

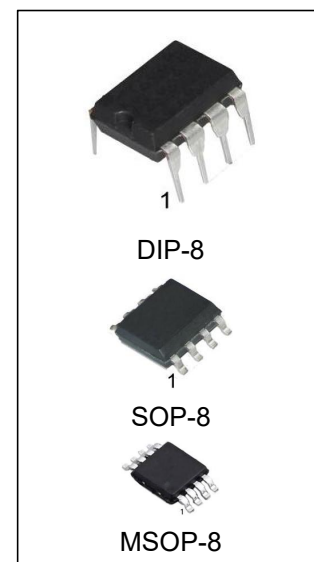
## DUAL OPERATIONAL AMPLIFIER

### DESCRIPTION

MC33078 is the dual operational amplifier, specially designed for improving the tone control, which is most suitable for the audio application. Featuring noiseless, higher gain bandwidth, high output current and low distortion ratio, and it is most suitable not only for acoustic electronic part of audio pre-amp and active filter, but also for the industrial measurement tools. It is also suitable for the head phone amp at higher output current. And further more, it can be applied for the handy type set operational amplifier of general purpose in application of low voltage single supply type which is properly biased of the input low voltage source.

### FEATURE

- Operating Voltage:  $\pm 2V \sim \pm 16V$ .
- Low Input Noise Voltage:  $0.8\mu V_{rms}$  Typ.
- Wide Gain Bandwidth Product:  $15\text{MHz}$  Typ.
- Low Distortion:  $0.0005\%$  Typ.
- Slew Rate:  $5V/\mu A$  Typ.
- Package Outline DIP-8、SIP-8 and MSOP-8 .
- Bipolar Technology.

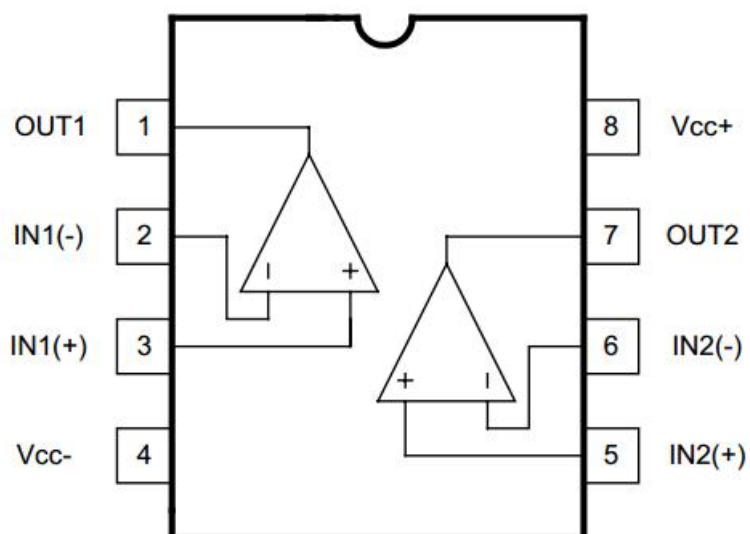


### ORDERING INFORMATION

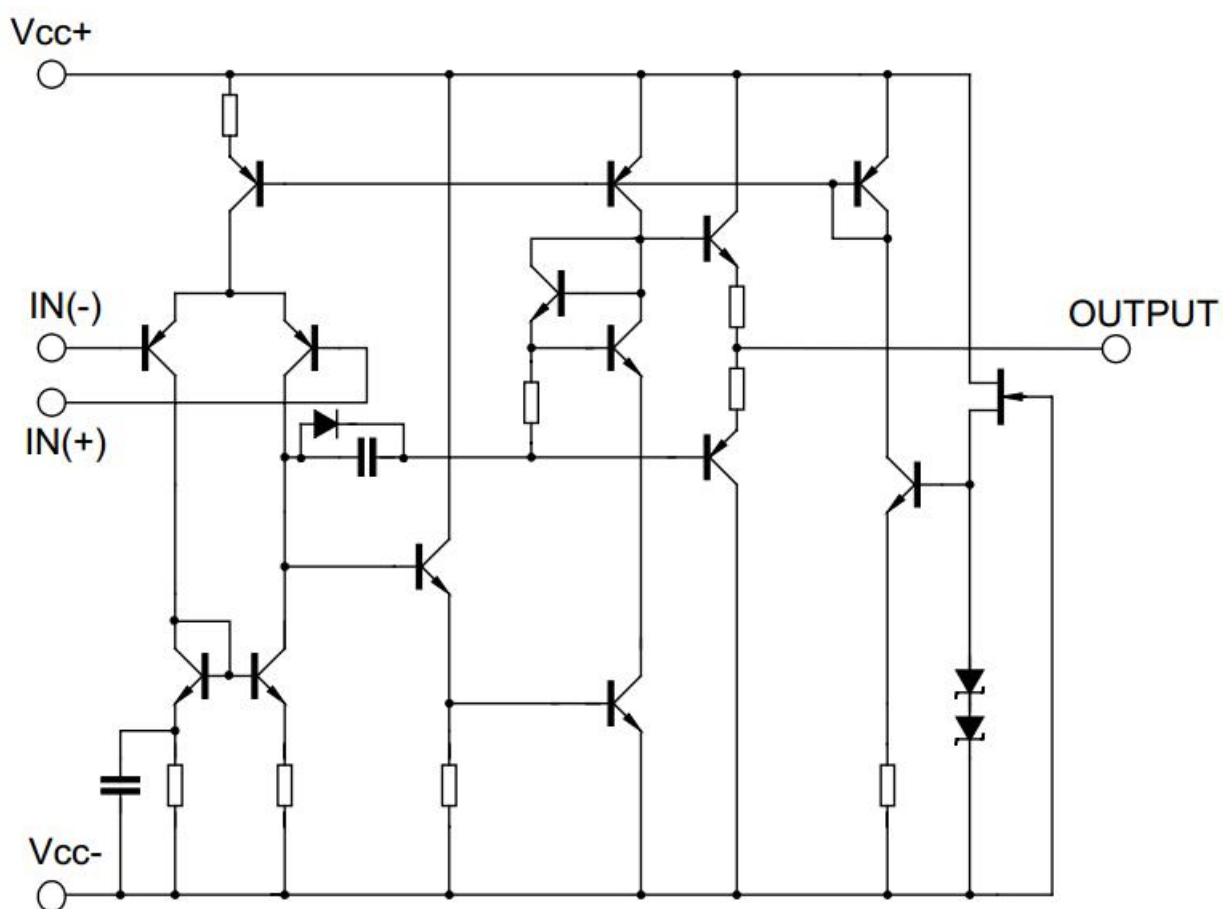
DEVICE	Package Type	MARKING	Packing	Packing Qty
MC33078N	DIP-8	MC33078	TUBE	2000pcs/box
MC33078M/TR	SOP-8	M33078	REEL	2500pcs/reel
MC33078MM/TR	MSOP-8	33078,MYU	REEL	3000pcs/reel

## PIN CONFIGURATION

DIP-8/SOP-8/MSOP-8



## EQUIVALENT CIRCUIT



**ABSOLUTE MAXIMUM RATINGS** (Ta=25°C)

Characteristic		Symbol	Value	Unit
Supply Voltage		V+/V-	±16	V
Input Voltage		V <sub>IC</sub>	±15	V
Differential Input Voltage		V <sub>ID</sub>	±30	V
Output Current		I <sub>O</sub>	±50	mA
Power Dissipation	DIP-8	P <sub>D</sub>	800	mW
	SOP-8		300	
	MSOP-8		250	
Operating Temperature Range		T <sub>OPR</sub>	-40~85	°C
Storage Temperature Range		T <sub>stg</sub>	-40~125	°C
Lead Temperature (Soldering, 10 seconds)		T <sub>L</sub>	260	°C

**Note:** Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is intended to be functional, but specific performance is not ensured.

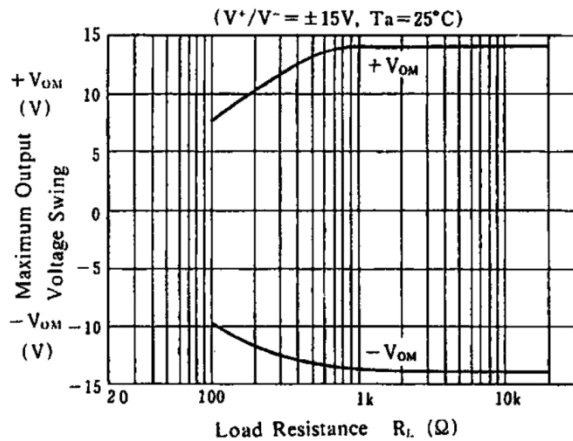
**ELECTRICAL CHARACTERISTICS**

(Unless otherwise specified: Ta= 25°C, V+/V- =±15V)

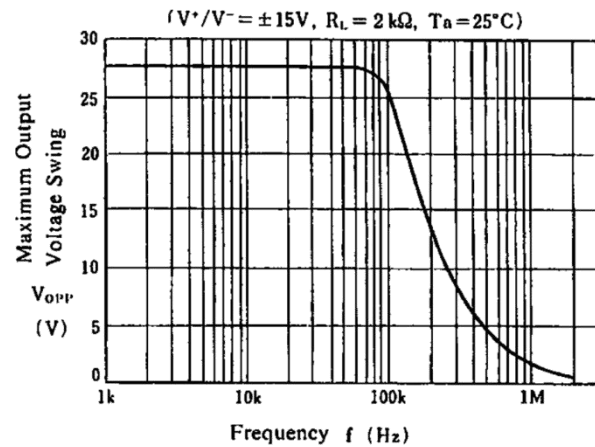
Parameter	Symbol	Test condition	Min	Typ	Max	Unit
Input Offset Voltage	V <sub>IO</sub>	R <sub>s</sub> ≤ 10 kΩ		0.5	3	mV
Input Offset Current	I <sub>IO</sub>			5	200	nA
Input Bias Current	I <sub>B</sub>			100	500	nA
Large Signal Voltage Gain	A <sub>v</sub>	R <sub>L</sub> ≥ 2kΩ, V <sub>O</sub> = ±10V	90	110		dB
Output Voltage Swing	V <sub>OM</sub>	R <sub>L</sub> ≥ 2kΩ	±12	±13.5		V
Input Common Mode Voltage Range	V <sub>ICM</sub>		±12	±13.5		V
Common Mode Rejection Ratio	CMR	R <sub>s</sub> ≤ 10 kΩ	80	110		dB
Supply Voltage Rejection Ratio	SVR	R <sub>s</sub> ≤ 10 kΩ	80	110		dB
Operating Current	I <sub>CC</sub>			6	9	mA
Slew Rate	SR	R <sub>L</sub> ≥ 2kΩ		5		V/μs
Gain Bandwidth Product	GB	f=10kHz		15		MHz
Total Harmonic Distortion	THD	A <sub>v</sub> =20dB, V <sub>O</sub> = 5 V, f=1kHz, R <sub>L</sub> =2kΩ		0.0005		%
Input Noise Voltage	V <sub>NI</sub>	RIAA R <sub>s</sub> =2.2kΩ, 30kHz LPF		0.8		μVrms

## CHARACTERISTICS CURVES

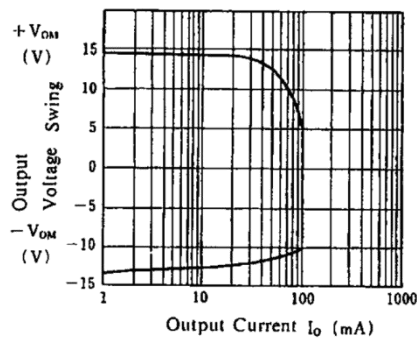
Maximum Output Voltage Swing vs. Load Resistance



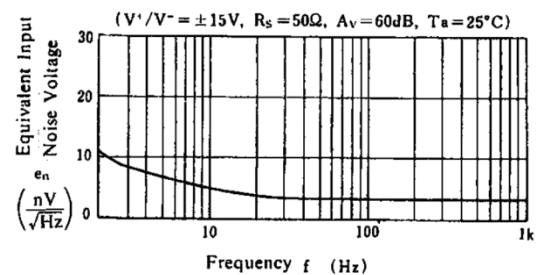
Maximum Output Voltage Swing vs. Frequency



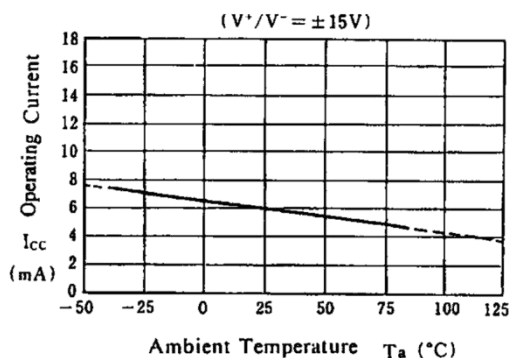
Output Voltage Swing vs. Output Current



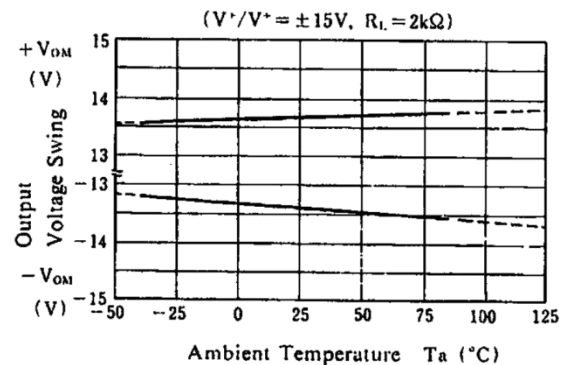
Equivalent Input Noise Voltage vs. Frequency



Operating Current vs. Temperature

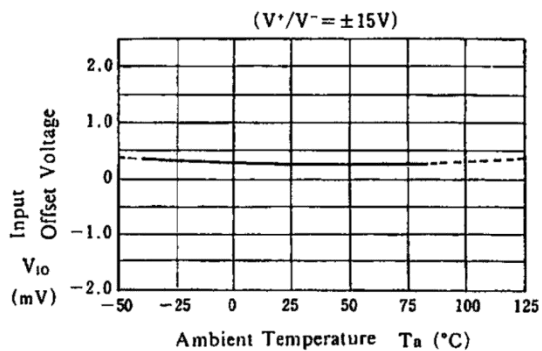


Output Voltage Swing vs. Temperature

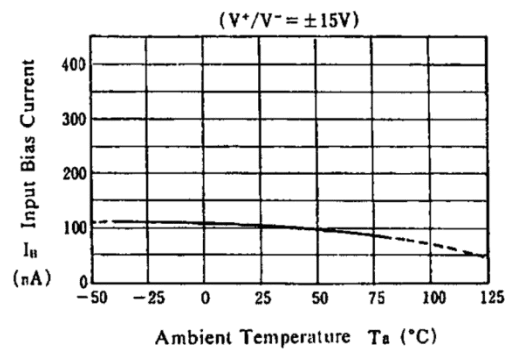


## TYPICAL CHARACTERISTICS

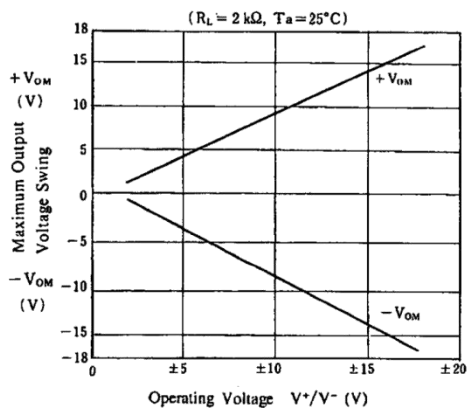
Input offset Voltage vs. Temperature



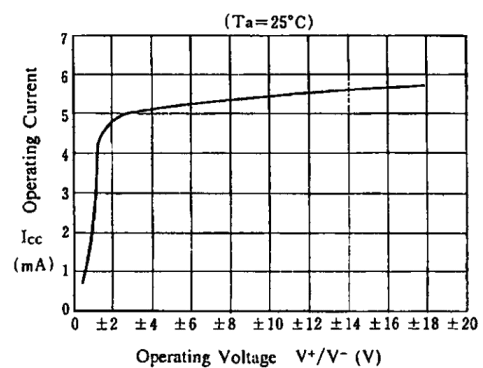
Input bias current vs. Temperature



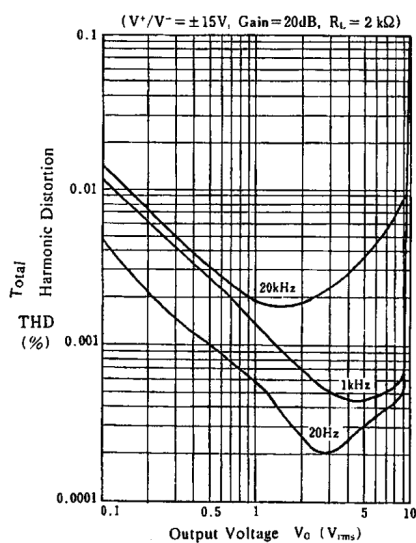
Maximum Output Voltage Swing vs. Operating Voltage



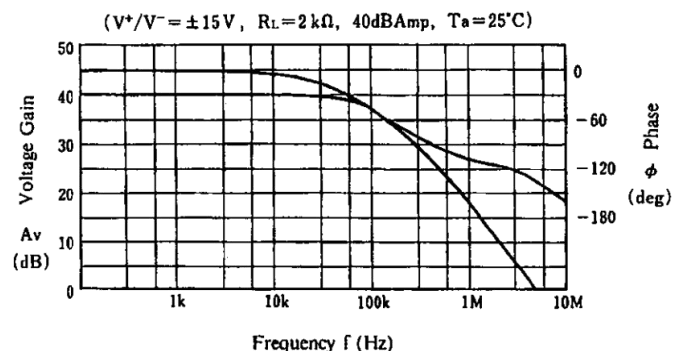
Operating Current vs. Operating Voltage



Total Harmonic Distortion vs. Output Voltage

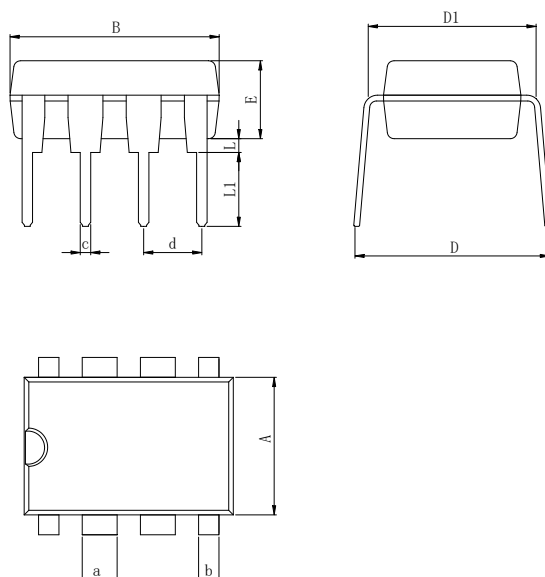


Voltage Gain Phase vs. Frequency



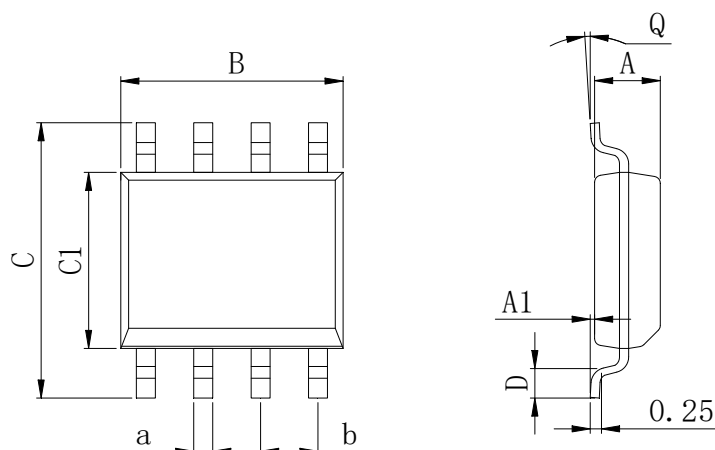
## Physical Dimensions

### DIP-8



Dimensions In Millimeters(DIP-8)											
Symbol:	A	B	D	D1	E	L	L1	a	b	c	d
Min:	6.10	9.00	8.10	7.42	3.10	0.50	3.00	1.50	0.85	0.40	2.54 BSC
Max:	6.68	9.50	10.9	7.82	3.55	0.70	3.60	1.55	0.90	0.50	

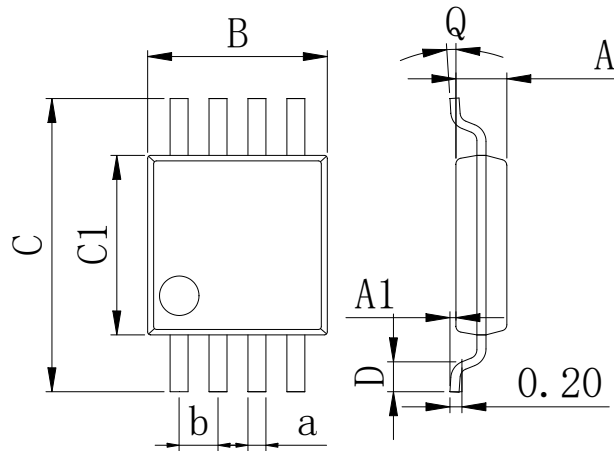
### SOP-8 (150mil)



Dimensions In Millimeters(SOP-8)									
Symbol:	A	A1	B	C	C1	D	Q	a	b
Min:	1.35	0.05	4.90	5.80	3.80	0.40	0°	0.35	1.27 BSC
Max:	1.55	0.20	5.10	6.20	4.00	0.80	8°	0.45	

## Physical Dimensions

MSOP-8



Dimensions In Millimeters(MSOP-8)

Symbol:	A	A1	B	C	C1	D	Q	a	b
Min:	0.80	0.05	2.90	4.75	2.90	0.35	0°	0.25	0.65 BSC
Max:	0.90	0.20	3.10	5.05	3.10	0.75	8°	0.35	

## Revision History

DATE	REVISION	PAGE
2014-6-9	New	1-9
2023-9-14	Update encapsulation type、 Updated DIP-8 dimension	1、 6
2024-11-1	Update Lead Temperature	3



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