Application Note

FH1 Reference Design: 2110 – 2170 MHz

The Communications Edge ™

Product Information

Summary:

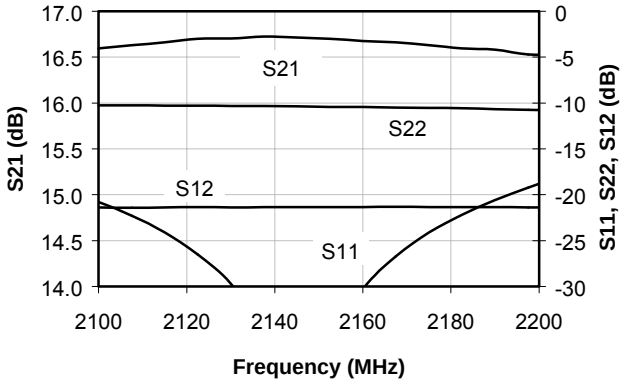
This application note details the operation and schematic of an application circuit using a WJ Communications FH1 device optimized for gain in the 2110 – 2170 MHz frequency band. This circuit is unconditionally stable and offers a gain of 16 dB while providing excellent performance for IP3, P1dB, and noise figure. The WJ Communications low-cost FET requires only a single supply that can be sourced directly from a voltage regulator. This circuit is ideal for use as a driver amplifier for wireless infrastructure equipment requiring high linearity at the UMTS frequency band for next generation 2.5 and 3G wireless infrastructure technologies.

Typical Performance

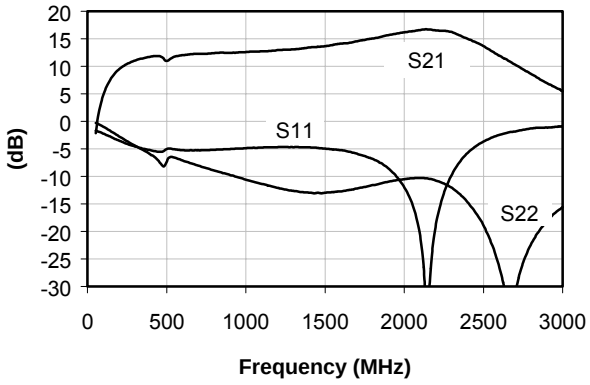
Frequency	2110 MHz	2170 MHz
S21 – Gain	16.7 dB	16.7 dB
S11 - Input R.L.	-25 dB	-20 dB
S22 - Output R.L.	-9 dB	-9 dB
Output P1dB	+22 dBm	+22 dB
Output IP3	+41 dBm	+41 dBm
Noise Figure	2.4 dB	2.5 dB
Bias	5 V @ 150 mA	

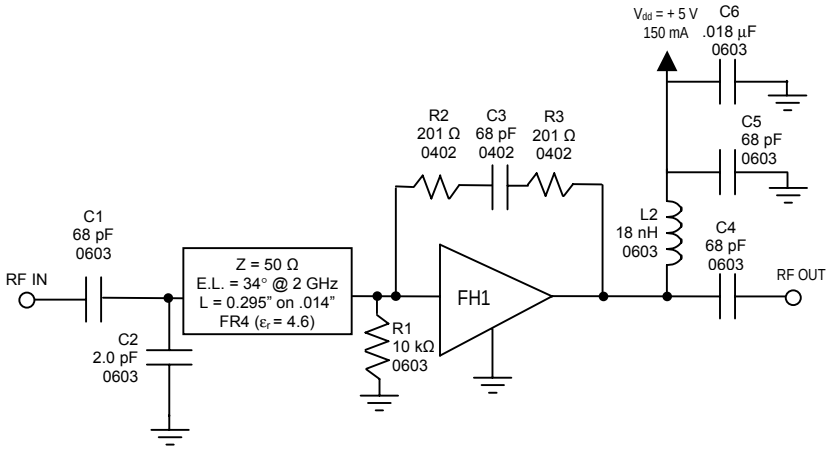
OIP3 is measured with 2 tones at an output power of +8 dBm/tone with 10 MHz spacing. The suppression on the largest IM3 product is used to calculate OIP3 using a 2:1 slope rule. Test parameters were taken at 25 °C.

Narrowband S-Parameters



Wideband S-Parameters





Bill of Materials

Ref. Des.	Value	Part Num / Size
C1, C4, C5	68 pF	size 0603
C2	2.0 pF	AVX ACCU-F 06035J2R0B
C3	68 pF	size 0402
C4	.018 µF	10%, 50V, X7R, 0805
R1	10 kΩ	size 0603
R2, R3	201 Ω	size 0402
U1	FH1	SOT-89
L2	18 nH	TOKO LL1608-FH15NJ

Notes:

1. The application circuit should be biased directly into a constant voltage DC regulator. A dropping resistor is NOT required for biasing this device.
2. The feedback incorporates the parasitics of the resistors as well as their placement into the design and thus two resistors are required for the feedback. They should not be combined into one resistor.
3. The application board material is 14 mil FR4 (er = 4.6)