



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 , $+105^{\circ}\text{C}$	•	•

N = Dual in Line Package (DIP)

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

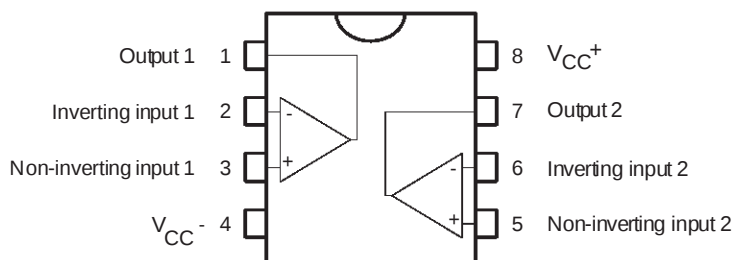


N
DIP8
(Plastic Package)



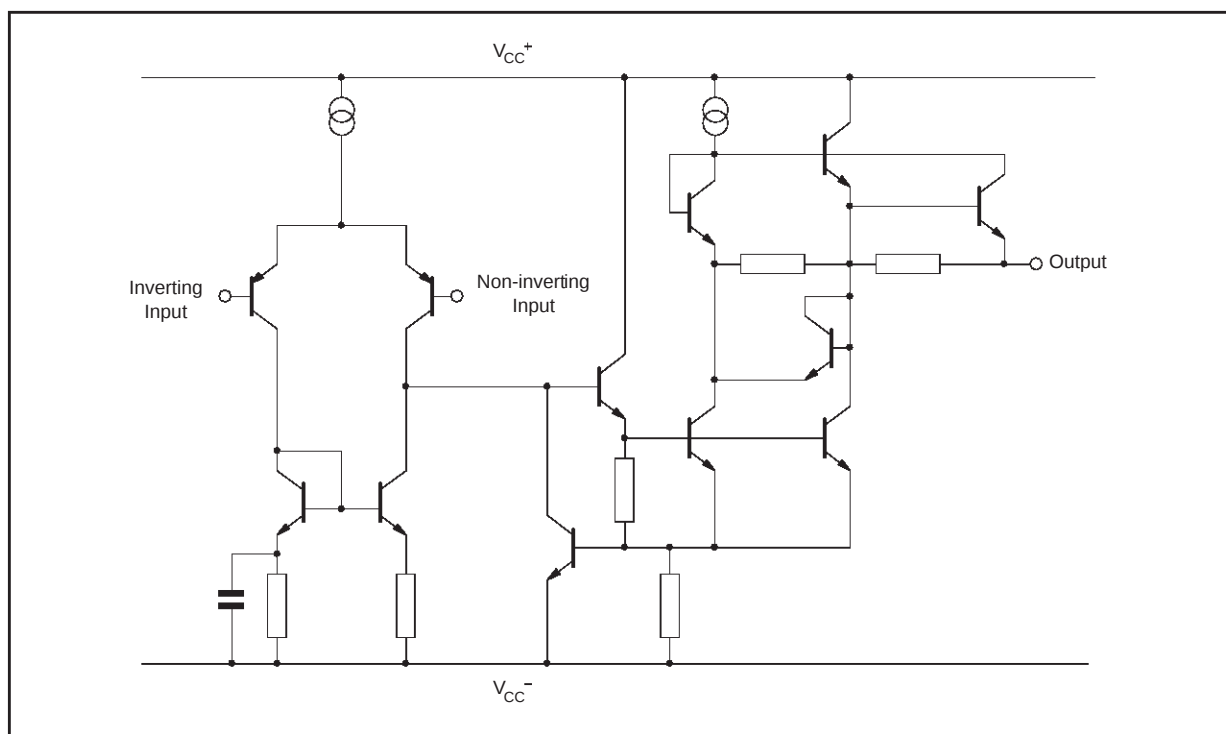
D
SO8
(Plastic Micropackage)

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.

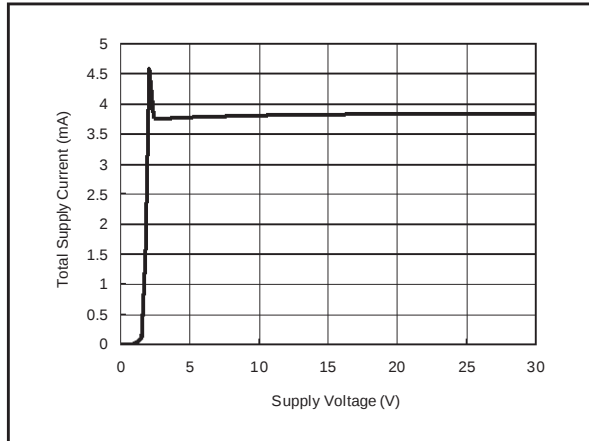
OPERATING CONDITIONS

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

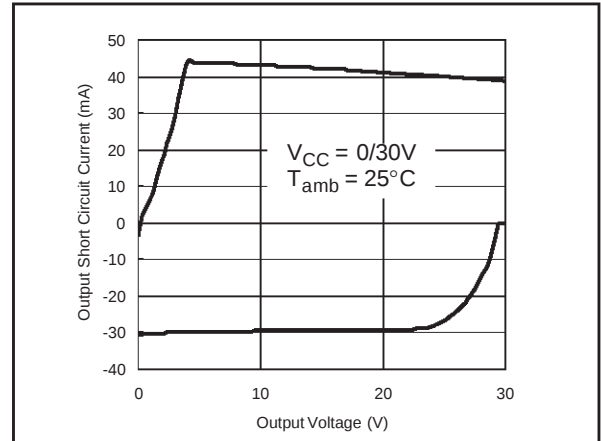
ELECTRICAL CHARACTERISTICS
 $V_{CC}^{+} = +15V$, $V_{CC}^{-} = -15V$, $T_{amb} = 25^{\circ}C$ (unless otherwise specified)

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

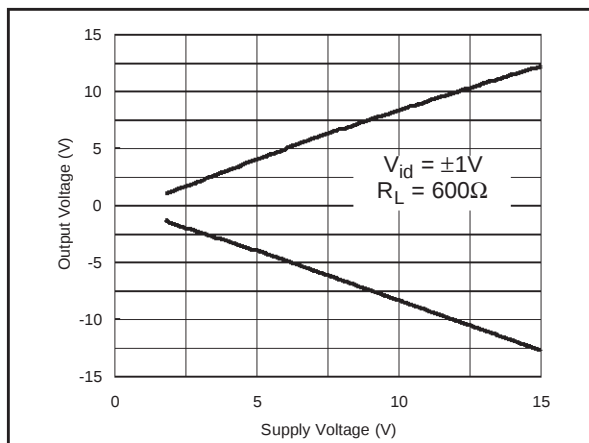
TOTAL SUPPLY CURRENT vs SUPPLY VOLTAGE



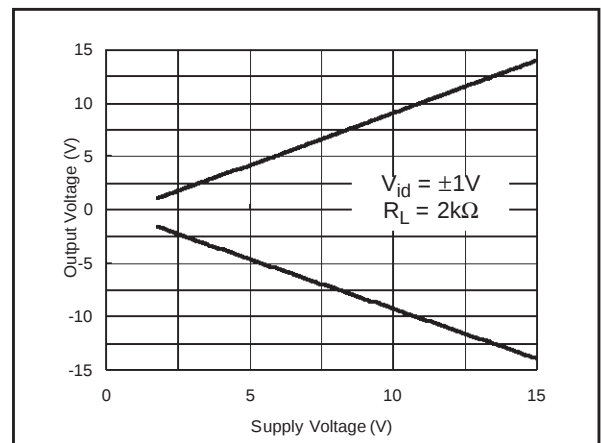
OUTPUT SHORT CIRCUIT CURRENT vs OUTPUT VOLTAGE



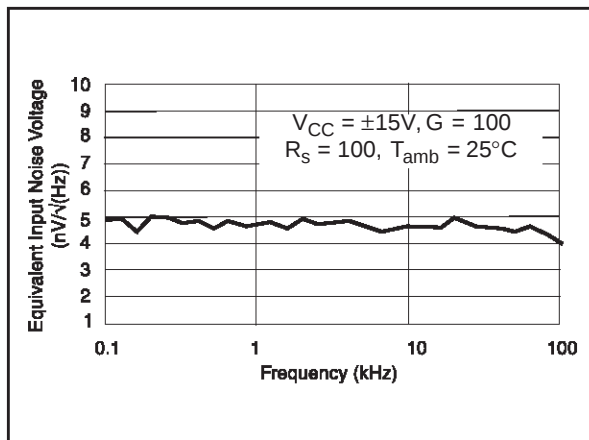
OUTPUT VOLTAGE vs SUPPLY VOLTAGE



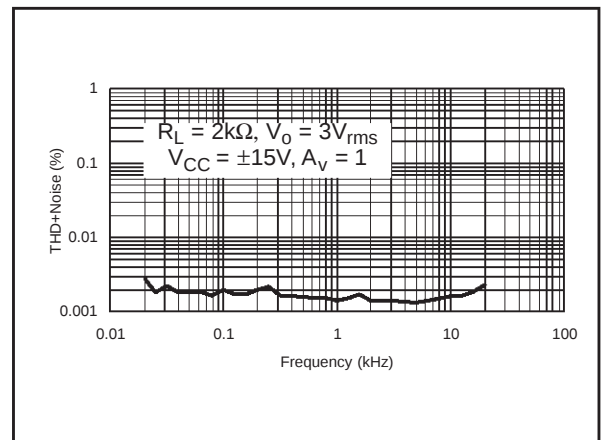
OUTPUT VOLTAGE vs SUPPLY VOLTAGE



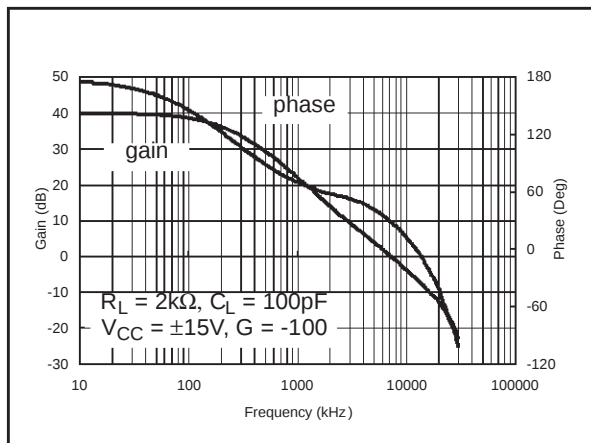
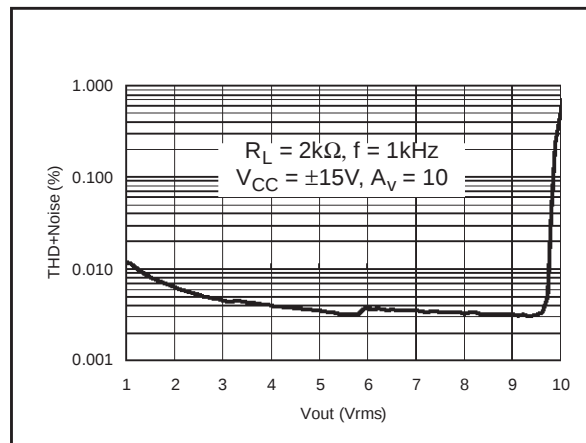
EQUIVALENT INPUT NOISE VOLTAGE vs FREQUENCY



THD + NOISE vs FREQUENCY



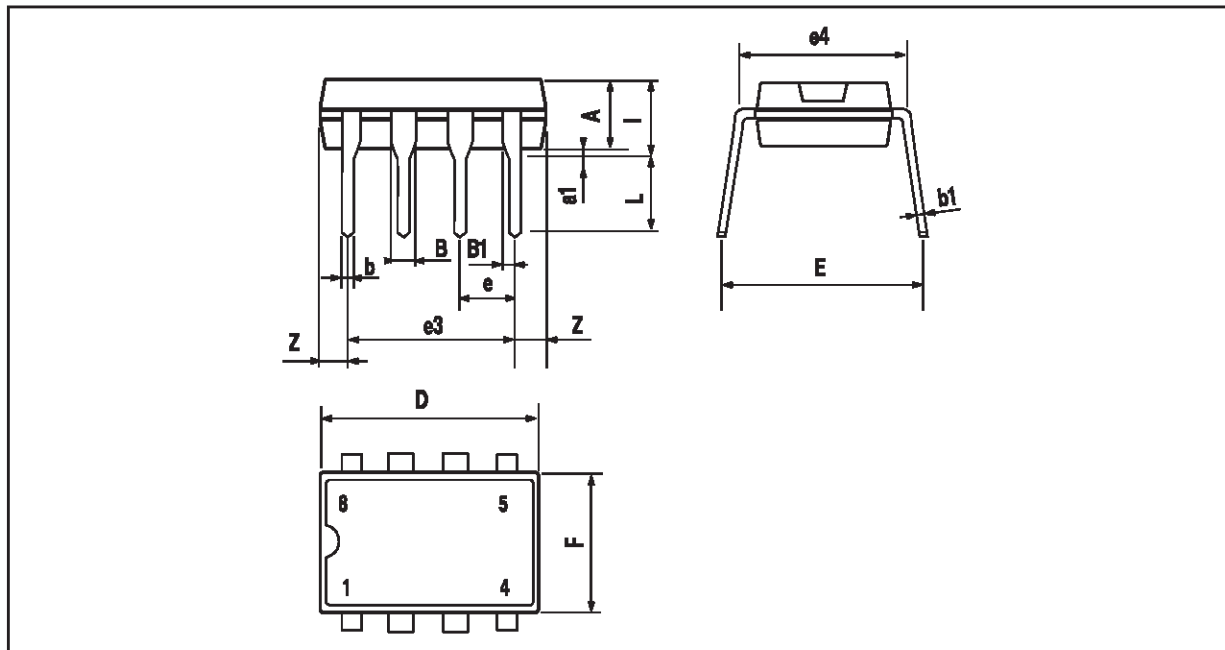
VOLTAGE GAIN AND PHASE vs FREQUENCY

THD + NOISE vs V_{out} 

LM833

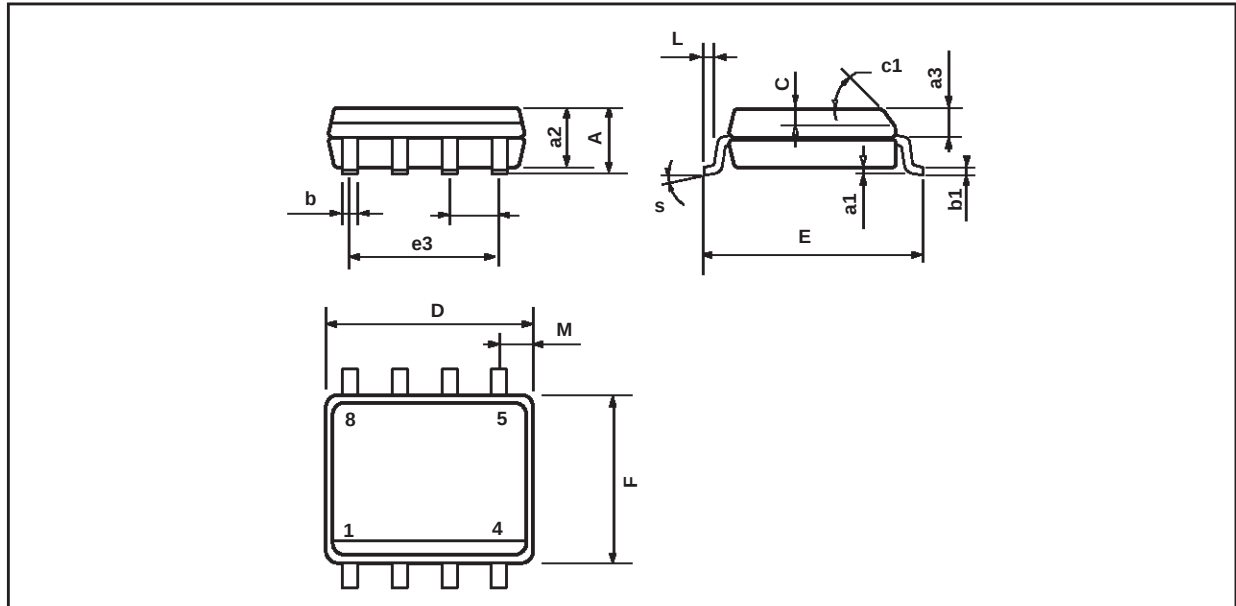
PACKAGE MECHANICAL DATA

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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