Plessey Semiconductors

SL600 SERIES

COMMUNICATIONS CIRCUITS

SL630C

MICROPHONE/HEADPHONE AMPLIFIER

The SL630C is designed specifically for use as a microphone or headphone amplifier. It has a voltage gain of 100, will accept balanced or unbalanced inputs, and can deliver up to 250mW output from a class AB push-pull output stage.

A gain control facility with a logarithmic law allows a.g.c. to be applied when the device is used as a microphone amplifier, and also allows remote volume control with a linear potentiometer. Gain reduction of 100 dB may be obtained

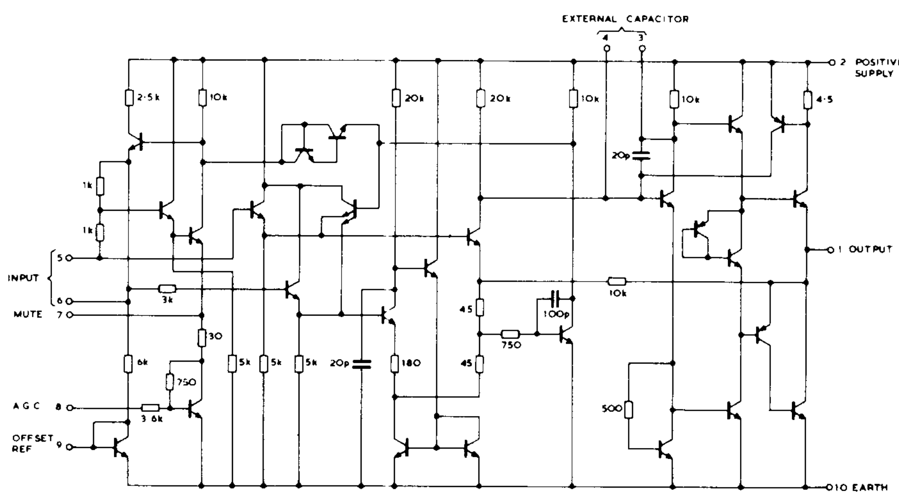

Fig 1 Circuit diagram

CM10

ELECTRICAL CHARACTERISTICS

Test conditions: Temperature = +25°C
Signal Frequency = 1kHz
Supply = 12V (unless otherwise stated)

Characteristic	Value			Units	Test Conditions
	Min.	Typ.	Max.		
Differential input voltage gain	38	40	42	dB	Input 1mVrms
Single ended input voltage gain	43	46	49	dB	Input 1mVrms
Maximum output voltage		1.2		Vrms	6V supply
	2.5	2.8		Vrms	12V supply
Maximum output power		See Fig. 6			0.5% distortion
Quiescent current (See also Fig. 6)			5	mA	6V supply
			13	mA	12V supply
Differential input impedance	1.0	2.0	3.6	kΩ	
Single ended input impedance		1.0	1.8	kΩ	
Output impedance		1.5	3.0	Ω	
Gain control range (See Fig. 5)	60	100		dB	
Maximum input (with gain reduced)		50		mVrms	10% distortion
Short circuit output current		110	200	mA	Irrespective of supply

OPERATING NOTES

Frequency Response

As with most small-signal integrated circuits, the inherent bandwidth of the SL630C is quite large. It extends from low audio frequencies up to approximately 0.5 MHz, unless restricted by a roll-off capacitor (C1) connected between pins 3 and 4. The approximate upper cut-off frequency is then given by

$$\omega \simeq \frac{10^8}{C1}$$

where C1 is in picofarads

Muting

This can be achieved, in any application, by switching pin 7 directly to the negative rail

Microphone Amplifier

Fig. 2 shows the SL630C used with a balanced input on pins 5 and 6. If the load resistance increases with frequency it is necessary to stabilize the output circuitry. This is accomplished with 10Ω in series with 1nF connected between pin 1 and earth. The earth return to pin 10 must not share any common leads particularly with the input. Decoupling pins 2 and 6 should follow normal engineering practice.

Headphone Amplifier

Fig. 3 shows the SL630C in a circuit suitable for powering a headset. The input is an unbalanced source connected to pin 5 and the device is decoupled at pins 1, 2 and 6 in the same manner as the microphone amplifier.

Manual gain adjustment using the remote gain control facility is also shown. It should be noted that the connection to pin 9 eliminates the 'dead' portion of the volume control range caused by the delayed attenuation characteristic shown in Fig. 5. R1 and R2 are chosen with regard to Fig. 5 to give the desired control range.

The input impedance at pin 8 is 3.6 kΩ.

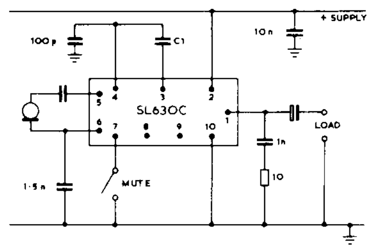

Fig 2 SL630C used as a microphone amplifier

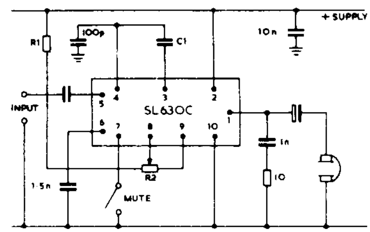

Fig 3 SL630C used as a headphone amplifier

Automatic Gain Control

To apply a.g.c., an SL620C should be ι sed as shown in the circuit of Fig. 4. This will give effective gain control with a low audio-frequency cut-off of 200 Hz and a control response time of approximately 20 ms.

To preserve low-frequency stability and prevent motor-boating, C4 should not exceed the value given and, whilst R1 should not exceed 300Ω ,the time constant C3R1 must not be greater than 800 μs.

R2 is non-essential, but is useful if the inout is likely to contain a large component below 300 Hz

C2 should be used if the power supply has a source impedance of more than a few ohms or is connected by long wires.

The system should not be tested with s newave inputs below 300Hz as such signals can give rise to delay effects not produced by speech wave orms.

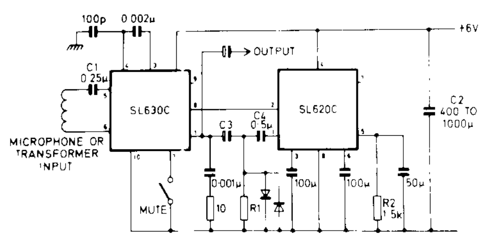

Fig 4 SL630C used wı h SL620C to achieve automatic gain control

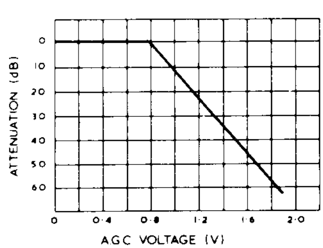

Fig 5 AGC characteristics

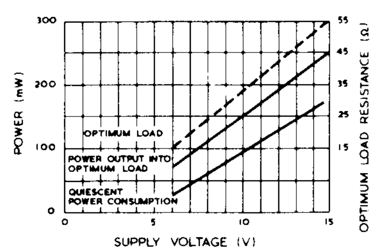

Fig 6 Power characteristics

ABSOLUTE MAXIMUM RATINGS

Storage temperature	−55°C to +150°C
Free-air operating temperature range	
6V supply	−55°C to +125°C
12V supply	−55°C to +100°C
Supply voltage	+18V