

VOLTAGE DETECTOR

■ GENERAL DESCRIPTION

The NJU7706/07 is a high precision voltage detector with a built-in delay time generator of fixed time.

The detection voltage is fixed internally with an accuracy of 1.0%, and three delay times 50ms, 100ms and 200ms are available.

NJU7706 is Nch. Open Drain and NJU7707 of output form is a C-MOS output.

■ PACKAGE OUTLINE

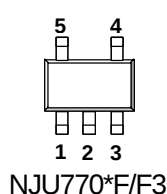


NJU7706/07F

■ FEATURES

- | | |
|--|--|
| ● High Precision Detection Voltage | ±1.0% |
| ● Low Quiescent Current | 1.8μA typ. |
| ● Detection Voltage Range | 1.5 ~ 6.0V(0.1V step) |
| ● Delay Time(Built-in Fixed Type) | 50ms /100ms /200ms(Built-in Fixed Type) |
| ● ON/OFF switch of delay time (DS pin) | |
| ● Manual Reset | 2type: Active "H" / Active "L" |
| ● Output Circuit Form | NJU7706: Nch. Open Drain type
NJU7707: C-MOS Output |
| ● Package Outline | SOT-23-5 (MTP5) |

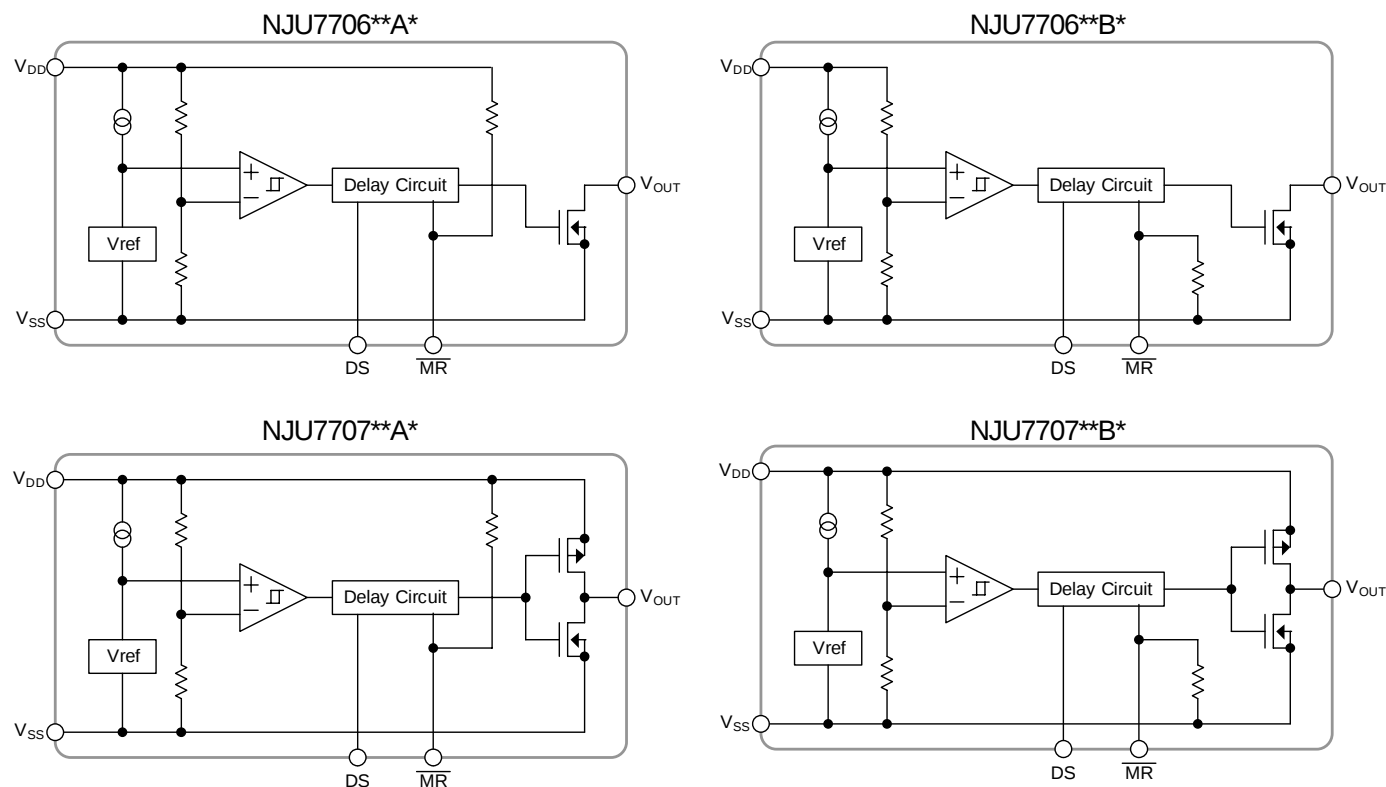
■ PIN CONFIGURATION



PIN FUNCTION

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

■ EQUIVALENT CIRCUIT



■ DETECTION VOLTAGE RANK LIST

Device Name	V_{DET}	MR Logic	Delay Time
NJU7706/07F39A1	3.9V	Active "L"	50mS
NJU7706/07F42A1	4.2V	Active "L"	50mS

Device Name	V_{DET}	MR Logic	Delay Time
NJU7706/07F15A1	1.5V	Active "L"	100mS
NJU7706/07F22A1	2.2V	Active "L"	100mS
NJU7706/07F27A1	2.7V	Active "L"	100mS
NJU7706/07F29A1	2.9V	Active "L"	100mS
NJU7706/07F42A1	4.2V	Active "L"	100mS
NJU7706/07F06A1	6.0V	Active "L"	100mS

Device Name	V_{DET}	MR Logic	Delay Time
NJU7706/07F39A1	3.9V	Active "L"	200mS
NJU7706/07F42A1	4.2V	Active "L"	200mS

Device Name	V_{DET}	MR Logic	Delay Time
NJU7706/07F27B1	2.7V	Active "H"	100mS

■ NJU7706

■ 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	200	mW
Operating Temperature	T_{opr}	-40 ~ +85	°C
Storage Temperature	T_{stg}	-40 ~ +125	°C

■ ELECTRICAL CHARACTERISTICS

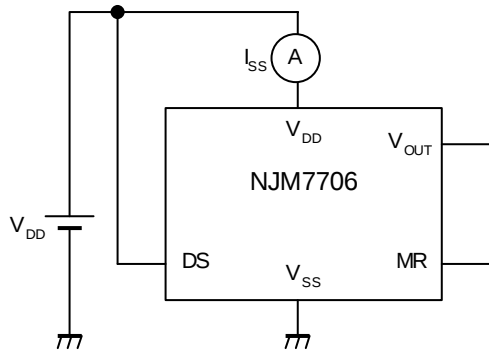
(Ta=25°C)

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	—	1.0	1.7	μA
			V _{DET} =2.0V ~ 6.0V Version	—	1.3	2.2	
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	Δ V _{DET} /ΔTa	Ta=0 ~ +85°C		—	±100	—	ppm/°C
Delay Time 1	t _{d1}	V _{DD} =V _{DET} +1V, DS="L Level"	NJU7706F***1	42.5	50	57.5	mS
			NJU7706F***2	85	100	115	mS
			NJU7706F***3	170	200	230	mS
Delay Time 2	t _{d2}	V _{DD} =V _{DET} +1V, DS="H Level"		25	50	300	μS
Input Voltage of DS pin	V _{DS_H}			1.5	—	V _{DD}	V
	V _{DS_L}			0	—	0.3	V
Input Voltage of MR pin (Active "L")	V _{MR_H}			1.5	—	V _{DD}	V
	V _{MR_L}			0	—	0.3	V
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	V
Impedance of MR pin	R _{MR}			1.0	2.0	3.0	MΩ
Operating Voltage (*note 1)	V _{DD}	R _L =100kΩ		0.8	—	9	V

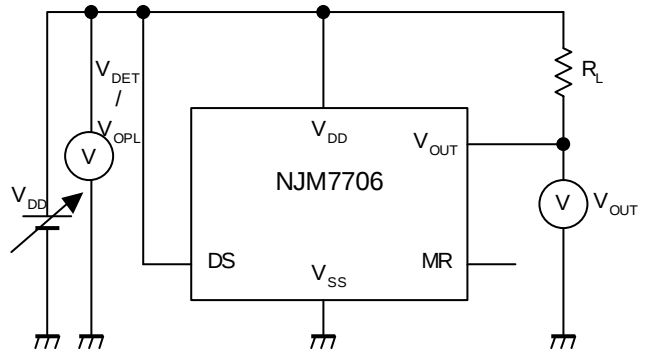
(*note 1): The minimum Operating Voltage(V_{OPL}) indicates the same value of the output voltage(V_{OUT}) on condition that V_{OUT} becomes 10% or less of the input voltage(V_{DD}).

■ TEST CIRCUIT

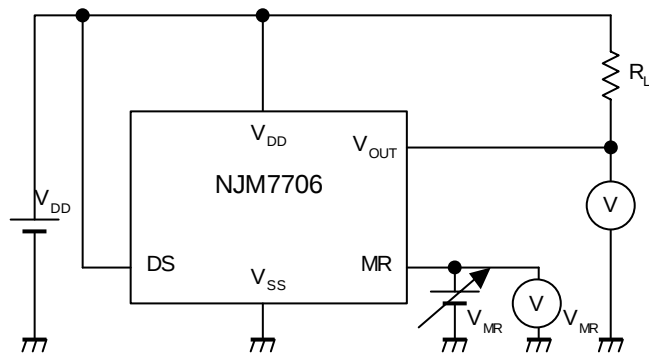
● Circuit Operating Current TEST CIRCUIT



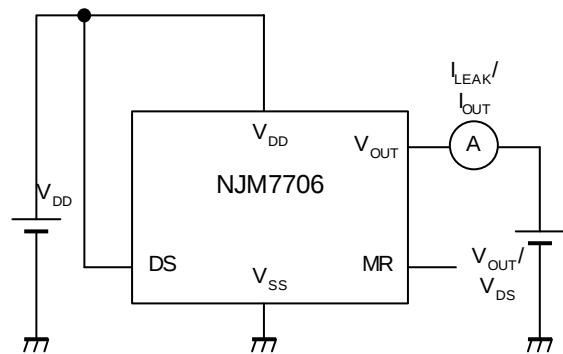
● Detection voltage/Minimum operating voltage TEST CIRCUIT



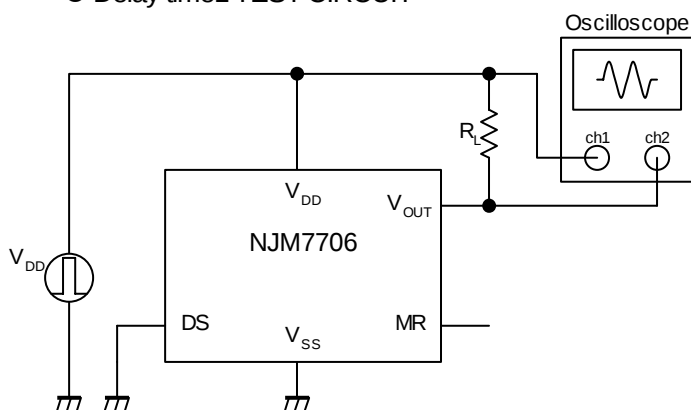
● MR pin Input voltage TEST CIRCUIT



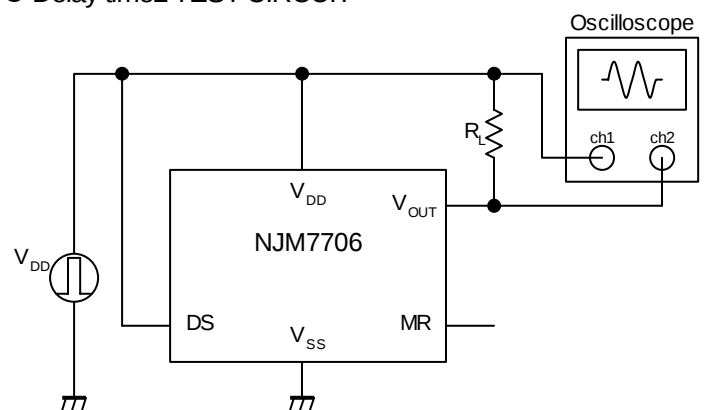
● Leak current / Output current TEST CIRCUIT



● Delay time1 TEST CIRCUIT

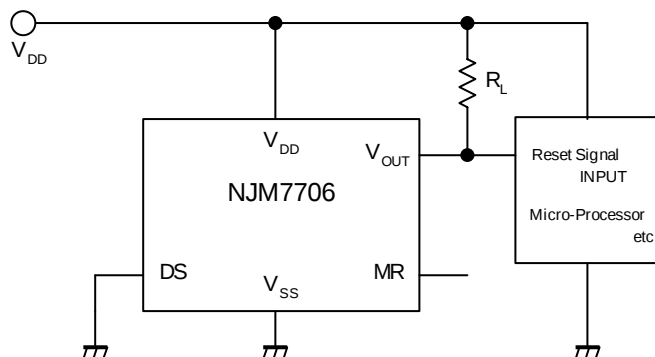


● Delay time2 TEST CIRCUIT

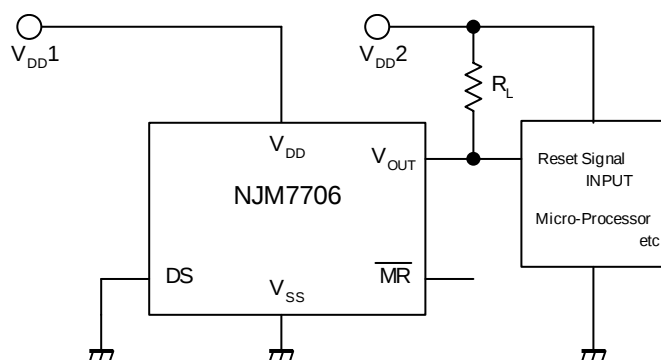


■ TYPICAL APPLICATION

① Power Supply Monitor Circuit



② Power Supply Monitor Circuit (V_{DD} line SEPARATE)



■ NJU7707

■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{DD}	+10	V
Output Voltage	V_{OUT}	$V_{SS}-0.3 \sim V_{DD}+0.3$	V
Output Current	I_{OUT}	50	mA
Power Dissipation	P_D	200	mW
Operating Temperature	T_{opr}	-40 ~ +85	°C
Storage Temperature	T_{stg}	-40 ~ +125	°C

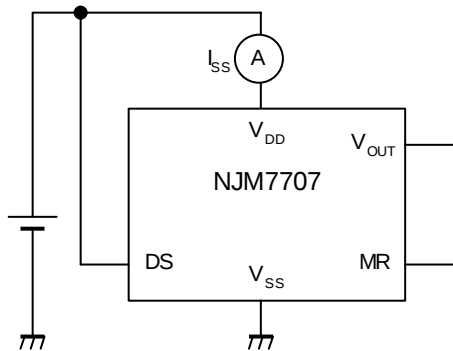
■ ELECTRICAL CHARACTERISTICS (Ta=25°C)

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}	$V_{DD}=V_{DET}+1V$				μA
		$V_{DET}=1.5V \sim 1.9V$ Version	—	1.0	1.7	
		$V_{DET}=2.0V \sim 6.0V$ Version	—	1.3	2.2	
Output Current	I_{OUT}	Nch, $V_{DS}=0.5V$	$V_{DD}=1.2V$	0.75	2.0	—
			$V_{DD}=2.4V$ (≥2.7V Version)	4.5	7.0	—
		Pch, $V_{DS}=0.5V$	$V_{DD}=4.8V$ (≤3.9V Version)	2.0	3.5	—
			$V_{DD}=6.0V$ (4.0V ~ 5.6V Version)	2.5	4.0	—
			$V_{DD}=8.4V$ (≥5.7V Version)	3.0	5.0	—
Detection Voltage Temperature Coefficient	$\Delta V_{DET} / \Delta T_a$	$T_a=0 \sim +85^\circ C$	—	±100	—	ppm/°C
Delay Time 1	t_{d1}	$V_{DD}=V_{DET}+1V$, DS="L Level"	NJU7707F***1	42.5	50	57.5
			NJU7707F***2	85	100	115
			NJU7707F***3	170	200	230
Delay Time 2	t_{d2}	$V_{DD}=V_{DET}+1V$, DS="H Level"	25	50	300	μS
Input Voltage of DS pin	V_{DS_H}		1.5	—	V_{DD}	V
	V_{DS_L}		0	—	0.3	V
Input Voltage of MR pin (Active "L")	V_{MR_H}		1.5	—	V_{DD}	V
	V_{MR_L}		0	—	0.3	V
Input Voltage of MR pin (Active "H")	V_{MR_H}		$V_{DD}-0.3$	—	V_{DD}	V
	V_{MR_L}		0	—	$V_{DD}-1.5$	V
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

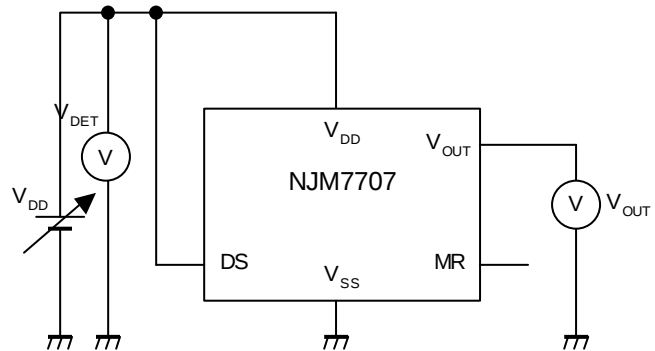
(*note 2): The minimum Operating Voltage(V_{OPL}) indicates the same value of the output voltage(V_{OUT}) on condition that V_{OUT} becomes 10% or less of the input voltage(V_{DD}).

■ TEST CIRCUIT

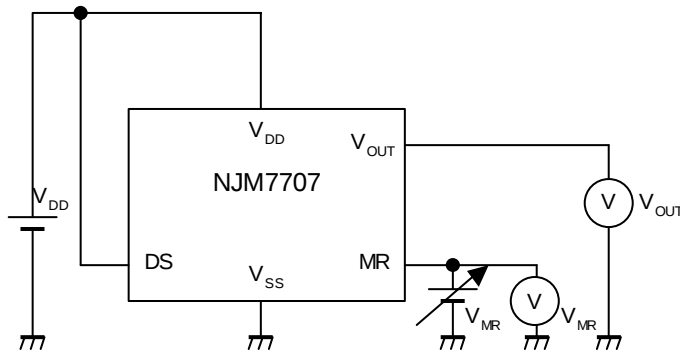
● Circuit Operating Current TEST CIRCUIT



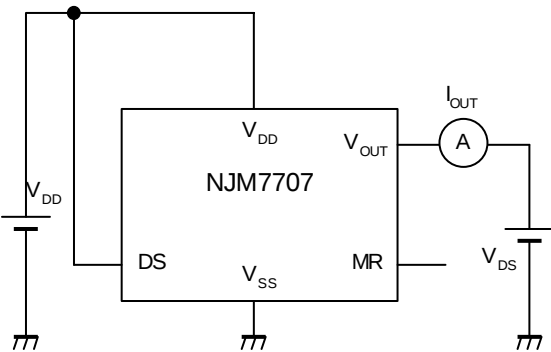
● Detection voltage TEST CIRCUIT



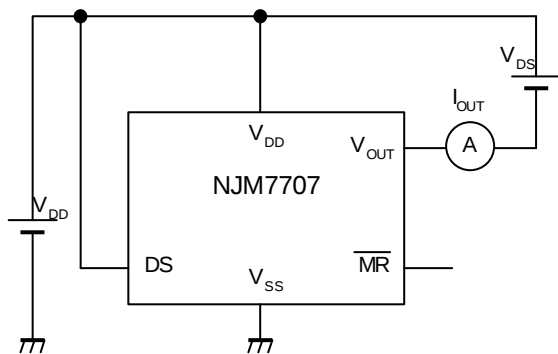
● MR pin Input voltage TEST CIRCUIT



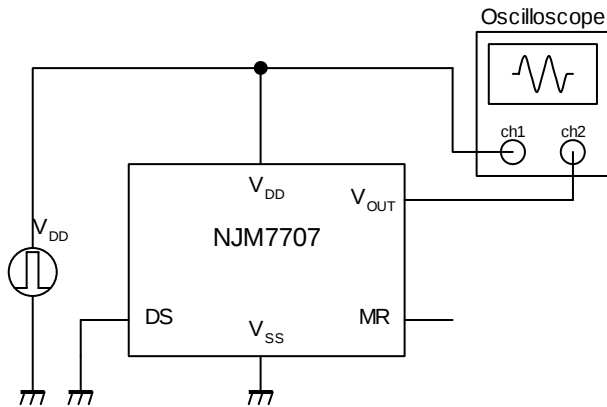
● Nch Output current TEST CIRCUIT



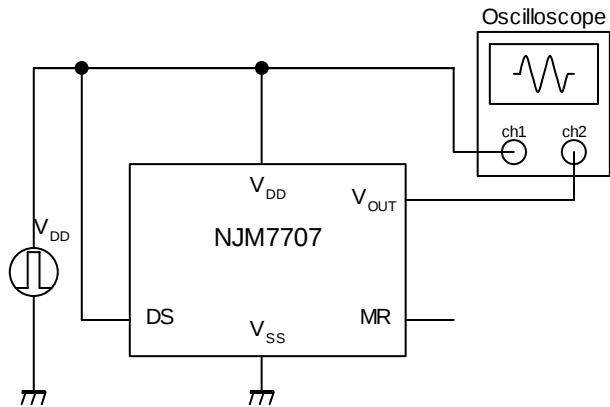
● Pch Output current TEST CIRCUIT



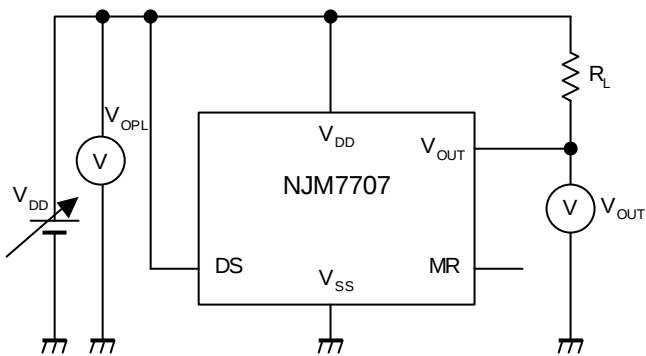
● Delay time1 TEST CIRCUIT



● Delay time2 TEST CIRCUIT

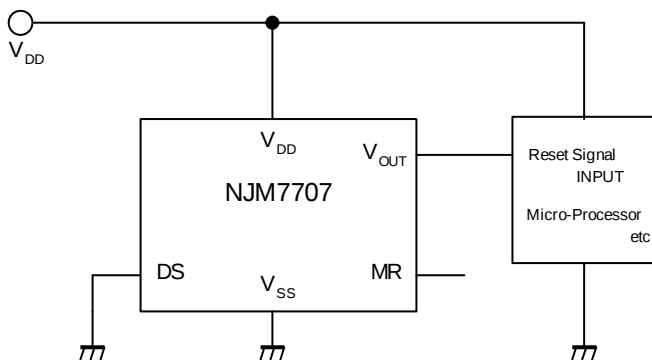


● Minimum operating voltage TEST CIRCUIT



■ TYPICAL APPLICATION

① Power Supply Monitor Circuit (VDD line COMMON)



[CAUTION]

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