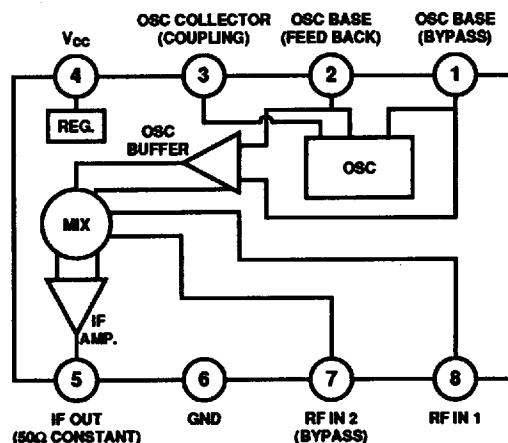


NEC[®]**SILICON MMIC
FREQUENCY CONVERTER****UPC2721
UPC2722**

T-74-11-01

FEATURES

- WIDE BAND OPERATION UP TO 2.5 GHz
- INTERNAL BALANCED AMPLIFIER FOR VCO
- SINGLE ENDED PUSH-PULL IF AMPLIFIER
- 5 V SINGLE SUPPLY VOLTAGE:
I_{CC} = 30 to 35 mA
- LOW CURRENT DISSIPATION
- TAPE AND REEL PACKAGING OPTION AVAILABLE

INTERNAL BLOCK DIAGRAM**DESCRIPTION**

The UPC2721 and UPC2722 are L-Band frequency converters which use the NESAT III process. These products consist of a double balanced mixer, local oscillator, IF preamplifier, and constant voltage generator. They are designed for low cost cellular radios, GPS receivers, PCN, and UHF TV tuner applications.

ELECTRICAL CHARACTERISTICS (T_A = 25°C, V_{CC} = 5 V, f_{RF} = 900 MHz, f_{IF} = 402.8 MHz and
f_{RF} = 2.0 GHz, f_{IF} = 402.8 MHz, Test Circuit 2 unless specified otherwise)

| PART NUMBER | | | UPC2721 | | | UPC2722 | | |
|------------------------------------|--|-------|---------|-----|-----|---------|-----|-----|
| SYMBOLS | PARAMETERS AND CONDITIONS | UNITS | MIN | TYP | MAX | MIN | TYP | MAX |
| I _{CC} | Circuit Current | mA | 25 | 35 | 45 | 20 | 30 | 40 |
| G _a | Conversion Gain | dB | 17 | 20 | 23 | 12 | 15 | 20 |
| PSAT | Saturated Output Power | dBm | 2 | 5 | | 0 | 3 | |
| NF | Noise Figure (Test Circuit 1) | dB | | 11 | 15 | | 11 | 15 |
| R _{TH} (J-A) ¹ | Thermal Resistance (Junction to Ambient) | °C/W | | | 270 | | | 270 |

Note:

1. Mounted on a 50 x 50 x 1.6 mm thick glass epoxy board with double sided copper.

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)

| SYMBOLS | PARAMETERS | UNITS | RATINGS |
|-----------------------------|-----------------------|-------|-------------|
| Vcc ¹ | Supply Voltage | V | 6 |
| P _T ² | Power Dissipation | mW | 240 |
| T _{OP} | Operating Temperature | °C | -40 to +85 |
| T _{STG} | Storage Temperature | °C | -55 to +150 |

Notes:

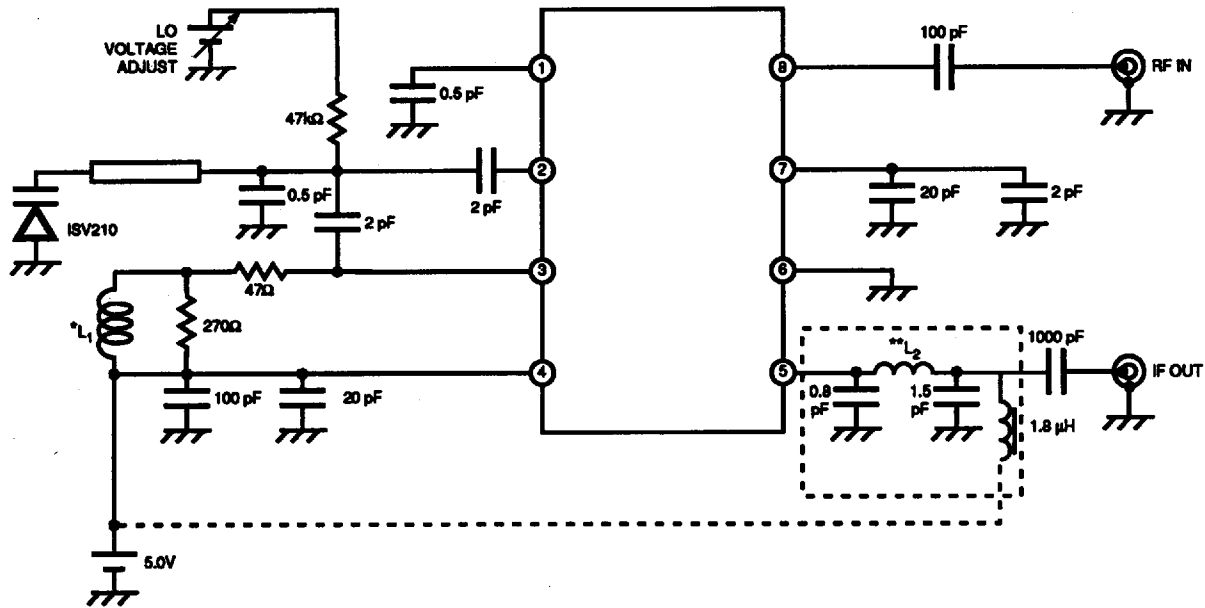
1. Recommended operating Vcc range is 4.5 to 5.5 V max.
2. T_A = +85°C mounted on a 50 x 50 x 1.6 mm thick glass epoxy board with double sided copper.

TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, Vcc = 5V)

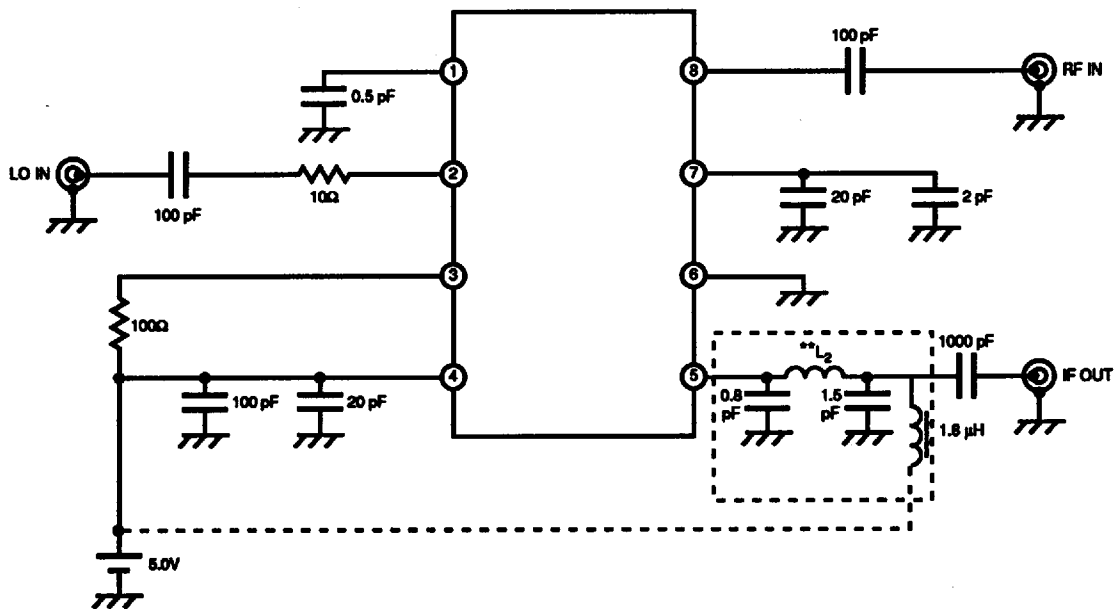
| SYMBOL | CHARACTERISTIC | TEST CONDITION | UNIT | PART NUMBER | |
|--------|--|----------------------------------|------|-------------|---------|
| | | | | UPC2721 | UPC2722 |
| CG | Conversion Gain f _{RF} = 900 to 2000 MHz | f _{IF} = 50 to 400 MHz | dB | 20 | 15 |
| | | f _{IF} = 400 to 600 MHz | dB | 15 | 15 |
| PSAT | Saturated Output Power f _{RF} = 900 to 2000 MHz, f _{IF} = 400 MHz | | dBm | 5 | 3 |
| CM | 1% Cross Modulation Distortion f _{desired} = 1.9 GHz, f _{undesired} = 1.028 GHz | | dB | -27 | -27 |
| NF | Noise Figure: f _{RF} = 900 to 2000 MHz f _{IF} = 400 MHz | | dB | 11 | 11 |

TEST CIRCUITS

1. VCO Test Circuit



2. External LO Test Circuit



--- UPC2722 only.

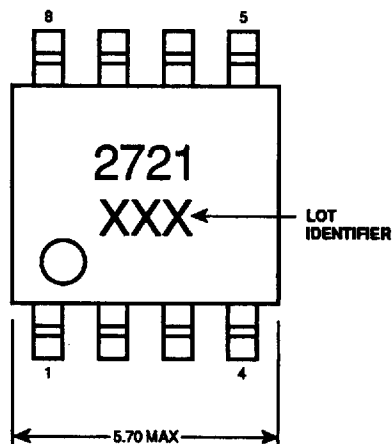
* L_1 = 10 turn, 0.3 mm diameter wire; 2.0 mm coil inside diameter.

** L_2 = 3 turn, 0.4 mm diameter wire; 4.0 mm coil inside diameter.

PACKAGE OUTLINE (Units in mm)

CONNECTIONS

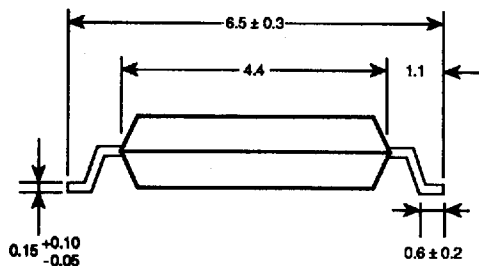
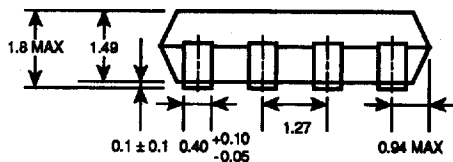
OUTLINE G08



1. OSC-Base (Bypass)
2. OSC-Base (Feed back)
3. OSC-Collector (Coupling)
4. Vcc
5. IF OUT (50 Ω)
6. GND
7. RF IN2 (Bypass)
8. RF IN1

Note: Package will be marked as 2721 or 2722 as shown.

Lead Material: Alloy 42
Lead Plating: Lead tin alloy



ORDERING INFORMATION

| PART NUMBER | QTY |
|----------------|---------|
| UPC2721GR - E3 | 3K/Reel |
| UPC2722GR - E3 | 3K/Reel |

Embossed Tape, 12 mm wide.
Pin 1 indicates pull-out direction of tape.