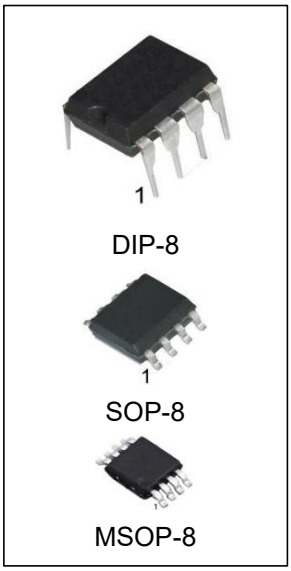
DUAL OPERATIONAL AMPLIFIER

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

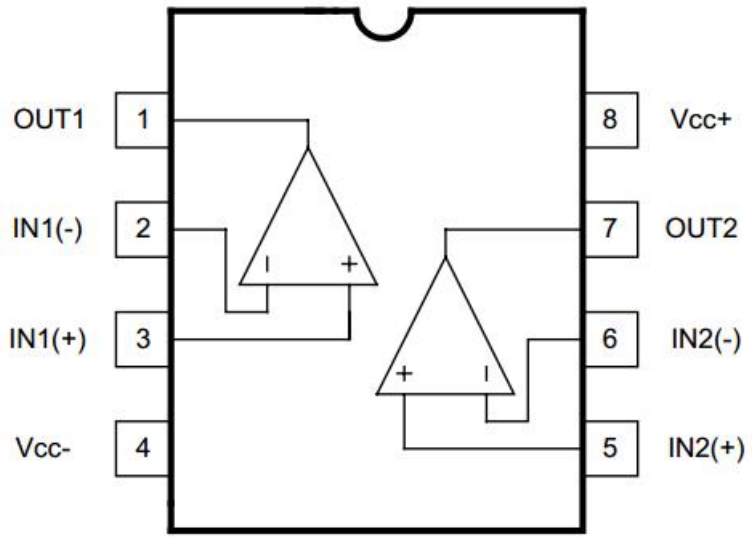
- Operating Voltage：±2V~±16V.
- Low Input Noise Voltage：0.8μVrms Typ.
- Wide Gain Bandwidth Product : 15mhz Typ.
- Low Distortion :0.0005% Typ.
- Slew Rate:5V/μA Typ.
- Package Outline DIP-8、SIP-8 and MSOP-8 .
- Bipolar Technology.

ORDERING INFORMATION

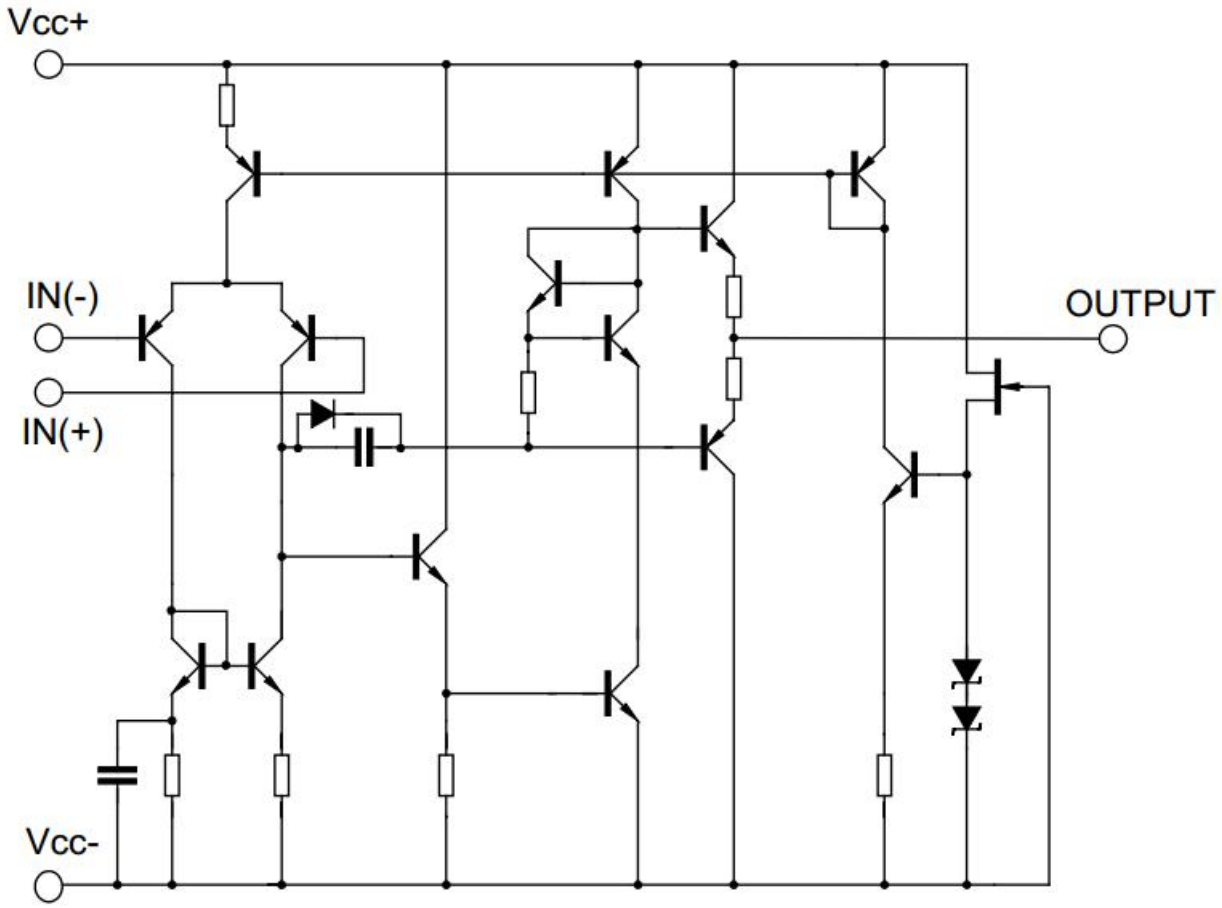
DEVICE	Package Type	MARKING	Packing	Packing Qty
MC33078N	DIP-8	MC33078	TUBE	2000pcs/box
MC33078M/TR	SOP-8	M33078	REEL	2500pcs/reel
MC33078MM/TR	MSOP-8	33078,MYU	REEL	3000pcs/reel

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_{IC}	±15	V
Differential Input Voltage		V_{ID}	±30	V
Output Current		I_O	±50	mA
Power Dissipation	DIP-8	P_D	800	mW
	SOP-8		300	
	MSOP-8		250	
Operating Temperature Range		T_{OPR}	-40~85	°C
Storage Temperature Range		Tstg	-40~125	°C
Lead Temperature (Soldering, 10 seconds)		T_L	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.

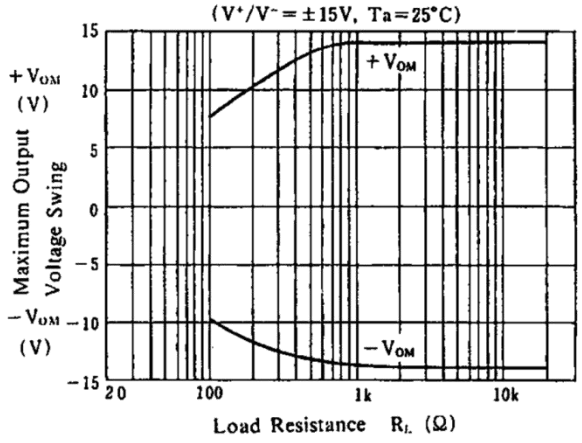
ELECTRICAL CHARACTERISTICS

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

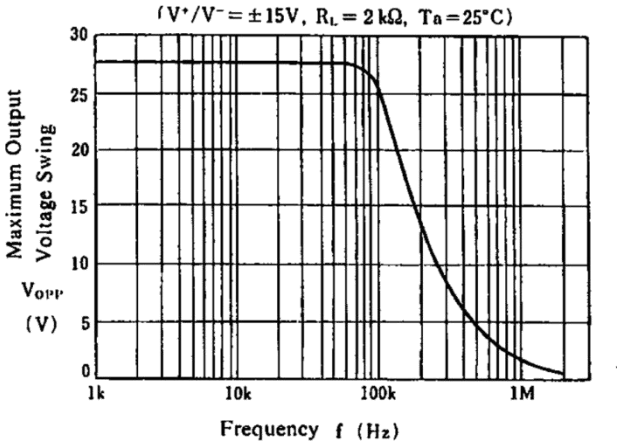
Parameter	Symbol	Test condition	Min	Typ	Max	Unit
Input Offset Voltage	V_{IO}	Rs ≤ 10 kΩ		0.5	3	m V
Input Offset Current	I_{IO}			5	200	nA
Input Bias Current	I_B			100	500	nA
Large Signal Voltage Gain	Av	RL ≥ 2kΩ，Vo =±10V	90	110		dB
Output Voltage Swing	V_{OM}	RL ≥ 2kΩ	±12	±13.5		V
Input Common Mode Voltage Range	V_{ICM}		±12	±13.5		V
Common Mode Rejection Ratio	CMR	Rs ≤ 10 kΩ	80	110		dB
Supply Voltage Rejection Ratio	SVR	Rs ≤ 10 kΩ	80	110		dB
Operating Current	Icc			6	9	m A
Slew Rate	SR	R_L ≥ 2kΩ		5		V/ μs
Gain Bandwidth Product	GB	f=10kHz		15		MHz
Total Harmonic Distortion	THD	Av=20dB，Vo = 5 V，f=1kHz，RL =2kΩ		0.0005		%
Input Noise Voltage	V_{NI}	RIAA Rs=2.2kΩ，30kHz LPF		0.8		μVrms

CHARACTERISTICS CURVES

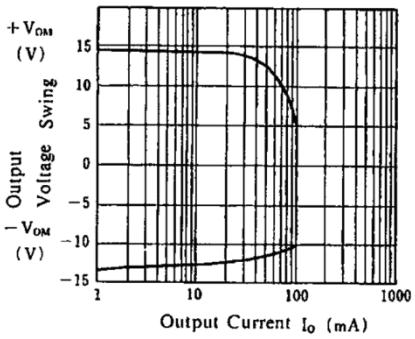
Maximum Output Voltage Swing vs.Load Resistance



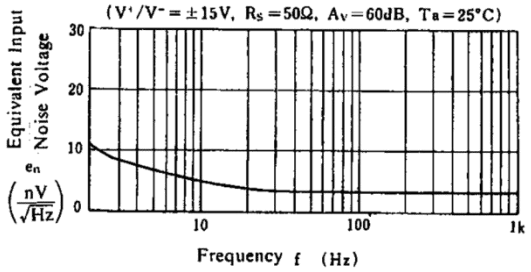
Maximum Output Voltage Swing vs.Frquency



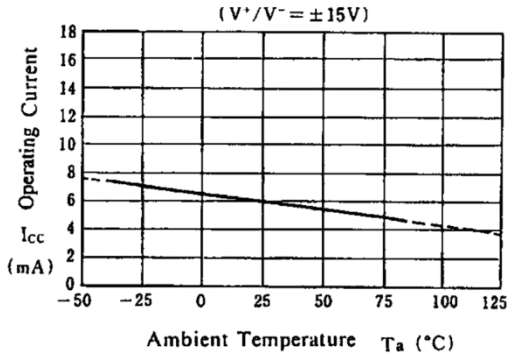
Output Voltage Swing vs.Output Current



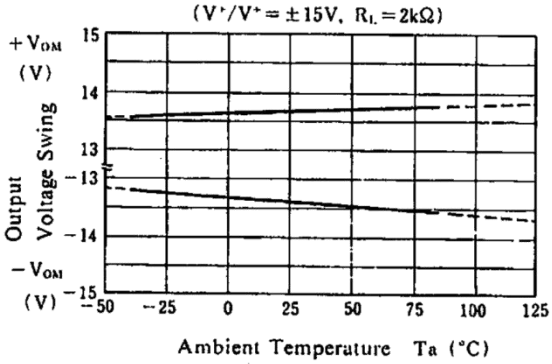
Equlvalent Input Noise Voltage vs.Frequency



Operating Current vs.Temperature

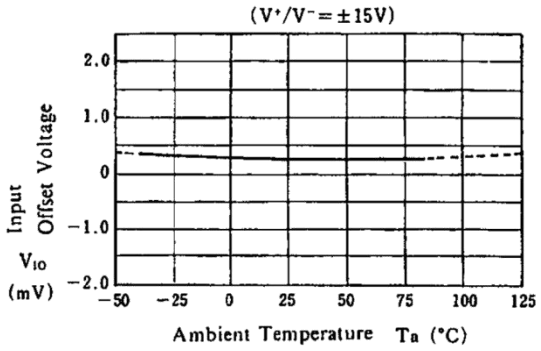


Output Voltage Swing vs. Temperature

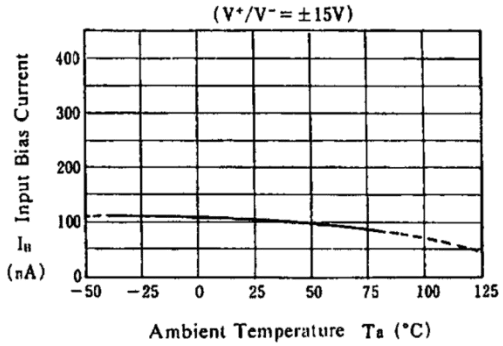


TYPICAL CHARACTERISTICS

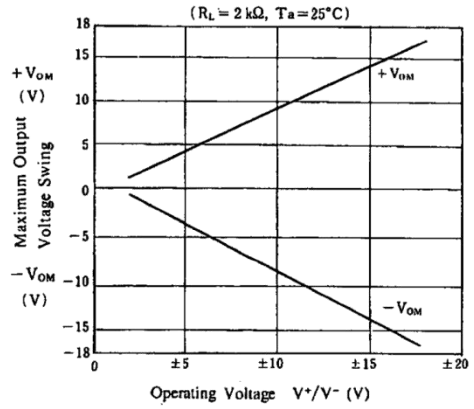
Input offset Voltage vs.Temperature



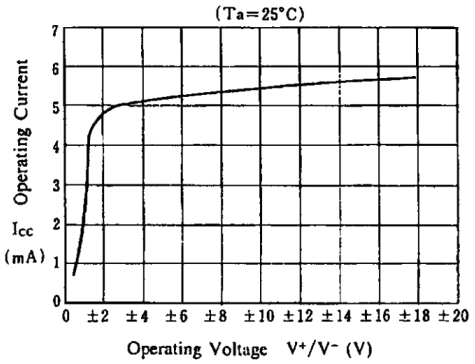
Input bias current vs.Temperature



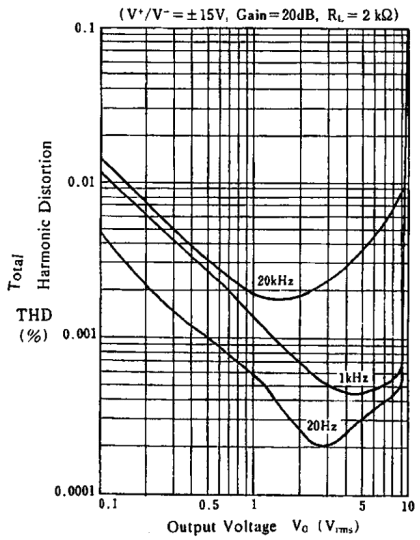
Maximum Output Voltage Swing vs.Operating Voltage



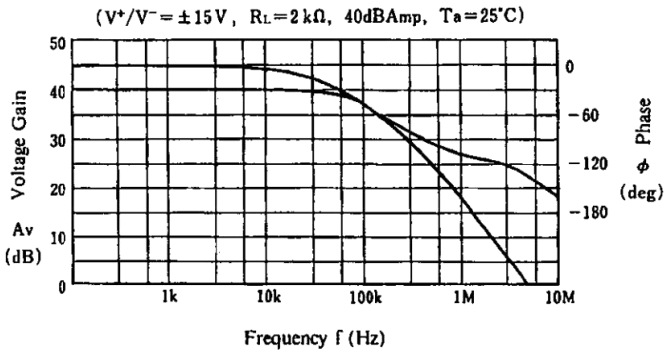
Operating Current vs.Operating



Total Harmonic Distortion vs.Output Voltage

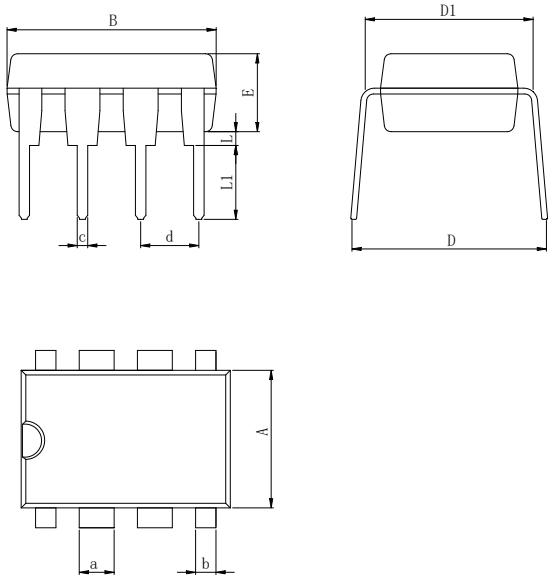


Voltage Gain Phase vs.Frequency



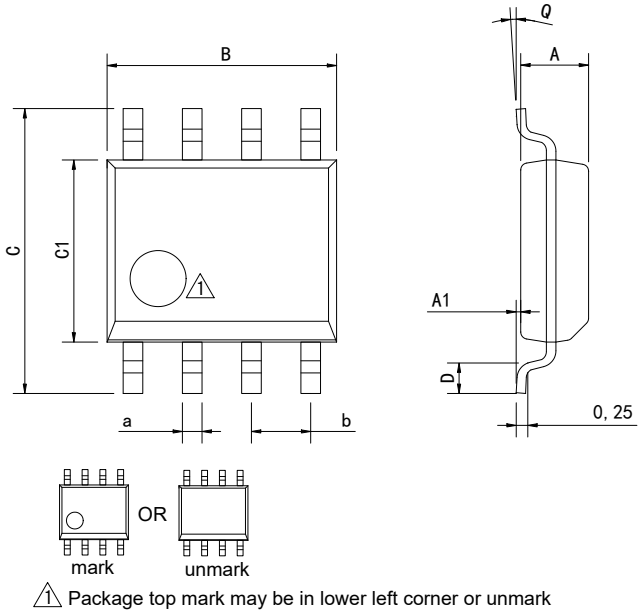
Physical Dimensions

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

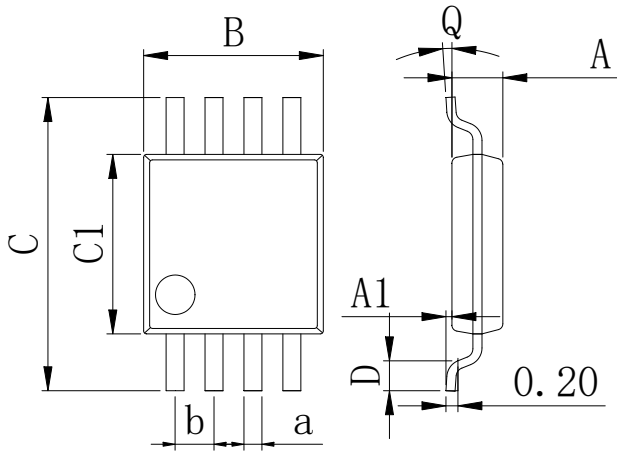


1 Package top mark may be in lower left corner or unmark

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

REVISION NUMBER	DATE	REVISION	PAGE
V1.0	2014-6	New	1-9
V1.1	2017-9	Update encapsulation type、Updated DIP-8 dimension	1、6
V1.2	2024-11	Update Lead Temperature	3
V1.3	2025-12	Update important statements、Update SOP-8 Dimension drawing	6、9

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