CMOS Voltage Regulator And Voltage Detector

■ General Description

The LN5075 series is a series of precise, low dropout, positive voltage regulators and high-precision voltage detectors developed using CMOS process. Low power consumption, small package, low temperature excursion can meet demand from the portable device applications.

The voltage regulator consists of a current limiter circuit and also operates as a short protect for the output current limiter and the output pin. The voltage detector has two output forms, which Nch open-drain and CMOS output, are available.

■ Applications

- Battery powered equipment
- Reference voltage sources
- Cameras, Video cameras
- Mobile phones
- Communication tools

■ Features

- Output Voltage Range:2V to 5.0V (selectable in 100mV steps)
- Highly Accurate :± 2%(both regulator and detector)
- Dropout Voltage :160mV @ 50mA (3.0V type)
- Low Power Consumption :6μA (TYP.)
- Maximum Output Current :100mA (Vin≥Vout+1V)
- Internal protector:current limiter and short protector
- Small packages:SOT-23-5 and other required

■ Package

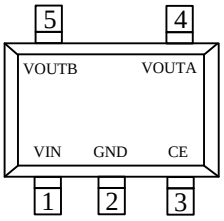
- SOT-23-5

■ Ordering Information

LN5075①②③④⑤⑥⑦⑧

Designator	Description	Symbol	Description
①	Voltage detector output form	N	NMOS open drain output
		C	CMOS output
②	LDO EN Type	E	Active 'High' (pull-down resistor built in)
		F	Active 'High' (no pull-down resistor built in)
		G	Active 'Low' (pull-up resistor built in)
		H	Active 'Low' (no pull-up resistor built in)
③④	Voltage detector VDF	01~	eg. 30 represents 3.0V
⑤⑥	LDO output voltage	01~	eg. 30 represents 3.0V
⑦	Packaging Types	M	SOT-23-5
⑧	Device Orientation	R	Embossed tape: Standard feed
		L	Embossed tape: Reverse feed

■ Pin Configuration

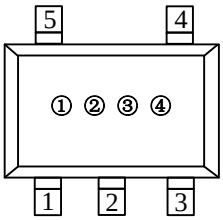


SOT-23-5L
(Top View)

Pin Number	Pin Name	Function
1	VIN	Power input
2	GND	Ground
3	CE	LDO EN Pin
4	VOUTA	Voltage detector output
5	VOUTB	LDO output

■ Marking Rule

- SOT-23-5



SOT-23-5L
(Top View)

①Represents the product lot

Marking symbol	Product Description
5	LN5075◆◆◆◆◆◆◆

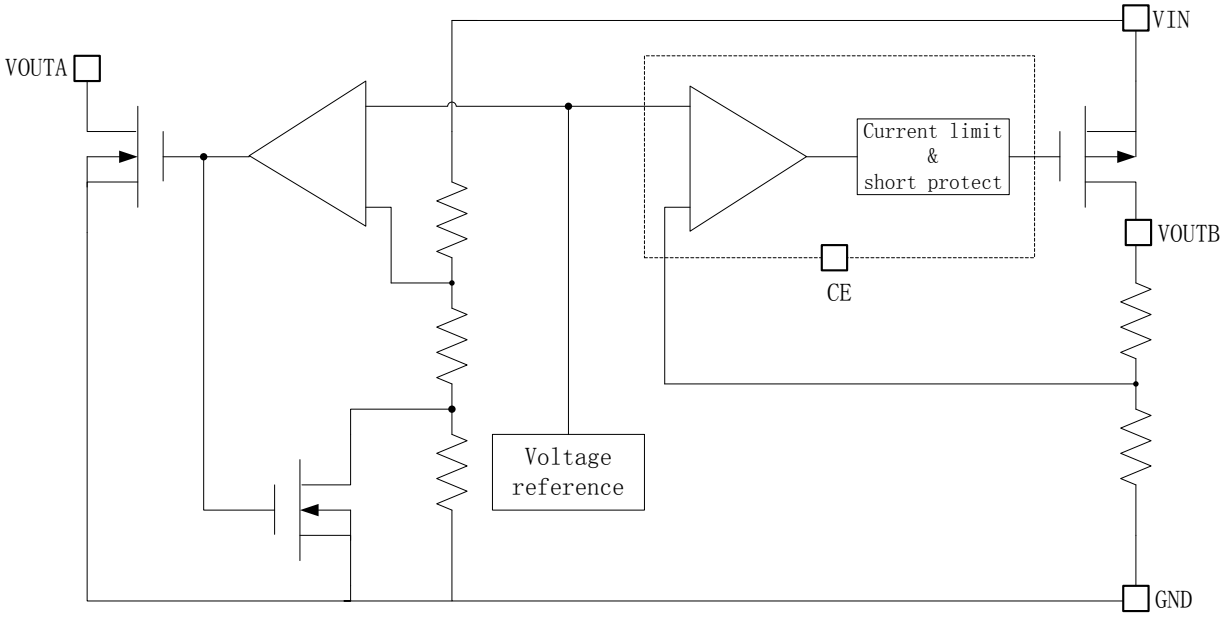
②③ Represents internally set sequential number

Mark		Internally Set Sequentially Number	Product Series
②	③		
V	F	VF	LN5075NF2425MR
G	U	GU	LN5075NF3940MR
E	F	EF	LN5075CF2425MR
T	U	TU	LN5075CF3940MR

④ Represents the assembly lot No.

Numbers 0-9, A-Z, to write down numbers 0-9, A-Z, and then repeat (except G, I, J, O, Q, W)

■ Function Block Diagram

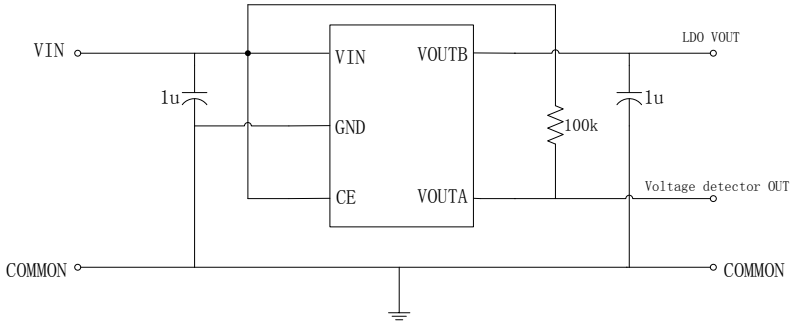


■ Absolute Maximum Ratings

Parameter	Symbol	Maximum Rating		Unit
Input Voltage	V_{IN}	V_{SS}-0.3～V_{SS}+6		V
Output Current	V_{OUT}	V_{SS}-0.3～V_{IN}+0.3		
Power Dissipation	P_D	SOT-23-5	250	mW
Operating Ambient Temperature	Topr	-40～+85		°C
Storage Temperature	Tstg	-40～+125		

Caution: The absolute maximum ratings are rated values exceeding which the product could suffer physical damage. These values must therefore not be exceeded under any conditions.

■ Typical Application Circuit



Caution: The above connection diagram and constant will not guarantee successful operation. Perform thorough evaluation using the actual application to set the constant.

■ Condition Of Use

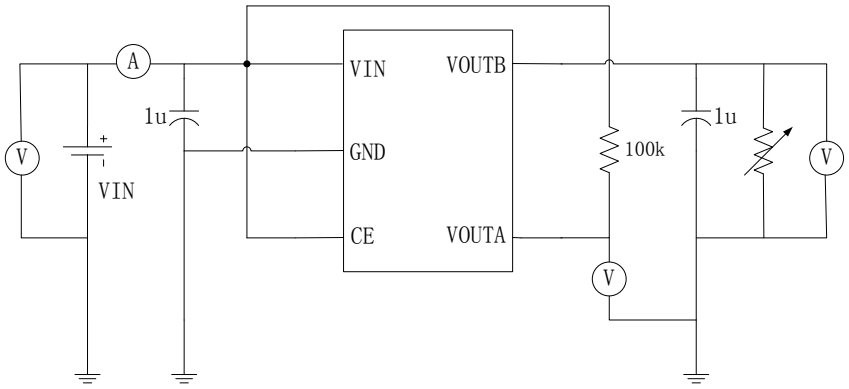
Input capacitor (CIN): 1.0μF or more

Output capacitor (CL):0.1 μF or more (tantalum capacitor)

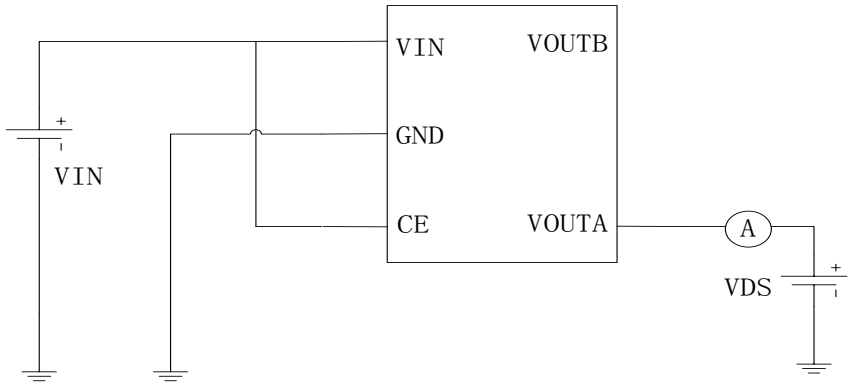
Pull up resistor:100kΩ approximately

Note: In general, linear regulated power supply due to selection of different external components may cause oscillation. Make sure the capacitor before use does not occur in the application of circuit oscillation.

■ Test Circuit



Circuit 1



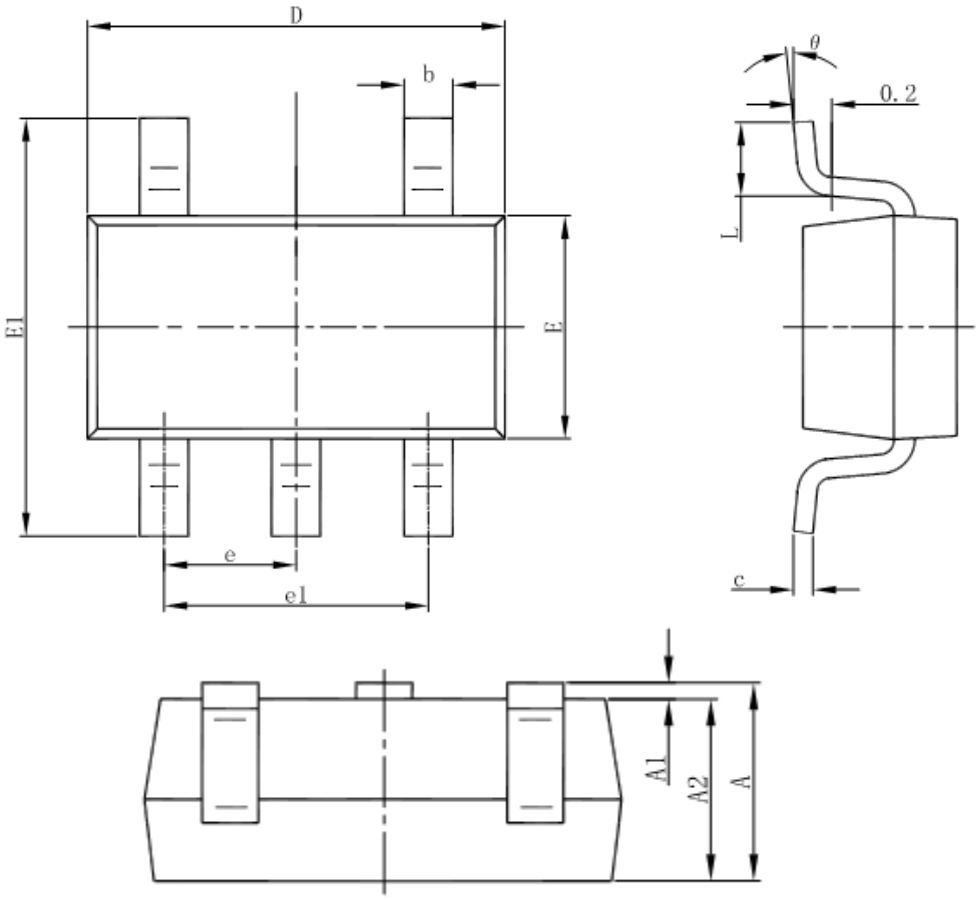
Circuit 2

■ Electrical Characteristics

Item	Symbol	Condition		Min	Typ	Max	Unit	Circuit
General								
Input voltage	V_{IN}	——		1.8	—	6.0	V	
Power dissipation	I_{SS1}	$V_{IN}=V_{OUT(S)}+1.0$ V		—	6		μA	1
Output Voltage Temperature Characteristics		-40～+85℃			±100		ppm/℃	
Voltage regulator								
Output voltage	$V_{OUT(E)1}$	$V_{IN}=V_{OUT(S)}+1.0$ V, I_{OUT}=1 mA		$V_{OUT(S)}$ ×0.98	$V_{OUT(S)}$	$V_{OUT(S)}$ ×1.02	V	1
Output current	I_{OUT}	$V_{IN}\geq V_{OUT(S)}+1.0$ V		100 *5	—	—	mA	1
Dropout voltage	V_{drop}	I_{OUT}=50 mA	1.5 V ≤$V_{OUT(S)}$≤2.5 V	—	0.20	0.28	V	1
			2.6 V ≤$V_{OUT(S)}$≤3.3 V	—	0.16	0.24		
			3.4 V ≤$V_{OUT(S)}$≤5.5 V	—	0.12	0.20		
Line regulations	$\frac{\Delta V_{OUT1}}{\Delta V_{IN} \bullet V_{OU}}$	$V_{OUT(S)}$+0.5 V ≤V_{IN}≤5.5 V I_{OUT}=1 mA		—	0.05	0.2	%/V	
Load regulations	ΔV_{OUT2}	$V_{IN}=V_{OUT(S)}+1.0$ V 1.0 mA ≤I_{OUT} ≤50 mA		—	20	40	mV	
Ripple rejection	|RR|	$V_{IN}=V_{OUT(S)}+1.0$ V，f=1.0 kHz Vrip=0.5 Vrms, I_{OUT}=10 mA		—	40	—	dB	1
Short current	I_{short}	$V_{IN}=V_{OUT(S)}+1.5$ V,		—	30	—	mA	1
Current limiter	I_{lim}	$V_{IN}=V_{OUT(S)}+1.5$ V,		—	380	—	mA	1
Voltage detector								
Detection voltage	VDF			VDF x0.98	VDF	VDF x1.02	V	1
Release voltage	VHYS			VDF x0.02	VDF x0.05	VDF x0.08	V	1
Output current	Iout	Nch Vds=0.5V	Vin=1.0V	1.0	2.2		mA	2
			Vin=1.5V	2.0	5.7			
			Vin=2.0V	3.0	7.7			
			Vin=3.0V	5.0	10.1			
			Vin=4.0V	6.0	11.5			
			Vin=5.0V	7.0	13.0			

■ Package Information

- **SOT-23-5**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°