RF Power Amplifier

Applications

- RF front end
- 868/915 MHz ISM band systems
- Wireless Metering (AMR/AMI) Systems
- Smart Grid Wireless Networks
- Wireless audio
- Alarm and security systems
- Home and building automation
- Wireless sensor networks
- Industrial monitoring and control

Product Description

BITxxxPA27R2 is a very low cost RF power amplifier module designed for medium range wireless applications.

BITxxxPA27R2 integrates a power amplifier, a low-noise amplifier, switchs, a saw filter and is matched to 50 ohm both input and output.

This module is intended for ISM (Industrial, Scientific and Medical) and frequency band @ 868, 915 Mhz:

BIT868PA27R2 for 868 MHz and
BIT915PA27 for 915 MHz.

In a typical system **BITxxxPA27R2** will be used together with all BIT's modules

BITxxxPA27R2 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).
- 1-uA in Power Down (LNA_EN=PA_EN= 0)
- Receive Current Consumption
  – 16 mA for High Gain Mode
  – 10 mA for Low Gain Mode
- 2 V to 3.7 V Operation
- Frequency bands:
  1. **BIT868PA27R2** 868 MHz
  2. **BIT915PA27R2** 915 MHz
- High output power (up to 27 dBm).
- 12 or 14dB Gain in Receive Mode
- Ideal for multi-channel operation.
- 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 to 4.2	V
Voltage on any digital pin		0 to 3.6	V
TX RF Input power		7	dBm
ANT RF Input Power	When RX is “ON”	5	dBm
Storage Ambient temperature		-50 to 150	°C

2. RECOMMENDED OPERATING CONDITIONS

	MIN	MAX	UNIT
Operating Ambient temperature range	-40	85	°C
Operating supply voltage	2.7	3.6	V
Operating frequency range BIT868PA27R2	865	873	Mhz
Operating frequency range BIT915PA27R2	902	928	Mhz
Control Voltage “High”	1.2	VDD	V
Control Voltage “Low”		0.3	V

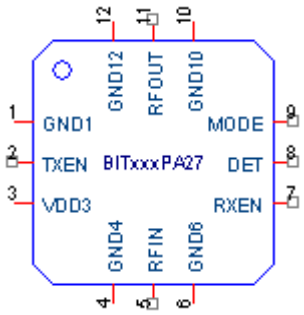
3. ELECTRICAL CHARACTERISTICS

TC = 25°C, VDD = 3.3 V, fRF = 868 MHz.

Parameter	Test conditions	Min	Typ	Max	Unit
DC Characteristics					
DC Control Pin Current Consumption	RXEN, TXEN, and MODE Pins		0.1		uA
DC Shutdown Current			1		uA
Transmit-Receive Switching Time				1	uSec
Shut-Down and "ON" State Switching Time				1	uSec
TRANSMIT TECHNICAL PARAMETERS					
Saturated Output Power	In Band	+26	+27		dBm
Linear Output Power	For 3% EVM, 802,11ah, 4MHz/64QAM		16		dBm
Large Signal Gain	Pout = +278 dBm		28		**dB**
Large Signal Current	POUT = +27dBm, Burst, 10% Duty Cycle		350		mA
Quiescent Current			40		mA
Second Harmonic	LNA_EN = PA_EN = 0		-32		dBc
Third Harmonic	HGM, LNA_EN, PA_EN		-22		dBc
Input Return Loss (S11)	HGM, LNA_EN, PA_EN		-10		dB
Input/Output Impedance Single-Ended			50		Ohm
Power Detector Voltage		200		1800	mV
VSWR for stability	PIN = -40 dBm, HGM = 1		6:1		dB
VSWR for ruggedness	PIN = -40 dBm, HGM = 0		10:1		
RECEIVE TECHNICAL PARAMETERS					
Gain	High Gain Mode		14		dB
	Low Gain Mode		12		
Noise Figure	High Gain Mode		3		dB
	Low Gain Mode		3.5		
Input Return Loss (S11)	At RFOUT Pin		-10		dB
Output Return Loss (S22)	At RFIN Pin		-10		dB
RF Port Impedance	At RFOUT and RFIN Pins		50		Ohm
DC Current	POUT < -10dBm, High Gain Mode		16		mA
DC Current	POUT < -10dBm, Low Gain Mode		10		mA
Input P1dB	High Gain Mode		-5		dBm
	Low Gain Mode		-5		

4. DEVICE INFORMATION

14.4mm x 14.4mm



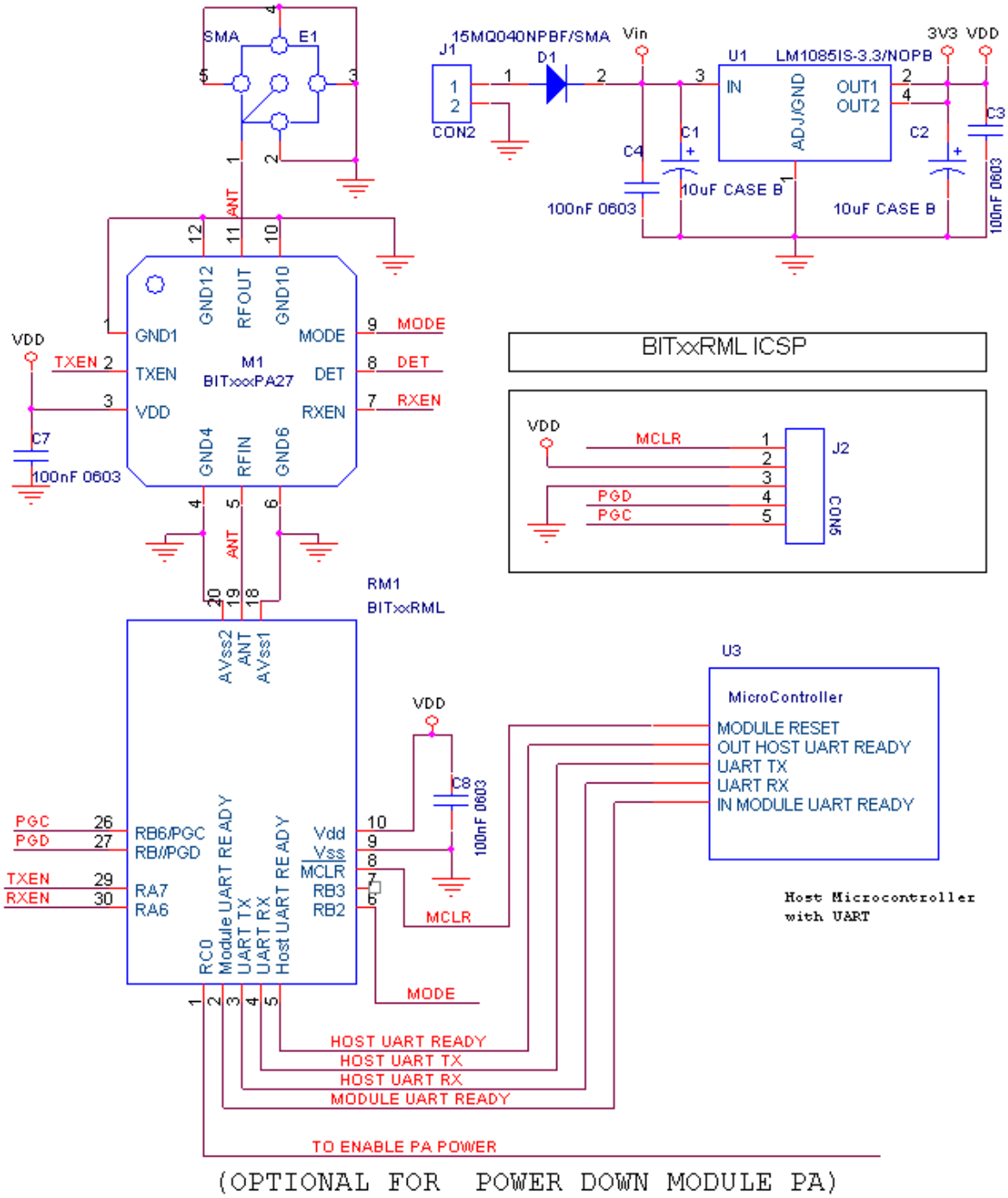
5. Pin-Out

Pin #	Pin Name	Pin Type	Descrizione
P1	GND1	Ground	Ground ConnectionT
P2	TXEN	Digital Input	CMOS Input to Enable Transmit Mode
P3	VDD	Power	Power supply connection
P4	GND4	Ground	Ground connection for RFIN
P5	RF_IN	RF	RF Input signal (max 10 dBm)
P6	GND6	Ground	Ground connection for RFIN
P7	RXEN	Digital Input	CMOS Input to Enable Receive Mode
P8	DET	OUT	Analog Voltage Proportional to the PA Power Output
P9	MODE	Digital Input	CMOS Input to Control High Gain/Low Gain for RX
P10	GND10	Ground	Ground connection for RFOUT
P11	RF_OUT	RF	RF output signal
P12	GND12	Ground	Ground connection for RFOUT

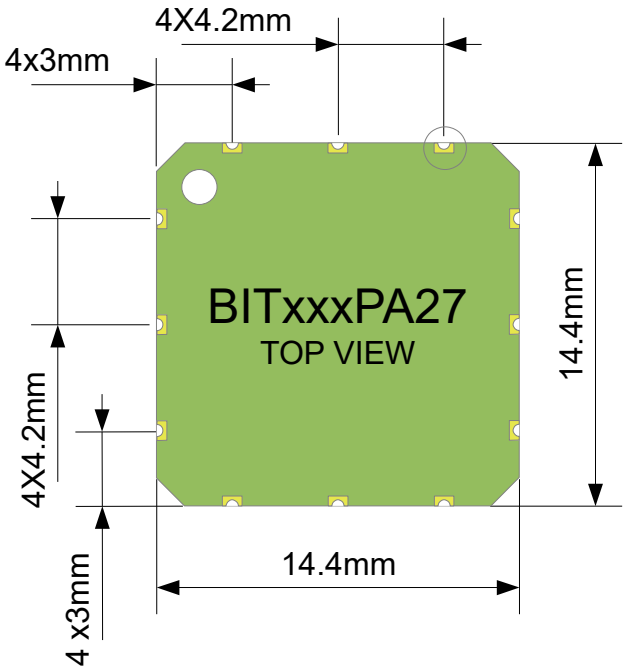
6. Truth Table

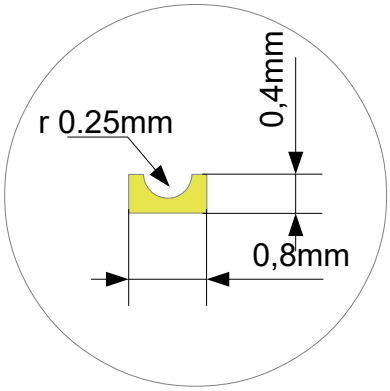
TXEN	RXEN	MODE	Operating Conditions
0	0	X	Shut-down
0	1	0	RX Active, Low Gain Mode
0	1	1	RX Active, High Gain Mode
1	X	X	TX Active

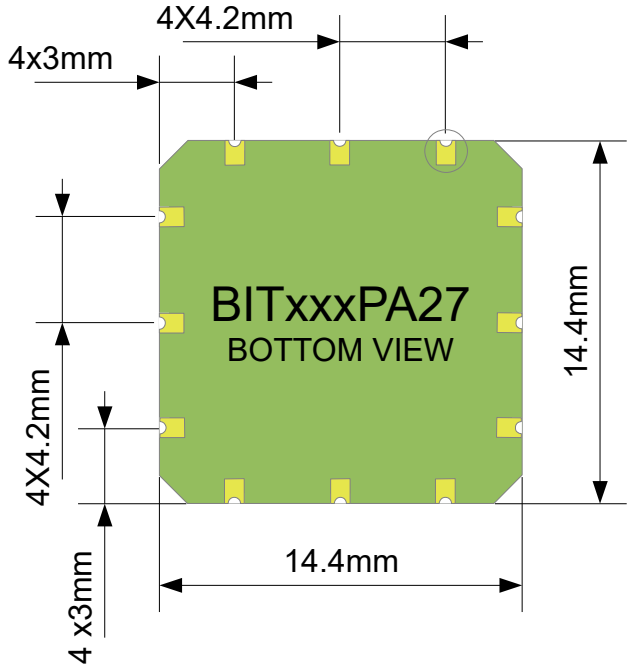
7. Typical application

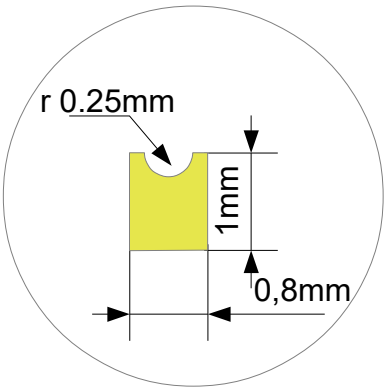


8. Package Description (All dimension in mm)

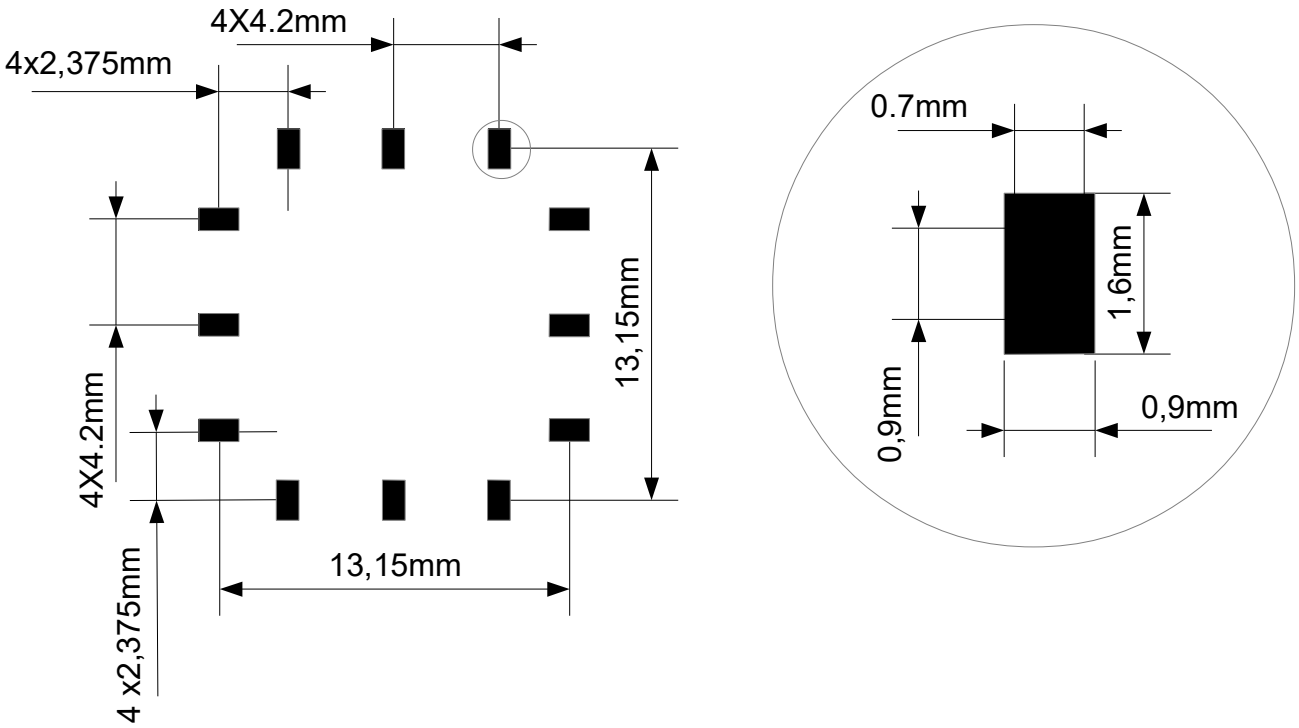








9. Recommended footprint (All dimension in mm)



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.

10. General Information

Disclaimer

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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.
Viale delle Industrie, 20 20020 Arese
Tel.: (+39) 02 30465311, fax: (+39) 02 30465396
http://www.bit.it/ info@bit.it

è una società del gruppo

http://www.kevin.it/

info@kevin.it