

LOW POWER SINGLE 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 SINGLE OP-AMPS

DESCRIPTION

The MC3x171 series are single bipolar operational amplifiers 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.

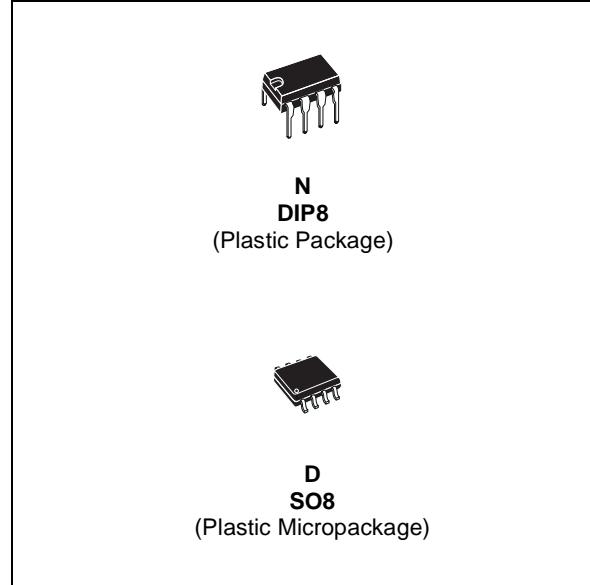
ORDER CODE

| Part Number | Temperature Range | Package | |
|-------------|-------------------|---------|---|
| | | N | D |
| MC33171 | -40°C, +105°C | • | • |
| MC35171 | -55°C, +125°C | • | • |

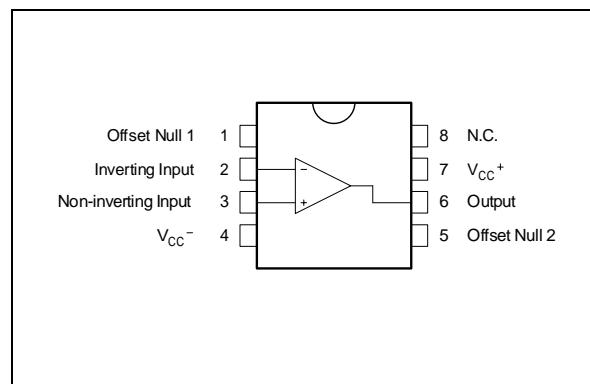
Example : MC33171N

N = Dual in Line Package (DIP)

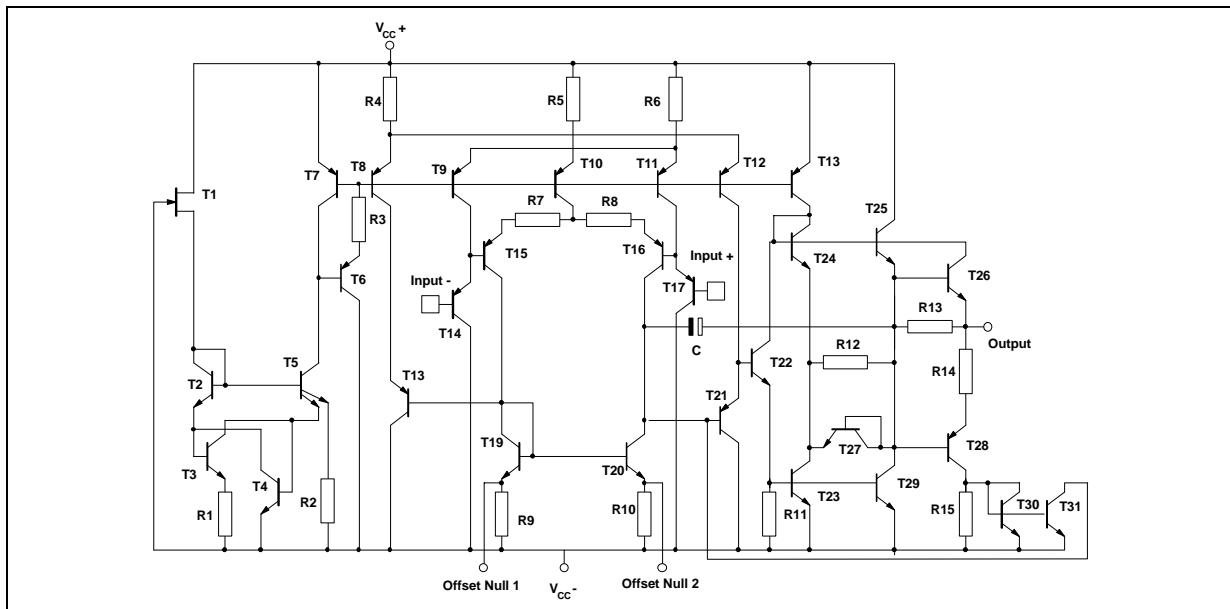
D = Small Outline Package (SO) - also available in Tape & Reel (DT)



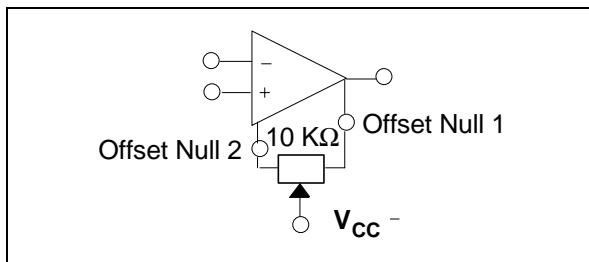
PIN CONNECTIONS (top view)



SCHEMATIC DIAGRAM



INPUT OFFSET VOLTAGE NULL CIRCUIT



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 MC33171 MC35171 | -40 to 105 -55 to 125 | °C |
| T_j | Junction Temperature | 150 | °C |
| T_{stg} | Storage Temperature | -65 to 150 | °C |

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

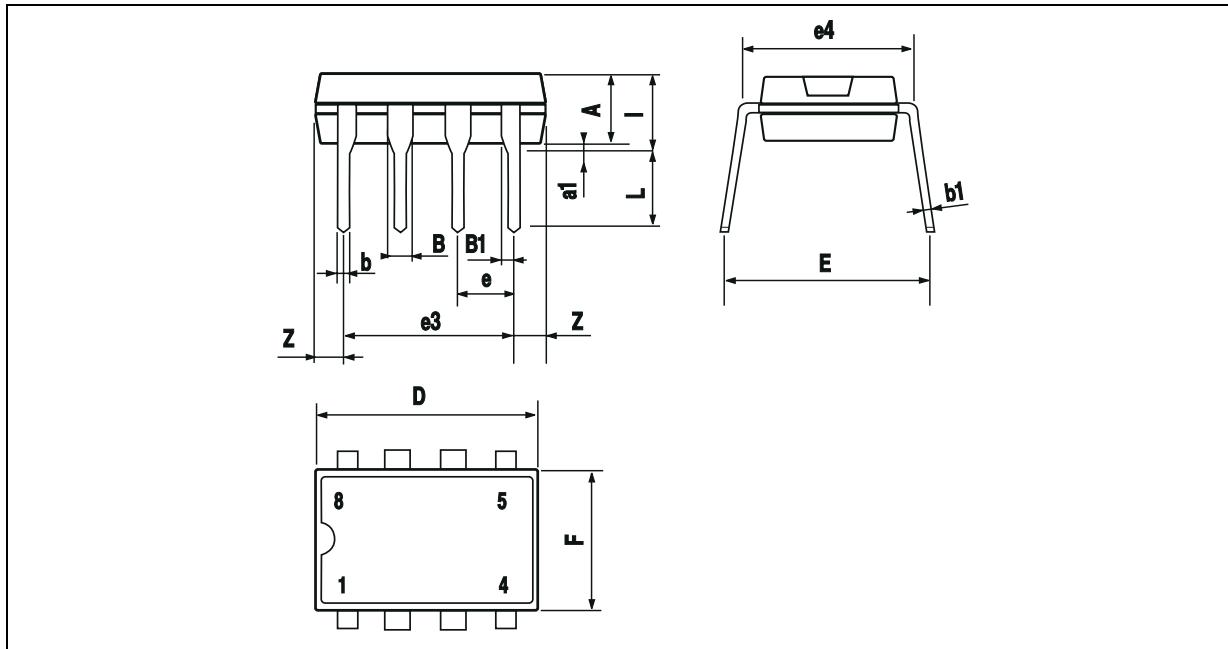
OPERATING CONDITIONS

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

ELECTRICAL CHARACTERISTICSV_{CC}⁺ = +15V, V_{CC}⁻ = -15V, R_L connected to Ground, T_{amb} = 25°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.} ≤ T _{amb} ≤ T _{max.} | | 1 1 | 4.5 5 6.5 | mV |
| DV _{io} | Input Offset Voltage Drift | | 10 | | µV/°C |
| I _{io} | Input Offset Current (V _{ic} = 0V) T _{min.} ≤ T _{amb} ≤ T _{max.} | | 5 40 | 20 40 | nA |
| I _{ib} | Input Bias Current (V _{ic} = 0V) T _{min.} ≤ T _{amb} ≤ T _{max.} | | 20 | 100 200 | nA |
| A _{vd} | Large Signal Voltage Gain (R _L = 10kΩ, V _o = ±10V) T _{min.} ≤ T _{amb} ≤ T _{max.} | 50 25 | 100 | | V/mV |
| V _{OH} | High Level Output Voltage V _{CC} ⁺ = 5V, V _{CC} ⁻ = 0V, R _L = 10kΩ V _{CC} ⁺ = +15V, V _{CC} ⁻ = -15V, R _L = 10kΩ V _{CC} ⁺ = +15V, V _{CC} ⁻ = -15V, R _L = 10kΩ, T _{min.} ≤ T _{amb} ≤ 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 = 10kΩ V _{CC} ⁺ = +15V, V _{CC} ⁻ = -15V, R _L = 10kΩ V _{CC} ⁺ = +15V, V _{CC} ⁻ = -15V, R _L = 10kΩ, T _{min.} ≤ T _{amb} ≤ T _{max.} | | 0.1 -14 | 0.15 -13.6 -13.3 | V |
| I _{sc} | Output Short Circuit Current (V _{id} = ±1V, V _o = 0V) Source Sink | 3 15 | 6 27 | | mA |
| V _{icm} | Input Common Mode Voltage Range T _{min.} ≤ T _{amb} ≤ 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} min.) | 80 | 100 | | dB |
| SVR | Supply Voltage Rejection Ratio (V _{CC} = ±5 to ±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.} ≤ T _{amb} ≤ T _{max.} | | 200 220 | 250 250 300 | µA |
| SR | Slew Rate (V _i = ±10V, R _L = 10kΩ, C _L = 100pF) | 1.6 | 2 | | V/µs |
| GBP | Gain Bandwidth Product R _L = 10kΩ, C _L = 100pF, f = 100kHz | 1.4 | 2.1 | | MHz |
| φm | Phase Margin (R _L = 10kΩ, C _L = 100pF) | | 45 | | Degrees |
| e _n | Equivalent Input Noise Voltage (f = 1kHz) | | 29 | | nV √Hz |
| THD | Total Harmonic Distortion | | 0.05 | | % |

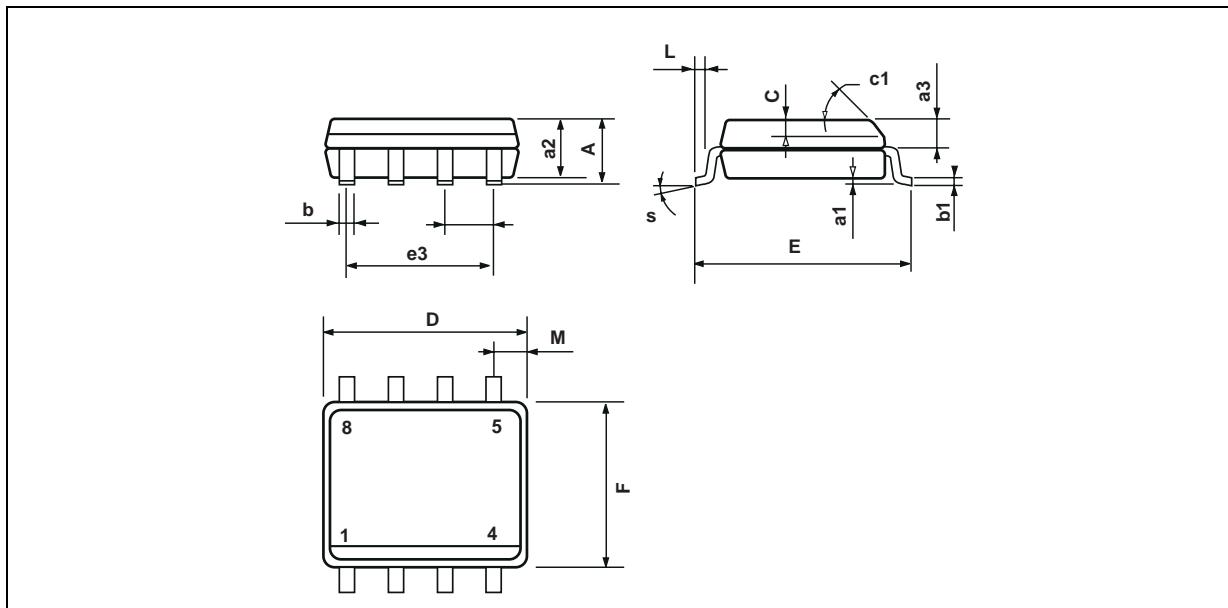
PACKAGE MECHANICAL DATA
8 PINS - PLASTIC DIP



| 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 |

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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