



MC33174 - MC35174

LOW POWER QUAD BIPOLAR OPERATIONAL AMPLIFIERS

- GOOD CONSUMPTION/SPEED RATIO :
ONLY 200 μ A FOR 2.1MHz, 2V μ s
- SINGLE (OR DUAL) SUPPLY OPERATION
FROM +4V TO +44V (\pm 2V TO \pm 22V)
- WIDE INPUT COMMON MODE MODE
VOLTAGE RANGE INCLUDING V_{CC^-}
- LOW LEVEL OUTPUT VOLTAGE CLOSE TO
 V_{CC^-} : 100mV TYPICAL
- PIN TO PIN COMPATIBLE WITH
STANDARD QUAD OP-AMPS

DESCRIPTION

The MC3x174 series are quad bipolar operational amplifier offering both low consumption (200 μ A) and good speed (2.1MHz, 2V/ μ s).

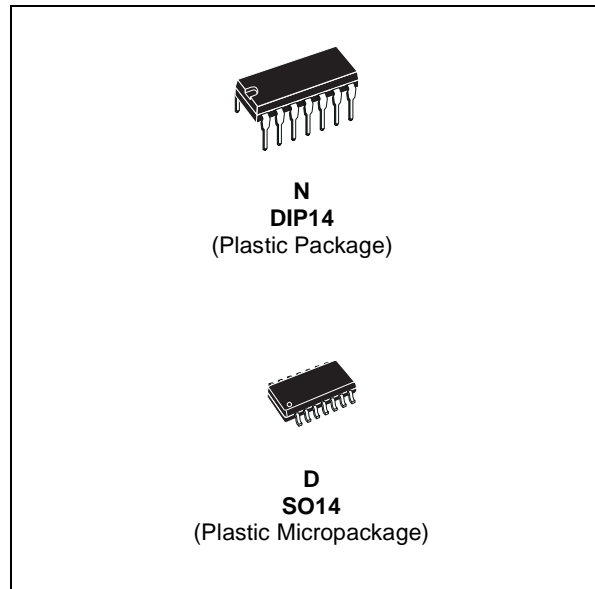
Moreover the Input Common Mode Range extends down to the lower supply rail, allowing single supply operation from +4V to +44V.

ORDER CODE

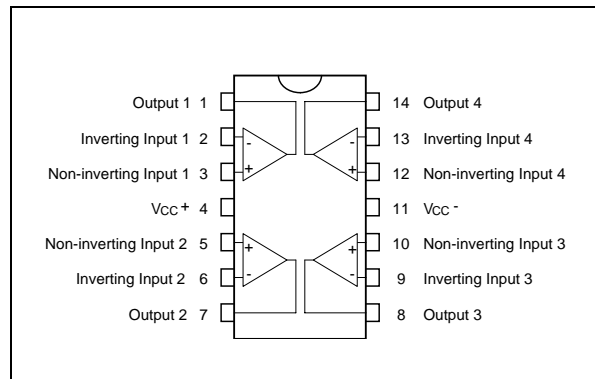
| Part Number | Temperature Range | Package | |
|---------------------------|-------------------|---------|---|
| | | N | D |
| MC33174 | -40°C, +105°C | • | • |
| MC35174 | -55°C, +125°C | • | • |
| Example : MC33174N | | | |

N = Dual in Line Package (DIP)

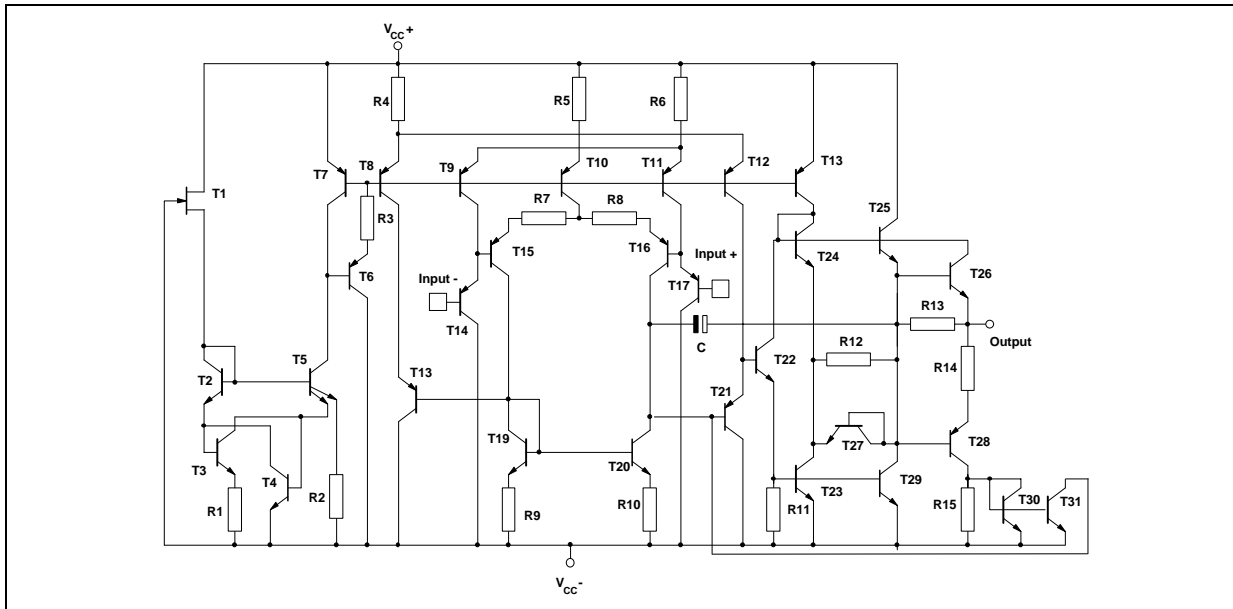
D = Small Outline Package (SO) - also available in Tape & Reel (DT))



PIN CONNECTIONS (top view)



SCHEMATIC DIAGRAM (for 1/4 MC33174)



MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|------------|--------------------------------------|--|--------------------|
| V_{CC} | Supply Voltage | ± 22 | V |
| V_{id} | Differential Input Voltage | see note 1) | V |
| V_i | Input Voltage | see note 1 | V |
| | Output Short Circuit Duration | Indefinite | s |
| T_{oper} | Operating Free-Air Temperature range | MC33174 -40 to 105 MC35174 -55 to 125 | $^{\circ}\text{C}$ |
| T_j | Junction Temperature | 150 | $^{\circ}\text{C}$ |
| T_{stg} | Storage Temperature | -65 to 150 | $^{\circ}\text{C}$ |

1. Either or both input voltages must not exceed the magnitude of V_{cc} .

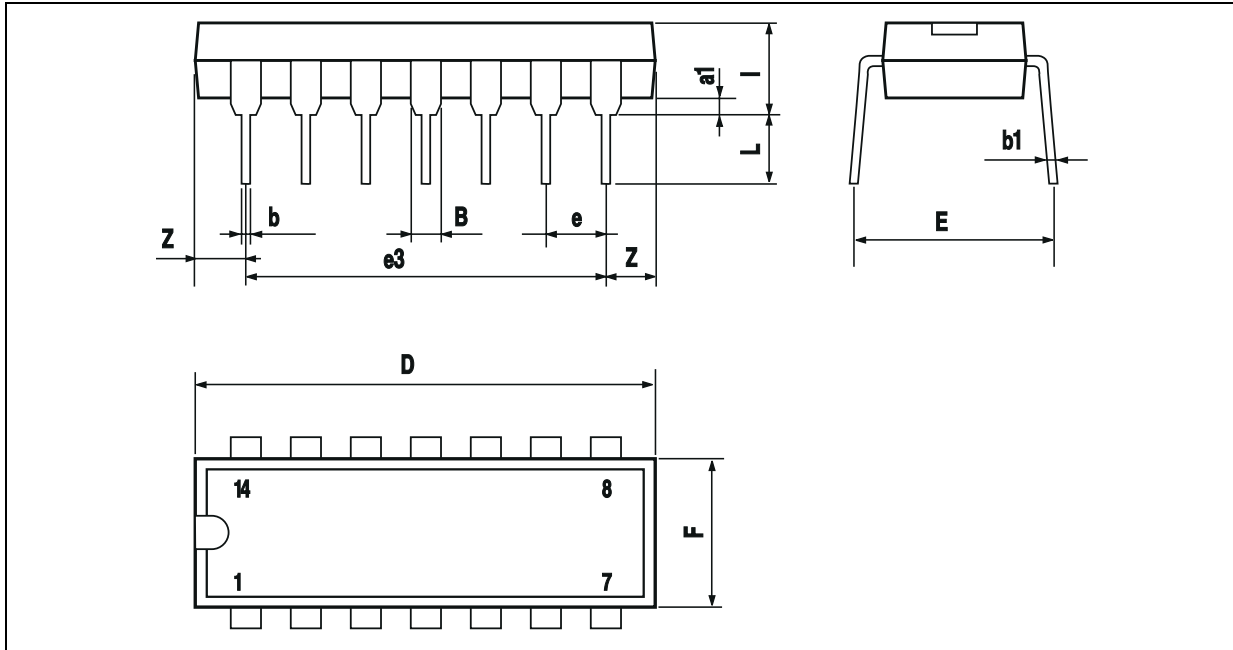
OPERATING CONDITIONS

| Symbol | Parameter | Value | Unit |
|----------|----------------|---------------------|------|
| V_{CC} | Supply Voltage | ± 2 to ± 22 | V |

ELECTRICAL CHARACTERISTICS
 $V_{CC}^+ = +15V$, $V_{CC}^- = -15V$, R_L connected to Ground, $T_{amb} = 25^\circ C$ (unless otherwise specified)

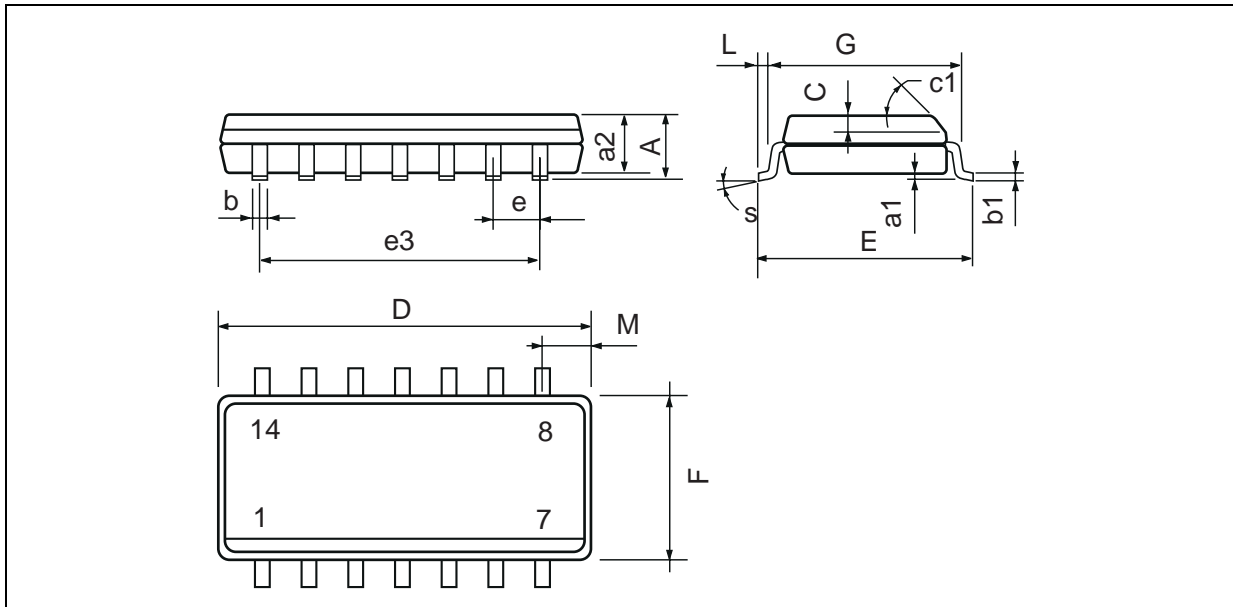
| Symbol | Parameter | Min. | Typ. | Max. | Unit |
|-----------------|--|--|-------------|------------------------|------------------------|
| V_{io} | Input Offset Voltage $V_{CC}^+ = +15V$, $V_{CC}^- = -15V$, $V_{ic} = 0V$ $V_{CC}^+ = 5V$, $V_{CC}^- = 0V$, $V_{ic} = 0V$, $V_o = 1.4V$ $V_{CC}^+ = +15V$, $V_{CC}^- = -15V$, $V_{ic} = 0V$, $T_{min.} \leq T_{amb} \leq T_{max.}$ | | 1 1 | 4.5 5 6.5 | mV |
| DV_{io} | Input Offset Voltage Drift | | 10 | | $\mu V/^\circ C$ |
| I_{io} | Input Offset Current ($V_{ic} = 0V$) $T_{min.} \leq T_{amb} \leq T_{max.}$ | | 5 | 20 40 | nA |
| I_{ib} | Input Bias Current ($V_{ic} = 0V$) $T_{min.} \leq T_{amb} \leq T_{max.}$ | | 20 | 100 200 | nA |
| A_{vd} | Large Signal Voltage Gain ($R_L = 10k\Omega$, $V_o = \pm 10V$) $T_{min.} \leq T_{amb} \leq T_{max.}$ | 50 25 | 100 | | V/mV |
| V_{OH} | High Level Output Voltage $V_{CC}^+ = 5V$, $V_{CC}^- = 0V$, $R_L = 10k\Omega$ $V_{CC}^+ = +15V$, $V_{CC}^- = -15V$, $R_L = 10k\Omega$ $V_{CC}^+ = +15V$, $V_{CC}^- = -15V$, $R_L = 10k\Omega$, $T_{min.} \leq T_{amb} \leq T_{max.}$ | 3.5 13.6 13.3 | 4.2 14.2 | | V |
| V_{OL} | Low Level Output Voltage $V_{CC}^+ = 5V$, $V_{CC}^- = 0V$, $R_L = 10k\Omega$ $V_{CC}^+ = +15V$, $V_{CC}^- = -15V$, $R_L = 10k\Omega$ $V_{CC}^+ = +15V$, $V_{CC}^- = -15V$, $R_L = 10k\Omega$, $T_{min.} \leq T_{amb} \leq T_{max.}$ | | 0.1 -14 | 0.15 -13.6 -13.3 | V |
| I_{sc} | Output Short Circuit Current ($V_{id} = \pm 1V$, $V_o = 0V$) Source Sink | 3 15 | 6 27 | | mA |
| V_{icm} | Input Common Mode Voltage Range $T_{min.} \leq T_{amb} \leq T_{max.}$ | V_{CC}^- to $(V_{CC}^+ - 1.8)$ V_{CC}^- to $(V_{CC}^+ - 2.2)$ | | | V |
| CMR | Common-mode Rejection Ratio ($V_{ic} = V_{icm \text{ min.}}$) | 80 | 100 | | dB |
| SVR | Supply Voltage Rejection Ratio ($V_{CC} = \pm 5$ to $\pm 15V$) | 80 | 100 | | dB |
| I_{CC} | Supply Current $V_{CC}^+ = 5V$, $V_{CC}^- = 0V$, no load $V_{CC}^+ = +15V$, $V_{CC}^- = -15V$, no load $V_{CC}^+ = +15V$, $V_{CC}^- = -15V$, no load, $T_{min.} \leq T_{amb} \leq T_{max.}$ | | 200 220 | 250 250 300 | μA |
| SR | Slew Rate ($V_i = \pm 10V$, $R_L = 10k\Omega$, $C_L = 100pF$) | 1.6 | 2 | | V/ μs |
| GBP | Gain Bandwidth Product $R_L = 10k\Omega$, $C_L = 100pF$, $f = 100kHz$ | 1.4 | 2.1 | | MHz |
| ϕ_m | Phase Margin ($R_L = 10k\Omega$, $C_L = 100pF$) | | 45 | | Degrees |
| e_n | Equivalent Input Noise Voltage ($f = 1kHz$) | | 29 | | $\frac{nV}{\sqrt{Hz}}$ |
| THD | Total Harmonic Distortion | | 0.05 | | % |
| V_{O1}/V_{O2} | Channel Separation | | 120 | | dB |

PACKAGE MECHANICAL DATA
14 PINS - PLASTIC DIP



| Dimensions | Millimeters | | | Inches | | |
|------------|-------------|-------|------|--------|-------|-------|
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| a1 | 0.51 | | | 0.020 | | |
| B | 1.39 | | 1.65 | 0.055 | | 0.065 |
| b | | 0.5 | | | 0.020 | |
| b1 | | 0.25 | | | 0.010 | |
| D | | | 20 | | | 0.787 |
| E | | 8.5 | | | 0.335 | |
| e | | 2.54 | | | 0.100 | |
| e3 | | 15.24 | | | 0.600 | |
| F | | | 7.1 | | | 0.280 |
| i | | | 5.1 | | | 0.201 |
| L | | 3.3 | | | 0.130 | |
| Z | 1.27 | | 2.54 | 0.050 | | 0.100 |

PACKAGE MECHANICAL DATA
14 PINS - PLASTIC MICROPACKAGE (SO)



| Dimensions | Millimeters | | | Inches | | |
|------------|-------------|------|------|--------|-------|-------|
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | | | 1.75 | | | 0.069 |
| a1 | 0.1 | | 0.2 | 0.004 | | 0.008 |
| a2 | | | 1.6 | | | 0.063 |
| b | 0.35 | | 0.46 | 0.014 | | 0.018 |
| b1 | 0.19 | | 0.25 | 0.007 | | 0.010 |
| C | | 0.5 | | | 0.020 | |
| c1 | 45° (typ.) | | | | | |
| D (1) | 8.55 | | 8.75 | 0.336 | | 0.344 |
| E | 5.8 | | 6.2 | 0.228 | | 0.244 |
| e | | 1.27 | | | 0.050 | |
| e3 | | 7.62 | | | 0.300 | |
| F (1) | 3.8 | | 4.0 | 0.150 | | 0.157 |
| G | 4.6 | | 5.3 | 0.181 | | 0.208 |
| L | 0.5 | | 1.27 | 0.020 | | 0.050 |
| M | | | 0.68 | | | 0.027 |
| S | 8° (max.) | | | | | |

Note : (1) D and F do not include mold flash or protrusions - Mold flash or protrusions shall not exceed 0.15mm (.066 inc) ONLY FOR DATA BOOK.

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