



Future
Communications
Integrated circuit Inc.

FC7113

Power Amplifier Module for CDMA/AMPS

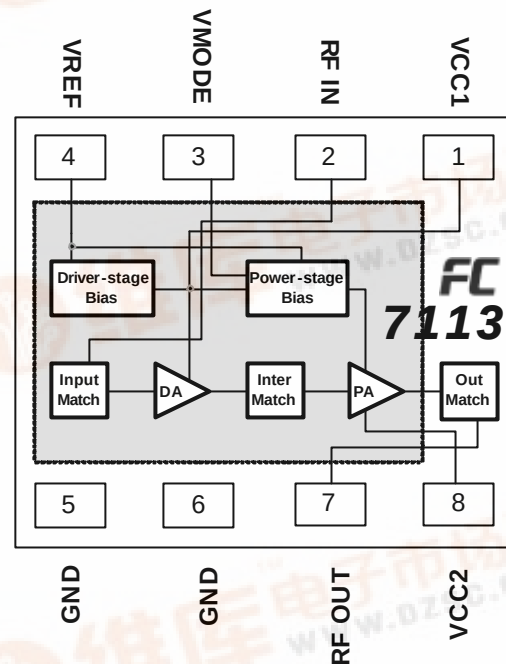
DESCRIPTION

FC7113 is a high-power, high-efficiency power amplifier module for CDMA/AMPS wireless handsets. It consists of a two-stage amplifier, 50-ohm matching network for both input and output ports, and bias control circuitry. One of the most important features of FC7113, the fixed bias mode operation, which eliminates the need for mode change between low-power and high-power/high-gain mode, provides excellent performance up to 31-dBm output power. This advantage also makes it possible to carry out one step calibration in any handsets with very low idle current. It is assembled in a 3mm x 3-mm package without any passive component in it. This lead-free package provides excellent electrical stability and low thermal resistance. This FC7113 is manufactured with an advanced InGaP HBT MMIC process.

FEATURES

- Small surface mounting package (3x3x1.32mm)
- Operating frequency: 824~849MHz
- CDMA single-mode operation up to 28dBm
- AMPS single-mode operation up to 31dBm
- High efficiency: 55% AMPS, 39.5% CDMA
- Very low quiescent current: 34mA
- Low leakage current in shutdown mode: < 1uA
- Optimized for a 50 Ω system
- Lead-free package
- No passive component in package

FUNCTIONAL BLOCK DIAGRAM



(TOP VIEW)

APPLICATIONS

- Single mode CDMA wireless handsets
- Dual mode AMPS/CDMA wireless handsets

REVISION HISTORY

- **Preliminary** version A datasheet release: October 5, 2004
- **Preliminary** version B datasheet release: December 30, 2004

For latest specifications, technical questions and additional product information, visit website or e-mail

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ABSOLUTE MAXIMUM RATINGS

Parameter	Unit	Min	Max
Supply Voltage (Vcc)	V	-	+5
Mode Control Voltage (VMODE)	V	-	+3.2
Reference Voltage (VREF)	V	-	+3.2
RF Input Power (RF IN)	dBm	-	+7
Storage Temperature (Tstg)	°C	-55	+125

Stress in excess of the absolute ratings may cause permanent damage. Functional operation is not implied under these conditions. Exposure to absolute ratings for extended periods of time may adversely affect reliability.

RECOMMENDED OPERATING CONDITIONS

Parameter	Unit	Min	Typ	Max	Note
Operating Frequency(f)	MHz	824	836.5	849	
Supply Voltage(Vcc)	V	+3.2	+3.4	+4.2	
Reference Voltage (VREF)	V	+2.8 0	+2.85 0	+2.9 +0.5	PA "on" PA "shut down"
Mode Control Voltage(VMODE)	V	+2.5 0	+2.85 0	+3.0 0.5	Low Mode High Mode
RF Output Power (RF OUT)	dBm	- -	+31 +28	- -	AMPS, Vcc=+3.4V CDMA, Vcc=+3.4V

The device may be operated safely over these conditions.

BIAS CONTROL

Power Mode		VREF	VMODE	Range
CDMA Mode	Low Mode	2.85V	2.5~2.85V	< -20dBm
	High Mode	2.85V	0~0.5V	-20 ~ 28dBm
AMPS Mode		2.85V	0~0.5V	<31dBm
Shut Down		0.0V	0.0V	-



ELECTRICAL CHARACTERISTICS

(*Test Condition : Vcc = 3.4V, Vref = 2.85V, T = +25°C and Frequency = 836.5MHz)

Parameter		Unit	Specification			Note
			Min	Typ	Max	
High Mode V _{mode} =0V	Gain	dB	- - -	27.5 28 27.5	- - -	Pout = 31dBm Pout = 28dBm Pout = 16dBm
	Adjacent Channel Power at ±885kHz offset*	dBc	- -	-50 -50	- -	Pout = 28dBm Pout = 16dBm
	Adjacent Channel Power At ±1.98MHz offset*	dBc	- -	-58 -60	- -	Pout = 28dBm Pout = 16dBm
	Total Supply Current	mA	- - -	670 470 120	- - -	Pout = 31dBm Pout = 28dBm Pout = 16dBm
	Power-Added Efficiency	%	- - -	55 39.5 9.8	- - -	Pout = 31dBm Pout = 28dBm Pout = 16dBm
	Quiescent Current (I _{CQ})	mA	-	34	-	
**Low Mode V _{mode} =2.85V	Gain	dB	-	17	-	Pout=<-20dBm
	Adjacent Channel Power at ±885kHz offset*	dBc	-	<-50	-	Pout=<-20dBm
	Adjacent Channel Power At ±1.98MHz offset*	dBc	-	<-60	-	Pout=<-20dBm
	Quiescent Current (I _{CQ})	mA	-	12	-	
Reference Current		mA	-	3.0	-	Through V _{ref} Pin(2.85V)
Mode Control Current		mA	-	0.2	-	Through V _{mode} Pin
Leakage Current		uA	-	1	-	V _{cc} =3.4V, V _{ref} =0V, V _{mode} =0V
Noise in Receive Band		dBm/Hz	-	-136	-	869MHz to 894MHz
Harmonics 2fo Harmonics 3fo		dBc	- -	-30 -35	- -	Pout<31dBm
Input Impedance		VSWR	-	1.5:1	-	
Ruggedness-No damage		VSWR	-	10:1	-	Pout<28dBm, all phases

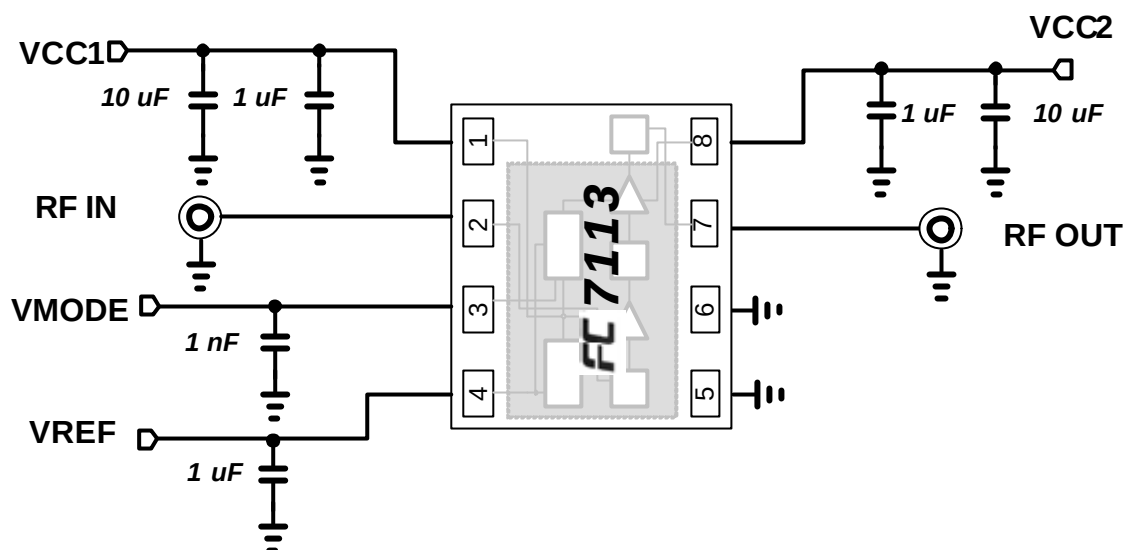
*Test Condition; Primary Channel BW=1.23 MHz, Adjacent Channel BW=30 kHz

**In the case that the transmitter has a wide dynamic range, it will be enough to use high mode only without switching operation.

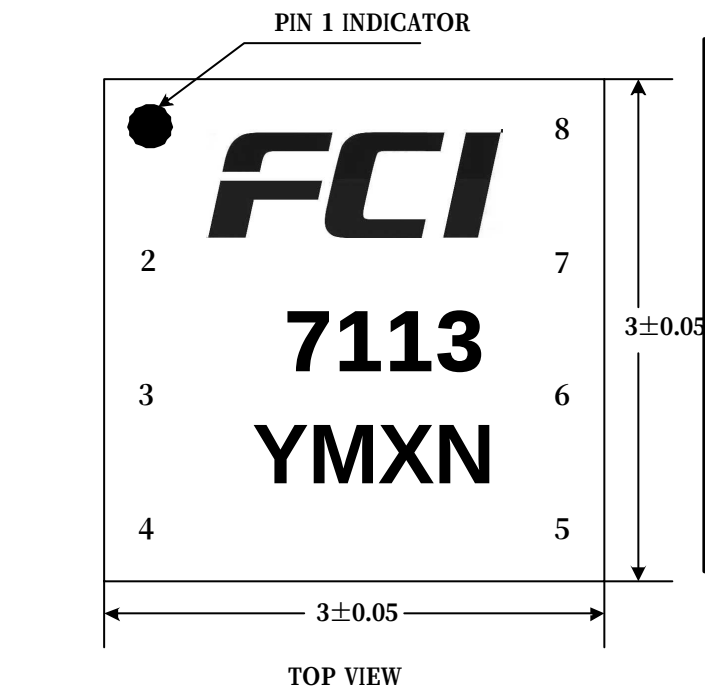
PIN DESCRIPTION

Pin	Name	Description	Pin	Name	Description
1	VCC1	Supply voltage	5	GND	Ground
2	RF IN	RF input	6	GND	Ground
3	VMODE	Mode control voltage	7	RFOUT	RF output
4	VREF	Reference voltage	8	VCC2	Supply voltage

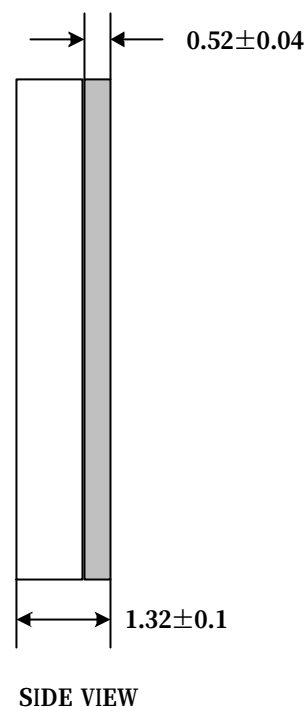
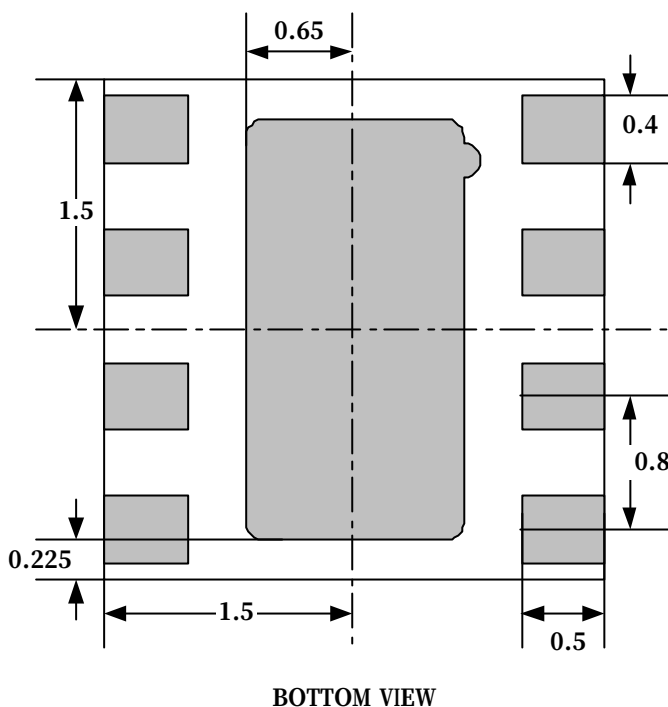
EVALUATION BOARD SCHEMATIC (TOP VIEW)



PACKAGE OUTLINE AND DIMENSIONS



Line	Device Marking Description
1	FCI's Company Name
2	7113 = Product Name
3	YMXN LOT Code Y = Year code M = Month code X = Manufacture code N = Wafer number
	Pin 1 Identifier



All dimensions are in millimeters