

FEATURES

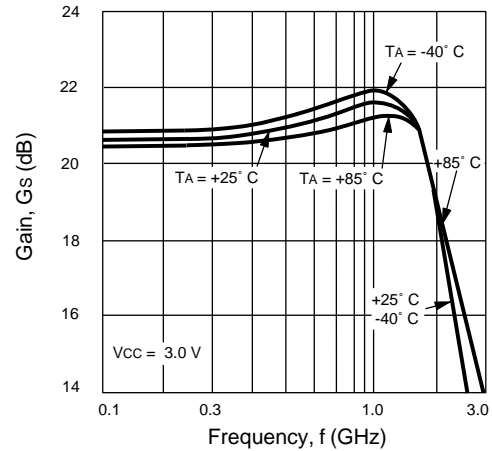
- **HIGH GAIN:** 21 dB at 900 to 1500 MHz Typical
- **HIGH OUTPUT POWER:** $P_{SAT} = +12.5$ dBm at 900 MHz
+11 dBm at 1500 MHz
- **LOW BIAS VOLTAGE:** 3.0 V Typical, 2.7 V Minimum
- **SUPER SMALL PACKAGE:** SOT-363
- **TAPE AND REEL PACKAGING OPTION AVAILABLE**

DESCRIPTION

The UPC2771TB is a Silicon Monolithic integrated circuit which is manufactured using the NESAT™ III process. The NESAT III process produces transistors with f_T approaching 20 GHz. The UPC2771TB is pin compatible and has comparable performance as the larger UPC2771T, 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. Operating on a 3 volt supply, this IC is ideally suited for hand-held, portable designs.

NEC's stringent quality assurance and test procedures ensure the highest reliability and performance.

GAIN vs. FREQUENCY AND TEMPERATURE



ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, $Z_L = Z_S = 50\ \Omega$, $V_{CC} = 3.0\text{ V}$)

| PART NUMBER PACKAGE OUTLINE | | | UPC2771TB S06 | | |
|--------------------------------|---|-------|------------------|-------|-----|
| SYMBOLS | PARAMETERS AND CONDITIONS | UNITS | MIN | TYP | MAX |
| I_{CC} | Circuit Current (no signal) | mA | | 36 | 45 |
| G_s | Small Signal Gain, $f = 900\text{ MHz}$ $f = 1500\text{ MHz}$ | dB | 19 | 21 | 24 |
| | | dB | 18 | 21 | 24 |
| f_U | Upper Limit Operating Frequency (The gain at f_U is 3 dB down from the gain at 100 MHz) | GHz | 1.8 | 2.2 | |
| P_{1dB} | 1 dB Compressed Output Power, $f = 900\text{ MHz}$ $f = 1500\text{ MHz}$ | dBm | +9 | +11.5 | |
| | | dBm | +7 | +9.5 | |
| P_{SAT} | Saturated Output Power, $f = 900\text{ MHz}$ $f = 1500\text{ MHz}$ | dBm | | +12.5 | |
| NF | Noise Figure, $f = 900\text{ MHz}$ $f = 1500\text{ MHz}$ | dB | | 6 | 7.5 |
| | | dB | | 6 | 7.5 |
| RLIN | Input Return Loss, $f = 900\text{ MHz}$ $f = 1500\text{ MHz}$ | dB | 10 | 14 | |
| | | dB | 10 | 14 | |
| RLOUT | Output Return Loss, $f = 900\text{ MHz}$ $f = 1500\text{ MHz}$ | dB | 6.5 | 9.0 | |
| | | dB | 5.5 | 8.5 | |
| ISOL | Isolation, $f = 900\text{ MHz}$ $f = 1500\text{ MHz}$ | dB | 25 | 30 | |
| | | dB | 25 | 30 | |
| OIP3 | SSB Output Third Order Intercept Point $f = 900, 902\text{ MHz}$, $P_{OUT} = +4\text{ dBm}$ $f = 1500, 1502\text{ MHz}$, $P_{OUT} = +4\text{ dBm}$ | dBm | | +13 | |
| | | dBm | | +10 | |
| PADJ1 | Adjacent Channel Power 1, $f = 900\text{ MHz}$, $\pi/4$ QPSK wave ¹ , $P_{OUT} = +7\text{ dBm}$ $\Delta f = \pm 50\text{ kHz}$ $\Delta f = \pm 100\text{ kHz}$ | dBc | | -61 | |
| PADJ2 | Adjacent Channel Power 2, $f = 1.5\text{ GHz}$, $\pi/4$ QPSK wave ¹ , $P_{OUT} = +7\text{ dBm}$ $\Delta f = \pm 50\text{ kHz}$ $\Delta f = \pm 100\text{ kHz}$ | dBc | | -59 | |
| | | dBc | | -72 | |

Note:

1. $\pi/4$ QPSK modulated wave input, data rate 42 kbps, Filter roll off $\alpha = 0.5$

ABSOLUTE MAXIMUM RATINGS¹ (T_A = 25°C)

| SYMBOLS | PARAMETERS | UNITS | RATINGS |
|------------------|--------------------------------------|-------|-------------|
| V _{CC} | Supply Voltage | V | 3.6 |
| I _{CC} | Total Supply Current | mA | 77.7 |
| P _{IN} | Input Power | dBm | +13 |
| P _T | Total Power Dissipation ² | mW | 200 |
| T _{OP} | Operating Temperature | °C | -40 to +85 |
| T _{STG} | Storage Temperature | °C | -55 to +150 |

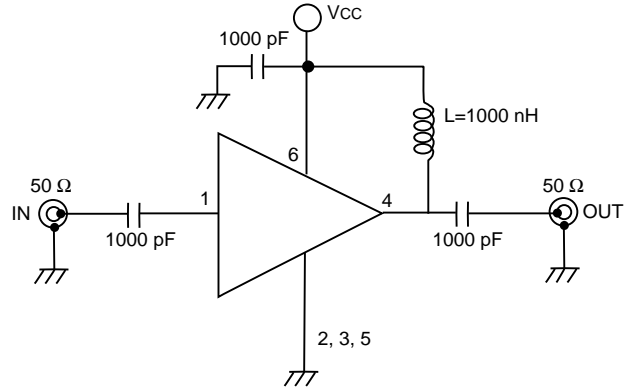
Notes:

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

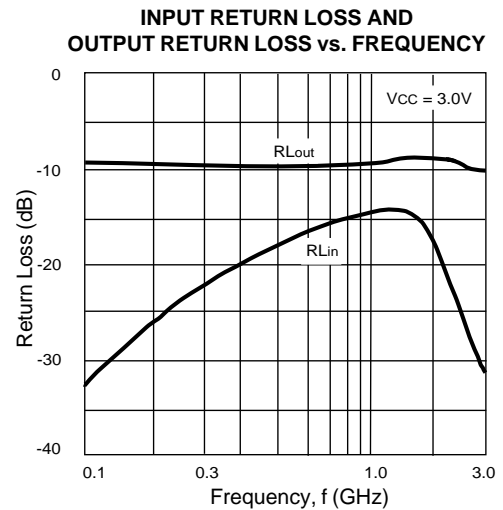
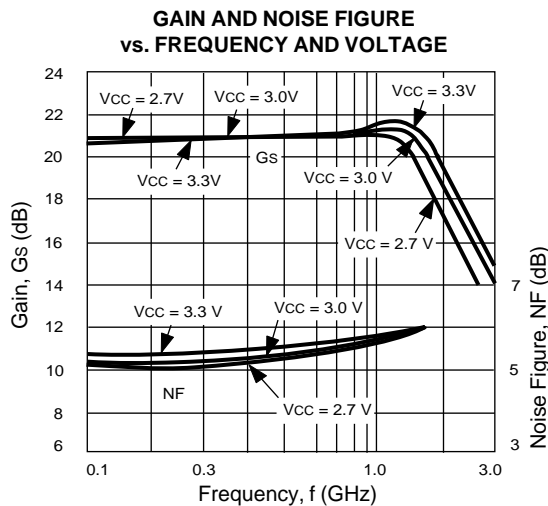
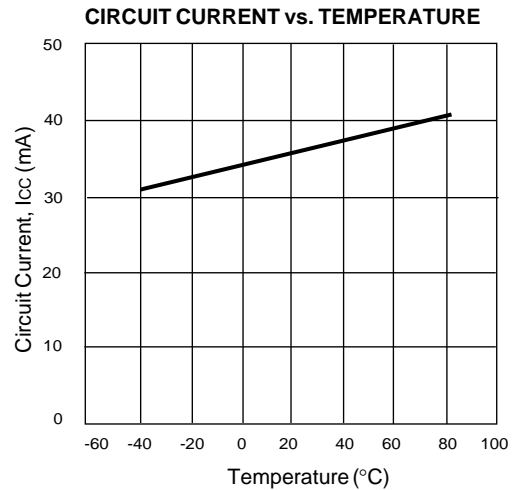
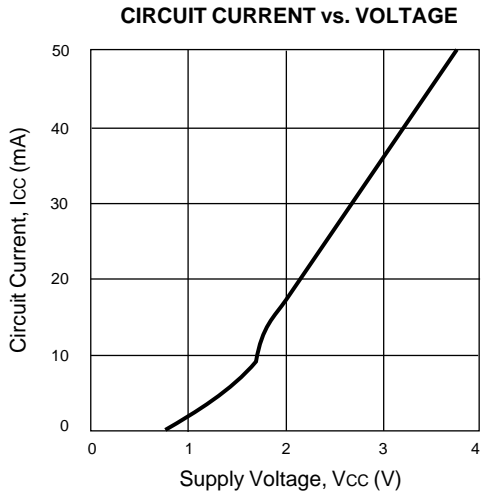
RECOMMENDED OPERATING CONDITIONS

| SYMBOLS | PARAMETERS | UNITS | MIN | TYP | MAX |
|-----------------|-----------------------|-------|-----|-----|-----|
| V _{CC} | Supply Voltage | V | 2.7 | 3 | 3.3 |
| T _{OP} | Operating Temperature | °C | -40 | +25 | +85 |

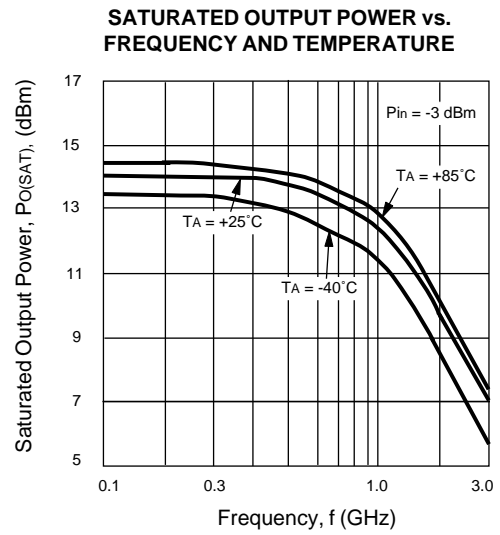
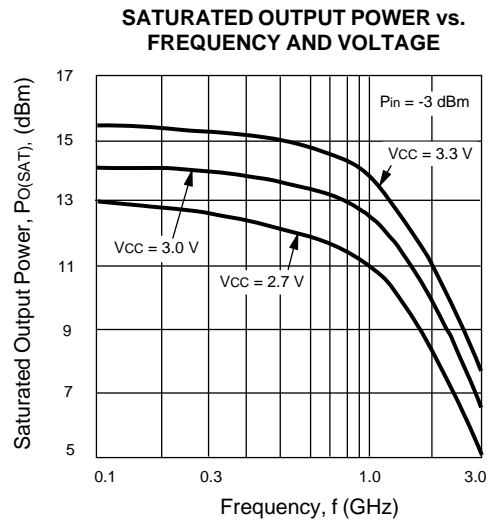
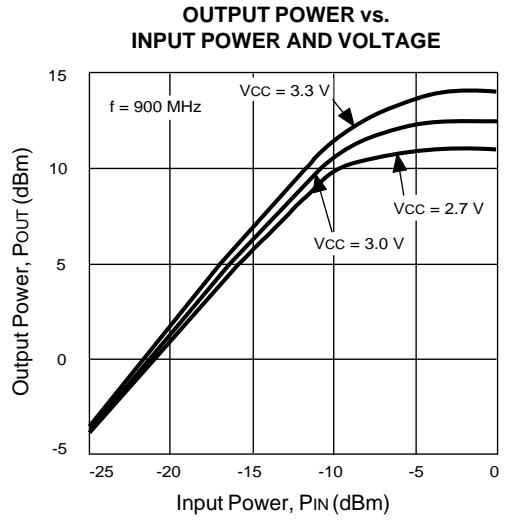
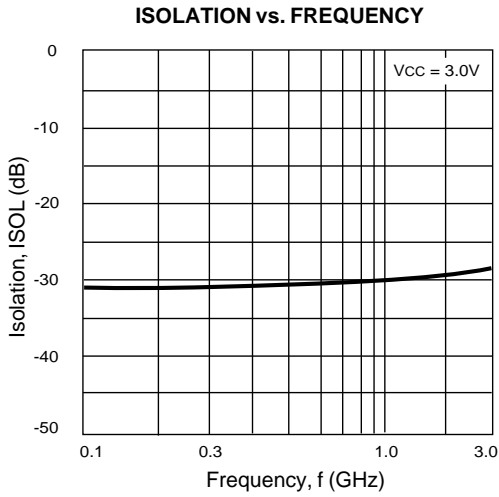
TEST CIRCUIT



TYPICAL PERFORMANCE CURVES (T_A = 25°C)

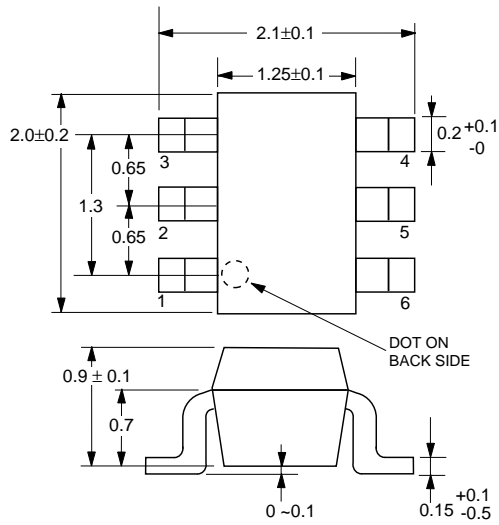


TYPICAL PERFORMANCE CURVES ($T_A = 25^\circ$)

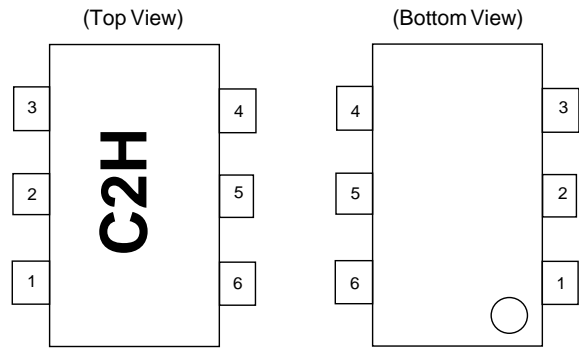


OUTLINE DIMENSIONS (Units in mm)

UPC2771TB
PACKAGE OUTLINE S06



LEAD CONNECTIONS



- 1. INPUT
- 2. GND
- 3. GND
- 4. OUTPUT
- 5. GND
- 6. Vcc

PIN DESCRIPTION

| Pin No. | Pin Name (V) | Applied Voltage | Description | Internal Equivalent Circuit |
|---------|--------------|-----------------|---|-----------------------------|
| 1 | Input | — | 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 | 2.7 to 3.3 | Signal output pin. Connect an inductor between this pin and VCC to supply current to the internal output transistors. | |
| 6 | VCC | | Power supply pin. This pin should be externally equipped with a bypass capacitor to minimize ground impedance. | |
| 2 | 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. | |

ORDERING INFORMATION

| PART NUMBER | QTY |
|--------------|---------|
| UPC2771TB-E3 | 3K/Reel |

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

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Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru

moschip.ru_4

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