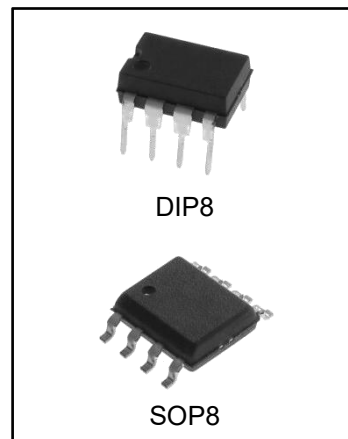


FEATURES

- Low Voltage Noise: 4.5 nV/ Hz
- High Gain Bandwidth Product: 15 MHz
- High Slew Rate: 7.0 V/ μ s
- Low Input Offset Voltage: 0.3 mV
- Low T.C. of Input Offset Voltage: 2.0 μ V/ $^{\circ}$ C
- Low Distortion: 0.002%
- Excellent Frequency Stability
- Dual Supply Operation



Ordering Information

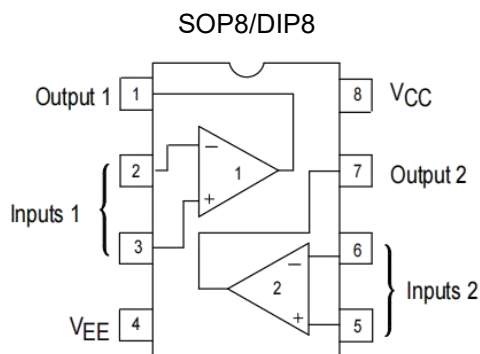
DEVICE	Package Type	MARKING	Packing	Packing Qty
LM833PG	DIP8	LM833	TUBE	2000pcs/Box
LM833DRG	SOP8	LM833	REEL	2500pcs/Reel

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, $7.0 \text{ V}/\mu\text{s}$ slew rate, 0.3 mV input offset voltage with $2.0 \mu\text{V}/^\circ\text{C}$ 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 DIP and SOP8 packages (M and N suffixes). For an improved performance dual/quad version, see the MC33079 family.

PIN CONNECTIONS



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 $+85$	$^\circ\text{C}$
Operating Junction Temperature	T_J	+150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-60 to $+150$	$^\circ\text{C}$
Maximum Power Dissipation (Notes 2 and 3)	P_D	500	mW

NOTES:

1. Either or both input voltages must not exceed the magnitude of V_{CC} or V_{EE} .
2. Power dissipation must be considered to ensure maximum junction temperature(T_J) is not exceeded (see power dissipation performance characteristic).
3. Maximum value at $T_A \leq 85^\circ\text{C}$.

ELECTRICAL CHARACTERISTICS ($V_{CC} = +15\text{ V}$, $V_{EE} = -15\text{ V}$, $T_A = 25^\circ\text{C}$, unless otherwise noted.)

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

AC ELECTRICAL CHARACTERISTICS ($V_{CC} = +15\text{ V}$, $V_{EE} = -15\text{ V}$, $T_A = 25^\circ\text{C}$, unless otherwise noted.)

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

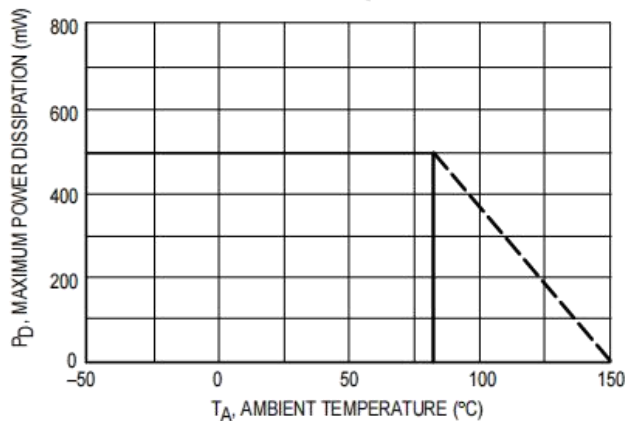
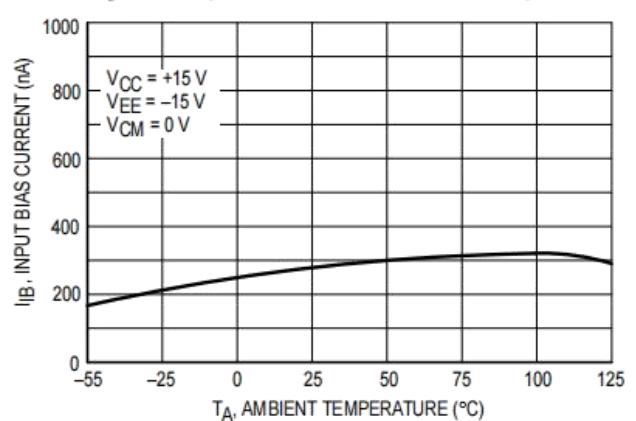
Figure 1. Maximum Power Dissipation versus Temperature

Figure 2. Input Bias Current versus Temperature


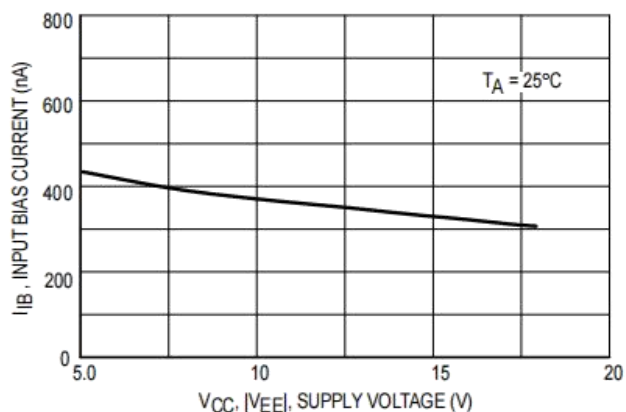
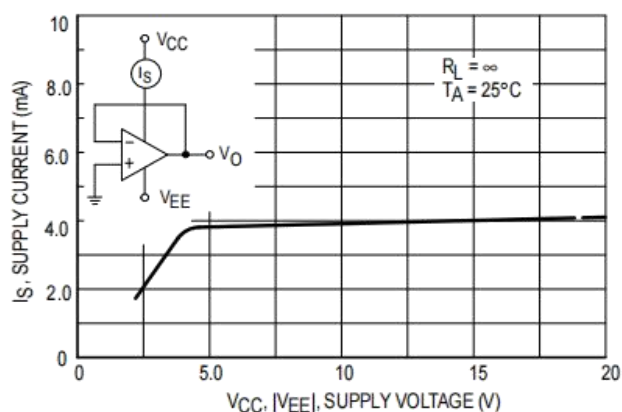
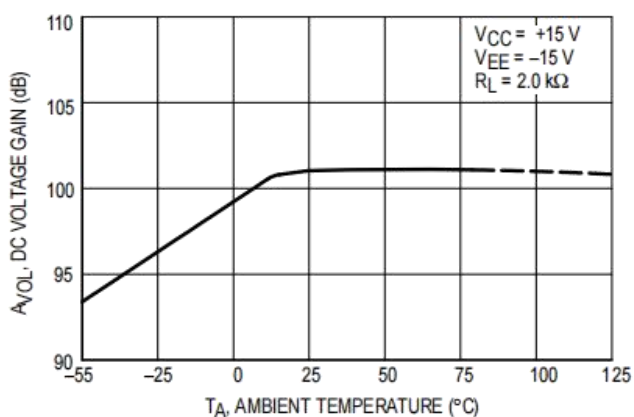
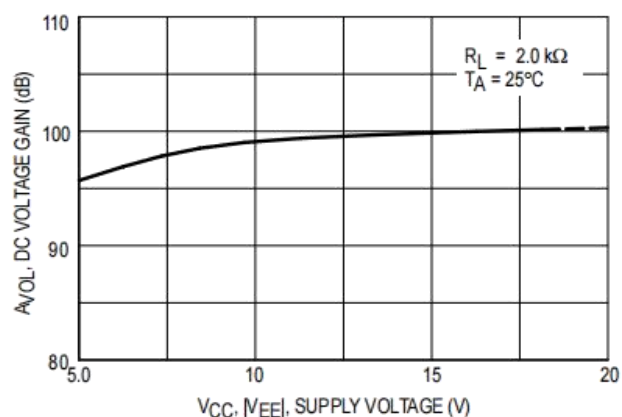
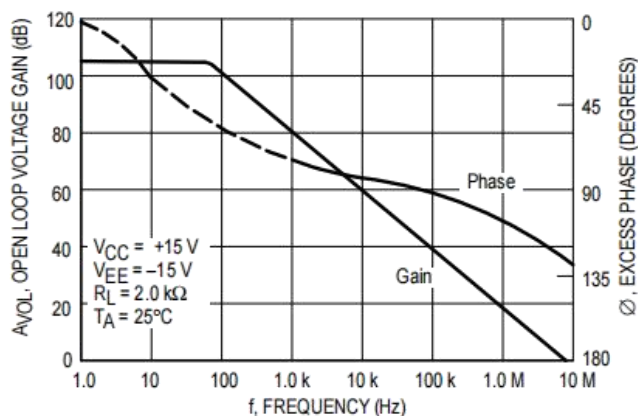
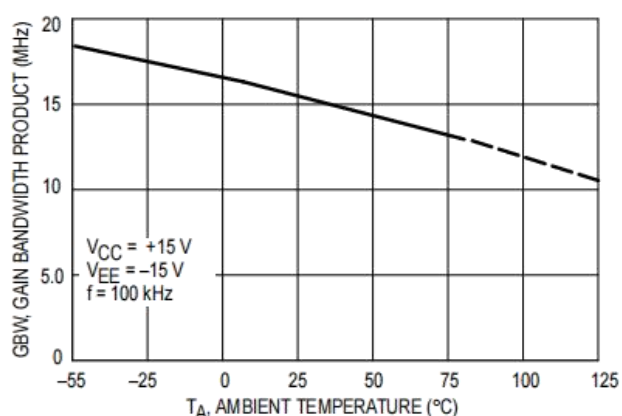
Figure 3. Input Bias Current versus Supply Voltage

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


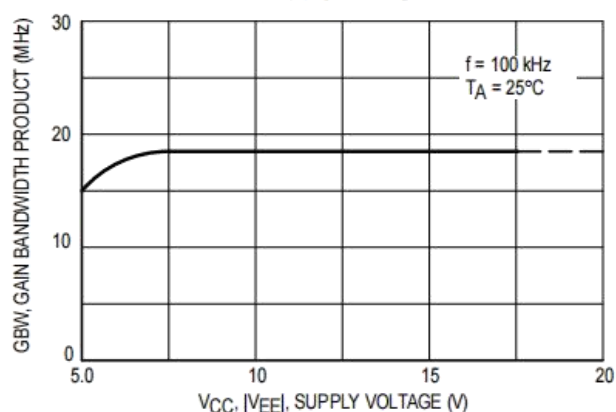
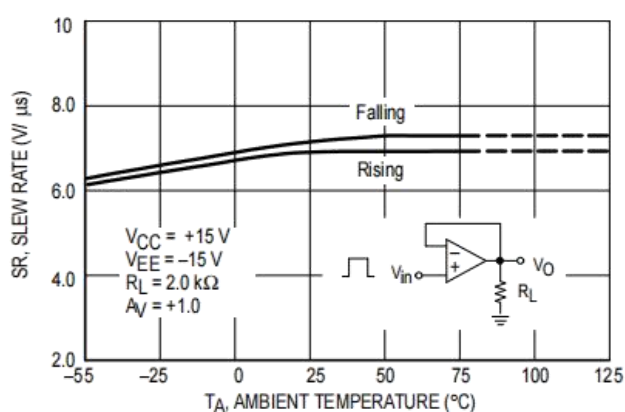
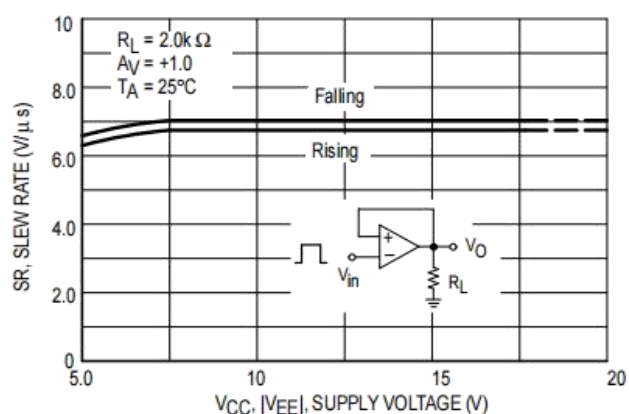
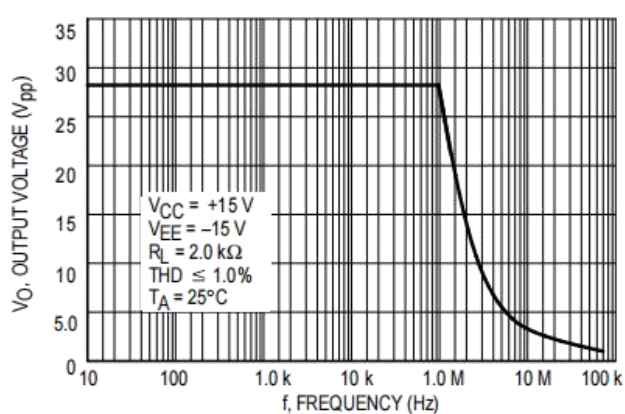
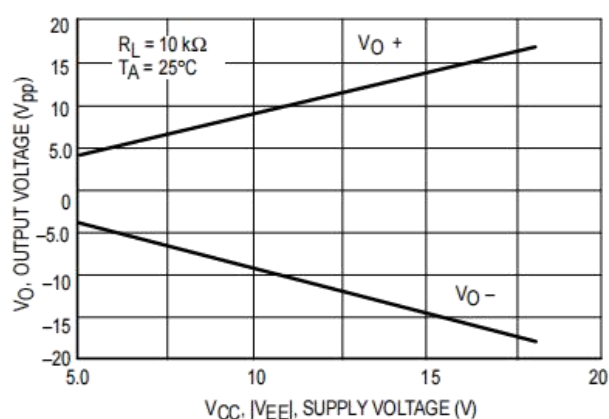
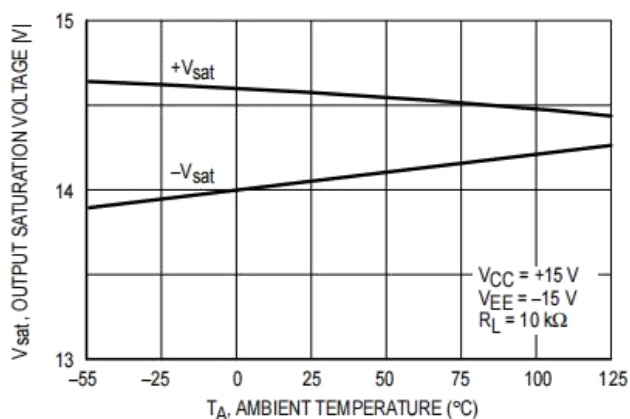
Figure 9. Gain Bandwidth Product versus Supply Voltage

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


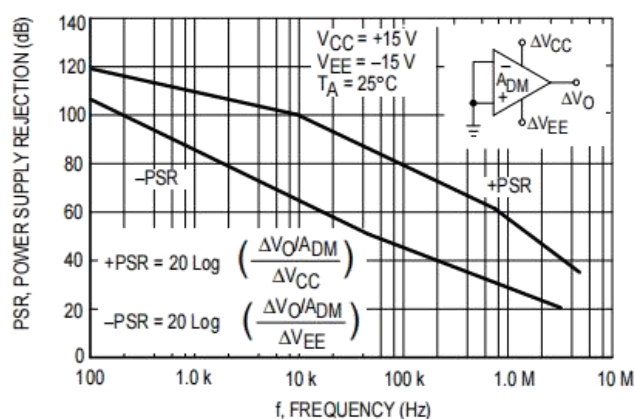
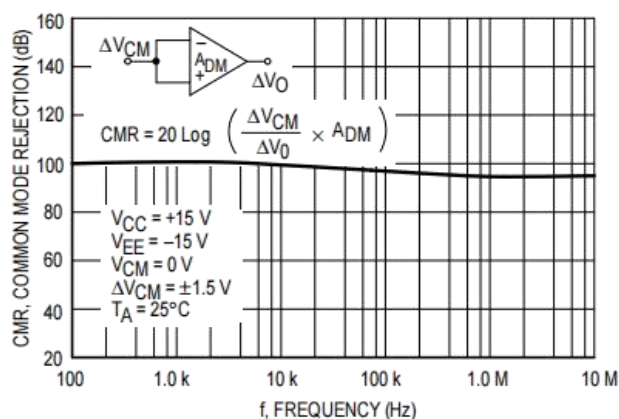
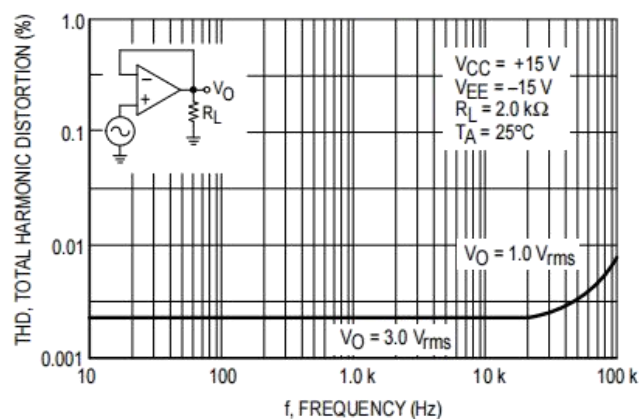
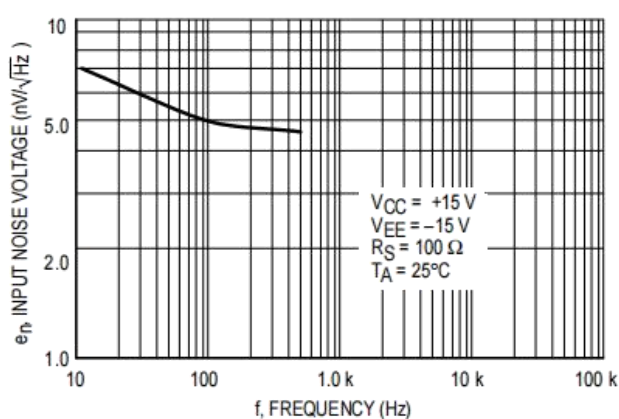
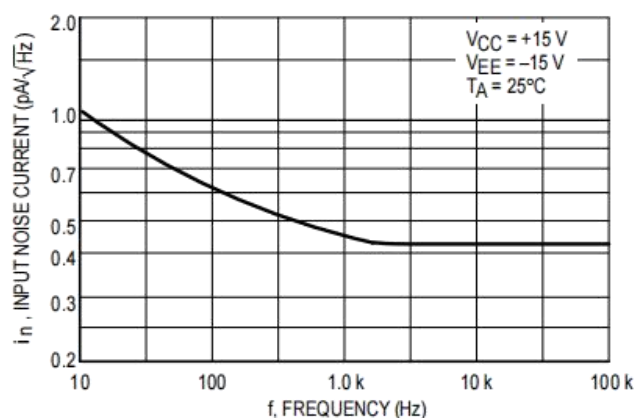
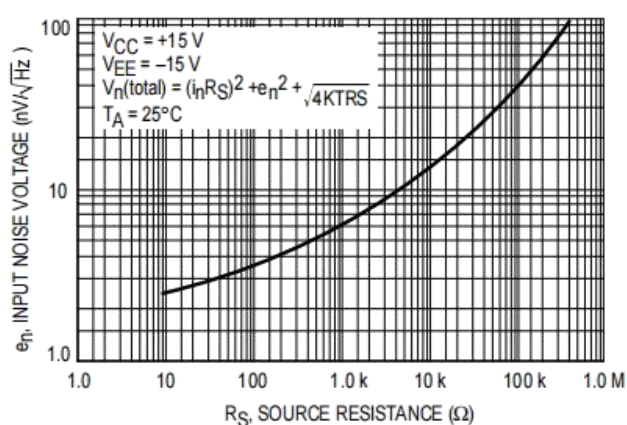
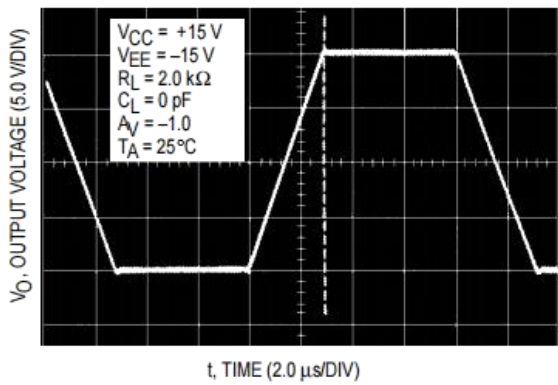
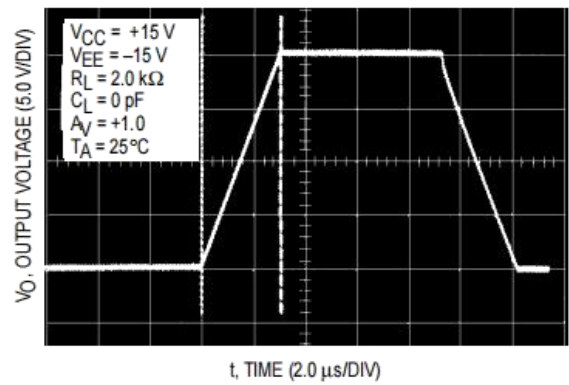
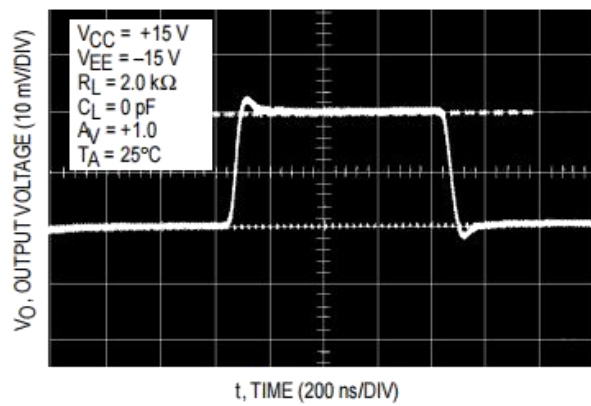
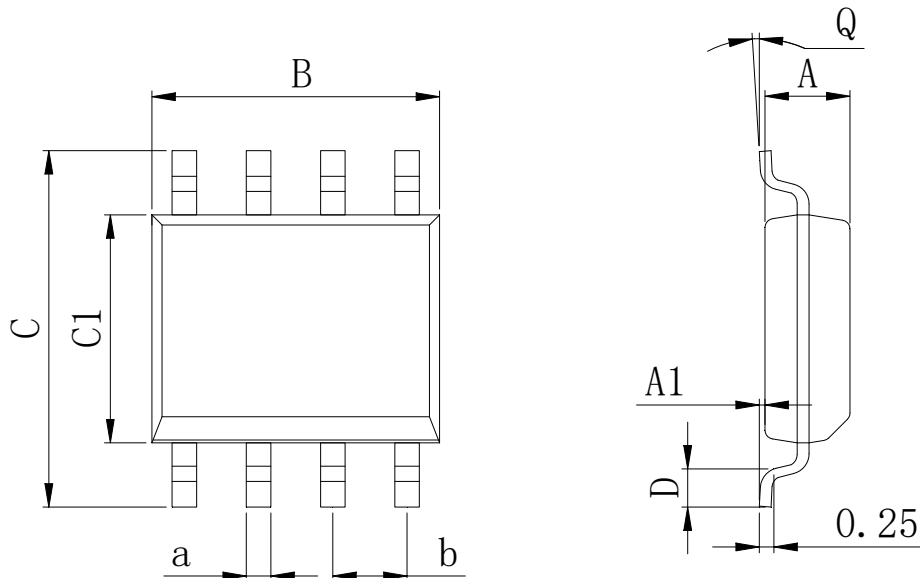
Figure 15. Power Supply Rejection versus Frequency

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

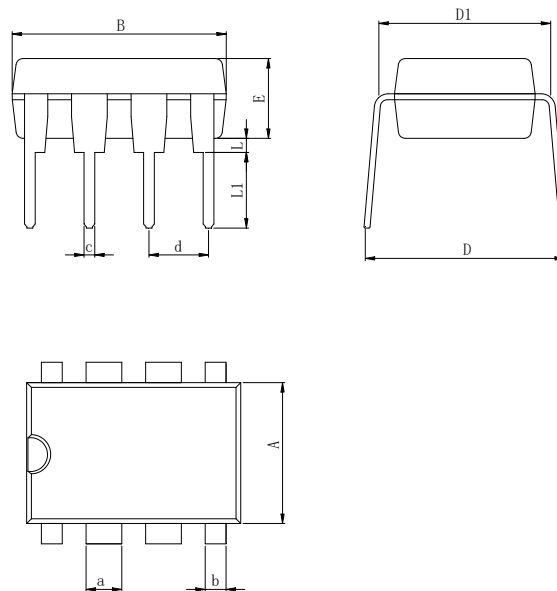
SOP8



Dimensions In Millimeters(SOP8)

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	

DIP8



Dimensions In Millimeters(DIP8)

Symbol:	A	B	D	D1	E	L	L1	a	b	c	d
Min:	6.10	9.00	8.40	7.42	3.10	0.50	3.00	1.50	0.85	0.40	2.54 BSC
Max:	6.68	9.50	9.00	7.82	3.55	0.70	3.60	1.55	0.90	0.50	

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