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## C-MOS 3-TERMINAL NEGATIVE VOLTAGE REGULATOR

### ■ GENERAL DESCRIPTION

The **NJU7211 series** is a C-MOS 3-terminal negative voltage regulator which contains internal precision voltage reference, error amplifier, control transistor and output voltage setting resistor.

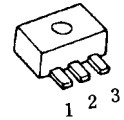
The regulation voltage is fixed by internal circuits and the following line-up of different output voltage versions are available.

The **NJU7211 series** is suitable for battery operated items and battery back-up systems because of low operating current and low dropout voltage.

### ■ PACKAGE OUTLINE



NJU7211L(TO-92)



NJU7211U(SOT-89)

### ■ FEATURES

- Low Operating Current (19 $\mu$ A typ.)
- Wide Operating Voltage Range
- Low Dropout Voltage
  - ( $\Delta V_{IO} < 0.6V$  -3.0V output,  $I_{OUT} = 20mA$ )
  - ( $\Delta V_{IO} < 0.6V$  -5.0V output,  $I_{OUT} = 40mA$ )
- Small Temperature Coefficient of Output Voltage
- Package Outline (TO-92/SOT-89)
- C-MOS Technology

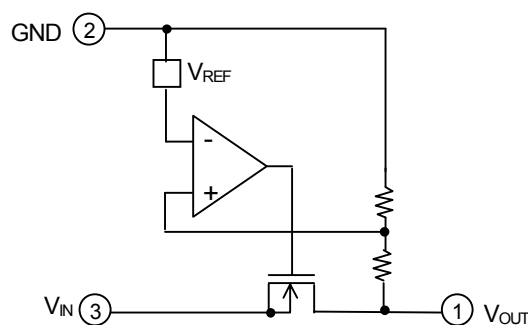
### ■ TERMINAL DESCRIPTION

No.	Description
1	Output
2	GND
3	Input

### ■ OUTPUT VOLTAGE LINE-UP

Output Voltage	TO-92 Type	SOT-89 Type
-2.0V	NJU7211L20	NJU7211U20
-3.0V	NJU7211L30	NJU7211U30
-4.0V	NJU7211L40	NJU7211U40
-5.0V	NJU7211L50	NJU7211U50

### ■ EQUIVALENT CIRCUIT



# NJU7211 Series

## ■ ABSOLUTE MAXIMUM RATINGS

( $T_a = 25^\circ\text{C}$ )

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	$V_{IN}$	-14	V
Output Voltage	$V_{OUT}$	GND+0.3 to $V_{IN}$ -0.3	V
Output Current	$I_{OUT}$	100	mA
Power Dissipation	$P_D$	500 (TO-92) 300 (SOT-89)	mW
Operating Temperature	$T_{opr}$	-25 to +75	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-40 to +125	$^\circ\text{C}$
Soldering Temperature / Time	$T_{sold}$	260 $^\circ\text{C}$ /10 sec	-

## ■ ELECTRICAL CHARACTERISTICS

-2.0V Version

( $C_{IN} = C_o = 0.1\mu\text{F}$ ,  $T_a = 25^\circ\text{C}$ )

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT}$	$V_{IN} = -4.0\text{V}$ , $I_{OUT} = 10\text{mA}$	-2.10	-2.00	-1.90	V
Dropout Voltage	$\Delta V_{IO}$	$I_{OUT} = 20\text{mA}$	-	0.2	0.6	V
Input Voltage	$V_{IN}$		-12	-	-	V
Operating Current	$I_Q$	$V_{IN} = -4.0\text{V}$	-	19	30	$\mu\text{A}$
Load Regulation	$\Delta V_{OUT} / \Delta I_{OUT}$	$V_{IN} = -4.0\text{V}$ , $I_{OUT} = 1 \sim 20\text{mA}$	-	-	120	mV
Line Regulation	$\Delta V_{OUT} / (\Delta V_{IN} \cdot V_{OUT})$	$V_{IN} = -3.0 \sim -12\text{V}$	-	0.1	-	%/V

-3.0V Version

( $C_{IN} = C_o = 0.1\mu\text{F}$ ,  $T_a = 25^\circ\text{C}$ )

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT}$	$V_{IN} = -5.0\text{V}$ , $I_{OUT} = 10\text{mA}$	-3.15	-3.00	-2.85	V
Dropout Voltage	$\Delta V_{IO}$	$I_{OUT} = 20\text{mA}$	-	0.2	0.6	V
Input Voltage	$V_{IN}$		-12	-	-	V
Operating Current	$I_Q$	$V_{IN} = -5.0\text{V}$	-	19	30	$\mu\text{A}$
Load Regulation	$\Delta V_{OUT} / \Delta I_{OUT}$	$V_{IN} = -5.0\text{V}$ , $I_{OUT} = 1 \sim 20\text{mA}$	-	80	120	mV
Line Regulation	$\Delta V_{OUT} / (\Delta V_{IN} \cdot V_{OUT})$	$V_{IN} = -4.0 \sim -12\text{V}$	-	0.1	-	%/V

-4.0V Version

( $C_{IN} = C_o = 0.1\mu\text{F}$ ,  $T_a = 25^\circ\text{C}$ )

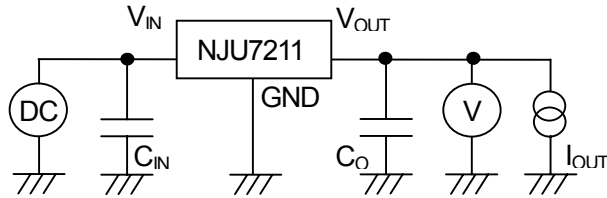
PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT}$	$V_{IN} = -6.0\text{V}$ , $I_{OUT} = 30\text{mA}$	-5.25	-5.00	-4.75	V
Dropout Voltage	$\Delta V_{IO}$	$I_{OUT} = 40\text{mA}$	-	0.3	0.6	V
Input Voltage	$V_{IN}$		-12	-	-	V
Operating Current	$I_Q$	$V_{IN} = -6.0\text{V}$	-	19	30	$\mu\text{A}$
Load Regulation	$\Delta V_{OUT} / \Delta I_{OUT}$	$V_{IN} = -6.0\text{V}$ , $I_{OUT} = 1 \sim 40\text{mA}$	-	-	120	mV
Line Regulation	$\Delta V_{OUT} / (\Delta V_{IN} \cdot V_{OUT})$	$V_{IN} = -5.0 \sim -12\text{V}$	-	0.1	-	%/V

-5.0V Version

( $C_{IN} = C_o = 0.1\mu\text{F}$ ,  $T_a = 25^\circ\text{C}$ )

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT}$	$V_{IN} = -7.0\text{V}$ , $I_{OUT} = 30\text{mA}$	-5.25	-5.00	-4.75	V
Dropout Voltage	$\Delta V_{IO}$	$I_{OUT} = 40\text{mA}$	-	0.3	0.6	V
Input Voltage	$V_{IN}$		-12	-	-	V
Operating Current	$I_Q$	$V_{IN} = -7.0\text{V}$	-	19	30	$\mu\text{A}$
Load Regulation	$\Delta V_{OUT} / \Delta I_{OUT}$	$V_{IN} = -7.0\text{V}$ , $I_{OUT} = 1 \sim 40\text{mA}$	-	80	120	mV
Line Regulation	$\Delta V_{OUT} / (\Delta V_{IN} \cdot V_{OUT})$	$V_{IN} = -6.0 \sim -12\text{V}$	-	0.1	-	%/V

## ■ MEASUREMENT CIRCUIT



**[CAUTION]**

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