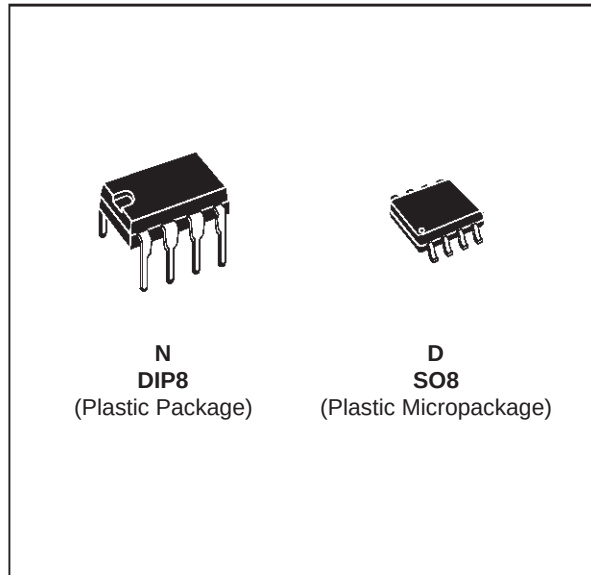


LOW POWER DUAL BIPOLAR OPERATIONAL AMPLIFIERS

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



DESCRIPTION

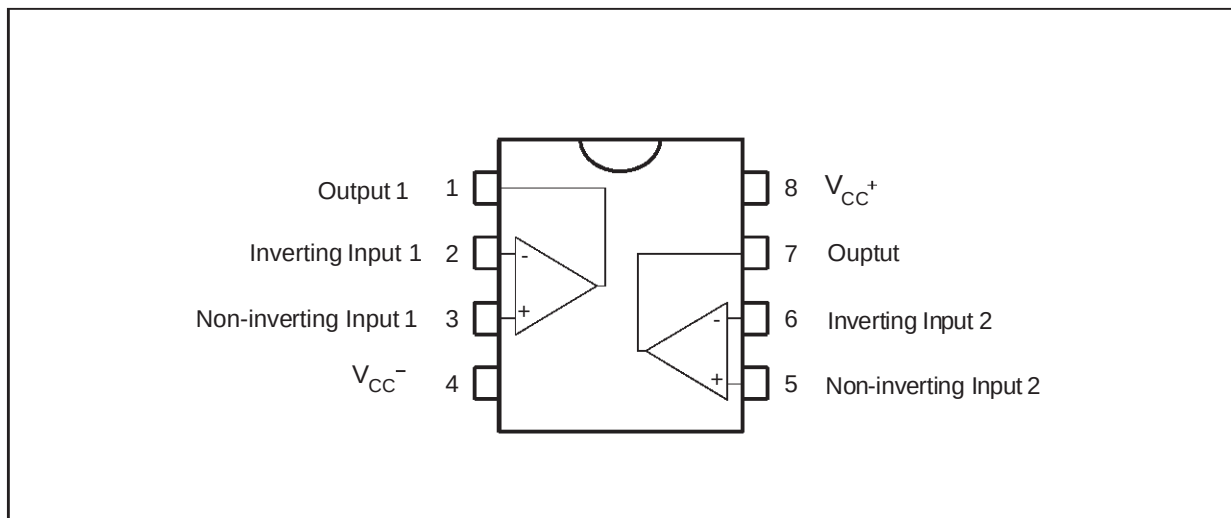
The MC33172 series are dual bipolar operational amplifiers offering both low consumption (200 μ A/Amp) and good speed (2.1MHz, 2V/ μ s). Moreover the Input Common Mode Range extends down to the lower supply rail, allowing single supply operation from +4V to +44V.

ORDER CODES

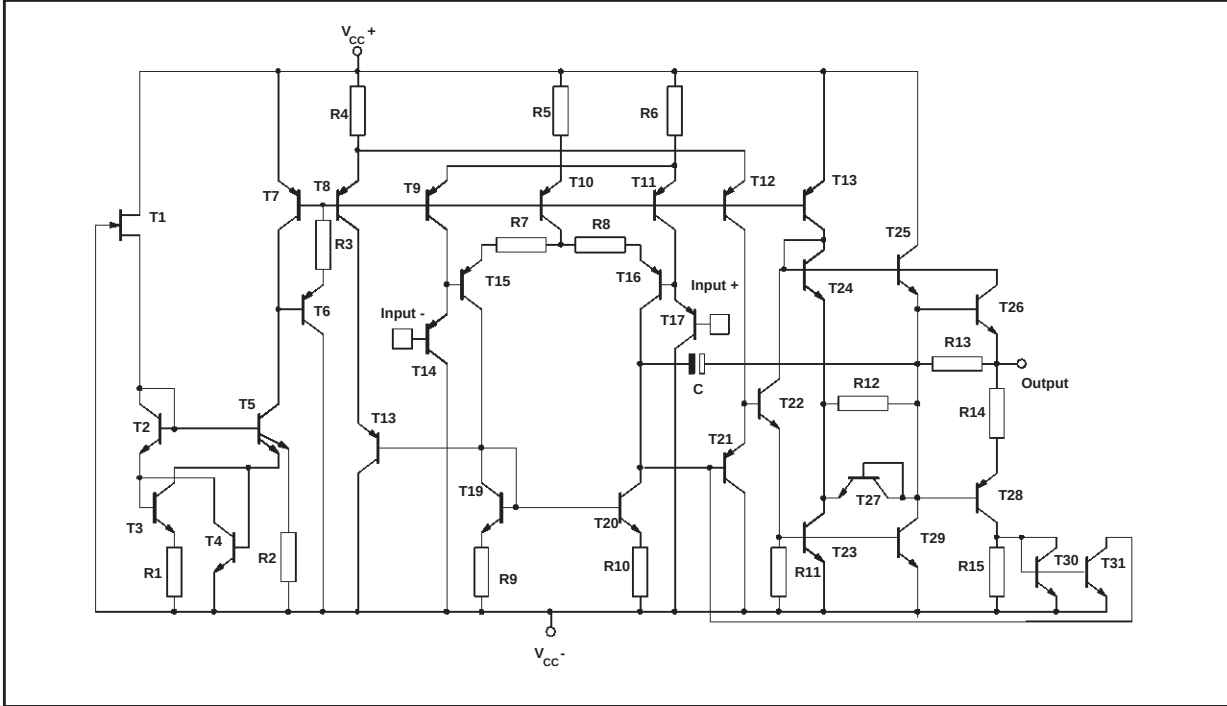
Part Number	Temperature Range	Package	
		N	D
MC33172	-40°C, +105°C	•	•
MC35172	-55°C, +125°C	•	•

Example: MC33172N

PIN CONNECTIONS (top view)



SCHEMATIC DIAGRAM (for 1/2 MC33172)



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	± 22	V
V_{id}	Differential Input Voltage	(Note 1)	V
V_i	Input Voltage	(Note 1)	V
	Output Short Circuit Duration	Indefinite	s
T_{oper}	Operating Temperature Range	MC33172 MC35172	$^{\circ}\text{C}$
T_j	Junction Temperature	150	$^{\circ}\text{C}$
T_{stg}	Storage Temperature	-65 to 150	$^{\circ}\text{C}$

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

OPERATING CONDITIONS

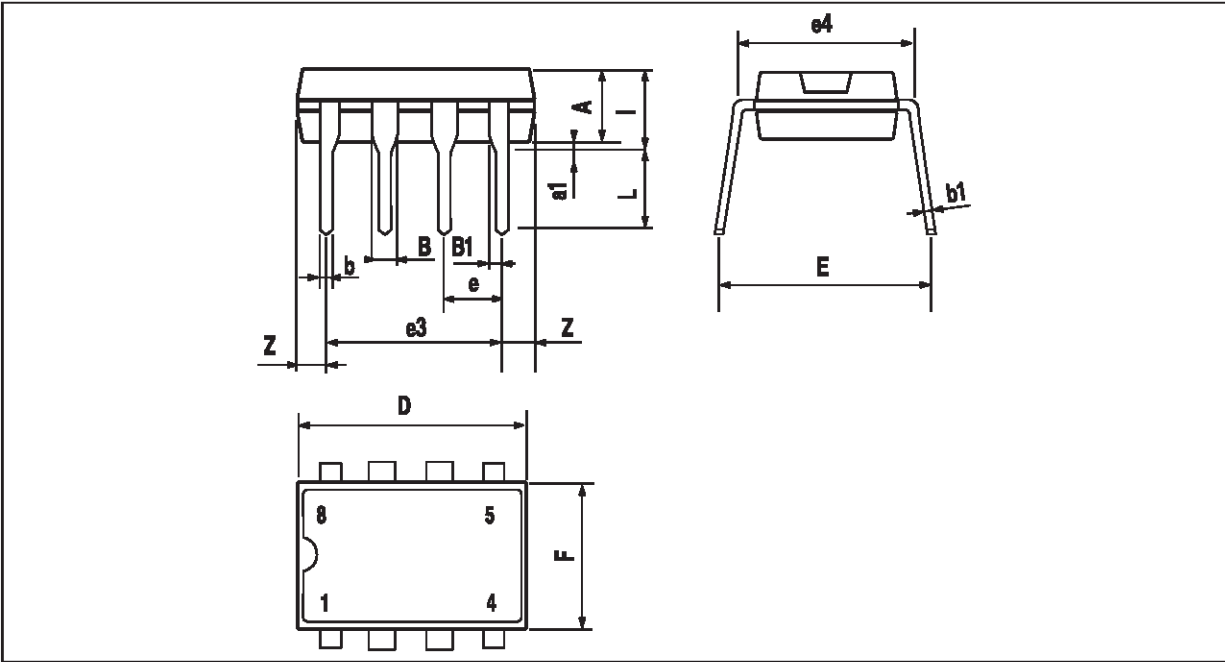
Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage Range	± 2 to ± 22	V

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 ($V_i = V_{icm \text{ min.}}$)	80	100		dB
SVR	Supply Voltage Rejection Ratio ($V_{CC} = \pm 5$ to $\pm 15V$)	80	100		dB
I_{CC}	Supply Current (per amplifier) $V_{CC}^+ = 5V$, $V_{CC}^- = 0V$, 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
8 PINS - PLASTIC DIP

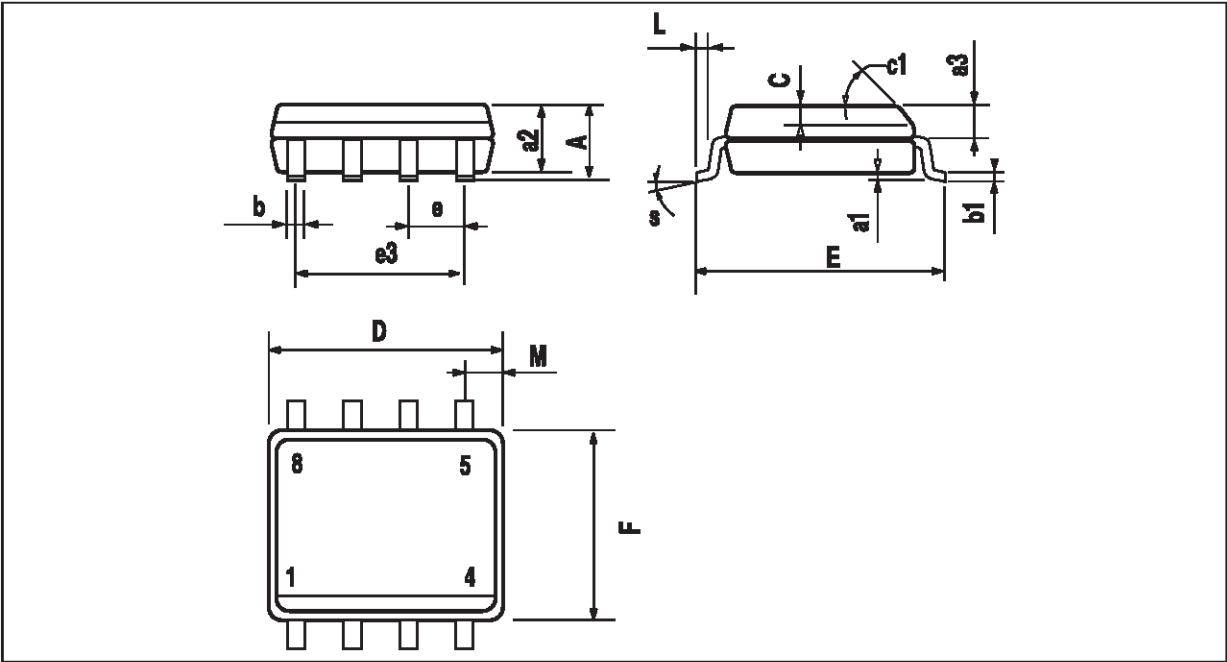


PM-DIP8.EPS

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

DIP8.TBL

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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