

FEATURES

- HIGH FREQUENCY OPERATION TO 2.5 GHz
- WIDE BAND OPERATION
- SINGLE SUPPLY VOLTAGE: $V_{CC} = 5\text{ V} \pm 10\%$
- AVAILABLE IN TAPE AND REEL (G08 PACKAGE)

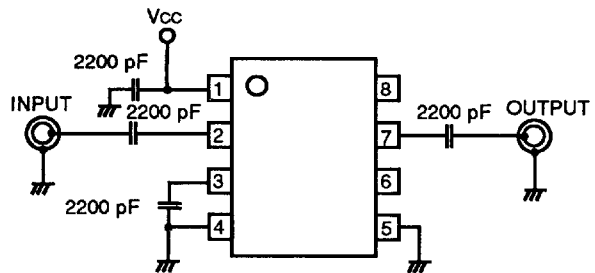
DESCRIPTION

The UPB584 series of devices are divide-by-2 silicon bipolar prescalers. They feature high frequency response and operate from a single 5 volt supply. The series is available in two package styles: 8 lead ceramic flat pack (UPB584B) and an 8 pin plastic mini-flat package (UPB584G). Applications include: synthesizer for DBS receiver and other telecommunication applications.

RECOMMENDED OPERATING CONDITIONS

| SYMBOL | PARAMETER | UNITS | RATINGS |
|--------|-----------------------|-------|------------|
| VCC | Supply Voltage | V | 4.5 to 5.5 |
| TOP | Operating Temperature | °C | -20 to +75 |

TEST CIRCUIT



Note: Because of the high internal gain and gain compression of the UPB584, this device is prone to self-oscillation in the absence of an RF input signal. If the device will be used in an application where DC power will be applied in the absence of an RF input signal, this self-oscillation can be suppressed by any of the following means:

- * Add a shunt resistor from the RF input line to ground. The blocking capacitor should be between the resistor and the UPB584, but physical separation should be minimized. Typically a resistor value between 50 and 100 ohms will suppress the self-oscillation.
- * Apply a DC offset voltage of +3.0 volts to the INPUT pin. The voltage source should be isolated from the INPUT pin by a series 1000 ohm resistor.
- * Apply a DC offset voltage of +1.5 volts to the BYPASS pin. The voltage source should be isolated from the BYPASS pin by a series 1000 ohm resistor.

All these approaches reduce the input sensitivity of the UPB584 (by as much as 3 dB for the example of a 50 ohm shunt resistor), but otherwise have no effect on the reliability or other electrical characteristics of this device.

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ELECTRICAL CHARACTERISTICS¹ ($T_A = -20$ to $+75^\circ\text{C}$, $V_{CC} = 5\text{ V}$)

| PART NUMBER PACKAGE OUTLINE | | | UPB584B, UPB584G BF08, G08 | | |
|--------------------------------|--|------------|-------------------------------|-----|------------|
| SYMBOLS | PARAMETERS AND CONDITIONS | UNITS | MIN | TYP | MAX |
| I _{CC} | Supply Current, $T_A = 25^\circ\text{C}$ | mA | 12 | 18 | 24 |
| f _{IN} | Frequency Response at: P _{IN} = -15 to +5 dBm P _{IN} = -10 to +5 dBm | GHz GHz | 0.5 0.5 | | 2.3 2.5 |
| P _{IN} | Input Power at f _{IN} = 0.5 to 2.3 GHz f _{IN} = 0.5 to 2.5 GHz | dBm dBm | -15 -10 | | +5 +5 |
| P _{OUT} | Power Output at f _{IN} = 2 GHz, P _{IN} = 0 dBm, V _{CC} = 5 V, $T_A = 25^\circ\text{C}$ | dBm | -12 | -7 | |
| R _{TH (J-C)} | Thermal Resistance, Junction to Case (UPB584B) | °C/W | | | 50 |
| R _{TH (J-A)} | Thermal Resistance, Junction to Ambient (UPB584G) ² | °C/W | | | 270 |

Notes:

1. $V_{CC} = 5\text{ V} \pm 10\%$ (unless otherwise noted) $Z_s = Z_o = 50\ \Omega$.
2. Mounted on a 5 x 5 x 0.16 mm epoxy glass circuit board.

UPB584B, UPB584G

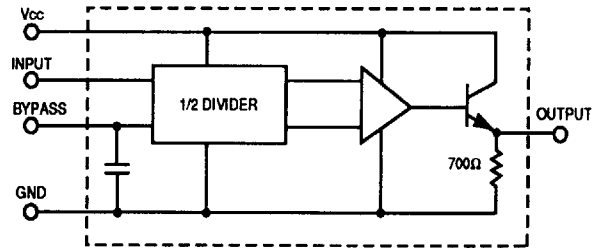
ABSOLUTE MAXIMUM RATINGS¹ (TA = 25°C)

| SYMBOLS | PARAMETERS | UNITS | RATINGS |
|------------------|---|-------|-------------------------------|
| V _{CC} | Supply Voltage | V | -0.5 to 6.0 |
| V _{IN} | Input Voltage | V | -0.5 to V _{CC} + 0.5 |
| P _{IN} | Input Power | dBm | +10 |
| P _D | Power Dissipation UPB584B UPB584G | W | 1.5 (TA = +125°C) |
| | | mW | 250 (TA = +85°C) |
| T _{OP} | Operating Temperature UPB584B UPB584G | °C | -55 to +125 |
| | | °C | -40 to +85 |
| T _{STG} | Storage Temperature UPB584B UPB584G | °C | -55 to +200 |
| | | °C | -65 to +150 |

Note:

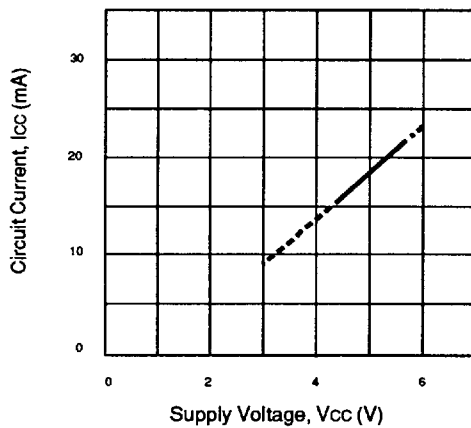
1. Operation in excess of any one of these parameters may result in permanent damage.

INTERNAL BLOCK DIAGRAM

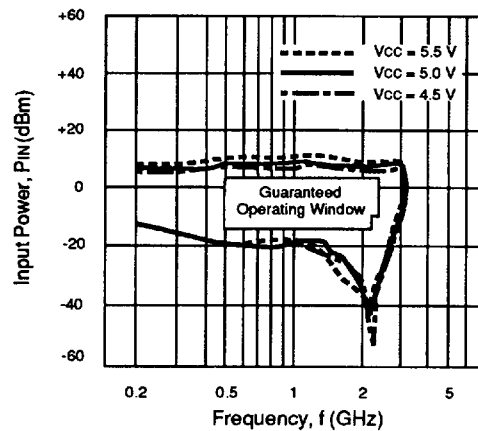


TYPICAL PERFORMANCE CURVES (TA = 25°C unless otherwise noted)

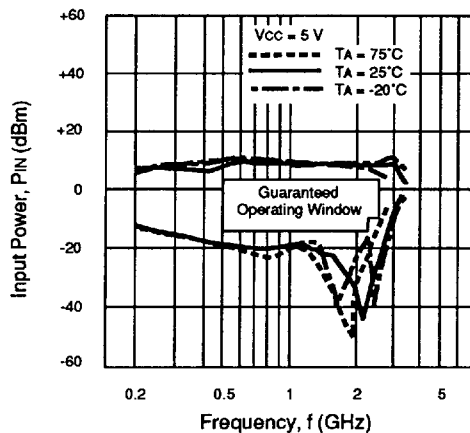
CIRCUIT CURRENT vs. VOLTAGE



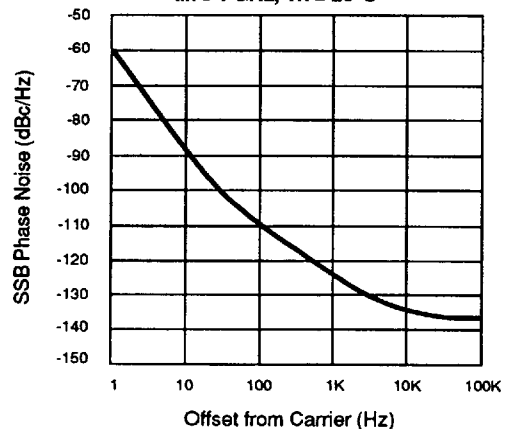
INPUT POWER vs. FREQUENCY AND VOLTAGE



INPUT POWER vs. FREQUENCY AND TEMPERATURE

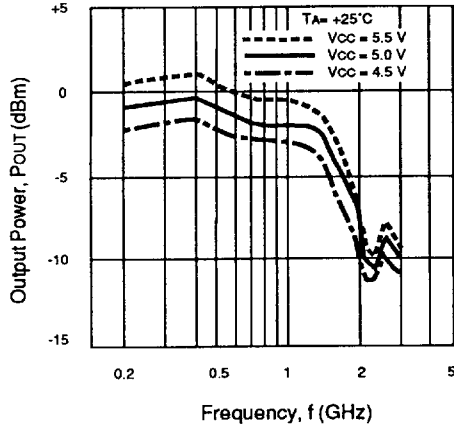


UPB584G SSB PHASE NOISE vs. OFFSET FROM CARRIER
f_{IN} = 1 GHz, TA = 25°C

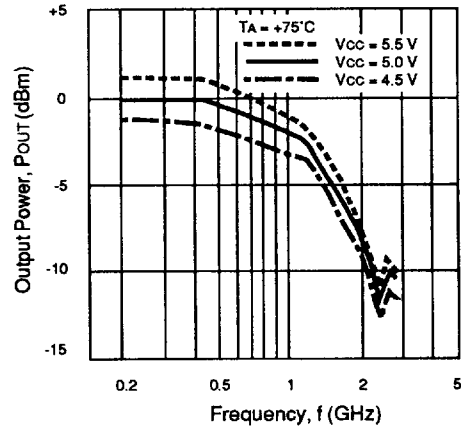


TYPICAL PERFORMANCE CURVES

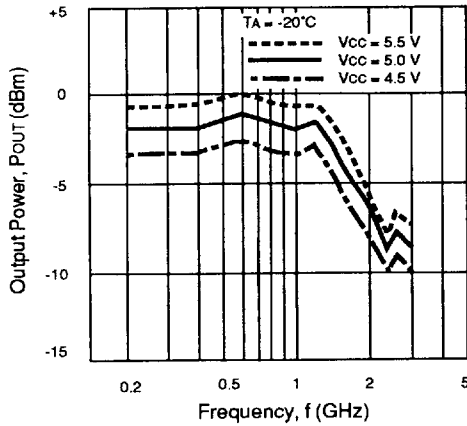
OUTPUT POWER vs. FREQUENCY AND VOLTAGE



OUTPUT POWER vs. FREQUENCY AND VOLTAGE



OUTPUT POWER vs. FREQUENCY AND VOLTAGE



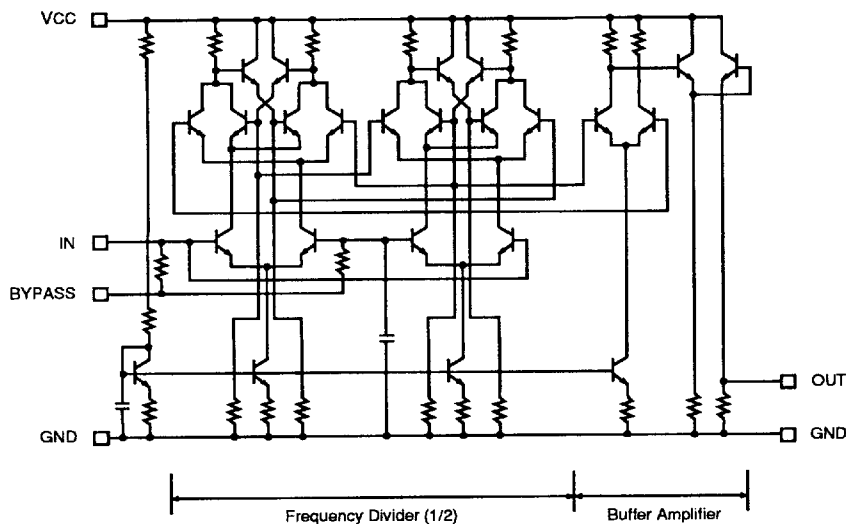
UPB584G
INPUT AND OUTPUT S-PARAMETERS

VCC = 5 V, ICC = 18 mA

| Frequency | | S11 | | Frequency | | S22 | |
|-----------|-------|------|-------|-----------|-----|-----|--|
| (GHz) | MAG | ANG | (GHz) | MAG | ANG | | |
| 0.20 | 0.076 | -154 | 0.10 | 0.424 | 173 | | |
| 0.40 | 0.095 | -149 | 0.20 | 0.550 | 149 | | |
| 0.60 | 0.117 | -148 | 0.30 | 0.566 | 130 | | |
| 0.80 | 0.138 | -150 | 0.40 | 0.580 | 112 | | |
| 1.00 | 0.159 | -150 | 0.50 | 0.593 | 95 | | |
| 1.20 | 0.185 | -154 | 0.60 | 0.605 | 79 | | |
| 1.40 | 0.210 | -159 | 0.70 | 0.613 | 65 | | |
| 1.60 | 0.234 | -164 | 0.80 | 0.619 | 51 | | |
| 1.80 | 0.258 | -170 | 0.90 | 0.620 | 38 | | |
| 2.00 | 0.284 | -176 | 1.00 | 0.619 | 27 | | |
| 2.20 | 0.309 | 177 | 1.10 | 0.614 | 16 | | |
| 2.40 | 0.334 | 170 | 1.20 | 0.607 | 6 | | |
| 2.60 | 0.361 | 162 | 1.30 | 0.599 | -5 | | |
| 2.80 | 0.385 | 154 | 1.40 | 0.588 | -14 | | |
| 3.00 | 0.407 | 145 | 1.50 | 0.575 | -23 | | |

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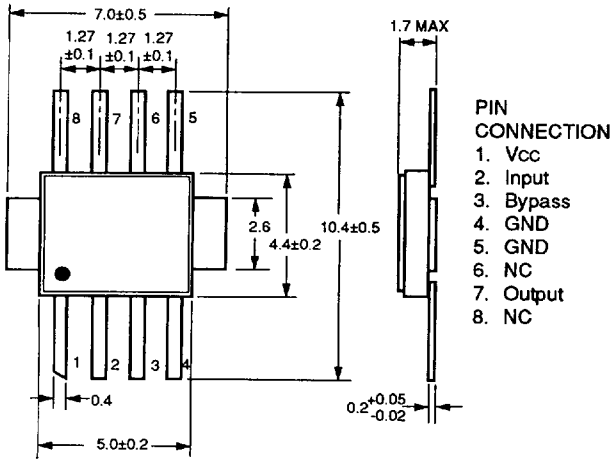
EQUIVALENT CIRCUIT



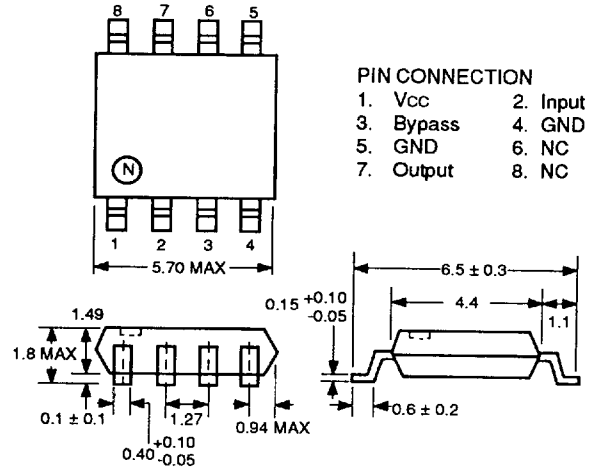
UPB584B, UPB584G

OUTLINE DIMENSIONS (Units in mm)

**UPB584B
PACKAGE OUTLINE BF08**



**UPB584G
PACKAGE OUTLINE G08**



ORDERING INFORMATION

| PART NUMBER | QTY |
|-------------|-----------|
| UPB584G-E1 | 2500/Reel |