

## LOW-NOISE DUAL OPERATIONAL AMPLIFIER

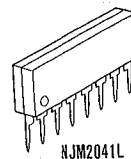
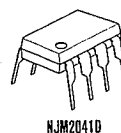
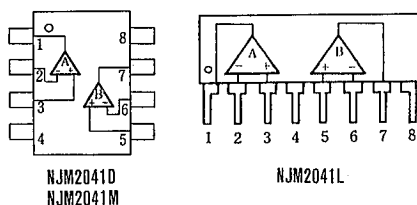
### ■ GENERAL DESCRIPTION

The NJM2041 is a bipolar operational amplifier which is designed as low noise version of the NJM4558 with high output current and fast slew rate ( $3V/\mu s$ ) and wide unity gain bandwidth (7MHz) constructed using New JRC Planar epitaxial process.

### ■ FEATURES

- Operating Voltage ( $\pm 4V \sim \pm 22V$ )
- High Output Current (25mA.)
- Slew Rate ( $3V/\mu s$  typ.)
- Unity Gain Bandwidth (7MHz typ.)
- Package Outline DIP8, DMP8, SIP8
- Bipolar Technology

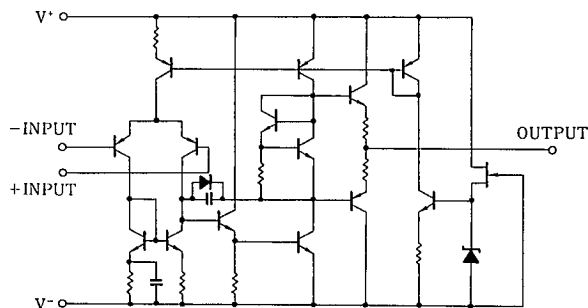
### ■ PIN CONFIGURATION



#### PIN FUNCTION

1. A OUTPUT
2. A-INPUT
3. A+INPUT
4.  $V^-$
5. B+INPUT
6. B-INPUT
7. B OUTPUT
8.  $V^+$

### ■ EQUIVALENT CIRCUIT (1/2 Shown)



## ■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

| PARAMETER                   | SYMBOL                         | RATINGS    | UNIT |
|-----------------------------|--------------------------------|------------|------|
| Supply Voltage              | V <sup>+</sup> /V <sup>-</sup> | ±22        | V    |
| Differential Input Voltage  | V <sub>ID</sub>                | ±30        | V    |
| Input Voltage               | V <sub>IC</sub>                | ±15 (note) | V    |
| Power Dissipation           | P <sub>D</sub>                 | (DIP8) 500 | mW   |
|                             |                                | (DIM8) 300 | mW   |
|                             |                                | (SIP8) 800 | mW   |
| Operating Temperature Range | T <sub>opr</sub>               | -20~+75    | °C   |
| Storage Temperature Range   | T <sub>stg</sub>               | -40~+125   | °C   |

(note) For supply voltage less than ±15V, the absolute maximum input voltage is equal to the supply voltage.

## ■ ELECTRICAL CHARACTERISTICS

(Ta=25°C, V<sup>+</sup>/V<sup>-</sup>=±15V)

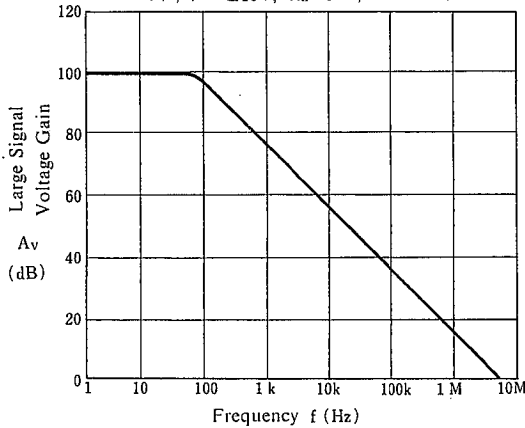
| PARAMETER                       | SYMBOL           | TEST CONDITION                              | MIN. | TYP.  | MAX. | UNIT  |
|---------------------------------|------------------|---|------|-------|------|-------|
| Input Offset Voltage            | V <sub>IO</sub>  | R <sub>S</sub> ≤ 10kΩ                       | —    | 0.3   | 3    | mV    |
| Input Offset Current            | I <sub>IO</sub>  |   | —    | 10    | 200  | nA    |
| Input Bias Current              | I <sub>B</sub>   |   | —    | 200   | 500  | nA    |
| Input Resistance                | R <sub>IN</sub>  |   | 50   | 200   | —    | kΩ    |
| Large signal Voltage Gain       | A <sub>V</sub>   | R <sub>L</sub> ≥ 2kΩ, V <sub>O</sub> = ±10V | 86   | 110   | —    | dB    |
| Maximum Output Voltage Swing 1  | V <sub>OM1</sub> | R <sub>L</sub> ≥ 10kΩ                       | ±12  | ±14   | —    | V     |
| Maximum Output Voltage Swing 2  | V <sub>OM2</sub> | I <sub>O</sub> = 25mA                       | ±10  | ±11.5 | —    | V     |
| Input Common Mode Voltage Range | V <sub>ICM</sub> |   | ±12  | ±14   | —    | V     |
| Common Mode Rejection Ratio     | CMR              | R <sub>S</sub> ≤ 10kΩ                       | 70   | 100   | —    | dB    |
| Supply Voltage Rejection Ratio  | SVR              | R <sub>S</sub> ≤ 10kΩ                       | 76   | 100   | —    | dB    |
| Operating Current               | I <sub>CC</sub>  |   | —    | 6     | 8    | mA    |
| Slew Rate                       | SR               |   | —    | 3     | —    | V/μs  |
| Gain Bandwidth Product          | GB               |   | —    | 7     | —    | MHz   |
| Equivalent Input Noise Voltage  | V <sub>NI</sub>  | FLAT+JISA R <sub>S</sub> =300Ω              | —    | 0.48  | 0.61 | μVrms |

(note) : New JRC's general selected products D-rank are also prepared for the noise standard (R<sub>S</sub>=2.2kΩ, RIAA, V<sub>NI</sub>=1.4μV Max.)

■ TYPICAL CHARACTERISTICS

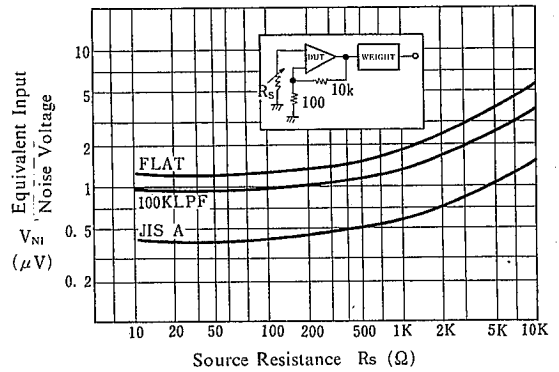
Large Signal Voltage Gain vs. Frequency

( $V^+/V^- = \pm 15V$ ,  $R_L = 2k\Omega$ ,  $T_a = 25^\circ C$ )



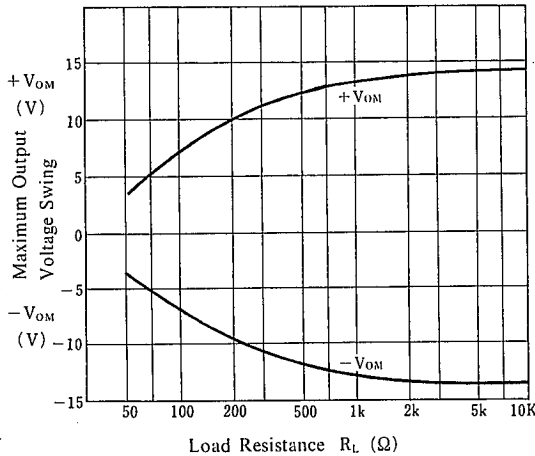
Equivalent Input Noise Voltage

( $V^+/V^- = \pm 15V$ ,  $T_a = 25^\circ C$ )



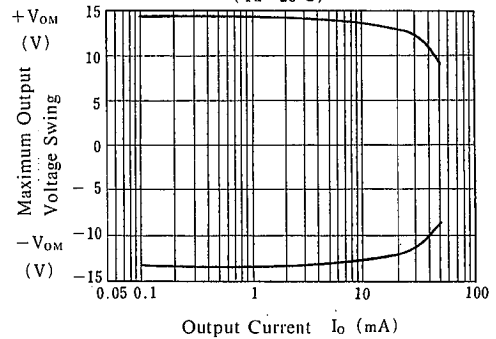
Maximum Output Voltage Swing vs. Load Resistance

( $V^+/V^- = \pm 15V$ ,  $T_a = 25^\circ C$ )



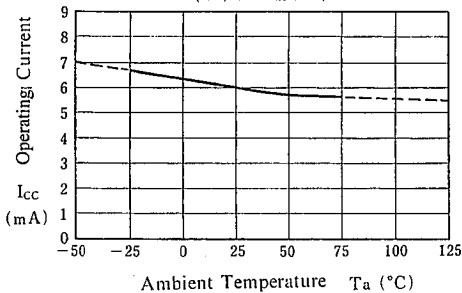
Maximum Output Voltage Swing vs. Output Current

( $T_a = 25^\circ C$ )



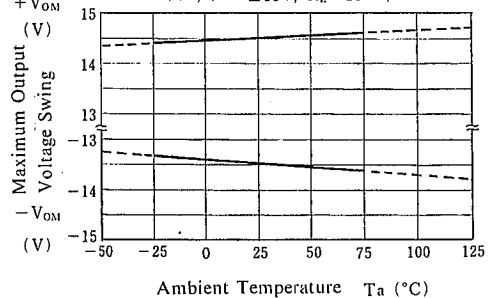
Operating Current vs. Temperature

( $V^+/V^- = \pm 15V$ )



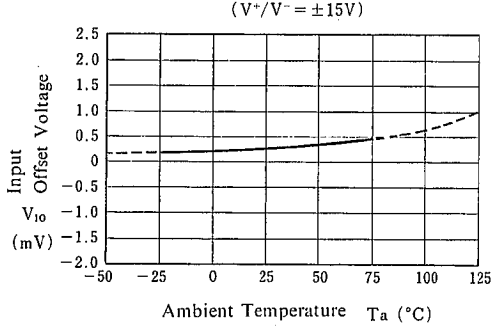
Maximum Output Voltage Swing vs. Temperature

( $V^+/V^- = \pm 15V$ ,  $R_L = 10k\Omega$ )

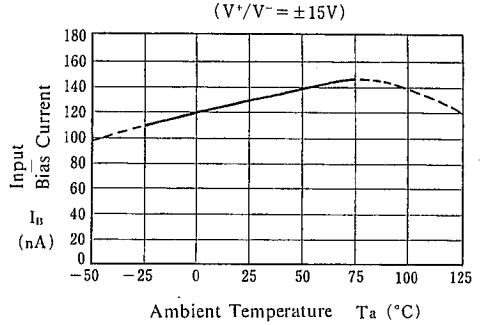


## ■ TYPICAL CHARACTERISTICS

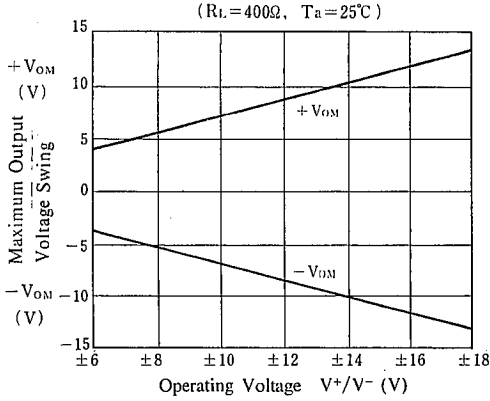
### Input Offset Voltage vs. Temperature



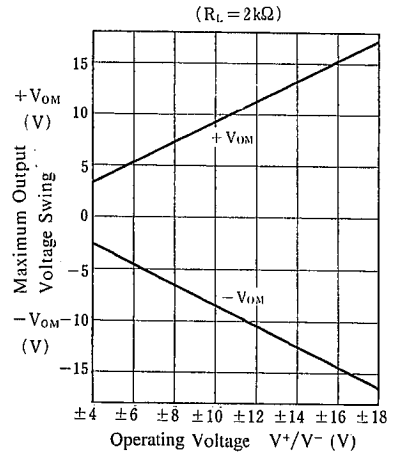
### Input Bias Current vs. Temperature



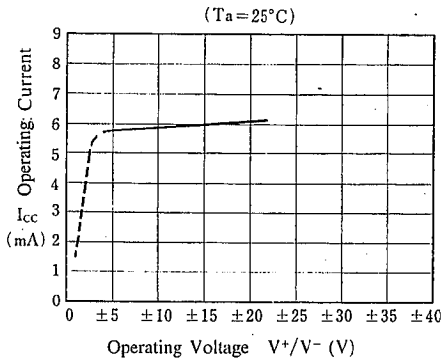
### Maximum Output Voltage Swing vs. Operating Voltage



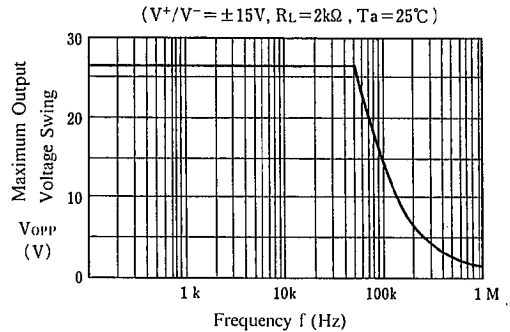
### Maximum Output Voltage Swing vs. Operating Voltage



### Operating Current vs. Operating Voltage



### Maximum Output Voltage Swing vs. Frequency



## MEMO

[CAUTION]

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