PRELIMINARY

C-MOS STEP-UP SWITCHING REGULATOR

■ GENERAL DESCRIPTION

The **NJU7262 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 operating clock is prepared on-chip or is available to input from external, and 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.

■ PACKAGE OUTLINE

NJU7262MXX

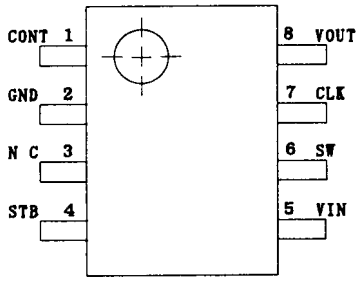
NJU7262VXX

NJU7262RXX

■ FEATURES

- Low Operating Voltage (1.0V min.)
- Low Operating Current (5.0μA typ. / V_{OUT} = 3.0V)
- Low Stand-by Current (0.2μA max. / V_{OUT} = 3.0V)
- High Precision Output Voltage (±3% max.)
- Wide Operating Voltage Range
- External/Internal Clock Select Function
- Stand-by Function
- CR Oscillator On-chip
- Diode On-chip
- Package Outline DMP-8/SSOP-8/VSP-8
- C-MOS Technology

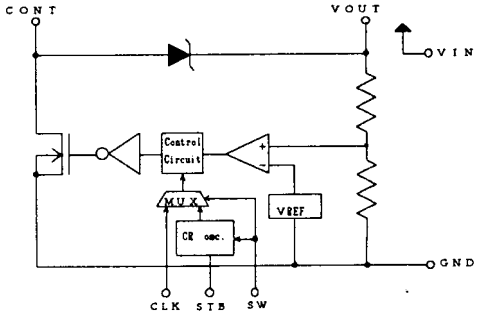
■ PIN CONFIGURATION



■ LINE-UP

Output Voltage (V)	Package		
	DMP-8	SSOP-8	VSP-8
3.0	NJU7262M30	NJU7262V30	NJU7262R30
5.0	NJU7262M50	NJU7262V50	NJU7262R50

■ EQUIVALENT CIRCUIT



■ TERMINAL DESCRIPTION

No.	Term. Name	I/O	FUNCTION
1	CONT	I	External Inductor Connect Terminal
2	GND	POWER	Power Source (GND)
3	NC	-	Non Connect
4	STB	I	Strobe Terminal : "H" ···Normal Operation (step-up) " L " ···Stand-By Operation
5	V_{IN}	POWER	Power Source (+)
6	SW	I	External / Internal "H" or OPEN···Internal Oscillation Clock Select Terminal "L" ···External Clock Input (When "L" level is input, Internal oscillation is stopped)
7	CLK	I	External Clock Input Terminal
8	V_{OUT}	O	Step-up Output Terminal

■ ABSOLUTE MAXIMUM RATINGS

(T_a = 25ºC)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	10	V
CONT Input Voltage	V_{CONT}	GND-0.3 ≤ V_{CONT} ≤ 10	V
STB, SW, CLK Input Voltage	V_I	GND-0.3 ≤ V_I ≤ V_{IN}	V
Output Voltage	V_{OUT}	GND-0.3 ≤ V_{OUT} ≤ 10	V
Power Dissipation	P_D	(DMP-8) 300 (SSOP-8) 250 (VSP-8) 320	mW
Operating Temperature Range	T_{opr}	-25 to + 75	ºC
Storage Temperature Range	T_{stg}	-40 to +125	ºC

Note) Decoupling capacitor should be connected between V_{DD} and V_{SS} due to the stabilized operation for the voltage converter.

■ ELECTRICAL CHARACTERISTICS

+3V Version

(T_a = 25°C)

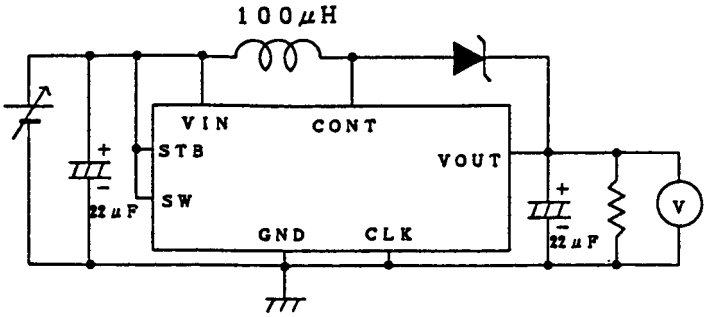
PARAMETER	SYMBOL		CONDITION	NORM			UNIT	MEASUREMENT CIRCUIT
				MIN.	TYP.	MAX.		
Input Voltage	V_{IN}			-	-	5.0	V	1
Start Voltage	V_{START}		NO LOAD	-	-	1.0	V	1
Oscillator Freq.	f_{OSC}		V_{IN} = 1.5V	20	30	50	kHz	2
Output Voltage	V_{OUT}		V_{IN} = 1.5V, I_{OUT} = 20mA	2.91	3.0	3.09	V	1
Input Stability	ΔV_{OUT1}		V_{IN} = 1.5V to 2.0V I_{OUT} = 20mA	-	30	100	mV	1
Load Stability	ΔV_{OUT2}		V_{IN} = 1.5V I_{OUT} = 10µA to 25mA	-	30	100	mV	1
Operating Current	I_{SS}		V_{IN} = V_{STB} = 1.5V, NO LOAD	-	5.0	10	µA	3
Stand-by Current	I_Q		V_{IN} = V_{sw} = 1.5V V_{STB} = V_{CLK} = 0V, NO LOAD	-	-	0.2	µA	4
Switching Current	I_{SI}		V_{DS} = 0.2V	-	250	-	mA	-
STB Terminal Input Voltage	H level	V_{STBH}	V_{IN} = 1.5V	1.0	-	-	V	5
	L level	V_{STBL}	V_{IN} = 1.5V	-	-	0.4	V	5
SW Terminal Input Voltage	H level	V_{SWH}	V_{IN} = 1.5V	1.0	-	-	V	6
	L level	V_{SWL}	V_{IN} = 1.5V	-	-	0.4	V	6
CLK Terminal Input Voltage	H level	V_{CLKH}	V_{IN} = 1.5V	1.0	-	-	V	7
	L level	V_{CLKL}	V_{IN} = 1.5V	-	-	0.4	V	7
STB Terminal Input Current	H level	I_{STBH1}	V_{IN} = 1.5V, V_{STB} = 1.0V	-	15	30	µA	8
		I_{STBH2}	V_{IN} = 1.5V, V_{STB} = 1.5V	-	0.1	-	µA	8
	L level	I_{STBL1}	V_{IN} = 1.5V, V_{STB} = 0.4V	-	15	30	µA	8
		I_{STBL2}	V_{IN} = 1.5V, V_{STB} = 0V	-	0.1	-	µA	8
SW Terminal Input Current	H level	I_{SWH}	V_{IN} = 1.5V, V_{SW} = V_{IN}	-	0.1	-	µA	8
	L level	I_{SWL}	V_{IN} = 1.5V, V_{SW} = 0V	-	10	30	µA	8
CLK Terminal Input Current	H level	I_{CLKH}	V_{IN} = 1.5V, V_{CLK} = V_{IN}	-	10	30	µA	8
	L level	I_{CLKL}	V_{IN} = 1.5V, V_{CLK} = 0V	-	0.1	-	µA	8

+5V Version (T_a = 25°C)

PARAMETER	SYMBOL		CONDITION	NORM			UNIT	MEASUREMENT CIRCUIT
				MIN.	TYP.	MAX.		
Input Voltage	V_{IN}			-	-	5.0	V	1
Start Voltage	V_{START}		NO LOAD	-	-	1.0	V	1
Oscillator Freq.	f_{OSC}		V_{IN} = 3.0V	20	30	50	kHz	2
Output Voltage	V_{OUT}		V_{IN} = 3.0V, I_{OUT} = 20mA	4.85	5.0	5.15	V	1
Input Stability	ΔV_{OUT1}		V_{IN} = 2.0V to 3.0V I_{OUT} = 20mA	-	30	100	mV	1
Load Stability	ΔV_{OUT2}		V_{IN} = 3.0V I_{OUT} = 10μA to 25mA	-	30	100	mV	1
Operating Current	I_{SS}		V_{IN} = V_{STB} = 3.0V, NO LOAD	-	5	15	μA	3
Stand-by Current	I_Q		V_{IN} = V_{SW} = 3.0V V_{STB} = V_{CLK} = 0V, NO LOAD	-	-	0.2	μA	4
Switching Current	I_{SI}		V_{DS} = 0.2V	-	250	-	mA	-
STB Terminal Input Voltage	H level	V_{STBH}	V_{IN} = 3.0V	2.4	-	-	V	5
	L level	V_{STBL}	V_{IN} = 3.0V	-	-	0.4	V	5
SW Terminal Input Voltage	H level	V_{SWH}	V_{IN} = 3.0V	2.4	-	-	V	6
	L level	V_{SWL}	V_{IN} = 3.0V	-	-	0.4	V	6
CLK Terminal Input Voltage	H level	V_{CLKH}	V_{IN} = 3.0V	2.4	-	-	V	7
	L level	V_{CLKL}	V_{IN} = 3.0V	-	-	0.4	V	7
STB Terminal Input Current	H level	I_{STBH1}	V_{IN} = 3.0V, V_{STB} = 2.4V	-	50	100	μA	8
		I_{STBH2}	V_{IN} = 3.0V, V_{STB} = 3.0V	-	0.1	-	μA	8
	L level	I_{STBL1}	V_{IN} = 3.0V, V_{STB} = 0.4V	-	50	100	μA	8
		I_{STBL2}	V_{IN} = 3.0V, V_{STB} = 0V	-	0.1	-	μA	8
SW Terminal Input Current	H level	I_{SWH}	V_{IN} = 3.0V, V_{SW} = V_{IN}	-	0.1	-	μA	8
	L level	I_{SWL}	V_{IN} = 3.0V, V_{SW} = 0V	-	10	30	μA	8
CLK Terminal Input Current	H level	I_{CLKH}	V_{IN} = 3.0V, V_{CLK} = V_{IN}	-	10	30	μA	8
	L level	I_{CLKL}	V_{IN} = 3.0V, V_{CLK} = 0V	-	0.1	-	μA	8

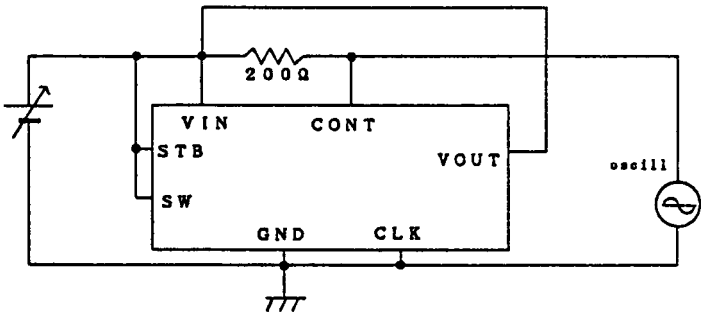
■ MEASUREMENT CIRCUIT

(1)



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

(2)



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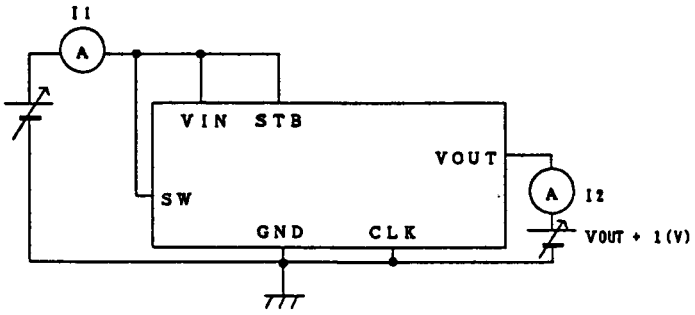
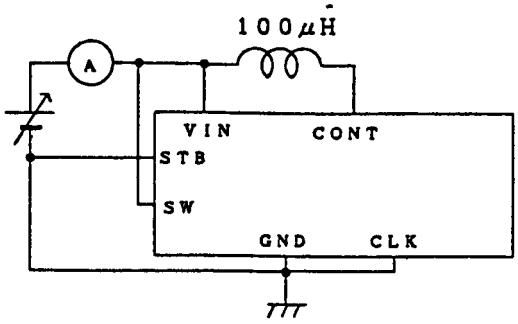
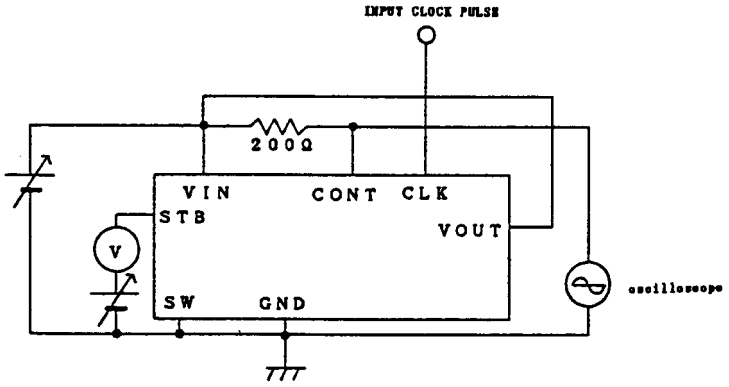


$$I_{SS} = I_1 + I_2 \times \frac{V_{OUT}}{V_{OUT}+1}$$

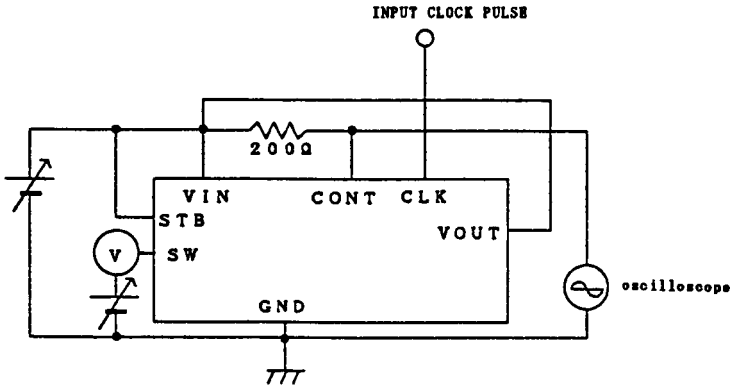
(4)


100μH
A
VIN
CONT
STB
SW
GND
CLK

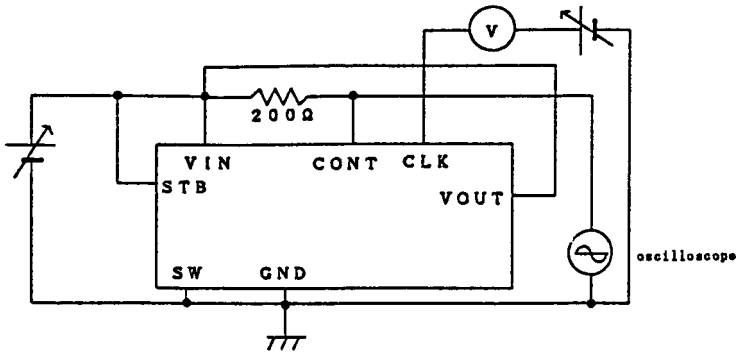
(5)


INPUT CLOCK PULSE
200Ω
VIN
CONT
CLK
STB
VOUT
V
SW
GND
oscilloscope

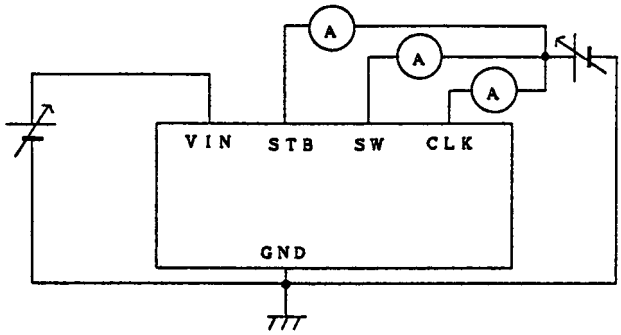
(6)


INPUT CLOCK PULSE
200Ω
VIN
CONT
CLK
STB
VOUT
V
SW
GND
oscilloscope

(7)



(8)



■ APPLICATION CIRCUIT