UMW LM833

Dual channel audio operational amplifier

1.Description

LM833 is a dual-channel audio operational amplifier especially suitable for audio and data signal applications. The device can work in a wide range of single and dual power supply voltages, low noise, high gain bandwidth and high conversion rate. It has the characteristics of low noise voltage, high conversion rate, low distortion and large phase margin.

LM833 is available in DIP8 and SOP8 packages.

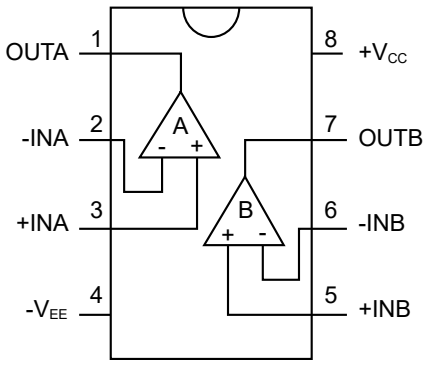
2.Features

- Dual power supply voltage:±15 V
- Low noise voltage: 4.5nV/√Hz.
- Low offset voltage: 0.3mV
- Pin description
- Low distortion: 0.002%
- High conversion rate:7V/μs
- High gain bandwidth: 15MHz
- High power bandwidth: 120KHz
- Large phase margin: 60°

3.Applications

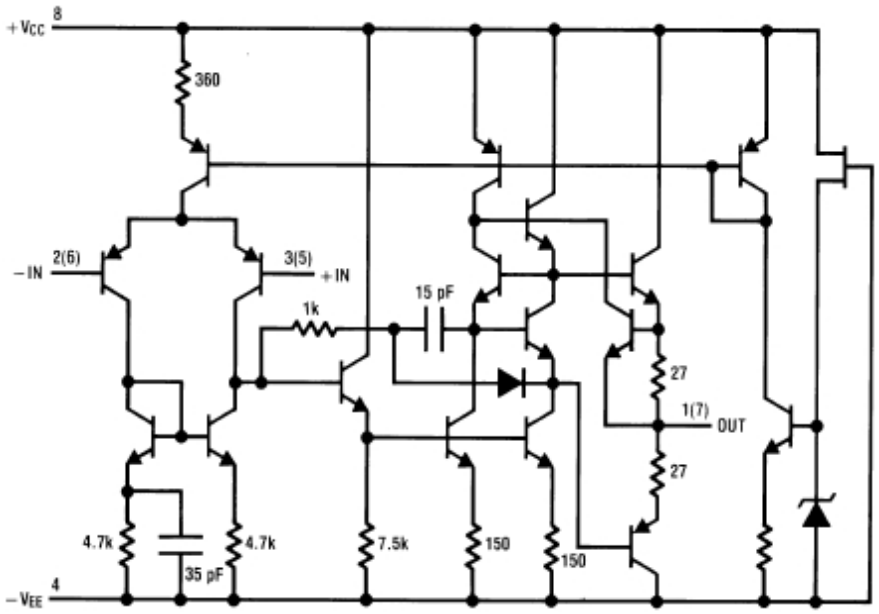
- HiFi audio system equipment
- Pre- amplification and filtering
- set- top box
- Microphone preamplifier circuit
- General amplifier application

4.Pinning Information



SOP-8

5.Logic Diagram



6.Limit Parameter

Parameter	Symbol	Value	Units
Power Supply Voltage	V_{CC}	±18 or 36	V
Differential Input Voltage	V_{ID}	±30	V
Input Voltage	V_I	±15	V
Operating Temperature Range	T_{OPER}	-40 to 85	°C
Storage Temperature	T_{STG}	-60 to 150	°C
Maximum Power Consumption	P_{TOT}	500	mW

7.Recommended Working Parameters

Parameter	Symbol	Value	Units
Power supply voltage	V_{CC}	±2.5 to ±15	V

8.1 DC Electrical Characteristics (T_A=25°C, V_S=±15V)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Input Bias Voltage	V_{OS}	R_S=10Ω		0.3	5	mV
Input Offset Current	I_{OS}			10	200	nA
Input Current Bias	I_B			500	1000	nA
Gain Voltage	A_V	R_L=2kΩ, V_O=±10V	90	110		dB
Output Conversion Voltage	V_{OM}	R_L=10kΩ	±12	±13.5		V
		R_L=2kΩ	±10	±13.4		V
Common-mode Input Voltage	V_{CM}		±12	±14		V
Common Mode Rejection Ratio	CMRR	V_{IN}=±12V	80	100		dB
Power Supply	PSRR	V_S=15~5V -15~ -5V	80	100		dB
Quiescent Current	I_Q	V_O=0V Both Amps		5	8	mA

8.2 AC Electrical Characteristics (T_A=25°C, V_S=±15V, R_L=2kΩ)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Conversion Rate	SR	R_L=2kΩ	5	7	-	V/μs
Gain Bandwidth Product	GBW	f=100kHz	10	15	-	MHz
Equivalent Input Noise Voltage	V_{NI}	RIAA, R_S=2.2kΩ(1)			1.4	μV

(1) RIAA Noise Voltage Measurement Circuit

8.3 Design Electrical Characteristics

(T_A=25°C, V_S=±15V) The following parameters are not tested or ensured.

Parameter	Symbol	Conditions	Typ	Units
Average Temperature Coefficient of Input Offset Voltage	$\Delta V_{OS}/\Delta T$		2	μV/°C
Distortion	THD	R_L=2kΩ, f=20-20kHz 0.002% V_{OUT}=3Vrms, A_V=1	0.002	%
Input Referred Noise Voltage	e_n	R_S=100Ω, f=1kHz	4.5	nV/√Hz
Input Referred Noise Current	i_n	f=1kHz	0.7	pA/√Hz
Power Bandwidth	PBW	V_O=27V_{pp}, R_L=2kΩ, THD≤1%	120	kHz
Unity Gain Frequency	f_U	Open Loop	9	MHz
Phase Margin	φM	Open Loop	60	deg
Input Referred Cross Talk		f=20-20kHz	-120	dB

9.1 Typical Characterisitics

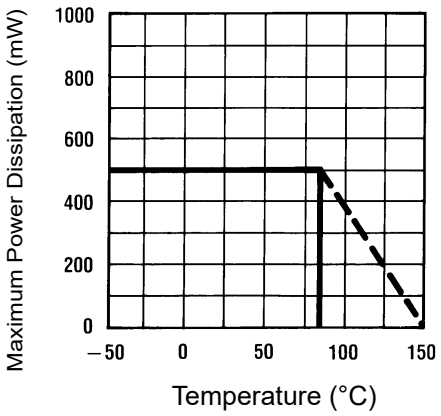


Figure 1: Maximum Power Dissipation vs Ambient Temperature

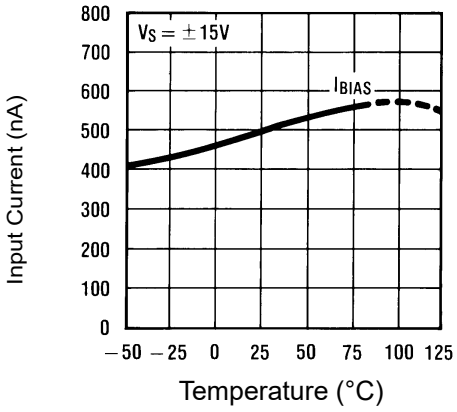


Figure 2: Input Bias Current vs Ambient Temperature

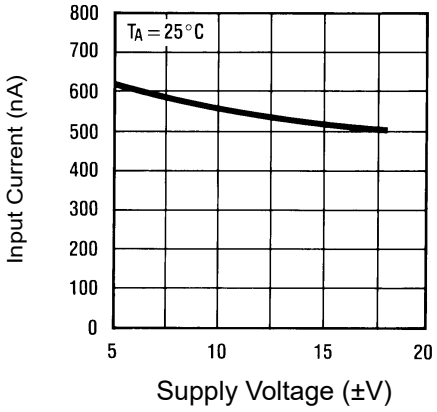


Figure 3: Input Bias Current vs Supply Voltage

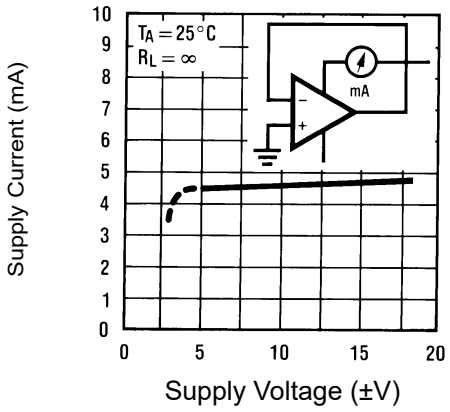


Figure 4: Supply Current vs Supply Voltage

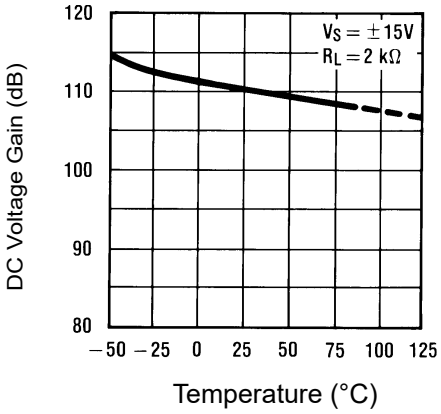


Figure 5: DC Voltage Gain vs Ambient Temperature

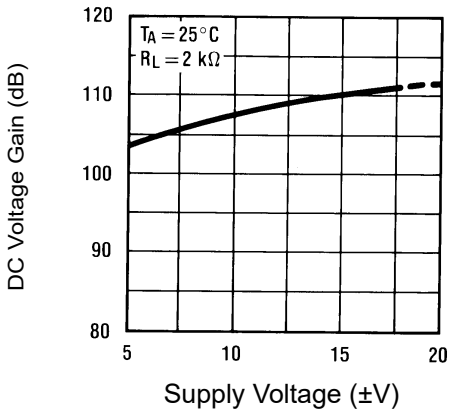


Figure 6: DC Voltage Gain vs Supply Voltage

9.2 Typical Characterisitics

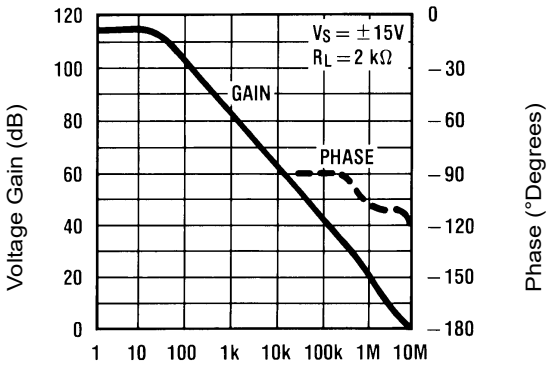


Figure 7: Voltage Gain & Phase vs Frequency

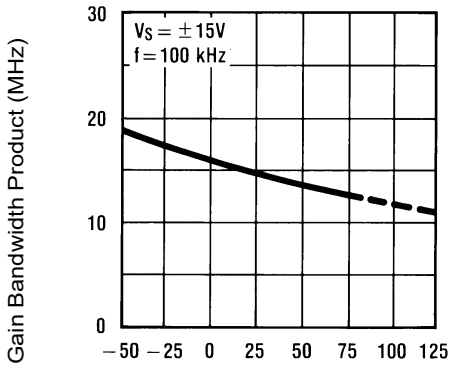


Figure 8: Gain Bandwidth Product vs Ambient Temperature

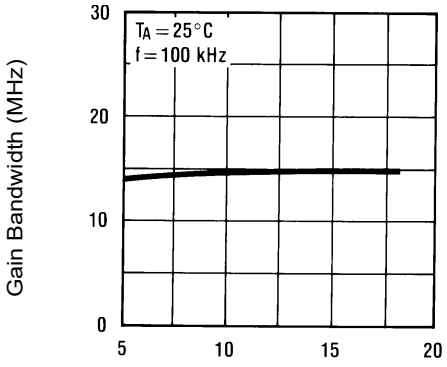


Figure 9: Gain Bandwidth vs Supply Voltage

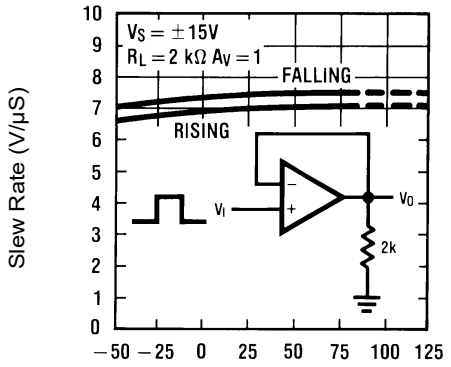


Figure 10: Slew Rate vs Ambient Temperature

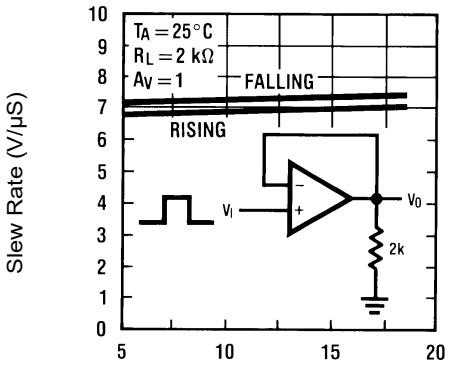


Figure 11: Slew Rate vs Supply Voltage

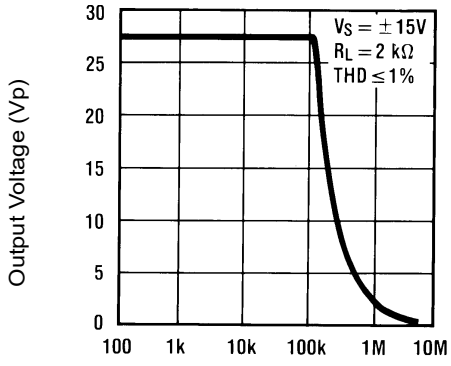


Figure 12: Power Bandwidth

9.3 Typical Characterisitics

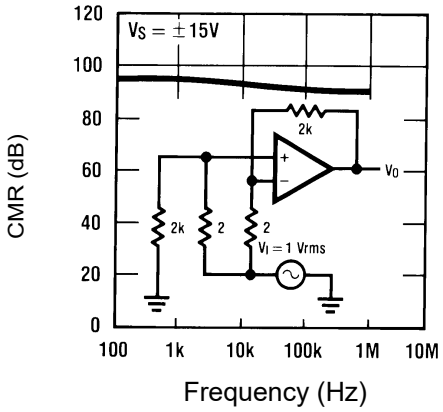


Figure 13: CMR vs Frequency

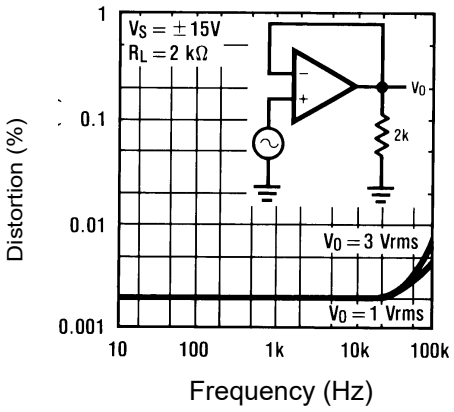


Figure 14: Distortion vs Frequency

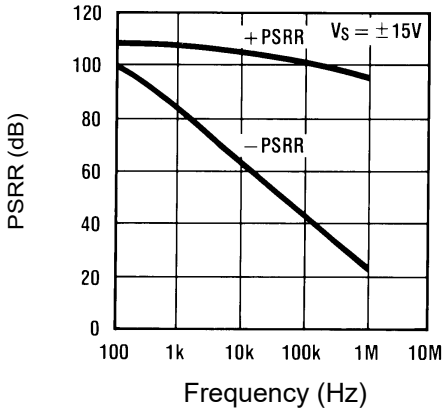


Figure 15: PSRR vs Frequency

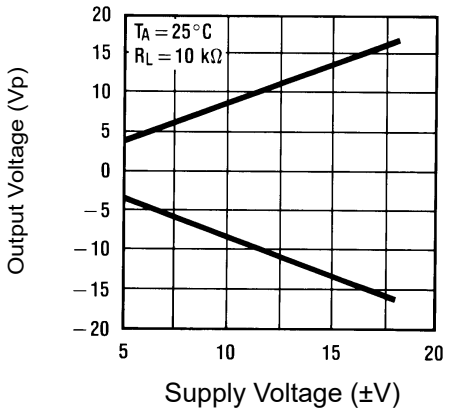


Figure 16: Maximum Output Voltage vs Supply Voltage

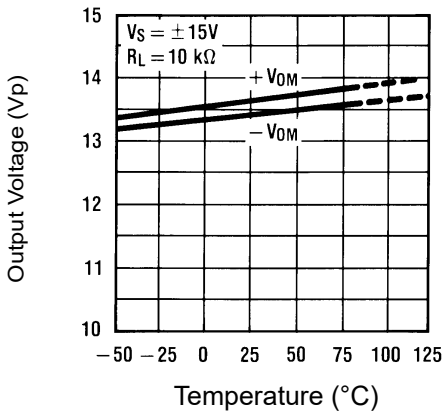


Figure 17: Maximum Output Voltage vs Ambient Temperature

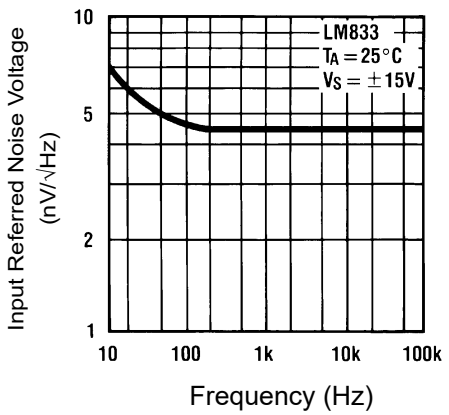


Figure 18: Spot Noise Voltage vs Frequency

9.4 Typical Characterisitics

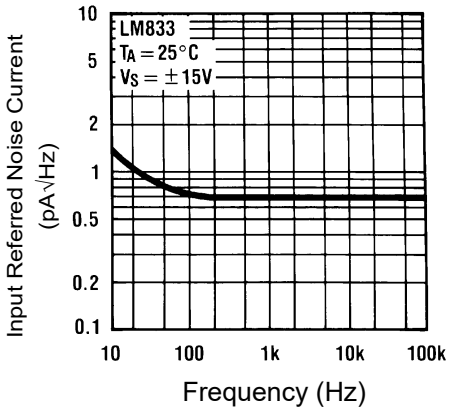


Figure 19: Spot Noise Current vs Frequency

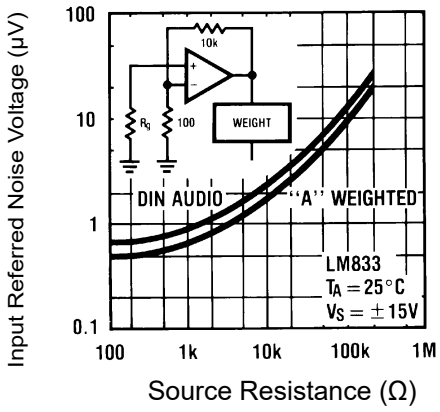


Figure 20: Input Referred Noise Voltage vs Source Resistance

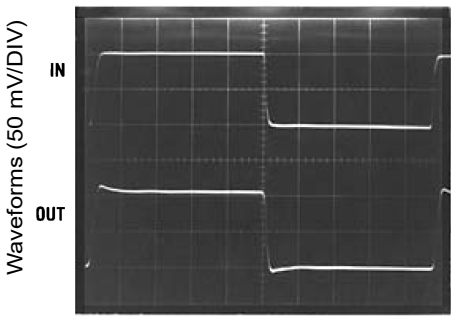


Figure 21: Noninverting Amp

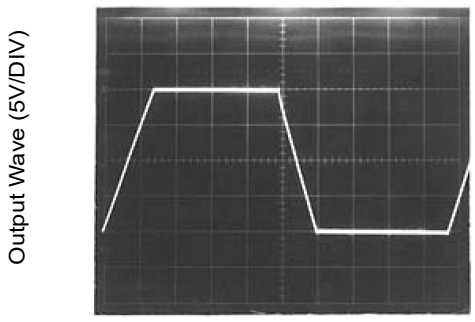


Figure 22: Noninverting Amp

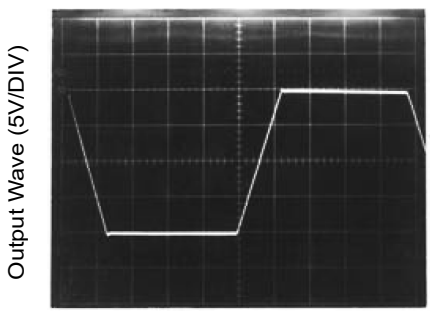
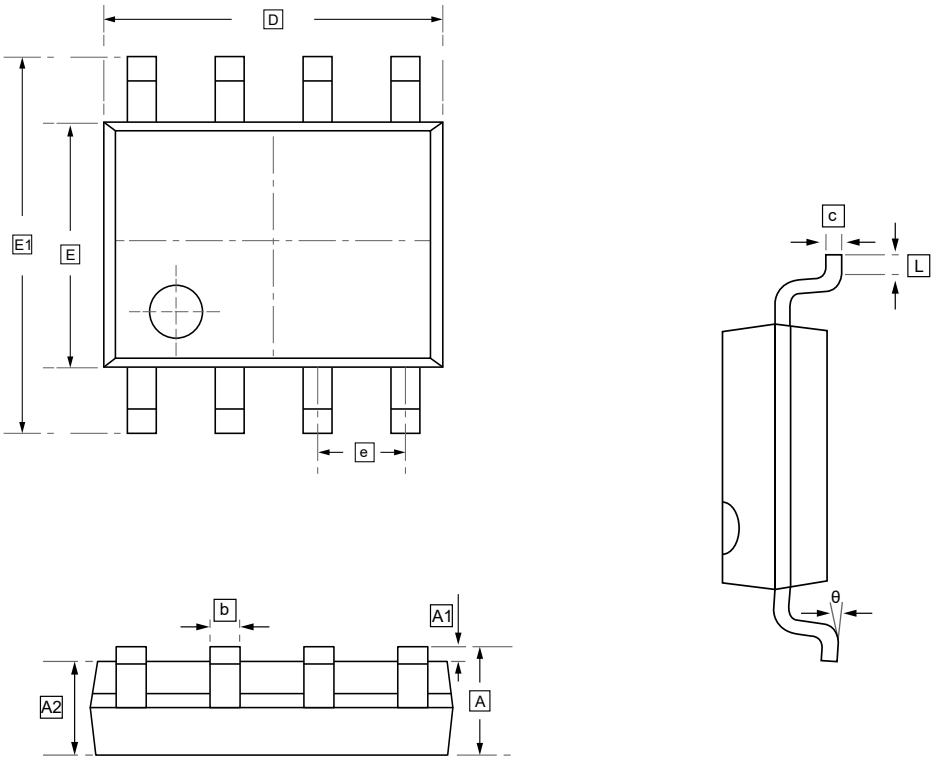


Figure 23: Inverting Amp

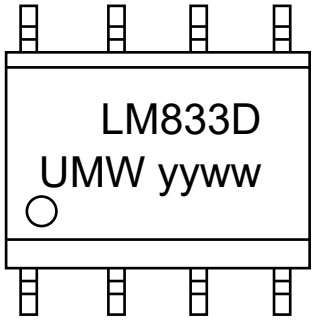
10.SOP-8 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	c	D	E	E1	e	L	θ
Min	1.350	0.000	1.350	0.330	0.170	4.700	3.800	5.800	1.270	0.400	0°
Max	1.750	0.100	1.550	0.510	0.250	5.100	4.000	6.200	BSC	1.270	8°

11.Ordering Information



yy: Year Code
ww: Week Code

Order Code	Marking	Package	Base QTY	Delivery Mode
UMW LM833DT	LM833D	SOP-8	2500	Tape and reel
UMW LM833MX	LM833M	SOP-8	2500	Tape and reel

12.Disclaimer

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