L3212

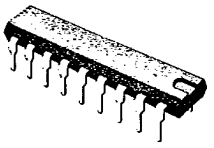
ADVANCE DATA

INTEGRATED TELEPHONE SPEECH TRANSMISSION CIRCUIT WITH DTMF INTERFACE

- ON CHIP DTMF AMPLIFIER/FILTER
- WORKS TO 14mA IN DTMF MODE, HENCE SUITABLE FOR USE ON CARRIER STATION
- DRIVES RECEIVERS OF 150Ω IMPEDANCE
- ON BOARD POWER SUPPLIES FOR ELECTRET POLARISATION AND DIALLER CHIP POWER
- LOOP-COMPENSATION START / STOP POINTS SELECTABLE ENABLING WORKING WITH DIFFERING EXCHANGE BATTERY VOLTAGES AND LINE CHARACTERISTICS
- DURING LONG LOOP DISCONNECT MODES i.e. 600ms FLASH TIMING, V_{DD} REGULATED VOLTAGE OUTPUT BECOMES HIGH IMPEDANCE ENSURING MINIMAL DISCHARGE OF 'KEEP ALIVE MEMORY' CAPACITOR
- WORKS IN SPEECH MODE TO 5mA/1.3V
- ALL IMPEDANCES CAN BE CONTROLLED BY AC BRIDGE CONFIGURATION
- DUAL LEVEL MUTING OF RECEIVER FOR DTMF AND LOOP-DISCONNECT DIALLING
- DTMF GAIN ADJUSTABLE TO SUIT SIGNALLING REQUIREMENTS
- RFL IS REDUCED BY INTERNAL BALANCED AMPLIFIERS
- ADJUSTABLE GAIN FOR SEND/RECEIVE

The L3212 is a monolithic integrated circuit in 18 pin plastic DIP package designed to replace the hybrid circuit in the telephone set. It works with magnetic capsules in receiving and with electret microphone in transmitting. With its very low voltage operation, the L3212 is particularly suitable to work in parallel with conventional telephone sets.

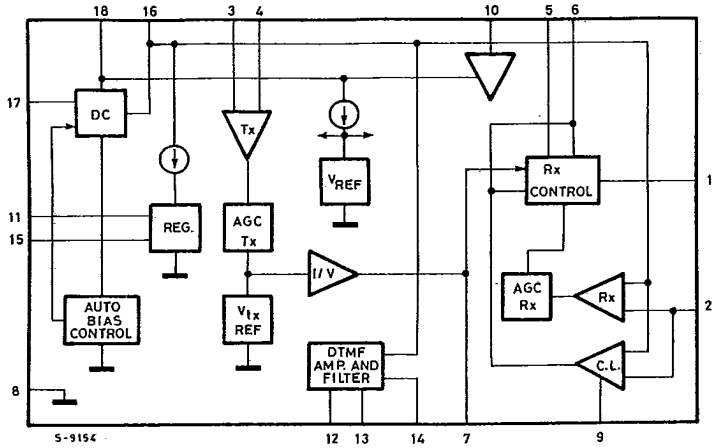
In addition to the speech operation, the L3212 acts as an interface for the DTMF for both feeding and signalling functions.



DIP-18 Plastic (0,4)

ORDERING NUMBER: L3212

BLOCK DIAGRAM



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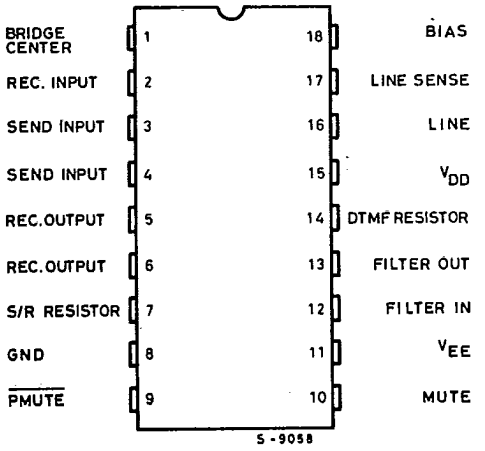
ABSOLUTE MAXIMUM RATINGS

V_L	Line voltage (3ms pulse duration)	20	V
I_L	Line current	150	mA
P_{tot}	Total power dissipation at $T_{amb} = 70°C$	1	W
T_{op}	Operating temperature	-20 to +55	°C
T_{stg}, T_j	Storage and junction temperature	-60 to +150	°C

CONNECTION DIAGRAM
(Top view)



THERMAL DATA

$R_{th\ j\text{-}amb}$	Thermal resistance junction-ambient	max	80	°C/W

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FUNCTIONAL PIN DESCRIPTION

Pin Number	Description
1	Reference point of receiver circuit.
2	Receiver input
3 and 4	Send input
5 and 6	Receiver output
7	Send/receive amplifier gain control.
8	Ground
9	Pulse Mute When low, in conjunction with Mute, provide 40dB attenuation of receive signal.
10	Mute, when high, mutes transmitter by 60dB and receiver by 26dB. Also causes power supplies to increase current available.
11	V_{EE} Electret power supply. Voltage source of 2.4V supplying up to 500μA. Used to polarize electret transmitter.
12	DTMF Filter In.
13	DTMF Filter Out.
14	DTMF resistor. Sets DTMF gain
15	V_{DD} Regulated power supply output. Used to power dialing chip.
16	Line input
17	Line sense. A resistor R_{DC} here sets DC resistance and amplifier AGC points.
18	Bias input. Used as bias reference internally.

Fig. 1 - Application and test circuit

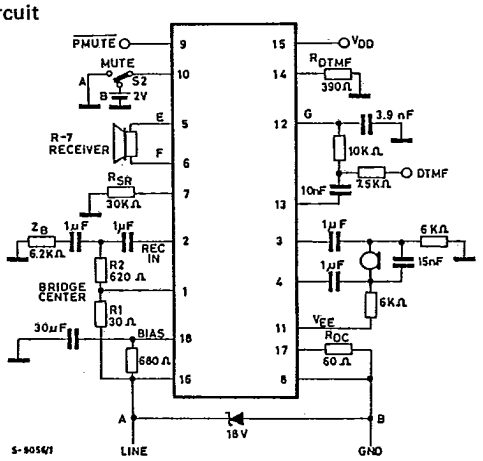

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Fig. 2 - Side tone and sending gain

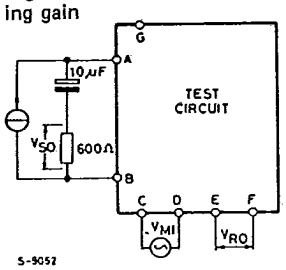


Fig. 3 - Receive gain

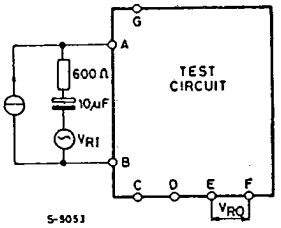
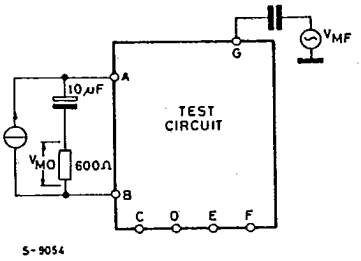


Fig. 4 - DTMF gain



Side tone = $\frac{V_{RO}}{V_{MI}}$ $G_S = \frac{V_{SO}}{V_{MI}}$ $G_R = \frac{V_{MO}}{V_{RI}}$ $G_{MF} = \frac{V_{MO}}{V_{MF}}$

ELECTRICAL CHARACTERISTICS (T_{amb} = 25°C, f = 200 to 3400Hz, S2 in position (A) on the test circuit, unless otherwise specified)

Parameter		Test Conditions	Min.	Typ.	Max.	Unit	Fig.
SPEECH OPERATION FOR I_L = 5mA TO 20mA							
V_L	Line voltage	I_L = 5mA			1.3	V	
V_{so}	Sending dynamic output voltage	I_L = 5mA		100		mV_{rms}	
I_{ro}	Receiving dynamic output current	I_L = 5mA		0.8		mA	
V_{EE}	Electret Bias	I_L = 5mA		0.7		V	
DTMF INTERFACE AND OPERATION: S2 IN POSITION (B)							
V_{DD}	DTMF supply voltage		2.4			V	
I_{DD}	DTMF supply current		2.5			mA	
DTMF	Amplifier gain	f_{MFIn} = 1KHz V_{MFIn} = 80mV	-3.3		-1.3	dB	4
DTMF	Transient voltage				V_L+5	V	
R_I	Input impedance	V_{MFIn} = 80mV	60			KΩ	
DTMF	Tone distortion	I_L > 14mA		2		%	
	Starting delay time				5	ms	
V_{IL}	Mute input LOW				1.0	V	
V_{IH}	Mute input HIGH		2.0			V	
V_{CL}	Conference level gain	V_{RO} / V_{SO}	-24	-27	-30	dB	
	Sending Gain Mute	V_{MI} = 3mV		-60		dB	1
	I_{Leak} V_{DD} leakage	V_{DD} = 2.5V		2		nA	

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ELECTRICAL CHARACTERISTICS (continued)

Parameter		Test Conditions	Min.	Typ.	Max.	Unit	Fig.
SPEECH OPERATION FOR I_L = 20mA TO 125mA							
V_L	Line Voltage	I_L = 20mA I_L = 125mA			3 10	V V	
G_S	Sending Gain	f = 1KHz I_L = 42mA V_{MI} = 3mV I_L = 96mA	39 35	40 36	41 37	dB dB	2 2
	Transmitting distortion	f = 1KHz V_{SO} = 700mV I_L = 20mA			2	%	2
	Sending Noise	V_{MI} = 0V		-70		dBmp	2
	Micro input impedance		40			KΩ	
G_R	Receiving gain	V_{RI} = 0.3V f = 1KHz I_L = 42mA I_L = 96mA	-11 -15	-10 -14	-9 -13	dB dB	3 3
	Receiving distortion	f = 1KHz V_{RO} = 440mV I_L = 20mA			2	%	3
	Receiving Noise	V_{RI} = 0V		100		μV	3
	Receiving out impedance	V_{RO} = 50mV		30		Ω	
	Sidetone	f = 1KHz		36		dB	2
Z_{ML}	Line matching impedance	V_{RI} = 0.3V f = 1KHz	500	600	700	Ω	3
	Return Loss	V_{RI} = 0.3V f = 1KHz	-14			dB	3
V_{EE}	Electret bias		2.4			V	
I_{EE}	Electret supply current		0.5			mA	
V_{DD}	DTMF supply voltage		2.4			V	
I_{DD}	DTMF stand-by supply current		0.5			mA	
PULSE DIALING OPERATION: S2 IN POSITION (B)							
I_{PL}	Input low current pulse mute				50	μA	
I_{Leak}	Input high current Pulse mute				-10	μA	
	Confidence level gain	Pulse Mute Low		-40		dB	3