



LM833

LOW NOISE DUAL OPERATIONAL AMPLIFIER

- LOW VOLTAGE NOISE: $4.5\text{nV}/\sqrt{\text{Hz}}$
- HIGH GAIN BANDWIDTH PRODUCT:
15MHz
- HIGH SLEW RATE: $7\text{V}/\mu\text{s}$
- LOW DISTORTION: 0.002%
- EXCELLENT FREQUENCY STABILITY
- ESD PROTECTION 2kV

DESCRIPTION

The LM833 is a monolithic dual operational amplifier particularly well suited for audio applications. It offers low voltage noise ($4.5\text{nV}/\sqrt{\text{Hz}}$) and high frequency performances (15MHz Gain Bandwidth product, $7\text{V}/\mu\text{s}$ slew rate).

In addition the LM833 has also a very low distortion (0.002%) and excellent phase/gain margins.

ORDER CODE

Part Number	Temperature Range	Package	
		N	D
LM833	-40°C, +105°C	•	•

N = Dual in Line Package (DIP)

D = Small Outline Package (SO) - also available in Tape & Reel (DT)

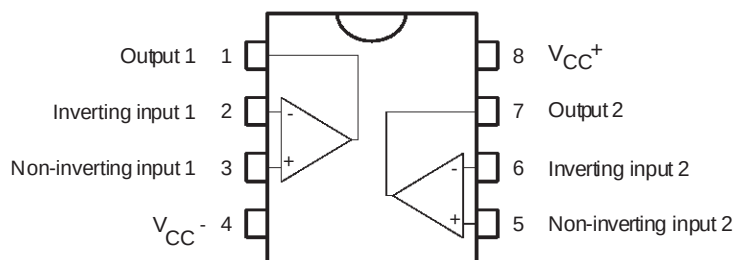


N
DIP8
(Plastic Package)



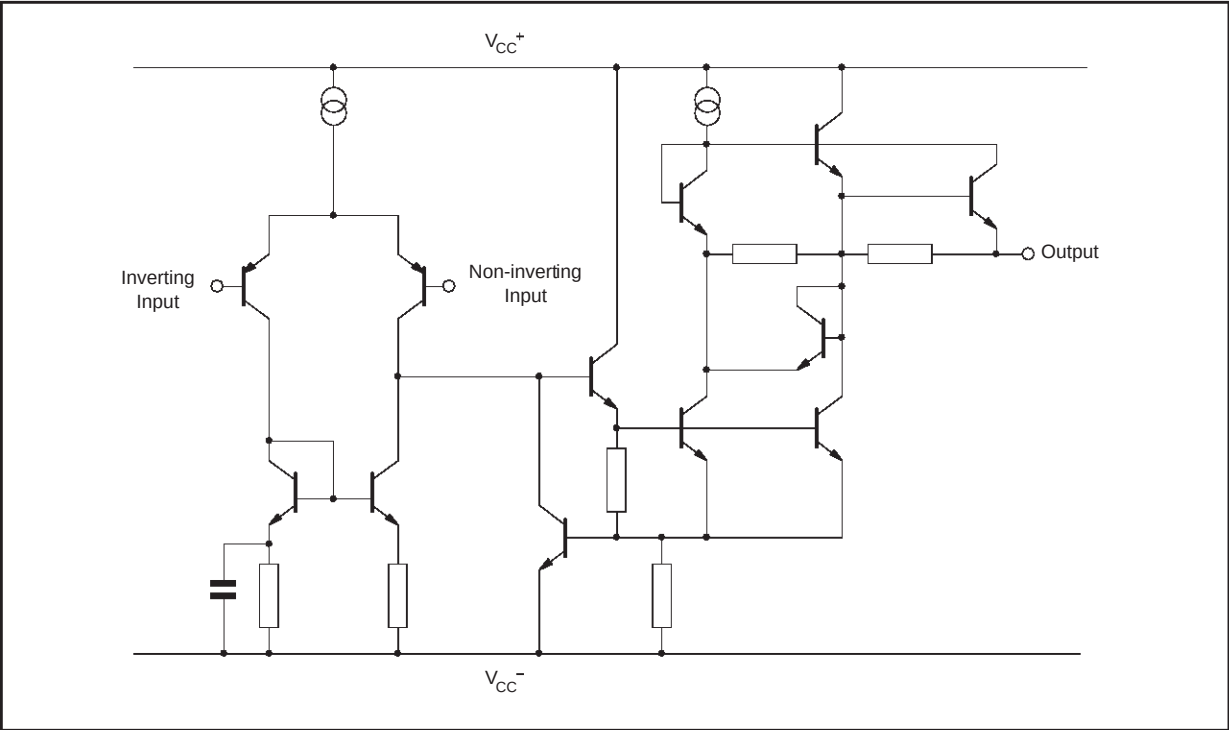
D
SO8
(Plastic Micropackage)

PIN CONNECTIONS (top view)



LM833

SCHEMATIC DIAGRAM (1/2 LM833)



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	± 18 or $+36$	V
V_{id}	Differential Input Voltage - note ¹⁾	± 30	V
V_i	Input Voltage - see note 1	± 15	V
	Output Short Circuit Duration	Infinite	s
T_{oper}	Operating Free-Air Temperature Range	-40 to 105	°C
T_j	Junction Temperature	+150	°C
T_{stg}	Storage Temperature	-65 to +150	°C
P_{tot}	Maximum Power Dissipation - note ²⁾	500	mW

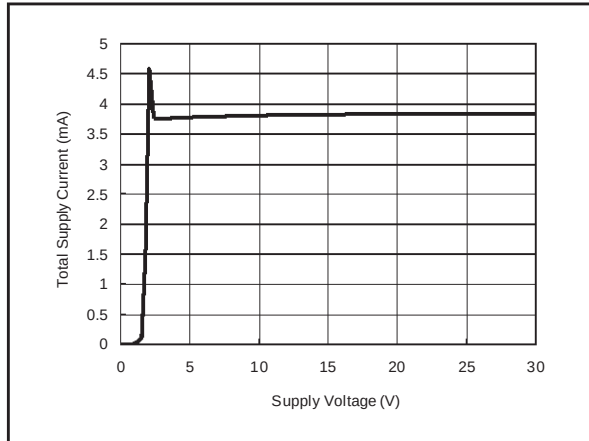
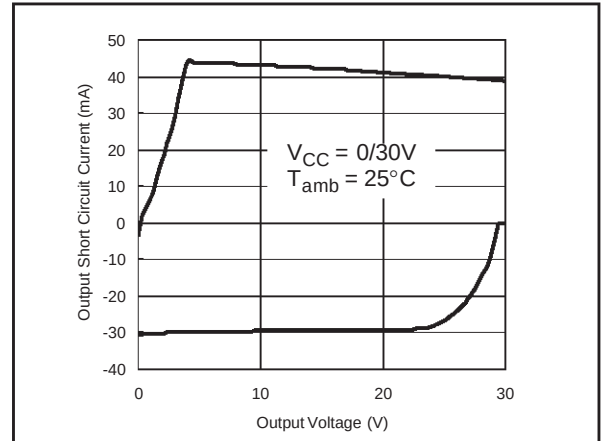
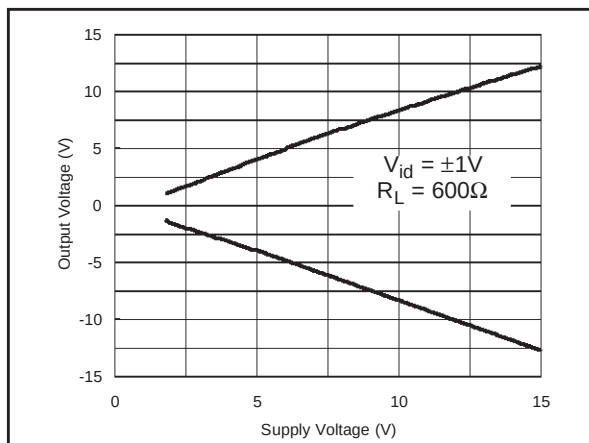
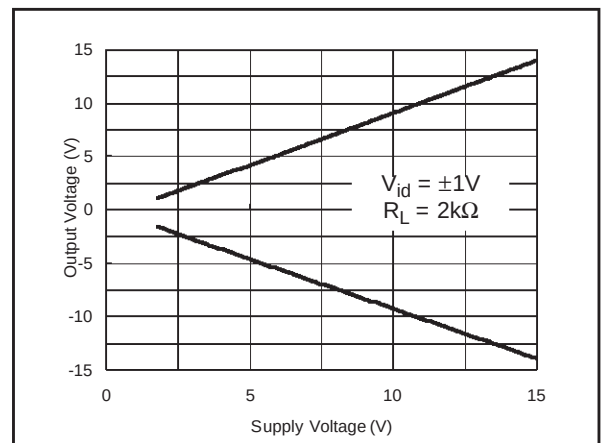
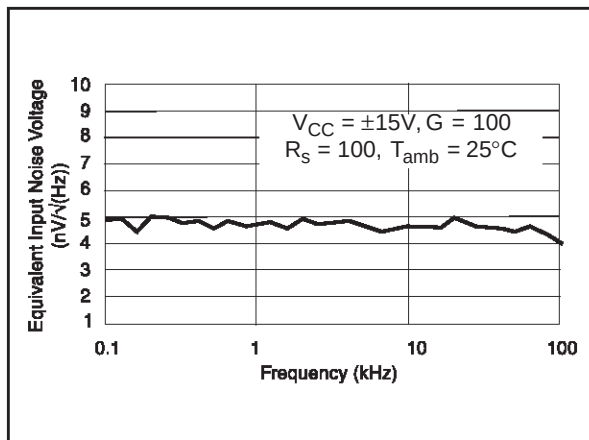
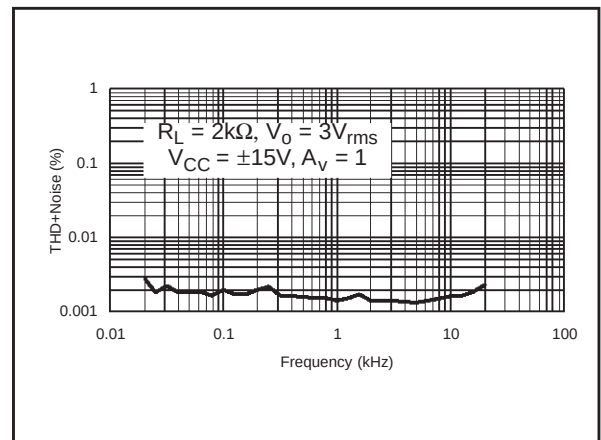
1. Either or both input voltages must not exceed the magnitude of V_{CC}^{+} or V_{CC}^{-} .
2. Power dissipation must be considered to ensure maximum junction temperature (T_j) is not exceeded.

OPERATING CONDITIONS

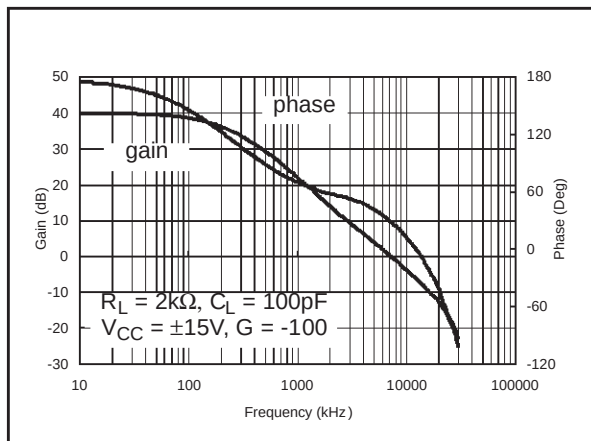
Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	± 2.5 to ± 15	V

ELECTRICAL CHARACTERISTICS
 $V_{CC}^{+} = +15V$, $V_{CC}^{-} = -15V$, $T_{amb} = 25^{\circ}C$ (unless otherwise specified)

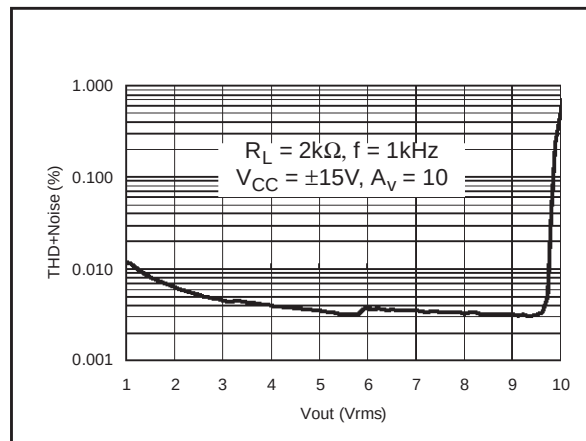
Symbol	Parameter	Min.	Typ.	Max.	Unit
V_{io}	Input Offset Voltage ($R_S = 10\Omega$, $V_O = 0V$, $V_{ic} = 0V$)		0.3	5	mV
DV_{io}	Input Offset Voltage Drift $R_S = 10\Omega$, $V_O = 0V$, $T_{min} \leq T_{amb} \leq T_{max}$.		2		$\mu V/^{\circ}C$
I_{io}	Input Offset Current ($V_O = 0V$, $V_{ic} = 0V$)		25	200	nA
I_{ib}	Input Bias Current ($V_O = 0V$, $V_{ic} = 0V$)		300	1000	nA
V_{icm}	Input Common Mode Voltage Range	± 12	± 14		V
A_{vd}	Large Signal Voltage Gain ($R_L = 2k\Omega$, $V_O = \pm 10V$)	90	100		dB
$\pm V_{opp}$	Output Voltage Swing ($V_{id} = \pm 1V$) $R_L = 2.0k\Omega$ $R_L = 2.0k\Omega$ $R_L = 10k\Omega$ $R_L = 10k\Omega$	10 12	13.7 -14 13.9 -14.4	-10 -12	V
CMR	Common-mode Rejection Ratio ($V_{ic} = \pm 13V$)	80	100		dB
SVR	Supply Voltage Rejection Ratio ($V_{CC}^{+} / V_{CC}^{-} = +15V / -15V$ to $+5V / -5V$)	80	105		dB
I_{CC}	Supply Current ($V_O = 0V$, All amplifiers)		4	8	mA
SR	Slew Rate ($V_i = -10V$ to $+10V$, $R_L = 2k\Omega$, $A_V = +1$)	5	7		V/ μs
GBP	Gain Bandwidth Product ($R_L = 2k\Omega$, $C_L = 100pF$, $f = 100kHz$)	10	15		MHz
B	Unity Gain Bandwidth (Open loop)		9		MHz
ϕ_m	Phase Margin ($R_L = 2k\Omega$)		60		Degrees
e_n	Equivalent Input Noise Voltage ($R_S = 100\Omega$, $f = 1kHz$)		4.5		$\frac{nV}{\sqrt{Hz}}$
i_n	Equivalent Input Noise Current ($f = 1kHz$)		0.5		$\frac{pA}{\sqrt{Hz}}$
THD	Total Harmonic Distortion ($R_L = 2k\Omega$, $f = 20Hz$ to $20kHz$, $V_O = 3V_{rms}$, $A_V = +1$)		0.002		%
V_{O1}/V_{O2}	Channel Separation ($f = 20Hz$ to $20kHz$)		120		dB
FPB	Full Power Bandwidth ($V_O = 27V_{pp}$, $R_L = 2k\Omega$, $THD \leq 1\%$)		120		kHz

TOTAL SUPPLY CURRENT vs SUPPLY VOLTAGE**OUTPUT SHORT CIRCUIT CURRENT vs OUTPUT VOLTAGE****OUTPUT VOLTAGE vs SUPPLY VOLTAGE****OUTPUT VOLTAGE vs SUPPLY VOLTAGE****EQUIVALENT INPUT NOISE VOLTAGE vs FREQUENCY****THD + NOISE vs FREQUENCY**

VOLTAGE GAIN AND PHASE vs FREQUENCY



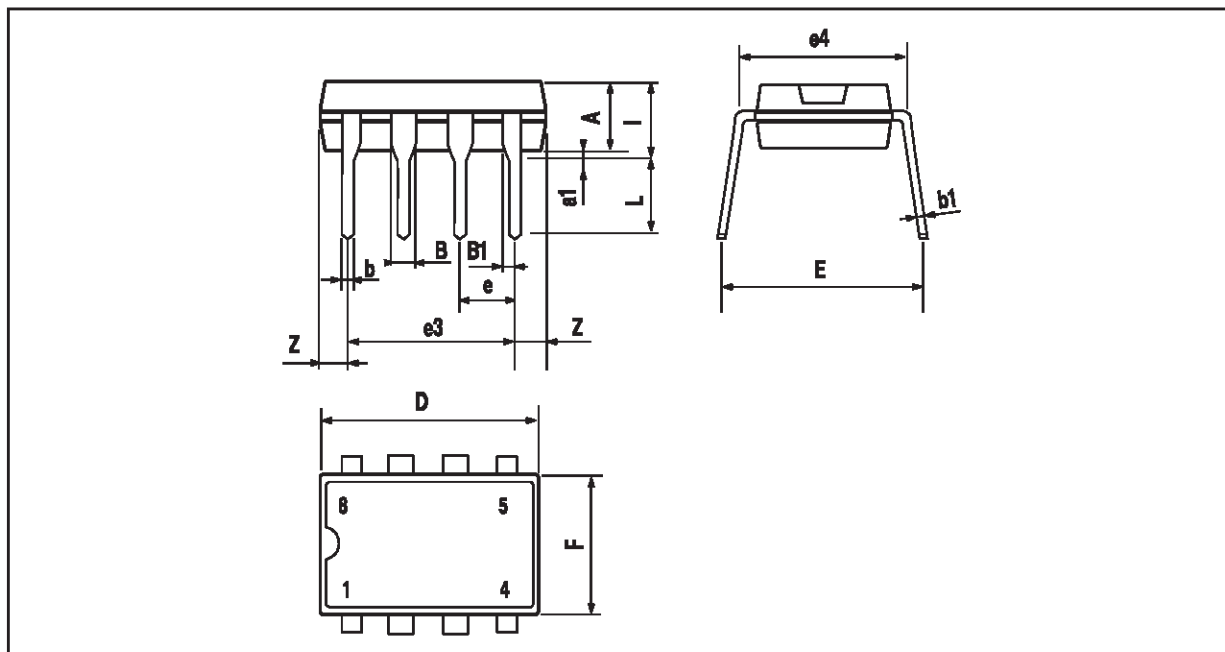
THD + NOISE vs Vout



LM833

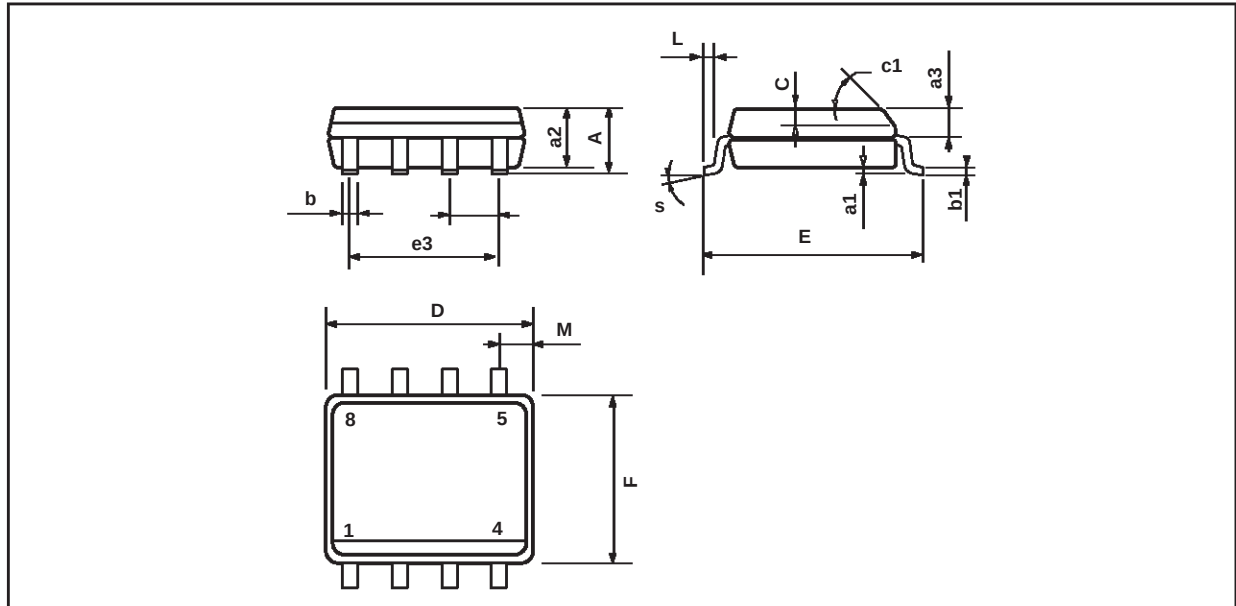
PACKAGE MECHANICAL DATA

8 PINS - PLASTIC DIP



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

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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