# Speech network

## BA6566/BA6566F/BA6566FP

The BA6566, BA6566F, and BA6566FP are speech network ICs which possess the basic functions required for handset communications. In addition to amplifying signals from a transmitter and sending them to a telephone line, they also amplify only reception signals from a telephone line and drive the receiver. They also compensate for fluctuation in the volume at which signals are transmitted and received, caused by the length of the telephone line (AGC).

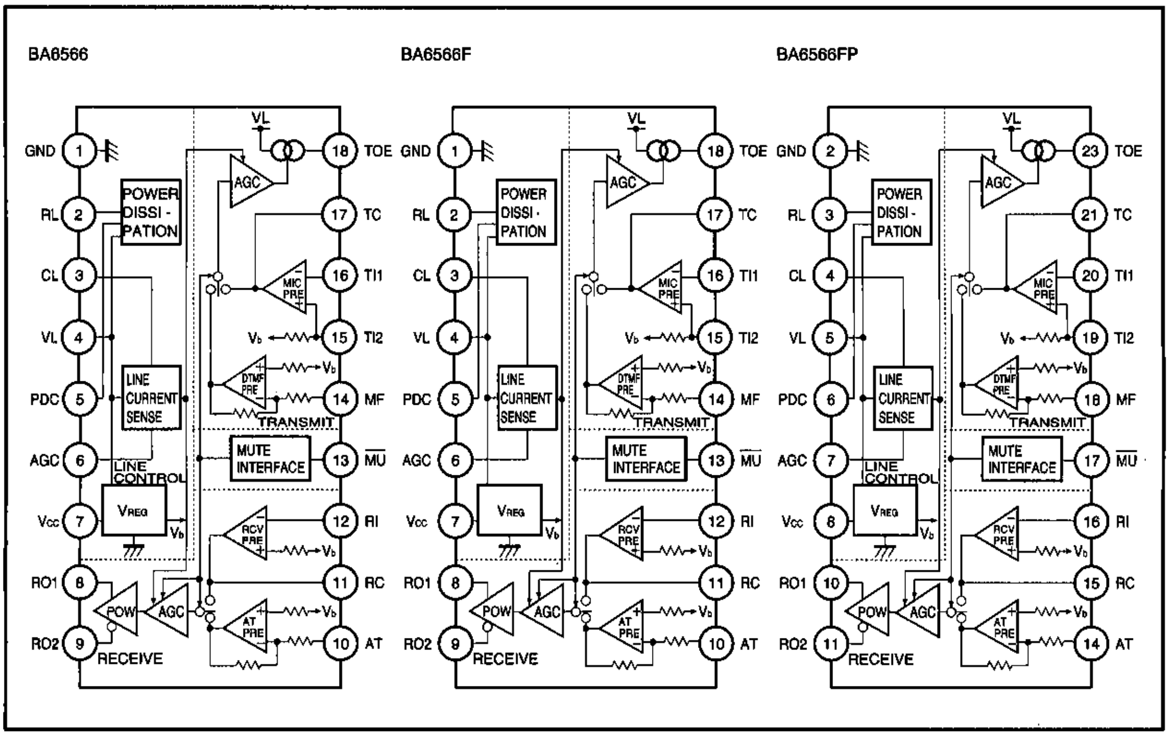
●Applications

Telephones and telephone equipment

●Features

1) Can accommodate both dynamic and piezoelectric receivers, simply by changing the circuit constant for a wide dynamic reception range.
2) Automatic gain control (AGC) is used, based on the transmission and reception telephone line current, for easier compliance with communications standards.
3) Erroneous operation caused by high-frequency electrical wave interference is minimized.
4) An HSOP package is used, eliminating the need for an attached transistor to dissipate heat. This means that a common circuit can be shared when a DIP package is used (BA6566FP).

●Block diagram



●Absolute maximum ratings (Ta=25℃)

| Parameter | | Symbol | Limits | Unit |
|---|---|---|---|---|
| Applied voltage | | $V_L$ | 16.5 | V |
| Power dissipation | BA6566 | Pd | 1100 *1 | mW |
| | BA6566F | | 600 *2 | |
| | BA6566FP | | 1200 *3 | |
| Operating temperature | | Topr | −35~60 | ℃ |
| Storage temperature | | Tstg | −55~125 | ℃ |
| Current consumption | | $I_L$ | 125 *4 | mA |

*1 Reduced by 11 mW for each increase in Ta of 1°C over 25°C.

*2 Reduced by 6 mW for each increase in Ta of 1°C over 25°C.

*3 Reduced by 12 mW for each increase in Ta of 1°C over 25°C.
When mounted on 90 mm × 50 mm × 1.6 mm glass epoxy board, fins should be soldered to foil pattern.

*4 With the BA6566, Reduced by 1 mA for each increase in Ta of 1°C over 50°C.
With the BA6566F, Reduced by 1.4 mA for each increase in Ta of 1°C over 50°C.
With the BA6566FP, Reduced by 1 mA for each increase in Ta of 1°C over 50°C.

●Electrical characteristics (Ta=25℃)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions | | | | Measurement Circuit |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | $I_L$ (mA) | AGC | Mute | f=1kHz | |
| Line voltage (5) | $V_L(5)$ | – | 2.0 | – | V | 5 | – | – | – | Fig.2 |
| Line voltage (20) | $V_L(20)$ | 2.5 | 3.5 | 5.0 | V | 20 | – | – | – | Fig.2 |
| Line voltage (30) | $V_L(30)$ | 3.0 | 4.0 | 5.4 | V | 30 | – | – | – | Fig.2 |
| Line voltage (90) | $V_L(90)$ | 5.2 | 7.0 | 9.5 | V | 90 | – | – | – | Fig.2 |
| Mute low level input voltage | $V_{IL}$ | 0.1 | 0.18 | 0.25 | V | 20~90 | – | – | – | Fig.2 |
| Mute low level input current | $I_{IL}$ | 25 | 35 | 45 | μA | 20~90 | – | – | – | Fig.2 |
| Transmit gain 1 (20–90) | $G_{T1}$ (20 - 90) | 37 | 41 | 44 | dB | 20~90 | OFF | OFF | Vin=−50dBV | Fig.3 |
| Transmit gain 1 (30–90) | $G_{T1}$ (30 - 90) | 38 | 41 | 44 | dB | 30~90 | OFF | OFF | Vin=−50dBV | Fig.3 |
| Transmit gain 2 (20) | $G_{T2}$ (20) | 38 | 41 | 45 | dB | 20 | ON | OFF | Vin=−50dBV | Fig.3 |
| Transmit gain 2 (30) | $G_{T2}$ (30) | 38 | 41 | 44 | dB | 30 | ON | OFF | Vin=−50dBV | Fig.3 |
| Transmit gain 2 (90) | $G_{T2}$ (90) | 34.5 | 37.5 | 40.5 | dB | 90 | ON | OFF | Vin=−50dBV | Fig.3 |
| Transmit distortion attenuation | $D_T$ | – | −46 | −20 | dB | 20~90 | – | OFF | Vin=−50dBV | Fig.3 |
| Transmit noise level | $N_T$ | – | −68 | −55 | dBV | 20~90 | – | OFF | BPF=400Hz ~30kHz | Fig.3 |
| Maximum transmit output level (20–90) | $O_T$ (20 - 90) | −2 | 3 | – | dBV | 20~90 | – | OFF | Dist=−20dB | Fig.3 |
| Maximum transmit output level (30–90) | $O_T$ (30 - 90) | 0 | 3 | – | dBV | 30~90 | – | OFF | Dist=−20dB | Fig.3 |
| Receive gain 1 (20–90) | $G_{R1}$ (20 - 90) | −13 | −10 | −7 | dB | 20~90 | OFF | OFF | $S_1$=1 Vin=−20dBV | Fig.4 |
| Receive gain 1 (20) | $G_{R1}$ (20) | −13 | −10 | −7 | dB | 20 | ON | OFF | $S_1$=1 Vin=−20dBV | Fig.4 |
| Receive gain 1 (30) | $G_{R1}$ (30) | −13 | −10 | −7 | dB | 30 | ON | OFF | $S_1$=1 Vin=−20dBV | Fig.4 |
| Receive gain 1 (90) | $G_{R1}$ (90) | −16.5 | −13.5 | −10.5 | dB | 90 | ON | OFF | $S_1$=1 Vin=−20dBV | Fig.4 |
| Receive distortion attenuation 1 | $D_{R1}$ | – | −46 | −20 | dB | 20~90 | – | OFF | $S_1$=1 Vin=−20dBV | Fig.4 |
| Receive noise level 1 | $N_{R1}$ | – | −70 | −60 | dBV | 20~90 | – | OFF | BPF=400Hz ~30kHz | Fig.4 |
| Maximum receive output level 1 (20 - 90) | $O_{R1}$ (20 - 90) | −15 | −7 | – | dBV | 20~90 | – | OFF | Dist=−20dB | Fig.4 |
| Maximum receive output level 1 (30 - 90) | $O_{R1}$ (30 - 90) | −11 | −7 | – | dBV | 30~90 | – | OFF | Dist=−20dB | Fig.4 |
| Receive gain 2 (20 - 90) | $G_{R2}$ (20 - 90) | 5 | 8 | 11 | dB | 20~90 | OFF | OFF | $S_1$=2 Vin=−20dBV | Fig.4 |
| Receive gain 2 (20) | $G_{R2}$ (20) | 5 | 8 | 11 | dB | 20 | ON | OFF | $S_1$=2 Vin=−20dBV | Fig.4 |

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions $I_L$ (mA) | Conditions AGC | Conditions Mute | Conditions f=1kHz | Measurement Circuit |
|---|---|---|---|---|---|---|---|---|---|---|
| Receive gain 2 (30) | $G_{R2}$ (30) | 5 | 8 | 11 | dB | 30 | ON | OFF | $S_1$=2 Vin=−20dBV | Fig.4 |
| Receive gain 2 (90) | $G_{R2}$ (90) | 1.5 | 4.5 | 7.5 | dB | 90 | ON | OFF | $S_1$=2 Vin=−20dBV | Fig.4 |
| Receive distortion attenuation 2 | $D_{R2}$ | — | −46 | −20 | dB | 20~90 | — | OFF | $S_1$=2 Vin=−20dBV | Fig.4 |
| Receive noise level (20 - 90) | $N_{R2}$ (20 - 90) | — | −66 | −50 | dBV | 20~90 | — | OFF | BPF=400Hz ~30kHz | Fig.4 |
| Receive noise level 2 (30 - 90) | $N_{R2}$ (30 - 90) | — | −66 | −55 | dBV | 30~90 | — | OFF | BPF=400Hz ~30kHz | Fig.4 |
| Maximum receive output level 2 (20 - 90) | $O_{R2}$ (20 - 90) | 1 | 7 | — | dBV | 20~90 | — | OFF | Dist=−20dB | Fig.4 |
| Maximum receive output level 2 (30 - 90) | $O_{R2}$ (30 - 90) | 3 | 7 | — | dBV | 30~90 | — | OFF | Dist=−20dB | Fig.4 |
| DTMF gain 1 | $G_{D1}$ (20 - 90) | 30.5 | 33.5 | 36.5 | dB | 20~90 | OFF | ON | Vin=−40dBV | Fig.5 |
| DTMF gain 2 (20) | $G_{D1}$ (20) | 30 | 33 | 36 | dB | 20 | ON | ON | Vin=−40dBV | Fig.5 |
| DTMF gain 2 (30) | $G_{D2}$ (30) | 30 | 33 | 36 | dB | 30 | ON | ON | Vin=−40dBV | Fig.5 |
| DTMF gain 2 (90) | $G_{D2}$ (90) | 27 | 30 | 33 | dB | 90 | ON | ON | Vin=−40dBV | Fig.5 |
| DTMF distortion attenuation | $D_D$ | — | −41 | −28 | dB | 20~90 | — | ON | Vin=−40dBV | Fig.5 |
| DTMF noise level | $N_D$ | — | −64 | −55 | dBV | 20~90 | — | ON | BPF=400Hz ~30kHz | Fig.5 |
| Maximum DTMF output level (20 - 90) | $O_D$ (20 - 90) | −4.5 | −0.5 | — | dBV | 20~90 | — | ON | Dist=−28dB | Fig.5 |
| Maximum DTMF output level (30 - 90) | $O_D$ (30 - 90) | −3.5 | −0.5 | — | dBV | 30~90 | — | ON | Dist=−28dB | Fig.5 |
| AT gain 1 | $G_{A1}$ | 23.5 | 26.5 | 29.5 | dB | 20~90 | — | ON | $S_1$=1 Vin=−40dBV | Fig.6 |
| AT gain 2 | $G_{A2}$ | 26.5 | 29.5 | 32.5 | dB | 20~90 | — | ON | $S_1$=2 Vin=−40dBV | Fig.6 |
| AC impedance | $Z_{TEL}$ | 450 | 565 | 750 | Ω | 20~90 | — | — | Vin=−20dBV | Fig.7 |
| Vcc pin voltage | $V_{CCR}$ | 1.15 | 1.27 | — | V | 20 | — | — | $S_3$=ON | Fig.2 |

● Measurement circuits

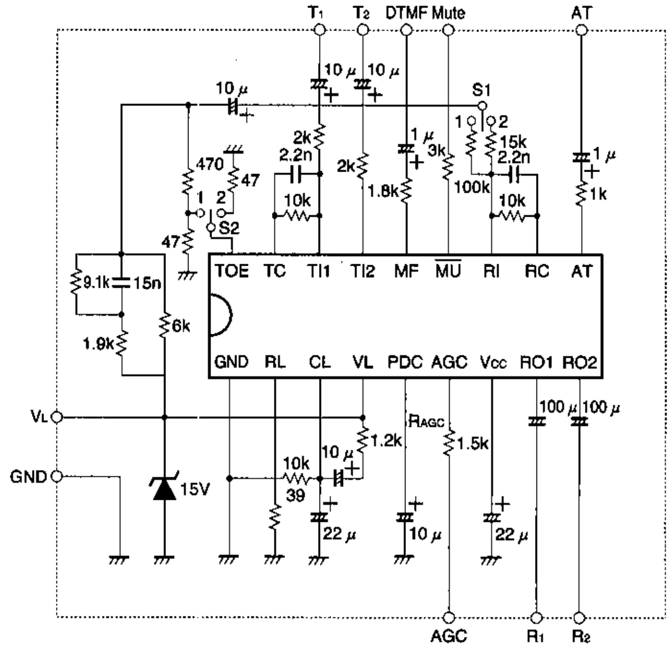



Fig. 1

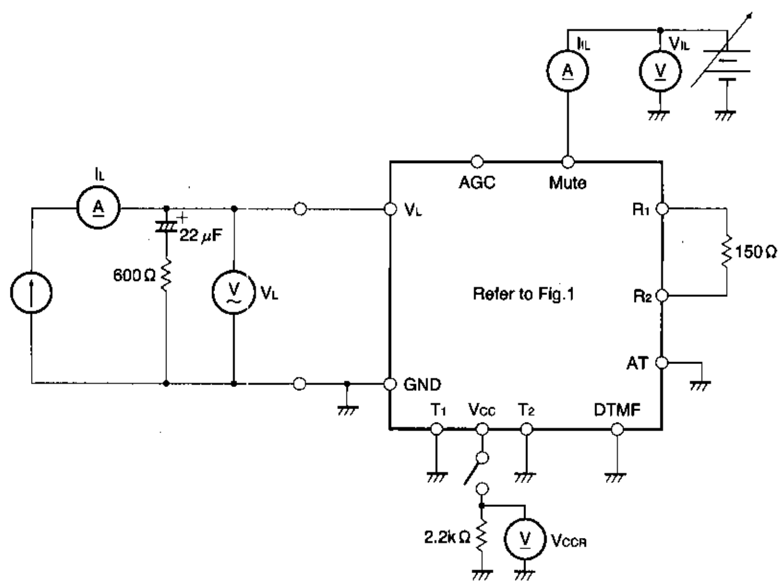



Fig. 2

●Measurement circuits

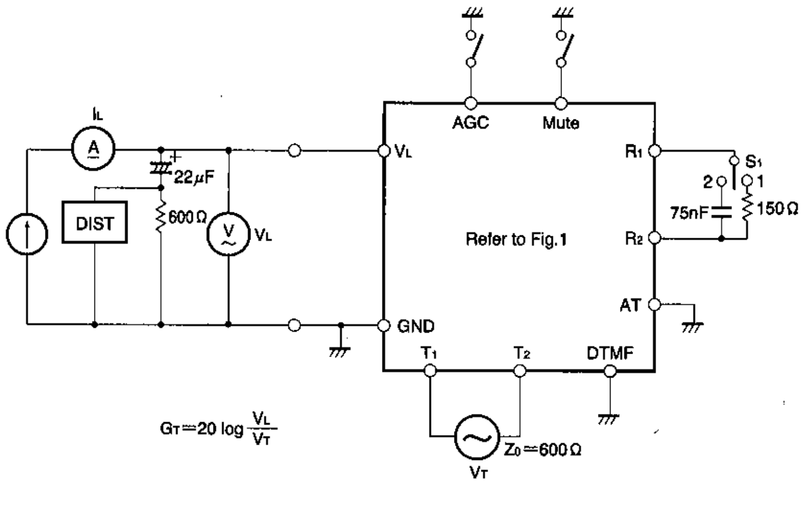



Fig. 3

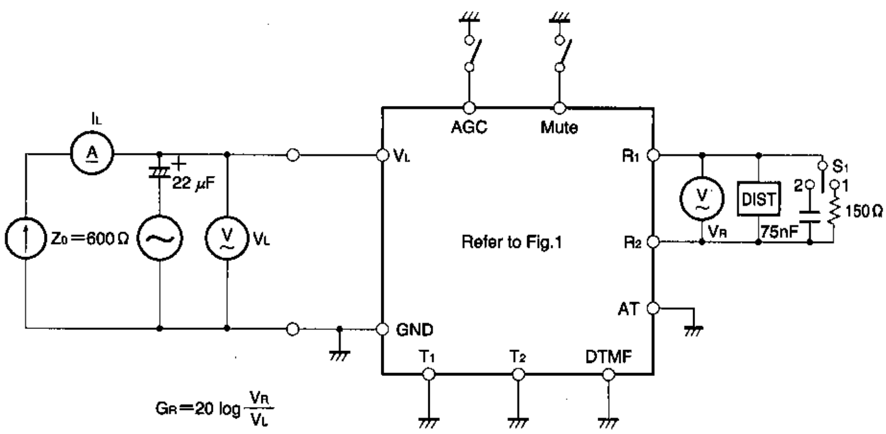



Fig. 4

●Measurement circuits

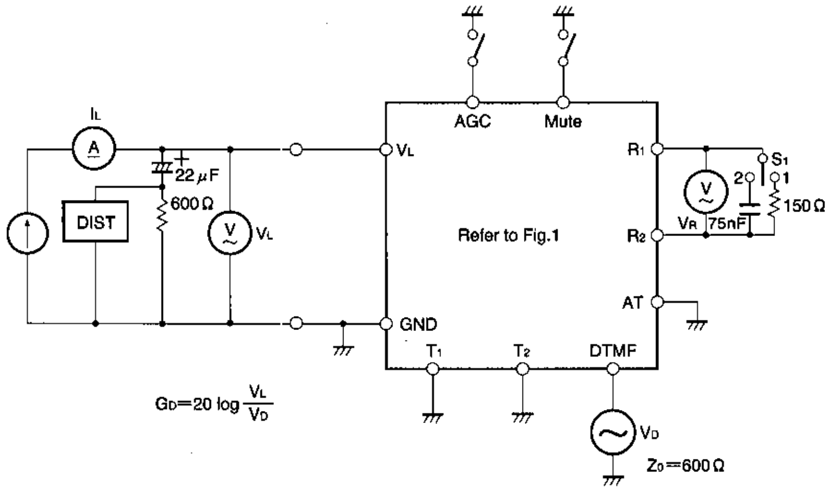



Fig. 5

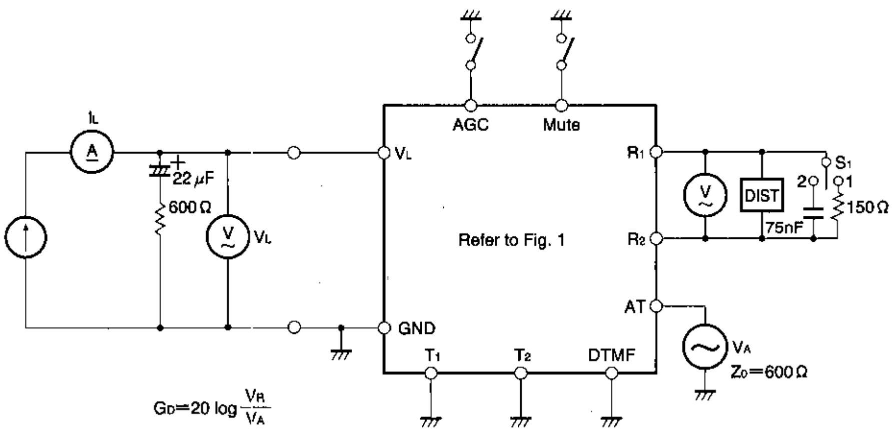
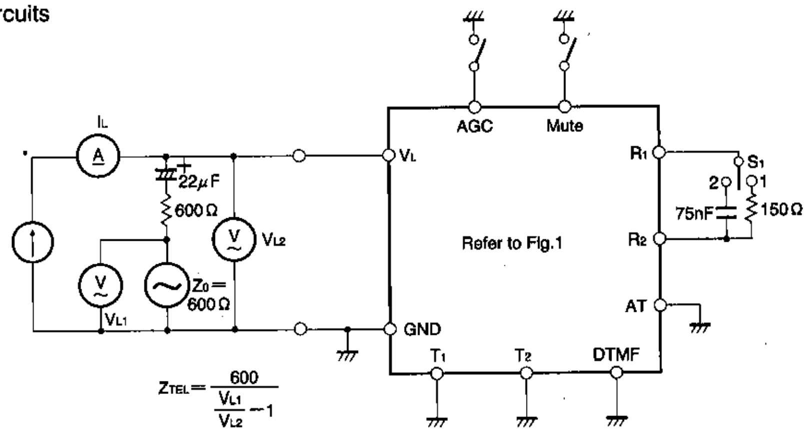



Fig. 6

●Measurement circuits

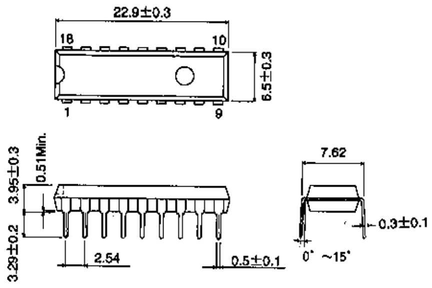



$$Z_{TEL} = \frac{600}{\frac{V_{L1}}{V_{L2}} - 1}$$

Fig. 7

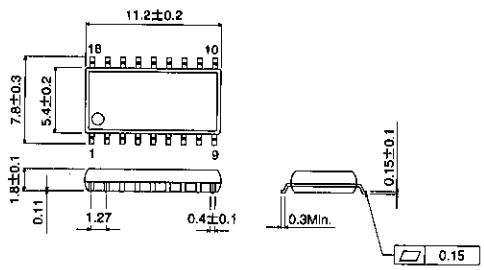
● External dimensions (Units: mm)

BA6566



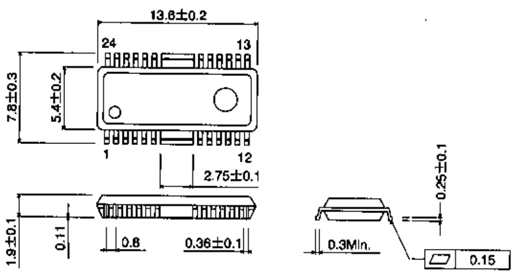

DIP18

BA6566F




SOP18

BA6566FP




HSOP24