

## C-MOS STEP-UP SWITCHING REGULATOR

### ■ GENERAL DESCRIPTION

The **NJU7261 series** is a C-MOS step-up switching regulator which contains accurate voltage reference, error amplifier, CR oscillator, control circuit, switching transistor, diode and resistor.

The stand-by function is effective for low power consumption.

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 portable equipment's or battery operated items because of its small packaged outline, low operating voltage and current.

### ■ FEATURES

- Low Operating Voltage (1.0V min.)
- Low Operating Current (5.0 $\mu$ A typ. /  $V_{OUT} = 3.0V$ )
- Low Stand-by Current (0.2 $\mu$ A max. /  $V_{OUT} = 3.0V$ )
- High Precision Output Voltage ( $\pm 3\%$  max.)
- Wide Operating Voltage Range
- Stand-by Function
- CR Oscillator On-chip
- Diode On-chip
- Package Outline SOT89-5
- C-MOS Technology

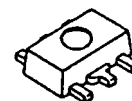
### ■ LINE-UP

Output Voltage (V)	Line-Up
3.0	NJU7261U30
3.3	NJU7261U33
4.5	NJU7261U45
5.0	NJU7261U50

### ■ TERMINAL DESCRIPTION

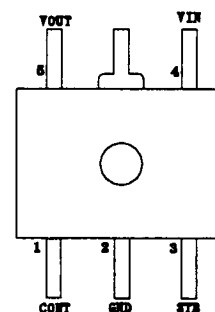
No.	Term. Name	I/O	FUNCTION
1	CONT	I	External Inductor Connect Terminal
2	GND	POWER	Power Source (GND)
3	STB	I	Strobe Terminal : "H" or OPEN...Normal Operation (step-up) " L" ...Standp-By Operation
4	$V_{IN}$	POWER	Power Source (+)
5	$V_{OUT}$	O	Step-up Output Terminal

### ■ PACKAGE OUTLINE

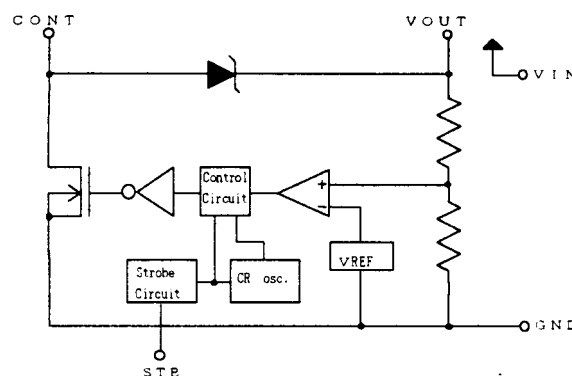


NJU7261UX

### ■ PIN CONFIGURATION



### ■ EQUIVALENT CIRCUIT



# NJU7261 Series

## ■ ABSOLUTE MAXIMUM RATINGS

(T<sub>a</sub> = 25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V <sub>IN</sub>	10	V
CONT Input Voltage	V <sub>CONT</sub>	GND-0.3 ≤ V <sub>CONT</sub> ≤ 10	V
Strobe Input Voltage	V <sub>STB</sub>	GND-0.3 ≤ V <sub>STB</sub> ≤ V <sub>IN</sub>	V
Output Voltage	V <sub>OUT</sub>	GND-0.3 ≤ V <sub>OUT</sub> ≤ 10	V
Power Dissipation	P <sub>D</sub>	300	mW
Operating Temperature Range	T <sub>opr</sub>	-25 to + 75	°C
Storage Temperature Range	T <sub>stg</sub>	-40 to +125	°C

Note1) When a coil used. This IC of V<sub>CONT</sub> possible over the absolute maximum ratings. Consequently please conduct enough to test.

Note2) The CONT input voltage (V<sub>CONT</sub>) should be inspected at the real application circuit, as some kinds of coils make the CONT input voltage exceed the Absolute Maximum Rating of the V<sub>CONT</sub>.

## ■ ELECTRICAL CHARACTERISTICS

+3.0V Version

(T<sub>a</sub> = 25°C)

PARAMETER	SYMBOL		CONDITION	NORM			UNIT	MEASUREMENT CIRCUIT
				MIN.	TYP.	MAX.		
Input Voltage	V <sub>IN</sub>			-	-	5.0	V	1
Start Voltage	V <sub>START</sub>		NO LOAD	-	-	1.0	V	1
Oscillator Freq.	f <sub>OSC</sub>		V <sub>IN</sub> = 1.5V	20	30	50	kHz	2
Output Voltage	V <sub>OUT</sub>		V <sub>IN</sub> = 1.5V, I <sub>OUT</sub> = 20mA	2.91	3.0	3.09	V	1
Input Stability	ΔV <sub>OUT1</sub>		V <sub>IN</sub> = 1.5V to 2.0V I <sub>OUT</sub> = 20mA	-	30	100	mV	1
Load Stability	ΔV <sub>OUT2</sub>		V <sub>IN</sub> = 1.5V I <sub>OUT</sub> = 10μA to 25mA	-	30	100	mV	1
Operating Current	I <sub>SS</sub>		V <sub>IN</sub> = V <sub>STB</sub> = 1.5V, NO LOAD	-	5.0	10	μA	3
Stand-by Current	I <sub>Q</sub>		V <sub>IN</sub> = 1.5V V <sub>STB</sub> = 0V, NO LOAD	-	-	0.2	μA	4
Switching Current	I <sub>SI</sub>		V <sub>DS</sub> = 0.2V	-	250	-	mA	-
STB Terminal Input Voltage	H level	V <sub>STBH</sub>	V <sub>IN</sub> = 1.5V	1.0	-	-	V	5
	L level	V <sub>STBL</sub>	V <sub>IN</sub> = 1.5V	-	-	0.4	V	5
STB Terminal Input Current	H level	I <sub>STBH1</sub>	V <sub>IN</sub> = 1.5V, V <sub>STB</sub> = 1.0V	-	15	30	μA	6
		I <sub>STBH2</sub>	V <sub>IN</sub> = 1.5V, V <sub>STB</sub> = 1.5V	-	0.1	-	μA	6
	L level	I <sub>STBL1</sub>	V <sub>IN</sub> = 1.5V, V <sub>STB</sub> = 0.4V	-	15	30	μA	6
		I <sub>STBL2</sub>	V <sub>IN</sub> = 1.5V, V <sub>STB</sub> = 0V	-	0.1	-	μA	6

# NJU7261 Series

+3.3V Version

(T<sub>a</sub> = 25°C)

PARAMETER	SYMBOL		CONDITION	NORM			UNIT	MEASUREMENT CIRCUIT
				MIN.	TYP.	MAX.		
Input Voltage	V <sub>IN</sub>			-	-	5.0	V	1
Start Voltage	V <sub>START</sub>		NO LOAD	-	-	1.0	V	1
Oscillator Freq.	f <sub>OSC</sub>		V <sub>IN</sub> = 1.5V	20	30	50	kHz	2
Output Voltage	V <sub>OUT</sub>		V <sub>IN</sub> = 1.5V, I <sub>OUT</sub> = 20mA	3.20	3.30	3.40	V	1
Input Stability	ΔV <sub>OUT1</sub>		V <sub>IN</sub> = 1.5V to 3.0V I <sub>OUT</sub> = 20mA	-	30	100	mV	1
Load Stability	ΔV <sub>OUT2</sub>		V <sub>IN</sub> = 1.5V I <sub>OUT</sub> = 10μA to 25mA	-	30	100	mV	1
Operating Current	I <sub>SS</sub>		V <sub>IN</sub> = V <sub>STB</sub> = 1.5V, NO LOAD	-	5	10	μA	3
Stand-by Current	I <sub>Q</sub>		V <sub>IN</sub> = 1.5V V <sub>STB</sub> = 0V, NO LOAD	-	-	0.2	μA	4
Switching Current	I <sub>SI</sub>		V <sub>DS</sub> = 0.2V	-	250	-	mA	-
STB Terminal Input Voltage	H level	V <sub>STBH</sub>	V <sub>IN</sub> = 1.5V	1.0	-	-	V	5
	L level	V <sub>STBL</sub>	V <sub>IN</sub> = 1.5V	-	-	0.4	V	5
STB Terminal Input Current	H level	I <sub>STBH1</sub>	V <sub>IN</sub> = 1.5V, V <sub>STB</sub> = 1.0V	-	15	30	μA	6
		I <sub>STBH2</sub>	V <sub>IN</sub> = 1.5V, V <sub>STB</sub> = 1.5V	-	0.1	-	μA	6
	L level	I <sub>STBL1</sub>	V <sub>IN</sub> = 1.5V, V <sub>STB</sub> = 0.4V	-	15	30	μA	6
		I <sub>STBL2</sub>	V <sub>IN</sub> = 1.5V, V <sub>STB</sub> = 0V	-	0.1	-	μA	6

+4.5V Version

(T<sub>a</sub> = 25°C)

PARAMETER	SYMBOL		CONDITION	NORM			UNIT	MEASUREMENT CIRCUIT
				MIN.	TYP.	MAX.		
Input Voltage	V <sub>IN</sub>			-	-	4.5	V	1
Start Voltage	V <sub>START</sub>		NO LOAD	-	-	1.0	V	1
Oscillator Freq.	f <sub>OSC</sub>		V <sub>IN</sub> = 3.0V	20	30	50	kHz	2
Output Voltage	V <sub>OUT</sub>		V <sub>IN</sub> = 3.0V, I <sub>OUT</sub> = 20mA	4.36	4.50	4.64	V	1
Input Stability	ΔV <sub>OUT1</sub>		V <sub>IN</sub> = 2.0V to 3.0V I <sub>OUT</sub> = 20mA	-	30	100	mV	1
Load Stability	ΔV <sub>OUT2</sub>		V <sub>IN</sub> = 3.0V I <sub>OUT</sub> = 10μA to 25mA	-	30	100	mV	1
Operating Current	I <sub>SS</sub>		V <sub>IN</sub> = V <sub>STB</sub> = 3.0V, NO LOAD	-	5	15	μA	3
Stand-by Current	I <sub>Q</sub>		V <sub>IN</sub> = 3.0V V <sub>STB</sub> = 0V, NO LOAD	-	-	0.2	μA	4
Switching Current	I <sub>SI</sub>		V <sub>DS</sub> = 0.2V	-	250	-	mA	-
STB Terminal Input Voltage	H level	V <sub>STBH</sub>	V <sub>IN</sub> = 3.0V	2.4	-	-	V	5
	L level	V <sub>STBL</sub>	V <sub>IN</sub> = 3.0V	-	-	0.4	V	5
STB Terminal Input Current	H level	I <sub>STBH1</sub>	V <sub>IN</sub> = 3.0V, V <sub>STB</sub> = 2.4V	-	50	100	μA	6
		I <sub>STBH2</sub>	V <sub>IN</sub> = 3.0V, V <sub>STB</sub> = 3.0V	-	0.1	-	μA	6
	L level	I <sub>STBL1</sub>	V <sub>IN</sub> = 3.0V, V <sub>STB</sub> = 0.4V	-	50	100	μA	6
		I <sub>STBL2</sub>	V <sub>IN</sub> = 3.0V, V <sub>STB</sub> = 0V	-	0.1	-	μA	6

# NJU7261 Series

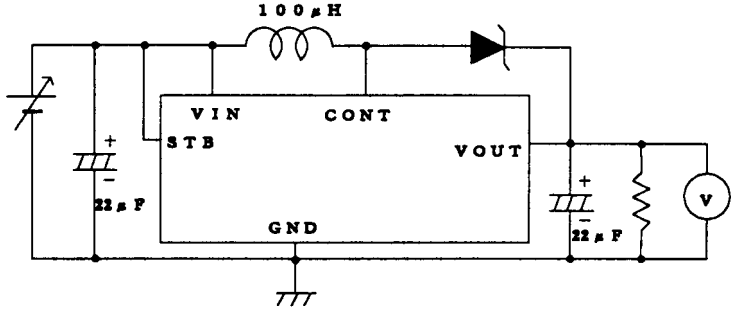
+5.0V Version

(T<sub>a</sub> = 25°C)

PARAMETER	SYMBOL		CONDITION	NORM			UNIT	MEASUREMENT CIRCUIT
				MIN.	TYP.	MAX.		
Input Voltage	V <sub>IN</sub>			-	-	5.0	V	1
Start Voltage	V <sub>START</sub>		NO LOAD	-	-	1.0	V	1
Oscillator Freq.	f <sub>OSC</sub>		V <sub>IN</sub> = 3.0V	20	30	50	kHz	2
Output Voltage	V <sub>OUT</sub>		V <sub>IN</sub> = 3.0V, I <sub>OUT</sub> = 20mA	4.85	5.0	5.15	V	1
Input Stability	ΔV <sub>OUT1</sub>		V <sub>IN</sub> = 2.0V to 3.0V I <sub>OUT</sub> = 20mA	-	30	100	mV	1
Load Stability	ΔV <sub>OUT2</sub>		V <sub>IN</sub> = 3.0V I <sub>OUT</sub> = 10μA to 25mA	-	30	100	mV	1
Operating Current	I <sub>SS</sub>		V <sub>IN</sub> = V <sub>STB</sub> = 3.0V, NO LOAD	-	5	15	μA	3
Stand-by Current	I <sub>Q</sub>		V <sub>IN</sub> = 3.0V V <sub>STB</sub> = 0V, NO LOAD	-	-	0.2	μA	4
Switching Current	I <sub>SI</sub>		V <sub>DS</sub> = 0.2V	-	250	-	mA	-
STB Terminal Input Voltage	H level	V <sub>STBH</sub>	V <sub>IN</sub> = 3.0V	2.4	-	-	V	5
	L level	V <sub>STBL</sub>	V <sub>IN</sub> = 3.0V	-	-	0.4	V	5
STB Terminal Input Current	H level	I <sub>STBH1</sub>	V <sub>IN</sub> = 3.0V, V <sub>STB</sub> = 2.4V	-	50	100	μA	6
		I <sub>STBH2</sub>	V <sub>IN</sub> = 3.0V, V <sub>STB</sub> = 3.0V	-	0.1	-	μA	6
	L level	I <sub>STBL1</sub>	V <sub>IN</sub> = 3.0V, V <sub>STB</sub> = 0.4V	-	50	100	μA	6
		I <sub>STBL2</sub>	V <sub>IN</sub> = 3.0V, V <sub>STB</sub> = 0V	-	0.1	-	μA	6

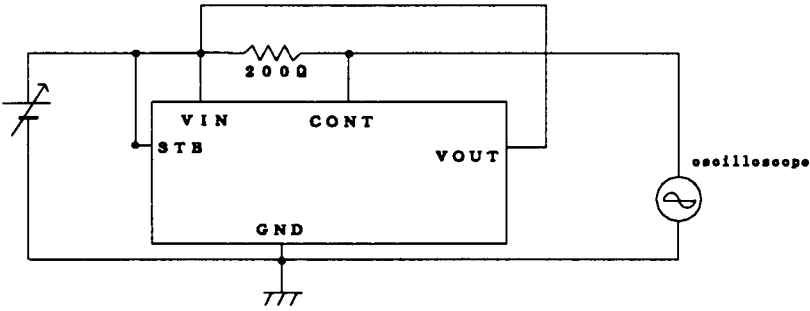
■ MEASUREMENT CIRCUIT 1

(1)

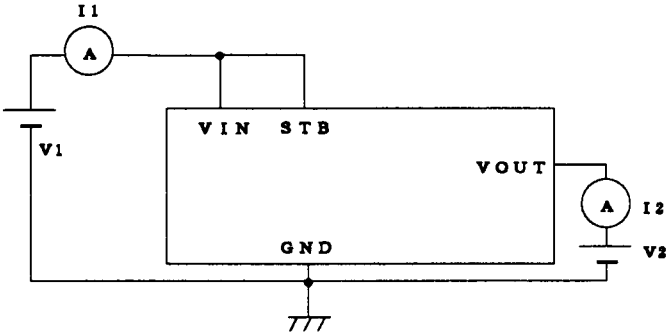


External Diode Type : "D1NS4" provided by SHINDENGEN  
( $I_F = 1A, V_F = 0.55V$ )

(2)



(3)



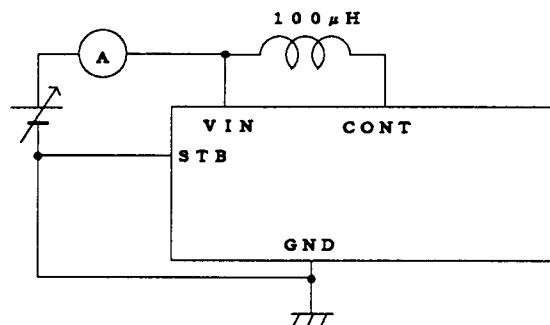
$$I_{SS} = I_1 + I_2 \times \frac{V_{OUT}}{V_2}$$

Under the condition of  $V_2 = V_{OUT} + 1.0V$

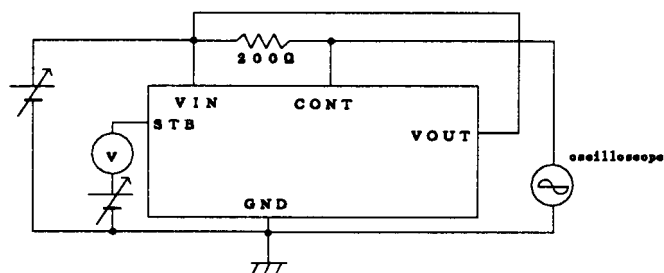
# NJU7261 Series

## MEASUREMENT CIRCUIT 2

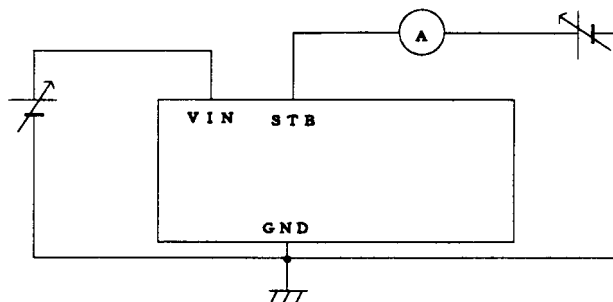
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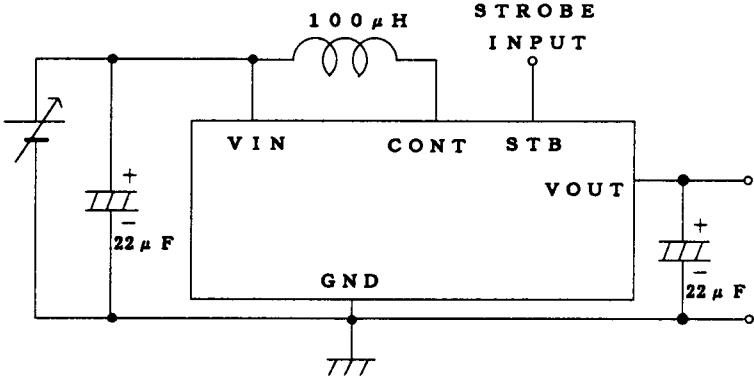
(5)



(6)

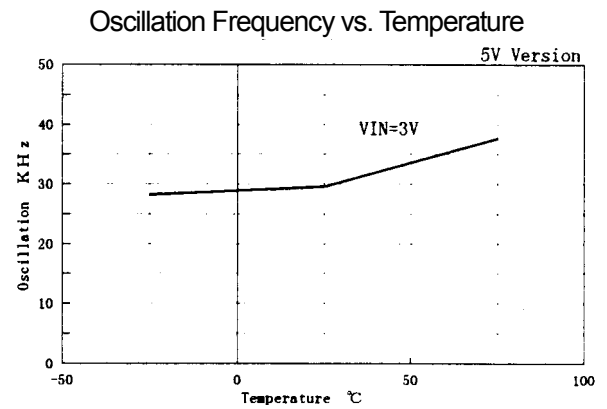
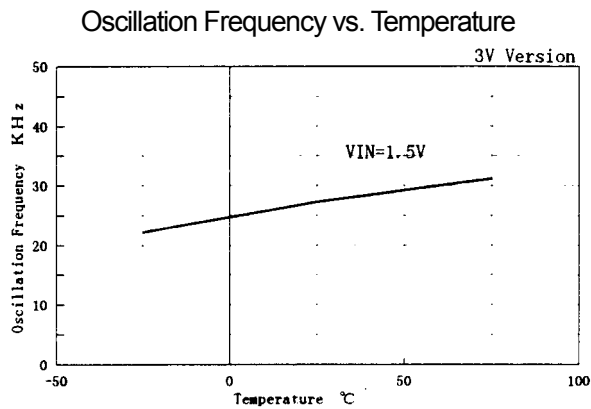
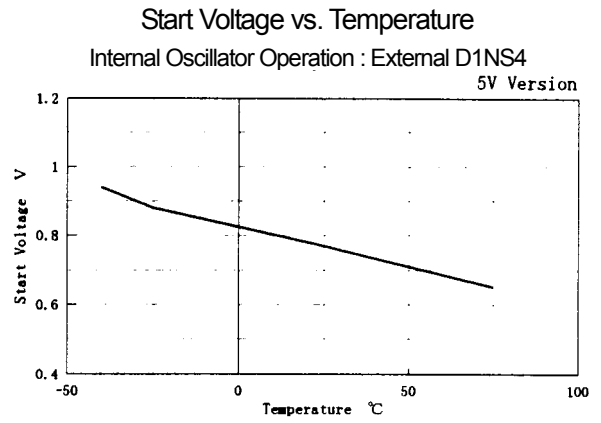
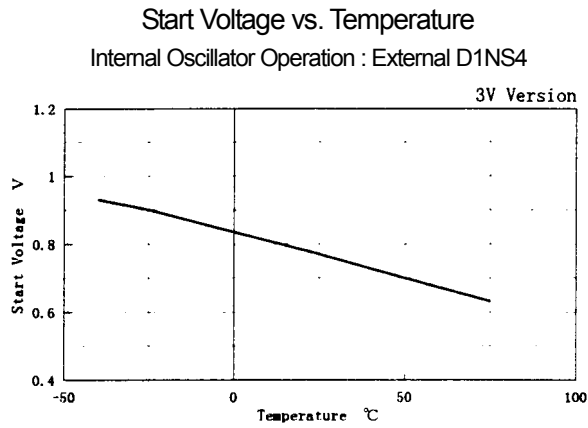


## ■ APPLICATION CIRCUIT



# NJU7261 Series

## ■ TYPICAL CHARACTERISTIC



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