

5 V, SUPER MINIMOLD WIDEBAND SI RFIC AMPLIFIER

FEATURES

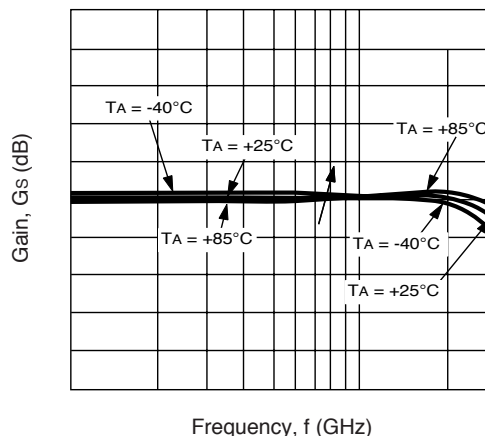
- **HIGH DENSITY SURFACE MOUNTING:**
6 pin super minimold or SOT-363 package
- **HIGH GAIN:** 15 dB TYP
- **SATURATED OUTPUT POWER:** +10 dBm
- **WIDEBAND RESPONSE:** $f_u = 2.9$ GHz TYP
- **SUPPLY VOLTAGE:** $V_{CC} = 4.5$ to 5.5 V

DESCRIPTION

The UPC2708TB is a Silicon RFIC manufactured using the NESAT III process. This device is suitable as buffer amplifier for DBS, PCS and other communication receivers. The UPC2708TB is pin compatible and has comparable performance as the larger UPC2708T, so it is suitable for use as a replacement to help reduce system size. The IC is housed in a 6 pin super minimold or SOT-363 package.

Stringent quality assurance and test procedures ensure the highest reliability and performance.

GAIN vs.
FREQUENCY and TEMPERATURE



ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, $f = 1$ GHz, $V_{CC} = 5$ V)

| PART NUMBER PACKAGE OUTLINE | | | UPC2708TB S06 | | |
|--------------------------------|--|---------------------------|------------------|-----------|------|
| SYMBOLS | PARAMETERS AND CONDITIONS | UNITS | MIN | TYP | MAX |
| I_{CC} | Circuit Current (no signal) | mA | 20 | 26 | 33 |
| G_s | Small Signal Gain | dB | 13 | 15 | 18.5 |
| f_u | Upper Limit Operating Frequency (The gain at f_u is 3 dB down from the gain at 0.1 GHz) | GHz | 2.7 | 2.9 | |
| ΔG_s | Gain Flatness, $f = 0.1 - 2.6$ GHz | dB | | ± 0.8 | |
| P_{SAT} | Saturated Output Power | dBm | +7.5 | +10 | |
| P_{1dB} | Output Power at 1 dB Compression Point | dBm | | +7.5 | |
| NF | Noise Figure | dB | | 6.5 | 8 |
| RL_{IN} | Input Return Loss | dB | 8 | 11 | |
| RL_{OUT} | Output Return Loss | dB | 16 | 20 | |
| ISOL | Isolation | dB | 18 | 23 | |
| ΔG_T | Gain-Temperature Coefficient | dB/ $^\circ\text{C}$ | | +0.002 | |
| R_{TH} | Thermal Resistance (Junction to Ambient) | $^\circ\text{C}/\text{W}$ | | | 325 |

ABSOLUTE MAXIMUM RATINGS¹ (TA = 25°C)

| SYMBOLS | PARAMETERS | UNITS | RATINGS |
|---------|--------------------------------|-------|-------------|
| VCC | Supply Voltage | V | 6 |
| PIN | Input Power | dBm | +10 |
| PT | Power Dissipation ² | mW | 200 |
| TOP | Operating Temperature | °C | -40 to +85 |
| TSTG | Storage Temperature | °C | -55 to +150 |

Notes:

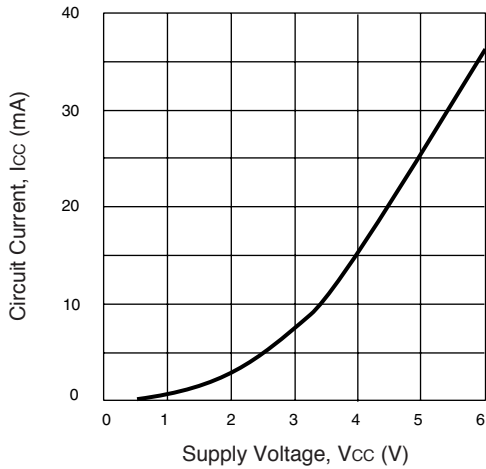
1. Operation in excess of any one of these parameters may result in permanent damage.
2. Mounted on 50 x 50 x 1.6 mm epoxy glass PWB (TA = +85°C).

RECOMMENDED OPERATING CONDITIONS

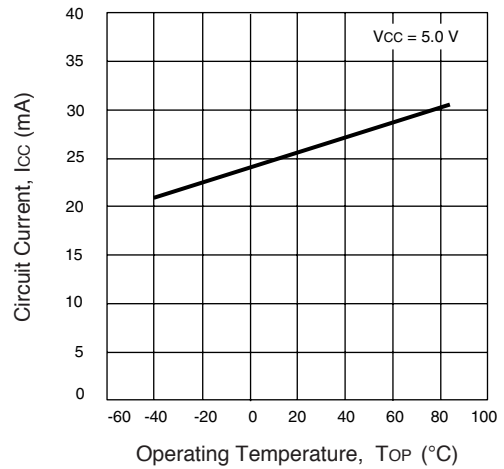
| SYMBOL | PARAMETER | UNITS | MIN | TYP | MAX |
|--------|----------------|-------|-----|-----|-----|
| VCC | Supply Voltage | V | 4.5 | 5.0 | 5.5 |

TYPICAL PERFORMANCE CURVES (TA = 25°C)

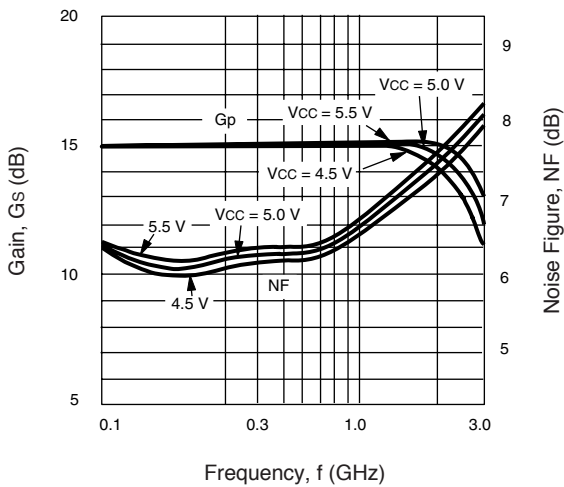
CIRCUIT CURRENT vs. VOLTAGE



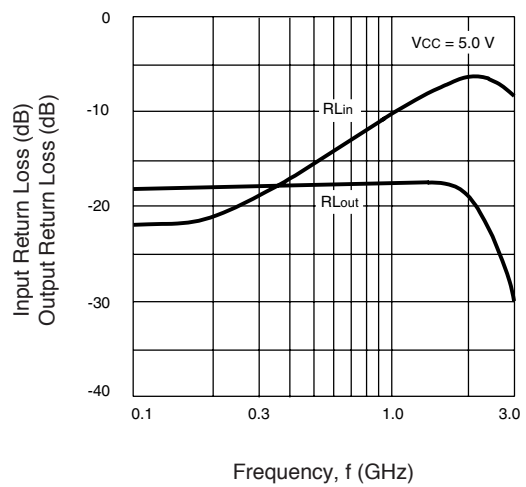
CIRCUIT CURRENT vs. TEMPERATURE



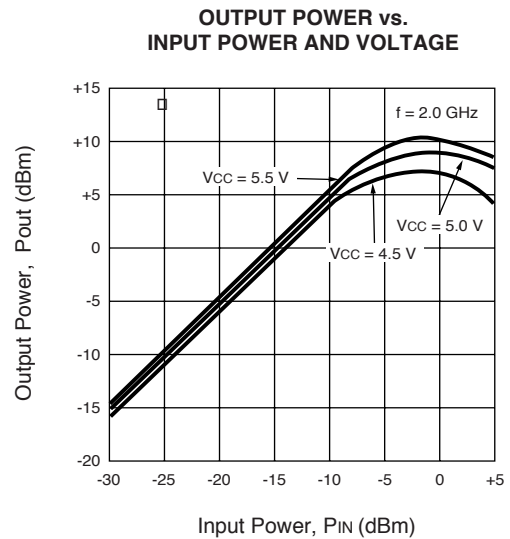
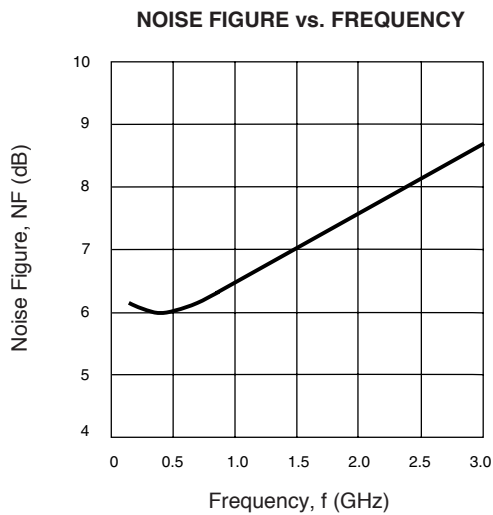
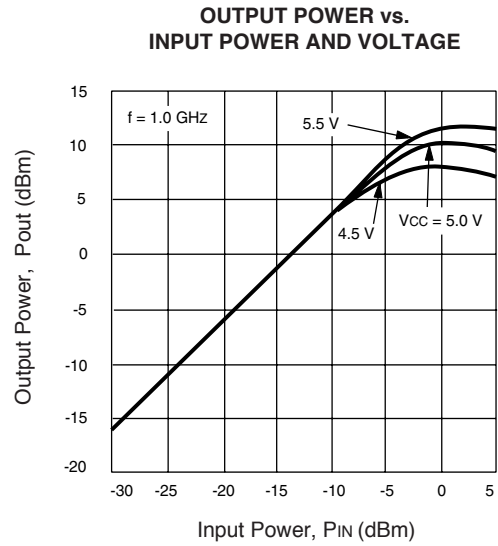
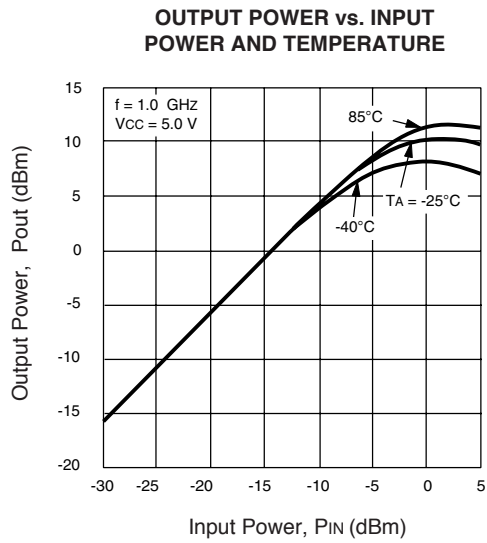
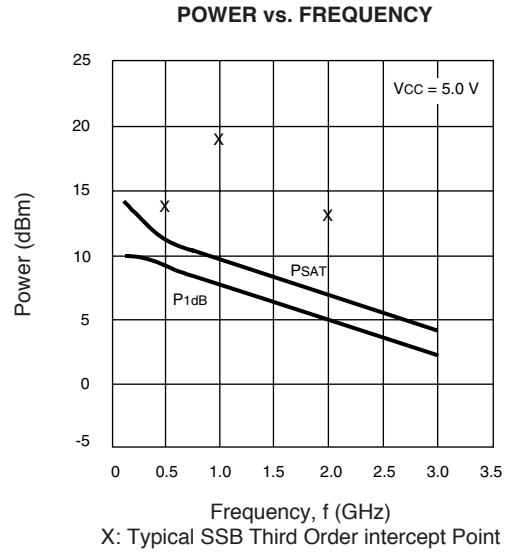
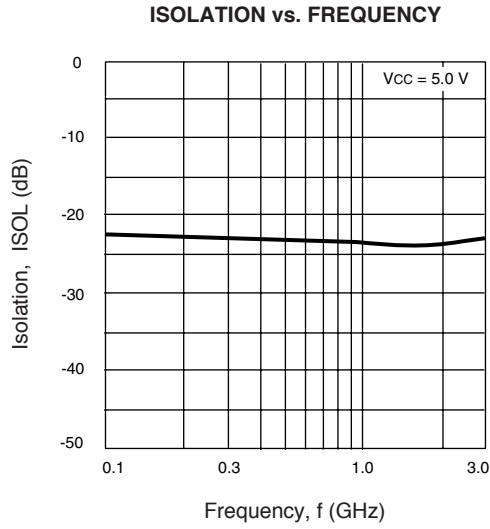
GAIN AND NOISE FIGURE vs. FREQUENCY AND VOLTAGE



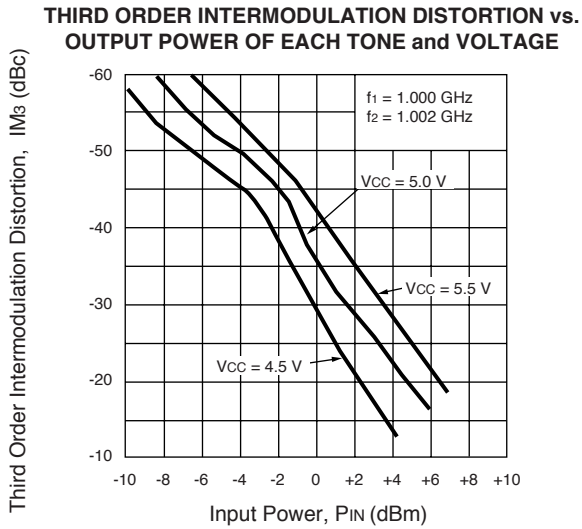
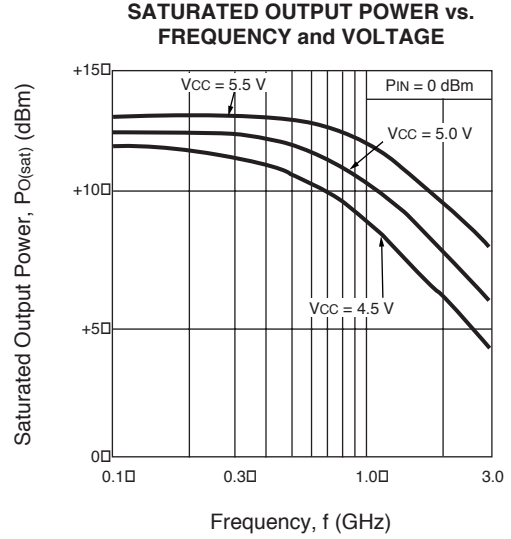
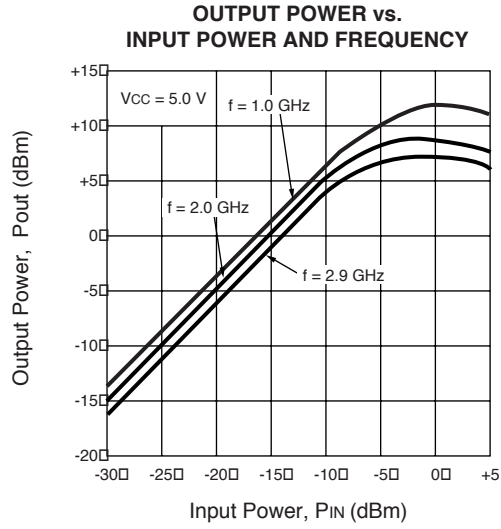
INPUT RETURN LOSS, OUTPUT RETURN LOSS vs. FREQUENCY



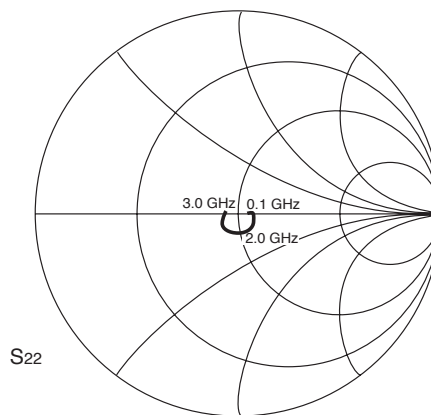
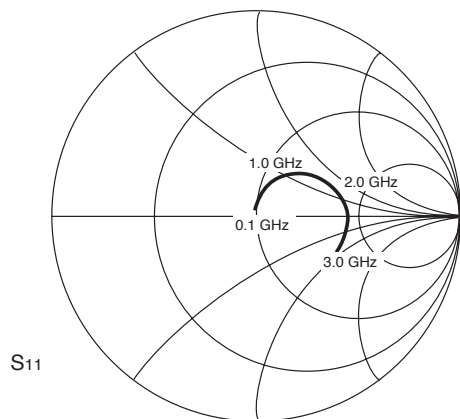
TYPICAL PERFORMANCE CURVES (TA = 25°C)



TYPICAL PERFORMANCE CURVES (T_A = 25°C)



TYPICAL SCATTERING PARAMETERS ($T_A = 25^\circ\text{C}$, $V_{CC} = V_{OUT} = 5.0\text{ V}$)



UPC2708TB

$V_{CC} = V_{OUT} = 5\text{ V}$, $I_{CC} = 27\text{ mA}$

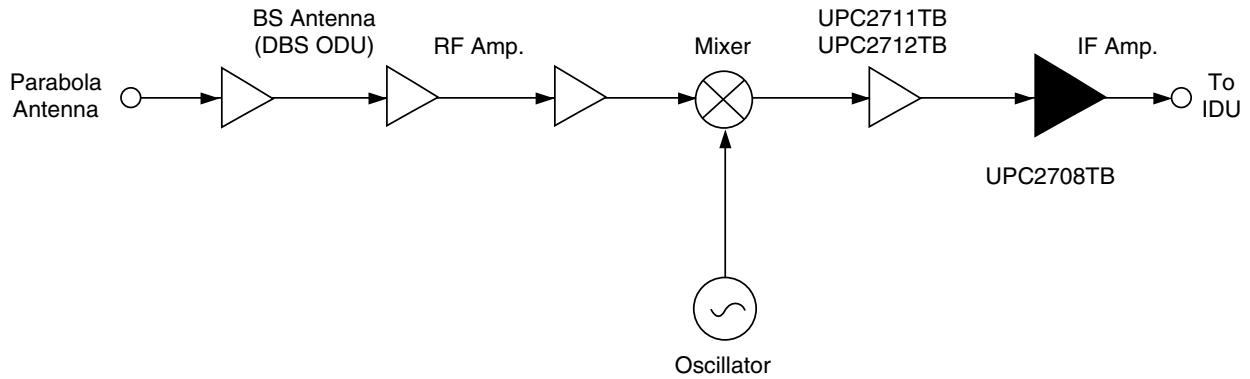
| FREQUENCY GHz | S11 | | S21 | | S12 | | S22 | | K |
|------------------|-------|-------|-------|--------|-------|------|-------|--------|------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG | |
| 0.1 | 0.039 | 138.9 | 5.815 | -4.8 | 0.077 | -0.8 | 0.051 | 0.9 | 1.34 |
| 0.2 | 0.053 | 119.7 | 5.822 | -9.8 | 0.075 | -1.5 | 0.048 | 1.4 | 1.36 |
| 0.3 | 0.069 | 106.7 | 5.815 | -14.3 | 0.074 | -0.6 | 0.049 | 5.9 | 1.38 |
| 0.4 | 0.088 | 97.2 | 5.813 | -18.8 | 0.074 | -0.5 | 0.054 | 8.9 | 1.36 |
| 0.5 | 0.105 | 91.6 | 5.794 | -23.8 | 0.072 | -1.1 | 0.054 | 8.8 | 1.39 |
| 0.6 | 0.123 | 84.9 | 5.823 | -28.4 | 0.071 | -0.6 | 0.056 | 10.4 | 1.40 |
| 0.7 | 0.144 | 79.7 | 5.871 | -33.0 | 0.070 | 0.1 | 0.060 | 11.5 | 1.40 |
| 0.8 | 0.164 | 74.7 | 5.890 | -38.2 | 0.071 | 0.5 | 0.065 | 11.6 | 1.37 |
| 0.9 | 0.186 | 70.7 | 5.938 | -42.8 | 0.073 | 2.3 | 0.072 | 11.1 | 1.34 |
| 1.0 | 0.205 | 66.1 | 5.960 | -47.6 | 0.070 | 4.4 | 0.082 | 5.6 | 1.31 |
| 1.1 | 0.226 | 61.7 | 6.072 | -52.7 | 0.069 | 5.0 | 0.091 | -4.6 | 1.28 |
| 1.2 | 0.245 | 57.7 | 6.097 | -57.5 | 0.070 | 4.4 | 0.082 | 5.6 | 1.31 |
| 1.3 | 0.263 | 53.7 | 6.174 | -63.0 | 0.067 | 2.5 | 0.085 | 0.6 | 1.33 |
| 1.4 | 0.286 | 48.6 | 6.275 | -68.4 | 0.069 | 5.0 | 0.091 | -4.6 | 1.28 |
| 1.5 | 0.308 | 44.3 | 6.371 | -74.3 | 0.070 | 5.4 | 0.092 | -8.2 | 1.24 |
| 1.6 | 0.328 | 40.7 | 6.419 | -79.8 | 0.066 | 7.1 | 0.097 | -12.6 | 1.26 |
| 1.7 | 0.344 | 36.2 | 6.470 | -85.9 | 0.067 | 5.6 | 0.096 | -19.6 | 1.23 |
| 1.8 | 0.364 | 31.0 | 6.555 | -92.1 | 0.069 | 8.2 | 0.100 | -23.9 | 1.18 |
| 1.9 | 0.382 | 26.0 | 6.542 | -98.3 | 0.070 | 8.4 | 0.092 | -8.2 | 1.24 |
| 2.0 | 0.395 | 21.2 | 6.570 | -104.7 | 0.070 | 8.7 | 0.101 | -38.9 | 1.13 |
| 2.1 | 0.405 | 16.8 | 6.528 | -111.3 | 0.070 | 10.1 | 0.100 | -47.2 | 1.12 |
| 2.2 | 0.417 | 11.8 | 6.527 | -118.5 | 0.071 | 9.4 | 0.096 | -57.2 | 1.09 |
| 2.3 | 0.427 | 6.6 | 6.438 | -124.7 | 0.072 | 9.5 | 0.098 | -66.1 | 1.09 |
| 2.4 | 0.431 | 2.2 | 6.336 | -131.3 | 0.071 | 10.7 | 0.095 | -76.5 | 1.09 |
| 2.5 | 0.431 | -3.0 | 6.247 | -138.1 | 0.072 | 12.8 | 0.098 | -86.1 | 1.09 |
| 2.6 | 0.434 | -8.2 | 6.127 | -145.0 | 0.071 | 15.4 | 0.094 | -99.9 | 1.10 |
| 2.7 | 0.423 | -12.3 | 5.952 | -151.7 | 0.071 | 14.5 | 0.088 | -116.7 | 1.14 |
| 2.8 | 0.419 | -17.1 | 5.816 | -158.2 | 0.070 | 16.1 | 0.081 | -134.4 | 1.18 |
| 2.9 | 0.408 | -21.5 | 5.619 | -165.0 | 0.073 | 15.3 | 0.074 | -149.7 | 1.19 |
| 3.0 | 0.400 | -26.2 | 5.354 | -171.5 | 0.074 | 17.1 | 0.065 | -170.3 | 1.24 |
| 3.1 | 0.386 | -29.3 | 5.134 | -177.4 | 0.075 | 17.1 | 0.053 | 172.8 | 1.28 |

PIN DESCRIPTIONS

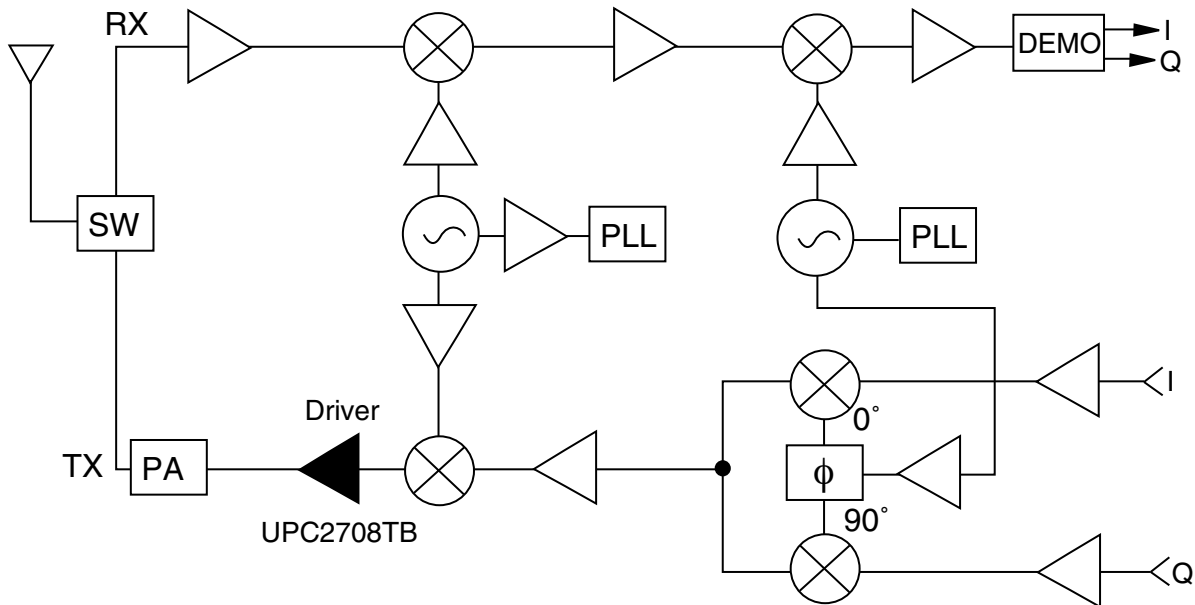
| Pin No. | Symbol | Applied Voltage (V) | Pin Voltage (V) | Description | Internal Equivalent Circuit |
|-------------|--------|---------------------|-----------------|---|-----------------------------|
| 1 | Input | – | 1.16 | Signal input pin. An internal matching circuit, configured with resistors, enables 50 Ω connection over a wide bandwidth. A multi-feedback circuit is designed to cancel the deviations of hFE and resistance. This pin must be coupled to the signal source with a blocking capacitor. | |
| 4 | Output | – | – | Signal output pin. Connect an inductor between this pin and Vcc to supply current to the internal output transistors. | |
| 6 | Vcc | 4.5 to 5.5 | – | Power supply pin. This pin should be externally equipped with a bypass capacitor to minimize ground impedance. | |
| 2 3 5 | GND | 0 | – | Ground pins. These pins should be connected to system ground with minimum inductance. Ground pattern on the board should be formed as wide as possible. All the ground pins must be connected together with wide ground pattern to minimize impedance difference. | |

SYSTEM APPLICATION EXAMPLE

EXAMPLE OF DBS CONVERTERS

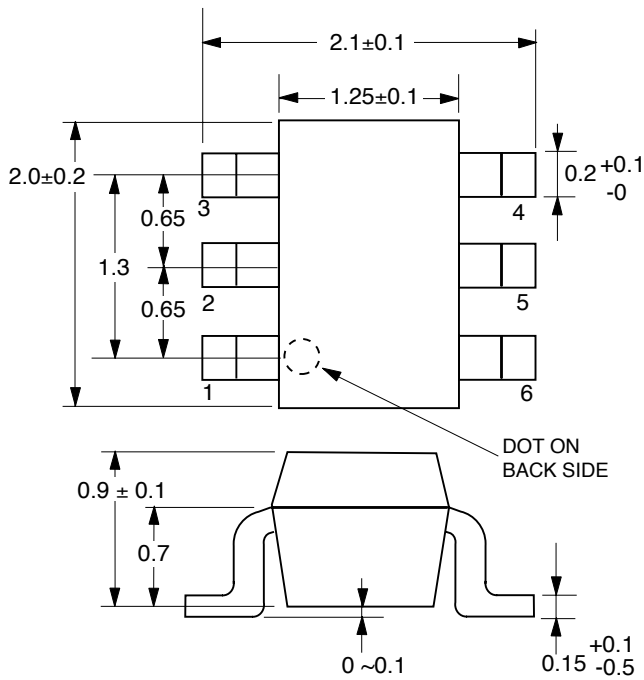


EXAMPLE OF 2.4 GHz BAND RECEIVER



OUTLINE DIMENSIONS (Units in mm)

PACKAGE OUTLINE S06
(Top View)

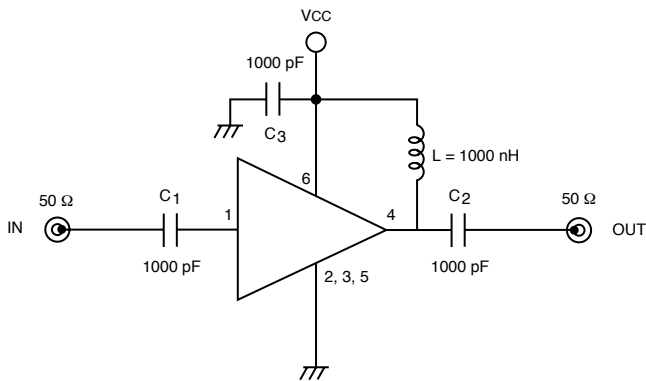


ORDERING INFORMATION

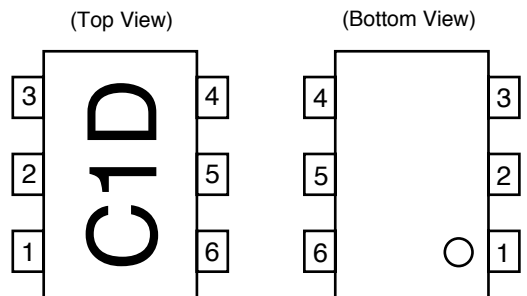
| PART NUMBER | MARKING | QTY |
|----------------|---------|---------|
| UPC2708TB-E3-A | C1D | 3K/Reel |

Note:
Embossed Tape, 8 mm wide. Pins 1, 2 and 3 face perforated side of tape.

TEST CIRCUIT



PIN CONNECTIONS



1. INPUT
2. GND
3. GND
4. OUTPUT
5. GND
6. VCC

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JONHON

«JONHON» (основан в 1970 г.)

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Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: ocean@oceanchips.ru

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А