VOLTAGE CONVERTER FOR GaAs FET

PRELIMINARY

■ GENERAL DESCRIPTION

The NJU7664 is a voltage converter for GaAs FET, which contains CR oscillation circuit and dual operational amplifiers.

The voltage converter is a circuit operated by the charge pumping system, and it generates the negative voltage from the positive power supply. Furthermore the charge pumping capacitor is incorporated.

Both of two operational amplifiers with the gain resistance which is set up at -0dB output the negative voltage by the inverted input voltage.

The NJU7664 realizes to operate the GaAs FET requiring the negative gate biassing.

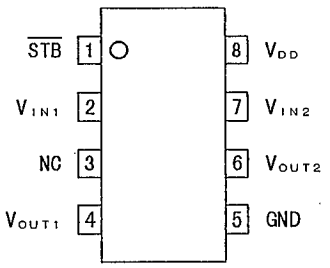
■ PACKAGE OUTLINE

NJU7664R

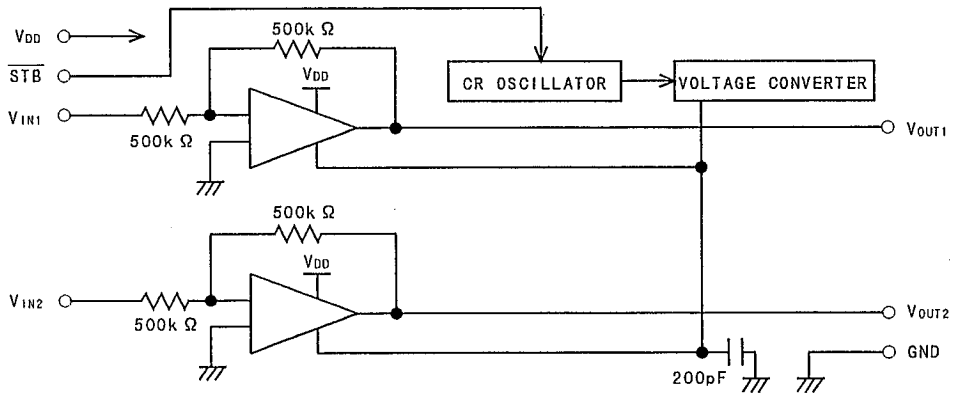
■ FEATURES

- Voltage Converter Operated With The Charge Pumping System
- Charge Pump Capacitor Incorporated
- CR Oscillation Circuit Incorporated
- Wide Operating Voltage V_{DD}=2.7V～5.2V
- Output Voltage 0～-4.0V (V_{DD}=5.2V)
- Low Operating Current 1.25mA MAX (V_{DD}=2.7V)
- Stand-by Function
- C-MOS Technology
- Package Outline VSP-8

■ PIN CONFIGURATION



■ BLOCK DIAGRAM



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■ TERMINAL DESCRIPTION

No.	SYMBOL	FUNCTION
1	$\overline{STB}$	Stand-by input terminal H:oscillating L:stop oscillating
2	V_{IN1}	Positive voltage input terminal 1
3	NC	No connection (Electrically open)
4	V_{OUT1}	Negative voltage output terminal 1
5	GND	Ground terminal
6	V_{OUT2}	Negative voltage output terminal 2
7	V_{IN2}	Positive voltage input terminal 2
8	V_{DD}	Power supply terminal

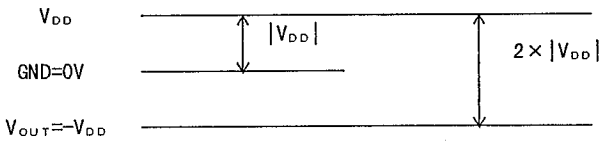
■ FUNCTIONAL DESCRIPTION

● Voltage Converter

The voltage converter is a circuit designed for generating the negative voltage ($-V_{DD}$) from the positive power supply (V_{DD}).

Because the voltage efficiency is 85% (TYP.), the negative voltage ($-V_{DD} \times 0.85$) is output typically.

This converter uses the charge pumping system which consists of capacitors and switches.



● Operational Amplifier

As the input and the feedback resistor of the operational amplifier is incorporated, an uni-multiple inverting amplifier is constructed.

● Stand-by Function

The NJU7664 turns to the stand-by mode when the $\overline{STB}$ terminal level is set to "L". During the stand-by mode, the voltage converter outputs GND voltage and the operating current is lower as the oscillator stop operating.

■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{DD}	5.5	V
Input Voltage	V_{IN}	GND-0.5 ~ V_{DD}+0.5	V
Output Voltage	V_{OUT}	-5.0	V
Power Dissipation	P_D	320	mW
Operating Temperature Range	T_{opr}	-30 ~ +85	°C
Storage Temperature Range	T_{stg}	-40 ~ +125	°C

Note 1) Decoupling capacitor should be connected between V_{DD} and GND due to the stabilized operation for the voltage converter.

■ ELECTRICAL CHARACTERISTICS

- DC CHARACTERISTICS

(V_{DD}=2.7V, GND=0V, Ta=25°C)

PARAMETER		SYMBOL	CONDITIONS		MIN	TYP	MAX	UNIT
Operating Voltage		V_{DD}			2.7	—	5.2	V
Operating Current		I_{DD1}	I_{SI1}=-100uA, I_{SI2}=-1uA		—	—	1.25	mA
		I_{DD2}	No load		—	—	1.0	mA
		I_{DD3}	$\overline{STB}$=L		—	—	1.0	μA
High Level Input Voltage		V_{IH}	$\overline{STB}$ terminal		0.8V_{DD}		V_{DD}	V
Low Level Input Voltage		V_{IL}	$\overline{STB}$ terminal		GND		0.2V_{DD}	V
Input Current 1		I_{IN1}	$\overline{STB}$ terminal, Vi=V_{DD} or GND		—	—	1.0	μA
Oscillation Frequency		f_{OSC}			—	4.0	—	MHz
OPAMP	Input Voltage	V_{IN}	V_{IN1}, V_{IN2} Terminals	V_{DD}=2.7V	0	—	2.0	V
				V_{DD}=5.2V	0	—	4.0	V
	Input Current 2	I_{IN2}	V_{IN1}, V_{IN2} Terminals	V_{DD}=2.7V, V_{IN}=2.0V	—	—	10.0	μA
				V_{DD}=5.2V, V_{IN}=4.0V	—	—	20.0	μA
	Output Voltage	V_{OUT}	V_{OUT1}, V_{OUT2} Terminals	V_{DD}=2.7V, I_{SI}=-100uA	-2.0	—	0	V
				V_{DD}=5.2V, I_{SI}=-100uA	-4.0	—	0	V
	Output Source Current	I_{SO}	V_{OUT1}, V_{OUT2} Terminals		5.0	—	—	μA
	Output Sink Current	I_{SI}	V_{OUT1}, V_{OUT2} Terminals		—	—	-100	μA
		$I_{SITOTAL}$	Total of V_{OUT1}, V_{OUT2} Term.		—	—	-105	μA
	Output Ripple Current	V_{RR1}	I_{SI}=-100μA, C_L=0.1uF		—	0.4	—	mV
		V_{RR2}	I_{SI}=-5μA, C_L=0.1uF		—	0.4	—	mV
	Gain Error	GER			-10	—	10	%

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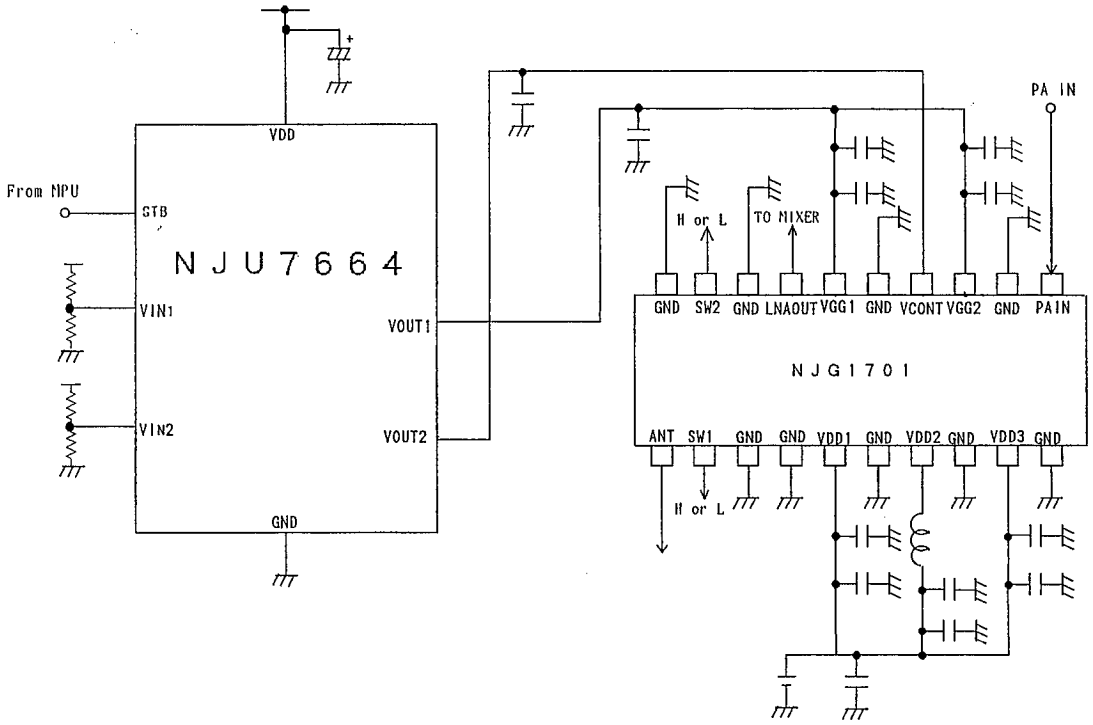
■ APPLICATION CIRCUITS



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