RF Power Amplifier 1Watt @169MHz

Applications

- RF front end
- 169 MHz ISM band systems
- Automated meter reading
- Advanced metering infrastructure
- ISM system

Product Description

BIT169PA30 is a very low cost RF power amplifier module designed for medium range wireless applications.

BIT169PA30 integrates a power amplifier, a switchs and is matched to 50 ohm both input and output.

This module is intended for meter reading and metering infrastructure ISM (Industrial, Scientific and Medical) @ 169 Mhz frequency band

In a typical system **BIT169PA30** will be used with BIT169RMH BIT's modules

BIT169PA30 has a very small package: only 14,4 x 14,4 mm ready for SMT assembly.

Key Features

- Small size (14,4 x 14,4 mm package, 12 pins).
- High output power (up to 30 dBm)
- Transmit bypass mode with 0.9 dB insertion loss
- Receive loss < 0.4dB
- <1μA Sleep Mode
- 680μA Receive Current Consumption
- 2 V to 3.6 V Operation
- Frequency bands 169 MHz
- High output power (up to 30 dBm).

Pb-free (RoHS compliant) package.

1. ABSOLUTE MAXIMUM RATINGS

Under no circumstances must the absolute maximum ratings be violated. Stress exceeding one or more of the limiting valuesmay cause permanent damage to the device.

		VALUE	UNIT
Supply voltage, VDD	All supply pins must have the same voltage	-0.3 to 3.8	V
Voltage on any digital pin		–0.5 to VDD	V
Input RF level		15	dBm
Transmit RF input power , bypass (TX)		20	dBm
Transmit RF input power (TX)		-4	dBm
Outupt Power		31	dBm
Voltage Standing Wave Ratio (VSWR)		10:1	
Operating temperature		-40 to 85	°C
Storage temperature range		-55 to 150	°C

CAUTION: Although this device is designed to be as robust as possible, Electrostatic Discharge (ESD) can damage this device. This device must be protected at all times from ESD. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD precautions should be used at all times.

2. RECOMMENDED OPERATING CONDITIONS

	MIN	Typ	MAX	UNIT
Operating frequency range	169		170	Mhz
Operating supply voltage	2		3.7	V
Receive RF input power (RX)			-15	dBm
Transmit RF input power (TX)		-6		dBm
Transmit RF input power, bypass (TX)		15	20	dBm
Transmit duty cycle			50	%
Control voltage: High Low	1,6 0		VDD 0,7	V V
Input Current: High Low		50 0		µA µA

3. ELECTRICAL CHARACTERISTICS

T_C = 25°C, VDD = 3,3 V, f_{RF} = 169 MHz

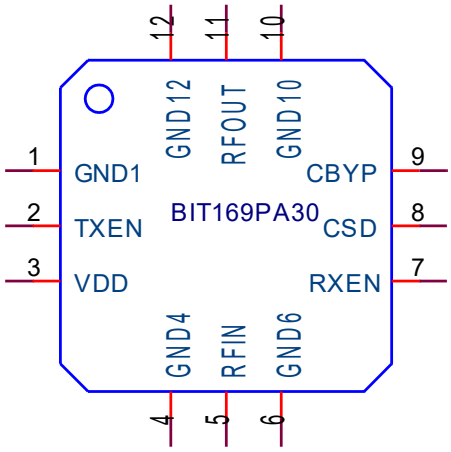
Parameter	Test conditions	Min	Typ	Max	Unit
Receive current	In receive mode		680		µA
Transmit quiescent current	In transmit mode		65		mA
Transmit bypass quiescent current	In transmit bypass mode		680		µA
Transmit operating current	In transmit mode: VDD = 3.6 V, POUT = +30.0 dBm		600		mA
Shuntdown	In sleep mode			1	µA
RF Receive (receive mode)					
Insertion loss			0,75		dB
1 dB Compression Point	1 dB gain compression	15			dBm
3rd Order Input Intercept Point		29	1		dBm
Input return loss		8	15		dB
RF Transmit (transmit mode)					
Output power, POUT	VDD = 3.6 V		30		dBm
PA Power Added Efficiency (PAE)	At RFOUT pin		63		%
2nd harmonic power			TBD		
3rd harmonic power			TBD		
Power-on-time (t_{on})	Final mode = transmit		1,2		µS
RF Transmit Bypass Mode					
Insertion loss	VDD = 3.0 to 3.6		1,25		dB
1 dB Input Compression Point		21			dBm
2nd harmonic power	PIN_TX = +20 dBm, VDD = 3.0 to 3.6 V		TBD		dBm
3rd harmonic power			TBD		

4. Truth Table

Mode	CSD	TXEN	RXEN	CBYP
Sleep	0	X	X	X
Transmit Bypass	1	1	0	0
Receive	1	0	1	X
Transmit	1	1	0	1

Note: "1" = 1.6 to VDD, "0" = 0 to 0.7 V, "X" = don't care.

DEVICE INFORMATION
14.4mm x 14.4mm

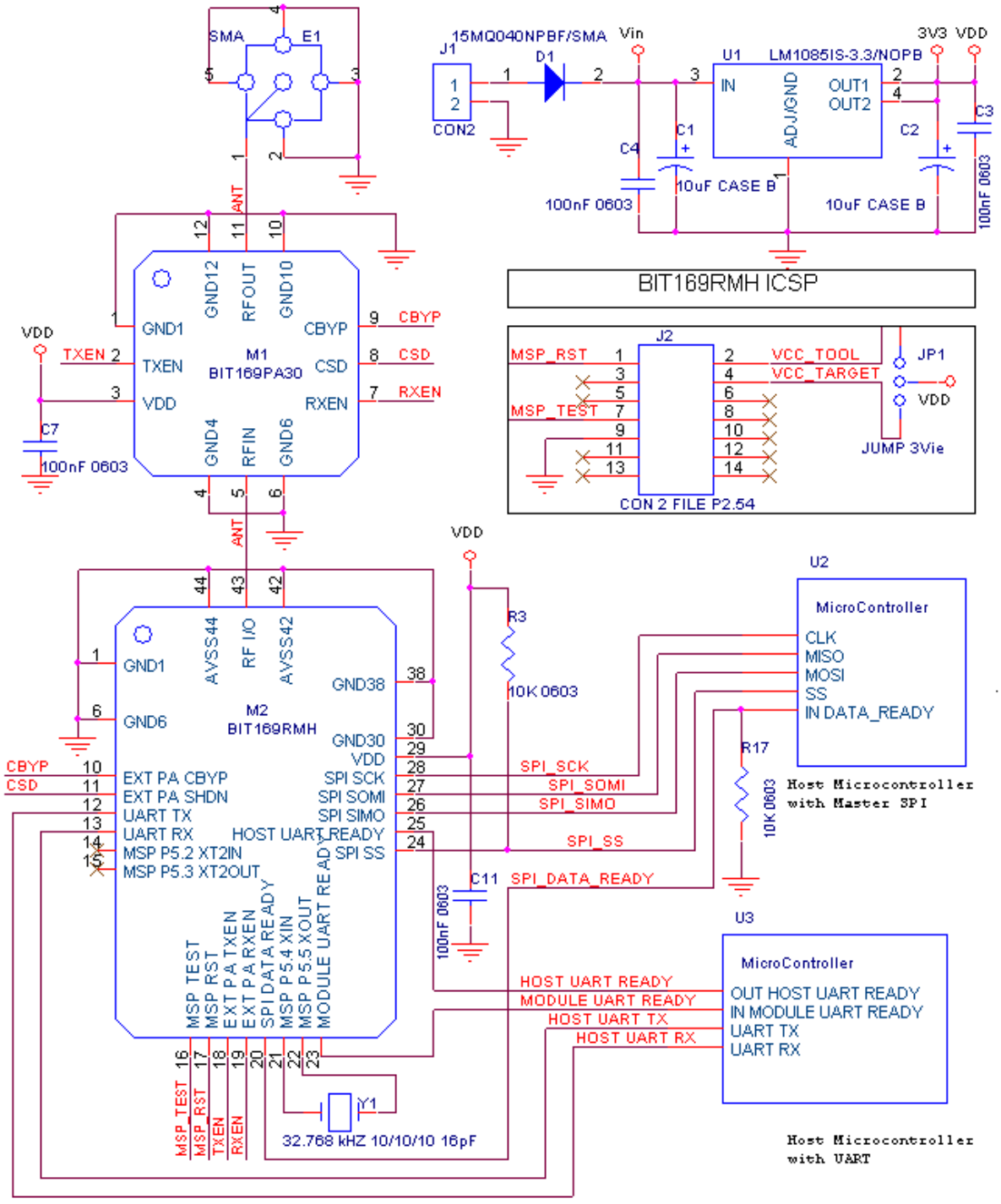


TOP VIEW

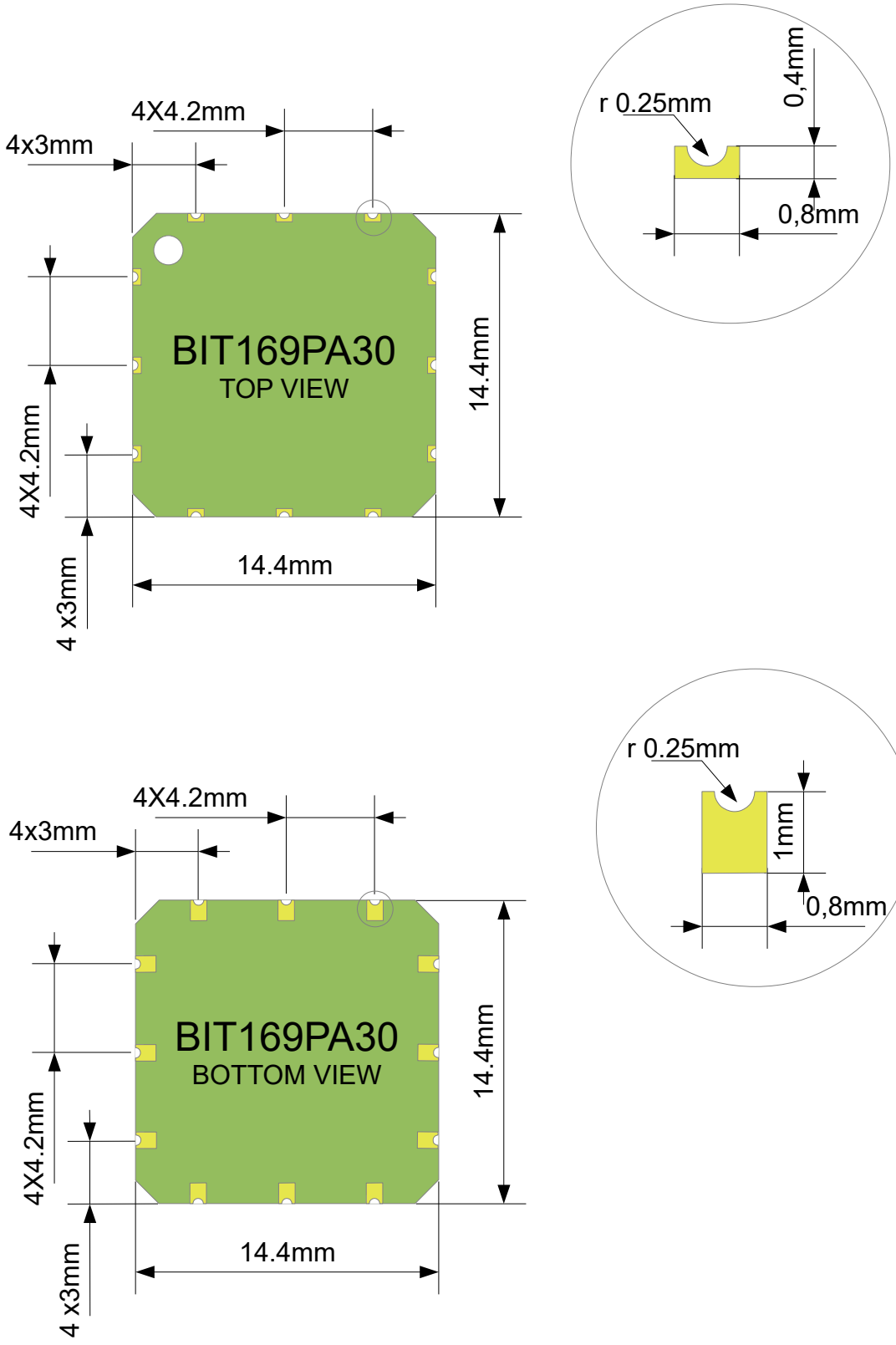
5. Pin-Out

Pin #	Pin Name	Pin Type	Descrizione
P1	GND1	Ground	Ground Connection
P2	TXEN	Digital Input	Transmitter enable signal (see Truth Table)
P3	VDD	Power	2V – 3.6V power supply connection
P4	GND4	Ground	Ground connection for RF_IN
P5	RFIN	RF	RF input signal
P6	GND6	Ground	Ground connection for RF_IN
P7	RXEN	Digital Input	Receiver enable signal (see Truth Table)
P8	CSD	Digital Input	Sleep Mode enable signal (see Truth Table)
P9	CBPY	Digital Input	Transmit with Bypass enable signal (see Truth Table)
P10	GND10	Ground	Ground connection for RF_OUT
P11	RFOUT	RF	RF output signal
P12	GND11	Ground	Ground connection for RF_OUT

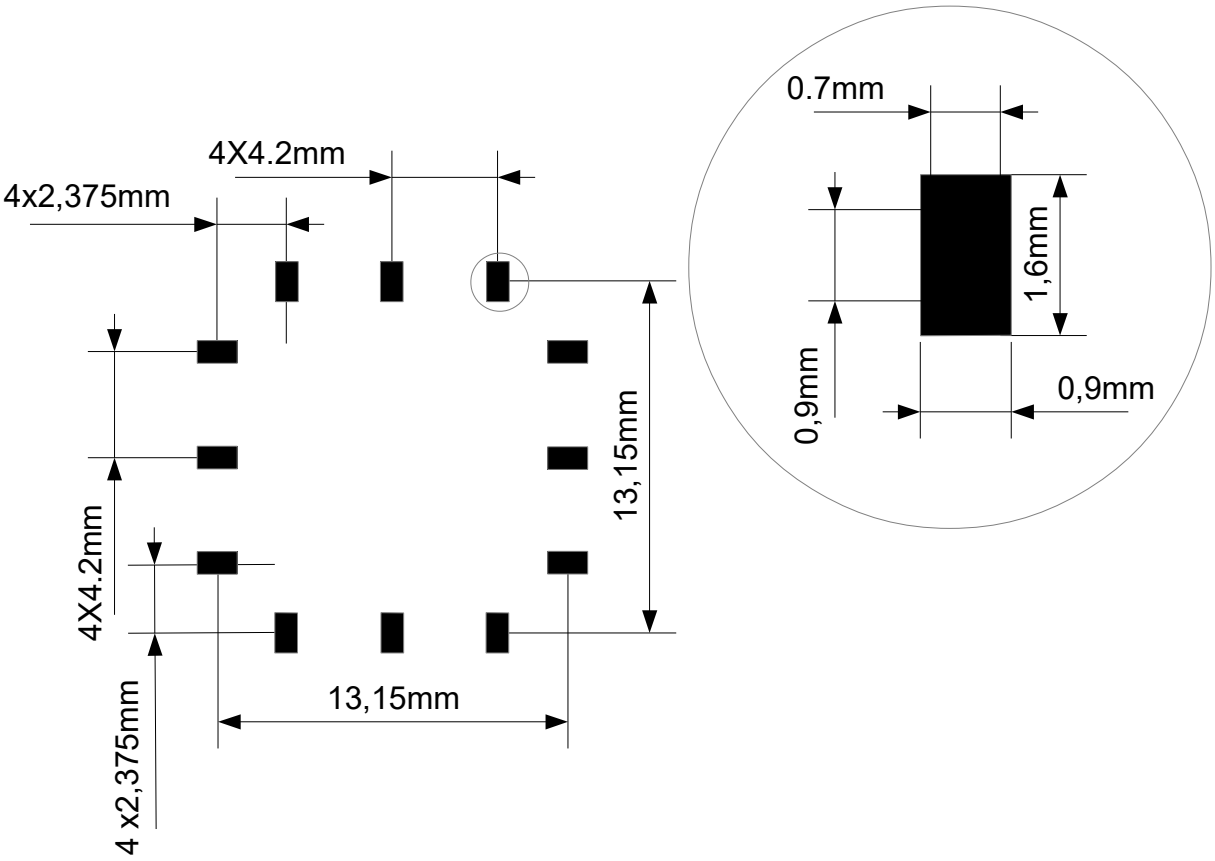
6. Typical application



7. Package Description (All dimension in mm)



8. Recommended footprint (All dimension in mm)



A PCB with two or more layers and with a solid ground plane in one of the inner-or bottom layer(s) is recommended. All GND-pins of the module shall be connected to this ground plane with vias with shortest possible routing, one via per GND-pin

The area underneath the module should be covered with solder resist in order to prevent short circuiting the test pads on the back side of the module. A solid ground plane is preferred.

9. General Information

Disclaimer

B.I.T. srl believes the information contained herein is correct and accurate at the time of this printing. However, B.I.T. srl reserves the right to make changes to this product without notice. B.I.T. srl does not assume any responsibility for the use of the described product; neither does it convey any license under its patent rights, or the rights of others. The latest updates are available at the BIT website or by contacting BIT directly.
As far as possible, major changes of product specifications and functionality, will be stated in product specific Errata Notes published at the BIT website. Customers are encouraged to sign up to the Developers Newsletter for the most recent updates on products and support tools.
Compliance with regulations is dependent on complete system performance. It is the customer's responsibility to ensure that the system complies with regulations.

Life Support Policy

This BIT product is not designed for use in life support appliances, devices, or other systems where malfunction can reasonably be expected to result in significant personal injury to the user, or as a critical component in any life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness. B.I.T. srl customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify B.I.T. srl for any damages resulting from any improper use or sale.

Bit is **I**talian **T**echnology S.r.l.
Via Settembrini, 29 – 20020 Lainate (MI)
Tel.: (+39) 02 30465311, fax: (+39) 02 30465358
http://www.bit.it/ **info@bit.it**

è una società del gruppo

http://www.kevin.it/

info@kevin.it