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.

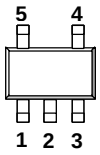
■ PACKAGE OUTLINE

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

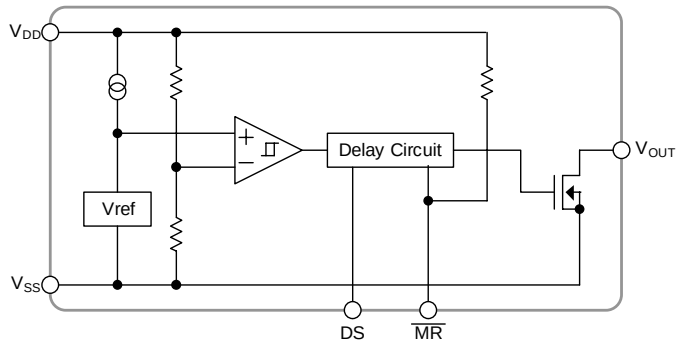


NJU770*F/F3

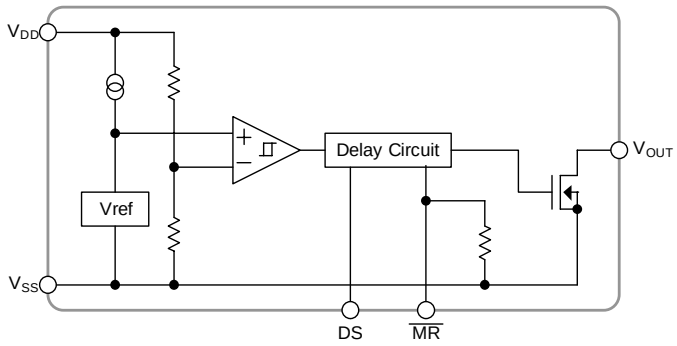
PIN FUNCTION
1.DS
2.V_{SS}
3.MR
4.V_{OUT}
5.V_{DD}

■ EQUIVALENT CIRCUIT

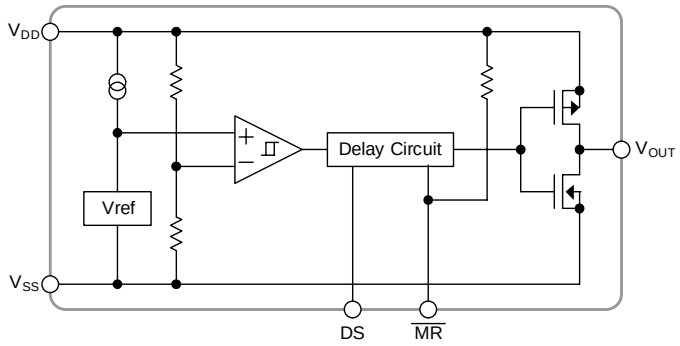
NJU7706**A*



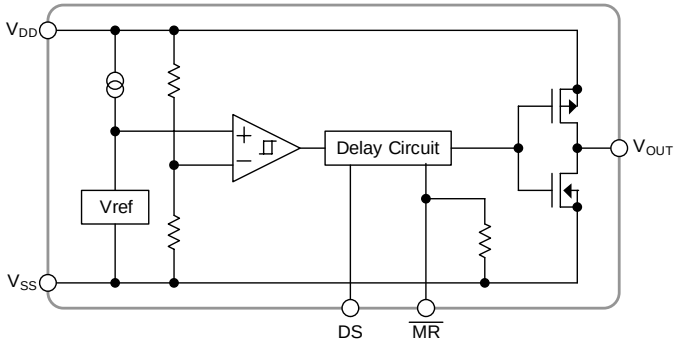
NJU7706**B*



NJU7707**A*



NJU7707**B*



■ 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

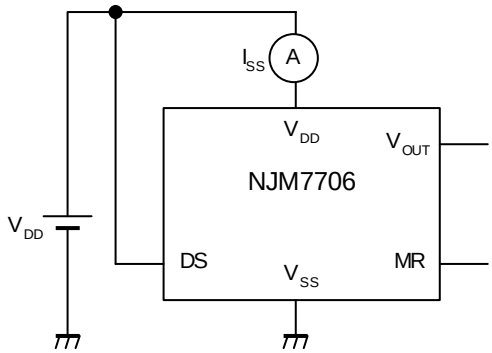
■ ELECTRICAL CHARACTERISTICS (Ta=25°C)

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	$\Delta V_{DET}/\Delta Ta$	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

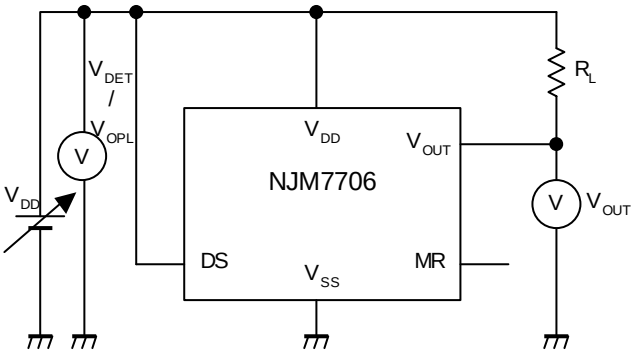
(*note 1): The minimum Operating Voltage(V_{OPL}) indicates the same value of the output voltage(V_{OUT}) on condition that V_{OUT} becomes 10% or less of the input voltage(V_{DD}).

■ TEST CIRCUIT

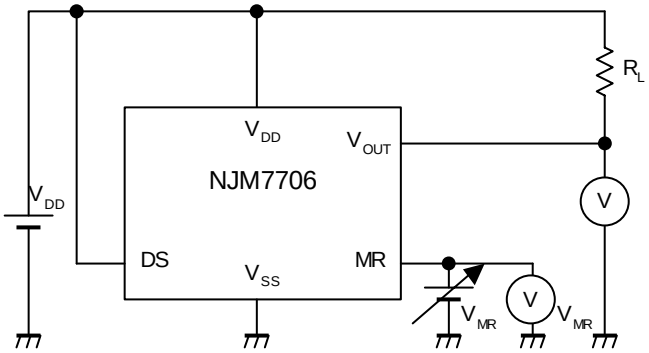
● Circuit Operating Current TEST CIRCUIT



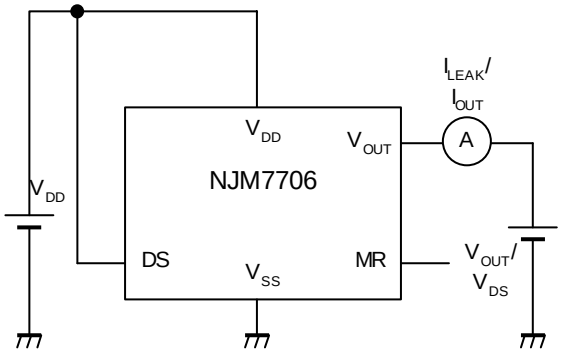
● Detection voltage/Minimum operating voltage TEST CIRCUIT



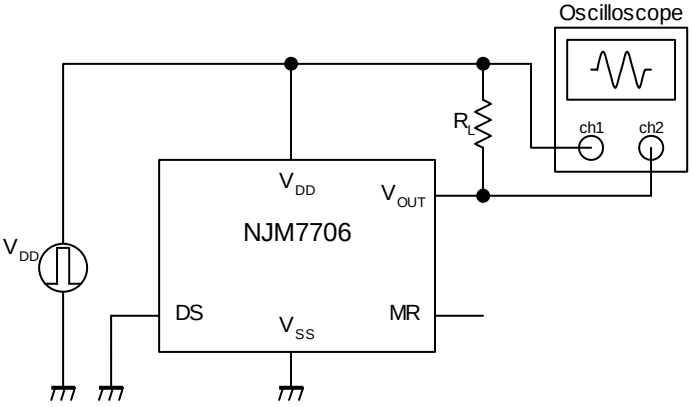
● MR pin Input voltage TEST CIRCUIT



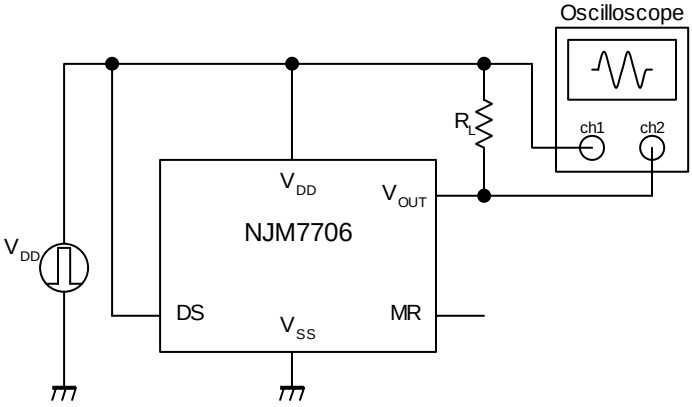
● Leak current / Output current TEST CIRCUIT



● Delay time1 TEST CIRCUIT

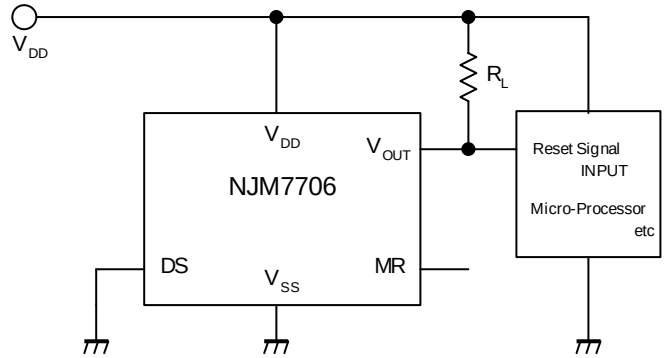


● Delay time2 TEST CIRCUIT

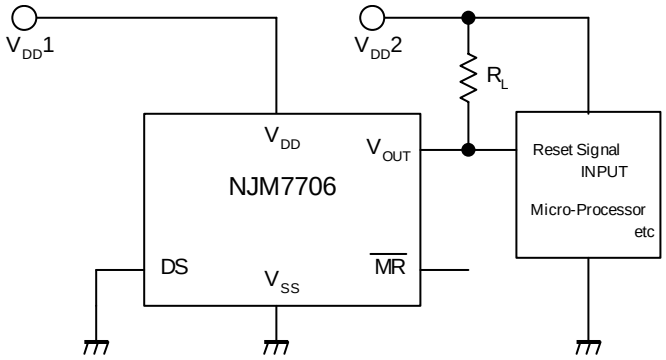


■ TYPICAL APPLICATION

① Power Supply Monitor Circuit



② Power Supply Monitor Circuit (VDD 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 ~ V_{DD}+0.3	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

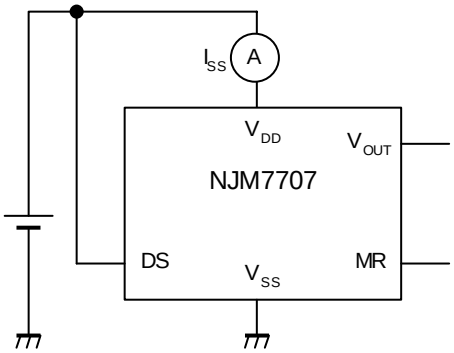
■ ELECTRICAL CHARACTERISTICS (Ta=25°C)

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	–	
		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	$\Delta V_{DET}/\Delta Ta$	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

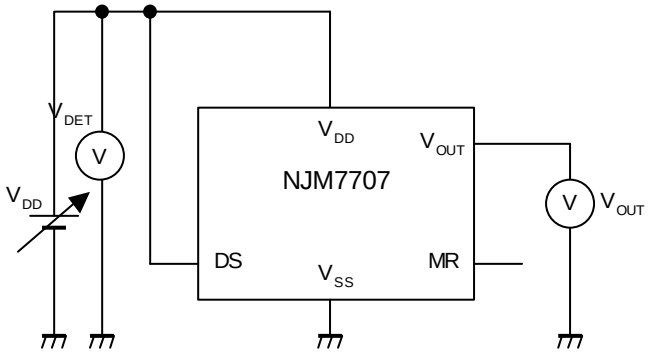
(*note 2): The minimum Operating Voltage(V_{OPL}) indicates the same value of the output voltage(V_{OUT}) on condition that V_{OUT} becomes 10% or less of the input voltage(V_{DD}).

■ TEST CIRCUIT

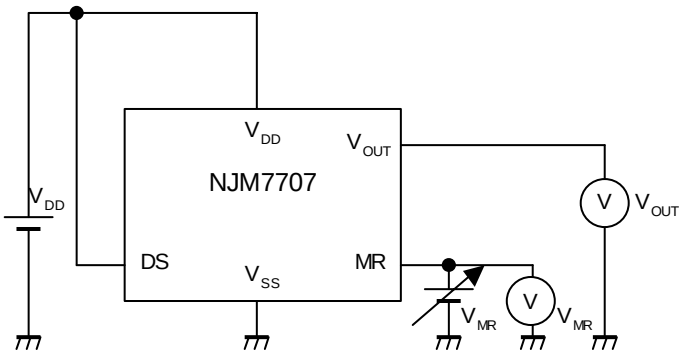
● Circuit Operating Current TEST CIRCUIT



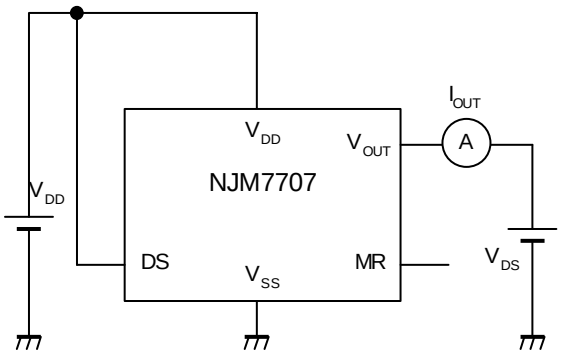
● Detection voltage TEST CIRCUIT



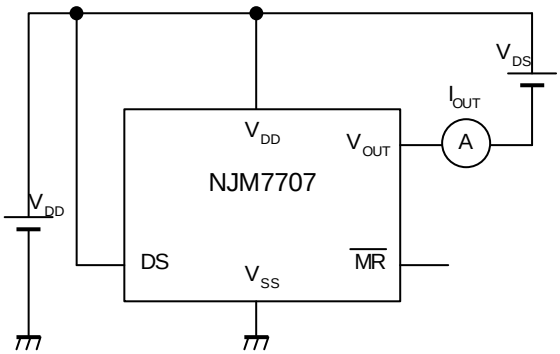
● MR pin Input voltage TEST CIRCUIT



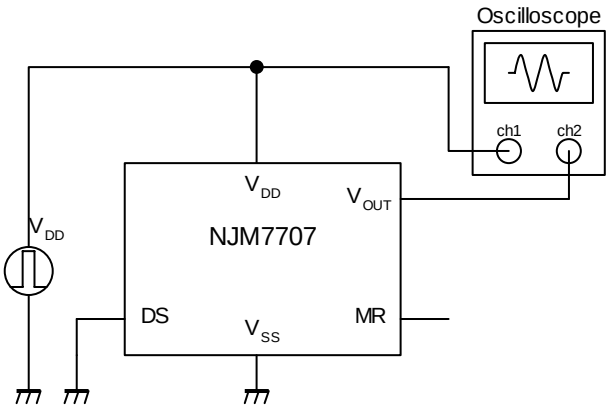
● Nch Output current TEST CIRCUIT



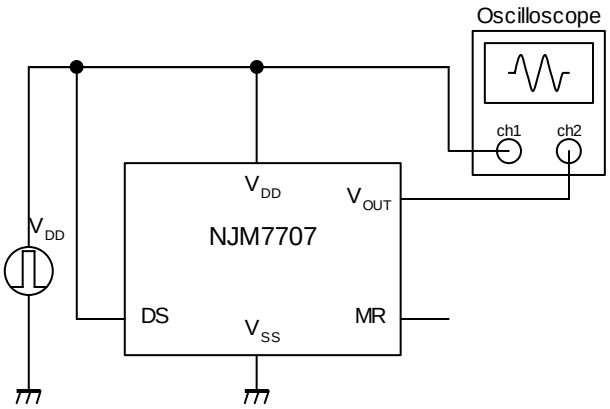
● Pch Output current TEST CIRCUIT



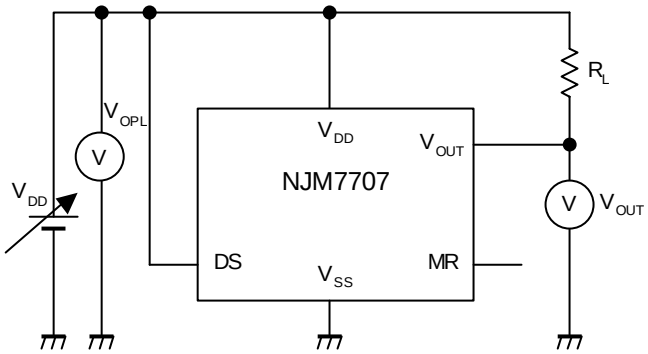
● Delay time1 TEST CIRCUIT



● Delay time2 TEST CIRCUIT

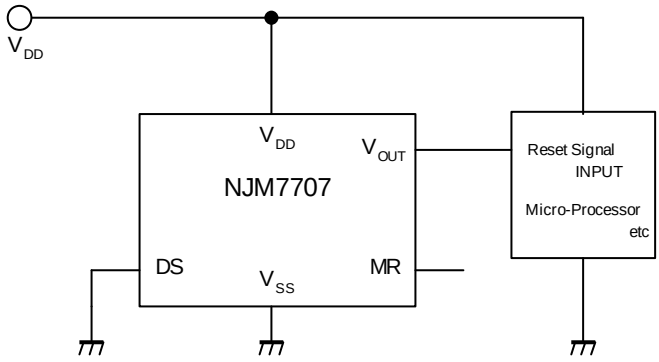


● Minimum operating voltage TEST CIRCUIT



■ TYPICAL APPLICATION

① Power Supply Monitor Circuit (VDD line COMMON)



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