

## Tiny, Rail-to-Rail Input/Output Single CMOS Operational Amplifier

### ■GENERAL DESCRIPTION

The NJU7042 is a tiny Rail-to-Rail Input/Output single CMOS operational amplifier

The operating voltage is 2.7V to 5.5V and the input and output stage permits signal to swing between both of the supply rails.

The input offset voltage is lower than 5mV, and the input bias current is as low as than 1pA, consequently very small signal around the ground level can be amplified.

Furthermore, The NJU7042 is packaged with very small SOT-23-5, therefore it can be especially applied to portable applications.

### ■PACKAGE INFORMATION



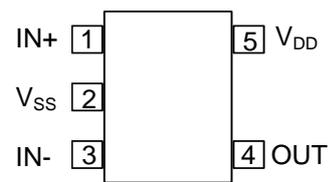
NJU7042F

### ■FEATURES

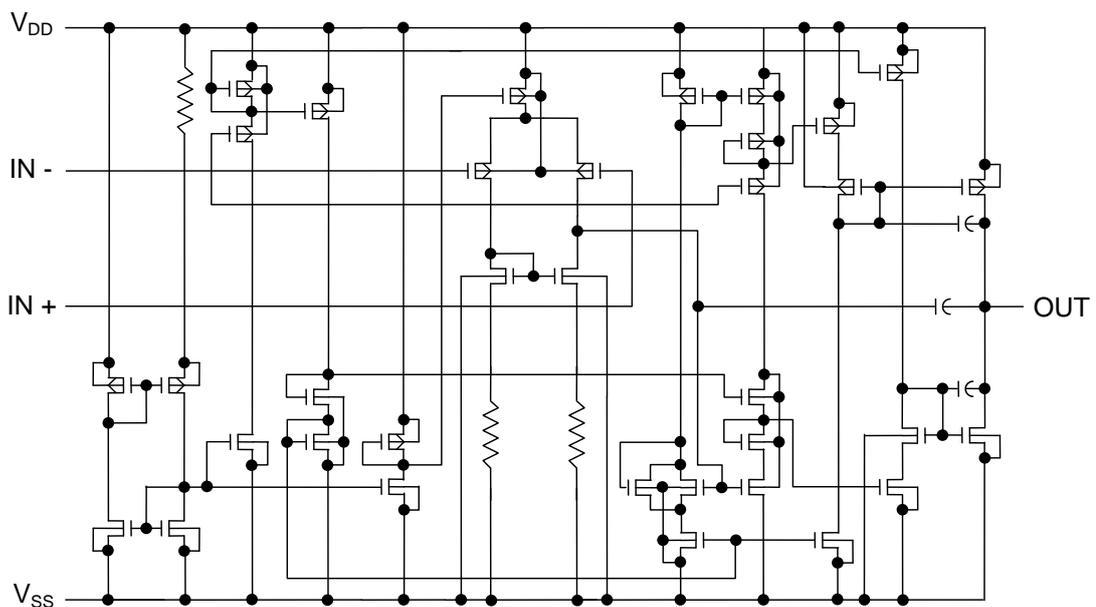
- Rail-to-Rail Input
  - Rail-to-Rail Output
  - Low Input Offset Voltage
  - Single-Power-Supply
  - Low Operating Current
  - High Load Current
  - Low Bias Current
  - Compensation Capacitor Incorporated
  - Package Outline
  - C-MOS Technology
- $V_{IN}=V_{SS}$  to  $V_{DD}$   
 $V_{OM} \geq 2.7V$  min. @3V  
 $V_{IO}=5mV$  max.  
 $V_{DD}=2.7$  to  $5.5V$   
 $I_{DD}=15\mu A$  typ.  
 $I_{OH}/I_{OL}=200\mu A$  typ.  
 $I_{IB}=1pA$  typ.  
 SOT-23-5

### ■PIN CONFIGURATION

(Top View)



### ■EQUIVALENT CIRCUIT



**■ABSOLUTE MAXIMUM RATINGS**

(Ta=25°C)

| PARAMETER                  | SYMBOL          | RATING       | UNIT |
|----------------------------|-----------------|--------------|------|
| Supply Voltage             | V <sub>DD</sub> | 7.0          | V    |
| Differential Input Voltage | V <sub>ID</sub> | ±7.0 (Note1) | V    |
| Common Mode Input Voltage  | V <sub>IC</sub> | -0.3 to 7.0  | V    |
| Power Dissipation          | P <sub>D</sub>  | 200          | mW   |
| Operating Temperature      | Topr            | -40 to +85   | °C   |
| Storage Temperature        | Tstg            | -55 to +125  | °C   |

Note1) If the supply voltage (V<sub>DD</sub>) is less than 7.0V, the input voltage must not over the V<sub>DD</sub> level though 7.0V is limit specified.

Note2) Decoupling capacitor should be connected between V<sub>DD</sub> and V<sub>SS</sub> due to the stabilized operation for the circuit.

**■ELECTRICAL CHARACTERISTICS**

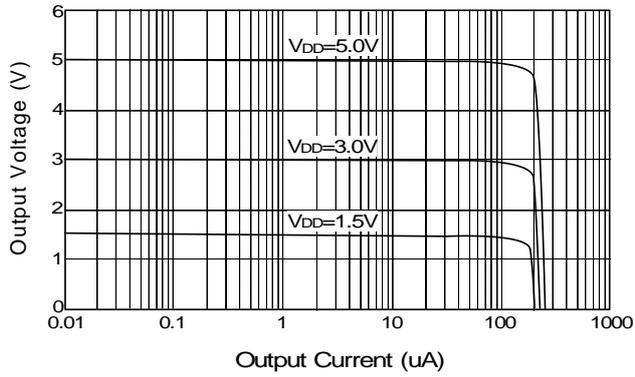
 (V<sub>DD</sub>=3.0V, R<sub>L</sub>=∞, Ta=25°C)

| PARAMETER                       | SYMBOL           | CONDITIONS                                 | MIN                                | TYP  | MAX                  | UNIT |
|---------------------------------|------------------|--|------------------------------------|------|----------------------|------|
| Operating Voltage               | V <sub>DD</sub>  |  | 2.7                                | -    | 5.5                  | V    |
| Input Offset Voltage            | V <sub>IO</sub>  | V <sub>IN</sub> =V <sub>DD</sub> /2        | -                                  | -    | 5                    | mV   |
| Input Offset Current            | I <sub>IO</sub>  |  | -                                  | 1    | -                    | pA   |
| Input Bias Current              | I <sub>IB</sub>  |  | -                                  | 1    | -                    | pA   |
| Input Impedance                 | R <sub>IN</sub>  |  | -                                  | 1    | -                    | TΩ   |
| Large Signal Voltage Gain       | A <sub>VD</sub>  |  | 60                                 | 70   | -                    | dB   |
| Input Common Mode Voltage Range | V <sub>ICM</sub> |  | V <sub>SS</sub> to V <sub>DD</sub> | -    | -                    | V    |
| Maximum Output Swing Voltage    | V <sub>OM1</sub> | R <sub>L</sub> =30kΩ                       | V <sub>DD</sub> -0.3               | -    | -                    | V    |
|                                 | V <sub>OM2</sub> | R <sub>L</sub> =30kΩ                       | -                                  | -    | V <sub>SS</sub> +0.3 |      |
| Output Source Current           | I <sub>OH</sub>  | V <sub>OH</sub> =V <sub>DD</sub> -0.3      | 100                                | 200  | -                    | uA   |
| Output Sink Current             | I <sub>OH</sub>  | V <sub>OL</sub> =V <sub>DD</sub> +0.3      | 100                                | 200  | -                    |      |
| Common Mode Rejection Ratio     | CMR              | V <sub>IN</sub> =V <sub>DD</sub> /2        | 60                                 | 70   | -                    | dB   |
| Supply Voltage Rejection Ratio  | SVR              | V <sub>DD</sub> =2.7 to 5.5V               | 60                                 | 70   | -                    | dB   |
| Operating Current               | I <sub>DD</sub>  |  | -                                  | 15   | 30                   | uA   |
| Slew Rate                       | SR               |  | -                                  | 0.03 | -                    | V/us |
| Unity Gain Bandwidth            | Ft               | A <sub>v</sub> =40dB, C <sub>L</sub> =10pF | -                                  | 47   | -                    | kHz  |

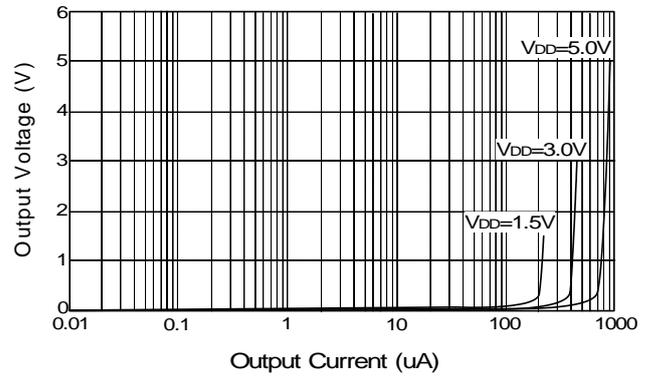
Note) The load capacitance (CL) should be used less than 200pF.

## ■ TYPICAL CHARACTERISTICS

Output Voltage vs. Output Current (SOURCE)



Output Voltage vs. Output Current (SINK)



**[CAUTION]**  
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