



# Application Note

## FH1 Reference Design: 1850 – 1990 MHz

The Communications Edge™

Product Information

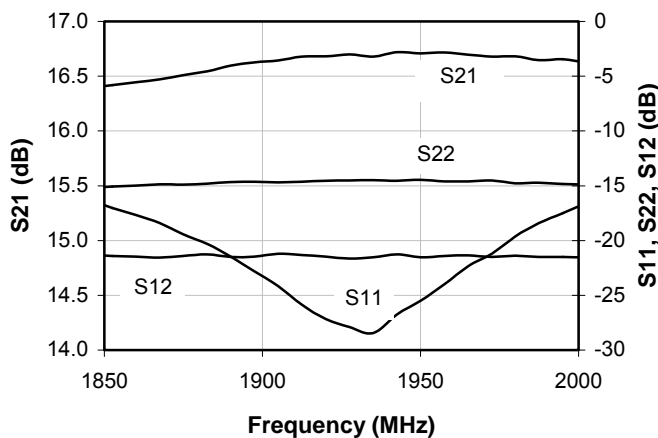
### Summary:

This application note details the operation and schematic of an application circuit using a WJ Communications FH1 device optimized for gain in the 1850 – 1990 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 1960 MHz, including GSM, TDMA, CDMA, GPRS, EDGE, and WCDMA 3G technologies.

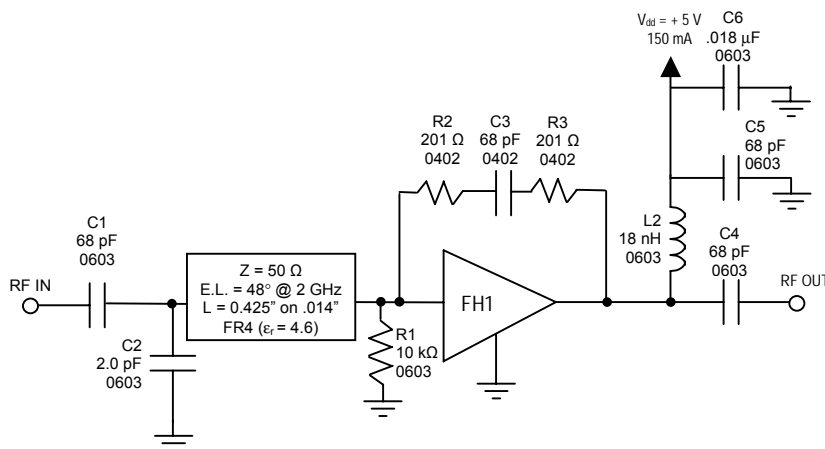
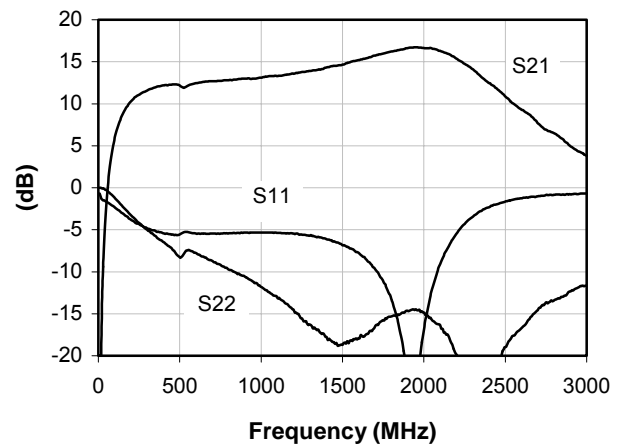
### Typical Parameters

| Frequency               | 1930 MHz     | 1990 MHz |
|-------------------------|--------------|----------|
| S21 – Gain              | 16.7 dB      | 16.6 dB  |
| S11 - Input R.L.        | -25 dB       | -18 dB   |
| S22 - Output R.L.       | -14 dB       | -14 dB   |
| Output P1dB             | 20.6 dBm     | 20.6 dB  |
| Output IP3 <sup>1</sup> | 41.5 dBm     | 41.0 dBm |
| Noise Figure            | 2.4 dB       | 2.5 dB   |
| Bias                    | 5 V @ 140 mA |          |

### 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)

Specifications and information are subject to change without notice