

VOLTAGE CONVERTER

■ GENERAL DESCRIPTION

The NJU7662 is a voltage converter incorporated CR-oscillator, voltage-level-shifter and power-MOS, which generates a polarity-converted negative voltage or twofold voltage of an operating voltage ranging from +4.5 to +20.0V.

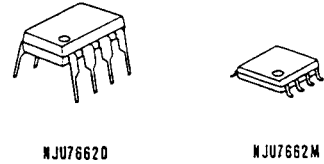
The application circuit of negative voltage converter requires only two capacitors, and positive twofold voltage converter requires two capacitors, two resistors and one diode as external components.

The oscillation frequency of the internal oscillator is 10kHz and the negative voltage converter (on no-load condition) achieves extremely high-efficiency voltage conversion rate of 99.9%.

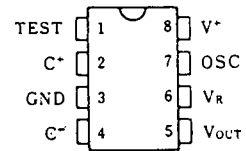
■ FEATURES

- Polarity-converted Negative Voltage Output
- Twofold Positive Voltage Output
- Operating Voltage --- +4.5 to +20.0 V
- High-efficiency Voltage Conversion Rate -- 99.9%
(No-load, Negative Voltage Converter)
- High-efficiency Power Conversion Rate -- 96%
(Negative Voltage Converter)
- Cascade Connection Available
2N-1 times voltage outputs for negative voltage
2N times voltage outputs for positive voltage
- Few External Components
--- 2 Capacitors (Negative Voltage Converter)
--- 2 Capacitors, 2 Resistors and 1 Diode
(Positive Voltage Converter)
- Package Outline DIP/DMP 8
- C-MOS Technology

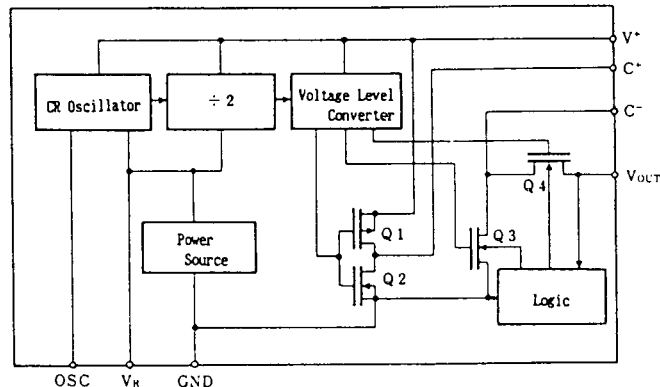
■ PACKAGE OUTLINE



■ PIN CONFIGURATION

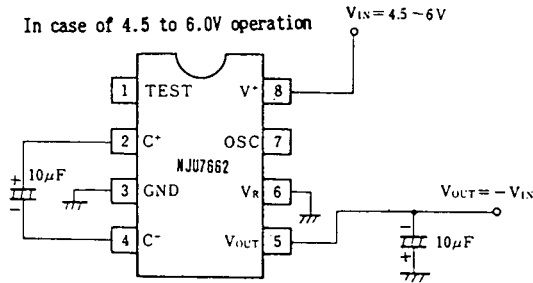


■ BLOCK DIAGRAM

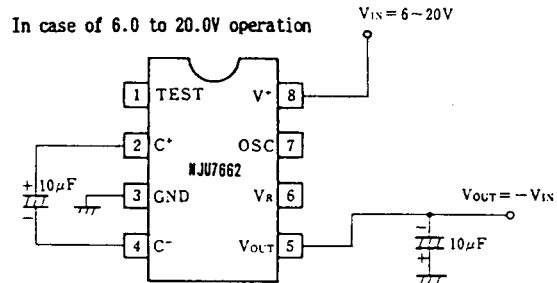


■ APPLICATION CIRCUITS

(1-1) NEGATIVE VOLTAGE OUTPUT

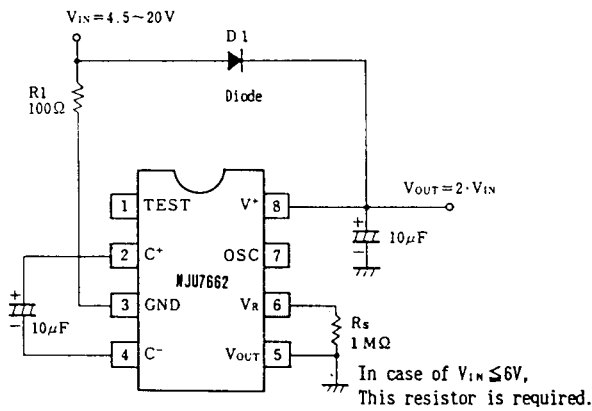


(1-2) NEGATIVE VOLTAGE OUTPUT



(*1) No. 6 Terminal must connect to GND or Open according to the operating voltage as follows;
 $V_+ < 6V$ --- Connect to GND
 $V_+ \geq 6V$ --- OPEN

(2) TWOFOLD VOLTAGE OUTPUT



In the twofold voltage application, R_1 , R_s and D_1 are required for start-up.

■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

| PARAMETER | SYMBOL | RATINGS | UNIT |
|-----------------------------|-----------------|---|------|
| Supply Voltage | V ⁺ | 22 | V |
| Input Voltage | V _{IN} | -0.3~V ⁺ +0.3 @V ⁺ <7 V ⁺ -7~V ⁺ +0.3 @V ⁺ ≥7 | V |
| Output Short | | CONTINUITY @V ⁺ <5.5 | V |
| Power Dissipation | P _D | 500 (DIP) 300 (DMP) | mW |
| Operating Temperature Range | Topr | -20 ~ + 70 | °C |
| Storage Temperature Range | Tstg | -65 ~ +150 | °C |

■ ELECTRICAL CHARACTERISTICS

 (Ta=25°C, V⁺=15V, C_{osc}=0)

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNIT |
|---------------------------------------|-------------------|--|-----|------|------|------|
| Operating Current | I ⁺ 1 | R _L =∞, V _R =OPEN | | 250 | 600 | μA |
| | I ⁺ 2 | V ⁺ =5V, R _L =∞, V _R =GND | | 20 | 150 | |
| Operating Voltage | V ⁺ HI | -20°C ≤ Ta ≤ 70°C, V _R =OPEN | 3.0 | | 10.0 | V |
| | V ⁺ LO | R _L =10kΩ, V _R =GND | 4.5 | | 6 | |
| Output Resistance (*Note 1) | R _{o1} | I _{out} =20mA, Ta=25°C | | 60 | 100 | Ω |
| | | V _R =OPEN, -20°C ≤ Ta ≤ 70°C | | 70 | 120 | |
| | R _{o2} | V ⁺ =5V, I _{out} =3mA, Ta=25°C | | 125 | 200 | |
| | | V _R =GND, -20°C ≤ Ta ≤ 70°C | | 150 | 250 | |
| Oscillation Frequency | F _o | | | 10 | | kHz |
| Power Conversion Rate | P _{EF} | R _L =2kΩ | 93 | 96 | | % |
| Voltage Conversion Rate | V _{EF} | R _L =∞ | 97 | 99.9 | | % |
| Oscillation Terminal Input Current | I _{osc1} | V ⁺ =15V, (V _{osc} =8~15V) | | 4.0 | | μA |
| | I _{osc2} | V ⁺ =5V, (V _{osc} =0~5) | | 0.5 | | |

*Note 1 The twofold positive converter needs 100 ohms series resistance on the power source terminal, therefore the output impedance increases to 200 ohms.