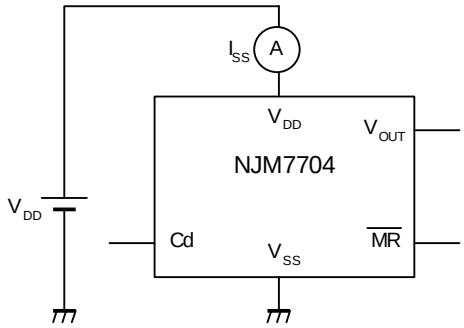
NJU7704***A



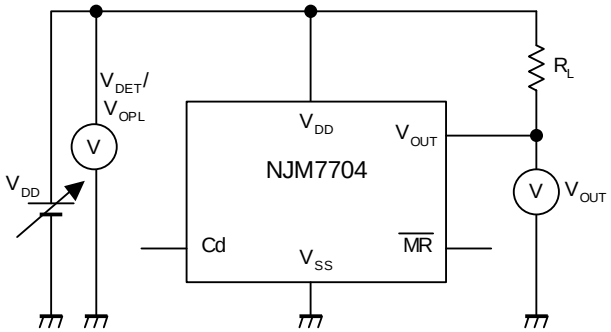
NJU7704F**B

■ TEST CIRCUIT

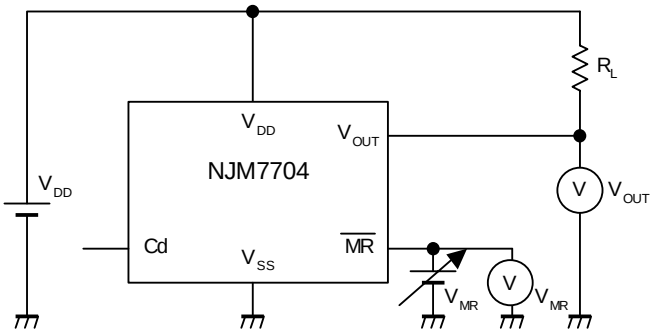
● Circuit Operating Current TEST CIRCUIT



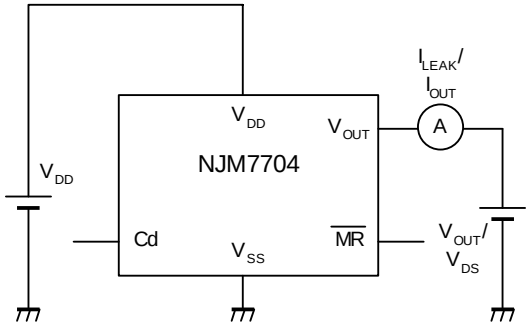
● Detection voltage/Minimum operating voltage TEST CIRCUIT



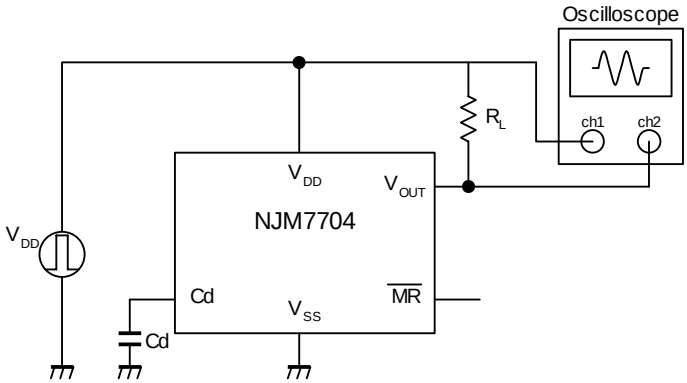
● MR pin Input voltage TEST CIRCUIT



● Leak current / Output current TEST CIRCUIT

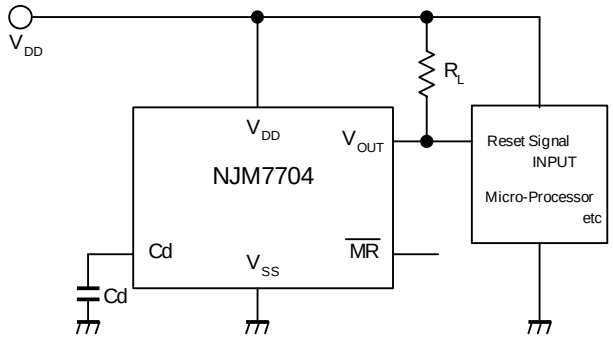


● Delay time TEST CIRCUIT

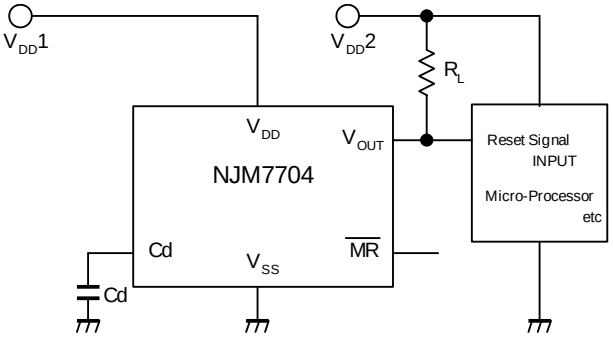


■ TYPICAL APPLICATION

① Power Supply Monitor Circuit (VDD line COMMON)



② Power Supply Monitor Circuit (VDD line SEPARATE)



■ 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	Topr	-40~+85		°C
Storage Temperature	Tstg	-40~+125		°C

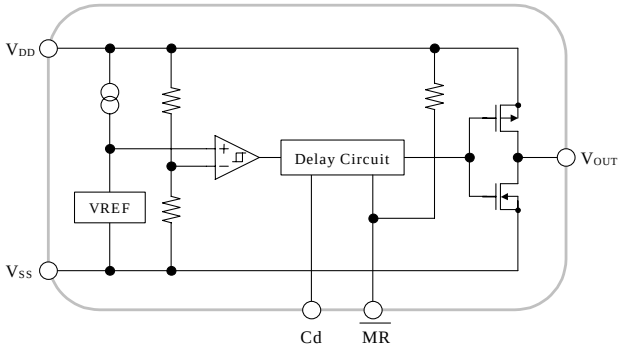
(*note 3): On board, 114.3mm×76.2mm×1.6mm 2layers FR-4

■ ELECTRICAL CHARACTERISTICS (Ta=25°C)

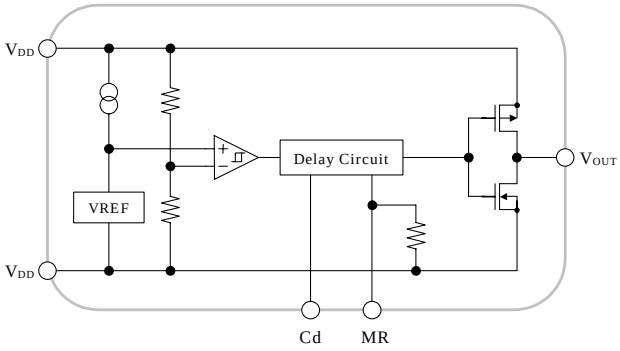
PARAMETER	SYMBOL	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Detection Voltage	V_{DET}			-1.0%	-	+1.0%	V
Hysteresis Voltage	V_{HYS}			70	90	130	mV
Quiescent Current	I_{SS}	$V_{DD}=V_{DET}$+1V	V_{DET}=1.5V~2.9V Version	-	0.7	1.5	µA
			V_{DET}=2.6V~6.0V Version	-	0.9	2.0	
Output Current	I_{OUT}	Nch,V_{DS}=0.5V	V_{DD}=1.2V	0.75	2.0	-	mA
			V_{DD}=2.4V (≥2.7V Version)	4.5	7.0	-	
		Pch,V_{DS}=0.5V	V_{DD}=4.8V (≤3.9V Version)	2.0	3.5	-	
			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	$\Delta V_{DET}/\Delta Ta$	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



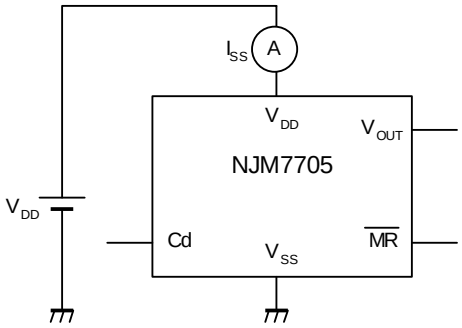
NJU7705***A



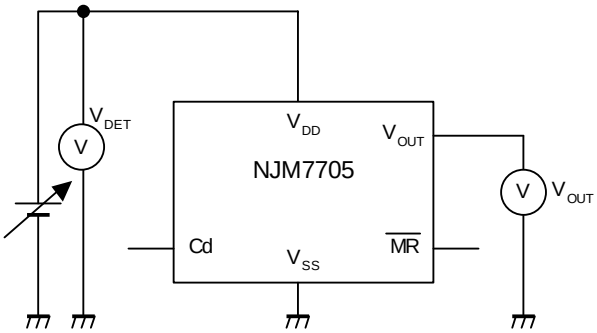
NJU7705***B

■ TEST CIRCUIT

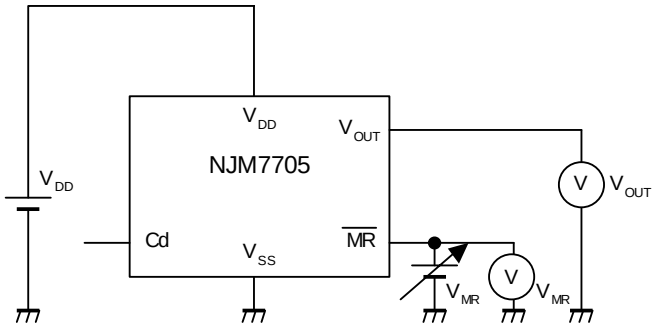
● Circuit Operating Current TEST CIRCUIT



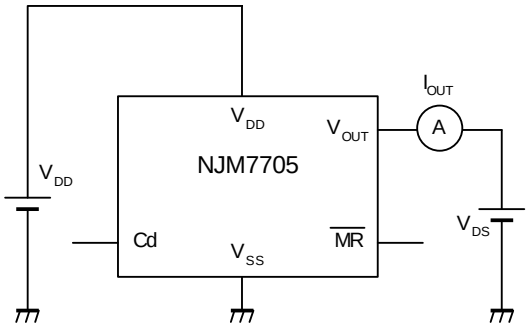
● Detection voltage TEST CIRCUIT



● MR pin Input voltage TEST CIRCUIT

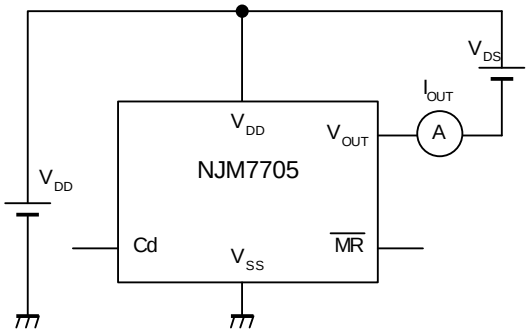


● Nch Output current TEST CIRCUIT

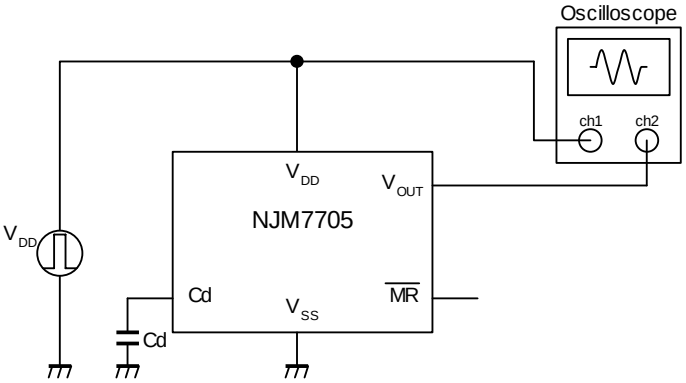


■ TEST CIRCUIT

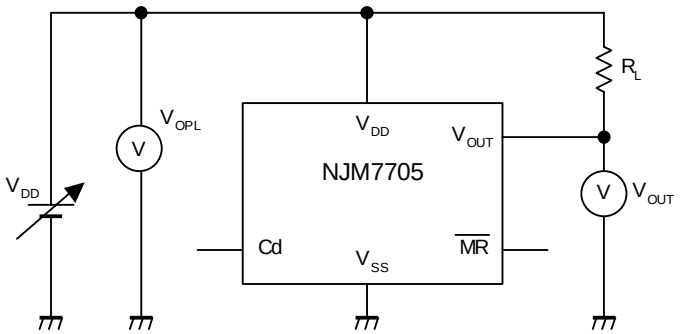
● Pch Output current TEST CIRCUIT



● Delay time TEST CIRCUIT



● Minimum operating voltage TEST CIRCUIT



■ TYPICAL APPLICATION

① Power Supply Monitor Circuit (VDD line COMMON)