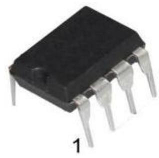
FEATURES

- Low Voltage Noise: 4.5 nV/ Hz
- High Gain Bandwidth Product: 15 MHz
- High Slew Rate: 7.0 V/μs
- Low Input Offset Voltage: 0.3 mV
- Low T.C. of Input Offset Voltage: 2.0 μV/℃
- Low Distortion: 0.002%
- Excellent Frequency Stability
- Dual Supply Operation



DIP-8

SOP-8

MSOP-8

DFN-8 3*3

ORDERING INFORMATION

DEVICE	Package Type	MARKING	Packing	Packing Qty
LM833PG	DIP-8	LM833	TUBE	2000pcs/Box
LM833DRG	SOP-8	LM833	REEL	2500pcs/Reel
LM833DRG4	SOP-8	LM833	REEL	4000pcs/Reel
LM833DGKRG	MSOP-8	LM833	REEL	3000pcs/Reel
LM833DQRG	DFN-8 3*3	LM833	REEL	5000pcs/Reel

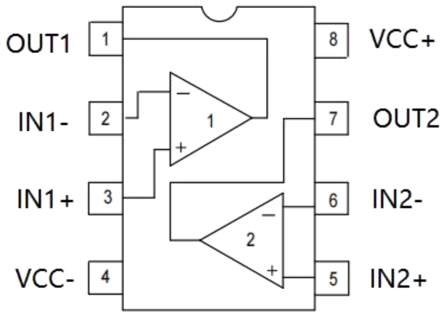
DESCRIPTION

The LM833 is a standard low–cost monolithic dual general–purpose operational amplifier employing Bipolar technology with innovative high–performance concepts for audio systems applications. With high frequency PNP transistors, the LM833 offers low voltage noise (4.5 nV/ Hz), 15 MHz gain bandwidth product, 7.0 V/μs slew rate, 0.3 mV input offset voltage with 2.0 μV/℃ temperature coefficient of input offset voltage. The LM833 output stage exhibits no deadband crossover distortion, large output voltage swing, excellent phase and gain margins, low open loop high frequency output impedance and symmetrical source/sink AC frequency response.

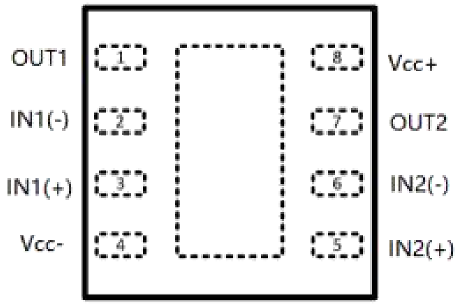
The LM833 is specified over the automotive temperature range and is available in the plastic DIP8 SOP8 and MSOP8 packages (M and N suffixes). For an improved performance dual/quad version, see the MC33079 family.

PIN CONNECTIONS

SOP-8/DIP-8/MSOP-8



DFN-8 3*3



MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Supply Voltage (V_{CC} to V_{EE})	V_S	+36	V
Input Differential Voltage Range (Note 1)	V_{IDR}	30	V
Input Voltage Range (Note 1)	V_{IR}	±15	V
Output Short Circuit Duration (Note 2)	t_{SC}	Indefinite	
Operating Ambient Temperature Range	T_A	–40 to +85	℃
Operating Junction Temperature	T_J	+150	℃
Storage Temperature	T_{stg}	–60 to +150	℃
Maximum Power Dissipation (Notes 2 and 3)	P_D	500	mW
Lead Temperature (Soldering, 10 seconds)	T_L	260	℃

NOTES:

1、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.

2、Either or both input voltages must not exceed the magnitude of VCC or VEE.

3、Power dissipation must be considered to ensure maximum junction temperature(TJ) is not exceeded (see power dissipation performance characteristic).

4、Maximum value at TA ≤ 85℃.

ELECTRICAL CHARACTERISTICS (VCC = +15 V, VEE = –15 V, TA = 25°C, unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
Input Offset Voltage (R_S = 10Ω, V_O = 0 V)	V_{IO}	–	0.3	5.0	mV
Average Temperature Coefficient of Input Offset Voltage R_S = 10Ω, V_O = 0 V, T_A = T_{low} to T_{high}	$\Delta V_{IO}/\Delta T$	–	2.0	–	μV/℃
Input Offset Current (V_{CM} = 0 V, V_O = 0 V)	I_{IO}	–	10	200	nA
Input Bias Current (V_{CM} = 0 V, V_O = 0 V)	I_{IB}	–	300	1000	nA
Common Mode Input Voltage Range	V_{ICR}	– –12	+14 –14	+12 –	V
Large Signal Voltage Gain (R_L = 2.0 kΩ, V_O =±10 V	A_{VOL}	90	110	–	dB
Output Voltage Swing: R_L = 2.0 kΩ, V_{ID} = 1.0 VR_L = 2.0 kΩ, V_{ID} = 1.0 V R_L = 10 kΩ, V_{ID} = 1.0 VR_L = 10 kΩ, V_{ID} = 1.0 V	V_{O+} V_{O-} V_{O+} V_{O-}	10 – 12 –	13.7 –14.1 13.9 –14.7	– –10 – –12	V
Common Mode Rejection (V_{in} = ±12 V)	CMR	80	100	–	dB
Power Supply Rejection (V_S = 15 V to 5.0 V, –15 V to –5.0 V)	PSR	80	115	–	dB
Power Supply Current (V_O = 0 V, Both Amplifiers)	I_D	–	4.0	8.0	mA

AC ELECTRICAL CHARACTERISTICS (VCC = +15 V, VEE = –15 V, TA = 25°C, unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
Slew Rate (V_{in} = –10 V to +10 V, R_L = 2.0 kΩ, A_V = +1.0)	SR	5.0	7.0	–	V/μs
Gain Bandwidth Product (f = 100 kHz)	GBW	10	15	–	MHz
Unity Gain Frequency (Open Loop)	f_U	–	9.0	–	MHz
Unity Gain Phase Margin (Open Loop)	θm	–	60	–	Deg
Equivalent Input Noise Voltage (R_S = 100Ω, f = 1.0 kHz)	e_n	–	4.5	–	nV/ $\sqrt{Hz}$
Equivalent Input Noise Current (f = 1.0 kHz)	i_n	–	0.5	–	pA/ $\sqrt{Hz}$
Power Bandwidth (V_O = 27 V_{pp}, R_L = 2.0 kΩ, THD ≤1.0%)	BWP	–	120	–	kHz
Distortion (R_L = 2.0 kΩ, f = 20 Hz to 20 kHz, V_O = 3.0 V_{rms}, A_V = +1.0)	THD	–	0.002	–	%
Channel Separation (f = 20 Hz to 20 kHz)	C_S	–	–120	–	dB

Figure 1. Maximum Power Dissipation versus Temperature

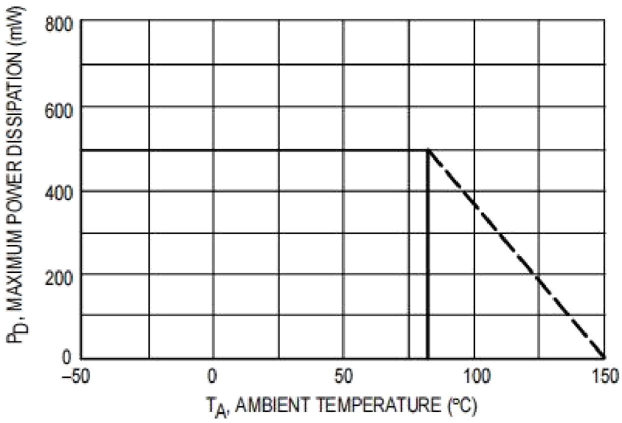


Figure 2. Input Bias Current versus Temperature

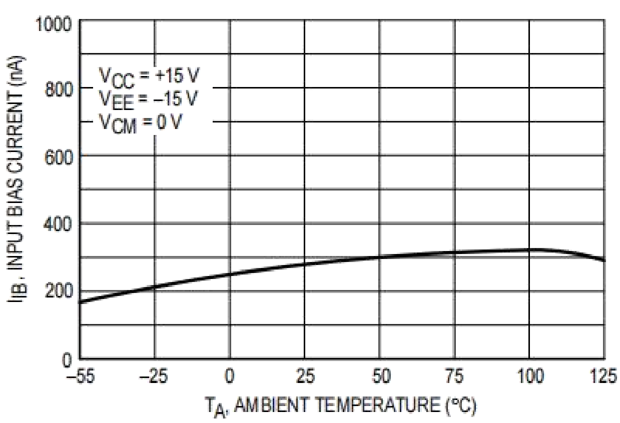


Figure 3. Input Bias Current versus Supply Voltage

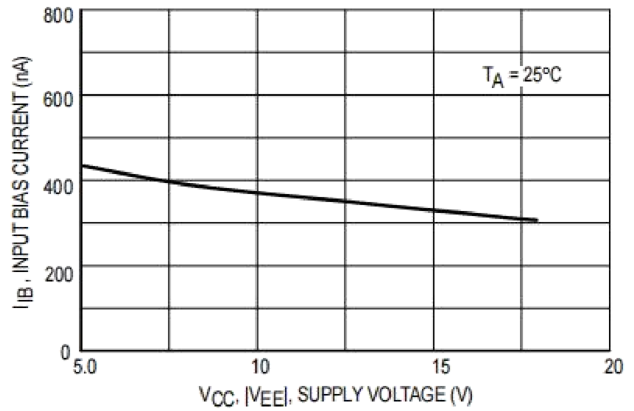


Figure 4. Supply Current versus Supply Voltage

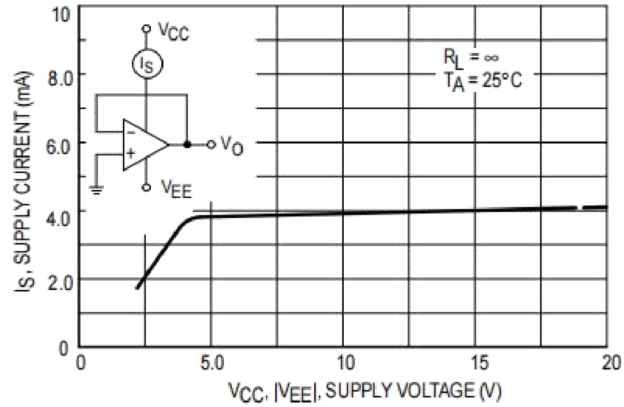


Figure 5. DC Voltage Gain versus Temperature

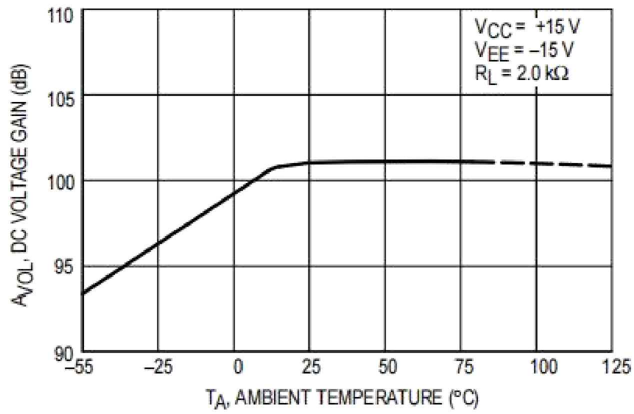


Figure 6. DC Voltage Gain versus Supply Voltage

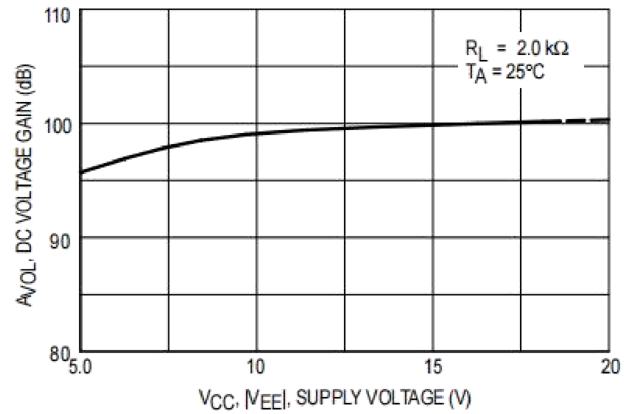


Figure 7. Open Loop Voltage Gain and Phase versus Frequency

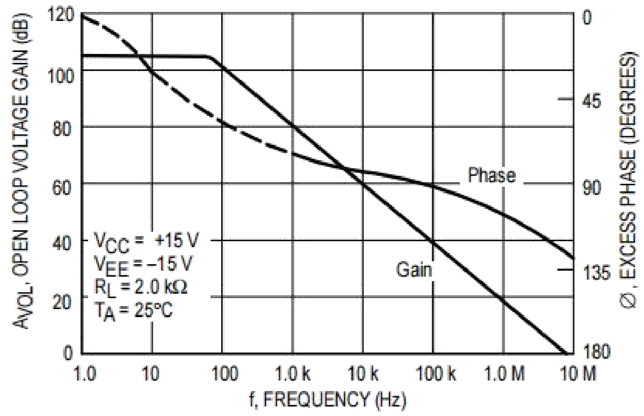


Figure 8. Gain Bandwidth Product versus Temperature

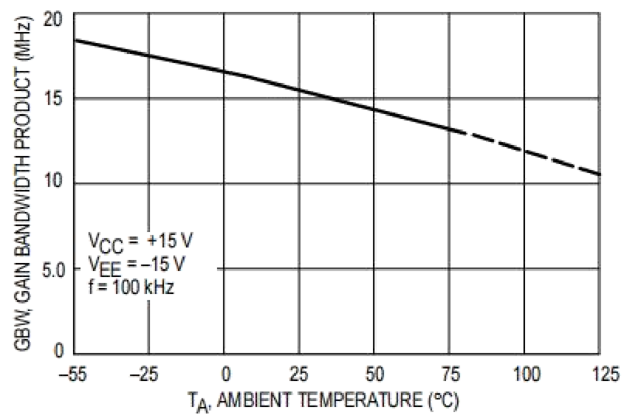


Figure 9. Gain Bandwidth Product versus Supply Voltage

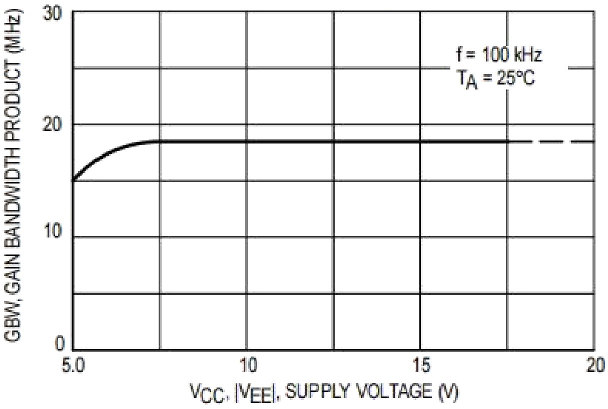


Figure 10. Slew Rate versus Temperature

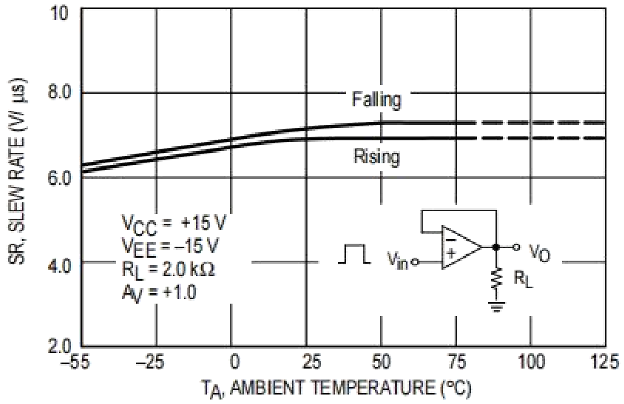


Figure 11. Slew Rate versus Supply Voltage

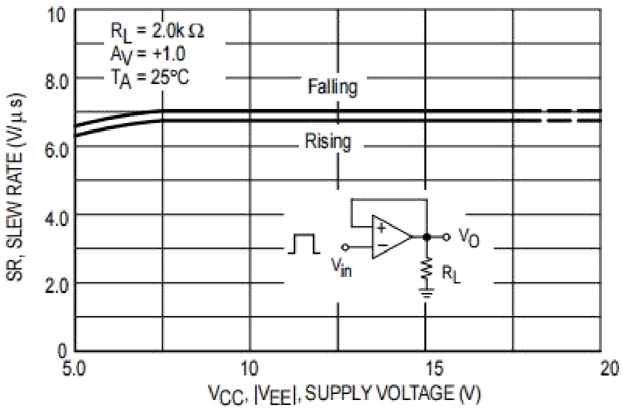


Figure 12. Output Voltage versus Frequency

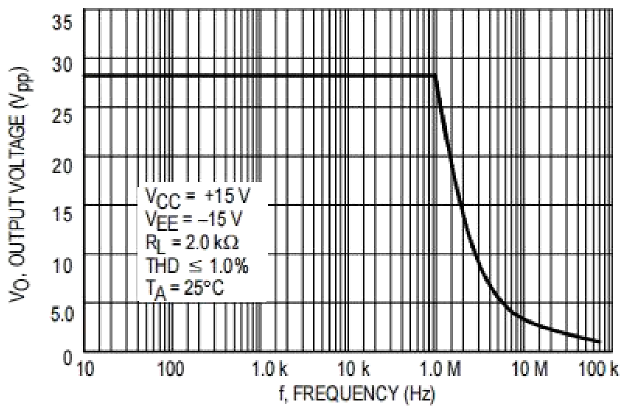


Figure 13. Maximum Output Voltage versus Supply Voltage

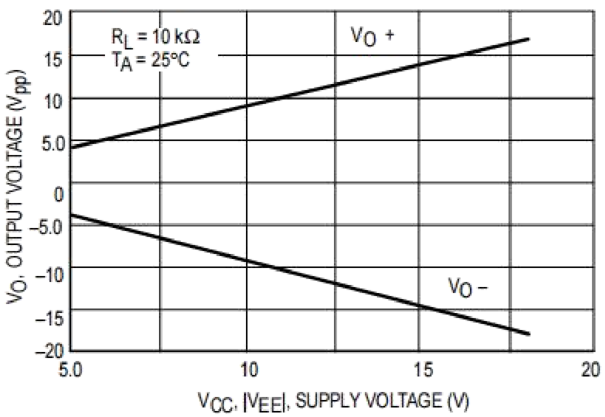


Figure 14. Output Saturation Voltage versus Temperature

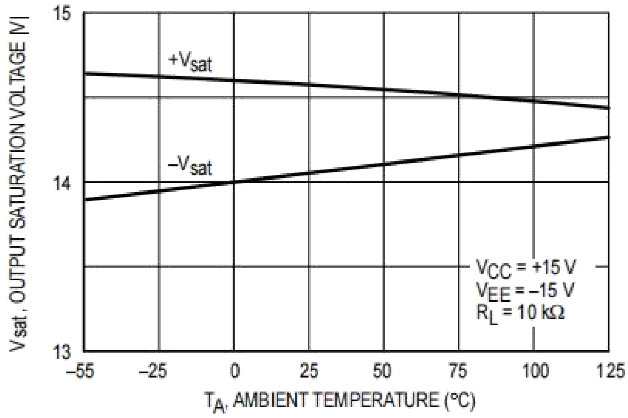


Figure 15. Power Supply Rejection versus Frequency

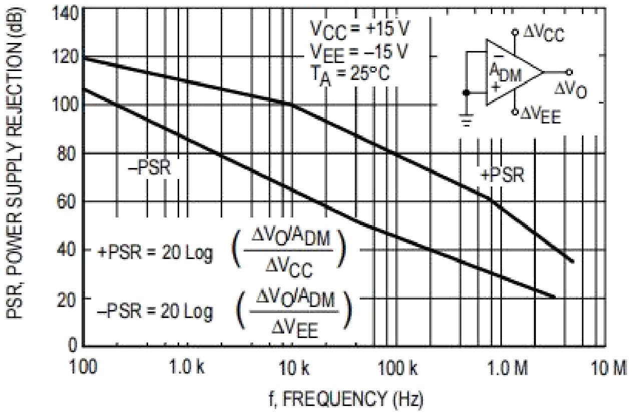


Figure 16. Common Mode Rejection versus Frequency

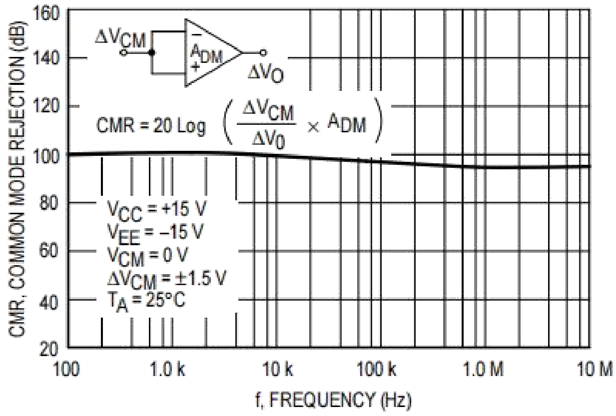


Figure 17. Total Harmonic Distortion versus Frequency

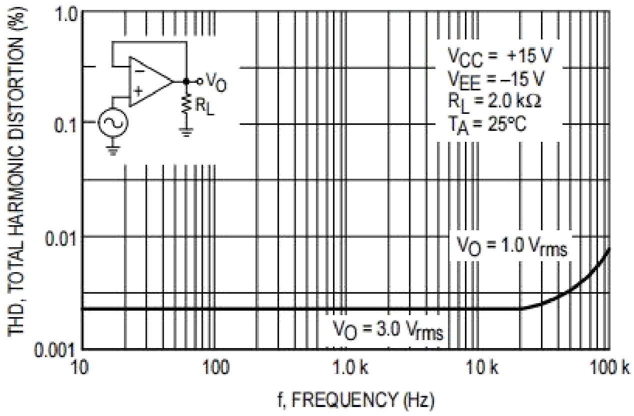


Figure 18. Input Referred Noise Voltage versus Frequency

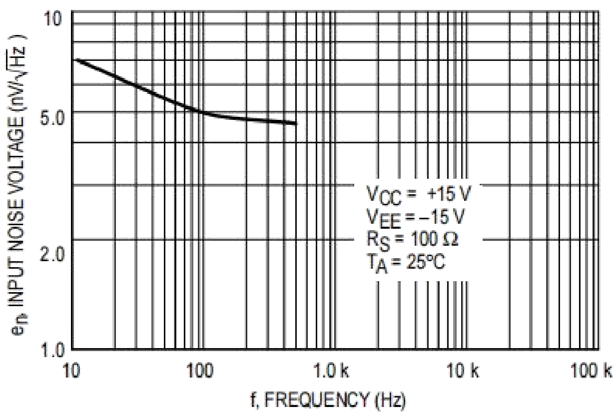


Figure 19. Input Referred Noise Current versus Frequency

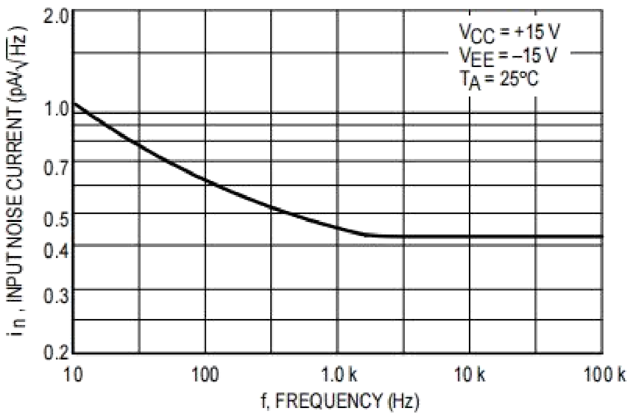


Figure 20. Input Referred Noise Voltage versus Source Resistance

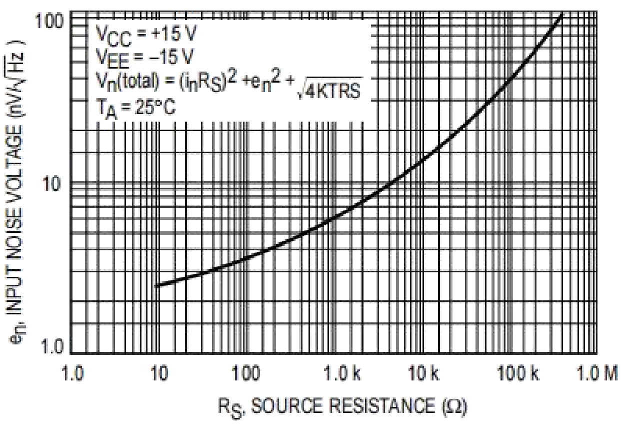


Figure 21. Inverting Amplifier

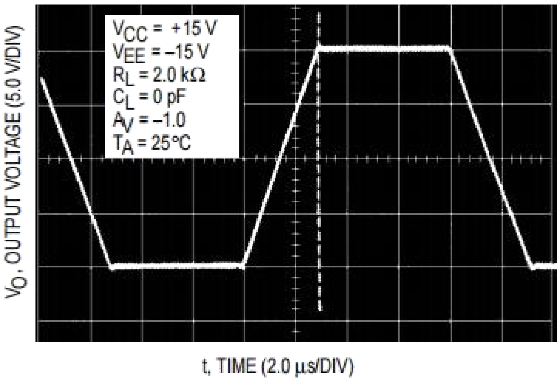


Figure 22. Noninverting Amplifier Slew Rate

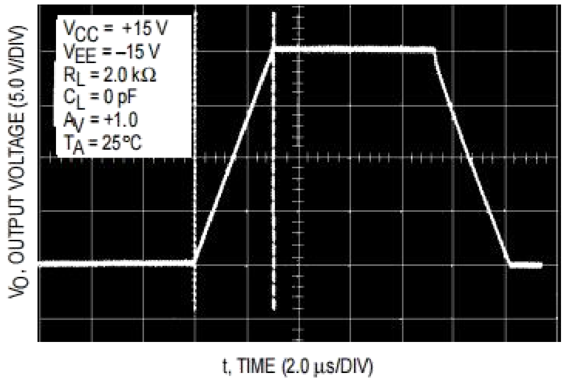
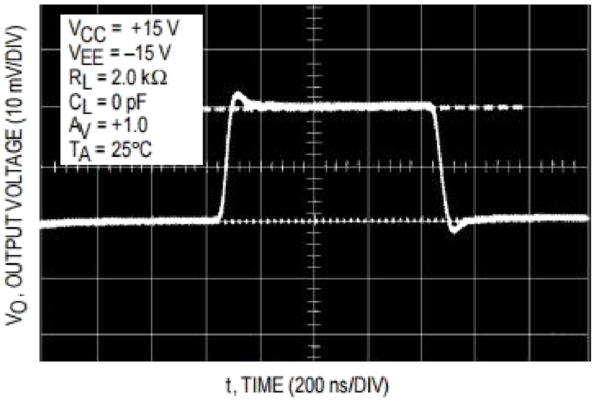
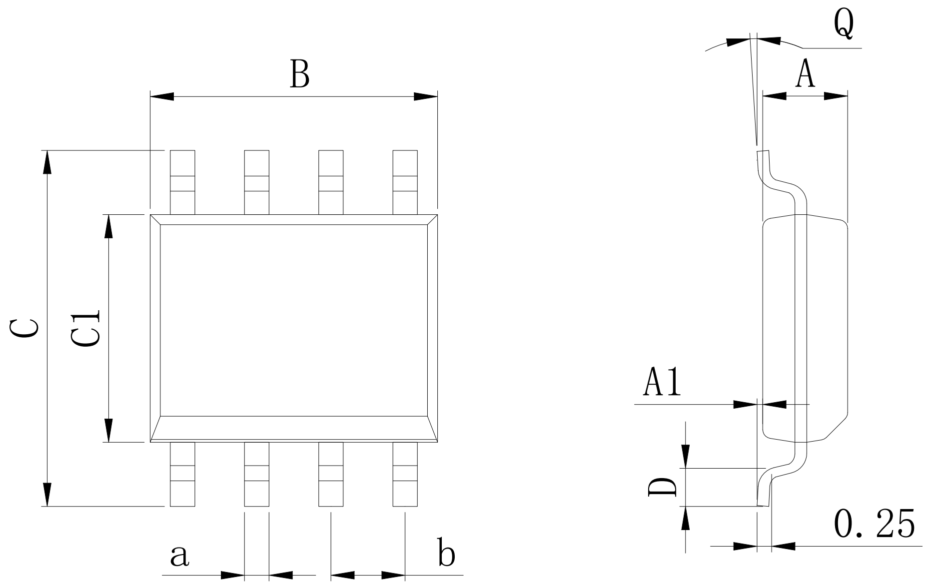


Figure 23. Noninverting Amplifier Overshoot



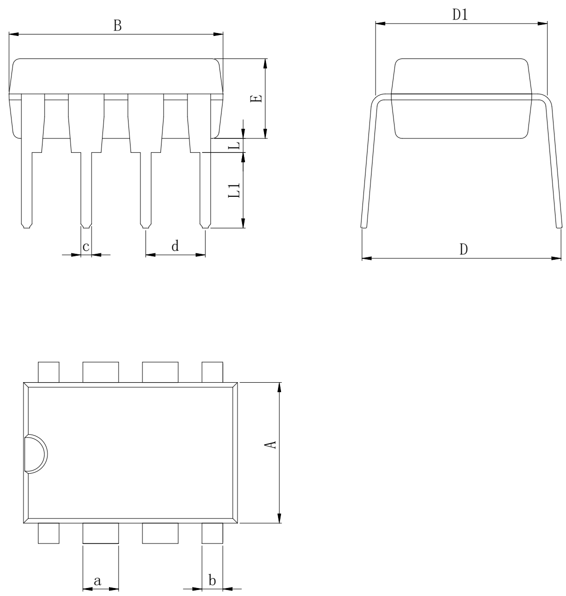
PHYSICAL DIMENSIONS

SOP-8



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	

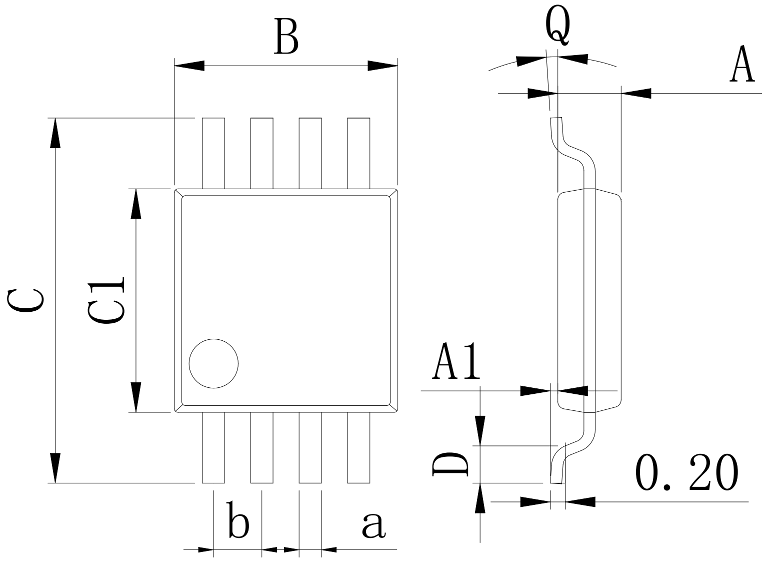
DIP-8



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	

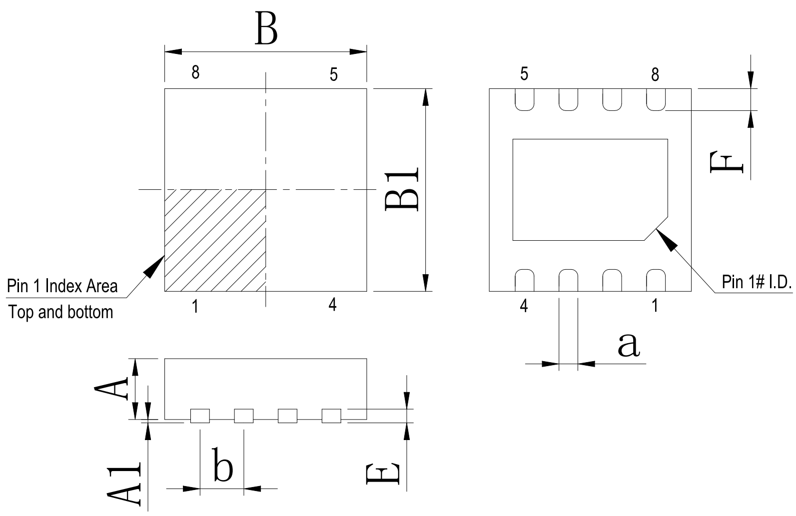
PHYSICAL DIMENSIONS

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	

DFN-8 3*3



Dimensions In Millimeters(DFN-8 3*3)								
Symbol:	A	A1	B	B1	E	F	a	b
Min:	0.85	0.00	2.90	2.90	0.20	0.30	0.20	0.65 BSC
Max:	0.95	0.05	3.10	3.10	0.25	0.50	0.34	

REVISION HISTORY

REVISION NUMBER	DATE	REVISION	PAGE
V1.0	2018-6	New	1-10
V1.1	2023-9	Update encapsulation type、Update Lead Temperature	1、2

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