Raytheon

# High Output Current Dual Operational Amplifier

RC4556

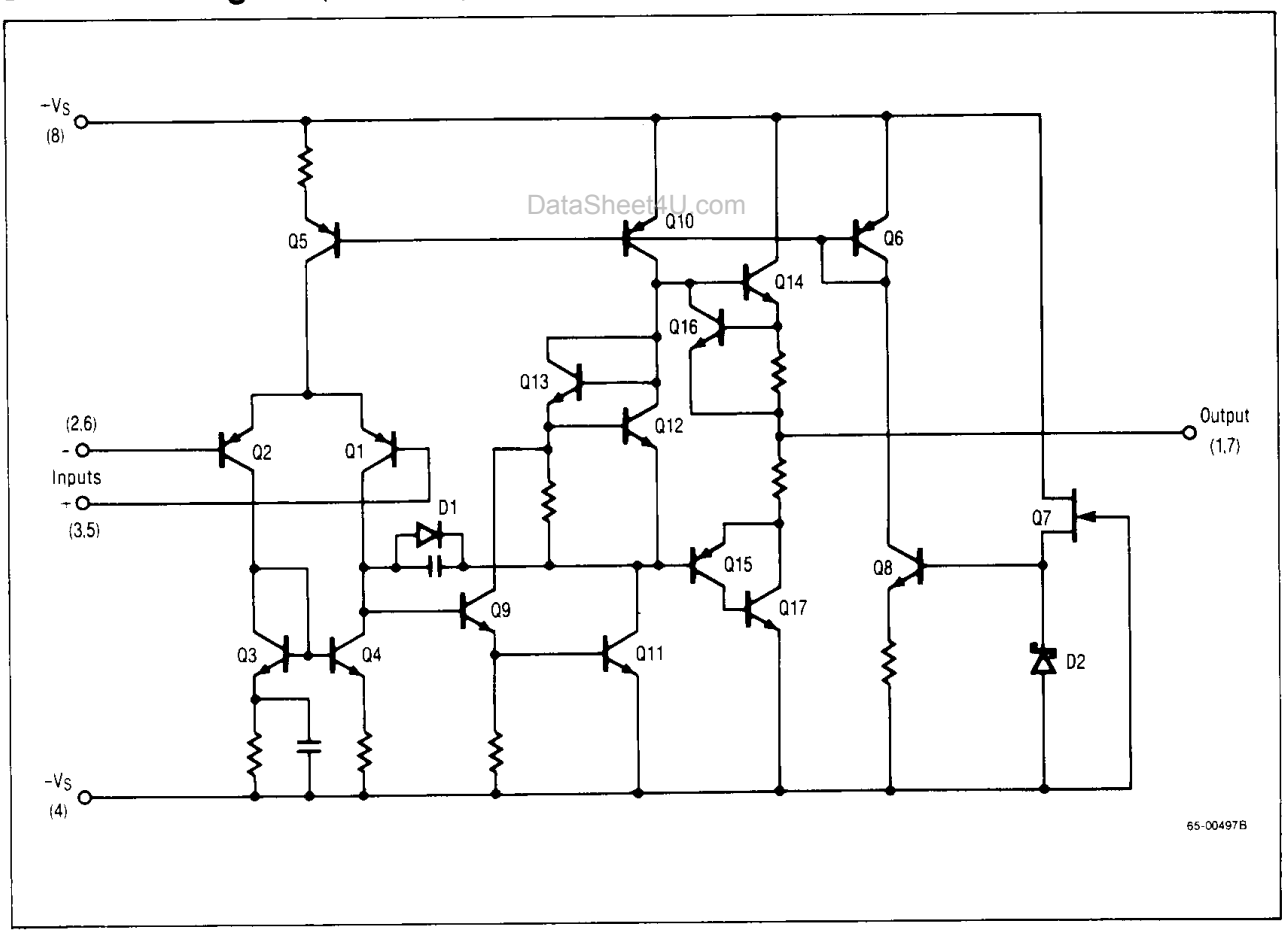
## Features

- Unity gain bandwidth — 8.0MHz
- Drives ±10.5V min into 150Ω (±10mA)
- Slew rate — 3.0V/μS
- Current drain per amplifier — 4.5mA
- Input offset voltage — 0.5mV
- Input offset current — 5.0nA
- Input bias current — 180nA
- 10nV/$\sqrt{Hz}$ noise at 1kHz
- Unity gain frequency compensated

## Description

The 4556 integrated circuit is a high-gain, high output current dual operational amplifier capable of driving ±70mA into 150Ω loads (±10.5V output voltage). The 4556 combines many of the features of the popular 4558 as well as having the capability of driving 150Ω loads. In addition, the wide bandwidth, low noise, high slew rate and low distortion of the 4556 make it ideal for many audio, telecommunications and instrumentation applications.

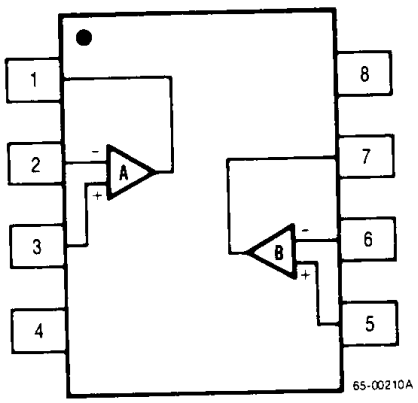
## Schematic Diagram (1/2 Shown)



# RC4556 High Output Current Dual Operational Amplifier

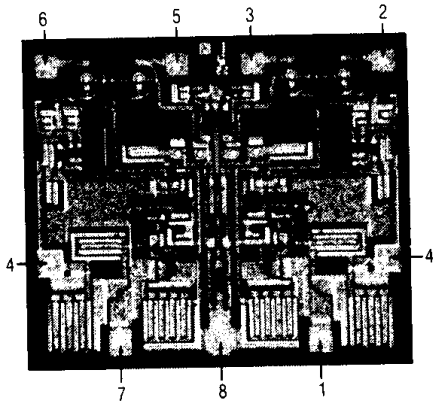
## Connection Information

**8-Lead**
**Dual In-Line Package**
(Top View)




| Pin | Function |
|---|---|
| 1 | A Output |
| 2 | A -Input |
| 3 | A +Input |
| 4 | $-V_S$ |
| 5 | B +Input |
| 6 | B -Input |
| 7 | B Output |
| 8 | $+V_S$ |

## Mask Pattern




**Die Size:** 52 x 61 mils
**Min. Pad Dimensions:** 4 x 4 mils

65-02068A

## Absolute Maximum Ratings

Supply Voltage ..... ±18V
Input Voltage[1] ..... ±15V
Differential Input Voltage ..... 30V
Output Short Circuit Duration[2] ..... Indefinite
Operating Temperature
Range ..... -20° C to +75° C
Lead Soldering Temperature (10 Sec)
RC4556NB ..... +300° C
RC4556M ..... +260° C

Notes: 1. For supply voltages less than ±15V, the absolute maximum input voltage is equal to the supply voltage.
2. Short circuit may be to ground on one amp only. Rating applies to +75° C ambient temperature.

## Thermal Characteristics

| | 8-Lead Micro-Pak Plastic DIP | 8-Lead Plastic DIP |
|---|---|---|
| Max. Junction Temp. | 125° C | 125° C |
| Max. $P_D$ $T_A < 50°$ C | 300mW | 468mW |
| Therm. Res. $\theta_{JC}$ | — | — |
| Therm. Res. $\theta_{JA}$ | 240° C/W | 160° C/W |
| For $T_A > 50°$ C Derate at | 4.17mW per ° C | 6.25mW per ° C |

## Ordering Information

| Part Number | Package | Operating Temperature Range |
|---|---|---|
| RC4556M | Micro-Plastic | -20° C to +75° C |
| RC4556NB | Plastic | -20° C to +75° C |

## Matching Characteristics

($V_S = \pm 15V$, $T_A = +25°$ C)

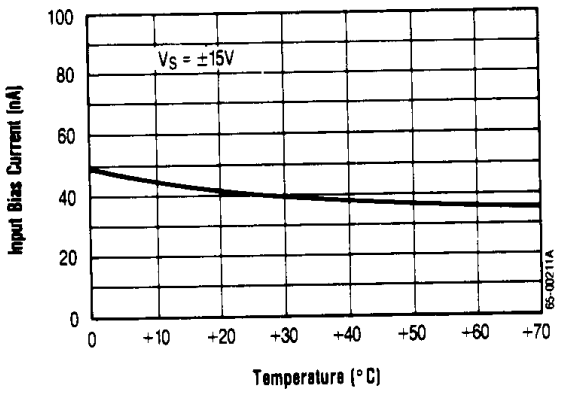
| Parameter | Conditions | Typ | Units |
|---|---|---|---|
| Voltage Gain | $R_L \geq 20k\Omega$ | ±1.0 | dB |
| Input Bias Current | | ±15 | nA |
| Input Offset Current | | ±7.5 | nA |
| Input Offset Voltage | $R_S \geq 10k\Omega$ | ±0.2 | mV |

## Electrical Characteristics ($V_S$ = ±15V and $T_A$ = +25°C unless otherwise specified)

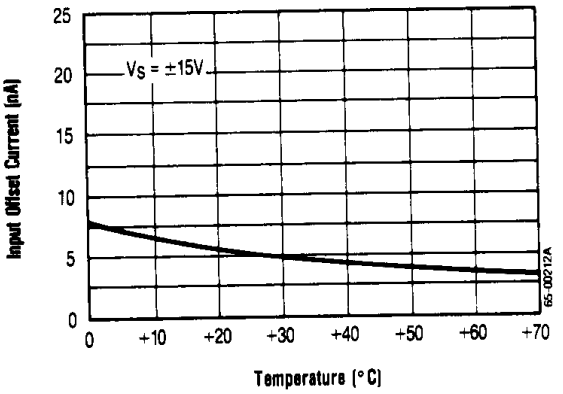
| Parameters | Test Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|
| Input Offset Voltage | $R_S \leq 10k\Omega$ | | 2.0 | 6.0 | mV |
| Input Offset Current | | | 5.0 | 200 | nA |
| Input Bias Current | | | 40 | 500 | nA |
| Input Resistance | | 0.3 | 1.0 | | MΩ |
| Large Signal Voltage Gain | $R_L \geq 2k\Omega$, $V_{OUT}$ = ±10V | 20 | 100 | | V/mV |
| Output Voltage Swing | $R_L \geq 2k\Omega$ | ±12 | ±13.5 | | V |
| | $R_L$ = 150Ω | ±10.5 | ±11 | | |
| Input Voltage Range | | ±12 | ±14 | | V |
| Common Mode Rejection Ratio | $R_S \leq 10k\Omega$ | 70 | 90 | | dB |
| Power Supply Rejection Ratio | $R_S \leq 10k\Omega$ | 76 | 90 | | dB |
| Power Consumption | $R_L = \infty$ | | 270 | 360 | mW |
| Transient Response Rise Time | $V_{IN}$ = 20mV, $R_L$ = 2kΩ | | 0.03 | | μS |
| Overshoot | $C_L \leq 100pF$ | | 40 | | % |
| Slew Rate | $R_L \geq 2k\Omega$ | | 3.0 | | V/μS |
| Channel Separation | f = 10kHz, $R_S$ = 1kΩ, Gain = 100 | | 90 | | dB |
| Unity Gain Bandwidth | | 5.0 | 8.0 | | MHz |
| **The following specifications apply for $-20°C \leq T_A \leq +75°C$** | | | | | |
| Input Offset Voltage | $R_S \leq 10k\Omega$ | | | 7.5 | mV |
| Input Offset Current | | | | 300 | nA |
| Input Bias Current | | | | 800 | nA |
| Large Signal Voltage Gain | $R_L \geq 2k\Omega$, $V_{OUT}$ = ±10V | 15 | | | V/mV |
| Output Voltage Swing | $R_L \geq 2k\Omega$ | ±10 | | | V |
| Power Consumption | $T_A$ = +75°C | | 260 | 340 | mW |
| | $T_A$ = −20°C | | 290 | 380 | |

## Typical Performance Characteristics

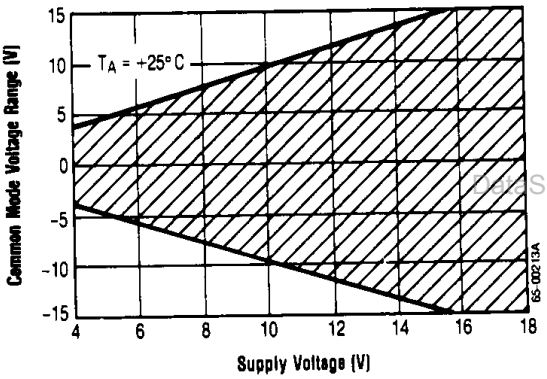
### Input Bias Current as a Function of Ambient Temperature



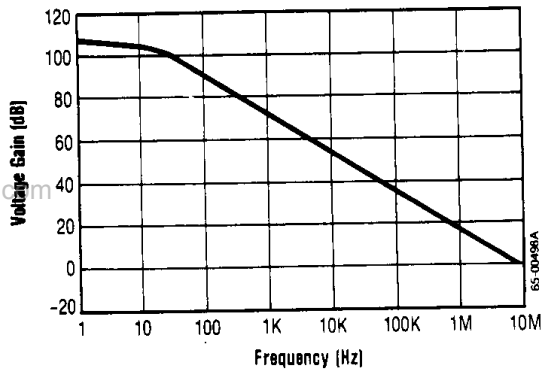

### Input Offset Current as a Function of Ambient Temperature



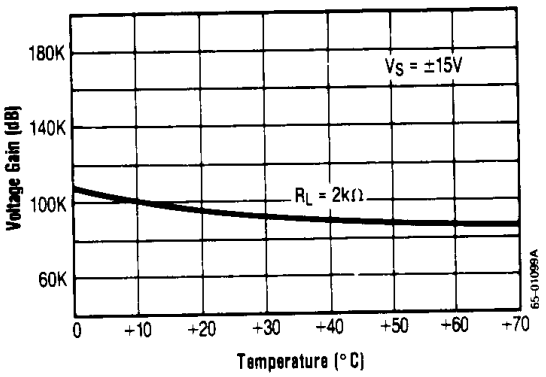

### Common Mode Range as a Function of Supply Voltage



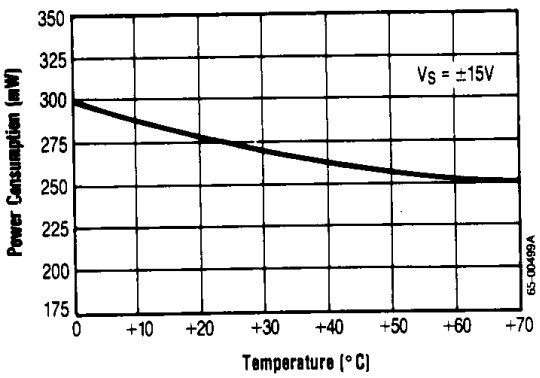

### Open Loop Gain as a Function of Temperature




### Open Loop Voltage Gain as a Function of Frequency

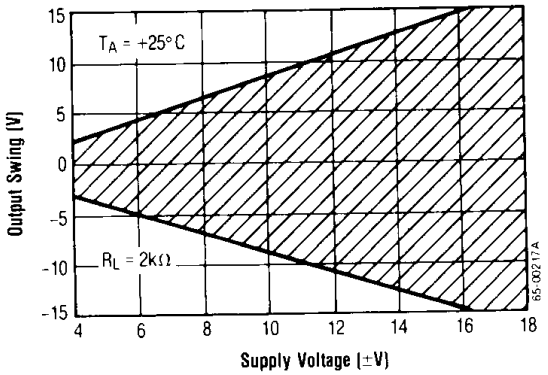



### Power Consumption as a Function of Ambient Temperature

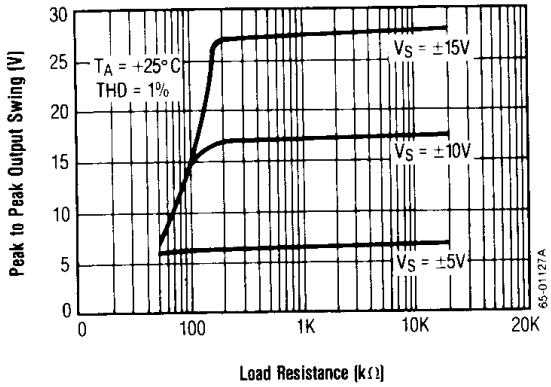


## Typical Performance Characteristics (Continued)

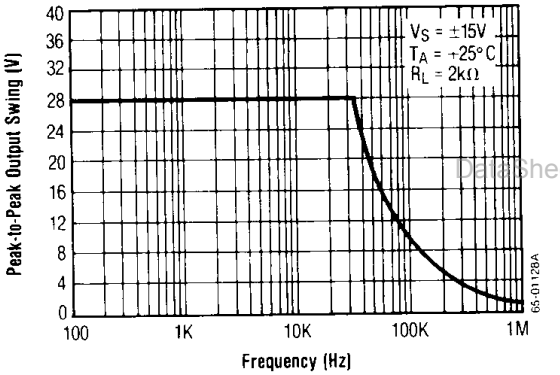
### Typical Output Voltage as a Function of Supply Voltage



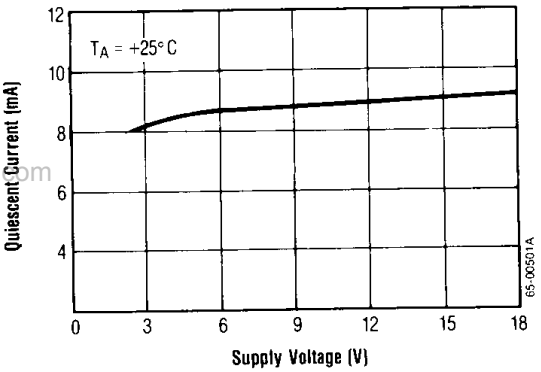

### Output Voltage Swing as a Function of Load Resistance



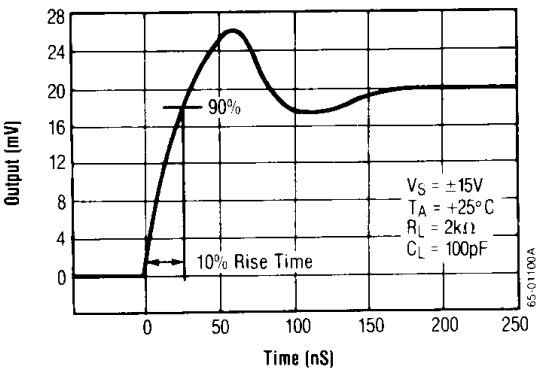

### Output Voltage Swing as a Function of Frequency



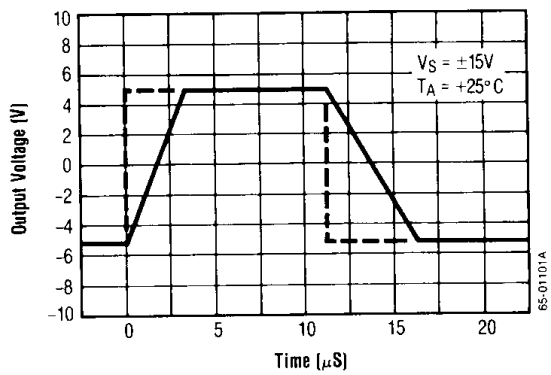

### Quiescent Current as a Function of Supply Voltage




### Transient Response

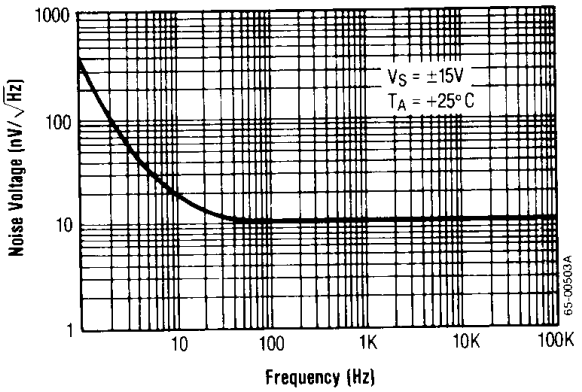



### Voltage Follower Large Signal Pulse Response

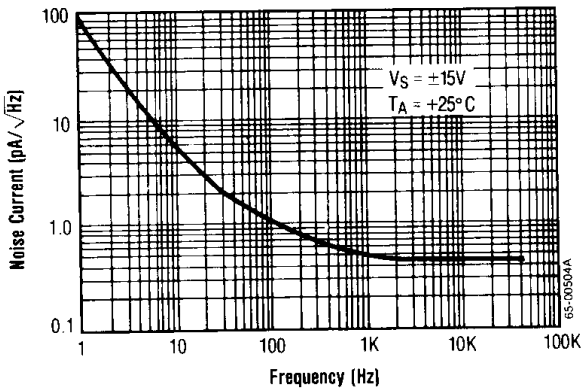


## Typical Performance Characteristics (Continued)

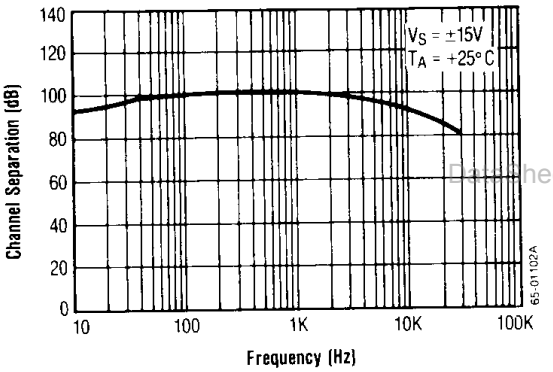
### Input Noise Voltage as a Function of Frequency



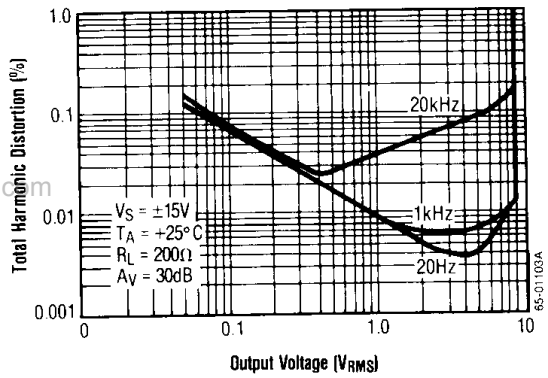

### Input Noise Current as a Function of Frequency



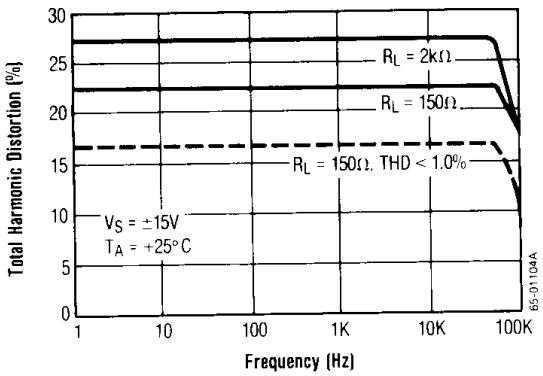

### Channel Separation




### Total Harmonic Distortion vs. Output Voltage




### Distortion vs. Frequency



## Comparison of Standard vs. Micro-Package