AP1288

2.4 to 2.5 GHz RF FEM

RFIC 2019.05 Update Rev1.3

DESCRIPTION

The AP1288 is a linear, low current consumption RF Front-End Module (FEM) which consists of power amplifier, low noise amplifier and T/R switch for ISM band wireless application. It offers highly integrated Input / Output matching on chip to reduce the bill of material. This RF FEM is developed for portable product of ISM band, and compact device or embedded module application of IoT with stable and outstanding performance.
AP1288 is housed in a 3 x 3 (mm), 16-pin, QFN leadless package, a high performance FEM.

KEY FEATURES

Tx:

- **Low current :**
  93mA for 20dBm 3.3V FSK application

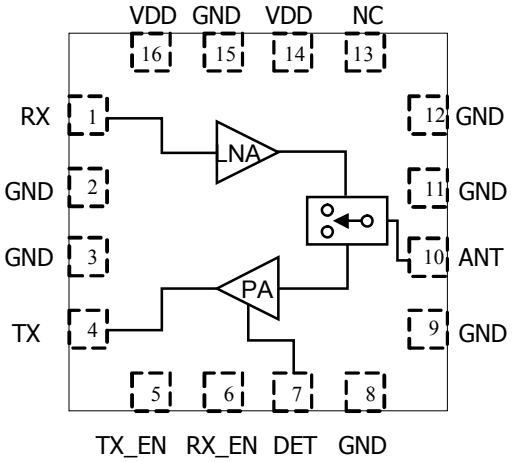
Rx:

- **Low current :**
  10mA for 3.3V application
- **Low Noise Figure :**
  2dB

Major Applications

- **802.15 PANs extended range device**
- **2.4 GHz ISM Band portable device**
- **2.4 GHz IoT Gateway device**
- **RF4CE application**

Pin Assignment



QFN-16pin, 3x3 (mm)

Pin Details

Pin Number	Name	Description
1	RX	RF signal to transceiver
2	GND	Connected to ground
3	GND	Connected to ground
4	TX	RF signal from transceiver
5	TX_EN	Control signal input for TX path enable
6	RX_EN	Control signal input for RX path enable
7	DET	
8	GND	Connected to ground
9	GND	Connected to ground
10	ANT	Antenna connection pin
11	GND	Connected to ground
12	GND	Connected to ground
13	NC	No-used pin
14	VDD	Supply voltage connection pin
15	GND	Connected to ground
16	VDD	Supply voltage connection pin
17	Center GND	IC center pad connected to ground

For more information,please contact us at:
Sales Dept.
Tel: +886-2-2698-1022
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Tx Electrical Characteristics for general ISM band application

VDD_C = VDD_TXTX_EN = 3.3V; RX_EN = 0V; CW signal; TA = 25°C; unless otherwise noted.

Parameter	Specification			Units	Notes
	Min	Typ.	Max		
Freq	2.4		2.5	GHz	
Input return loss		15		dB	
Output return loss		9		dB	
PAE		31.5		%	
P1dB		20		dBm	
Saturation Power			22	dBm	
Small Signal Gain		26		dB	
2nd Harmonics		-23		dBm/MHz	@ Pout = 20dBm
3rdHarmonics		-22		dBm/MHz	@ Pout = 20dBm
Current Consumption		93		mA	@ Pout = 20dBm

Rx Electrical Characteristics for general ISM band application

VDD_C = RX_EN = 3.3V; TX_EN = 0V; CW signal; TA = 25°C; unless otherwise noted.

Parameter	Specification			Units	Notes
	Min	Typ.	Max		
Freq	2.4		2.5	GHz	
Small Signal Gain		14.3		dB	
Noise Figure		2.0		dB	
Idle Current		10		mA	
Input Return Loss		8		dB	
Output Return Loss		7		dB	
P1dB		7		dBm	

Caution: ESD Sensitive
Appropriate precaution in handling, packaging
And testing devices must be observed.

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Absolute Maximum Ratings

Parameter	Rating	Unit
DC Power Supply For Drain	+4	V
DC Supply Current For Drain	300	mA
RF Input Power	+5	dBm
Operating Ambient Temperature	-40~85	˚C
Storage Temperature	-40~125	˚C
ESD (HBM, JESD22-A114, all pins)	300	V
Moisture Sensitivity	MSL3	

Logic Control Table

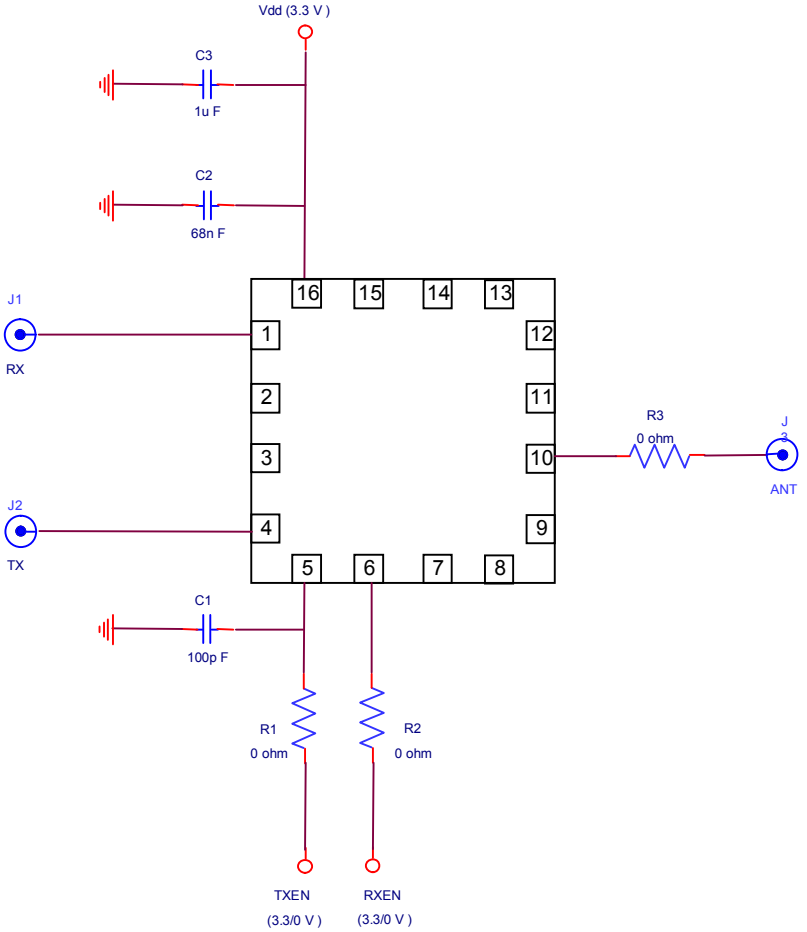
TX_EN	RX_EN	State
1	0	TX Active
0	1	RX Active

Note:

"1" = +3V to +3.3V

"0" = +0V to +0.2V

ISM Band General Application Reference Circuit



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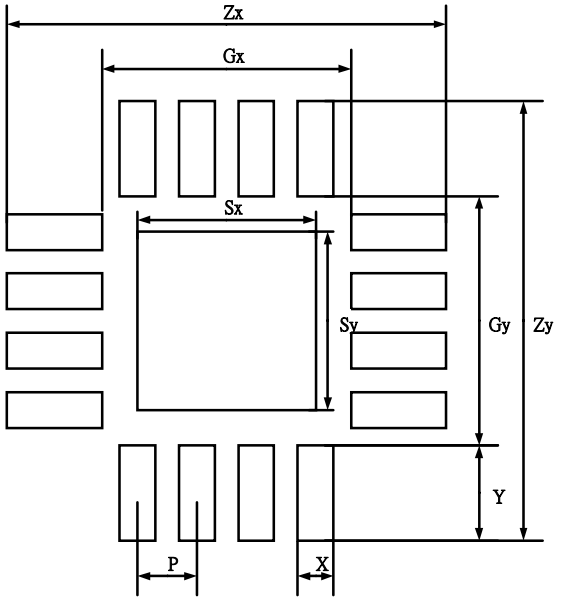
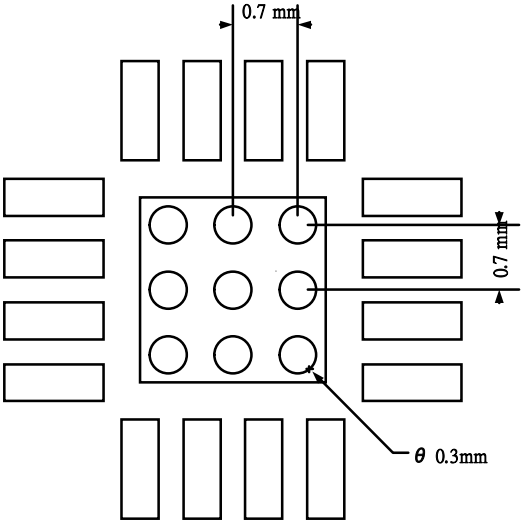
Suggested PCB Layout

I/O Pin, Central PAD Layout



Thermal PAD Via Design



PCB Footprint Dimension (mm)								
P	X	Y	Sx	Sy	Gx	Gy	Zx	Zy
0.5	0.3	0.85	1.5	1.5	2.1	2.1	3.8	3.8

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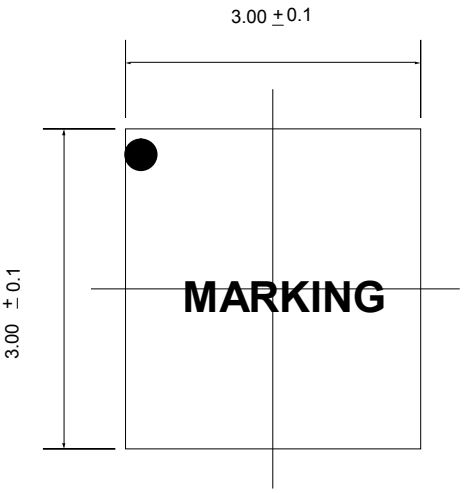
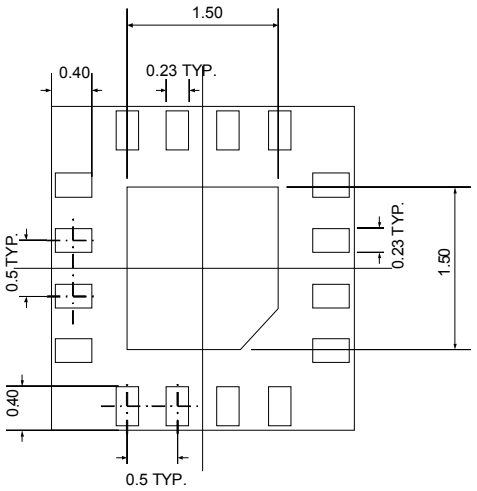
Package Outline

Top View

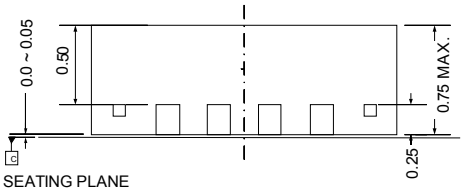


Bottom View



Unit: mm

Side View



Note：

1. Dimension and tolerance conform to ASME Y14.5M-1994.

2. Refer to JEDEC STD. MO-220 WEED-2 ISSUE B

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