A MICROSEMI COMPANY

MWS11-PHxx-CS

W-CMDA Power Amplifier

PRELIMINARY

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.

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

KEY FEATURES

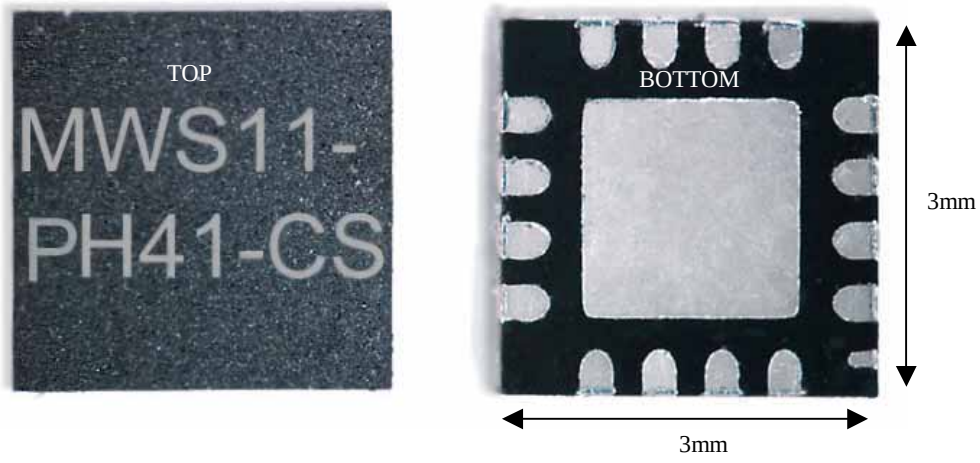
- Single 3V Supply
- 27dBm Linear Output Power
- 28dB Linear Gain
- 40% Linear Efficiency
- 70mA Idle Current

APPLICATIONS

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

PRODUCT HIGHLIGHT

16-Pin Leadless Package



Actual Size

PACKAGE ORDER INFO

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

PACKAGE DATA

www.Microsemi.com

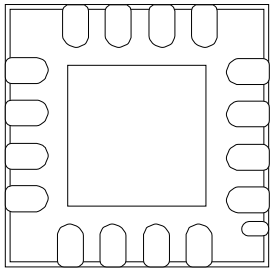
Microsemi
Micro WaveSys
11861 Western Avenue, Garden Grove, CA. 92841, 714-898-8121, Fax: 714-893-2570

ABSOLUTE MAXIMUM RATINGS

Supply Voltage (V_{BAT})	8.0V_{DC}
Supply Voltage (P_{OUT}≤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.
PKGGND	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.

Microsemi
Micro WaveSys
11861 Western Avenue, Garden Grove, CA. 92841, 714-898-8121, Fax: 714-893-2570

ELECTRICAL CHARACTERISTICS

Unless otherwise specified, the following specifications apply over the operating ambient temperature -35°C ≤ T_A ≤ 85°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 @ $2 \times F_{TX} - F_{INT} = 2110MHz$		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

Microsemi
Micro WaveSys
11861 Western Avenue, Garden Grove, CA. 92841, 714-898-8121, Fax: 714-893-2570

APPLICATION

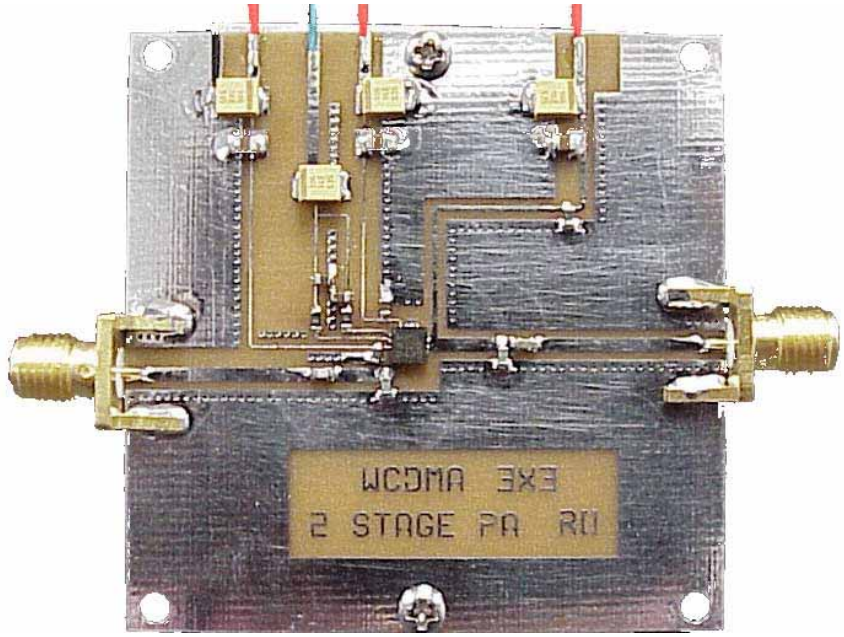


Figure 1 – Evaluation Board for the W-CDMA Power Amp

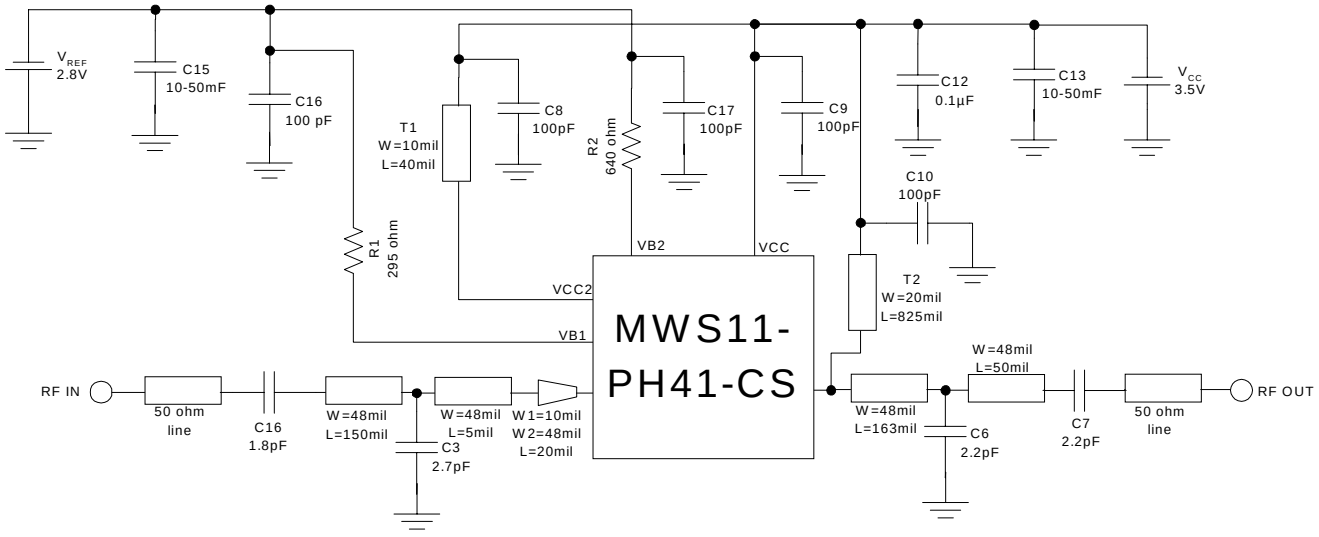


Figure 2 – Evaluation Board for the W-CDMA Schematic

Microsemi
Micro WaveSys
11861 Western Avenue, Garden Grove, CA. 92841, 714-898-8121, Fax: 714-893-2570