

J-FET INPUT OPERATIONAL AMPLIFIER

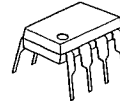
GENERAL DESCRIPTION

The NJM2162/64 combines feature of the NJM062/064 as well as and providing the capability of wider bandwidth and higher slew rate. It is suitable for telecom application (active filters etc.).

FEATURES

- Operating Voltage (±2V ~ ±18V)
- High Input Resistance (10<sup>12</sup> Ω typ.)
- Low Operating Current (1.2mA typ.)
- High Slew Rate (10V/μs typ.)
- J-FET Input
- Wide Unity Gain Bandwidth (3MHz typ.)
- Bipolar Technology
- Package Outline DIP8/14, DMP8/14, SIP8, SSOP8/14

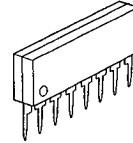
PACKAGE OUTLINE



NJM2162D



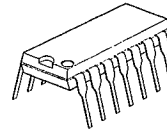
NJM2162M



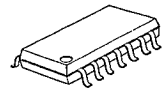
NJM2162L



NJM2162V



NJM2164D

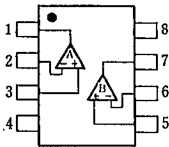


NJM2164M

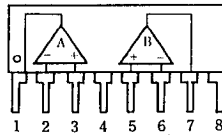


NJM2164V

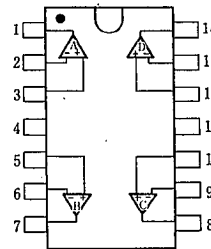
PIN CONFIGURATION



NJM2162D  
NJM2162M  
NJM2162V



NJM2162L



NJM2164D  
NJM2164M  
NJM2164V

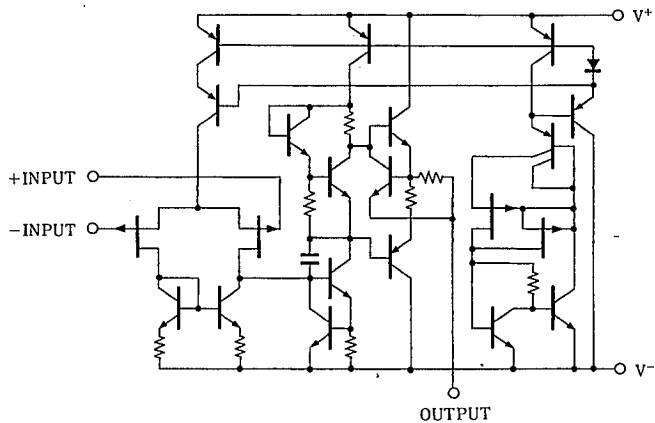
PIN FUNCTION

- NJM2162:
- 1. A OUTPUT
  - 2. A-INPUT
  - 3. A+INPUT
  - 4. V-
  - 5. B+INPUT
  - 6. B-INPUT
  - 7. B OUTPUT
  - 8. V+

- NJM2164:
- 1. A OUTPUT
  - 2. A-INPUT
  - 3. A+INPUT
  - 4. V+
  - 5. B+INPUT
  - 6. B-INPUT
  - 7. B OUTPUT
  - 8. C OUTPUT
  - 9. C-INPUT
  - 10. C+INPUT
  - 11. V-
  - 12. D+INPUT
  - 13. D-INPUT
  - 14. D OUTPUT

EQUIVALENT CIRCUIT

(2162 is 1/2 Shown, 2164 is 1/4 Shown)



## ■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sup>+</sup> /V <sup>-</sup>	±18	V
Differential Input Voltage	V <sub>ID</sub>	±30	V
Input Voltage	V <sub>IC</sub>	±15 (note 1)	V
Power Dissipation	P <sub>D</sub>	(DIP8) 500	mW
		(DMP) 300	mW
		(SIP8) 800	mW
		(SSOP8) 250	mW
		(DIP14) 700	mW
		(DMP14) 700 (note2)	mW
		(SSOP14) 300	mW
Operating Temperature Range	T <sub>opr</sub>	-20~+75	°C
Storage Temperature Range	T <sub>stg</sub>	-40~+125	°C

(note 1) For supply voltage less than ±15V, the absolute maximum input voltage is equal to the supply voltage.  
 (note 2) at on PC board

## ■ ELECTRICAL CHARACTERISTICS

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

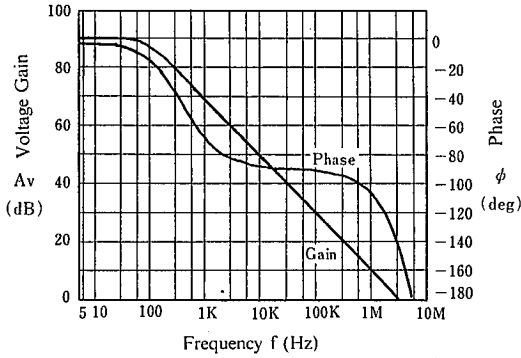
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Voltage	V <sup>+</sup> /V <sup>-</sup>		±2	—	±18	V
Input Offset Voltage	V <sub>IO</sub>	R <sub>s</sub> = 50Ω	—	5	15	mV
Input Offset Current	I <sub>IO</sub>		—	1	200	pA
Input Bias Current	I <sub>B</sub>		—	2	400	pA
Input Common Mode voltage Range	V <sub>ICM</sub>		±13	+15	—	V
				-13.5		
Maximum Output Voltage Swing	V <sub>OM</sub>	R <sub>L</sub> = 10Ω	±13	+14	—	V
				-14.0		
Large signal Voltage Gain	A <sub>v</sub>	R <sub>L</sub> ≥ 10kΩ, V <sub>O</sub> = ±10V	70	80	—	dB
Unity Gain Bandwidth	f <sub>T</sub>	R <sub>L</sub> = 10Ω	—	3	—	MHz
Input Resistance	R <sub>IN</sub>		—	10 <sup>12</sup>	—	Ω
Common Mode Rejection Ratio	CMR	R <sub>s</sub> ≤ 10kΩ	70	90	—	dB
Supply voltage Rejection Ratio	SVR	R <sub>s</sub> ≤ 10kΩ	70	100	—	dB
Operating Current	I <sub>CC</sub>	R <sub>L</sub> = ∞ (1 circuit)	—	0.3	0.45	mA
Slew Rate	SR	R <sub>L</sub> = 10kΩ	—	10	—	V/μs
Equivalent Input Noise Voltage	e <sub>n</sub>	R <sub>S</sub> = 100Ω, f = 1kHz	—	40	—	nV/√Hz

(Note) The NJM 2162/64 is the product in which the AC feature have been made much higher comparing to NJM062/64. Therefore special care being required for the oscillation due to the capacitive load when operation on voltage follower.

## TYPICAL CHARACTERISTICS

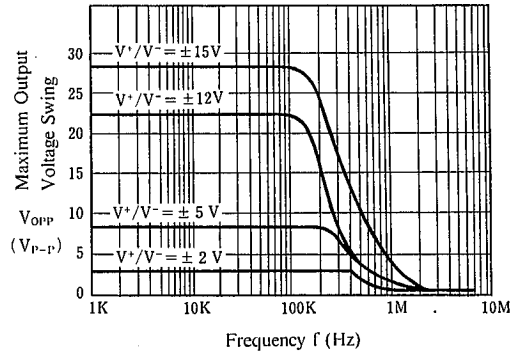
### Voltage Gain, Phase Shift vs. Frequency

( $V^+/V^- = \pm 15V$ ,  $Z_L = 10k\Omega // 100pF$ ,  $T_a = 25^\circ C$ )



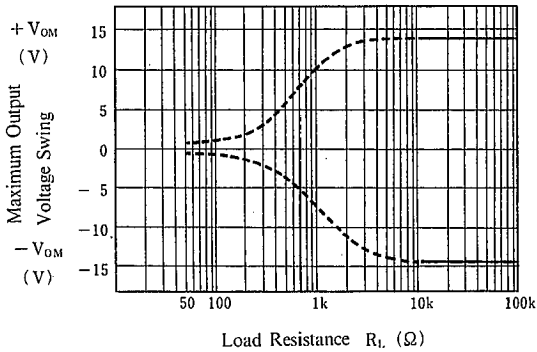
### Maximum Output Voltage Swing vs. Frequency

( $R_L = 10k\Omega$ ,  $T_a = 25^\circ C$ )



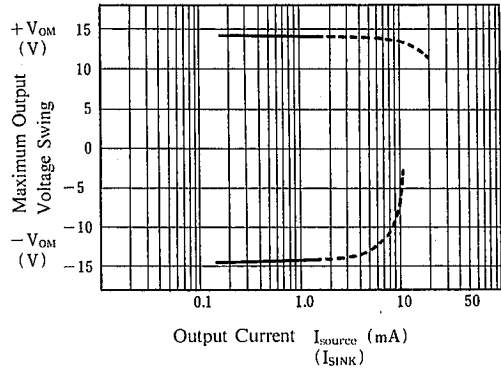
### Maximum Output Voltage Swing vs. Load Resistance

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



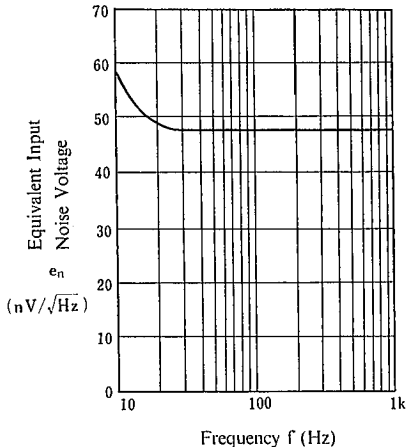
### Maximum Output Voltage Swing vs. Output Current

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



### Equivalent Input Noise Voltage vs. Frequency

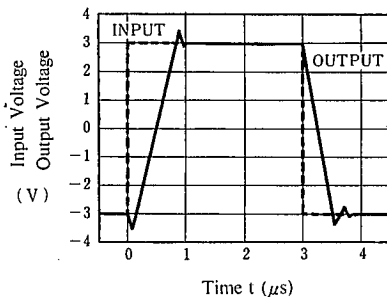
( $V^+/V^- = \pm 15V$ ,  $R_s = 100\Omega$ ,  $T_a = 25^\circ C$ )



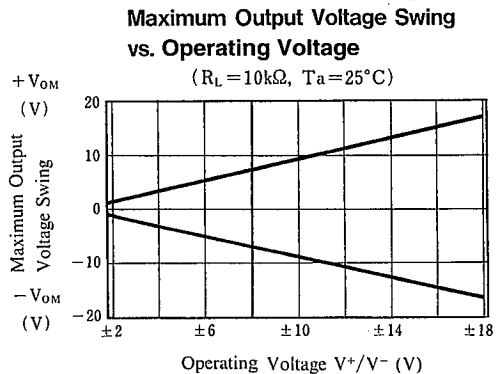
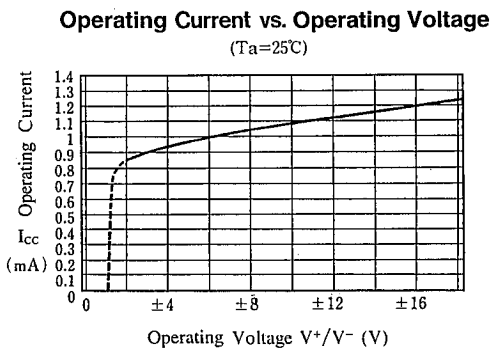
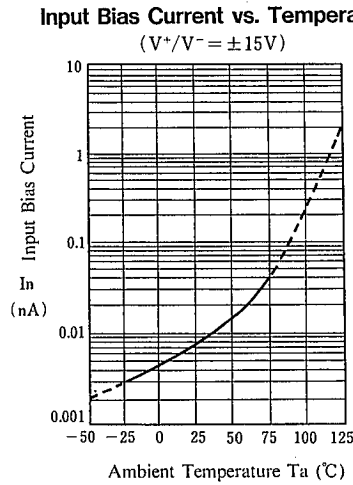
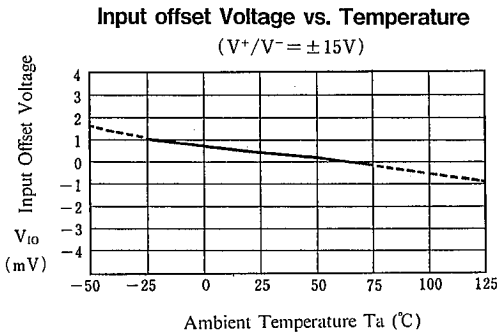
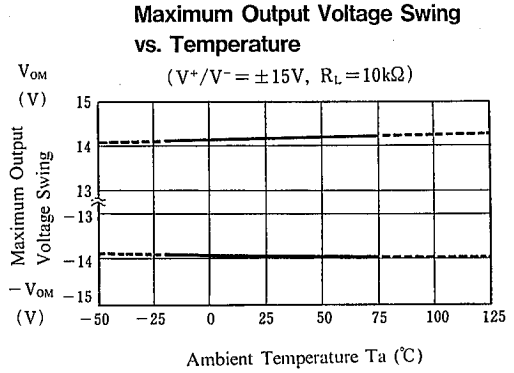
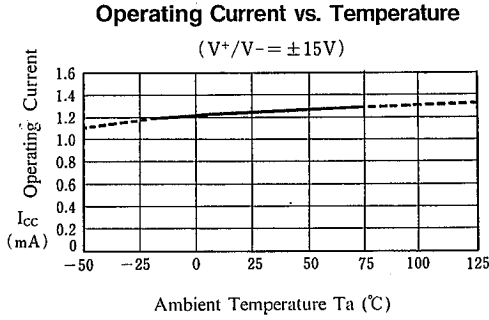
### Voltage Follower

#### Large Signal Pulse Response

( $V^+/V^- = \pm 15V$ ,  $R_L = 10k\Omega$ ,  $C_L = 100pF$ ,  $T_a = 25^\circ C$ )



■ TYPICAL CHARACTERISTICS



## MEMO

**[CAUTION]**

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