

## C-MOS 3-TERMINAL POSITIVE VOLTAGE REGULATOR

### ■ GENERAL DESCRIPTION

The **NJU7201 series** is a 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 voltage versions are available.

The **NJU7201 series** is suitable for battery operated items and battery back-up systems because of low operating current and low dropout voltage.

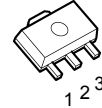
### ■ FEATURES

- Low Operating Current (19 $\mu$ A typ.)
- Wide Operating Voltage Range
- Low Dropout Voltage
  - ( $\Delta V_{IO} < 0.3V$  1.2 to 1.5V output,  $I_{OUT} = 0.5mA$ )
  - ( $\Delta V_{IO} < 0.6V$  2.5 to 3.5V output,  $I_{OUT} = 20mA$ )
  - ( $\Delta V_{IO} < 0.6V$  4.0 to 5.5V output,  $I_{OUT} = 40mA$ )
- Small Temperature Coefficient of Output Voltage
- Package Outline (SOT-89)
- C-MOS Technology

### ■ OUTPUT VOLTAGE LINE-UP

Output Voltage	SOT-89 Type	Output Voltage	SOT-89 Type
+1.2V	NJU7201U12	+3.5V	NJU7201U35
+1.5V	NJU7201U15	+4.0V	NJU7201U40
+2.5V	NJU7201U25	+4.5V	NJU7201U45
+2.7V	NJU7201U27	+5.0V	NJU7201U50
+3.0V	NJU7201U30	+5.2V	NJU7201U52
+3.2V	NJU7201U32	+5.5V	NJU7201U55

### ■ PACKAGE OUTLINE

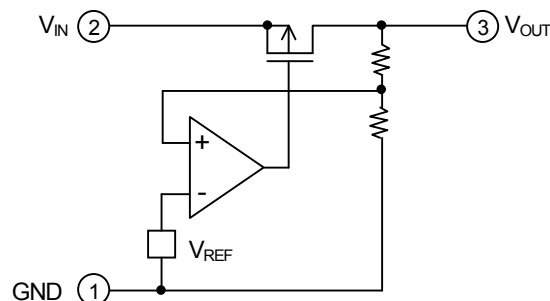


**NJU7201U** (SOT-89)

### ■ TERMINAL DESCRIPTION

No.	Description
1	GND
2	Input
3	Output

### ■ EQUIVALENT CIRCUIT



# NJU7201 Series

## ■ ABSOLUTE MAXIMUM RATINGS

(T<sub>a</sub> = 25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V <sub>IN</sub>	14	V
Output Voltage	V <sub>OUT</sub>	V <sub>IN</sub> +0.3 to GND-0.3	V
Output Current	I <sub>OUT</sub>	100	mA
Power Dissipation	P <sub>D</sub>	300 (SOT-89)	mW
Operating Temperature	T <sub>opr</sub>	-25 to +75	°C
Storage Temperature	T <sub>stg</sub>	-40 to +125	°C

## ■ ELECTRICAL CHARACTERISTICS

+1.2V Version

(C<sub>IN</sub> = C<sub>O</sub> = 0.1μF, T<sub>a</sub> = 25°C)

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	V <sub>OUT</sub>	V <sub>IN</sub> = 3.0V, I <sub>OUT</sub> = 5mA	1.14	1.20	1.26	V
Dropout Voltage	ΔV <sub>IO</sub>	I <sub>OUT</sub> = 0.5mA	-	0.020	0.30	V
Input Voltage	V <sub>IN</sub>		-	-	12	V
Operating Current	I <sub>Q</sub>	V <sub>IN</sub> = 3.0V	-	19	30	μA
Load Regulation	ΔV <sub>OUT</sub> / ΔI <sub>OUT</sub>	V <sub>IN</sub> = 3.0V, I <sub>OUT</sub> = 1 ~ 15mA	-	10	180	mV
Line Regulation	ΔV <sub>OUT</sub> / (ΔV <sub>IN</sub> * V <sub>OUT</sub> )	V <sub>IN</sub> = 1.5 ~ 12V	-	0.10	-	%/V

+1.5V Version

(C<sub>IN</sub> = C<sub>O</sub> = 0.1μF, T<sub>a</sub> = 25°C)

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	V <sub>OUT</sub>	V <sub>IN</sub> = 3.0V, I <sub>OUT</sub> = 5mA	1.425	1.500	1.575	V
Dropout Voltage	ΔV <sub>IO</sub>	I <sub>OUT</sub> = 0.5mA	-	0.020	0.30	V
Input Voltage	V <sub>IN</sub>		-	-	12	V
Operating Current	I <sub>Q</sub>	V <sub>IN</sub> = 3.0V	-	19	30	μA
Load Regulation	ΔV <sub>OUT</sub> / ΔI <sub>OUT</sub>	V <sub>IN</sub> = 3.0V, I <sub>OUT</sub> = 1 ~ 15mA	-	-	180	mV
Line Regulation	ΔV <sub>OUT</sub> / (ΔV <sub>IN</sub> * V <sub>OUT</sub> )	V <sub>IN</sub> = 1.8 ~ 12V	-	0.10	-	%/V

+2.5V Version

(C<sub>IN</sub> = C<sub>O</sub> = 0.1μF, T<sub>a</sub> = 25°C)

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	V <sub>OUT</sub>	V <sub>IN</sub> = 4.5V, I <sub>OUT</sub> = 10mA	2.375	2.500	2.625	V
Dropout Voltage	ΔV <sub>IO</sub>	I <sub>OUT</sub> = 20mA	-	0.20	0.60	V
Input Voltage	V <sub>IN</sub>		-	-	12	V
Operating Current	I <sub>Q</sub>	V <sub>IN</sub> = 4.5V	-	19	30	μA
Load Regulation	ΔV <sub>OUT</sub> / ΔI <sub>OUT</sub>	V <sub>IN</sub> = 4.5V, I <sub>OUT</sub> = 1 ~ 20mA	-	-	180	mV
Line Regulation	ΔV <sub>OUT</sub> / (ΔV <sub>IN</sub> * V <sub>OUT</sub> )	V <sub>IN</sub> = 3.5 ~ 12V	-	0.10	-	%/V

+2.7V Version

(C<sub>IN</sub> = C<sub>O</sub> = 0.1μF, T<sub>a</sub> = 25°C)

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	V <sub>OUT</sub>	V <sub>IN</sub> = 4.7V, I <sub>OUT</sub> = 10mA	2.565	2.700	2.835	V
Dropout Voltage	ΔV <sub>IO</sub>	I <sub>OUT</sub> = 20mA	-	0.20	0.60	V
Input Voltage	V <sub>IN</sub>		-	-	12	V
Operating Current	I <sub>Q</sub>	V <sub>IN</sub> = 4.7V	-	19	30	μA
Load Regulation	ΔV <sub>OUT</sub> / ΔI <sub>OUT</sub>	V <sub>IN</sub> = 4.7V, I <sub>OUT</sub> = 1 ~ 20mA	-	-	180	mV
Line Regulation	ΔV <sub>OUT</sub> / (ΔV <sub>IN</sub> * V <sub>OUT</sub> )	V <sub>IN</sub> = 3.7 ~ 12V	-	0.10	-	%/V

# NJU7201 Series

## +3.0V Version

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

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT}$	$V_{IN} = 5.0V$ , $I_{OUT} = 10mA$	2.85	3.00	3.15	V
Dropout Voltage	$\Delta V_{IO}$	$I_{OUT} = 20mA$	-	0.20	0.60	V
Input Voltage	$V_{IN}$		-	-	12	V
Operating Current	$I_Q$	$V_{IN} = 5.0V$	-	19	30	$\mu A$
Load Regulation	$\Delta V_{OUT} / \Delta I_{OUT}$	$V_{IN} = 5.0V$ , $I_{OUT} = 1 \sim 20mA$	-	15	180	mV
Line Regulation	$\Delta V_{OUT} / (\Delta V_{IN} \cdot V_{OUT})$	$V_{IN} = 4.0 \sim 12.0V$	-	0.10	-	%/V

## +3.2V Version

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

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT}$	$V_{IN} = 5.2V$ , $I_{OUT} = 10mA$	3.04	3.20	3.36	V
Dropout Voltage	$\Delta V_{IO}$	$I_{OUT} = 20mA$	-	0.20	0.60	V
Input Voltage	$V_{IN}$		-	-	12	V
Operating Current	$I_Q$	$V_{IN} = 5.2V$	-	19	30	$\mu A$
Load Regulation	$\Delta V_{OUT} / \Delta I_{OUT}$	$V_{IN} = 5.2V$ , $I_{OUT} = 1 \sim 20mA$	-	-	180	mV
Line Regulation	$\Delta V_{OUT} / (\Delta V_{IN} \cdot V_{OUT})$	$V_{IN} = 4.2 \sim 12.0V$	-	0.10	-	%/V

## +3.5V Version

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

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT}$	$V_{IN} = 5.5V$ , $I_{OUT} = 10mA$	3.325	3.500	3.675	V
Dropout Voltage	$\Delta V_{IO}$	$I_{OUT} = 20mA$	-	0.20	0.60	V
Input Voltage	$V_{IN}$		-	-	12	V
Operating Current	$I_Q$	$V_{IN} = 5.5V$	-	19	30	$\mu A$
Load Regulation	$\Delta V_{OUT} / \Delta I_{OUT}$	$V_{IN} = 5.5V$ , $I_{OUT} = 1 \sim 20mA$	-	-	180	mV
Line Regulation	$\Delta V_{OUT} / (\Delta V_{IN} \cdot V_{OUT})$	$V_{IN} = 4.5 \sim 12.0V$	-	0.10	-	%/V

## +4.0V Version

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

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT}$	$V_{IN} = 6.0V$ , $I_{OUT} = 30mA$	3.8	4.0	4.2	V
Dropout Voltage	$\Delta V_{IO}$	$I_{OUT} = 40mA$	-	0.30	0.60	V
Input Voltage	$V_{IN}$		-	-	12	V
Operating Current	$I_Q$	$V_{IN} = 6.0V$	-	19	30	$\mu A$
Load Regulation	$\Delta V_{OUT} / \Delta I_{OUT}$	$V_{IN} = 6.0V$ , $I_{OUT} = 1 \sim 40mA$	-	-	120	mV
Line Regulation	$\Delta V_{OUT} / (\Delta V_{IN} \cdot V_{OUT})$	$V_{IN} = 5.0 \sim 12.0V$	-	0.10	-	%/V

# NJU7201 Series

+4.5V Version

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

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT}$	$V_{IN} = 6.5V, I_{OUT} = 30mA$	4.275	4.5	4.725	V
Dropout Voltage	$\Delta V_{IO}$	$I_{OUT} = 40mA$	-	0.30	0.60	V
Input Voltage	$V_{IN}$		-	-	12	V
Operating Current	$I_Q$	$V_{IN} = 6.5V$	-	19	30	$\mu A$
Load Regulation	$\Delta V_{OUT} / \Delta I_{OUT}$	$V_{IN} = 6.5V, I_{OUT} = 1 \sim 40mA$	-	-	120	mV
Line Regulation	$\Delta V_{OUT} / (\Delta V_{IN} \cdot V_{OUT})$	$V_{IN} = 5.5 \sim 12.0V$	-	0.10	-	%/V

+5.0V Version

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

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT}$	$V_{IN} = 7.0V, I_{OUT} = 30mA$	4.75	5.00	5.25	V
Dropout Voltage	$\Delta V_{IO}$	$I_{OUT} = 40mA$	-	0.30	0.60	V
Input Voltage	$V_{IN}$		-	-	12	V
Operating Current	$I_Q$	$V_{IN} = 7.0V$	-	19	30	$\mu A$
Load Regulation	$\Delta V_{OUT} / \Delta I_{OUT}$	$V_{IN} = 7.0V, I_{OUT} = 1 \sim 40mA$	-	35	120	mV
Line Regulation	$\Delta V_{OUT} / (\Delta V_{IN} \cdot V_{OUT})$	$V_{IN} = 6.0 \sim 12.0V$	-	0.10	-	%/V

+5.2V Version

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

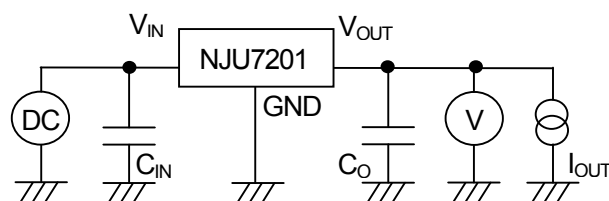
PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT}$	$V_{IN} = 7.2V, I_{OUT} = 30mA$	4.94	5.20	5.46	V
Dropout Voltage	$\Delta V_{IO}$	$I_{OUT} = 40mA$	-	0.30	0.60	V
Input Voltage	$V_{IN}$		-	-	12	V
Operating Current	$I_Q$	$V_{IN} = 7.2V$	-	19	30	$\mu A$
Load Regulation	$\Delta V_{OUT} / \Delta I_{OUT}$	$V_{IN} = 7.2V, I_{OUT} = 1 \sim 40mA$	-	-	120	mV
Line Regulation	$\Delta V_{OUT} / (\Delta V_{IN} \cdot V_{OUT})$	$V_{IN} = 6.2 \sim 12.0V$	-	0.10	-	%/V

+5.5V Version

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

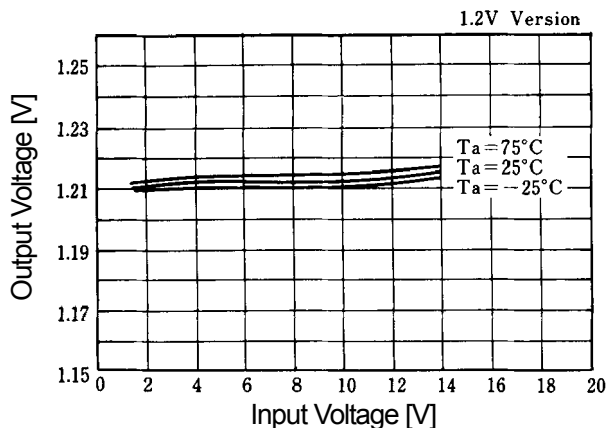
PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT}$	$V_{IN} = 7.5V, I_{OUT} = 30mA$	5.225	5.500	5.775	V
Dropout Voltage	$\Delta V_{IO}$	$I_{OUT} = 40mA$	-	0.30	0.60	V
Input Voltage	$V_{IN}$		-	-	12	V
Operating Current	$I_Q$	$V_{IN} = 7.5V$	-	19	30	$\mu A$
Load Regulation	$\Delta V_{OUT} / \Delta I_{OUT}$	$V_{IN} = 7.5V, I_{OUT} = 1 \sim 40mA$	-	-	120	mV
Line Regulation	$\Delta V_{OUT} / (\Delta V_{IN} \cdot V_{OUT})$	$V_{IN} = 6.5 \sim 12.0V$	-	0.10	-	%/V

## MEASUREMENT CIRCUIT

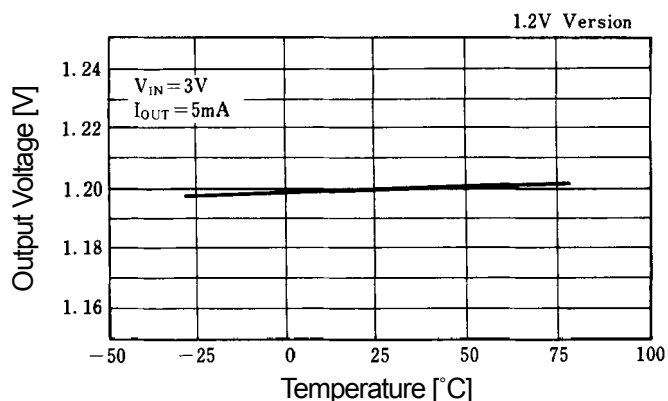


## ■ TYPICAL CHARACTERISTICS

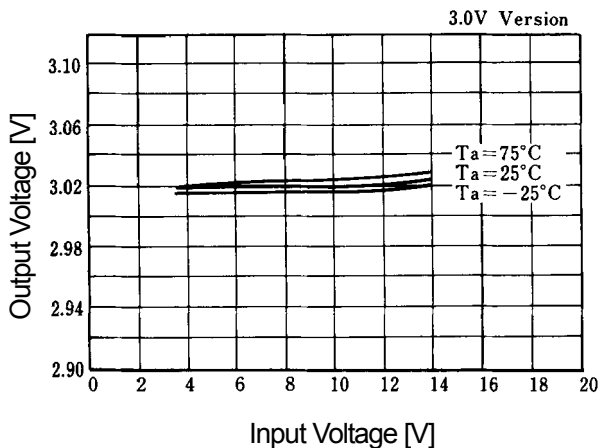
### Output Voltage vs. Input Voltage



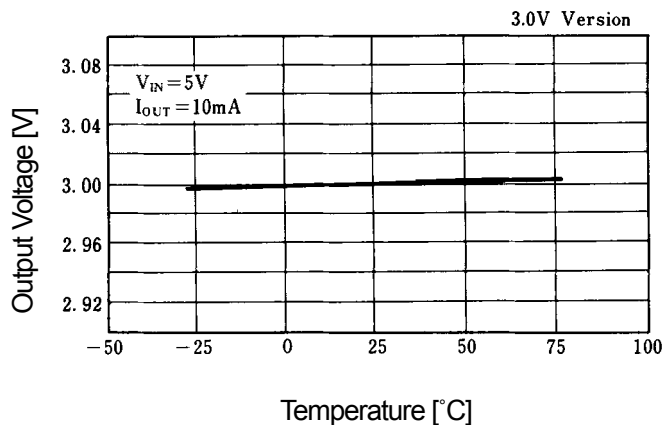
### Output Voltage vs. Input Temperature



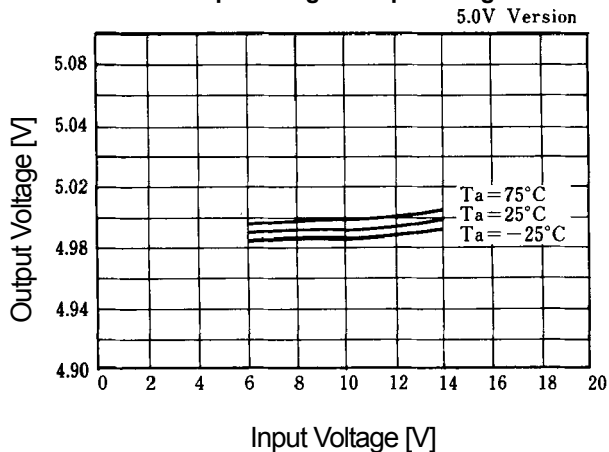
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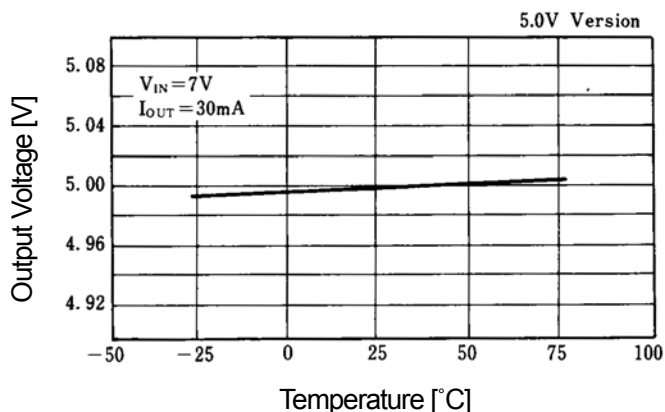
### Output Voltage vs. Input Temperature



### Output Voltage vs. Input Voltage

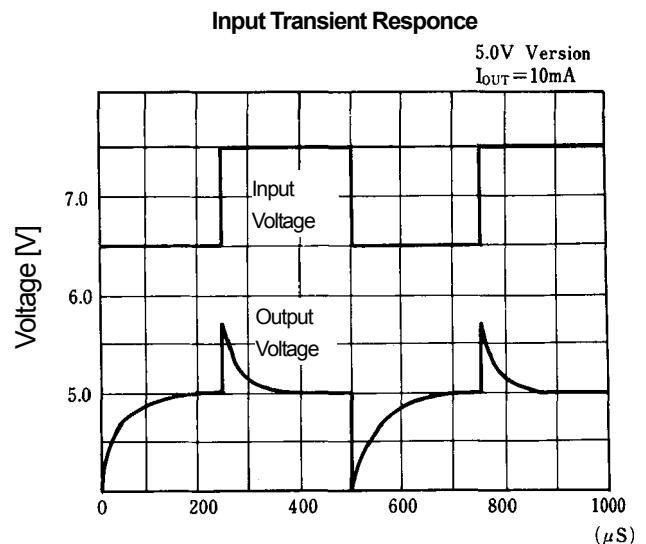
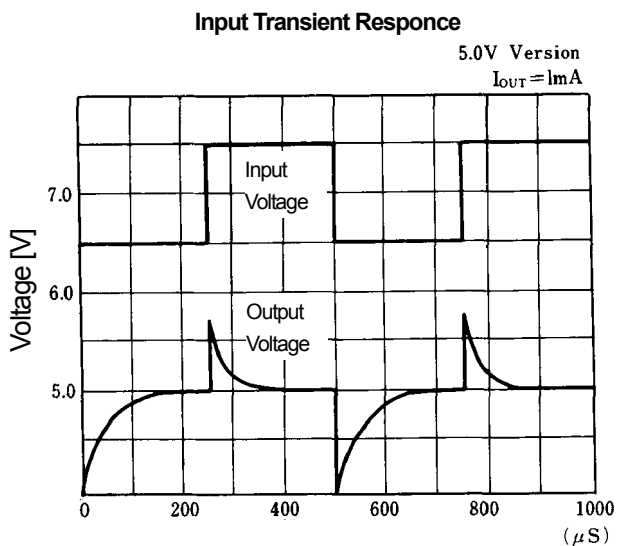
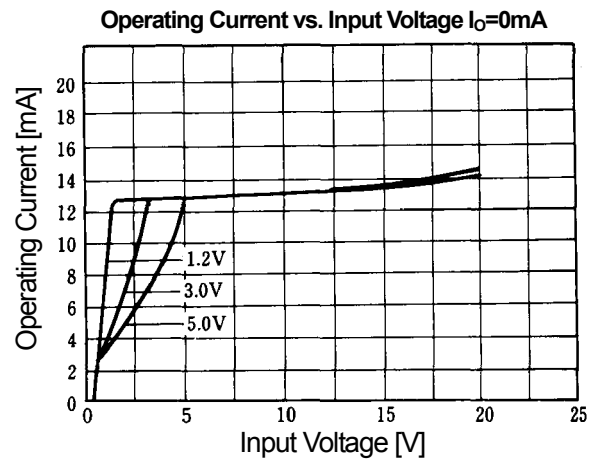
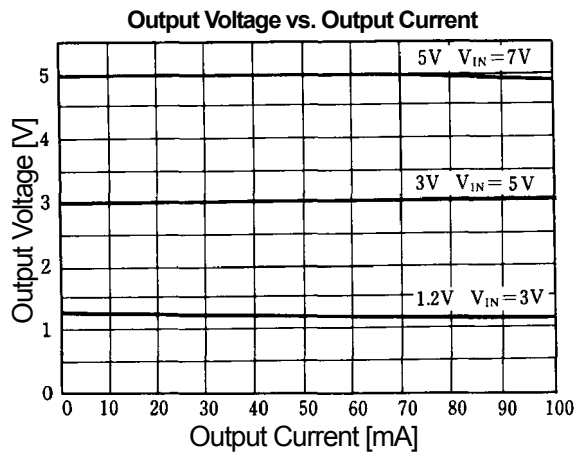
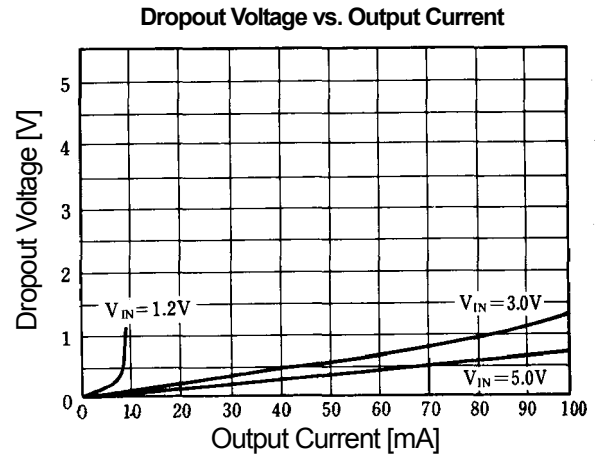
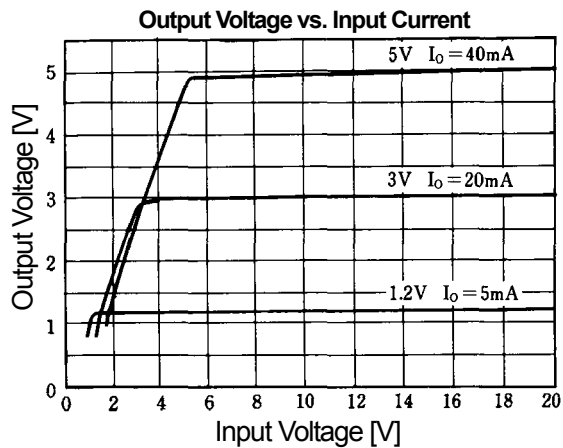


### Output Voltage vs. Input Temperature



# NJU7201 Series

## ■ TYPICAL CHARACTERISTICS



**[CAUTION]**

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