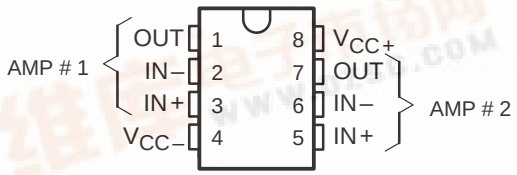
# RC4559
# DUAL HIGH-PERFORMANCE OPERATIONAL AMPLIFIER

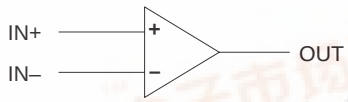
SLOS074 – D2785, OCTOBER 1983 — REVISED JUNE 1988

- **Matched Gain and Offset Between Amplifiers**
- **Unity-Gain Bandwidth . . . 3 MHz Min**
- **Slew Rate . . . 1.5 V/ns Min**
- **Low Equivalent Input Noise Voltage 2 μV/Hz Max (20 Hz to 20 kHz)**
- **No Frequency Compensation Required**
- **No Latch Up**
- **Wide Common-Mode Voltage Range**
- **Low Power Consumption**
- **Designed to be Interchangeable with Raytheon RC4559**

**D OR P PACKAGE**
**(TOP VIEW)**




**symbol (each amplifier)**




**AVAILABLE OPTIONS**

| SYMBOLIZATION | | OPERATING TEMPERATURE RANGE | $V_{IO}$ max at 25°C |
|---|---|---|---|
| DEVICE | PACKAGE SUFFIX | | |
| RC4559 | D, P | –0°C to 70°C | 6 mV |

The D packages are available taped and reeled. Add the suffix R to the device type when ordering. (i.e.,RC4559DR)

## description

The RC4559 is a dual high-performance operational amplifier. The high common-mode input voltage and the absence of latch-up make this amplifier ideal for low-noise signal applications such as audio preamplifiers and signal conditioners. This amplifier features a guaranteed dynamic performance and output drive capability that far exceeds that of the general-purpose type amplifiers.

The RC4559 is characterized for operation from 0°C to 70°C.

## absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage $V_{CC+}$ (see Note 1) . . . . . 18 V
Supply voltage $V_{CC-}$ (see Note 1) . . . . . –18 V
Differential input voltage (see Note 2) . . . . . ±30 V
Input voltage (any input, see Notes 1 and 3) . . . . . ±15 V
Duration of output short-circuit to ground, one amplifier at a time (see Note 4) . . . . . unlimited
Continuous total dissipation . . . . . 500 mW
Operating free-air temperature range . . . . . 0°C to 70°C
Storage temperature range . . . . . –65°C to 125°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds . . . . . 260°C

NOTES: 1. All voltage values, unless otherwise noted, are with respect to the zero reference level (ground) of the supply voltages where the zero reference level is the midpoint between $V_{CC+}$ and $V_{CC-}$.
2. Differential voltages are at the noninverting input terminal with respect to the inverting input terminal.
3. The magnitude of the input voltage must never exceed the magnitude of the supply voltage or 15 volts, whichever is less.
4. Temperature and/or supply voltages must be limited to ensure that the dissipation rating is not exceeded.

## electrical characteristics at specified free-air temperature, $V_{CC+}$ = 15 V, $V_{CC-}$ = −15 V

| PARAMETER | | TEST CONDITIONS† | $T_A$‡ | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|---|
| $V_{IO}$ | Input offset voltage | $V_O$ = 0 | 25°C | | 2 | 6 | mV |
| | | | Full Range | | | 7.5 | |
| $I_{IO}$ | Input offset current | $V_O$ = 0 | 25°C | | 5 | 100 | nA |
| | | | Full range | | | 200 | |
| $I_{IB}$I | nput bias current | $V_O$ = 0 | 25°C | | 40 | 250 | nA |
| | | | Full range | | | 500 | |
| $V_I$ | Input voltage range | | 25°C | ±12 | ±13 | | V |
| $V_{OM}$ | Maximum peak output voltlage swing | $R_L \geq 3$ kΩ | 25°C | ±12 | ±13 | | V |
| | | $R_L$ = 600 Ω | 25°C | ±9.5 | ±10 | | |
| | | $R_L \geq 2$ kΩ | Full range | ±10 | | | |
| $V_I$ | Input voltage range | $V_O$ = ±10 V, $R_L$ = 2 kΩ | 25°C | 20 | 300 | | V/mV |
| | | | Full range | 15 | | | |
| $B_{OM}$ | Maximum output-swing bandwidth | $V_{OPP}$ = 20 V, $R_L$ = 2 kΩ | 25°C | 24 | 32 | | kHz |
| $B_1$ | Unity-gain bandwidth | | 25°C | 3 | 4 | | MHz |
| $r_i$ | Input resistance | | 25°C | 0.3 | 1 | | MΩ |
| CMRR | Common-mode rejection ratio | $V_O$ = 0 | 25°C | 80 | 100 | | dB |
| $k_{SVS}$ | Supply voltage sensitivity ($\Delta V_{IO}/\Delta V_{CC}$) | $V_O$ = 0 | 25°C | | 10 | 75 | μV/V |
| $V_n$ | Equivalent input noise voltage (closed loop) | $A_{VD}$ = 100, $R_S$ = 1 kΩ, f = 20 Hz to 20 kHz | 25°C | | 1.4 | 2 | μV |
| $I_n$ | Equivalent input noise current | f = 20 Hz to 20 kHz | 25°C | | 25 | | pA |
| $I_{CC}$ | Supply current (both amplifiers) | No load, No signal | 25°C | | 3.3 | 5.6 | mA |
| | | | 0°C | | 4 | 6.6 | |
| | | | 70°C | | 3 | 5 | |
| $V_{o1}/V_{o2}$ | Crosstalk attentuation | $A_{VD}$ = 100, $R_S$ = 1 kΩ, f = 10 kHz | 25°C | | 90 | | dB |

† All characteristics are specified under open-loop operation, unless otherwise noted.
‡ Full range operating free-air temperature range is 0°C to 70°C.

## matching characteristics at $V_{CC+}$ = 15 V, $V_{CC-}$ = −15 V, $T_A$ = 25°C

| PARAMETER | | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| $V_{IO}$ | Input offset voltage | $V_O$ = 0 | | ±0.2 | | mV |
| $I_{IO}$ | Input offset current | $V_O$ = 0 | | ±7.5 | | nA |
| $I_{IB}$ | Input bias current | $V_O$ = 0 | | ±15 | | nA |
| $A_{VD}$ | Large-signal differential voltage amplification | $V_O$ = ±10 V, $R_L$ = 2 kΩ | | ±1 | | dB |

## operating characteristics, $V_{CC+}$ = 15 V, $V_{CC-}$ = −15 V, $T_A$ = 25°C

| PARAMETER | | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| $t_r$ | Rise time | $V_I$ = 20 mV, $R_L$ = 2 kΩ, $C_L$ = 100 pF | | 80 | | μs |
| | Overshoot | | | 18% | | |
| SR | Slew rate at unity gain | $V_I$ = 10 mV, $R_L$ = 2 kΩ, $C_L$ = 100 pF | 1.5 | 2 | | V/μs |

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