

6427525 N E C ELECTRONICS INC

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**NEC**

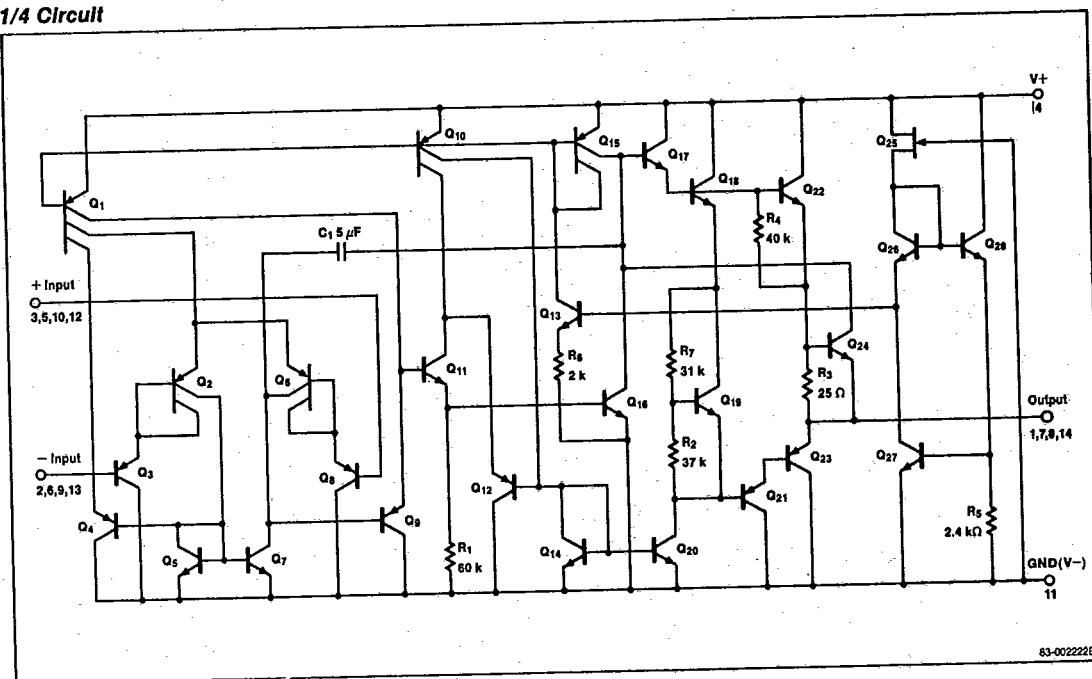
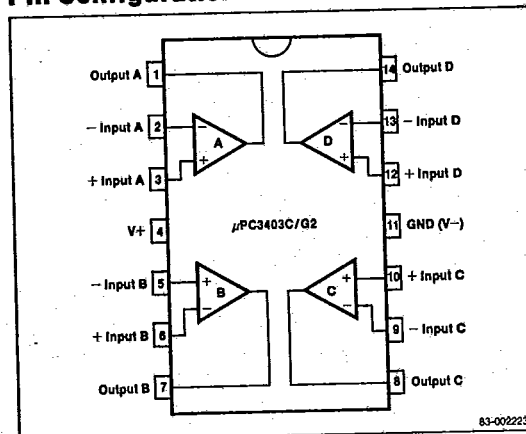
NEC Electronics Inc.

 **$\mu$ PC3403  
QUAD HIGH-PERFORMANCE  
OPERATIONAL AMPLIFIER****Description**

The  $\mu$ PC3403 quad operational amplifier is designed with four independent high gain frequency compensated operational amplifiers. Featuring operations from either single or split power supplies from 3 V to  $\pm 18$  V. The common mode input range includes the negative supply which eliminates the need for external biasing circuitry in most applications.

**Features**

- ☐ Input common mode voltage range includes ground or negative supply
- ☐ Output voltage can swing to ground or negative supply
- ☐ Wide power supply range:
  - Single supply of 3.0 to 36 V
  - Split supplies of  $\pm 1.5$  to 18 V
- ☐ Class AB output stage for minimal crossover distortion
- ☐ Short-circuit protected outputs
- ☐ MC3403 direct replacement

**Equivalent Circuit****1/4 Circuit****Pin Configuration****3**

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**μPC3403****NEC****Absolute Maximum Ratings** $T_A = 25^\circ\text{C}$ 

|                                 |                               |
|---------------------------------|-------------------------------|
| Voltage Between $V^+$ and $V^-$ | 36 V                          |
| Differential Input Voltage      | $\pm 36$ V                    |
| Input Voltage (Note 1)          | $\pm 18$ V                    |
| Power Dissipation, C Package    | 570 mW                        |
| Power Dissipation, G2 Package   | 550 mW                        |
| Operating Temperature Range     | 0 to $+70^\circ\text{C}$      |
| Storage Temperature Range       | $-55$ to $+125^\circ\text{C}$ |

Note: 1. The absolute maximum input voltage is equal to the supply voltage.

Comment: Stress above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

**Ordering Information**

| Part Number | Package          | Operating Temperature Range              |
|-------------|------------------|------------------------------------------|
| μPC3403C    | Plastic DIP      | $0^\circ\text{C}$ to $+70^\circ\text{C}$ |
| μPC3403G2   | Plastic Miniflat | $0^\circ\text{C}$ to $+70^\circ\text{C}$ |

**Electrical Characteristics** $T_A = 25^\circ\text{C}$ ,  $V^\pm = \pm 15$  V

| Parameter                               | Symbol              | Limits      |              |          | Unit | Test Conditions                                                        |
|-----------------------------------------|---------------------|-------------|--------------|----------|------|------------------------------------------------------------------------|
|                                         |                     | Min.        | Typ.         | Max.     |      |                                                                        |
| Input Offset Voltage                    | $V_{IO}$            |             | 2.0          | 7.0      | mV   | $V^+ = +5$ V, $V^- = \text{GND}$                                       |
| Input Offset Current                    | $I_{IO}$            |             | 5            | 50       | nA   | $V^+ = +5$ V, $V^- = \text{GND}$                                       |
| Input Bias Current                      | $I_b$               |             | 45           | 250      | nA   | $V^+ = +5$ V, $V^- = \text{GND}$                                       |
| Large Signal Voltage Gain               | $A_{VOL}$           | 86          | 98           |          | dB   | $V_O = \pm 10$ V, $R_L = 2$ k $\Omega$                                 |
|                                         |                     | 86          | 98           |          | dB   | $V^+ = +5$ V, $V^- = \text{GND}$ , $R_L = 2$ k $\Omega$                |
| Input Voltage Range                     | $V_{ICM}$           | +13 to -15  | +13.5 to -15 |          | V    |                                                                        |
| Common Mode Rejection Ratio             | CMRR                | 70          | 90           |          | dB   |                                                                        |
| Supply Voltage Rejection Ratio          | SVRR                |             | 89           | 103      | dB   |                                                                        |
|                                         |                     |             |              | 103      | dB   | $V^+ = +5$ V, $V^- = \text{GND}$                                       |
| Supply Current                          | $I_{CC}$            |             | 2.8          | 7.0      | mA   | $V_O = 0$ , $R_L = \infty$ , all channels                              |
|                                         |                     |             | 2.5          | 7.0      | mA   | $V^+ = +5$ V, $V^- = \text{GND}$ , all channels                        |
| Output Short Circuit Current (see Note) | $I_{O\text{SHORT}}$ | $\pm 10$    | $\pm 20$     | $\pm 45$ | mA   |                                                                        |
| Output Voltage Swing                    | $V_{OM}$            | $\pm 12$    | $\pm 13.5$   |          |      | $R_L = 10$ k $\Omega$                                                  |
|                                         |                     | $\pm 10$    | $\pm 13$     |          | V    | $R_L = 2.0$ k $\Omega$                                                 |
|                                         |                     | $V^+ - 1.7$ | $V^+ - 1.5$  |          | V    | $R_L = 10$ k $\Omega$ , $5$ V $\leq V^+ \leq 30$ V, $V^- = \text{GND}$ |
| Channel Separation                      | CS                  |             | 120          |          | dB   | $f = 1$ kHz to 20 kHz                                                  |

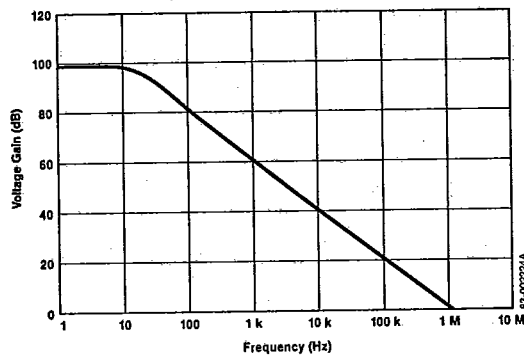
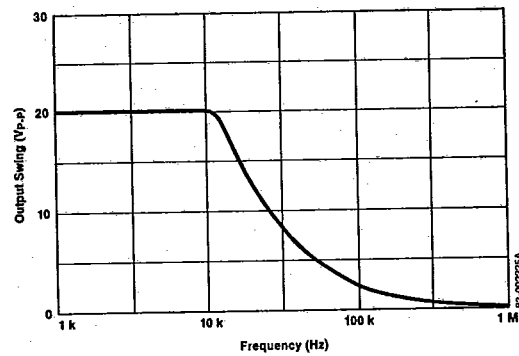
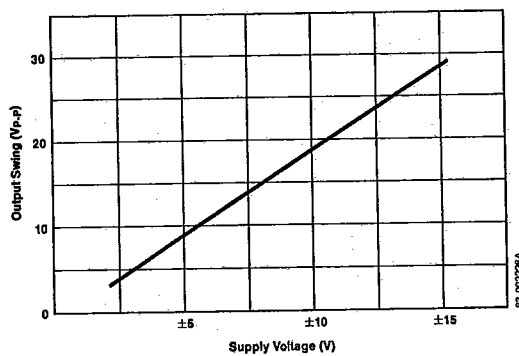
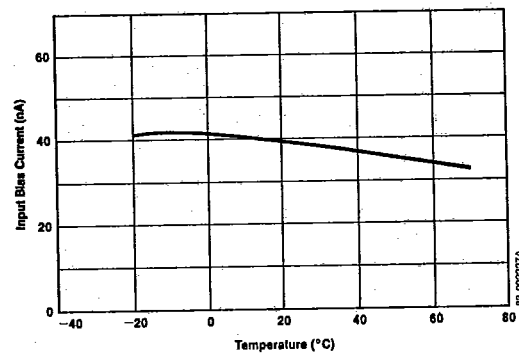
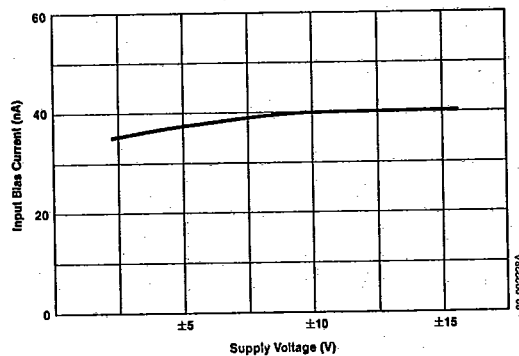
Note: Do not exceed the maximum power dissipation rating.

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**NEC** **$\mu$ PC3403****Operating Characteristics** $T_A = 25^\circ\text{C}$ **Open Loop Frequency Response****Power Bandwidth****Output Swing****Input Bias Current****Input Bias Current****3**