HIGH PRECISION C-MOS 3-TERMINAL POSITIVE VOLTAGE REGULATOR

■ GENERAL DESCRIPTION

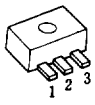
The NJU7221 series is a high precision output voltage (±2%) C-MOS 3-terminal positive voltage regulator which contains internal accurate voltage reference, error amplifier, control transistor and output voltage setting resistor.

The regulation voltage is fixed by internal circuits and the following line-up of different output voltages version are available.

This series is suitable for battery operated items and battery back-up systems because of low operating current and low dropout voltage.

■ PACKAGE OUTLINE

NJU7221L(TO-92)



NJU7221U(SOT-89)

■ FEATURES

- Low Operating Current (19 μA typ)
- High precision Output Voltage (±2%)
- Wide Operating Voltage
- Low Dropout Voltage
  (△VIO<0.3V -- 1.2~1.5V output, Iout=0.5mA)
  (△VIO<0.6V -- 2.5~3.5V output, Iout=20mA)
  (△VIO<0.6V -- 4.0~5.5V output, Iout=40mA)
- Small Temperature Coefficient of Output Voltage
- Package Outline TO-92/SOT-89
- C-MOS Technology

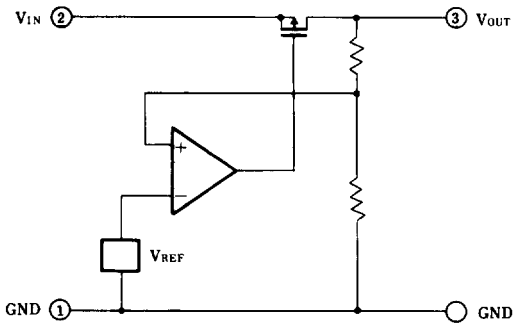
■ TERMINAL DESCRIPTION

NO	DESCRIPTION
1	GND
2	INPUT
3	OUTPUT

■ OUTPUT VOLTAGE LINE-UP

OUTPUT VOLTAGE	TO-92 TYPE	SOT-89 TYPE	OUTPUT VOLTAGE	TO-92 TYPE	SOT-89TYPE
1.2V	7221L12	7221U12	3.5V	7221L35	7221U35
1.5V	7221L15	7221U15	4.0V	7221L40	7221U40
2.5V	7221L25	7221U25	4.5V	7221L45	7221U45
2.7V	7221L27	7221U27	5.0V	7221L50	7221U50
3.0V	7221L30	7221U30	5.2V	7221L52	7221U52
3.2V	7221L32	7221U32	5.5V	7221L55	7221U55

■ EQUIVALENT CIRCUIT



■ ABSOLUTE MAXIMUM RATINGS

(Ta=25℃)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	14	V
Output Voltage	V_{OUT}	GND−0.3～V_{IN}+0.3	V
Output Current	I_{OUT}	100	mA
Power Dissipation	P_D	(TO−92) 500 (SOT−89) 300	mW
Operating Temperature Range	T_{opr}	−25～+75	℃
Storage Temperature Range	T_{stg}	−40～+125	℃
Soldering Temperature	T_{sold}	260	℃
Soldering Time	t_{sold}	10	sec

■ ELECTRICAL CHARACTERISTICS

• +1.2V VERSION

(C_{IN}=C_O=0.1 μF, Ta=25℃)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	V_{IN}=3.0V, I_{OUT}=5mA	1.176	1.200	1.224	V
Dropout Voltage	$\triangle V_{IO}$	I_{OUT}=0.5mA		0.020	0.30	V
Input Voltage	V_{IN}				12	V
Operating Current	I_Q	V_{IN}=3.0V		19	30	μA
Load Regulation	$\triangle V_{OUT}$ / $\triangle I_{OUT}$	V_{IN}=3.0V, I_{OUT}=1～15mA		10	180	mV
Line Regulation	$\triangle V_{OUT}$ / ($\triangle V_{IN}$ · V_{OUT})	V_{IN}=1.5V～12V		0.10		%/V

• +1.5V VERSION

(C_{IN}=C_O=0.1 μF, Ta=25℃)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	V_{IN}=3.0V, I_{OUT}=5mA	1.47	1.50	1.53	V
Dropout Voltage	$\triangle V_{IO}$	I_{OUT}=0.5mA		0.020	0.30	V
Input Voltage	V_{IN}				12	V
Operating Current	I_Q	V_{IN}=3.0V		19	30	μA
Load Regulation	$\triangle V_{OUT}$ / $\triangle I_{OUT}$	V_{IN}=3.0V, I_{OUT}=1～15mA		10	180	mV
Line Regulation	$\triangle V_{OUT}$ / ($\triangle V_{IN}$ · V_{OUT})	V_{IN}=1.8V～12V		0.10		%/V

• +2.5V VERSION

(C_{IN}=C_O=0.1 μF, Ta=25℃)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	V_{IN}=4.5V, I_{OUT}=10mA	2.45	2.50	2.55	V
Dropout Voltage	$\triangle V_{IO}$	I_{OUT}=20mA		0.20	0.60	V
Input Voltage	V_{IN}				12	V
Operating Current	I_Q	V_{IN}=4.5V		19	30	μA
Load Regulation	$\triangle V_{OUT}$ / $\triangle I_{OUT}$	V_{IN}=4.5V, I_{OUT}=1～20mA		15	180	mV
Line Regulation	$\triangle V_{OUT}$ / ($\triangle V_{IN}$ · V_{OUT})	V_{IN}=3.5V～12V		0.10		%/V

• +2.7V VERSION

(C_{IN}=C_O=0.1 μF, Ta=25℃)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	V_{IN}=4.7V, I_{OUT}=10mA	2.646	2.700	2.754	V
Dropout Voltage	$\triangle V_{IO}$	I_{OUT}=20mA		0.20	0.60	V
Input Voltage	V_{IN}				12	V
Operating Current	I_Q	V_{IN}=4.7V		19	30	μA
Load Regulation	$\triangle V_{OUT} / \triangle I_{OUT}$	V_{IN}=4.7V, I_{OUT}=1～20mA		15	180	mV
Line Regulation	$\triangle V_{OUT} / (\triangle V_{IN} \cdot V_{OUT})$	V_{IN}=3.7V～12V		0.10		%/V

• +3.0V VERSION

(C_{IN}=C_O=0.1 μF, Ta=25℃)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	V_{IN}=5.0V, I_{OUT}=10mA	2.94	3.00	3.06	V
Dropout Voltage	$\triangle V_{IO}$	I_{OUT}=20mA		0.20	0.60	V
Input Voltage	V_{IN}				12	V
Operating Current	I_Q	V_{IN}=5.0V		19	30	μA
Load Regulation	$\triangle V_{OUT} / \triangle I_{OUT}$	V_{IN}=5.0V, I_{OUT}=1～20mA		15	180	mV
Line Regulation	$\triangle V_{OUT} / (\triangle V_{IN} \cdot V_{OUT})$	V_{IN}=4.0V～12V		0.10		%/V

• +3.2V VERSION

(C_{IN}=C_O=0.1 μF, Ta=25℃)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	V_{IN}=5.2V, I_{OUT}=10mA	3.136	3.200	3.264	V
Dropout Voltage	$\triangle V_{IO}$	I_{OUT}=20mA		0.20	0.60	V
Input Voltage	V_{IN}				12	V
Operating Current	I_Q	V_{IN}=5.2V		19	30	μA
Load Regulation	$\triangle V_{OUT} / \triangle I_{OUT}$	V_{IN}=5.2V, I_{OUT}=1～20mA		15	180	mV
Line Regulation	$\triangle V_{OUT} / (\triangle V_{IN} \cdot V_{OUT})$	V_{IN}=4.2V～12V		0.10		%/V

• +3.5V VERSION

(C_{IN}=C_O=0.1 μF, Ta=25℃)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	V_{IN}=5.5V, I_{OUT}=10mA	3.45	3.50	3.57	V
Dropout Voltage	$\triangle V_{IO}$	I_{OUT}=20mA		0.20	0.60	V
Input Voltage	V_{IN}				12	V
Operating Current	I_Q	V_{IN}=5.5V		19	30	μA
Load Regulation	$\triangle V_{OUT} / \triangle I_{OUT}$	V_{IN}=5.5V, I_{OUT}=1～20mA		15	180	mV
Line Regulation	$\triangle V_{OUT} / (\triangle V_{IN} \cdot V_{OUT})$	V_{IN}=4.5V～12V		0.10		%/V

• +4.0V VERSION

(C_{IN}=C_O=0.1 μF, Ta=25℃)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	V_{IN}=6.0V, I_{OUT}=30mA	3.92	4.00	4.08	V
Dropout Voltage	$\triangle V_{IO}$	I_{OUT}=40mA		0.30	0.60	V
Input Voltage	V_{IN}				12	V
Operating Current	I_Q	V_{IN}=6.0V		19	30	μA
Load Regulation	$\triangle V_{OUT} / \triangle I_{OUT}$	V_{IN}=6.0V, I_{OUT}=1～40mA		35	120	mV
Line Regulation	$\triangle V_{OUT} / (\triangle V_{IN} \cdot V_{OUT})$	V_{IN}=5.0V～12V		0.10		%/V

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• +4.5V VERSION

(C_{IN}=C_O=0.1 μF, Ta=25℃)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	V_{IN}=6.5V, I_{OUT}=30mA	4.41	4.50	4.59	V
Dropout Voltage	$\triangle V_{IO}$	I_{OUT}=40mA		0.30	0.60	V
Input Voltage	V_{IN}				12	V
Operating Current	I_Q	V_{IN}=6.5V		19	30	μA
Load Regulation	$\triangle V_{OUT} / \triangle I_{OUT}$	V_{IN}=6.5V, I_{OUT}=1～40mA		35	120	mV
Line Regulation	$\triangle V_{OUT} / (\triangle V_{IN} \cdot V_{OUT})$	V_{IN}=5.5V～12V		0.10		%/V

• +5.0V VERSION

(C_{IN}=C_O=0.1 μF, Ta=25℃)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	V_{IN}=7.0V, I_{OUT}=30mA	4.90	5.00	5.10	V
Dropout Voltage	$\triangle V_{IO}$	I_{OUT}=40mA		0.30	0.60	V
Input Voltage	V_{IN}				12	V
Operating Current	I_Q	V_{IN}=7.0V		19	30	μA
Load Regulation	$\triangle V_{OUT} / \triangle I_{OUT}$	V_{IN}=7.0V, I_{OUT}=1～40mA		35	120	mV
Line Regulation	$\triangle V_{OUT} / (\triangle V_{IN} \cdot V_{OUT})$	V_{IN}=6.0V～12V		0.10		%/V

• +5.2V VERSION

(C_{IN}=C_O=0.1 μF, Ta=25℃)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	V_{IN}=7.2V, I_{OUT}=30mA	5.096	5.200	5.304	V
Dropout Voltage	$\triangle V_{IO}$	I_{OUT}=40mA		0.30	0.60	V
Input Voltage	V_{IN}				12	V
Operating Current	I_Q	V_{IN}=7.2V		19	30	μA
Load Regulation	$\triangle V_{OUT} / \triangle I_{OUT}$	V_{IN}=7.2V, I_{OUT}=1～40mA		35	120	mV
Line Regulation	$\triangle V_{OUT} / (\triangle V_{IN} \cdot V_{OUT})$	V_{IN}=6.2V～12V		0.10		%/V

• +5.5V VERSION

(C_{IN}=C_O=0.1 μF, Ta=25℃)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	V_{IN}=7.5V, I_{OUT}=30mA	5.39	5.50	5.61	V
Dropout Voltage	$\triangle V_{IO}$	I_{OUT}=40mA		0.30	0.60	V
Input Voltage	V_{IN}				12	V
Operating Current	I_Q	V_{IN}=7.5V		19	30	μA
Load Regulation	$\triangle V_{OUT} / \triangle I_{OUT}$	V_{IN}=7.5V, I_{OUT}=1～40mA		35	120	mV
Line Regulation	$\triangle V_{OUT} / (\triangle V_{IN} \cdot V_{OUT})$	V_{IN}=6.5V～12V		0.10		%/V

■ MEASUREMENT CIRCUIT