

# LXK6712: 5 GHz WLAN Front End Module for 802.11ac

## Applications

- n IEEE 802.11a/n/ac wireless LAN system
- n 5GHz ISM Band application
- n WiFi-enabled wireless portable systems

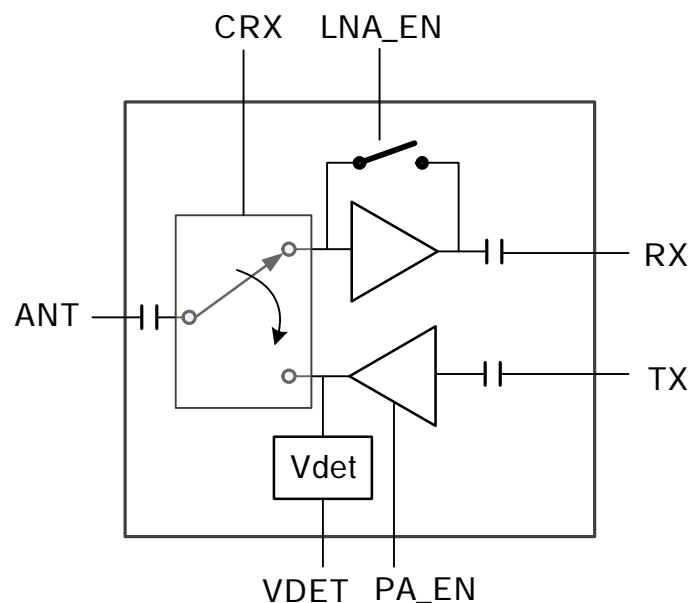
## Features

- n Integrated 5GHz PA, LNA with bypass and SPDT
- n Transmit gain: 29dB
- n Receive gain: 13 dB
- n 50 Ohm input and output impedance
- n Output power: 19dBm@1.8% EVM, 11ac, 256QAM
- n Temperature compensation
- n Small QFN (16-pin, 3mm x 3mm) package

## Product Description

The LXK6712 is a highly integrated front end module (FEM) including a 5 GHz Power amplifier, an LNA with bypass and a SPDT Transmit/Receive switch. It is intended for 802.11a/n/ac wireless LAN applications. A digital enable/disable function is included in both PA and LNA which allows power saving during off mode.

The LXK6712 is housed in a miniature 16-pin, 3mm x 3mm QFN package. A functional block diagram is shown in Figure 1. A package and pin-out view of LXK6712 is shown in Figure 2.



**Figure 1. LXK6712 Functional Block Diagram**

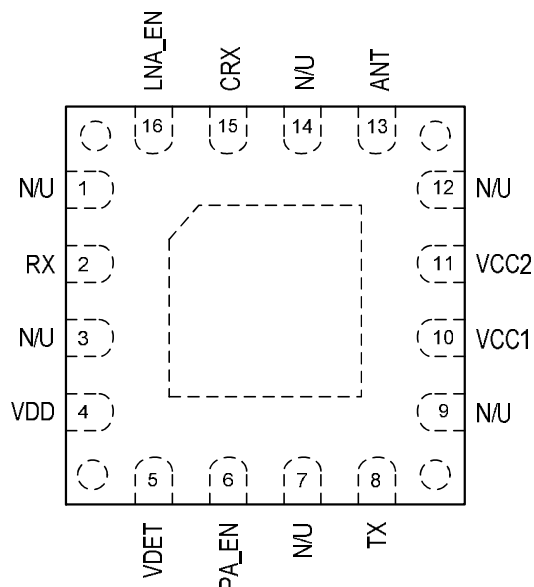


Figure 2. LXK6712 Pinout – 16-Pin QFN

Table 1. LXK6712 Signal Description

Pin#	Name	Description	Pin#	Name	Description
1	N/U	No connection	9	N/U	No connection
2	RX	RF receiver output	10	VCC1	PA supply voltage 1
3	N/U	No connection	11	VCC2	PA supply voltage 2
4	VDD	LNA supply voltage	12	N/U	No connection
5	VDET	Power detector output	13	ANT	Antenna port
6	PA_EN	PA enable control	14	N/U	No connection
7	N/U	No connection	15	CRX	Switch control voltage
8	TX	RF transmitter input	16	LNA_EN	LNA enable control

Table 2 Absolute Maximum Rating

Parameter	Symbol	Minimum	Maximum	Units
Supply voltage	VCC1,VCC2	-0.3	+6.0	V
Supply voltage	VDD		+6.0	V
DC input on control pins (PA_EN, LNA_EN, CRX)	V <sub>IN</sub>	-0.3	+3.6	V
Input power (50 Ω load)	P <sub>IN</sub>		+10	dBm
Supply current	I <sub>CC</sub>		400	mA
Storage temperature	T <sub>STG</sub>	-40	+150	°C
Operating ambient temperature	T <sub>op</sub>	-40	+85	°C
Junction temperature	T <sub>J</sub>		150	°C
ESD Rating – Human Body Model	ESD		Class 1C	

Table 3. Recommended Operating Conditions

Parameter	Symbol	Minimum	Typical	Maximum	Units
PA supply voltage	VCC1,VCC2		5.0		V
LNA supply voltage	VDD		5.0		V
PA supply current	I <sub>CC</sub>		280		mA
LNA supply current	I <sub>DD</sub>		14		mA
Control logic:					
High	V <sub>HI</sub>	2.5		3.6	V
Low	V <sub>LO</sub>	0		0.2	V
PA enable current (PA_EN high)	I <sub>PA_EN</sub>		5		mA
LNA enable current(LNA_EN high)			80		uA
CRX enable current			10		uA

Table 4. Electrical Specifications (TA=+25 °C)

Parameters	Minimum	Typical	Maximum	Units
Transmit Characteristics (Vcc=+5.0V, PA_EN=3.3V, LNA_EN=CRX=0V)				
Frequency	5150		5850	MHz
Small signal gain		29		dB
Pout	EVM 1.8%, MCS9, HT40	19		dBm
(with-42 dB EVM source)	EVM 3.0%, MCS9, HT40	20		
	EVM 3.0%, MCS0, HT40	21		
Harmonics (2 <sup>nd</sup> and 3 <sup>rd</sup> ), Pout=21dBm		-28		dBm/MHz
Gain flatness over band ( over any 40MHz bandwidth )	-0.25		+0.25	dB
Isolation (Ant port to TX or RX port)		40		dB
Quiescent supply current Icq		280		mA
Operating supply current, Pout=19dBm		330		mA
Input return loss		-15		dB
Output return loss		-8		
Receive Characteristics (VDD=+5.0V, PA_EN=0V, LNA_EN=CRX=3.3V)				
Frequency	5150		5850	MHz
Small signal gain		13		dB
3 <sup>rd</sup> order Input Intercept Point IIP3		+7		dBm
1dB Input Compression Point IP1dB		-3		dBm
Input return loss		-10		dB
Output return loss		-10		dB
Noise Figure		3.0		dB
Supply current, RX On		14		mA
Enable time		400		ns
Receive Bypass Characteristics				
Insertion loss  S21		10		dB
1dB Input Compression Point IP1dB		+3		dBm

Table 5 Control Logic

Mode	State	CRX	LNA_EN(note1)	PA_EN
All off (switch in TX mode)	1	0	0	0
WLAN receive	2	1	1	0
WLAN receive bypass	3	1	0	0
WLAN transmit	4	0	0	1

Note 1:LNA is on while LNA\_EN is high. LNA is off and in bypass mode when LNA\_EN is low.

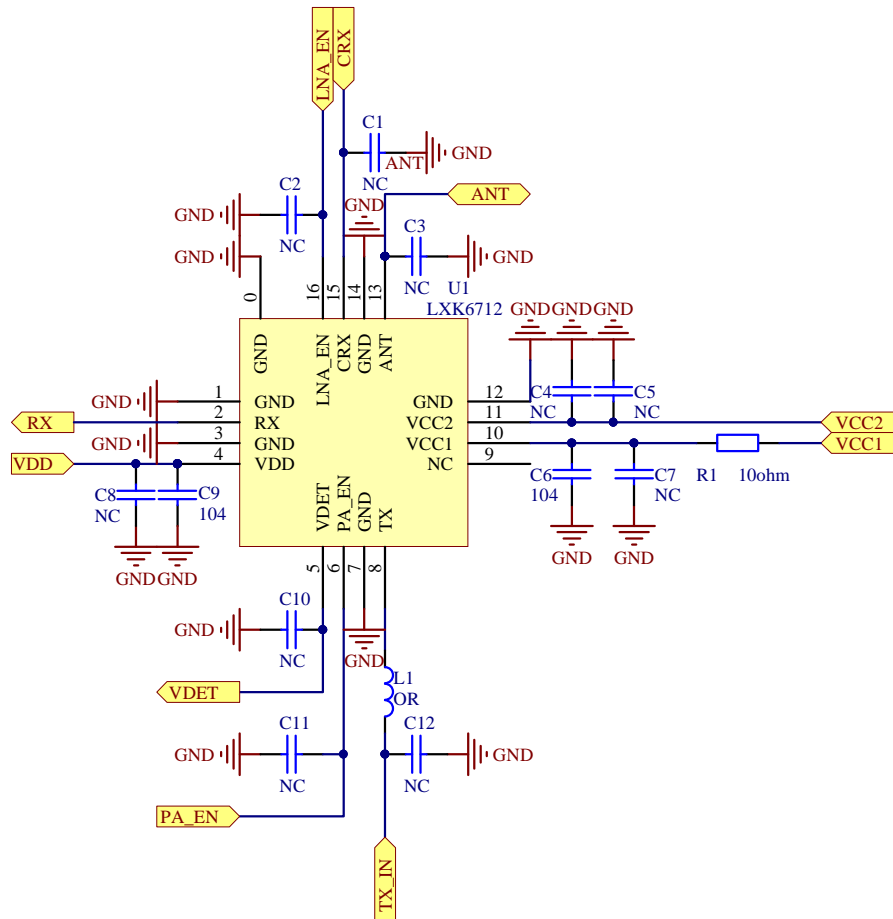


Figure 3.LXX6712 Application Schematic

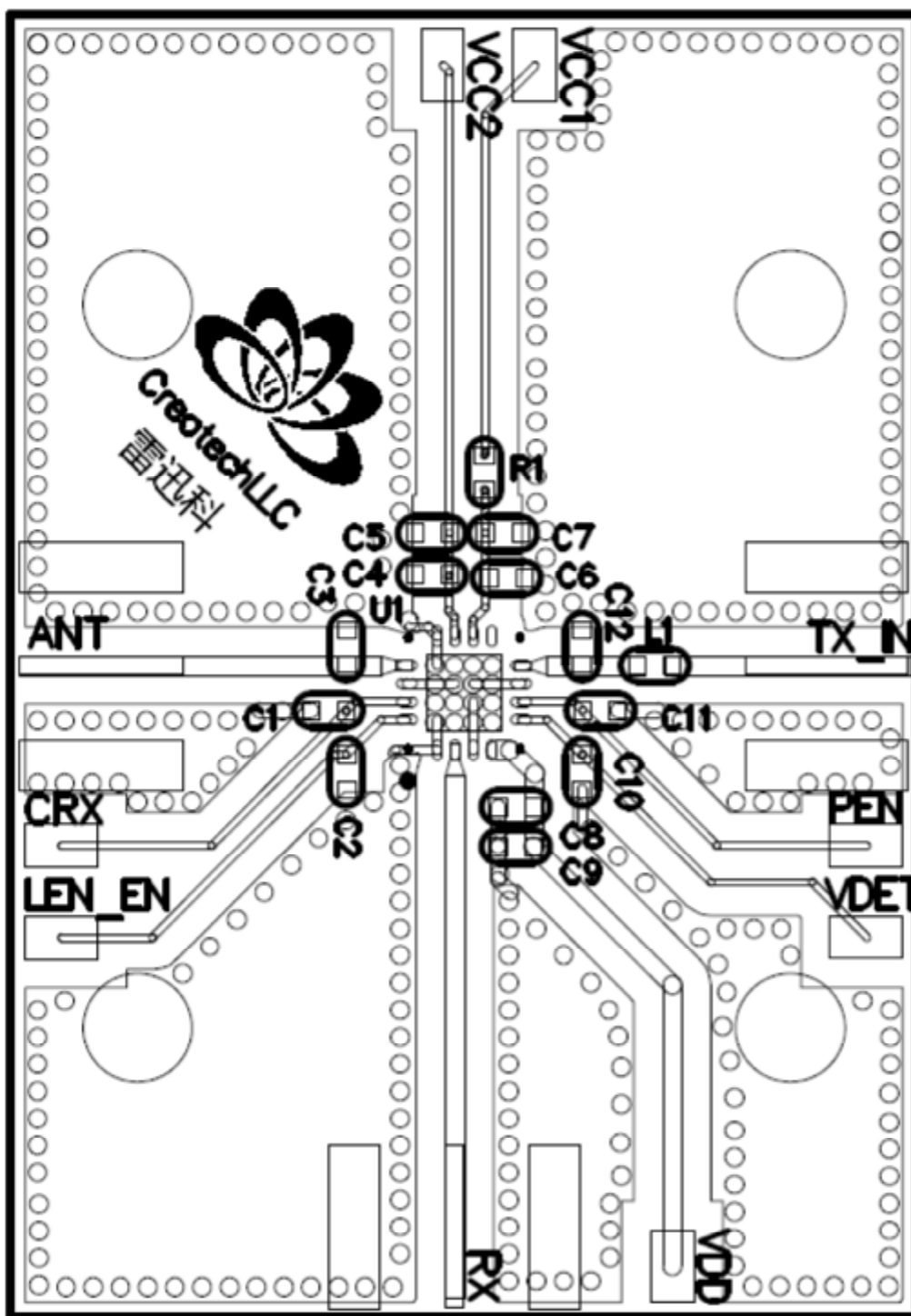
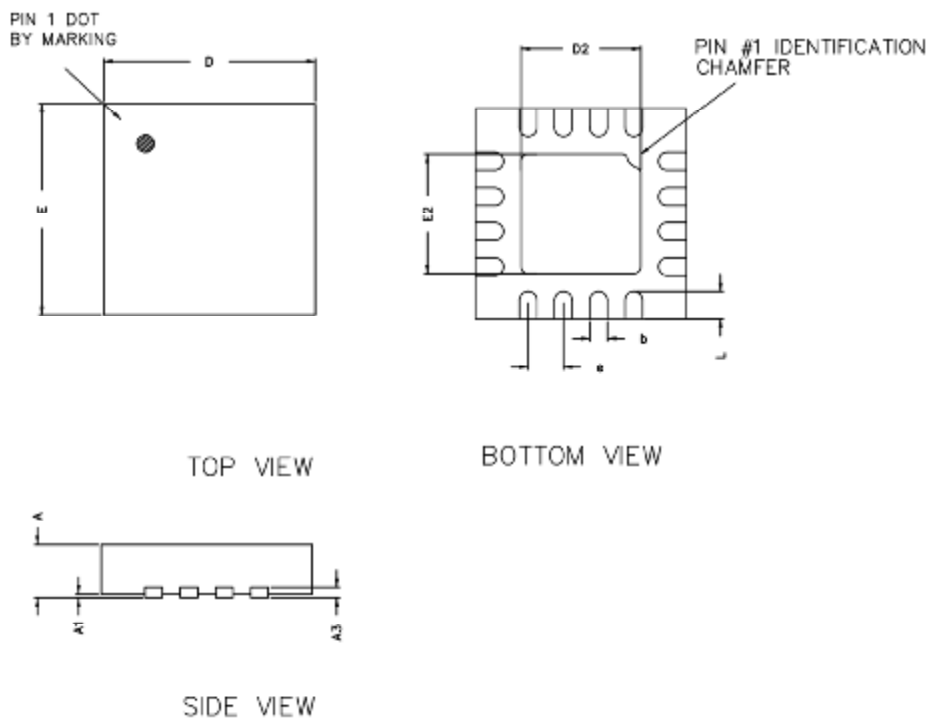
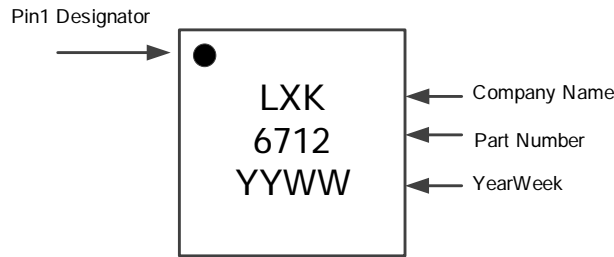


Figure 4. LXK6712 Evaluation Board Assembly Drawing

Package diagram:



COMMON DIMENSIONS(MM)			
REF.	MIN.	NOM.	MAX
A	0.70	0.75	0.80
A1	0.00	-	0.05
A3	0.2 REF		
D	2.95	3.00	3.05
E	2.95	3.00	3.05
b	0.18	0.25	0.30
L	0.20	0.30	0.40
D2	1.55	1.70	1.80
E2	1.55	1.70	1.80
e	0.5 BSC		

**Ordering Information**

Model Name	Manufacturing Part Number	Evaluation Board Part Number
LXX6712FEM	LXX6712	EVB-LXX6712-01

**Document Change History**

Revision	Date	Notes
1.0	Oct. 12, 2015	Created.

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