



# MC33171 - MC35171

## LOW POWER SINGLE BIPOLAR OPERATIONAL AMPLIFIERS

- GOOD CONSUMPTION/SPEED RATIO :  
ONLY 200 $\mu$ A FOR 2.1MHz, 2V $\mu$ 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 $\mu$ A) and good speed (2.1MHz, 2V/ $\mu$ s).

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

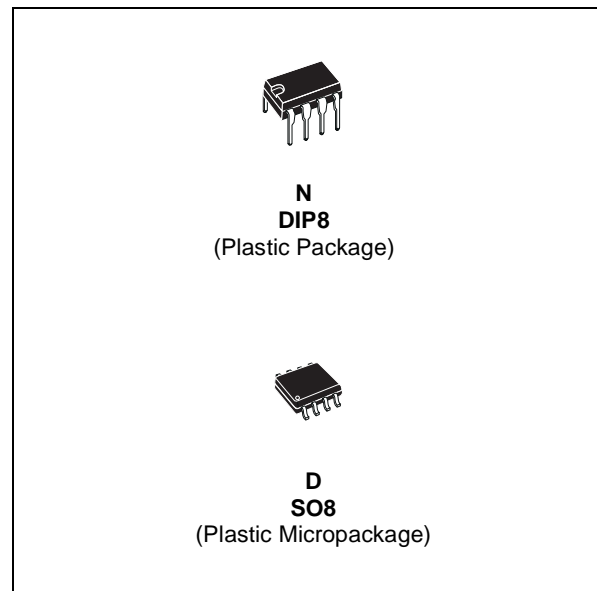
### ORDER CODE

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

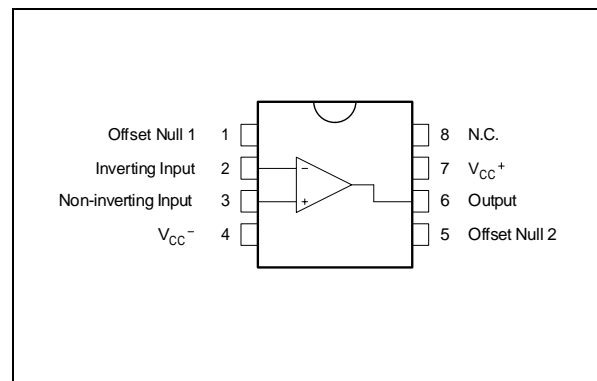
**Example** : MC33171N

**N** = Dual in Line Package (DIP)

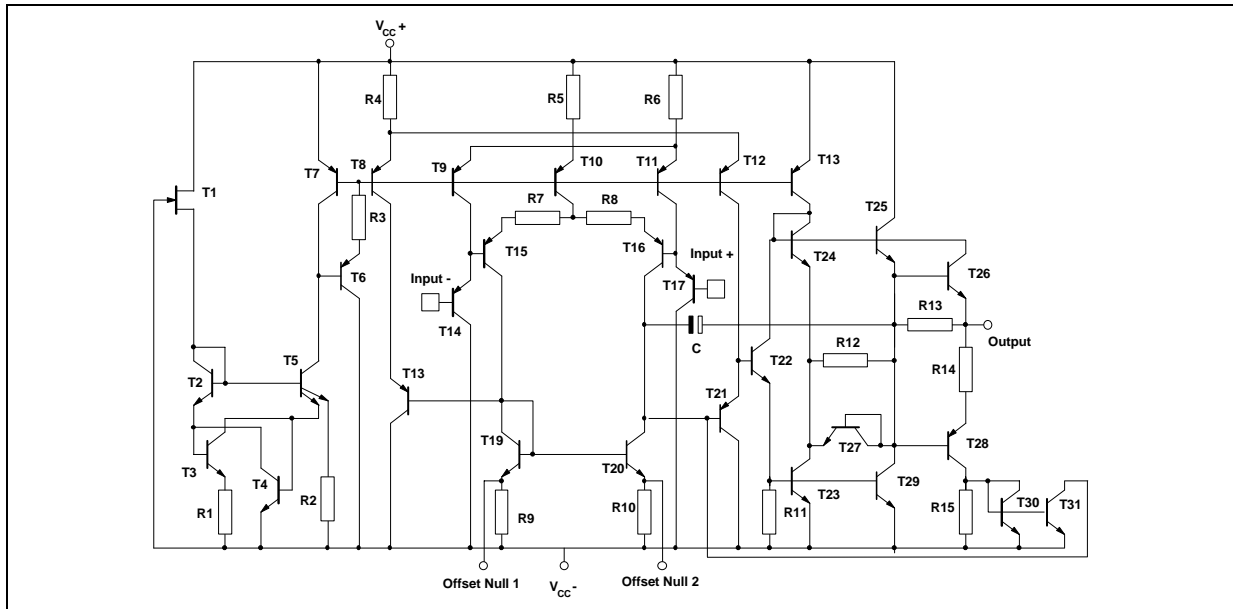
**D** = Small Outline Package (SO) - also available in Tape & Reel (DT)



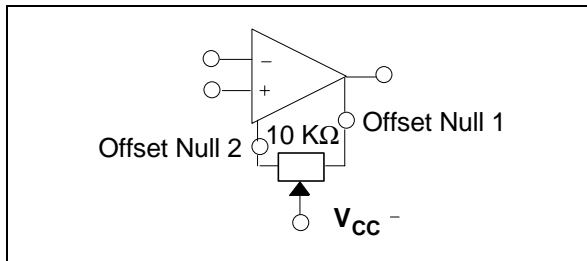
### PIN CONNECTIONS (top view)



**SCHEMATIC DIAGRAM**



**INPUT OFFSET VOLTAGE NULL CIRCUIT**



**MAXIMUM RATINGS**

Symbol	Parameter	Value	Unit	
$V_{CC}$	Supply Voltage	$\pm 22$	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 $125$	$^{\circ}C$
$T_j$	Junction Temperature	150	$^{\circ}C$	
$T_{stg}$	Storage Temperature	$-65$ to $150$	$^{\circ}C$	

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

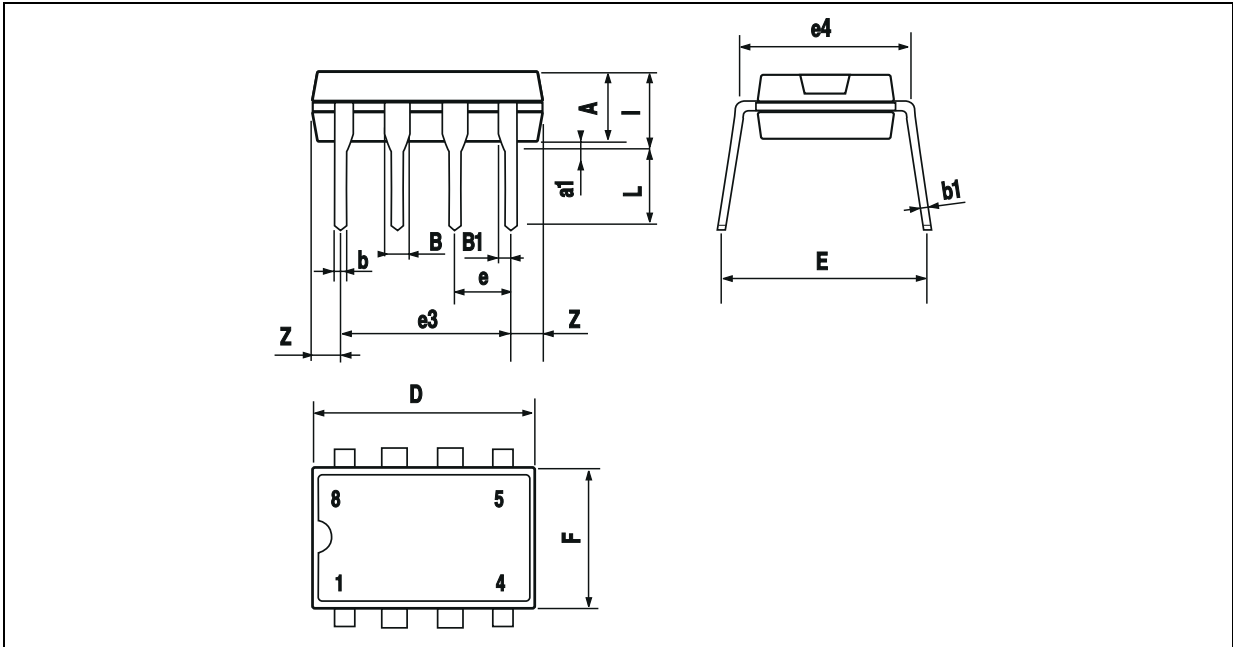
**OPERATING CONDITIONS**

Symbol	Parameter	Value	Unit
$V_{CC}$	Supply Voltage	$\pm 2$ to $\pm 22$	V

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

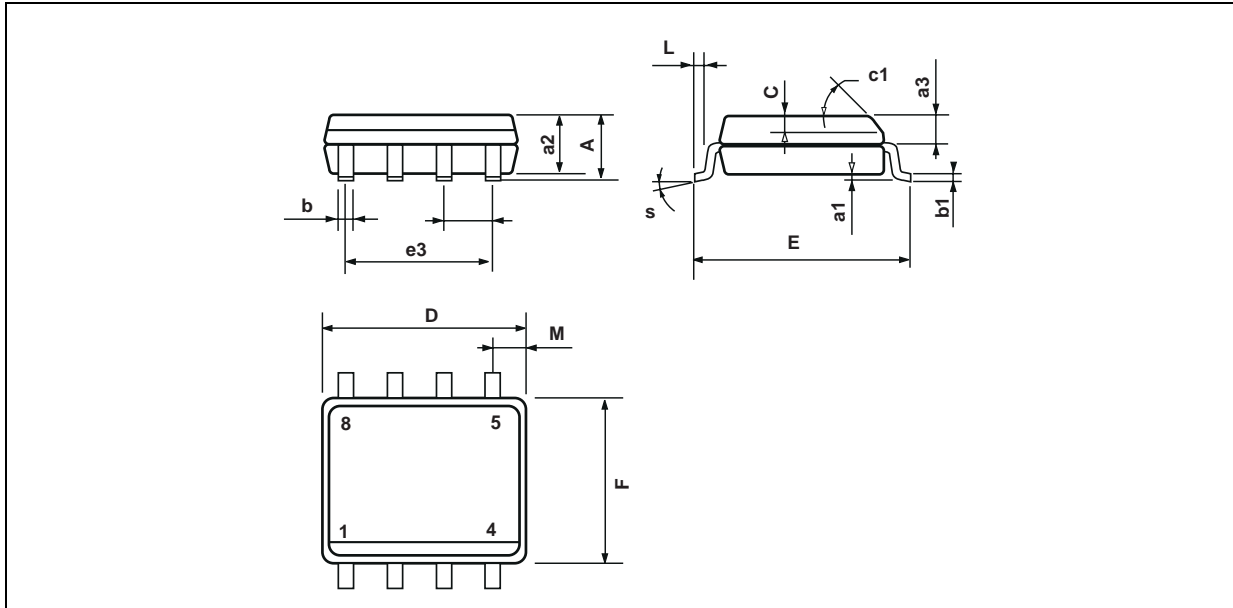
Symbol	Parameter	Min.	Typ.	Max.	Unit
$V_{io}$	Input Offset Voltage $V_{CC}^+ = +15V$ , $V_{CC}^- = -15V$ , $V_{ic} = 0V$ $V_{CC}^+ = 5V$ , $V_{CC}^- = 0V$ , $V_{ic} = 0V$ , $V_o = 1.4V$ $V_{CC}^+ = +15V$ , $V_{CC}^- = -15V$ , $V_{ic} = 0V$ , $T_{min.} \leq T_{amb} \leq T_{max.}$		1 1	4.5 5 6.5	mV
$DV_{io}$	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	$\mu A$
SR	Slew Rate ( $V_i = \pm 10V$ , $R_L = 10k\Omega$ , $C_L = 100pF$ )	1.6	2		V/ $\mu s$
GBP	Gain Bandwidth Product $R_L = 10k\Omega$ , $C_L = 100pF$ , $f = 100kHz$	1.4	2.1		MHz
$\phi_m$	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		%

**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.)					

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

© The ST logo is a registered trademark of STMicroelectronics

© 2001 STMicroelectronics - Printed in Italy - All Rights Reserved  
STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - Canada - China - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia  
Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States

© <http://www.st.com>