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Direct Conversion FSK Data Receiver Advance Information

Supersedes the October 1994 edition, DS4003 - 1.4

DS4003 - 2.2 September 1995

This device is an advanced direct conversion receiver for operation up to 470MHz. The design is based on the SL6609A but is specifically designed for use in very small pagers i.e. credit card sized, where local oscillator re-radiation is a problem. This design has overcome this difficulty.

The device also includes a 1 volt regulator capable of sourcing up to 5mA, a battery flag and the facility of incorporating a more complex post detection filter off-chip. Both battery flag and data outputs have open collector outputs to ease their interface with other devices.

Adjacent channel rejection is provided using tuneable gyrator filters. To assist operation in the presence of large interfering signals both RF and audio AGC functions are provided.

FEATURES

- Very low power operation - typ 3.0mW
- Superior sensitivity of -130dBm
- Operation at wide range of paging data rates 512, 1200, 2400 baud
- Small package offering SSOP
- Excellent performance of LO Rejection

APPLICATIONS

- Credit card pagers
- Watch pagers
- Small form factor pagers i.e. PCMCIA

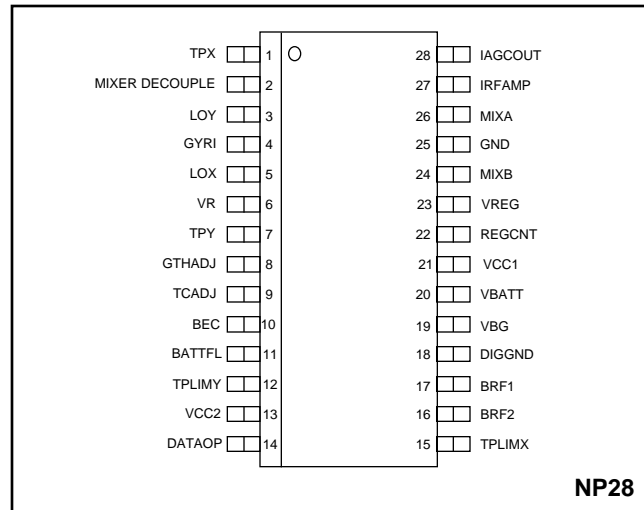


Fig.1 Pin connections

ABSOLUTE MAXIMUM RATINGS

| | |
|-----------------------|-----------------|
| Supply voltage | 6V |
| Storage temperature | -55°C to +150°C |
| Operating temperature | -20°C to +70°C |

ORDERING INFORMATION

- SL6610 / KG / NPDS - SSOP devices in anti-static sticks
- SL6610 / KG / NPDE - SSOP devices in tape and reel

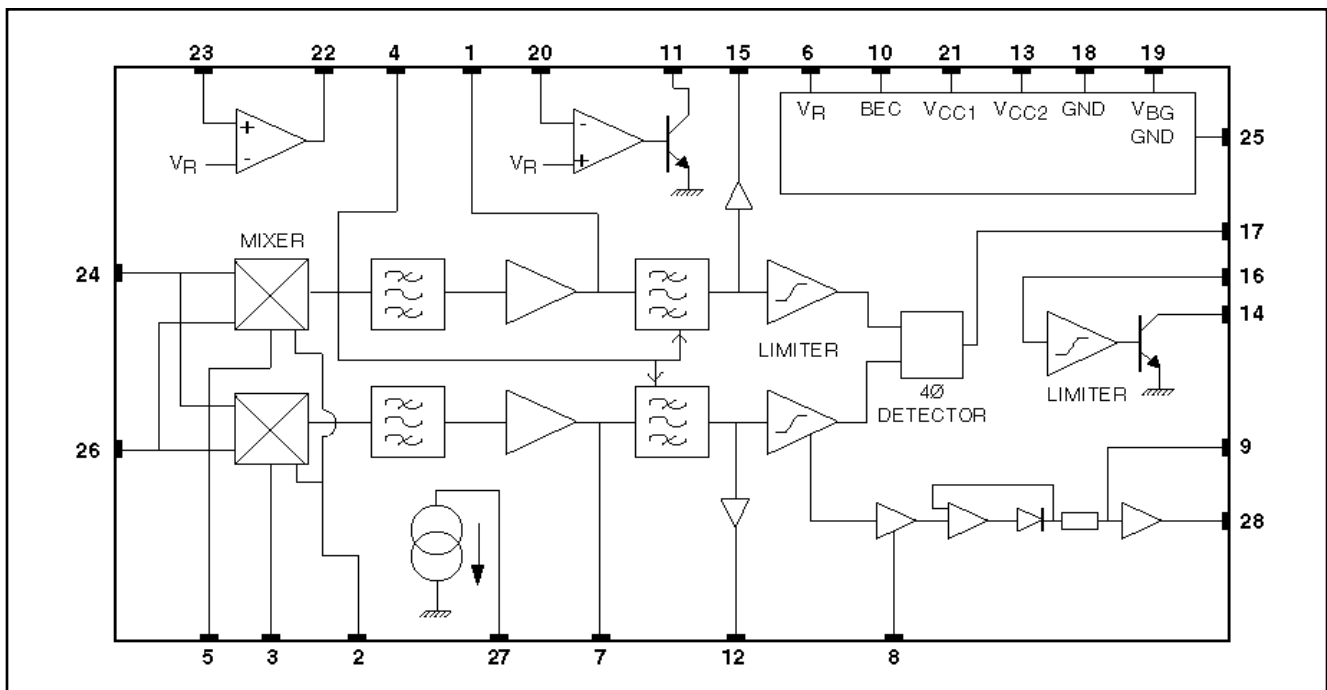


Fig.2 Block diagram of SL6610

SL6610

ELECTRICAL CHARACTERISTICS

These characteristics are guaranteed over the following conditions unless otherwise stated:

Tamb = 25°C, VCC1 = 1.3V, VCC2 = 2.7V

| Characteristics | Pin | Value | | | Units | Comments |
|-------------------------------|----------|-------|------|------|-------|--------------------------------------------------------------------------------------------------------------------------------|
| | | Min | Typ | Max | | |
| VCC1 - Supply voltage | 21 | 0.95 | 1.3 | 2.8 | V | VCC1 ≤ VCC2 - 0.7 volts |
| VCC2 - Supply voltage | 13 | 1.8 | 2.7 | 3.5 | V | |
| ICC1 - Supply current | 21,27,28 | | 1.5 | 1.8 | mA | Includes IRF. Does not include regulator supply. Audio AGC inactive Batt flag & Data O/P high Pin 27 voltage: 0.3 - 1.3V |
| ICC2 - Supply current | 11,13,14 | | 550 | 700 | µA | |
| Power down ICC1 | 21,27,28 | | | 1 | µA | |
| Power down ICC2 | 11,13,14 | | | 8 | µA | |
| 1 volt regulator | 23 | 0.95 | 1.0 | 1.05 | V | I Load = 3mA. Ext PNP. β ≥ 100, V _{CE} = 0.1 volt |
| Band gap voltage reference | 19 | 1.15 | 1.21 | 1.27 | V | VCC1 > 1.1V |
| Band gap current source | 19 | | | 20 | µA | |
| Voltage reference | 6 | 0.93 | 1.0 | 1.07 | V | |
| Voltage reference sink/source | 6 | | | 10 | µA | |
| 1 volt regulator load current | | 0.25 | 3 | 5 | mA | |
| Turn on Time | | | 5 | | ms | Stable data o/p when 3dB above sensitivity. C _{BG} and C _{VR} = 2.2µF |
| Turn off Time | | | 1 | | ms | Fall to 10% of steady state current C _{BG} and C _{VR} = 2.2µF |
| Detector output current | 17 | | +/-4 | | µA | |
| RF current source | | | | | | |
| Current Source (IRF) | 27 | 400 | 500 | 600 | µA | Pin 27 voltage: 0.3 - 1.3V |
| Decoder | | | | | | |
| Sensitivity | | 40 | | | µVrms | Signal injected at TPX and TPY B.E.R. ≤ 1 in 30 5KHz deviation @ 1200 bits/sec BRF capacitor = 1nF |
| Output mark space ratio | 14 | 7:9 | | 9:7 | | |
| Data O/P Sink Current | 14 | 100 | | 500 | µA | Output logic low |
| Data O/P Leakage Current | 14 | | | 1.0 | µA | Output logic high |

ELECTRICAL CHARACTERISTICS

These characteristics are guaranteed over the following conditions unless otherwise stated:

T_{amb} = 25°C, V_{CC1} = 1.3V, V_{CC2} = 2.7V

| Characteristics | Pin | Value | | | Units | Comments |
|----------------------------|--------|--------------------------|------|-----|-------|----------------------------------------------------------------------------------------------|
| | | Min | Typ | Max | | |
| Battery Economy | | | | | | |
| Input logic high | 10 | (V _{CC2} - 0.3) | | | V | Powered Up |
| Input logic low | 10 | | | 0.3 | V | Powered Down |
| Input current | 10 | | 0.05 | 1 | µA | Powered Up |
| Input current | 10 | | 6 | 8 | µA | Powered down transient initial |
| Battery Flag Input | | | | | | |
| Input current | 20 | | | 1 | µA | |
| Battery Flag Output | | | | | | |
| Battfl Sink Current | 11 | 50 | | 500 | µA | (VBATT-VR) > 20mV |
| Battfl leakage current | 11 | | | 1 | µA | (VBATT-VR) < -20mV |
| Mixers | | | | | | |
| Gain to "IF Test" | | 34 | | 41 | dB | LO inputs driven in parallel with 50mVRMS @ 50MHz. IF = 2kHz See Figs.8a, 8b See Fig.9 |
| RF input impedance | 24, 26 | | | | | Equal to Pin 21 (VCC1) |
| LO input impedance | 3, 5 | | | | | |
| LO DC bias voltage | 3, 5 | | | | V | |
| Audio AGC | | | | | | |
| Max Audio AGC Sink Current | 28 | 45 | 65 | 85 | µA | |

RECEIVER CHARACTERISTICS (Demonstration board)

Measurement conditions unless stated V_{CC1} = 1.3V, V_{CC2} = 2.7V, LNA = 18dB Power Gain, 2dB Noise figure,

Carrier frequency 153MHz, BER 1 in 30, T_{amb} = 25°C

(TPx/TPy typically:- 160mV_{pp} ± 10% for -73dBm RF input to the LNA)

| Characteristics | Pin | Value | | | Units | Comments |
|-----------------------------|-----|-------|--------|------|-------|-----------------------------------------------------------|
| | | Min | Typ | Max | | |
| Sensitivity | | -130 | -128 | -125 | dBm | 1200 bps f = 4kHz LO = -18dBm |
| Intermodulation | | 52 | 56 | | dB | 1200 bps f = 4kHz LO = -18dBm |
| Adjacent channel | | 68 | 73 | | dB | 1200 bps f = 4kHz LO = -18dBm Channel spacing 25kHz |
| Centre frequency acceptance | | | +/-2.3 | | kHz | 1200 bps f = 4kHz LO = -18dBm |
| Deviation acceptance | | | +/-2.2 | | kHz | 1200 bps f = 4kHz LO = -18dBm |

SL6610

RECEIVER CHARACTERISTICS (Demonstration board)

Measurement conditions unless stated $V_{CC1} = 1.3V$, $V_{CC2} = 2.7V$, LNA = 20dB Power Gain, 2dB Noise figure,

Carrier frequency 282MHz, BER 1 in 30, $T_{amb} = 25^{\circ}C$

(TPx/TPy typically:- $160mV_{pp} \pm 10\%$ for -73dBm RF input to the LNA)

| Characteristics | Pin | Value | | | Units | Comments |
|-----------------------------|-----|----------|----------------|--------------|------------|----------------------------------------------------------------------------------|
| | | Min | Typ | Max | | |
| Sensitivity | | -130 | -128 -125.5 | -125 -122 | dBm dBm | 1200 bps f = 4kHz 2400 bps f = 4.5kHz LO = -15dBm |
| Intermodulation (IP3) | | 52 49 | 56 53.5 | | dB | 1200 bps f = 4kHz 2400 bps f = 4.5kHz LO = -15dBm |
| Intermodulation (IP2) | | 47 | 52 | | dB | 1200 bps f = 4kHz LO = -15dBm |
| Adjacent channel | | 67 64 | 72.5 69.5 | | dB | 1200 bps f = 4kHz 2400 bps f = 4.5kHz LO = -15dBm Channel spacing 25kHz |
| Centre frequency acceptance | | +/-1.9 | +/-2.3 +/-2 | | kHz | 1200 bps f = 4kHz 2400 bps f = 4.5kHz LO = -15dBm |
| Deviation acceptance | | | +/-2.2 +/-2 | | kHz | 1200 bps f = 4kHz 2400 bps f = 4.5kHz LO = -15dBm |

RECEIVER CHARACTERISTICS

Measurement conditions unless stated $V_{CC1} = 1.3V$, $V_{CC2} = 2.7V$, LNA = 22dB Power Gain, 2dB Noise figure,

Carrier frequency 470MHz, BER 1 in 30, $T_{amb} = 25^{\circ}C$

(TPx/TPy typically:- $140mV_{pp} \pm 10\%$ for -73dBm RF input to the LNA)

| Characteristics | Pin | Value | | | Units | Comments |
|-----------------------------|-----|-------|---------|------|-------|-----------------------------------------------------------|
| | | Min | Typ | Max | | |
| Sensitivity | | -128 | -126 | -123 | dBm | 1200 bps f = 4kHz LO = -15dBm |
| Intermodulation | | 50 | 55.5 | | dB | 1200 bps f = 4kHz LO = -15dBm |
| Adjacent channel | | 67 | 72.5 | | dB | 1200 bps f = 4kHz LO = -15dBm Channel spacing 25kHz |
| Centre frequency acceptance | | | +/- 2.3 | | kHz | 1200 bps f = 4kHz LO = -15dBm |
| Deviation acceptance | | | +/- 2.2 | | kHz | 1200 bps f = 4kHz LO = -15dBm |

RECEIVER CHARACTERISTICS (Demonstration board)

Measurement conditions unless stated LNA = 18dB Power Gain, 2dB Noise figure,

Carrier frequency 282MHz, BER 1 in 30, Tamb = 0 to 45°C, Vcc2 = 2.7V, Vcc1 = 1.2V to 1.6V**(TPx/TPy typically:- 120mV_{pp} ± 10% for - 73dBm RF input to the LNA)**

| Characteristics | Pin | Value | | | Units | Comments |
|----------------------------------------------|-----|--------|--------|-----|-----------|-----------------------------------------------------------|
| | | Min | Typ | Max | | |
| Sensitivity (Desense from 25°C, Vcc1 = 1.3V) | | | | 1.5 | dB | 1200 bps f = 4kHz LO = -15dBm |
| Intermodulation (IP3) | | 53 | 58 | | dB | 1200 bps f = 4kHz LO = -15dBm |
| Intermodulation (IP2) | | 47 | 53 | | dB | 1200 bps f = 4kHz LO = -15dBm |
| Adjacent channel | | 66 | 72.5 | | dB kHz | 1200 bps f = 4kHz LO = -15dBm Channel spacing 25kHz |
| Centre frequency acceptance | | +/-1.8 | +/-2.3 | | kHz | 1200 bps f = 4kHz LO = -15dBm |
| Deviation acceptance | | | +/-2.2 | | kHz | 1200 bps f = 4kHz LO = -15dBm |
| LO Rejection:- | | | | | | |
| 0.5dB Sensitivity loss | | -59 | -55 | | dBm | Level of local oscillator at the RF input to the LNA |
| 3dB Sensitivity loss | | -52 | -48 | -44 | dBm | |

SL6610

OPERATION OF SL6610

The SL6610 is a Direct Conversion Receiver designed for use up to 470MHz. It is available in a 28 pin SSOP package and it integrates all the facilities required for the conversion of an RF FSK signal to a base-band data signal.

Low Noise Amplifier

To achieve optimum performance it is necessary to incorporate a Low Noise RF Amplifier at the front end of the receiver. This is easily biased using the on chip voltage and current sources provided.

All voltages and current sources used for bias of the RF amplifier, receiver and mixers should be RF decoupled using suitable capacitors (see fig.4 for a suitable Low-Noise-Amplifier).

Local Oscillator

The Local Oscillator signal is applied to the device in phase quadrature. This can be achieved with the use of two RC networks operating at the $-3\text{dB}/45^\circ$ transfer characteristic, giving a full 90° phase differential between the LO ports of the device. Each LO port of the device also requires an equal level of drive from the Oscillator. (see Fig.5).

Gyrator Filters

The on chip filters include an adjustable gyrator filter. This may be adjusted with the use of an additional resistor between pin 4 and GND. This allows flexibility of filter characteristics and also allows for compensation for possible process variations.

Audio AGC

The Audio AGC fundamentally consists of a current sink which is controlled by the audio (baseband data) signal. It has three parameters that may be controlled by the user. These are the Attack (turn on) time, Decay (duration) time and Threshold level (see Fig.6 and 7). See Application note for details.

Regulator

The on chip regulator must be used in conjunction with a suitable PNP transistor to achieve regulation. As the transistor forms part of the regulator feedback loop the transistor should exhibit the following characteristics:-

$$H_{FE} > = 100 \text{ for } V_{CE} > = 0.1\text{V}$$

| Pin Number | Pin Name | Pin Description |
|------------|----------|------------------------------------------------------------------------------------------------------------------------|
| 1 | TPX | X channel pre-gyrator filter test-point. This can be used for input and output |
| 2 | MIX-DEC | Mixer bias de-couple pin |
| 3 | LOY | LO input channel Y |
| 4 | GYRI | Gyrator current adjust pin |
| 5 | LOX | LO input channel X |
| 6 | VR | VREF 1.0 V internal signal ground |
| 7 | TPY | Y channel pre-gyrator filter test point, input or output |
| 8 | GTHADJ | Audio AGC gain and threshold adjust. RSSI signal indicator |
| 9 | TCADJ | Audio AGC time constant adjust |
| 10 | BEC | Battery economy control |
| 11 | BATFL | Battery flag output |
| 12 | TPLIMY | Y channel limiter (post gyrator filter) test point, output only |
| 13 | VCC2 | Supply connection |
| 14 | DATAOP | Data output pin |
| 15 | TPLIMX | X channel limiter (post gyrator filter) test point, output only |
| 16 | BRF2 | Bit rate filter 2, input to data output stage |
| 17 | BRF1 | Bit rate filter 1, output from detector |
| 18 | DIG GND | Digital ground |
| 19 | VBG | Bandgap voltage output |
| 20 | VBATT | Battery flag input voltage |
| 21 | VCC1 | Supply connection |
| 22 | REGCNT | 1V regulator control external PNP drive |
| 23 | VREG | 1V regulator output voltage |
| 24 | MIXB | Mixer input B |
| 25 | GND | Ground |
| 26 | MIXA | Mixer input A |
| 27 | IRFAMP | Current source for external LNA. Value of current output will decrease at high mixer input signal levels due to RF AGC |
| 28 | IAGCOUT | Audio AGC output current |

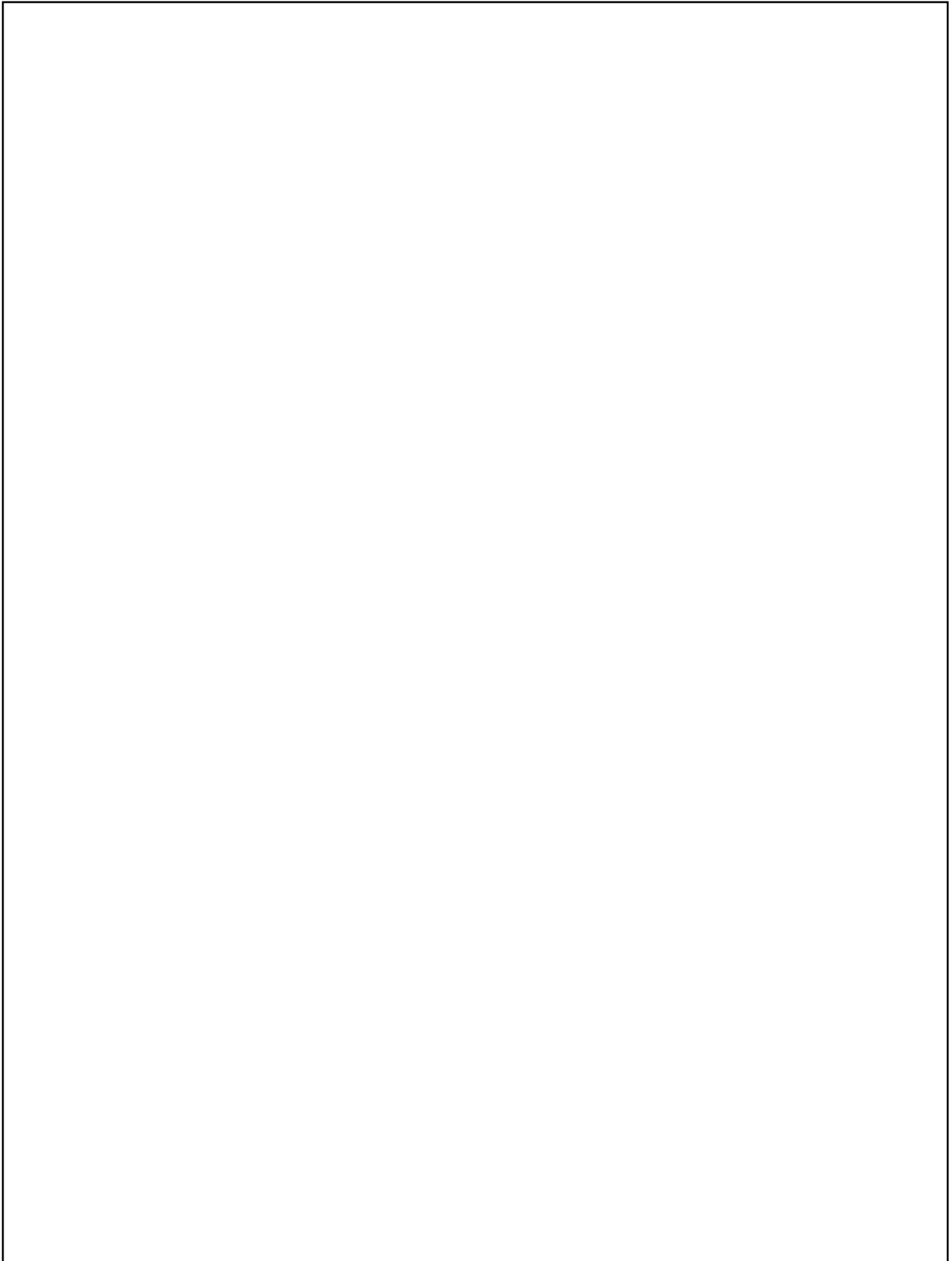


Fig.3 Application circuit board

SL6610

COMPONENTS LIST FOR APPLICATION BOARD At 282MHz, 25kHz Channel Spacing.

(LO Circuit in Fig.3)

Resistors

| | |
|-----|---------------------|
| R1 | open circuit |
| R2 | not used |
| R3 | 100 |
| R4 | 100k |
| R5 | 1k |
| R6 | 1k |
| R7 | 100 |
| R8 | open circuit |
| R9 | 220k |
| R10 | 1M |
| R11 | 100k ⁽⁶⁾ |
| R12 | not used |
| R13 | 1k5 ⁽¹⁾ |
| R14 | 4k7 |
| R15 | 4k7 |
| R16 | 33k |
| R17 | not used |
| R18 | 0R ⁽³⁾ |
| R19 | 10k |
| R20 | 620 |
| R21 | 1k |
| R22 | open circuit |

Capacitors

| | |
|------|-------------------|
| C1 | 1n |
| C2 | 2p7 |
| C3 | 4p7 |
| C4 | 1n |
| C5 | 2p7 |
| C6 | 2u2 |
| C7 | 1n |
| C8 | 100n |
| C9 | 1n ⁽²⁾ |
| C10 | 2u2 |
| C11 | 100n |
| C12 | 1n |
| C13 | 1n |
| C14 | 1n |
| C15 | 1n |
| C16 | 1n |
| C17 | 1n |
| C17a | 1n |

Notes

1. The values of R13 is determined by the set-up procedure. See Application Note.
2. The value of C9 is determined by the output data rate. Use 2nF for 512bps, 1nF for 1200bps and 470pF for 2400bps.
3. L2 is used in the Audio AGC circuit (see Fig. 6). For the characteristics of the Audio AGC current source see Fig.7. If the audio AGC is not required then the current source (Pin 28) may be disabled by connecting Pin 9 (TCADJ) to VR (Pin 6) and by connecting Pin 28 (IAGCOUT) to Vcc1, (R18). The voltage at Pin 8 may still be used as an RSSI. R9, C8, C14, C19, R17 and D1 may then be omitted. See Fig.6 for AGC component values.

| | |
|-----|----------|
| C18 | 1n |
| C19 | 100n |
| C20 | 1n |
| C21 | 1n |
| C22 | not used |
| C23 | 1n |
| C24 | 1n |
| C25 | 1n |
| C26 | 6p8 |
| C27 | 1n |
| C28 | 1n |
| C29 | 100p |
| C30 | 2u2 |
| C31 | 2u2 |
| C32 | 4p7 |
| C33 | 4p7 |
| C34 | 3p3 |
| C35 | not used |
| VC1 | 1-10p |
| VC2 | 1-10p |
| VC3 | 1-10p |

Inductors

| | |
|----|-------------------------|
| L1 | 68n ⁽⁴⁾ |
| L2 | not used ⁽³⁾ |
| L3 | 470n |
| L4 | 39n |
| L5 | 680n |

Active Components

| | |
|----|--------------------------------|
| Q1 | FM5T589 |
| Q2 | 2SC5065 (Toshiba) |
| Q3 | BFT25A (Philips) |
| Q4 | not used |
| Q5 | 2SC5065 (Toshiba) |
| D1 | Panasonic MA862 ⁽⁵⁾ |

Misc

| | |
|------|-------------------------------|
| T1 | 30nH 1:1 Coilcraft M1686-A |
| Xtal | 5th Overtone 94.075MHz |

4. L1 and C26 form the low noise matching network for the RF amplifier. The values given are for the RF amplifier specified in the Applications Circuit with no Audio AGC connected. i.e. R17 and D1 omitted.
5. Suggested diode for use with the Audio AGC circuit (see Fig.6) (D1 is not included on the general demonstration circuit).
6. The value of R11 is dependent on the data output load. R11 should allow sufficient current to drive the data output load.

COMPONENTS LIST FOR APPLICATION BOARD At 470MHz, 25kHz Channel Spacing.
(LO circuit is 50 network as in Fig.5 - crystal oscillator not specified)

Resistors

| | | | |
|-----|-----------------------------|-----|--------------|
| R1 | open circuit | C14 | 1n |
| R2 | not used | C15 | 1n |
| R3 | 100 | C16 | 1n |
| R4 | 100k | C17 | 1n |
| R5 | 100 | C18 | 1n |
| R6 | 100 | C19 | 100n |
| R7 | 100 | C20 | 1n |
| R8 | open circuit | C21 | 1n |
| R9 | 220k | C22 | not used |
| R10 | 1M | C23 | not used |
| R11 | 100k ⁽²⁾ | C24 | 1n |
| R12 | 300 ⁽³⁾ | C25 | 1n |
| R13 | 3k9 ⁽¹⁾ | C26 | open circuit |
| R14 | 4k7 | C27 | not used |
| R15 | 4k7 | C28 | not used |
| R16 | 33k | C29 | 100p |
| R17 | open circuit ⁽⁴⁾ | C30 | 2u2 |
| R18 | 0R ⁽⁴⁾ | C31 | 2u2 |
| R22 | open circuit | C34 | 1p5 |
| | | VC1 | 1-3pF |

Capacitors

| | |
|-----|-------------------|
| C1 | 1n |
| C2 | 3.3pF |
| C3 | 1n |
| C4 | 1n |
| C5 | 3.9pF |
| C6 | 2u2 |
| C7 | 1n |
| C8 | 100n |
| C9 | 1n ⁽²⁾ |
| C10 | 2u2 |
| C11 | 100n |
| C12 | 1n |
| C13 | 1n |

Inductors

| | |
|----|-------------------------------------|
| L1 | 47nH ⁽⁵⁾ |
| L2 | not used ⁽³⁾ |
| T1 | 16nH 2 Turn 1:1 (Coilcraft) Q4123-A |

Active Components

| | |
|----|--------------------------------|
| Q1 | Zetex FM589 |
| Q2 | Philips BFT25A |
| Q3 | Not Used |
| Q4 | Philips BFT25A ⁽³⁾ |
| Q5 | Philips BFT25A |
| D1 | Panasonic MA862 ⁽⁶⁾ |

Notes

- The values of R13 is determined by the set-up procedure. See Application Note.
- The value of "C9" is determined by the output data rate. Use 2nF for 512bps, 1nF for 1200bps and 470pF for 2400bps.
- R12 & Q4 form a dummy load for the regulator. Permitted load currents for the regulator are 250µA to 5mA. The 1V regulator (output Pin 23) can be switched off by connecting Pin 23 directly to VCC2. Q1, Q4, R12 and C12 must then be omitted
- L2 is used in the Audio AGC circuit (see Fig.6). For the characteristics of the Audio AGC current source see figure 7. If the Audio AGC is not required then the current source (Pin 28) may be disabled by connecting Pin 9 (TCADJ) to VR (Pin 6) and by connecting Pin 28 (IAGCOUT) to Vcc1, (R18). The voltage at Pin 8 may still be used as an RSSI. R9, C8, C14, C19, R17 and D1 may then be omitted.
- L1 and C26 form the low noise matching network for the RF amplifier. The values given are for the RF amplifier specified in the Applications Circuit with no Audio AGC connected. i.e. R17 and D1 omitted.
- Suggested diode for use with the Audio AGC circuit (D1 is not included on the general demonstration circuit).
- The value of R11 is dependent on the data output load. R11 should allow sufficient current to drive the data output load.

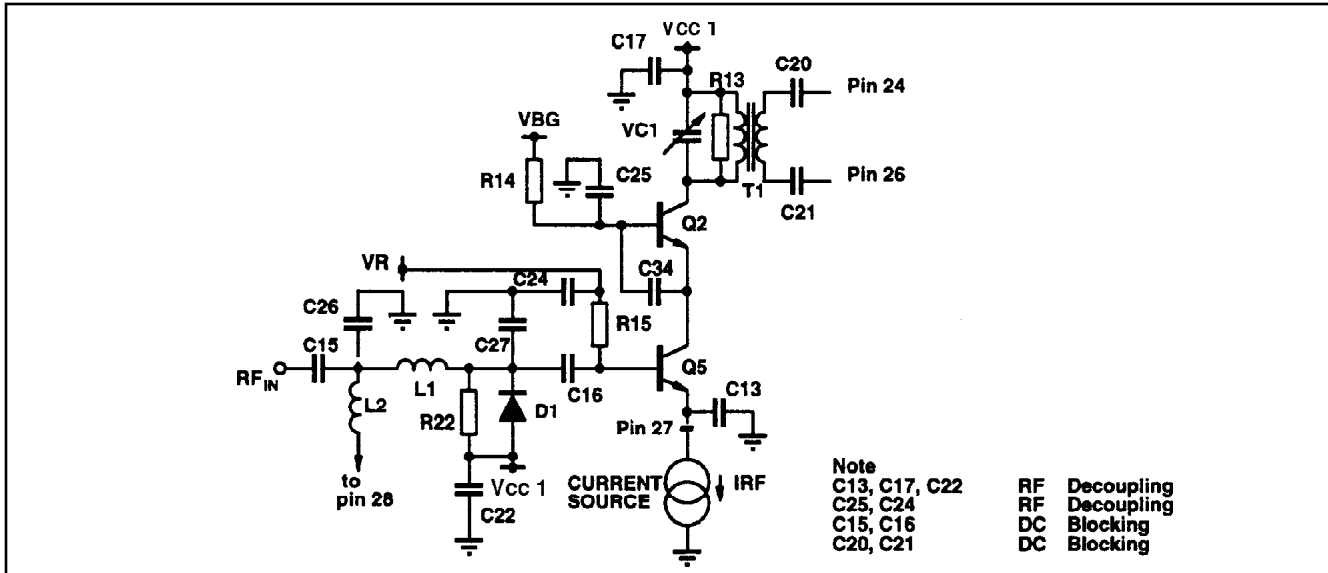


Fig.4 RF amplifier

RF Amplifier Components Values

| | | | | |
|-----------|------------|------------|----------------|----------------------|
| Resistors | | Capacitors | | Active components |
| R14, R15 | 4k7 | C13, C15 | 1nF | D1 MA862 (Panasonic) |
| R13 | see note 1 | C16, C17 | 1nF | |
| R22 | 47k | C20, C21 | 1nF see note 2 | |
| | | C24, C25 | 1nF | |
| | | L2 | 820nH | |

Notes:

- (1) The value of R13 is determined by the set up procedure (See "Set up for optimum performance").
- (2) C20 and C21 are purely for demonstration purposes. Pin 24 and Pin 26 may be DC coupled provided that no DC voltage is applied to the mixer inputs.

Frequency Dependent Components

| | 153MHz | 280MHz | 450MHz |
|--------|-------------------|-------------------|-------------------|
| C26 | not used | 6.8p | not used |
| C27 | not used | not used | not used |
| L1 | 150nH | 68nH | 39nH |
| C34 | 3p3 | 2p2 | 1p5 |
| T1 | 100nH | 30nH | 16nH |
| VC1 | Coilcraft N2261-A | Coilcraft M1686-A | Coilcraft Q4123-A |
| Q4, Q5 | 1-10pF | 1-10pF | 1-3pF |
| | Toshiba 2SC5065 | Toshiba 2SC5065 | Philips BFT25A |

(See also Lo drive Network)

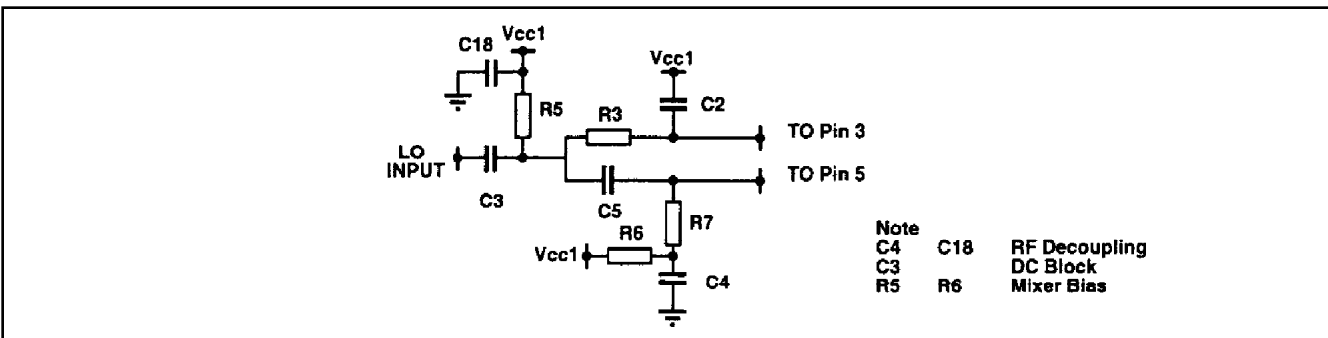


Fig.5 Local oscillator drive network

LO Drive Network Component Values

50Ohm input impedance (External LO injection)

| | 153MHz | 280MHz | 450MHz |
|--------------------------|--------|--------|--------|
| C2 | 10p | 5p6 | 3p3 |
| C5 | 10p | 5p6 | 3p9 |
| C3, C4, C18 = 1n | | | |
| R3, R5, R6, R7 = 100Ohms | | | |

Higher Input Impedance (crystal oscillator input)

| | 153MHz | 280MHz | 450MHz |
|--------------|-----------------------------------------------------------|--------|--------|
| C3 | Set by load allowable on crystal oscillator (typical 4p7) | | |
| C2 | 10p | 5p6 | 3p3 |
| C5 | 10p | 5p6 | 3p9 |
| R3 | 100 | 100 | 100 |
| R7 | 100 | 100 | 100 |
| R5, R6 = 1k | | | |
| C4, C18 = 1n | | | |

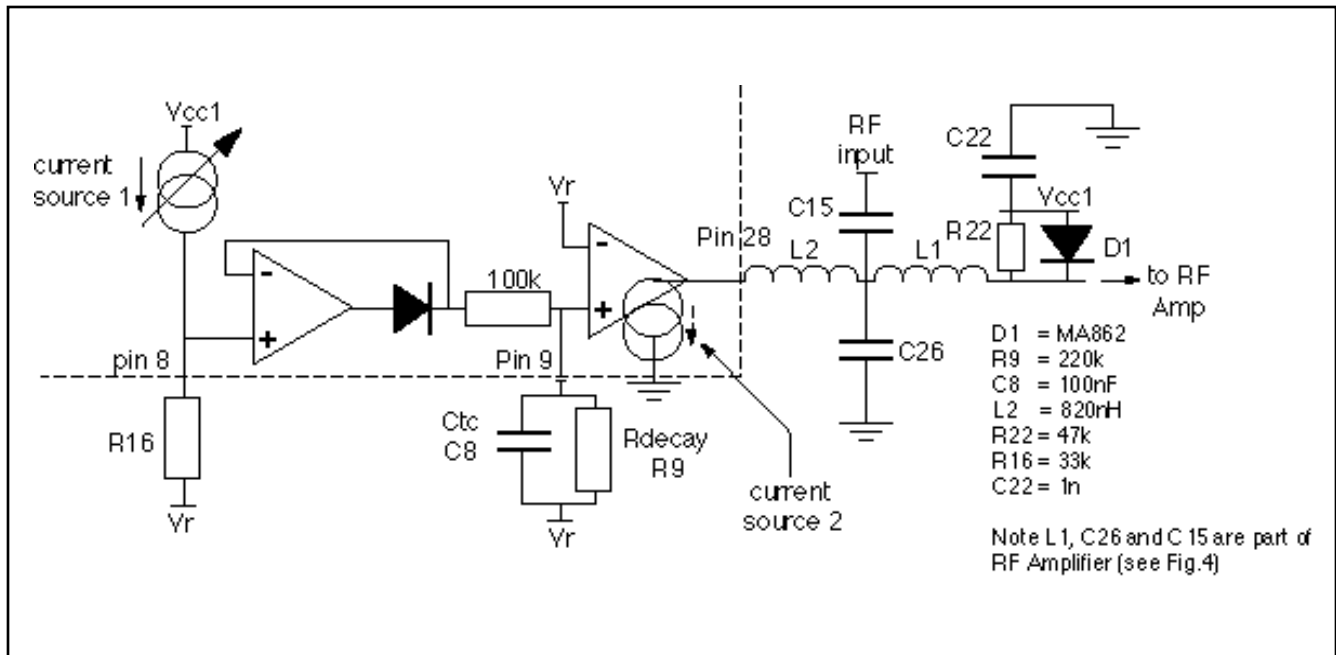


Fig.6 AGC Schematic

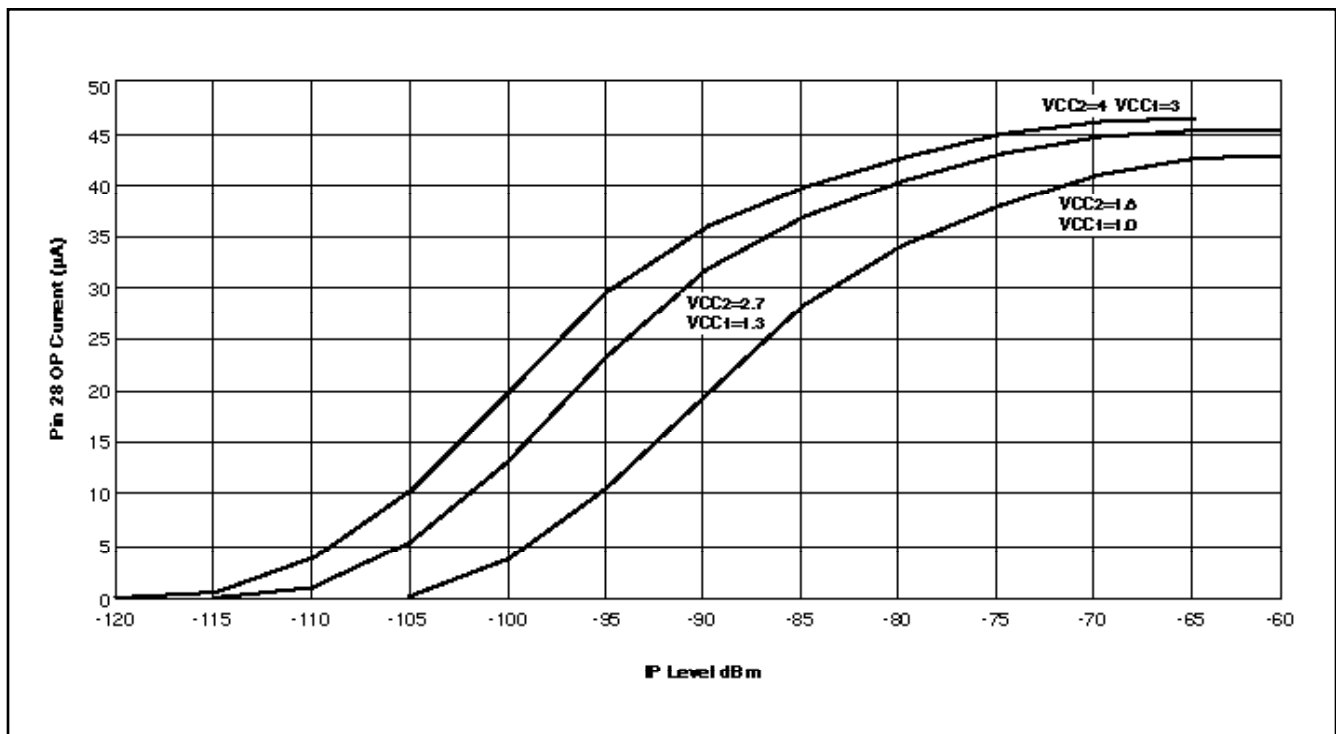


Fig.7 Audio AGC current vs. IP power at 25°C

SL6610

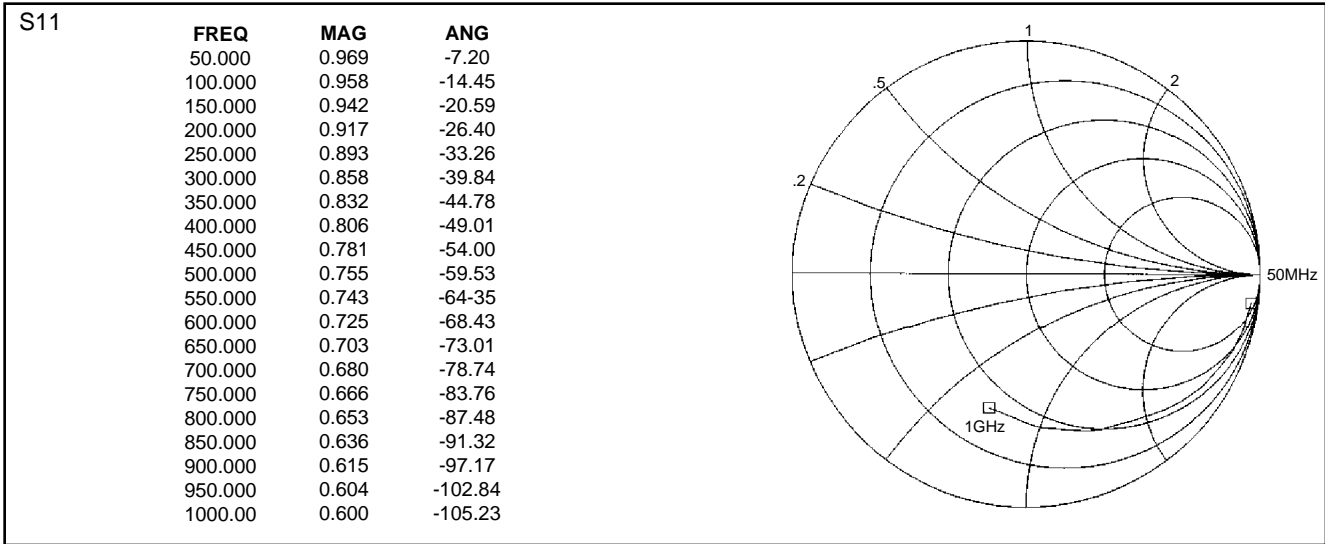


Fig.8a SL6609A Mixer A input S-Parameters

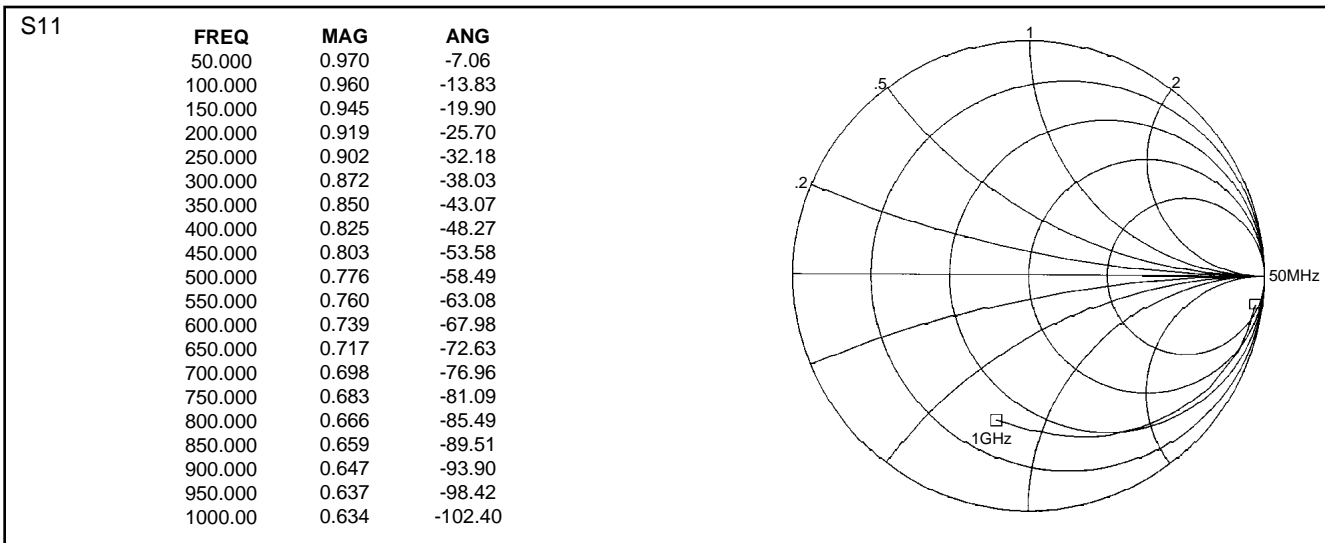


Fig.8b SL6609A Mixer B input S-Parameters

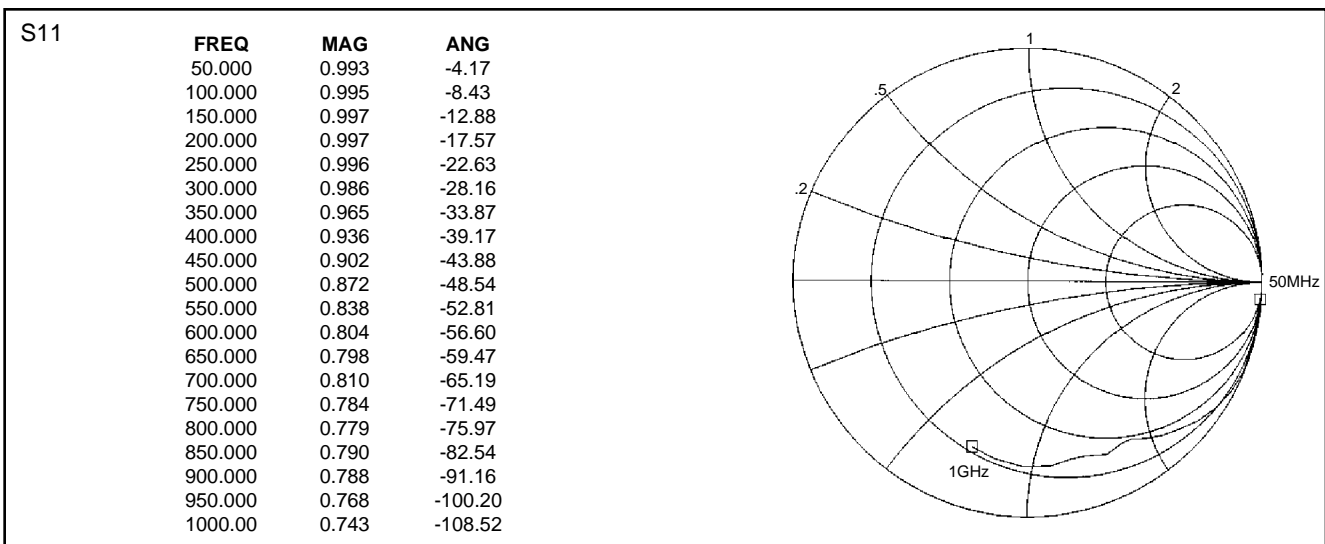


Fig.9 SL6609A LO X,Y inputs S-Parameters

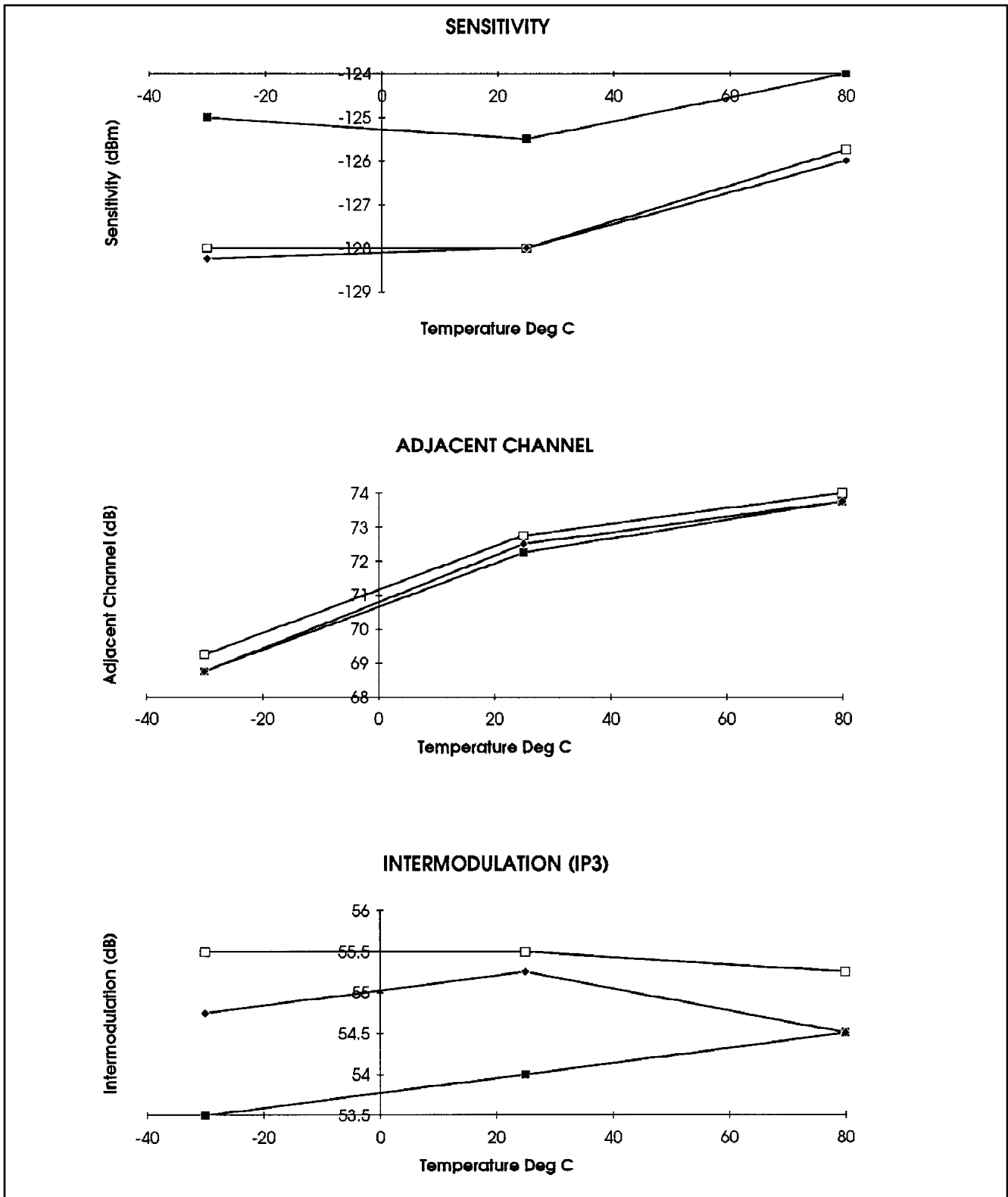


Fig.10a AC parameters vs. supply and temperature

Conditions:- 282MHz demonstration board i.e. 20dB LNA, 2dB noise figure, carrier frequency 282MHz, 1200bps baud rate, 4kHz deviation frequency, BER 1 in 30.

| | |
|---|--------------------------|
| ■ | Vcc1 = 1.0V, Vcc2 = 1.8V |
| □ | Vcc1 = 1.3V, Vcc2 = 2.7V |
| ◆ | Vcc1 = 3.0V, Vcc2 = 4.0V |

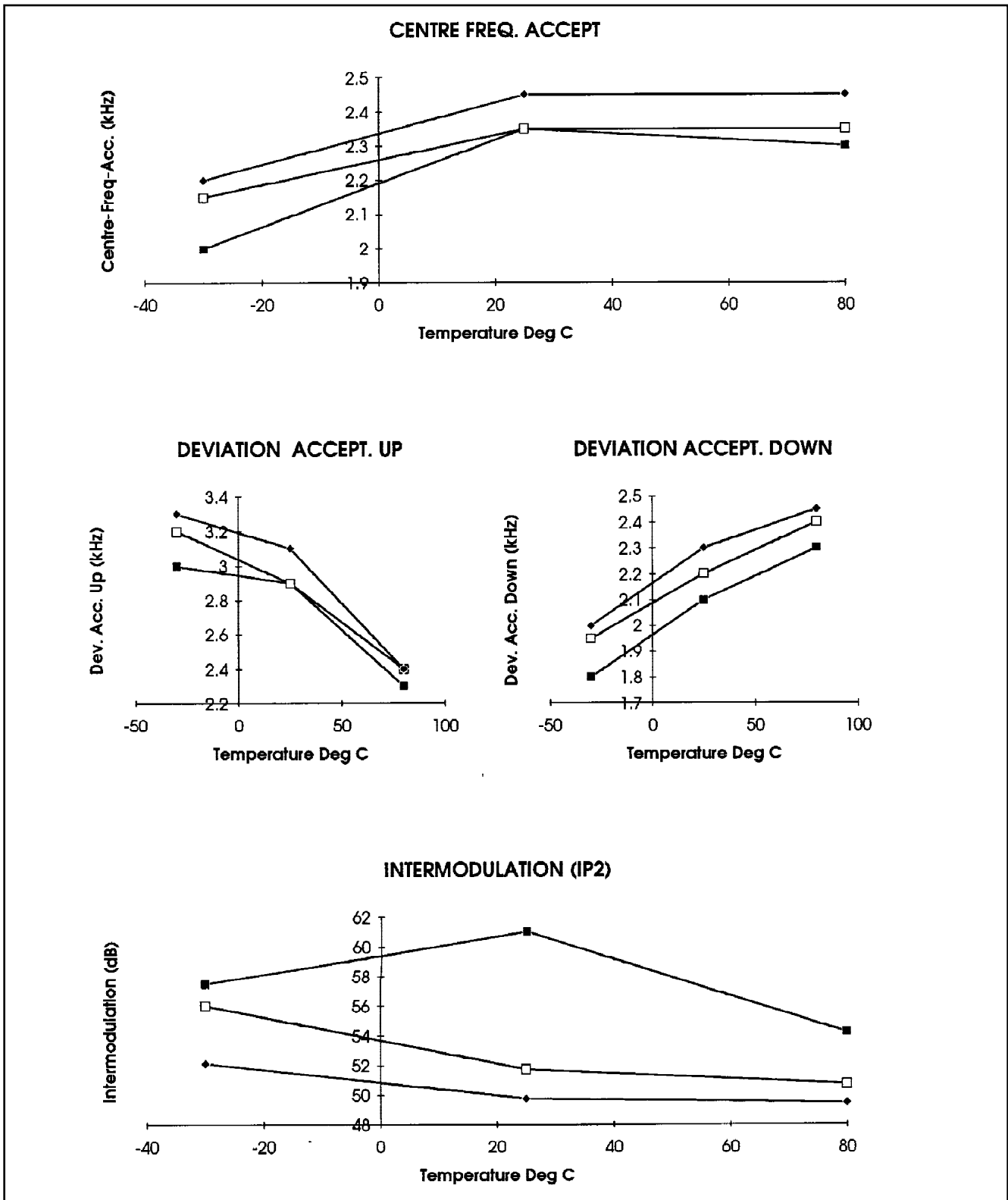
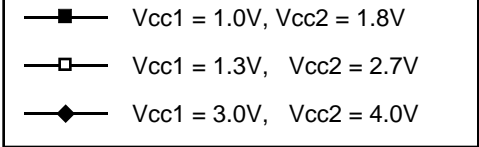


Fig.10b AC parameters vs. supply and temperature

Conditions:- 282MHz demonstration board i.e. 20dB LNA, 2dB noise figure, carrier frequency 282MHz, 1200bps baud rate, 4kHz deviation frequency, BER 1 in 30.



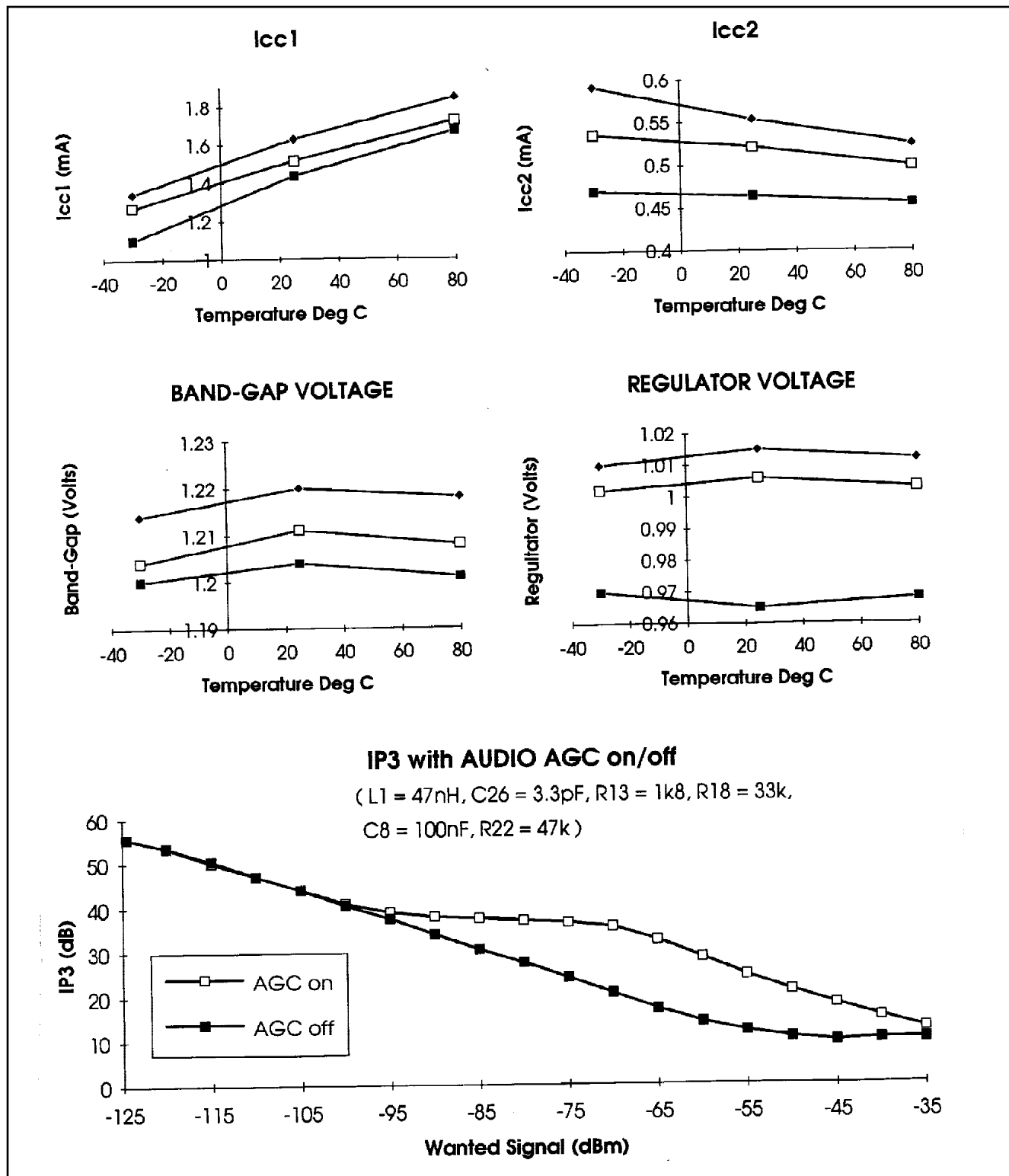


Fig.11 DC parameters vs. supply and temperature (IP3 vs audio AGC both on and off)

Conditions:- ICC1 includes 500µA LNA current but does not include the regulator supply (audio AGC inactive). ICC2 measured with BATT FLAG and DATA O/P HIGH, Fc = 282MHz.

| | |
|---|----------------------------|
| ■ | Vcc1 = 0.98V, Vcc2 = 1.78V |
| □ | Vcc1 = 1.3V, Vcc2 = 2.7V |
| ◆ | Vcc1 = 3.0V, Vcc2 = 4.0V |

Note 1- IP3 is level above wanted needed to reduce receiver to 1 in 30 B.E.R.

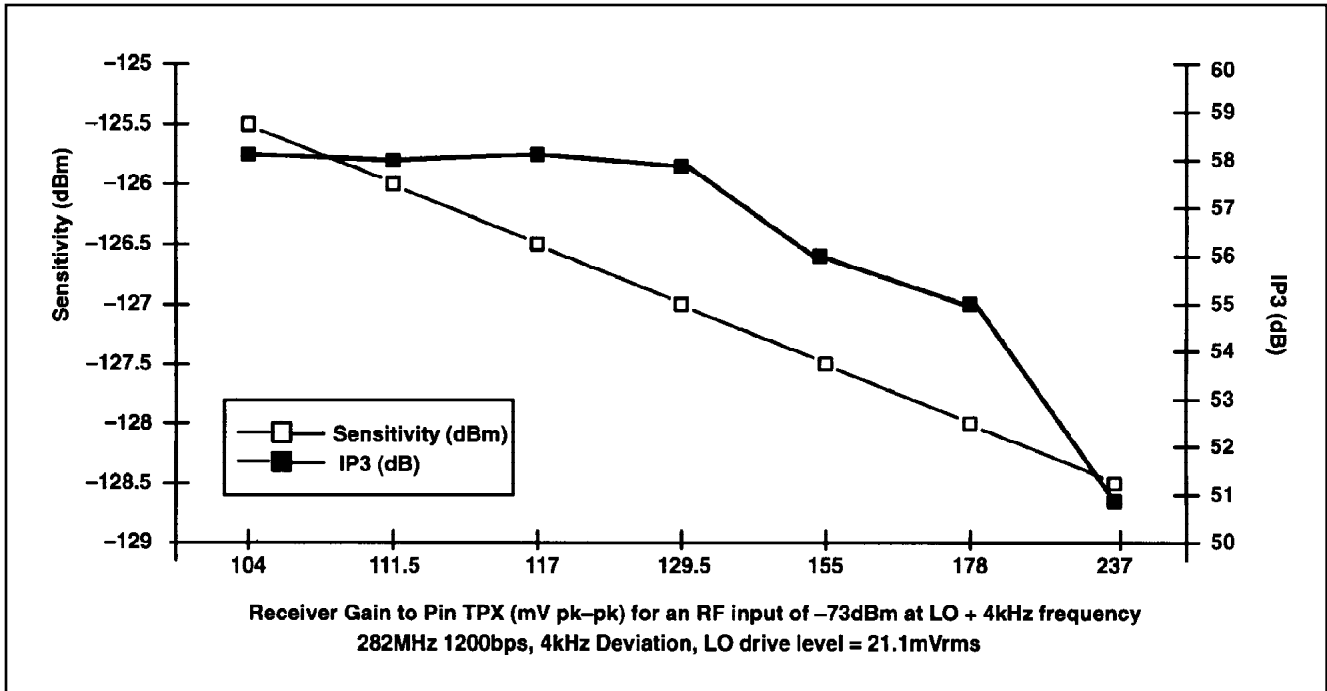


Fig.12 Sensitivity, IP3 vs Receiver Gain

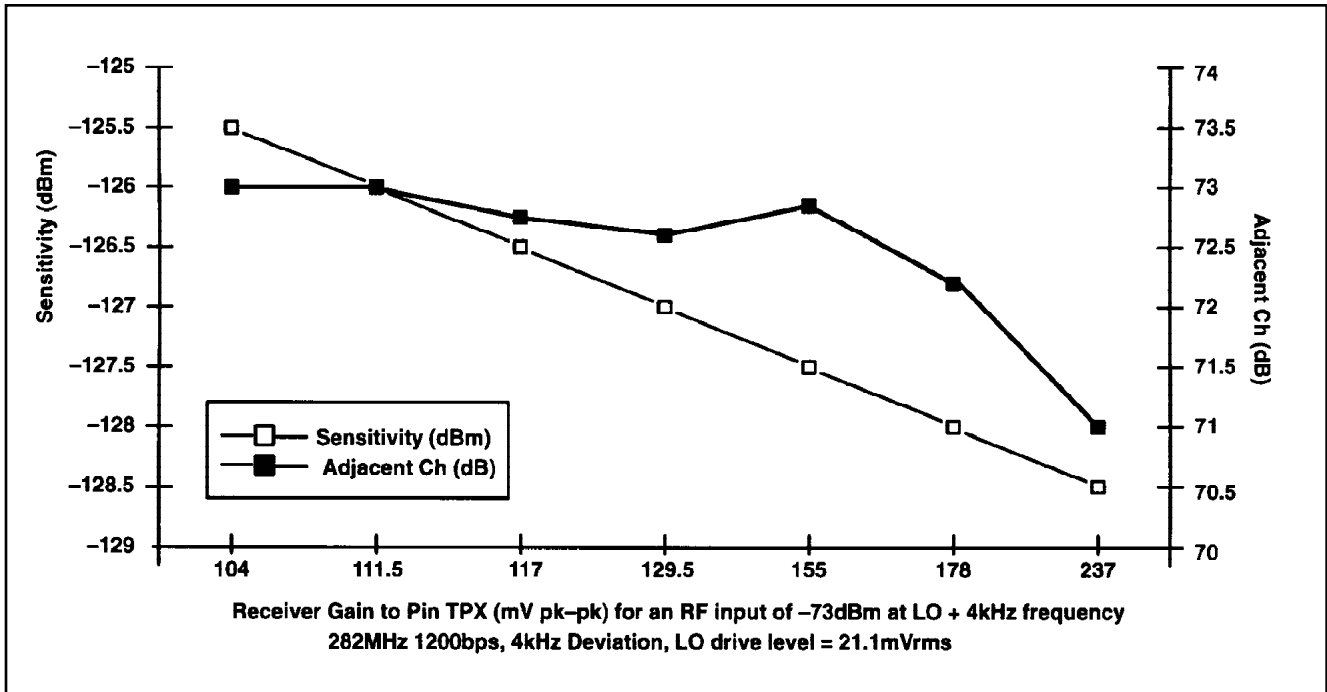


Fig.13 Sensitivity, adjacent Channel vs Receiver Gain

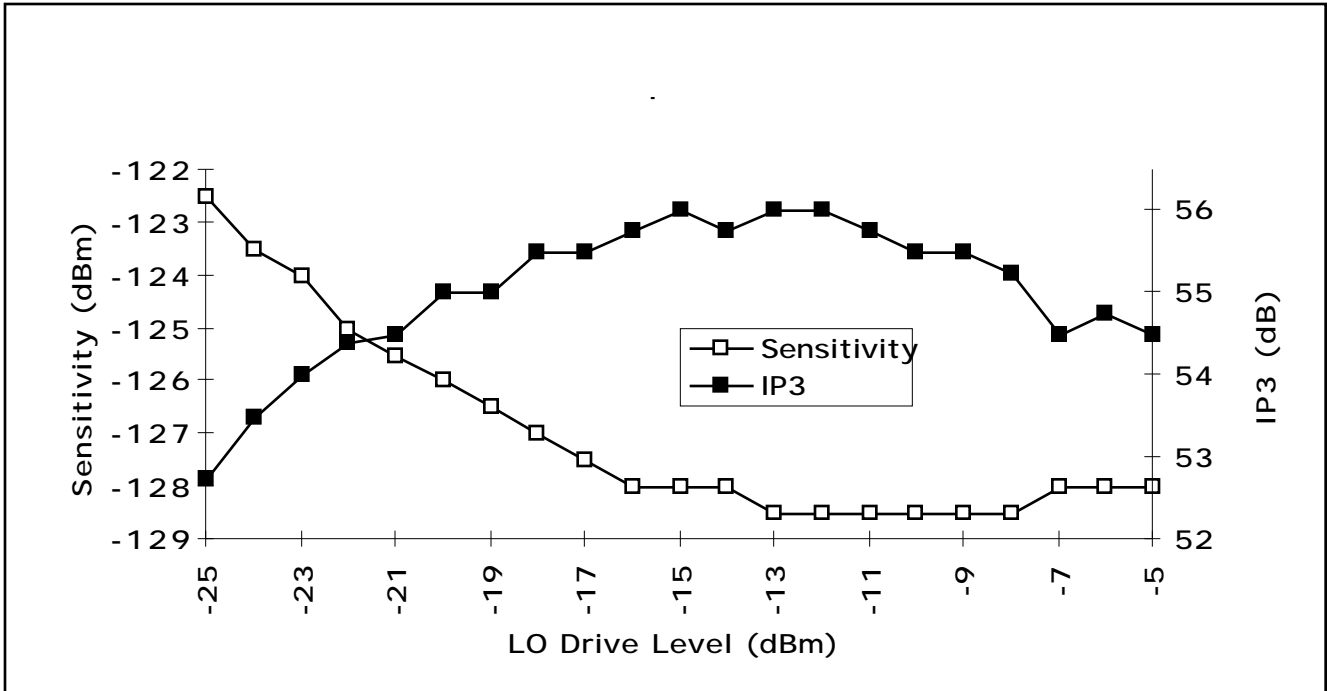


Fig.14 Sensitivity, IP3 vs LO level

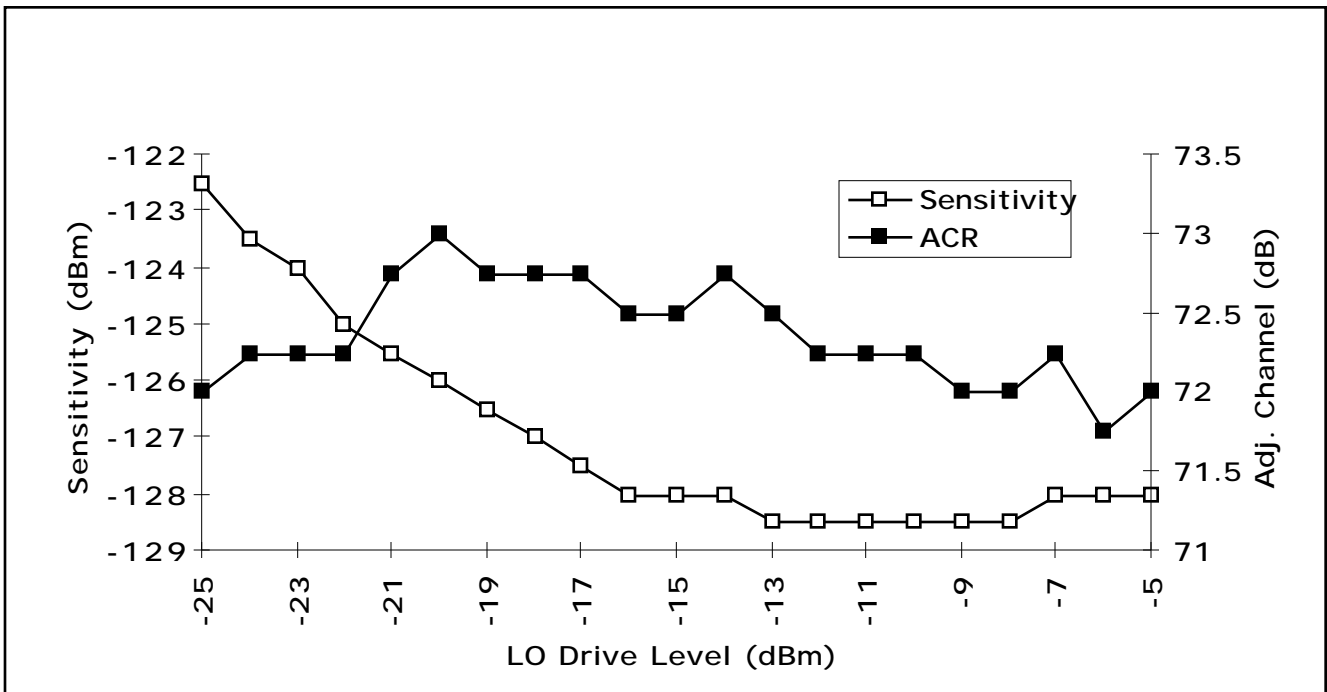
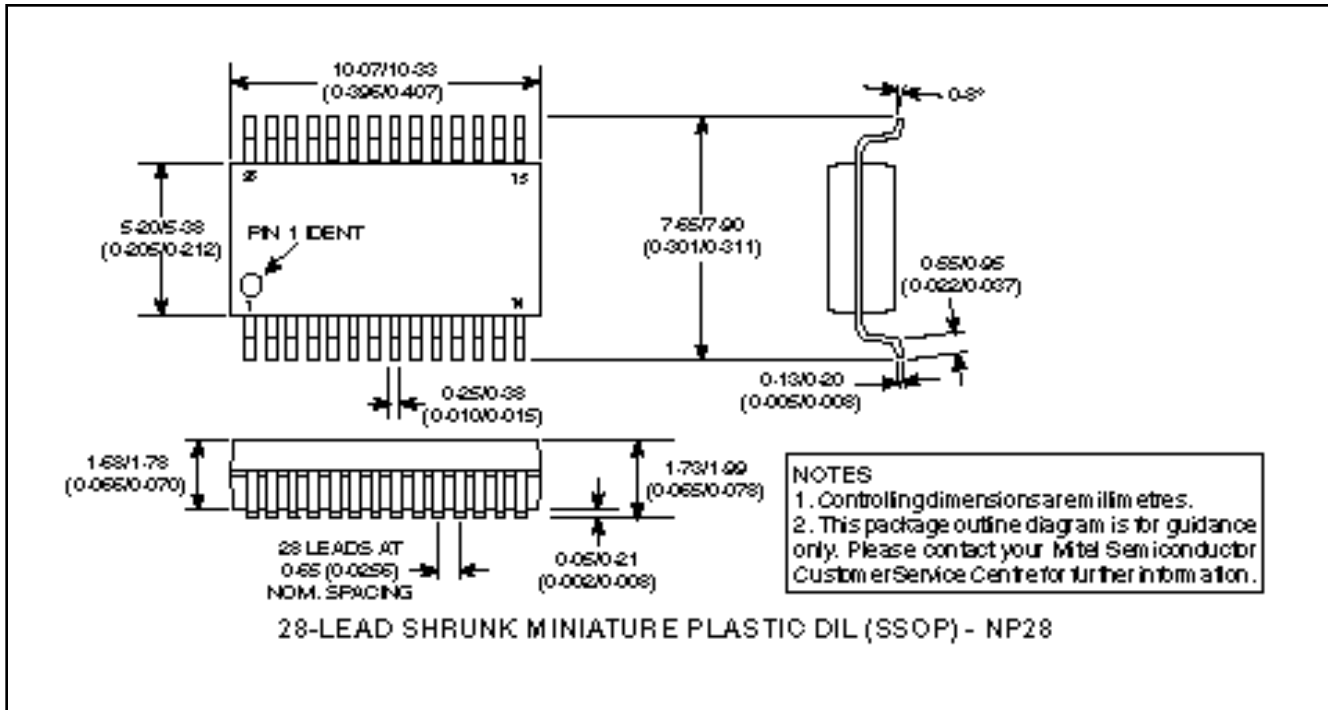


Fig.15 Sensitivity, Adjacent Channel vs LO level

SL6610

PACKAGE DETAILS

Dimensions are shown thus: mm (in)



HEADQUARTERS OPERATIONS
MITEL SEMICONDUCTOR
Cheney Manor, Swindon,
Wiltshire SN2 2QW, United Kingdom.
Tel: (01793) 518000
Fax: (01793) 518411

MITEL SEMICONDUCTOR
1500 Green Hills Road,
Scotts Valley, California 95066-4922
United States of America.
Tel (408) 438 2900
Fax: (408) 438 5576/6231

Internet: <http://www.gpsemi.com>

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