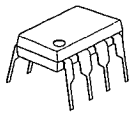
# DUAL OPERATIONAL AMPLIFIER

## ■ GENERAL DESCRIPTION

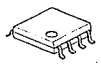
NJM4580 is the dual operational amplifier, specially designed for improving the tone control, which is most suitable for the audio application.

Featuring noiseless, higher gain bandwidth, high output current and low distortion ratio, and it is most suitable not only for acoustic electronic parts of audio pre-amp and active filter, but also for the industrial measurement tools. It is also suitable for the head phone amp at higher output current, and further more, it can be applied for the handy type set operational amplifier of genenal purpose in application of low voltage single supply type which is properly biased of the input low voltage source.

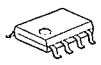
## ■ PACKAGE OUTLINE



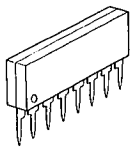
NJM4580D



NJM4580M



NJM4580E



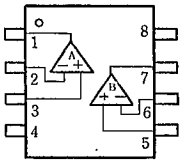
NJM4580L

NJM4580V

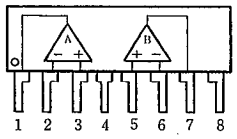
## ■ FEATURES

- Operating Voltage (±2V～±18V)
- Low Input Noise Voltage (0.8 μVrms typ.)
- Wide Gain Bandwidth Product (15MHz typ.)
- Low Distortion (0.0005% typ.)
- Slew Rate (5V/ μs typ.)
- Package Outline DIP8, SIP8, EMP8, SSOP8, DMP8
- Bipolar Technology

## ■ PIN CONFIGURATION



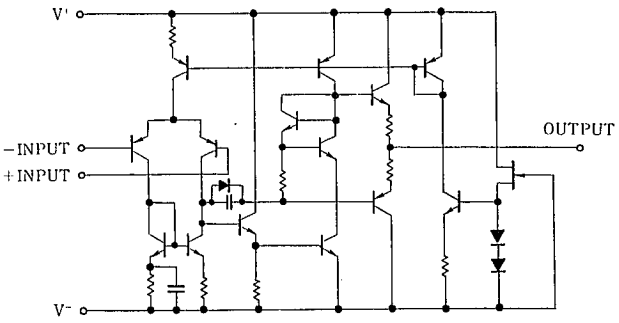

NJM4580D, NJM4580E
NJM4580M, NJM4580V




NJM4580L

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℃)

| PARAMETER | SYMBOL | RATINGS | UNIT |
|---|---|---|---|
| Supply Voltage | $V^+/V^-$ | ±18 | V |
| Input Voltage | $V_{IC}$ | ±15 (note) | V |
| Differential Input Voltage | $V_{ID}$ | ±30 (note) | V |
| Output Current | $I_O$ | ±50 | mA |
| Power Dissipation | $P_D$ | (DIP8) 800 | mW |
| | | (SIP8) 800 | mW |
| | | (DMP8) 300 | mW |
| | | (EMP8) 300 | mW |
| | | (SSOP8) 250 | mW |
| Operating Temperature Range | $T_{opr}$ | −40～+85 | ℃ |
| Storage Temperature Range | $T_{stg}$ | −40～+125 | ℃ |

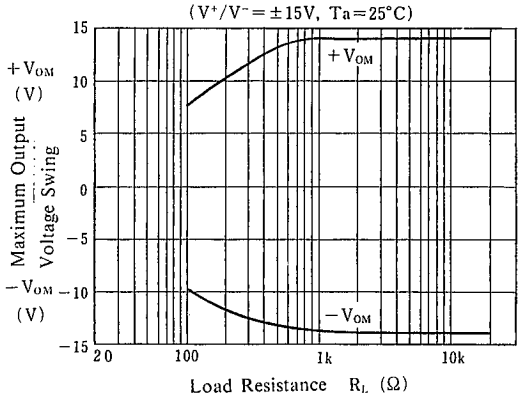
## ■ ELECTRICAL CHARACTERISTICS

($Ta=25℃$, $V^+/V^-=\pm15V$)

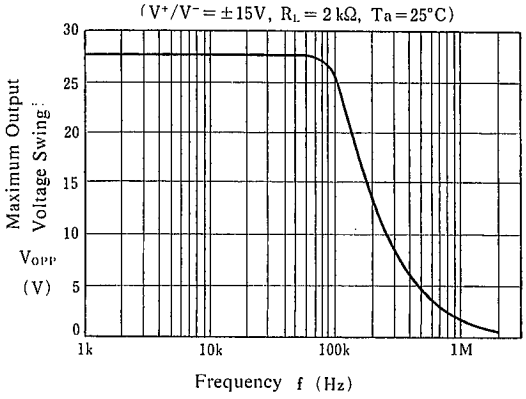
| PARAMETER | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| Input Offset Voltage | $V_{IO}$ | $R_S \leqq 10k\Omega$ | — | 0.5 | 3 | mV |
| Input Offset Current | $I_{IO}$ | | — | 5 | 200 | nA |
| Input Bias Current | $I_B$ | | — | 100 | 500 | nA |
| Large Signal Voltage Gain | $A_V$ | $R_L \geqq 2k\Omega$, $V_O=\pm10V$ | 90 | 110 | — | dB |
| Output Voltage Swing | $V_{OM}$ | $R_L \geqq 2k\Omega$ | ±12 | ±13.5 | — | V |
| Input Common Mode Voltage Range | $V_{ICM}$ | | ±12 | ±13.5 | — | V |
| Common Mode Rejection Ratio | CMR | $R_S \leqq 10k\Omega$ | 80 | 110 | — | dB |
| Supply Voltage Rejection Ratio | SVR | $R_S \leqq 10k\Omega$ | 80 | 110 | — | dB |
| Operating Current | $I_{CC}$ | | — | 6 | 9 | mA |
| Slew Rate | SR | $R_L \geqq 2k\Omega$ | — | 5 | — | V/μs |
| Gain Bandwidth Product | GB | f=10kHz | — | 15 | — | MHz |
| Total Harmonic Distortion | THD | $A_V=20dB$, $V_O=5V$, $R_L=2k\Omega$, f=1kHz | — | 0.0005 | — | % |
| Input Noise Voltage | $V_{NI}$ | RIAA $R_S=2.2k\Omega$, 30kHzLPF | — | 0.8 | — | $\mu V_{rms}$ |

## ■ TYPICAL CHARACTERISTICS

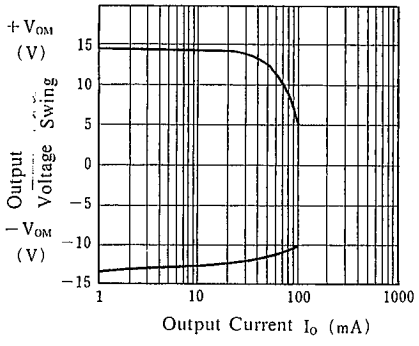
### Maximum Output Voltage Swing vs. Load Resistance



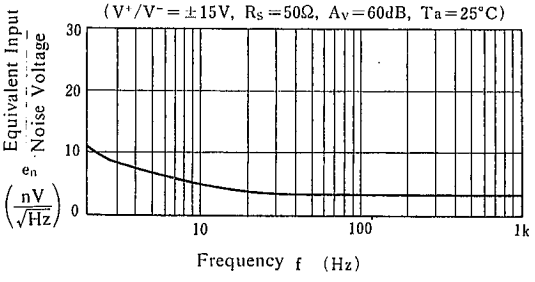

### Maximum Output Voltage Swing vs. Frquency



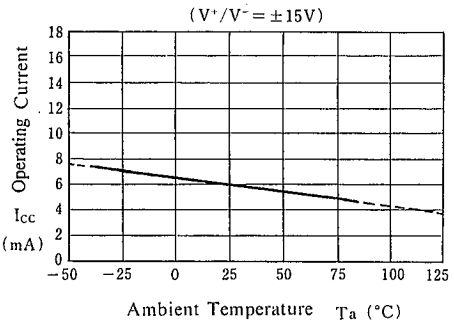

### Output Voltage Swing vs. Output Current



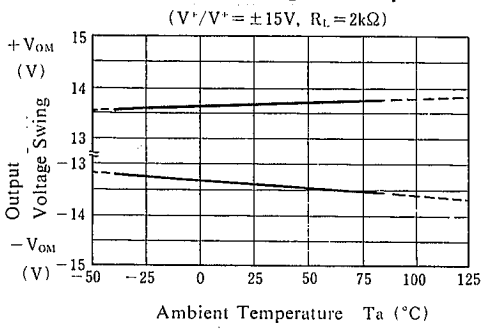

### Equivalent Input Noise Voltage vs. Frequency




### Operating Current vs. Temperature

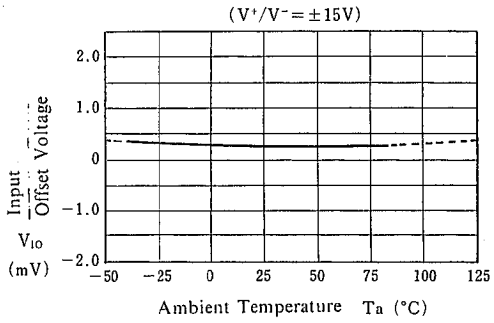



### Output Voltage Swing vs. Temperature

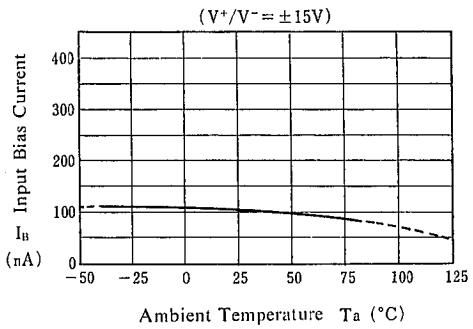


## ■ TYPICAL CHARACTERISTICS

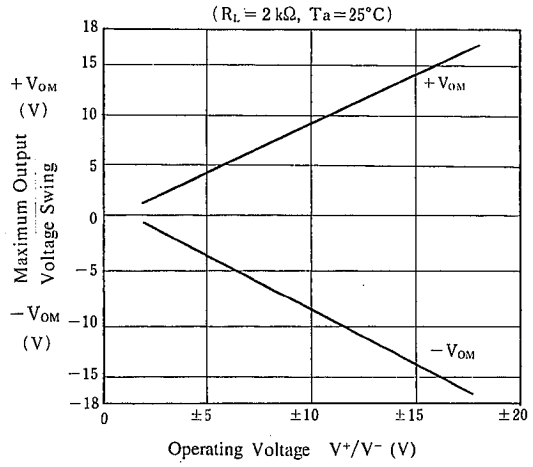
### Input Offset Voltage vs. Temperature



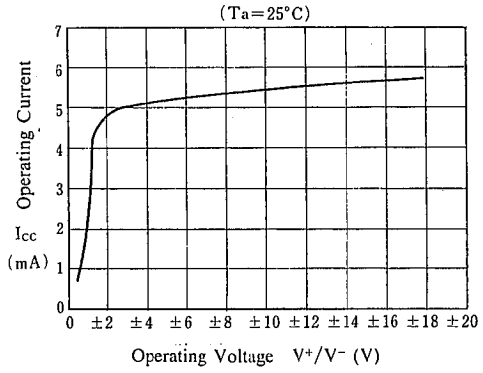

### Input Bias Current vs. Temperature



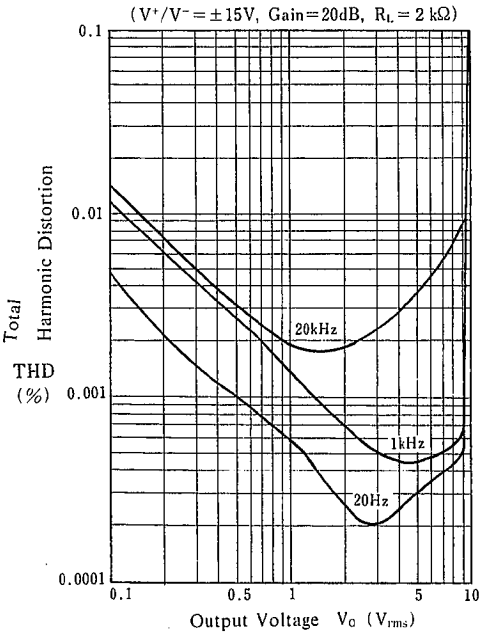

### Maximum Output Voltage Swing vs. Operating Voltage



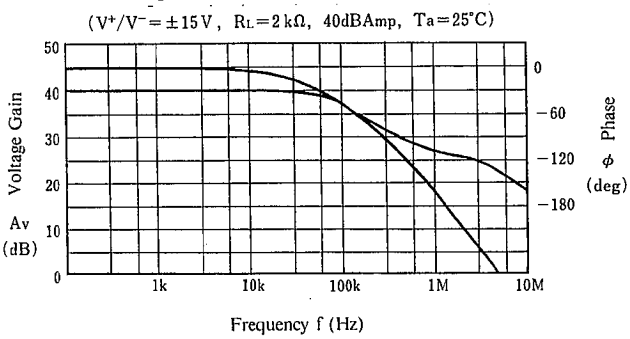

### Operating Current vs. Operating Voltage




### Total Harmonic Distortion vs. Output Voltage




### Voltage Gain, Phase vs. Frequency



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