

NEC

5 GHz DIVIDE-BY-4 STATIC PRESCALER

UPG501B

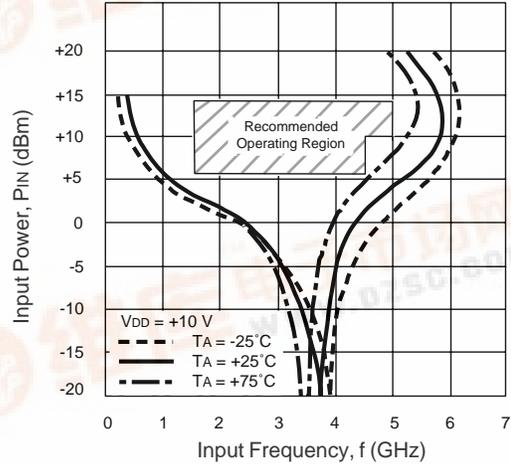
FEATURES

- **WIDE OPERATING FREQUENCY RANGE:**
 $f_{IN} = 1.5 \text{ GHz to } 5 \text{ GHz}$ ($T_A = 25^\circ\text{C}$)
- **SINGLE SUPPLY VOLTAGE:** $V_{DD} = +10 \text{ V}$
- **DIVISION RATIO OF 4**
- **HIGH RELIABILITY HERMETICALLY SEALED PACKAGE**
- **GUARANTEED PERFORMANCE OVER AN AMBIENT TEMPERATURE RANGE:** $-25^\circ\text{C to } +75^\circ\text{C}$

DESCRIPTION

The UPG501B is a GaAs divide-by-4 prescaler that is capable of operating up to 5 GHz. It is intended to be used in frequency synthesizers of microwave communications systems and measurement equipment. The UPG501B is a static divider with two (2) master-slave D-type flip-flops using Source-Coupled-FET-Logic (SCFL). It operates from a single supply voltage. The UPG501B is housed in a hermetically sealed 8-lead ceramic flat package that is easy to use and provides high reliability.

INPUT POWER vs. INPUT FREQUENCY



ELECTRICAL CHARACTERISTICS ($T_A = -25^\circ\text{C to } +75^\circ\text{C}$, $V_{DD} = 10 \text{ V}$, $V_{GG} = \text{Open}$)

PART NUMBER PACKAGE OUTLINE			UPG501B BF08		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
I _{DD}	Supply Current	mA	50	70	90
f _{IN(U)}	Upper Limit of Input Frequency	GHz	5.0	5.3	
f _{IN(L)}	Lower Limit of Input Frequency	GHz		0.7	1.5
P _{IN}	Input Power, f _{IN} = 4.5 to 5 GHz	dBm	10.0		13.0
	f _{IN} = 1.5 to 4.5 GHz	dBm	6.0		13.0
P _{OUT}	Output Power at f _{IN} = 5 GHz	dBm	-1.0	2.0	
R _{TH(CH-C)}	Thermal Resistance (Channel to Case)	°C/W			16



UPG501B

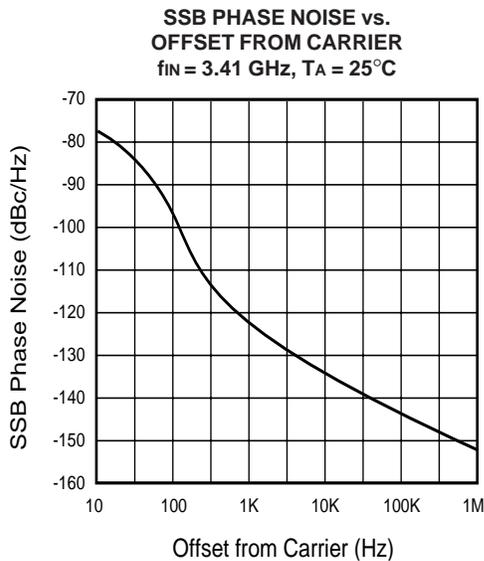
ABSOLUTE MAXIMUM RATINGS¹ (T_A = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
V _{DD}	Supply Voltage	V	+12
I _{DD}	Supply Current	mA	150
P _T	Total Power Dissipation ²	W	1.5
P _{IN}	Input Power	dBm	+20
T _{OP}	Operating Temperature	°C	-65 to +125
T _{STG}	Storage Temperature	°C	-65 to +175

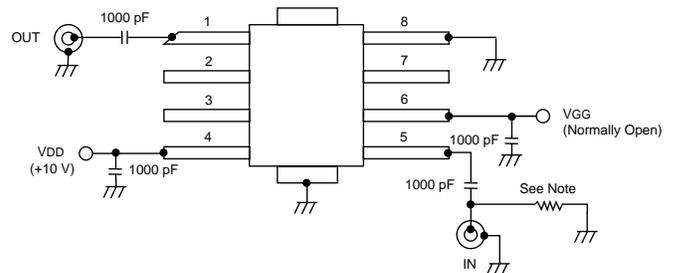
Notes:

1. Operation in excess of any one of these conditions may result in permanent damage.
2. T_C ≤ 125°C

TYPICAL PERFORMANCE CURVES (T_A = 25°C)



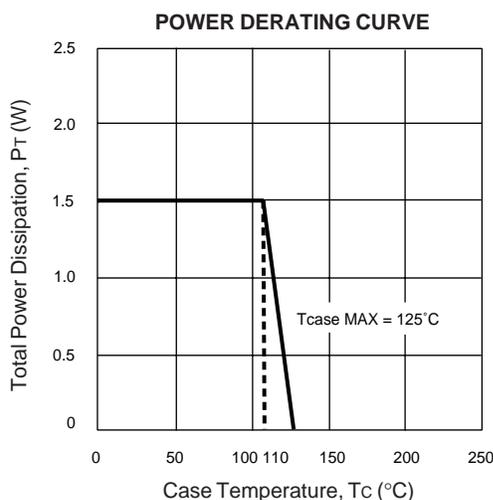
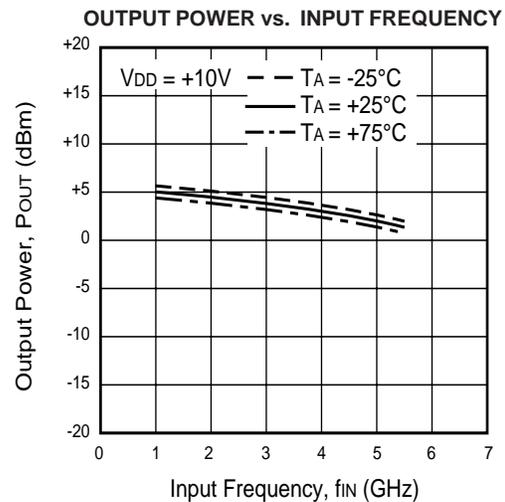
TEST CIRCUIT



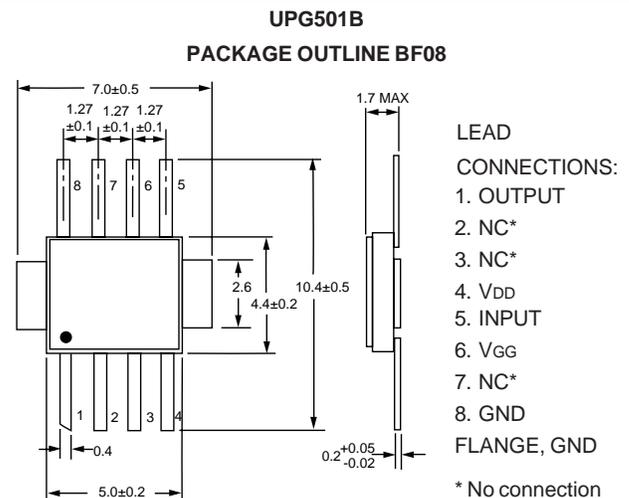
Note: Because of the high internal gain and gain compression of the UPG501B, the device is subject to self-oscillation in the absence of an RF input signal. This self-oscillation can be suppressed by either of the following means:

- Add a shunt resistor to the RF input line. Typically a resistor value between 50 and 1000 ohms will suppress the self-oscillation (see the test circuit).
- Apply a negative voltage through a 1000 ohm resistor to the normally open VGG connection. Typically voltages between 0 and -9 volts will suppress the self-oscillation.

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



OUTLINE DIMENSIONS (Units in mm)



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