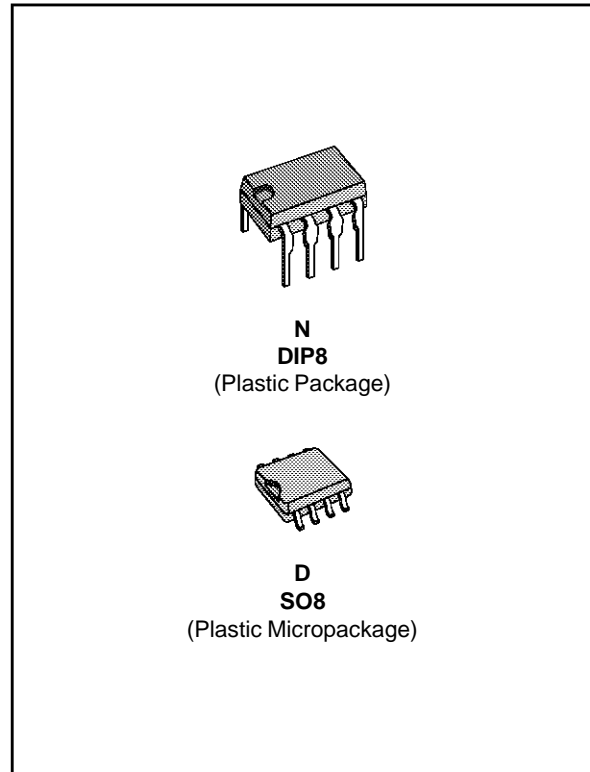


LOW NOISE DUAL OPERATIONAL AMPLIFIERS

- 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 dedicated to audio applications. The LM833 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).

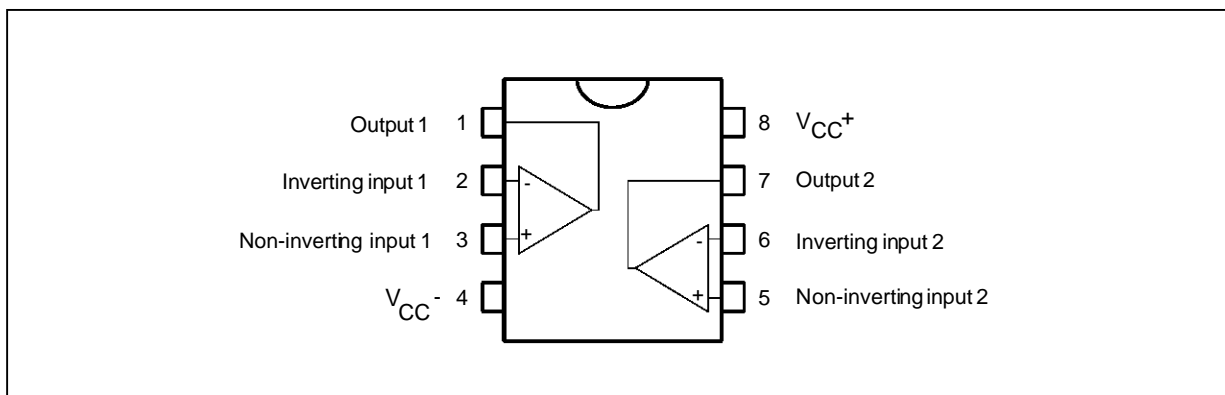
In addition the LM833 has also a very low distortion (0.002%) and excellent phase/gain margins.

ORDER CODES

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

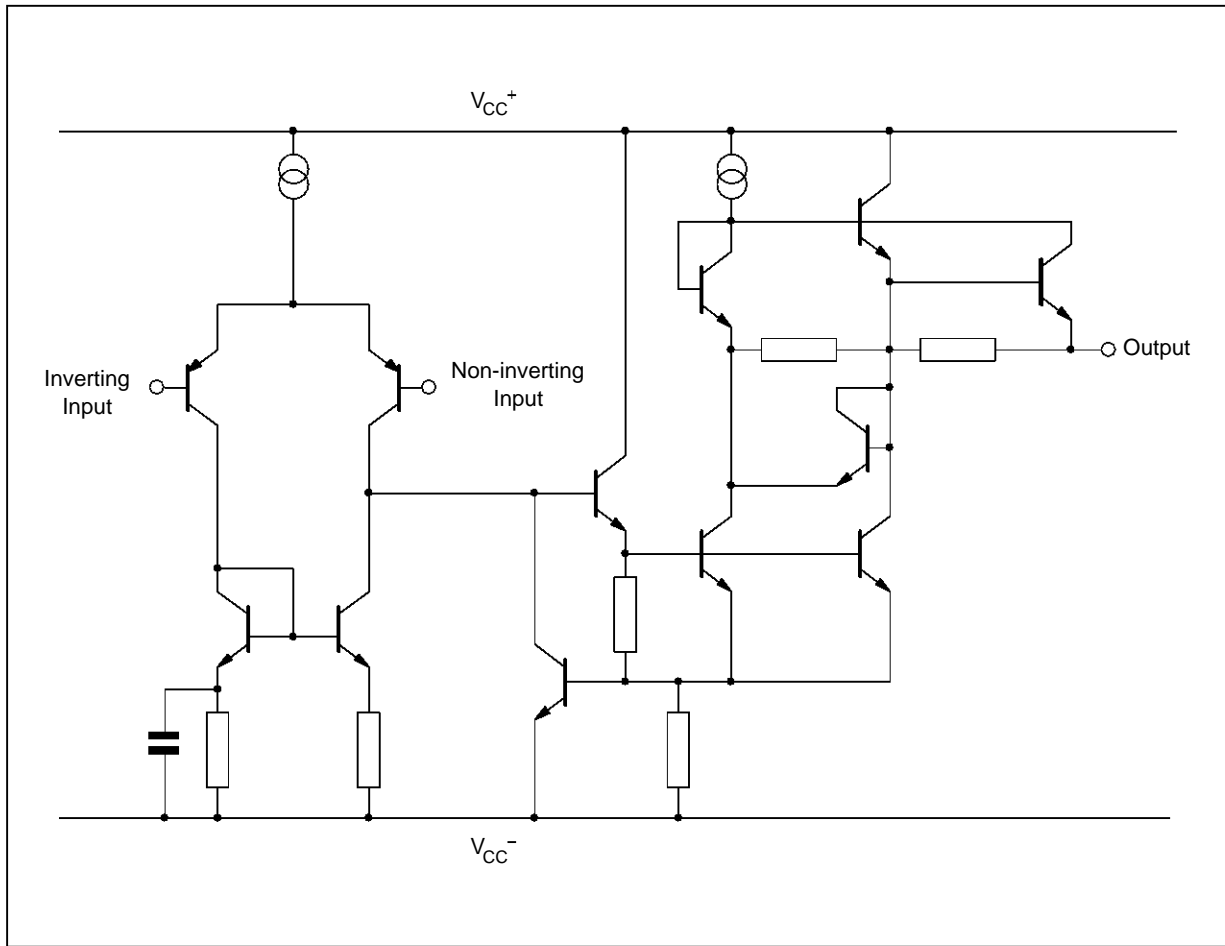
833-01.TBL

PIN CONNECTIONS (top view)



833-01.EPS

SCHEMATIC DIAGRAM (1/2 LM833)



833-02.EPS

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 - (note 1) | ± 15 | V |
| | Output Short-Circuit Duration - (note 2) | Infinite | |
| T_{oper} | Operating Free-air Temperature Range | -40 to $+105$ | $^{\circ}C$ |
| T_j | Maximum Junction Temperature | $+150$ | $^{\circ}C$ |
| T_{stg} | Storage Temperature | -65 to $+150$ | $^{\circ}C$ |
| P_{tot} | Maximum Power Dissipation - (note 2) | 500 | mW |

- Notes : 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

833-02.TBL

OPERATING CONDITIONS

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

833-03.TBL

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

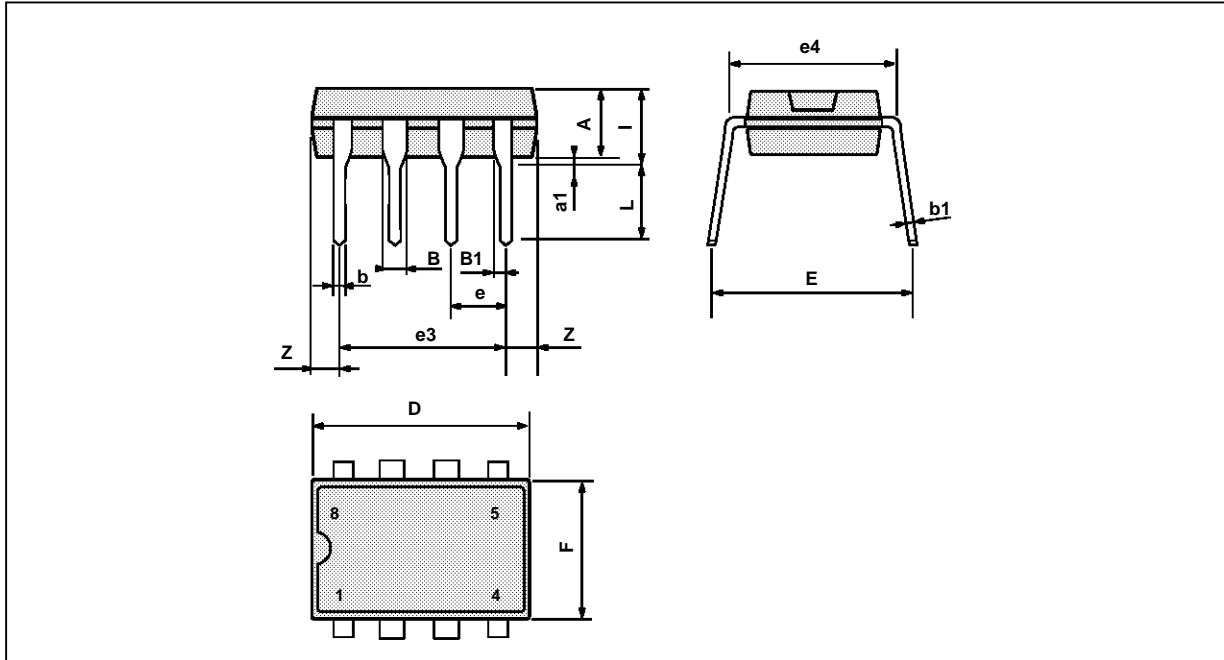
| Symbol | Parameter | Min. | Typ. | Max. | Unit |
|-----------------|--|----------|------------------------------|------------|------------------------|
| V_{io} | Input Offset Voltage ($R_S = 10\Omega$, $V_{ic} = 0V$, $V_o = 0V$) | | 0.3 | 5 | mV |
| DV_{io} | Input Offset Voltage Drift $R_S = 10\Omega$, $V_o = 0V$, $T_{min.} \leq T_{amb} \leq T_{max.}$ | | 2 | | $\mu V/^\circ C$ |
| i_{io} | Input Offset Current ($V_{ic} = 0V$, $V_o = 0V$) | | 25 | 200 | nA |
| i_{ib} | Input Bias Current ($V_{ic} = 0V$, $V_o = 0V$) | | 300 | 1000 | nA |
| V_{icm} | Common Mode Input 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 ($V_{ic} = \pm 12V$) | 80 | 100 | | dB |
| SVR | Supply Voltage Rejection Ratio $V_{CC}^+ / V_{CC}^- = +15V / -15V$ to $+5V / -5V$ | 80 | 105 | | dB |
| I_{CC} | Supply Current ($V_o = 0V$, both amplifiers) | | 4 | 8 | mA |
| SR | Slew Rate ($V_i = -10V$ to $+10V$, $R_L = 2k\Omega$, $A_v = +1V$) | 5 | 7 | | V/ μs |
| GBP | Gain Bandwidth Product ($f = 100kHz$, $R_L = 2k\Omega$, $C_L = 100pF$) | 10 | 15 | | MHz |
| B | Unity Gain Bandwidth (Open loop) | | 9 | | MHz |
| ϕ_m | Phase Margin | | 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 | | $\frac{pA}{\sqrt{Hz}}$ |
| FPB | Full Power Bandwidth ($V_o = 27V_{pp}$, $R_L = 2k\Omega$, $THD \leq 1\%$) | | 120 | | kHz |
| 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 |

833-04.TBL

LM833

PACKAGE MECHANICAL DATA

8 PINS - PLASTIC DIP

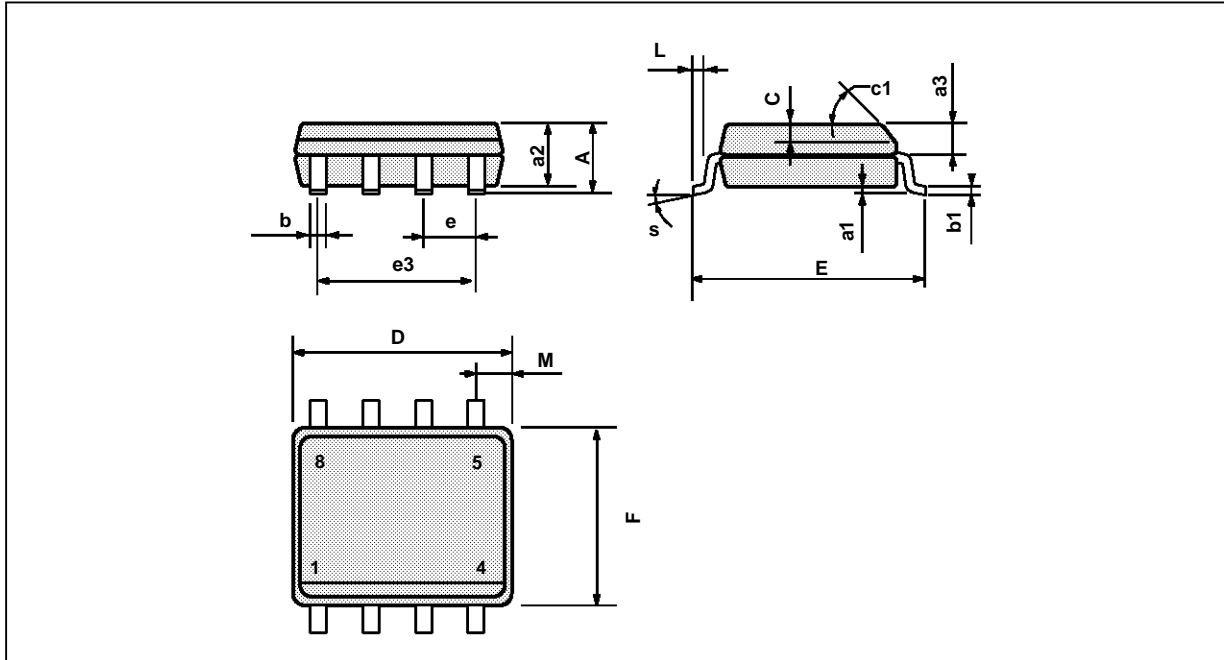


PM-DIP8.EPS

| 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 |

DIP8.TBL

PACKAGE MECHANICAL DATA
8 PINS - PLASTIC MICROPACKAGE (SO)



PH-SO8.EPS

| 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.) | | | | | |

SO8.TBL

Information furnished is believed to be accurate and reliable. However, SGS-THOMSON Microelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No licence is granted by implication or otherwise under any patent or patent rights of SGS-THOMSON Microelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. SGS-THOMSON Microelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of SGS-THOMSON Microelectronics.

© 1994 SGS-THOMSON Microelectronics - All Rights Reserved

SGS-THOMSON Microelectronics GROUP OF COMPANIES

Australia - Brazil - France - Germany - Hong Kong - Italy - Japan - Korea - Malaysia - Malta - Morocco - The Netherlands
Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A.

ORDER CODE: