MC33171 - MC35171

LOW POWER SINGLE BIPOLAR OPERATIONAL AMPLIFIERS

- GOOD CONSUMPTION/SPEED RATIO : ONLY 200µA FOR 2.1MHz, 2Vµs
- SINGLE (OR DUAL) SUPPLY OPERATION FROM +4V TO +44V (±2V TO ±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

N
DIP8
(Plastic Package)

D
SO8
(Plastic Micropackage)

DESCRIPTION

The MC3x171 series are single bipolar operational amplifiers offering both low consumption (200µA) and good speed (2.1MHz, 2V/µs).

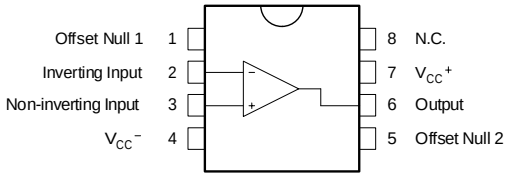
Moreover the Input Common Mode Range extends down to the lower supply rail, allowing single supply operation from +4V to +44V.

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)



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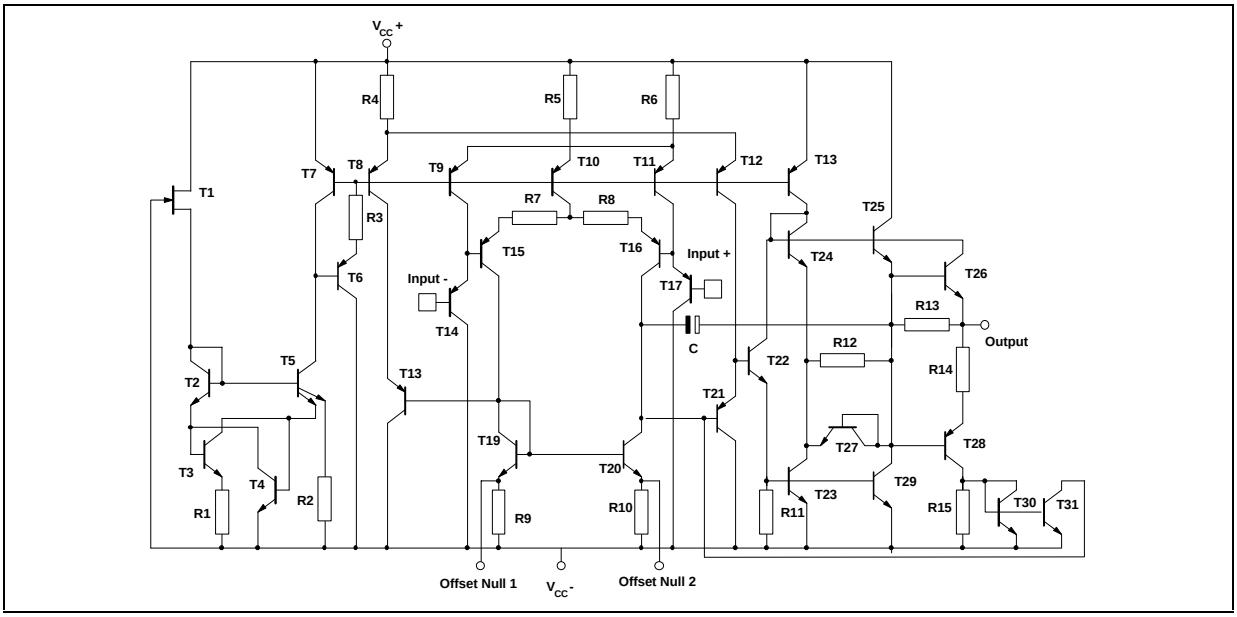
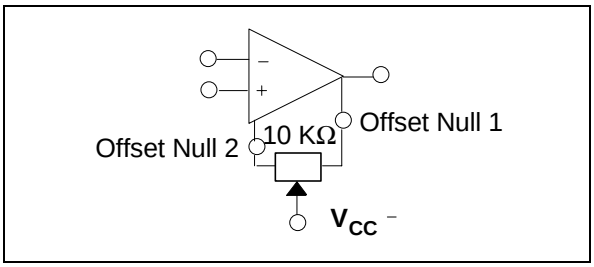
SCHEMATIC DIAGRAM



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 Vcc.

OPERATING CONDITIONS

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

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ELECTRICAL CHARACTERISTICS

V_{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, $T_{min.} \le T_{amb} \le T_{max.}$		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) $T_{min.} \le T_{amb} \le T_{max.}$		5	20 40	nA
I_{ib}	Input Bias Current (V_{ic} = 0V) $T_{min.} \le T_{amb} \le T_{max.}$		20	100 200	nA
A_{vd}	Large Signal Voltage Gain (R_L = 10kΩ, V_o = ±10V) $T_{min.} \le T_{amb} \le T_{max.}$	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, $T_{min.} \le T_{amb} \le T_{max.}$	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, $T_{min.} \le T_{amb} \le T_{max.}$		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 $T_{min.} \le T_{amb} \le T_{max}$	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, $T_{min.} \le T_{amb} \le T_{max.}$		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		$\frac{nV}{\sqrt{Hz}}$
THD	Total Harmonic Distortion		0.05		%

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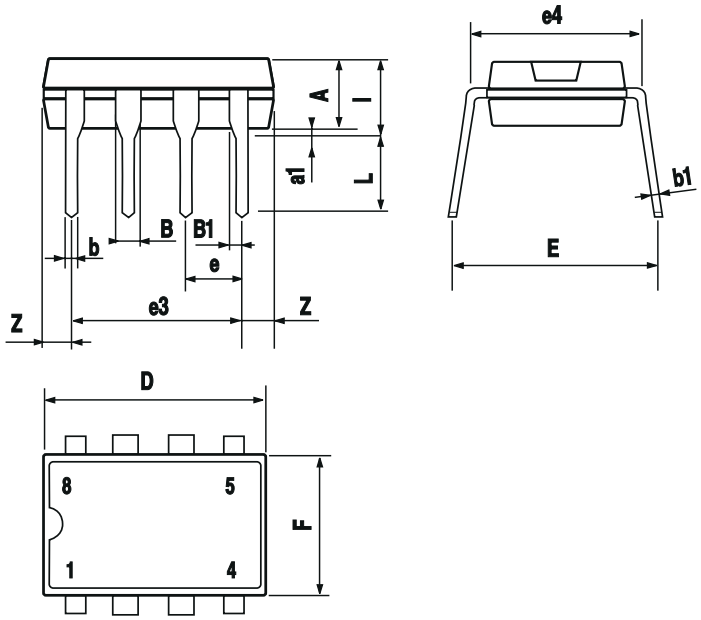
PACKAGE MECHANICAL DATA

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			0260
i			5.08			0.200
L	3.18		3.81	0.125		0.150
Z			1.52			0.060

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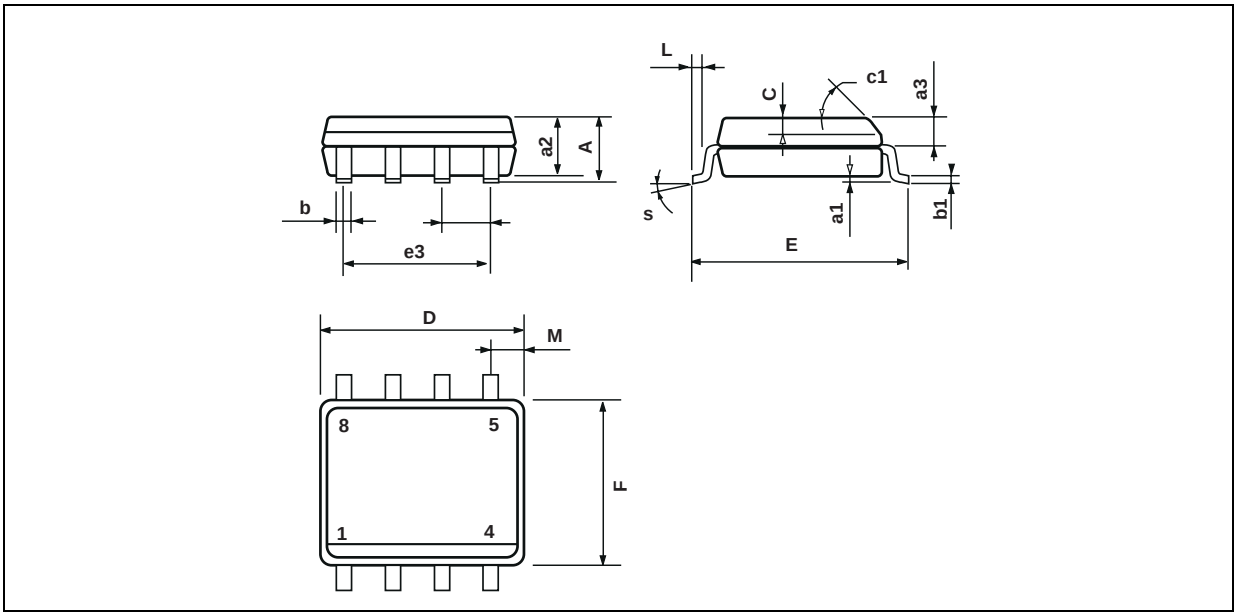
PACKAGE MECHANICAL DATA

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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