

## VOLTAGE DETECTOR

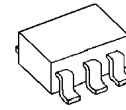
### ■ GENERAL DESCRIPTION

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

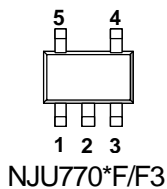


NJU7704/05F3

### ■ FEATURES

- High Precision Detection Voltage  $\pm 1.0\%$
- Low Quiescent Current 0.9 $\mu$ 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<sub>SS</sub>
- 3.MR
- 4.V<sub>OUT</sub>
- 5.V<sub>DD</sub>

# NJU7704/05

## ■ DETECTION VOLTAGE RANK LIST

Device Name	V <sub>DET</sub>	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 <sub>DET</sub>	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 <sub>DD</sub>	+10	V
Output Voltage	V <sub>OUT</sub>	V <sub>SS</sub> -0.3~+10	V
Output Current	I <sub>OUT</sub>	50	mA
Power Dissipation	P <sub>D</sub>	SOT-23-5	200
		SC88A	250(*note 1)
Operating Temperature	T <sub>opr</sub>	-40 ~ +85	°C
Storage Temperature	T <sub>stg</sub>	-40 ~ +125	°C

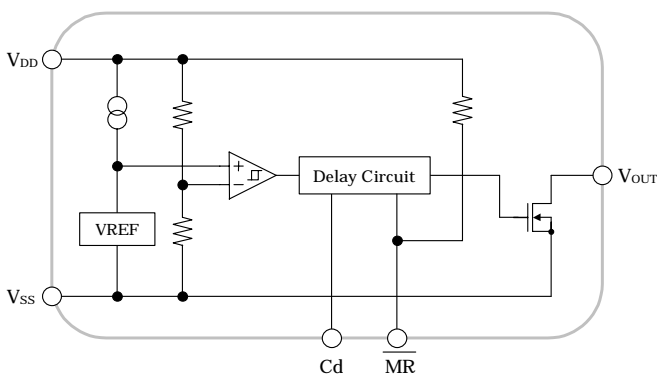
(\*note 1): On board, 114.3mm×76.2mm×1.6mm 2layers FR-4

■ ELECTRICAL CHARACTERISTICS (Ta=25°C)

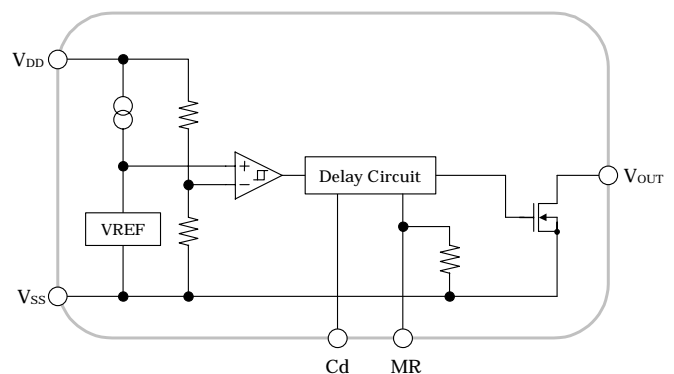
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Detection Voltage	V <sub>DET</sub>		-1.0%	-	+1.0%	V	
Hysteresis Voltage	V <sub>HYS</sub>		70	90	130	mV	
Quiescent Current	I <sub>SS</sub>	V <sub>DD</sub> =V <sub>DET</sub> +1V	V <sub>DET</sub> =1.5V~1.9V Version	-	0.7	1.5	μA
			V <sub>DET</sub> =2.0V~6.0V Version	-	0.9	2.0	
Output Current	I <sub>OUT</sub>	Nch, V <sub>DS</sub> =0.5V	V <sub>DD</sub> =1.2V	0.75	2.0	-	mA
			V <sub>DD</sub> =2.4V (≥2.7V Version)	4.5	7.0	-	
Output Leak Current	I <sub>LEAK</sub>	V <sub>DD</sub> =V <sub>OUT</sub> =9V	-	-	0.1	μA	
Detection Voltage Temperature Coefficient	ΔV <sub>DET</sub> /ΔTa	Ta=0~+85°C	-	±100	-	ppm/°C	
Delay Time	t <sub>d</sub>	V <sub>DD</sub> =V <sub>DET</sub> +1V, Cd=4.7nF	8	10	12	ms	
Input Voltage of MR pin (Active "L")	V <sub>MR_H</sub>		1.5	-	V <sub>DD</sub>	V	
	V <sub>MR_L</sub>		0	-	0.3		
Input Voltage of MR pin (Active "H")	V <sub>MR_H</sub>		V <sub>DD</sub> -0.3	-	V <sub>DD</sub>	V	
	V <sub>MR_L</sub>		0	-	V <sub>DD</sub> -1.5		
Impedance of MR pin	R <sub>MR</sub>		1.0	2.0	3.0	MΩ	
Operating Voltage (*note 2)	V <sub>DD</sub>	R <sub>L</sub> =100kΩ	0.8	-	9	V	

(\*note 2): The minimum Operating Voltage(V<sub>OPL</sub>) indicates the same value of the output voltage(V<sub>OUT</sub>) on condition that V<sub>OUT</sub> becomes 10% or less of the input voltage(V<sub>DD</sub>).

■ EQUIVALENT CIRCUIT



NJU7704\*\*\*A

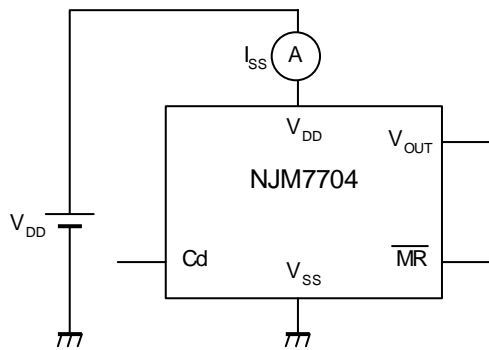


NJU7704F\*\*B

# NJU7704/05

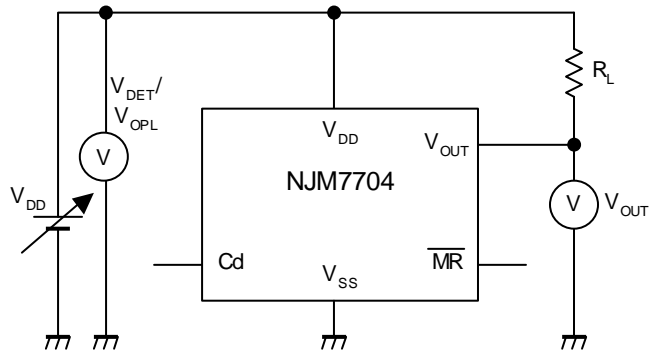
## ■ TEST CIRCUIT

### ● Circuit Operating Current TEST CIRCUIT

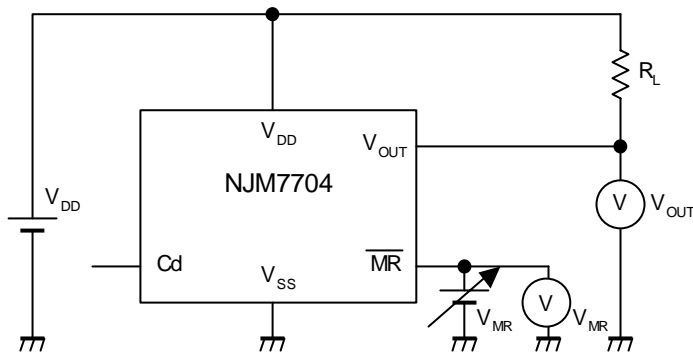


### ● Detection voltage/Minimum operating voltage TEST CIRCUIT

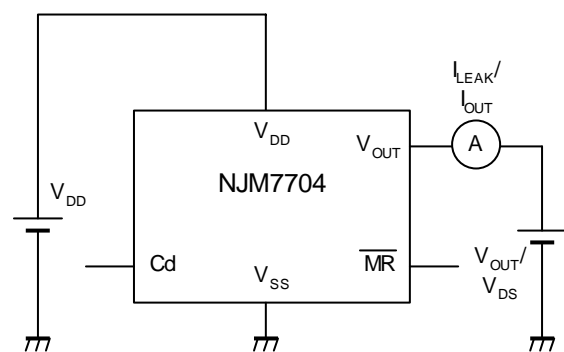
#### TEST CIRCUIT



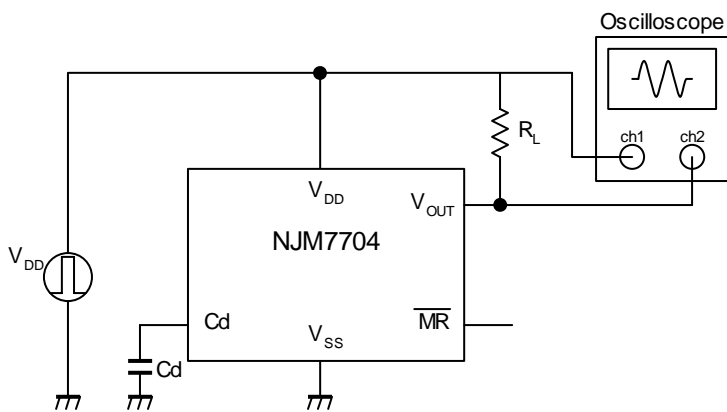
### ● MR pin Input voltage TEST CIRCUIT



### ● Leak current / Output current TEST CIRCUIT

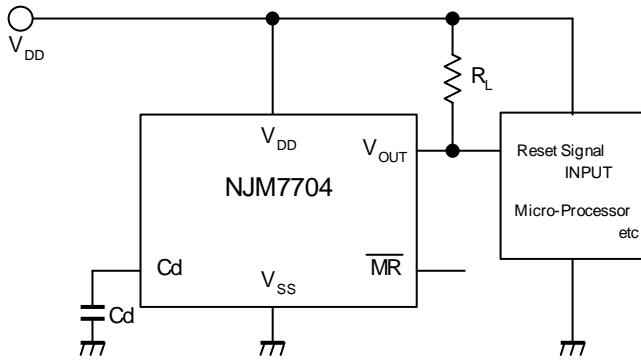


### ● Delay time TEST CIRCUIT

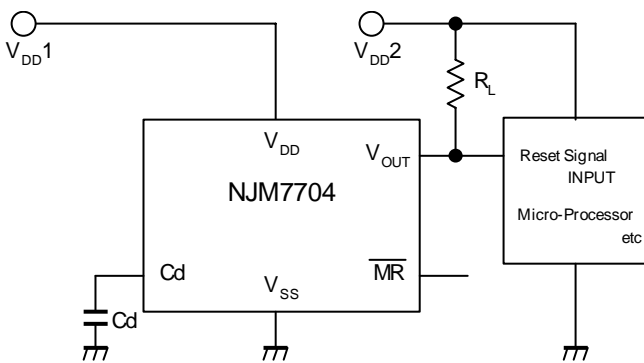


## ■ TYPICAL APPLICATION

### 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 <sub>DD</sub>	+10		V
Output Voltage	V <sub>OUT</sub>	V <sub>SS</sub> -0.3~+10		V
Output Current	I <sub>OUT</sub>	50		mA
Power Dissipation	P <sub>D</sub>	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

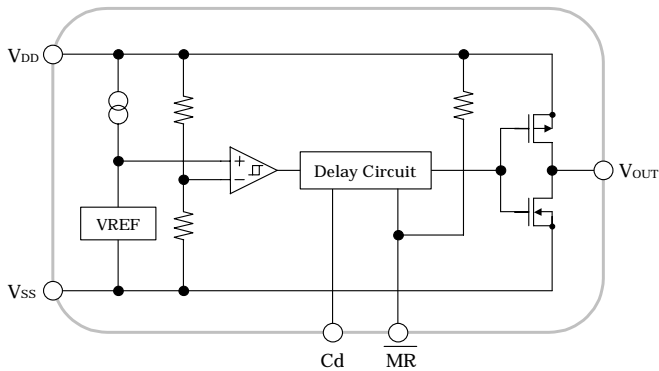
### ■ ELECTRICAL CHARACTERISTICS

(Ta=25°C)

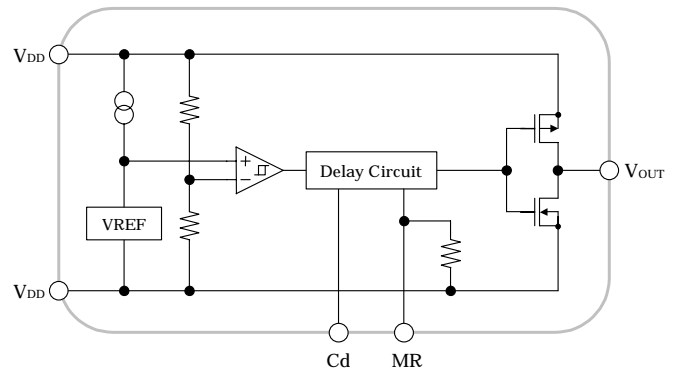
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Detection Voltage	V <sub>DET</sub>		-1.0%	-	+1.0%	V	
Hysteresis Voltage	V <sub>HYS</sub>		70	90	130	mV	
Quiescent Current	I <sub>SS</sub>	V <sub>DD</sub> =V <sub>DET</sub> +1V	V <sub>DET</sub> =1.5V~2.9V Version	-	0.7	1.5	μA
			V <sub>DET</sub> =2.6V~6.0V Version	-	0.9	2.0	
Output Current	I <sub>OUT</sub>	Nch, V <sub>DS</sub> =0.5V	V <sub>DD</sub> =1.2V	0.75	2.0	-	mA
			V <sub>DD</sub> =2.4V (≥2.7V Version)	4.5	7.0	-	
		Pch, V <sub>DS</sub> =0.5V	V <sub>DD</sub> =4.8V (≤3.9V Version)	2.0	3.5	-	
			V <sub>DD</sub> =6.0V (4.0~5.6V Version)	2.5	4.0	-	
V <sub>DD</sub> =8.4V (≥5.7V Version)	3.0	5.0	-				
Detection Voltage Temperature Coefficient	Δ V <sub>DET</sub> / ΔTa	Ta=0~+85°C	-	±100	-	ppm/°C	
Delay Time	t <sub>d</sub>	V <sub>DD</sub> =V <sub>DET</sub> +1V, Cd=4.7nF	8	10	12	ms	
Input Voltage of MR pin (Active "L")	V <sub>MR_H</sub>		1.5	-	V <sub>DD</sub>	V	
	V <sub>MR_L</sub>		0	-	0.3		
Input Voltage of MR pin (Active "H")	V <sub>MR_H</sub>		V <sub>DD</sub> -0.3	-	V <sub>DD</sub>	V	
	V <sub>MR_L</sub>		0	-	V <sub>DD</sub> -1.5		
Impedance of MR pin	R <sub>MR</sub>		1.0	2.0	3.0	MΩ	
Operating Voltage (*note 4)	V <sub>DD</sub>	R <sub>L</sub> =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



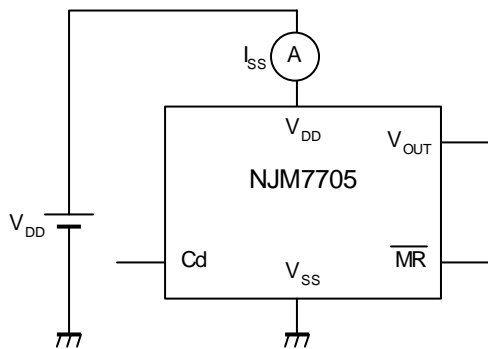
NJU7705\*\*\*A



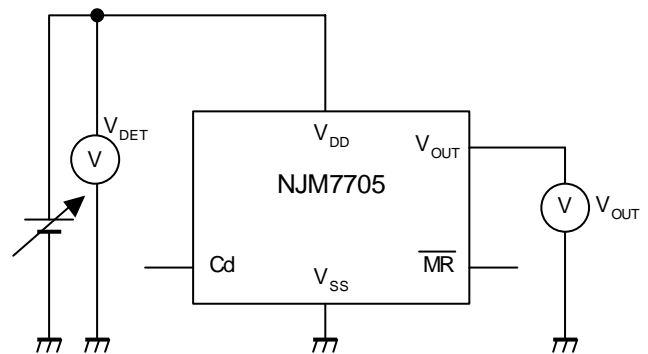
NJU7705\*\*\*B

## ■ TEST CIRCUIT

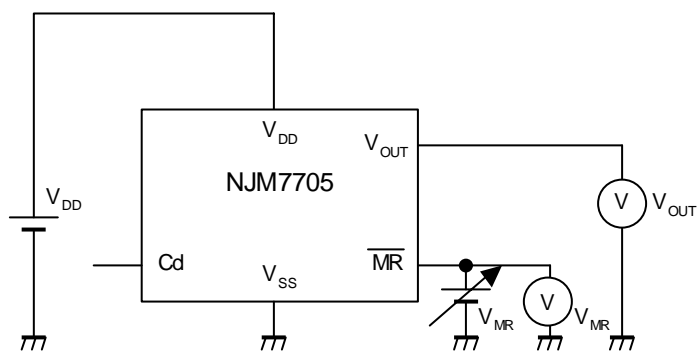
### ● Circuit Operating Current TEST CIRCUIT



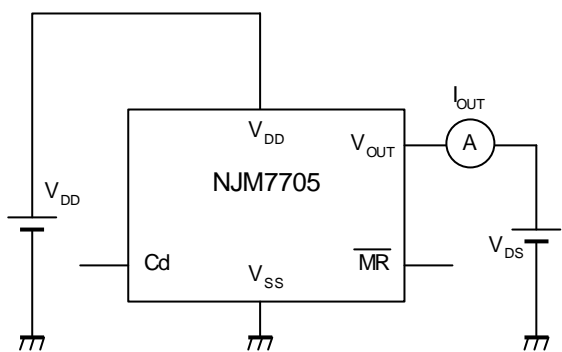
### ● Detection voltage TEST CIRCUIT



### ● MR pin Input voltage TEST CIRCUIT



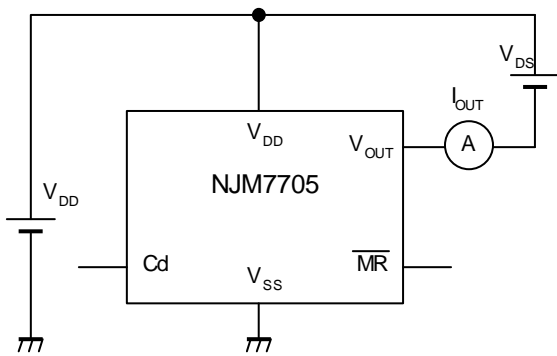
### ● Nch Output current TEST CIRCUIT



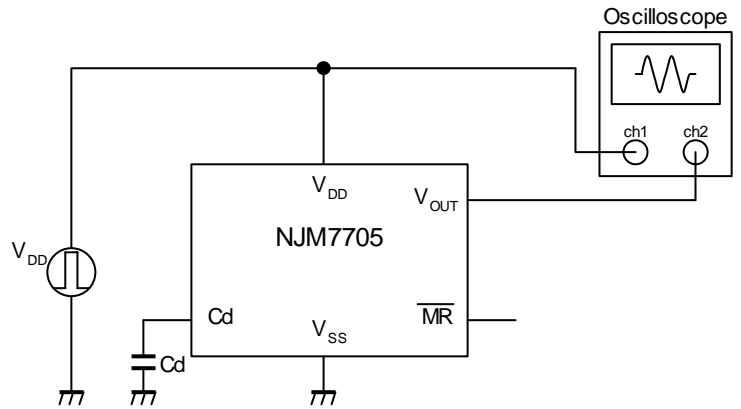
# NJU7704/05

## ■ TEST CIRCUIT

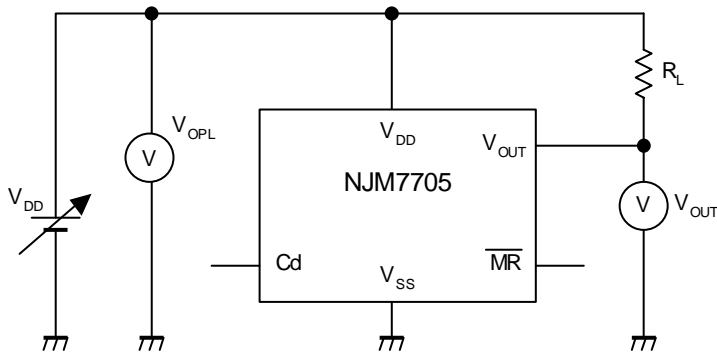
### ● Pch Output current TEST CIRCUIT



### ● Delay time TEST CIRCUIT

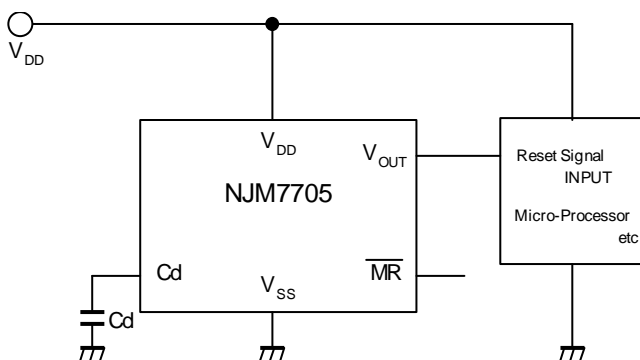


### ● Minimum operating voltage TEST CIRCUIT



## ■ TYPICAL APPLICATION

### ① Power Supply Monitor Circuit (VDD line COMMON)



#### [CAUTION]

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