



# MC1458 MC1558

## HIGH PERFORMANCE DUAL OPERATIONAL AMPLIFIERS

- LOW POWER CONSUMPTION
- LARGE INPUT VOLTAGE RANGE
- NO LATCH-UP
- HIGH GAIN
- SHORT-CIRCUIT PROTECTION
- NO FREQUENCY COMPENSATION REQUIRED

### DESCRIPTION

The MC1458 is high performance monolithic dual operational amplifier intended for a wide range of analog applications:

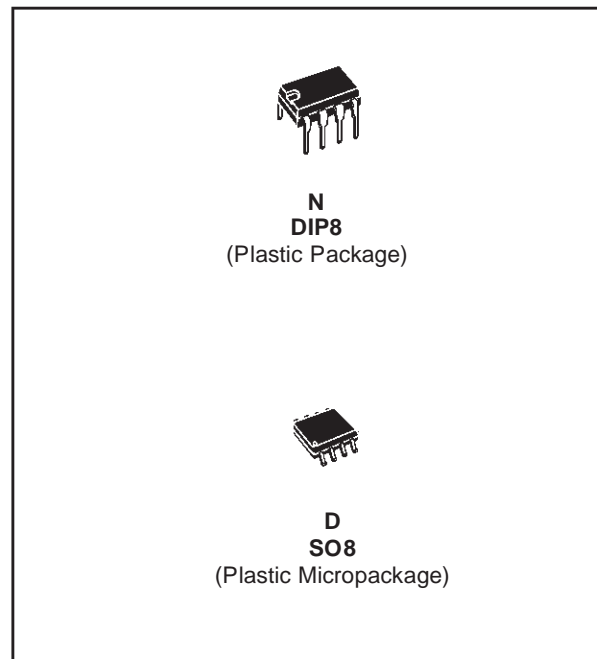
- Summing amplifier
- Voltage follower
- Integrator
- Active filter
- Function generator

The high gain and wide range of operating voltages provide superior performance in integrator, summing amplifiers and general feedback applications.

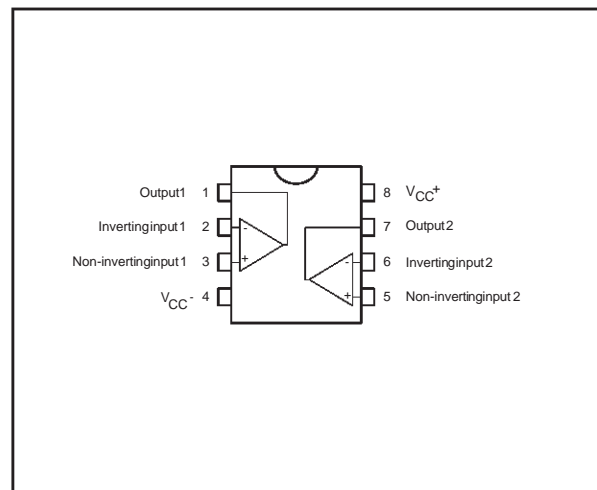
### ORDER CODE

| Part Number              | Temperature Range | Package |   |
|--------------------------|-------------------|---------|---|
|                          |                   | N       | D |
| MC1458                   | 0°C, +70°C        | •       | • |
| MC1458I                  | -40°C, +105°C     | •       | • |
| MC1558                   | -55°C, +125°C     | •       | • |
| <b>Example : MC1458N</b> |                   |         |   |

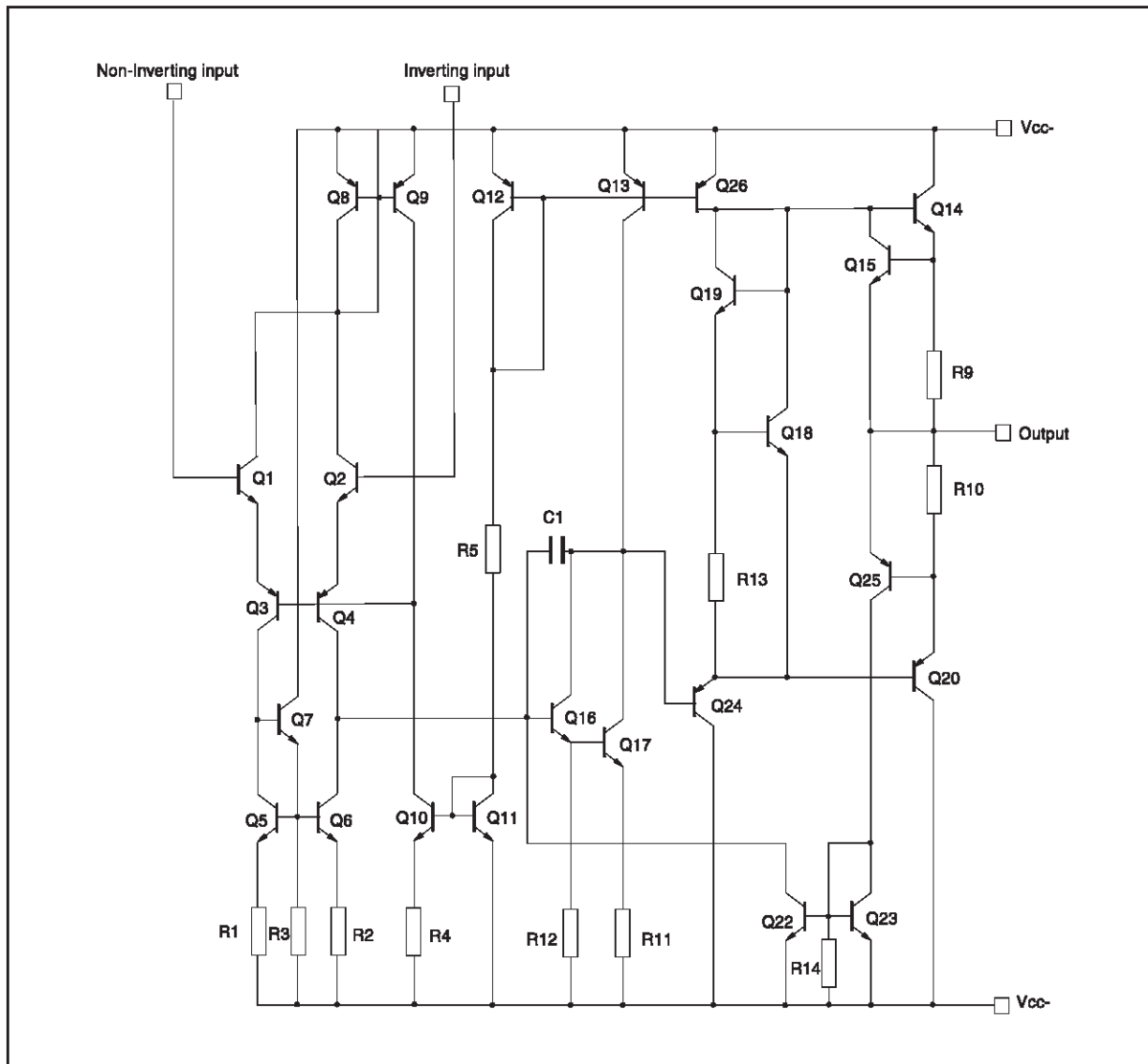
N = Dual in Line Package (DIP)  
D = Small Outline Package (SO) - also available in Tape & Reel (DT)



### PIN CONNECTIONS (top view)



**SCHEMATIC DIAGRAM**



**ABSOLUTE MAXIMUM RATINGS**

| Symbol     | Parameter                            | MC1458      | MC1458I     | MC1558      | Unit |
|------------|--------------------------------------|-------------|-------------|-------------|------|
| $V_{CC}$   | Supply voltage                       |             | ±22         |             | V    |
| $V_i$      | Input Voltage                        |             | ±15         |             | V    |
| $V_{id}$   | Differential Input Voltage           |             | ±30         |             | V    |
|            | Output Short-circuit Duration        |             | Infinite    |             |      |
| $P_{tot}$  | Power Dissipation                    |             | 300<br>500  |             | mW   |
|            |                                      | D Suffix    |             |             |      |
|            |                                      | N Suffix    |             |             |      |
| $T_{oper}$ | Operating Free-air Temperature Range | 0 to +70    | -40 to +105 | -55 to +125 | °C   |
| $T_{stg}$  | Storage Temperature Range            | -65 to +150 |             |             | °C   |

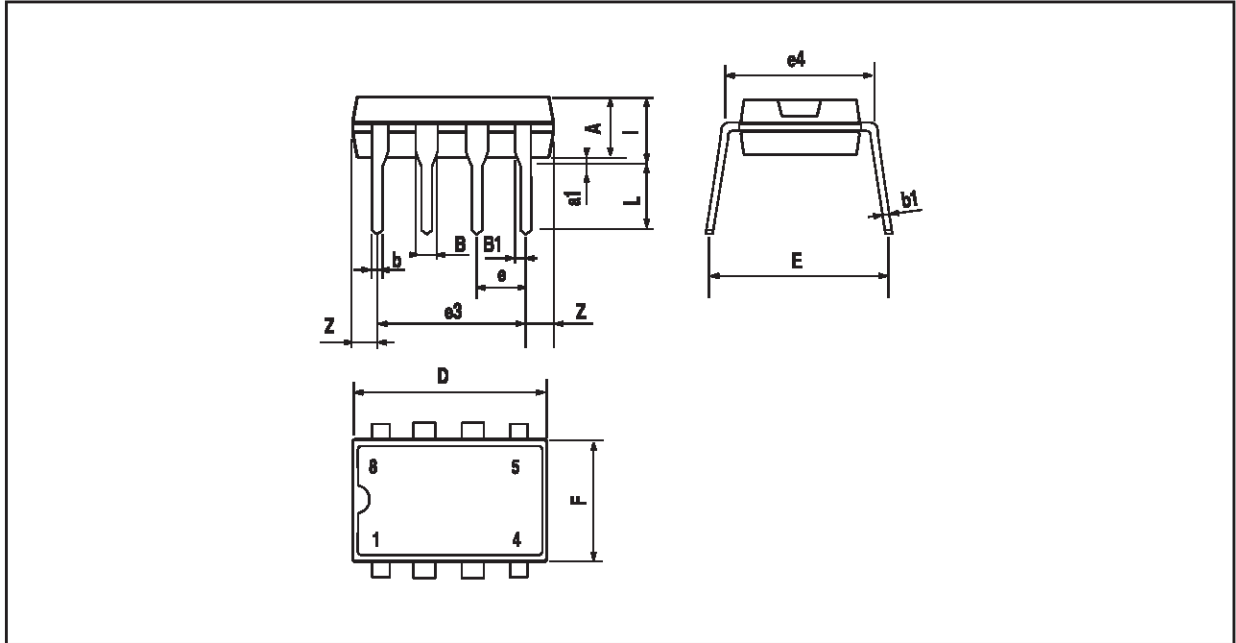
**ELECTRICAL CHARACTERISTICS** $V_{CC} = \pm 15V$ ,  $T_{amb} = 25^{\circ}C$  (unless otherwise specified)

| Symbol        | Parameter  | Min.   | Typ.     | Max.       | Unit       |
|---------------|--|--|----------|------------|------------|
| $V_{io}$      | Input Offset Voltage ( $R_s \leq 10k\Omega$ )<br>$T_{amb} = 25^{\circ}C$<br>$T_{min} \leq T_{amb} \leq T_{max}$                    |  | 1        | 5<br>6     | mV         |
| $I_{io}$      | Input Offset Current<br>$T_{amb} = 25^{\circ}C$<br>$T_{min} \leq T_{amb} \leq T_{max}$   |  | 2        | 200<br>300 | nA         |
| $I_{ib}$      | Input Bias Current<br>$T_{amb} = 25^{\circ}C$<br>$T_{min} \leq T_{amb} \leq T_{max}$   |  | 30       | 500<br>800 | nA         |
| $A_{Vd}$      | Large Signal Voltage Gain ( $V_o = \pm 10V$ , $R_L = 2k\Omega$ )<br>$T_{amb} = 25^{\circ}C$<br>$T_{min} \leq T_{amb} \leq T_{max}$ | 50<br>25   | 200      |            | V/mV       |
| SVR           | Supply Voltage Rejection Ratio ( $R_s \leq 10k\Omega$ )<br>$T_{amb} = 25^{\circ}C$<br>$T_{min} \leq T_{amb} \leq T_{max}$          | 77<br>77   | 90       |            | dB         |
| $I_{CC}$      | Supply Current, all Amp, no load<br>$T_{amb} = 25^{\circ}C$<br>$T_{min} \leq T_{amb} \leq T_{max}$                                 |  | 2.3      | 5<br>6     | mA         |
| $V_{icm}$     | Input Common Mode Voltage Range<br>$T_{amb} = 25^{\circ}C$<br>$T_{min} \leq T_{amb} \leq T_{max}$                                  | $\pm 12$<br>$\pm 12$   |          |            |            |
| CMR           | Common Mode Rejection Ratio ( $R_s \leq 10k\Omega$ )<br>$T_{amb} = 25^{\circ}C$<br>$T_{min} \leq T_{amb} \leq T_{max}$             | 70<br>70   | 90       |            | dB         |
| $I_{os}$      | Output Short-circuit Current<br>$T_{amb} = 25^{\circ}C$  | 10   | 20       | 35         | mA         |
| $\pm V_{opp}$ | Output Voltage Swing<br>$T_{amb} = 25^{\circ}C$<br>$T_{min} \leq T_{amb} \leq T_{max}$   | $R_L \leq 10k\Omega$<br>12<br>$R_L \leq 2k\Omega$<br>10<br>$R_L \leq 10k\Omega$<br>12<br>$R_L \leq 2k\Omega$<br>10 | 14<br>13 |            | V          |
| SR            | Slew Rate ( $V_I = \pm 10V$ , $R_L = 2k\Omega$ , $C_L = 100pF$ , unity Gain)   | 0.2  | 0.8      |            | V/ $\mu s$ |
| $t_r$         | Rise Time ( $V_I = \pm 20mV$ , $R_L = 2k\Omega$ , $C_L = 100pF$ , unity Gain)  |  | 0.3      |            | $\mu s$    |
| $K_{OV}$      | Overshoot ( $V_I = 20mV$ , $R_L = 2k\Omega$ , $C_L = 100pF$ , unity Gain)  |  | 5        |            | %          |
| $R_I$         | Input Resistance   | 0.3  | 2        |            | $M\Omega$  |
| $Z_{ic}$      | Common-mode Input Impedance  |  | 200      |            | $M\Omega$  |
| $C_I$         | Input Capacitance  |  | 1.4      |            | pF         |
| $R_O$         | Output Resistance  |  | 75       |            | $\Omega$   |
| FPB           | Full Power Bandwidth ( $R_L = 2k\Omega$ , $V_o \geq \pm 10V$ , $A_{VD} = 1$ , THD $\leq 5\%$ )                                     |  | 14       |            | KHz        |

**MC1458-MC1558**

| Symbol          | Parameter   | Min. | Typ. | Max. | Unit                                 |
|-----------------|---|------|------|------|--------------------------------------|
| B               | Unity Gain Bandwidth<br>( $V_I = 10 \text{ mV}$ , $R_L = 2\text{k}\Omega$ , $C_L = 100\text{pF}$ )  |      | 1    |      | MHZ                                  |
| GBP             | Gain Bandwith Product ( $V_I = 10 \text{ mV}$ , $R_L = 2\text{k}\Omega$ , $C_L = 100\text{pF}$<br>$f = 100\text{kHz}$ )                   | 0.4  | 1    |      | MHz                                  |
| THD             | Total Harmonic Distortion ( $f = 1\text{kHz}$ , $A_v = 20\text{dB}$ , $R_L = 2\text{k}\Omega$<br>$C_L = 100\text{pF}$ , $V_o = 2V_{pp}$ ) |      | 0.02 |      | %                                    |
| $e_n$           | Equivalent Input Noise Voltage ( $f = 1\text{kHz}$ , $R_s = 100\Omega$ )  |      | 45   |      | $\frac{\text{nV}}{\sqrt{\text{Hz}}}$ |
| $\phi_m$        | Phase Margin  |      | 65   |      | Degrees                              |
| Am              | Gain Margin   |      | 11   |      | dB                                   |
| $V_{o1}/V_{o2}$ | Channel Separation  |      | 120  |      | dB                                   |

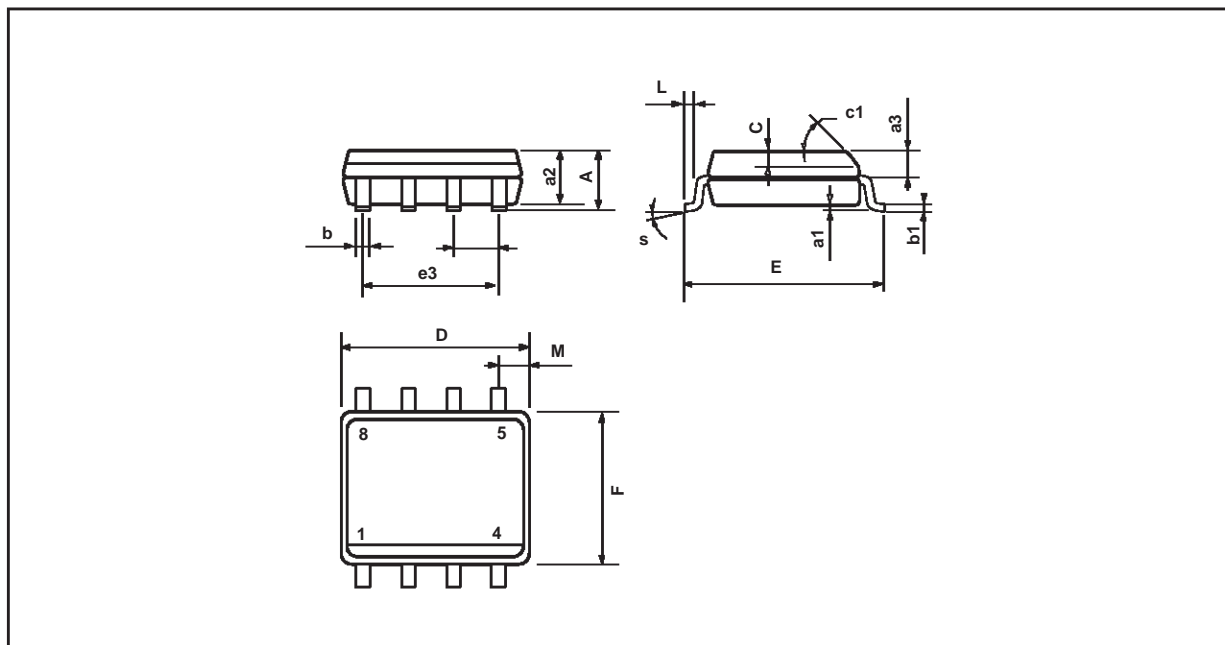
**PACKAGE MECHANICAL DATA**  
8 PINS - PLASTIC PACKAGE



| Dimensions | Millimeters |      |       | Inches |       |       |
|------------|-------------|------|-------|--------|-------|-------|
|            | Min.        | Typ. | Max.  | Min.   | Typ.  | Max.  |
| A          |             | 3.32 |       |        | 0.131 |       |
| a1         | 0.51        |      |       | 0.020  |       |       |
| B          | 1.15        |      | 1.65  | 0.045  |       | 0.065 |
| b          | 0.356       |      | 0.55  | 0.014  |       | 0.022 |
| b1         | 0.204       |      | 0.304 | 0.008  |       | 0.012 |
| D          |             |      | 10.92 |        |       | 0.430 |
| E          | 7.95        |      | 9.75  | 0.313  |       | 0.384 |
| e          |             | 2.54 |       |        | 0.100 |       |
| e3         |             | 7.62 |       |        | 0.300 |       |
| e4         |             | 7.62 |       |        | 0.300 |       |
| F          |             |      | 6.6   |        |       | 0.260 |
| i          |             |      | 5.08  |        |       | 0.200 |
| L          | 3.18        |      | 3.81  | 0.125  |       | 0.150 |
| Z          |             |      | 1.52  |        |       | 0.060 |

## MC1458-MC1558

### PACKAGE MECHANICAL DATA 8 PINS - PLASTIC MICROPACKAGE (SO)



| Dimensions | Millimeters |      |      | Inches |       |       |
|------------|-------------|------|------|--------|-------|-------|
|            | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A          |             |      | 1.75 |        |       | 0.069 |
| a1         | 0.1         |      | 0.25 | 0.004  |       | 0.010 |
| a2         |             |      | 1.65 |        |       | 0.065 |
| a3         | 0.65        |      | 0.85 | 0.026  |       | 0.033 |
| b          | 0.35        |      | 0.48 | 0.014  |       | 0.019 |
| b1         | 0.19        |      | 0.25 | 0.007  |       | 0.010 |
| C          | 0.25        |      | 0.5  | 0.010  |       | 0.020 |
| c1         | 45° (typ.)  |      |      |        |       |       |
| D          | 4.8         |      | 5.0  | 0.189  |       | 0.197 |
| E          | 5.8         |      | 6.2  | 0.228  |       | 0.244 |
| e          |             | 1.27 |      |        | 0.050 |       |
| e3         |             | 3.81 |      |        | 0.150 |       |
| F          | 3.8         |      | 4.0  | 0.150  |       | 0.157 |
| L          | 0.4         |      | 1.27 | 0.016  |       | 0.050 |
| M          |             |      | 0.6  |        |       | 0.024 |
| S          | 8° (max.)   |      |      |        |       |       |

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