

## SMALL PACKAGE VOLTAGE INVERTER

### ■ GENERAL DESCRIPTION

The **NJU7665** series is a voltage inverter incorporated RC oscillator, pre-buffer and power-MOS, which generates a polarity-converted negative voltage from +1.5V to +5.5V.

The switching frequency is fixed by internal RC oscillator and the following line-up of 3 version are available to select.

The **NJU7665** series is in MTP-5 package and it is suitable for battery use items and other portable items.

### ■ PACKAGE OUTLINE



**NJU7665XF**

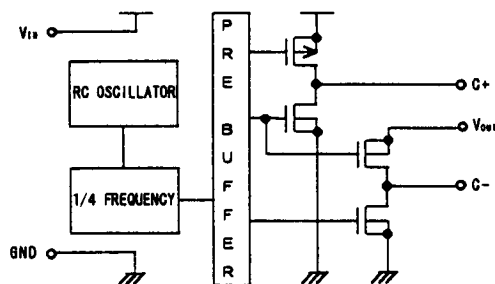
### ■ FEATURES

- Input Voltage : 1.5 to 5.5V
- Switching Frequency : fsw = 7.5k, 75k, 150kHz
- Low Output Resistance : 75Ω MAX. (C version, C = 1μF, V<sub>IN</sub> = 3V)
- Low Operating Current : 100μA MAX. (A version)
- C-MOS Technology
- Package Outline : MTP-5

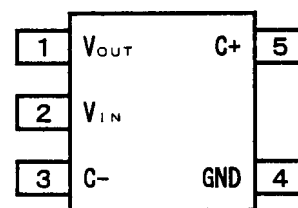
### ■ LINE-UP TABLE

TYPE NO.	Switching Frequency	Supply Current	Output Resistance
NJU7665A	7.5kHz (typ.)	100μA (max.)	1kΩ (max.)
NJU7665B	75kHz (typ.)	0.65mA (max.)	100Ω (max.)
NJU7665C	150kHz (typ.)	1.4mA (max.)	75Ω (max.)

### ■ BLOCK DIAGRAM



### ■ PIN CONFIGURATION



### ■ TERMINAL DESCRIPTION

Terminal No.	Symbol	Function
1	V <sub>OUT</sub>	Output Voltage
2	V <sub>IN</sub>	Power Supply Terminal
3	C <sup>-</sup>	Charge Pump Capacitor (-) Connecting Terminal
4	GND	Ground Terminal
5	C <sup>+</sup>	Charge Pump Capacitor (+) Connecting Terminal

# NJU7665 Series

## ■ ABSOLUTE MAXIMUM RATINGS

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

PARAMETER	SYMBOL	RATINGS	UNIT
Input Supply Voltage	$V_{IN}$	-0.3 to 6.0	V
Power Dissipation	$P_D$	200	mW
Operating Temperature	$T_{opr}$	-40 to +85	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55 to +125	$^\circ\text{C}$

Note1) Decoupling capacitor should be connected between  $V_{IN}$  and GND due to the stabilized operation for the IC.

## ■ ELECTRICAL CHARACTERISTICS

A version

( $V_{IN} = 3.0\text{V}$ ,  $C_1 = C_2 = 1\mu\text{F}$ ,  $T_a = 25^\circ\text{C}$ )

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Current	$I_{IN}$	$R_L = \infty$	–	–	100	$\mu\text{A}$
Input Supply Voltage	$V_{IN}$	$-40^\circ\text{C} \leq T_a \leq 85^\circ\text{C}$	1.5	–	5.5	V
Output Resistance	$R_{OUT}$	$I_{OUT} = 500\mu\text{A}$	–	–	1.0	$\text{k}\Omega$
Switching Frequency	$F_{SW}$		4.5	7.5	10.5	$\text{kHz}$
Voltage Conversion Rate	$V_{EF}$	$R_L = \infty$	90	99.3	–	%

B version

( $V_{IN} = 3.0\text{V}$ ,  $C_1 = C_2 = 1\mu\text{F}$ ,  $T_a = 25^\circ\text{C}$ )

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Current	$I_{IN}$	$R_L = \infty$	–	–	0.65	$\text{mA}$
Input Supply Voltage	$V_{IN}$	$-40^\circ\text{C} \leq T_a \leq 85^\circ\text{C}$	1.5	–	5.5	V
Output Resistance	$R_{OUT}$	$I_{OUT} = 5\text{mA}$	–	–	100	$\Omega$
Switching Frequency	$F_{SW}$		40	75	100	$\text{kHz}$
Voltage Conversion Rate	$V_{EF}$	$R_L = \infty$	90	99.3	–	%

C version

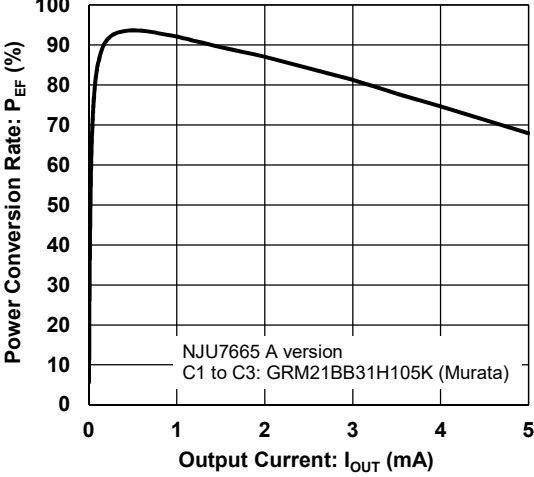
( $V_{IN} = 3.0\text{V}$ ,  $C_1 = C_2 = 1\mu\text{F}$ ,  $T_a = 25^\circ\text{C}$ )

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Current	$I_{IN}$	$R_L = \infty$	–	–	1.4	$\text{mA}$
Input Supply Voltage	$V_{IN}$	$-40^\circ\text{C} \leq T_a \leq 85^\circ\text{C}$	1.5	–	5.5	V
Output Resistance	$R_{OUT}$	$I_{OUT} = 10\text{mA}$	–	–	75	$\Omega$
Switching Frequency	$F_{SW}$		80	150	200	$\text{kHz}$
Voltage Conversion Rate	$V_{EF}$	$R_L = \infty$	90	99.3	–	%

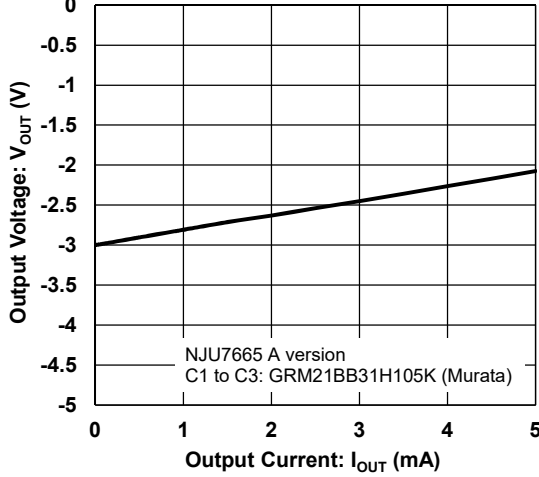
NOTE2) Please minimize the wiring impedance of C+, C- terminals due to the power conversion rate.

## CHARACTERISTICS

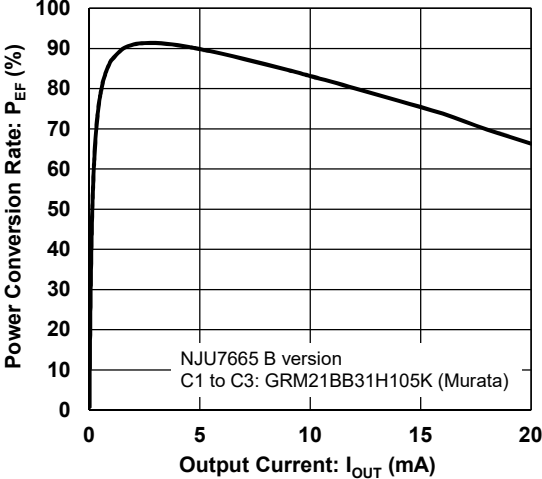
Power Conversion Rate vs. Output Current  
( $V_{IN}=3V$ ,  $C1=C2=C3=1\mu F/50V$ ,  $T_a=25^\circ C$ )



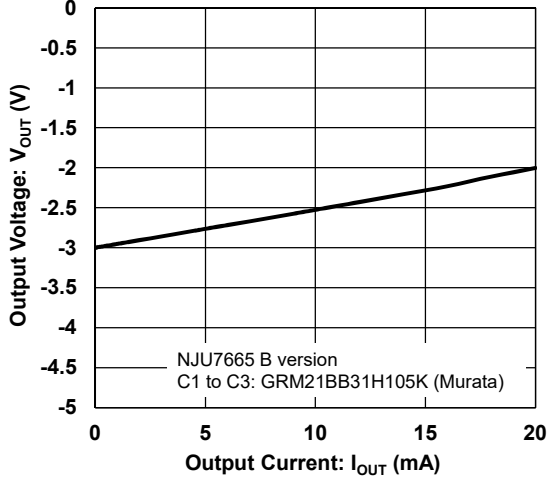
Output Voltage vs. Output Current  
( $V_{IN}=3V$ ,  $C1=C2=C3=1\mu F/50V$ ,  $T_a=25^\circ C$ )



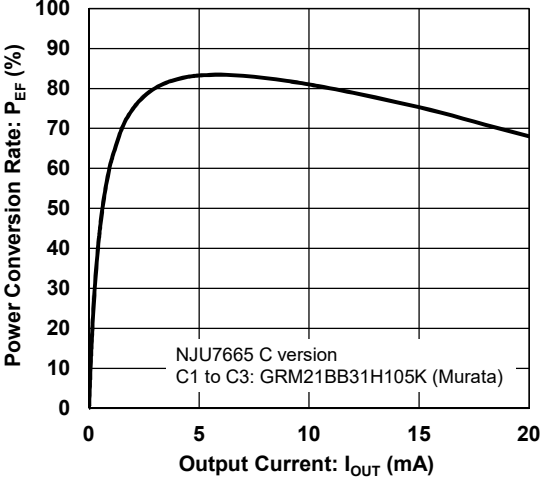
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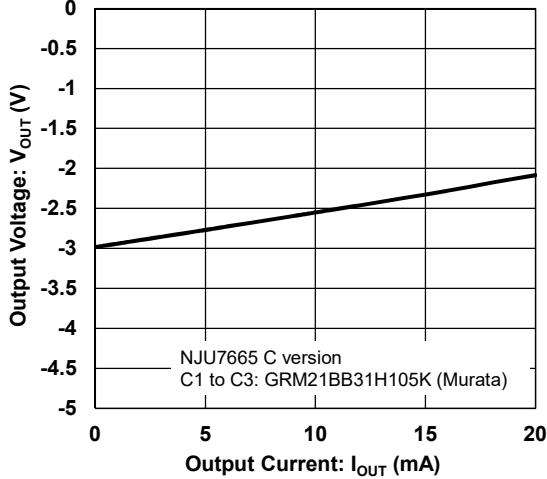
Output Voltage vs. Output Current  
( $V_{IN}=3V$ ,  $C1=C2=C3=1\mu F/50V$ ,  $T_a=25^\circ C$ )



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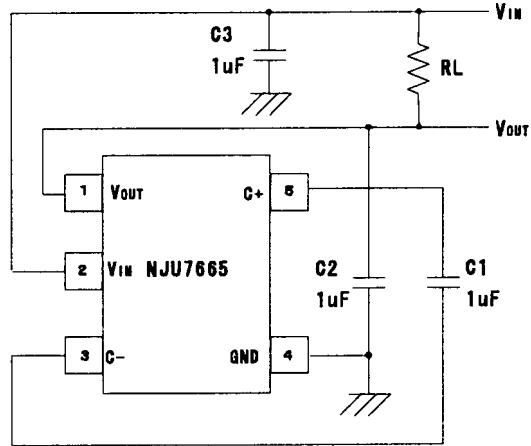
Output Voltage vs. Output Current  
( $V_{IN}=3V$ ,  $C1=C2=C3=1\mu F/50V$ ,  $T_a=25^\circ C$ )



# NJU7665 Series

## APPLICATION CIRCUIT

### 1. Negative Voltage Output Circuit



### 2. Parallel Connection Circuit

The following circuit reduce the output impedance.

