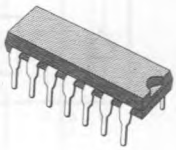
SGS-THOMSON MICROELECTRONICS

# L3280

## LOW VOLTAGE TELEPHONE SPEECH CIRCUIT

**ADVANCE DATA**

- OPERATION DOWN TO 1.3 V/5 mA
- DTMF & BEEP TONE INPUTS
- EXTERNAL MUTING FOR EARPHONE AND MICROPHONE
- MUTE TURNS ON BEEP TONE & DTMF INPUTS AND TURNS OFF EARPHONE & MICROPHONE
- SUITABLE FOR DYNAMIC OR PIEZO EARPHONES AND PIEZO, DYNAMIC OR ELECTRET MICROPHONES



**DIP14 Plastic** (0.25)

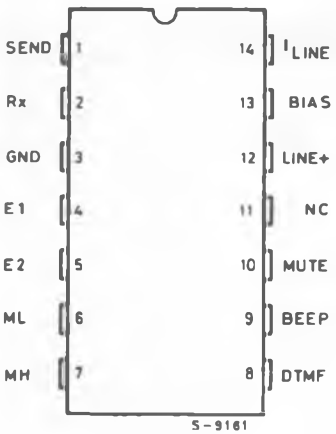
**ORDER CODES :** L3280B
L3280AB

### DESCRIPTION

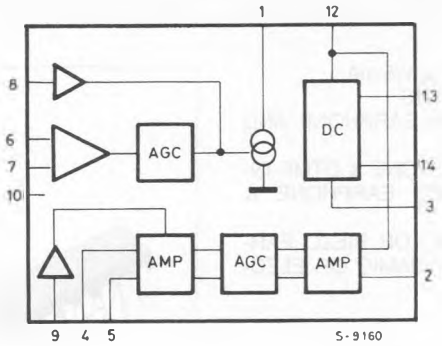
The L3280 is a brand new low voltage speech circuit designed to replace hybrid circuits in telephone sets. It is designed for sets that may be operated in parallel. It features both DTMF input and Beep tone input ; ALC on send and receive and muting input.

Various DC - characteristics can be programmed at pin 14 replacing testing resistor (43 Ω) with proper network value.

### PIN CONNECTION (top view)



## BLOCK DIAGRAM




## ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_L$ | Line Voltage (3 ms pulse) | 20 | V |
| $I_L$ | Line Current | 150 | mA |
| $P_{tot}$ | Total Power Dissipation, $T_{amb}$ = 70 °C | 1 | W |
| $T_{op}$ | Operating Temperature | – 20 to 55 | °C |
| $T_j$ | Junction Temperature | – 65 to 150 | °C |

## THERMAL DATA

| | | | | |
|---|---|---|---|---|
| $R_{th\ j\text{-}amb}$ | Thermal Resistance Junction-ambient | Max | 80 | °C/W |

**Figure 1** : Test Circuits.

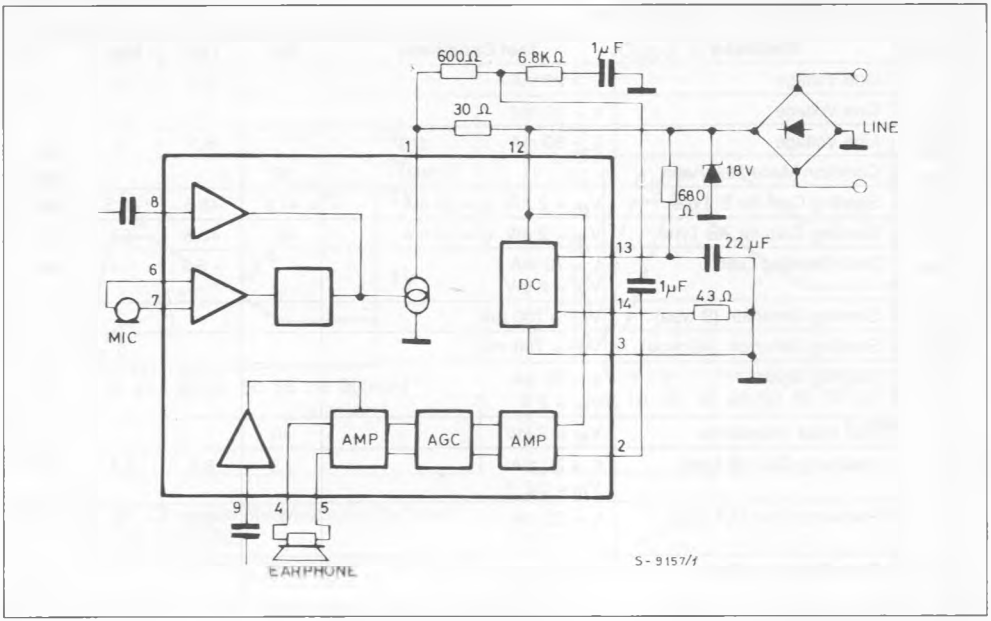



**Figure 2** .

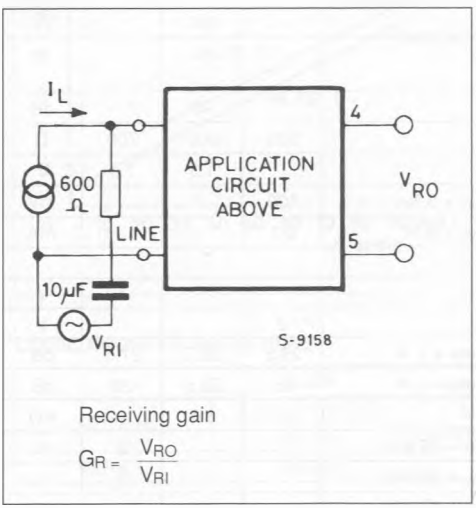
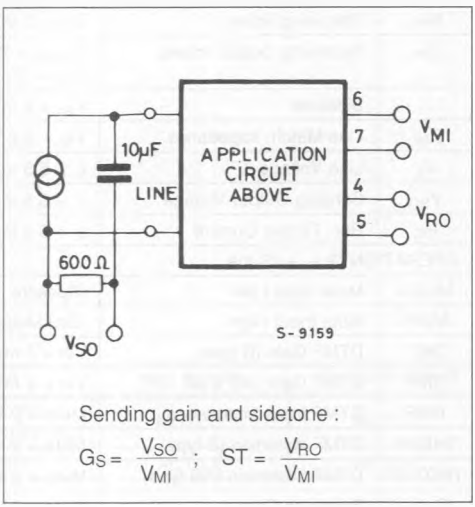



**Figure 3**.



**ELECTRICAL CHARACTERISTICS** ($T_{amb}$ = 25 °C ; frequency = 1 Khz ; $I_l$ = 20 mA : mute low ; R1 (pin 14) = 43 Ω unless otherwise spec.)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_L$ | Line Voltage | $I_L$ = 20 mA | | 2.9 | 3.2 | V |
| $V_L$ | Line Voltage | $I_L$ = 50 mA | | 5.8 | 6.2 | V |
| $V_L$ | Line Voltage | $I_L$ = 80 mA | | 8.5 | 10 | V |
| $C_{MRR}$ | Common Mode Rej. Ratio | | 50 | | | dB |
| $G_S$ | Sending Gain for B Type | $V_{MI}$ = 2 mV, $I_L$ = 20 mA | 47.5 | 48.5 | 49.5 | dB |
| $G_S$ | Sending Gain for AB Type | $V_{MI}$ = 2 mV, $I_L$ = 20 mA | 47 | 48.5 | 50 | dB |
| $D_{GS}$ | Delta Sending Gain | $I_L$ = 70 mA<br>$V_{MI}$ = 2 mV | – 7 | – 5.5 | – 4 | dB |
| $T_{HDS}$ | Sending Distortion (B type) | $V_{SO}$ = 700 mV | | | 2 | % |
| $T_{HDS}$ | Sending Distortion (AB type) | $V_{SO}$ = 700 mV | | | 5 | % |
| $N_{TX}$ | Sending Noise | $I_L$ = 50 mA<br>$V_{MI}$ = 0 V | | – 71 | | dBm |
| $Z_{MI}$ | Mic. Input Impedance | $V_{MI}$ = 2 mV | 40 | | | KΩ |
| $G_R$ | Receiving Gain (B type) | $I_L$ = 20 mA<br>$V_{RI}$ = 0.2 V | 7.5 | 8.5 | 9.5 | dB |
| $G_R$ | Receiving Gain (AB type) | $I_L$ = 20 mA<br>$V_{RI}$ = 0.2 V | 7 | 8.5 | 10 | dB |
| $D_{GR}$ | Delta Receiving Gain | $I_L$ = 70 mA<br>$V_{RI}$ = 0.2 V | – 7 | – 5.5 | – 4 | dB |
| $T_{HDR}$ | Receiving Distortion (B type) | $V_{RO}$ = 350 mV ; $R_{LOAD}$ = 350 Ω | | | 2 | % |
| $T_{HDR}$ | Receiving Distortion (AB type) | $V_{RO}$ = 350 mV ; $R_{LOAD}$ = 350 Ω | | | 5 | % |
| $N_{RX}$ | Receiving Noise | $V_{RI}$ = 0 V | | 300 | | μV |
| $Z_{RO}$ | Receiving Output Imped. | $R_{LOAD}$ = 200 Ω<br>$V_{RO}$ = 50 mV | | 10 | | Ω |
| | Sidetone | $V_{MI}$ = 2 mV | | 40 | | dB |
| $Z_{ML}$ | Line Match. Impedance | $V_{RI}$ = 0.2 V | 500 | 600 | 700 | Ω |
| $V_L$ | Line Voltage | $I_L$ = 5.5 mA | | 1.3 | 1.6 | V |
| $V_{SO}$ | Sending Output Voltage | $I_L$ = 5.5 mA, $T_{HD}$ = 5 % | 100 | | | mV |
| $I_{RO}$ | Rec. Output Current | $I_L$ = 5.5 mA, $T_{HD}$ = 5 % | 0.7 | | | mA |
| OPERATION @ $I_L$ = 16 mA | | | | | | |
| MULO | Mute Input Low | (Speech) | | | 1 | V |
| MUHI | Mute Input High | (Dial Mode) | 2 | | | V |
| GMF | DTMF Gain (B type) | Vin = 2 mV ; Mute = 2 V | 25.5 | 26.5 | 27.5 | dB |
| GMF | DTMF Gain (AB type) | Vin = 2 mV ; Mute = 2 V | 25 | 26.5 | 28 | dB |
| RMF | DTMF Input Impedance | Mute = 2 V | 6 | 8.5 | | KΩ |
| THDMF | DTMF distortion (B type) | Mute = 2 V ; Vin = 25 mV | | | 2 | % |
| THDTMF | DTMF Distortion (AB type) | Mute = 2 V ; $V_{in}$ = 25 mV | | | 5 | % |
| $G_{beep}$ | Beeptone Gain | Mute = 2 V ; $V_{in}$ = 25 mV | | 8.5 | | dB |
| $R_{beep}$ | Beeptone Input Imped. | Mute = 2 V ; $V_{Bt}$ = 100 mV | 12 | | | KΩ |
| THD | Beeptone Distortion | Mute = 2 V ; $V_{Bt}$ = 100 mV | | | 5 | % |
| $D_{VL}$ | Delta $V_{LINE}$ | Mute = 2 V ; $I_L$ = 20 mA | 0.5 | | 1.2 | V |

## CHARACTERISTIC AT 1 KHz

**Figure 4** : Receive Characteristic and Max Output at 2 % THD.

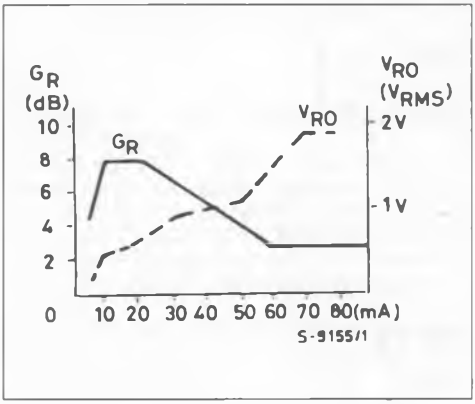



**Figure 5** : Sending ALC Characteristic and Max Output at 2 % THD.

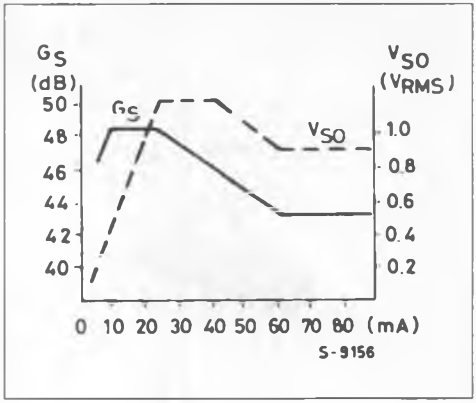
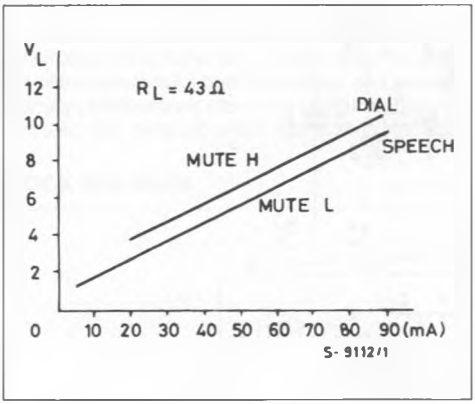



**Figure 6** : DC Characteristic Measured between Line and GND.




## LOGIC OF MUTE SWITCHING

| | DTMF | BEEP | MIC INPUT | RECEIVE INPUT |
|---|---|---|---|---|
| MUTE H | ACTIVE TO LINE OUTPUT | ACTIVE TO EARPHONE OUTPUT | MUTED | MUTED |
| MUTE L | MUTED | MUTED | ACTIVE | ACTIVE |

**Figure 7 :** Application Circuit for Dynamic Transducer.