

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

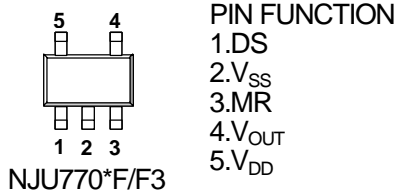


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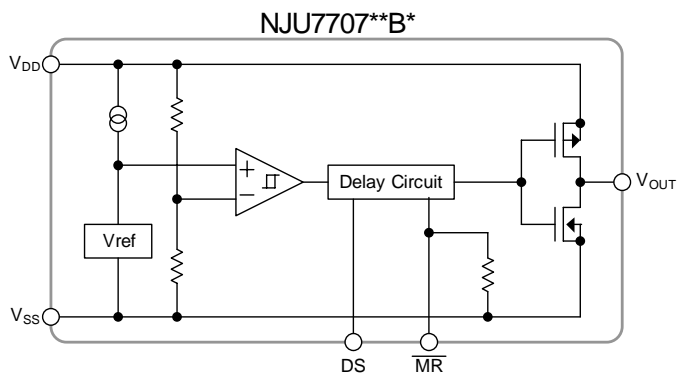
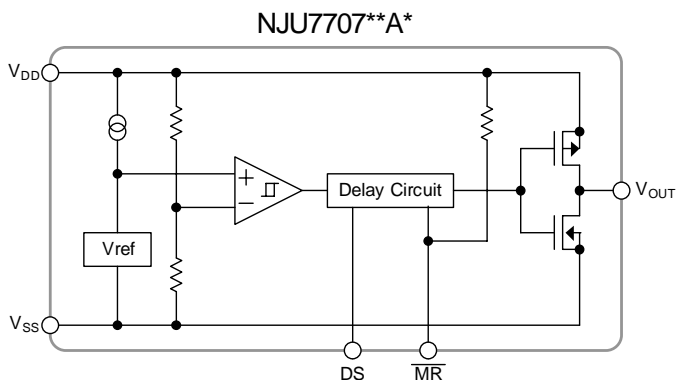
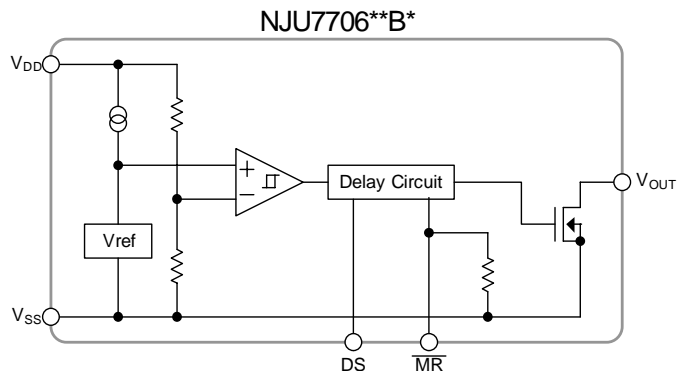
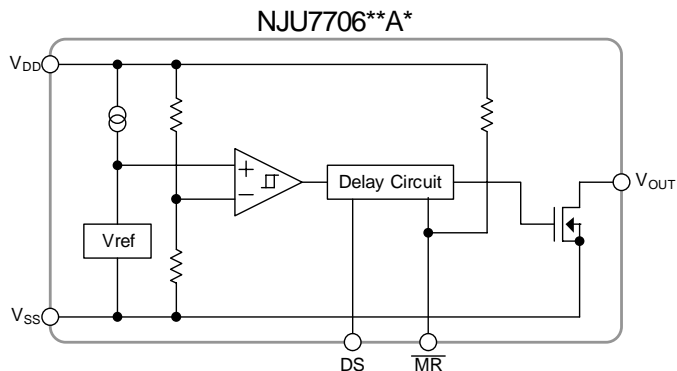
■ FEATURES

- 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



■ 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
NJU7706/07F27B1	2.7V	Active "H"	100mS

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

■ 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 ~ +10	V
Output Current	I _{OUT}	50	mA
Power Dissipation	P _D	200	mW
Operating Temperature	Topr	-40 ~ +85	°C
Storage Temperature	Tstg	-40 ~ +125	°C

■ ELECTRICAL CHARACTERISTICS

(Ta=25°C)

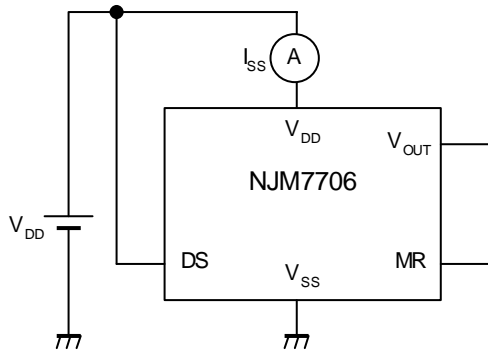
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Detection Voltage	V _{DET}		-1.0%	–	+1.0%	V	
Hysteresis Voltage	V _{HYS}		70	90	130	mV	
Quiescent Current	I _{SS}	V _{DD} =V _{DET} +1V	V _{DET} =1.5V ~ 1.9V Version	–	1.0	1.7	μA
			V _{DET} =2.0V ~ 6.0V Version	–	1.3	2.2	
Output Current	I _{OUT}	Nch, 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}).

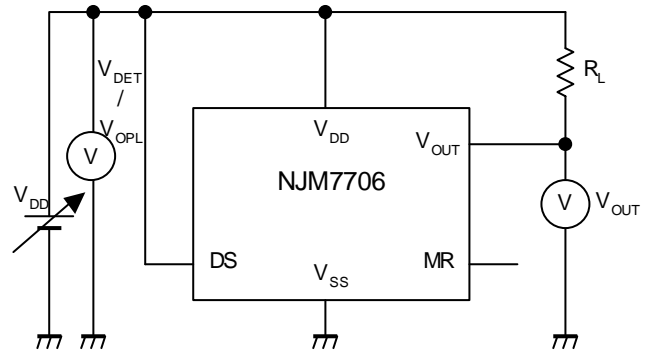
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■ TEST CIRCUIT

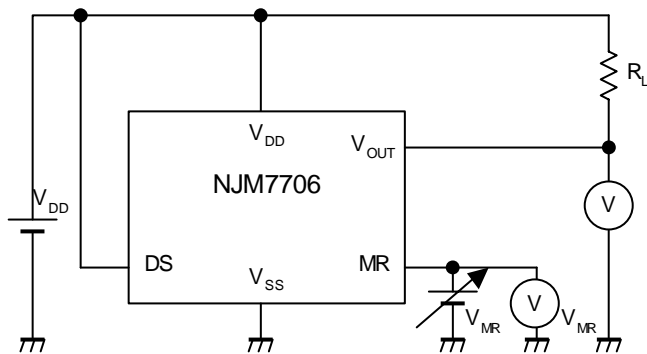
● Circuit Operating Current TEST CIRCUIT



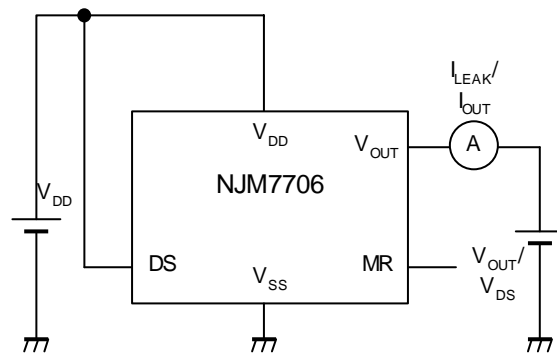
● Detection voltage/Minimum operating voltage TEST CIRCUIT



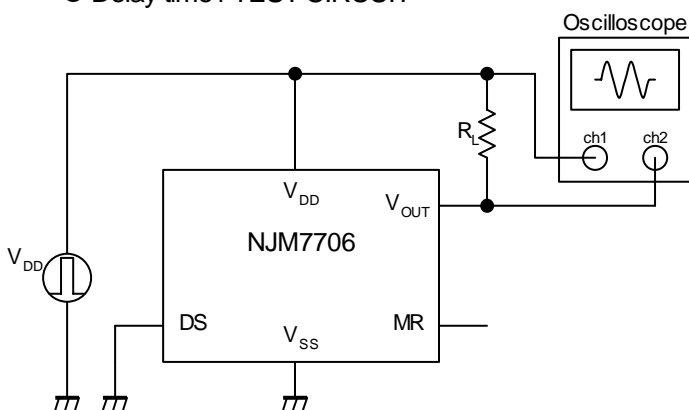
● MR pin Input voltage TEST CIRCUIT



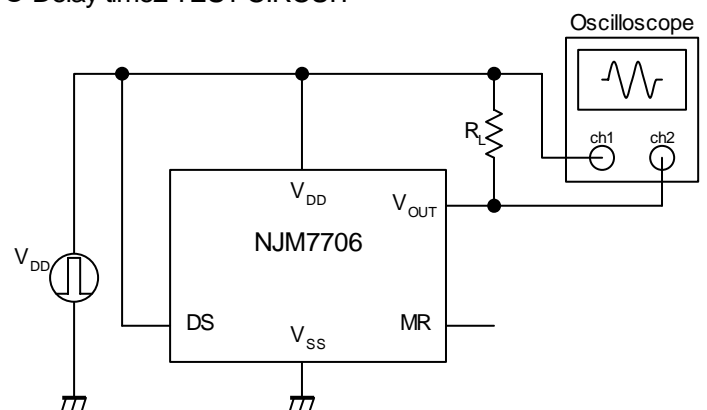
● Leak current / Output current TEST CIRCUIT



● Delay time1 TEST CIRCUIT

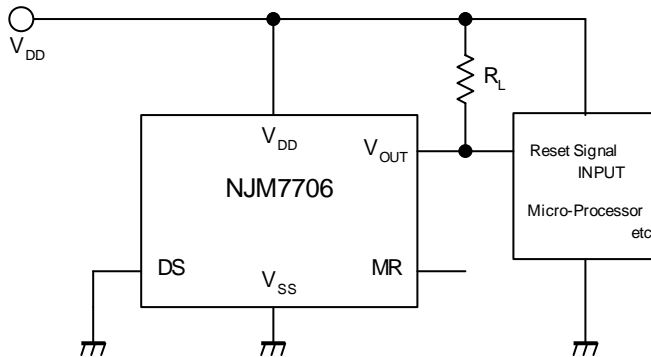


● Delay time2 TEST CIRCUIT

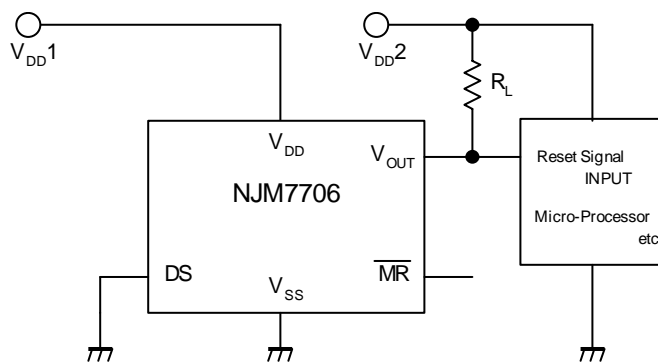


■ TYPICAL APPLICATION

① Power Supply Monitor Circuit



② Power Supply Monitor Circuit (VDD line SEPARATE)



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■ 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 ~ 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

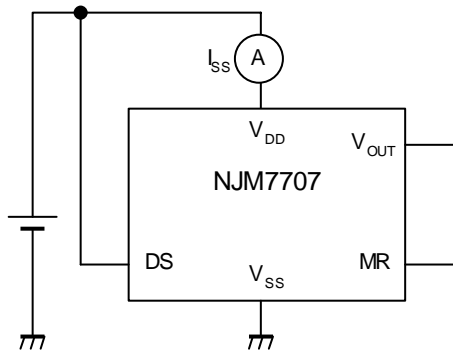
(Ta=25°C)

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	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	–	
		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	Δ V _{DET} / ΔTa	Ta=0 ~ +85°C	–	±100	–	ppm/°C	
Delay Time 1	t _{d1}	V _{DD} =V _{DET} +1V, DS="L Level"	NJU7707F***1	42.5	50	57.5	mS
			NJU7707F***2	85	100	115	mS
			NJU7707F***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 2)	V _{DD}	R _L =100kΩ	0.8	–	9	V	

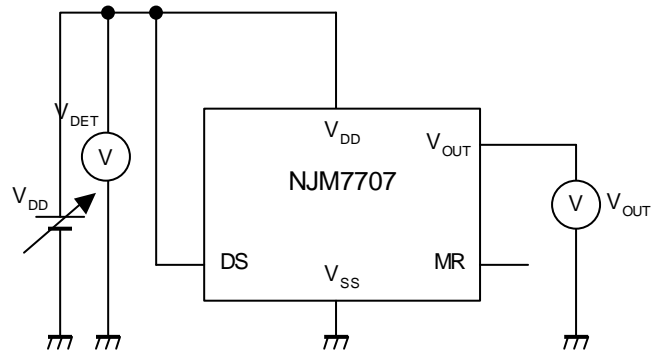
(*note 2): The minimum Operating Voltage(V_{OPL}) indicates the same value of the output voltage(V_{OUT}) on condition that V_{OUT} becomes 10% or less of the input voltage(V_{DD}).

■ TEST CIRCUIT

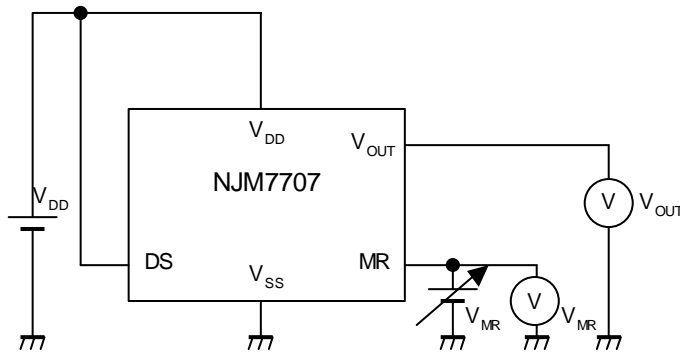
● Circuit Operating Current TEST CIRCUIT



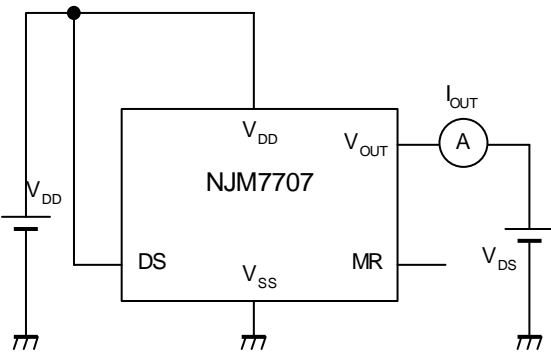
● Detection voltage TEST CIRCUIT



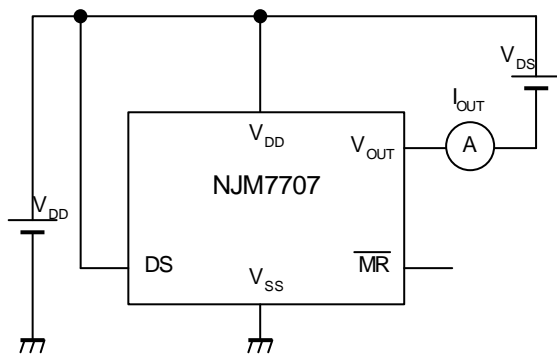
● MR pin Input voltage TEST CIRCUIT



● Nch Output current TEST CIRCUIT

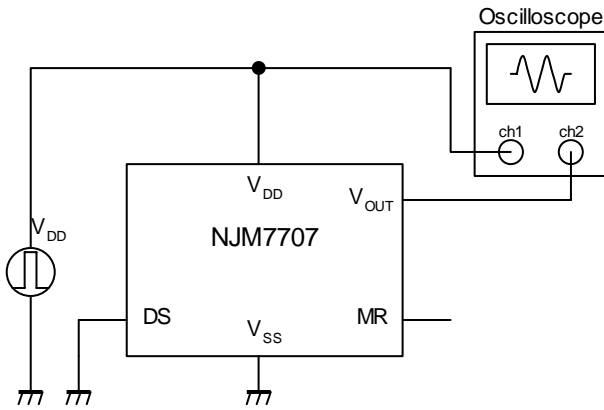


● Pch Output current TEST CIRCUIT

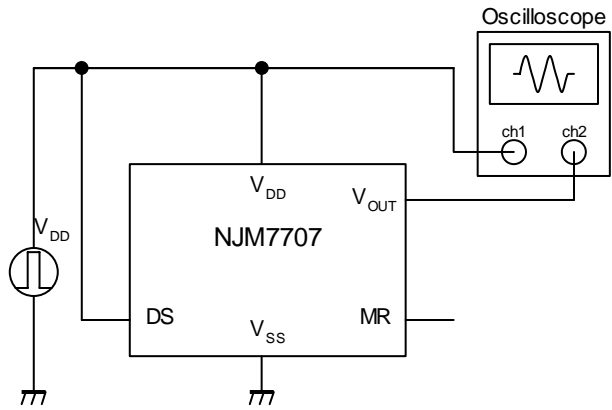


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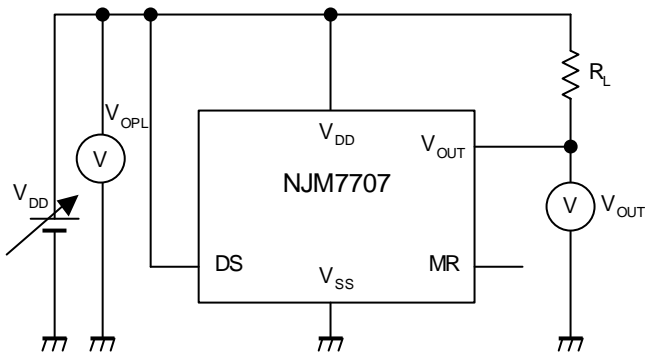
● Delay time1 TEST CIRCUIT



● Delay time2 TEST CIRCUIT

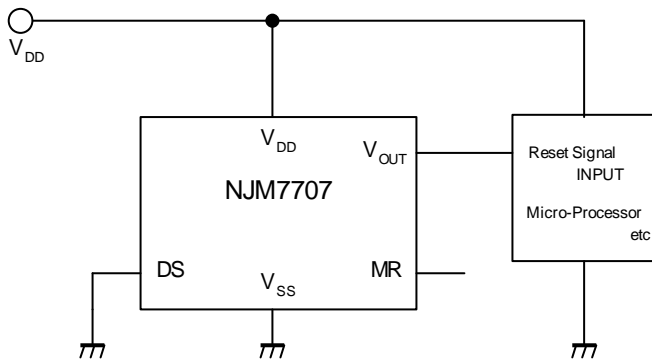


● Minimum operating voltage TEST CIRCUIT



■ TYPICAL APPLICATION

① Power Supply Monitor Circuit (VDD line COMMON)



[CAUTION]

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