

DESCRIPTION

The MWS W-CDMA is a high-efficiency linear amplifier targeting 3V mobile handheld systems. The device is manufactured in an advanced InGaP/GaAs Heterojunction Bipolar Transistor (HBT) RF IC fab process. It is designed for use as a final RF amplifier in 3V W-CDMA and CDMA2000, spread spectrum systems,

and other linear applications in the 1800MHz to 2000MHz band.

There are two 16-pin package versions for this Power Amplifier. One is a 3mm x 3mm chip scale package (CSP) with external input/output match and the other is an internally I/O matched module.

KEY FEATURES

- Single 3V Supply
- 27dBm Linear Output Power
- 28dB Linear Gain
- 40% Linear Efficiency
- 70mA Idle Current

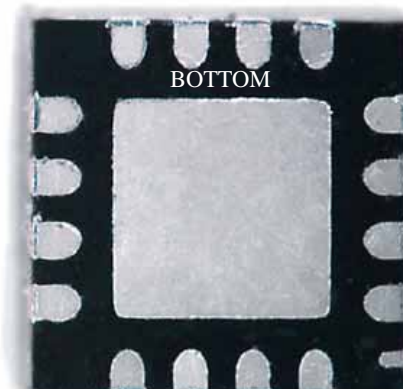
APPLICATIONS

- 3V 1920-1980 W-CDMA Handsets
- 3V 1850-1910 CMDA2000 Handsets
- Spread Spectrum Systems
- Other Linear Wireless Applications

IMPORTANT: For the most current data, consult MICROSEMI's website: <http://www.microsemi.com>

PRODUCT HIGHLIGHT

16-Pin Leadless Package




3mm

3mm


 Actual Size

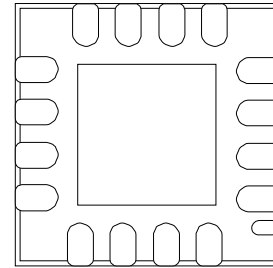
PACKAGE ORDER INFO

| | | |
|------------|-----------|--|
| T_J (°C) | |  Plastic MLP 16-PIN |
| | W-CDMA | MWS11-PH41-CS |
| | CDMA-2000 | MWS11-PH43-CS |

ABSOLUTE MAXIMUM RATINGS

| | |
|--|--------------------|
| Supply Voltage (V_{BAT})..... | 8.0V _{DC} |
| Supply Voltage ($P_{OUT} \leq 31$ dBm)..... | 5.0V _{DC} |
| Mode Voltage (V_{MODE})..... | 3.0V _{DC} |
| Control Voltage (V_{PD})..... | 3.0V _{DC} |
| Input RF Power | 6dBm |
| Operating Case Temperature..... | -30°C to 100°C |
| Storage Temperature | 30°C to 150°C |

Note: Exceeding these ratings could cause damage to the device. All voltages are with respect to Ground. Currents are positive into, negative out of specified terminal.

PACKAGE PIN OUT

FUNCTIONAL PIN DESCRIPTION (16 PIN) THREE STAGE VERSION

| PIN NAME | DESCRIPTION |
|----------|---|
| RF IN | RF input. An external series capacitor is required as a DC block. The input match can be improved to < 2:1 by using a series capacitor and shunt inductor. |
| VCC1 | Power supply for first stage and interstage match. V_{CC} should be fed through an inductor terminated with a capacitor on the supply side. |
| VCC2 | Power supply for Second stage and interstage match. V_{CC} should be fed through an inductor terminated with a capacitor on the supply side. |
| VCC | Supply for bias reference circuits. |
| VB1 | First stage control voltage. The VB1 pin can be connected with the other stage control voltages into a single reference voltage through an external resistor bridge. |
| VB2 | Second stage control voltage. The VB2 pin can be connected with the other stage control voltages into a single reference voltage through an external resistor bridge. |
| RF OUT | RF Output and Power supply for final stage. This is the unmatched collector output of the third stage. A DC Block is required following the matching components. The biasing may be provided via a parallel L-C set for resonance at the operating frequency of 1920MHz to 1980 MHz. It is important to select an inductor with very low DC resistance with a 1A current rating. Alternatively, shunt microstrip techniques are also applicable and provide very low DC resistance. Low frequency bypassing is required for stability. There are three pins designated as RF OUT. |
| GND | This is a circuit level ground, isolated from the backside ground contact. |
| GND1 | Ground for First Stage. This ground should be isolated from the backside ground contact. |
| GND2 | Ground for Second Stage. This ground should be isolated from the backside ground contact. |
| PKG GND | Ground connection. The backside of the package should be soldered to a top side ground pad which is connected to the ground plane with multiple vias. The pad should have a short thermal path to the ground plane. |

ELECTRICAL CHARACTERISTICS

Unless otherwise specified, the following specifications apply over the operating ambient temperature $-35^{\circ}\text{C} \leq T_A \leq 85^{\circ}\text{C}$ except where otherwise noted. Test conditions: [Enter Test Conditions Here]

| Parameter | Symbol | Test Conditions | MWS11-PHxx-CS | | | Units | |
|---|--------|---|---------------|-------|------|-------|-----|
| | | | Min | Typ | Max | | |
| Frequency Range | | T = 25°C, V _{CC} = 3.4V at 27dBm output power RMS power as defined by 3GPP | 1920 | | 1980 | MHz | |
| Nominal Linear Output Power (WCDMA Modulation) | | T = 25°C, V _{CC} = 3.4V at 27dBm output power RMS power as defined by 3GPP | 27 | 29 | 30 | dBm | |
| Linear Gain | | T = 25°C, V _{CC} = 3.4V at 27dBm output power RMS power as defined by 3GPP | 25 | 27 | 28 | dB | |
| Second Harmonic | | T = 25°C, V _{CC} = 3.4V at 27dBm output power RMS power as defined by 3GPP | | -35 | | dB | |
| Third Harmonic | | T = 25°C, V _{CC} = 3.4V at 27dBm output power RMS power as defined by 3GPP | | -40 | | dB | |
| Fourth Harmonic | | T = 25°C, V _{CC} = 3.4V at 27dBm output power RMS power as defined by 3GPP | | -45 | | dB | |
| Total Linear Efficiency | | T = 25°C, V _{CC} = 3.4V at 27dBm output power RMS power as defined by 3GPP | 35 | 40 | | % | |
| Adjacent Channel Power Rejection @5 MHz | | -50 dBm to 27 dBm output. Power V _{CC} 3.0 to 5.0V, T = -10 to +75°C, load VSWR = 1:1 to 5:1, all phases | -45 | -40 | -33 | dBc | |
| @10 MHz | | | -60 | -50 | -43 | dBc | |
| Reverse Inter modulation @ $2 \times F_{TX} - F_{INT} = 2110\text{MHz}$ | | Levels at the Output: interferer -25 dBm @ 1790 MHz, useful signal 27 dBm @ 1980 MHz | | | -35 | dBm | |
| Output Power Dynamic | | | -50 | | 27 | dBm | |
| Quiescent Current @ Low Power | | | | 70 | | mA | |
| Modulation Accuracy (EVM) | | EVM and Peak Code Domain Error Refer to 3GPP spec. 3G TS 25.101 | | | 17.5 | % | |
| Noise Power in Band 925-960 MHz @ 100 KHz BW | | Eq. To -132 dBm / Hz | | | -79 | dBm | |
| 1805-1880 MHz @ 100 KHz BW | | | | | | -71 | dBm |
| 2110-2170 MHz @ 3.84 MHz BW | | | | | | -66 | |
| Nominal Linear Output Power | | V _{CC} = 3.0V, -10°C < Temp < +75°C WCDMA Modulation | 25 | | | dBm | |
| Input VSWR | | | | < 2:1 | | | |
| Output VSWR | | | | 5:1 | | | |
| Leakage Current (Down Power) | | | | 10 | | μA | |
| Power supply Voltage | | | 3.04 | 3.4 | 5.0 | V | |

APPLICATION

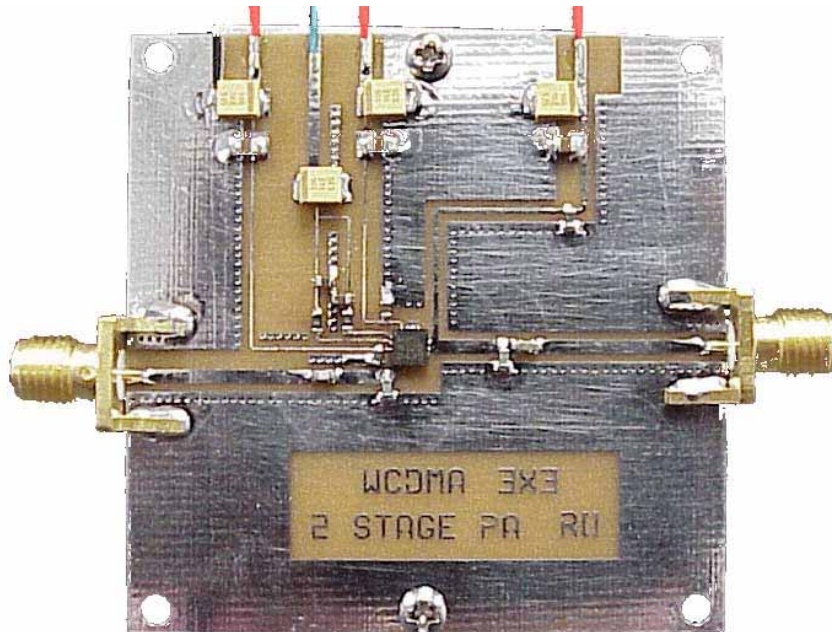


Figure 1 – Evaluation Board for the W-CDMA Power Amp

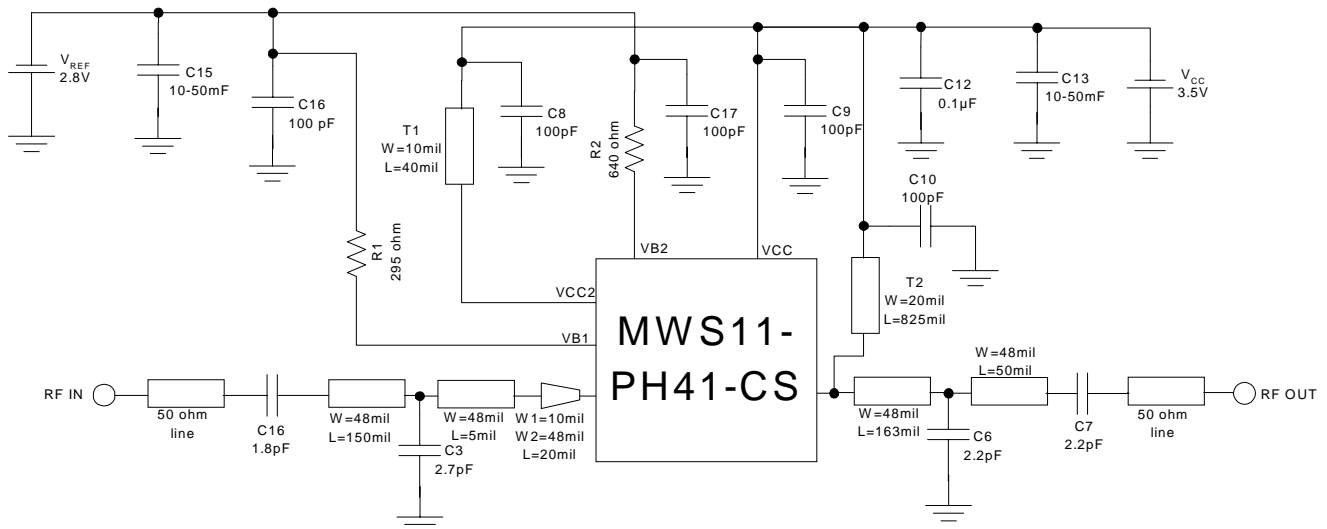


Figure 2 – Evaluation Board for the W-CDMA Schematic