DATA SHEET

LXK6601E: 1.8~2.7 GHz Linear Power Amplifier

Applications

- Small Cells/Repeaters/DAS
- Wireless Infrastructure
- 1.8G/2.0G/2.3/2.6GHz LTE Applications

Features

- Frequency band: 1.8 to 2.7GHz
- 3~5V Single Supply Voltage
- 28dBm,EVM<4%,1.89/2.35/2.6GHz,TDD-LTE-20MHz _1.7_64QAM at 5V supply
- Small signal gain: 35 dB
- 50 Ohm input internally matched
- Active bias circuit
- Temperature compensation
- QFN (16-pin, 3mm x 3mm x 0.75mm)， MSL3

Product Description

The LXK6601E is a high-power, high-gain linear power amplifier for 1.8~2.7GHz frequency band. For 1.8GHz、2.0GHz、2.3GHz and 2.6GHz LTE application, the device provides a typical 28dBm linear output power @ EVM<4%. The device is internally matched to 50 Ohms at the input and the output can be easily matched to obtain optimum power.

The LXK6601E is housed in a miniature 16-pin, 3mm x 3mm x 0.75mm QFN package. A power detector is also included on-chip.

A functional block diagram of LXK6601E is shown in Figure 1. The 16-pin, 3x3 QFN package and pin-out are provided in Figure 2. Signal pin assignments and functional pin descriptions are provided in Table 1.

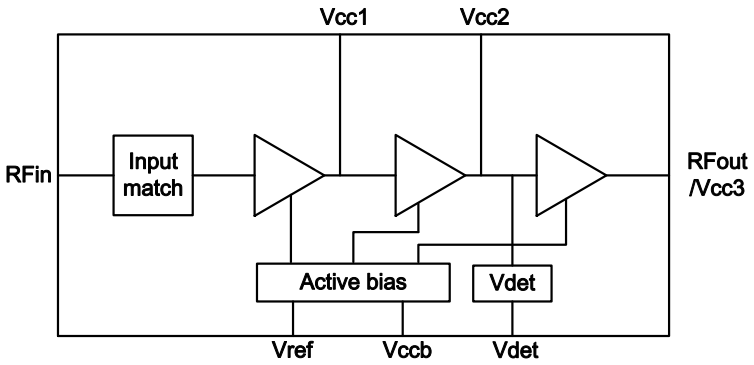


Figure 1. LXK6601E Functional Block Diagram

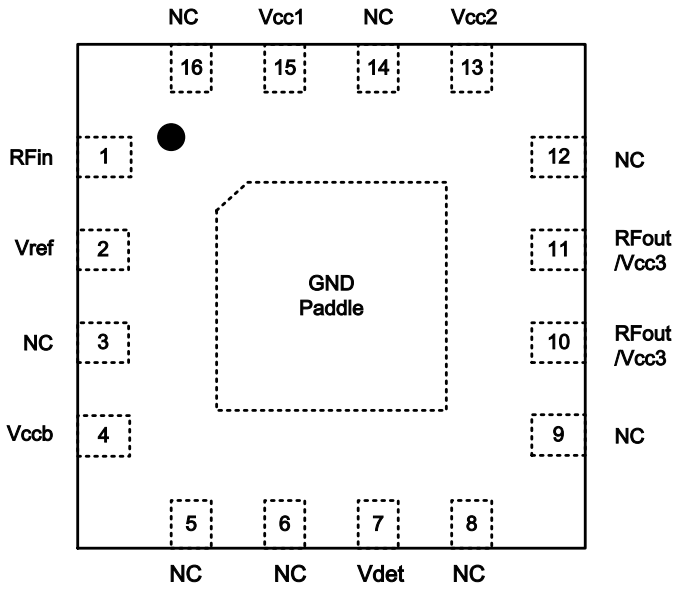


Figure 2. LXK6601E Pinout - 16 Pin 3x3 QFN (Top View)

Table 1. LXK6601E Pin Names and Descriptions

Pin	Name	Description
1	RFin	RF input
2	Vref	Reference voltage for bias of stage-1, 2 & 3
3	NC	Not connected
4	Vccb	Power supply for bias circuit
5	NC	Not connected
6	NC	Not connected
7	Vdet	Power detector output
8	NC	Not connected
9	NC	Not connected
10	RFout	RF output and power supply for stage-3
11	RFout	RF output and power supply for stage-3
12	NC	Not connected
13	Vcc2	Power supply for stage-2
14	NC	Not connected
15	Vcc1	Power supply for stage-1
16	NC	Not connected

Table 2. Absolute Maximum Ratings

Caution: This device is ESD sensitive. Handling and assembling of this device should be at ESD protected workstations.

Symbol	Parameter	Min.	Max.	Units
Pin	RF input power (CW)		15	dBm
V_{CC1},V_{CC2},V_{CC3}	Supply voltage for stage-1,2&3		6.0	V
Vccb	Supply voltage for bias circuit		6.0	V
Vref	Reference voltage for bias circuit		3.5	V
I_{CC}	Total Supply Current		1.5	A
T_{STG}	Storage temperature	-40	125	^{O}C
T_A	Operating temperature	-40	85	^{O}C
T_J	Junction temperature		150	^{O}C
ΘJC	Thermal resistance		10	°C/W
ESD	ESD Rating – Human Body Model		Class 1C	

Table 3. Recommended Operating Conditions

Symbol	Parameter	Min.	Typ.	Max.	Units
f	Operating frequency	1800		2700	MHz
V_{CC1}, V_{CC2}, V_{CC3}	Supply voltage for stage-1,2&3	4.75	5.0	5.25	V
Vref	Reference voltage for bias circuit	2.8	2.9	3.0	V
Vccb	Supply voltage for bias circuit	4.5	5.0	5.5	V
T_A	Operating temperature	-40	25	85	^{O}C

Table 4. DC Electrical Specifications

(T=25℃, Vcc=Vccb=5V, Vref=2.9V)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
Vcc1	Supply voltage for stage-1		4.75	5	5.25	V
Vcc2	Supply voltage for stage-2		4.75	5	5.25	V
Vcc3	Supply voltage for stage-3		4.75	5	5.25	V
Vccb	Supply voltage for bias circuit		4.75	5	5.25	V
Vref	Reference voltage for bias circuit		2.8	2.9	3.0	V
Icc	Total collector supply current for PA	Quiescent(No RF) Pout=28dBm		240 400		mA
Iref	Reference current for bias circuit	Quiescent(No RF)		7		mA

Table 5. RF Electrical Specifications

(T=25℃, Vcc=Vccb=5V, Vref=2.9V，f=1890MHz，Unless Otherwise Noted)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
f	Frequency	-	1880		1900	MHz
P1dB	1dB gain compression point	1dB gain compression		33		dBm
S21	Small signal gain	Pin=-20dBm		34		dB
△S21	Small signal gain variation	Gain variation over band		0.7		dB
S11	Input return loss	-			-8	dB
Pout	Output power for TDD-LTE	TDD-LTE-20MHz_1.7_64QAM, EVM<4%		28		dBm

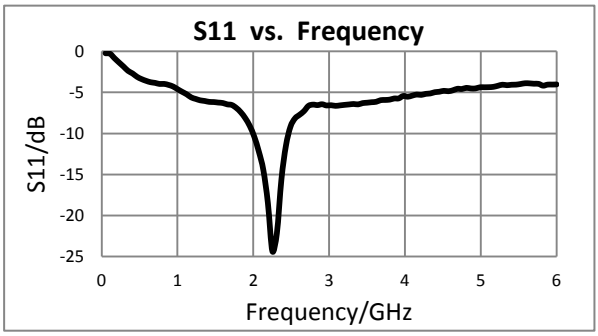


Figure3.S11 vs Freq

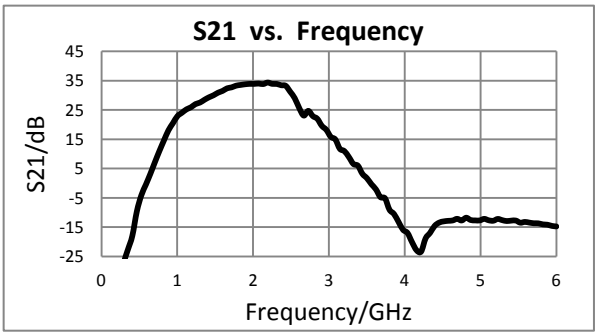


Figure4.S21 vs Freq

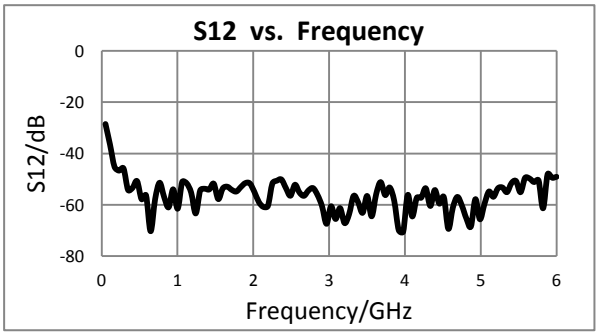


Figure5.S12 vs Freq

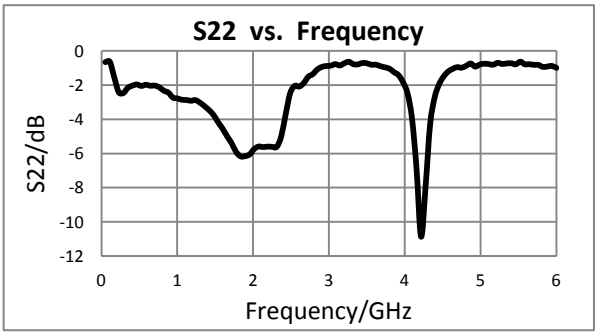


Figure6.S22 vs Freq

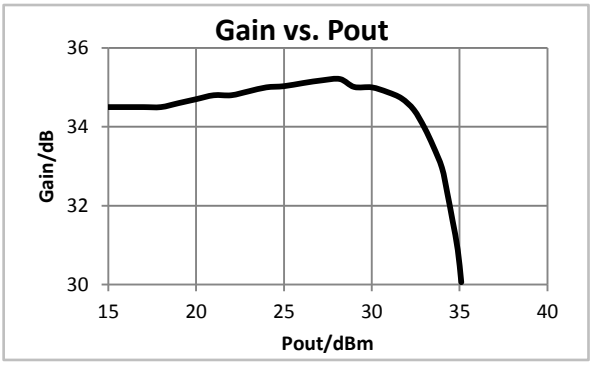


Figure7.Po vs Gain (CW signal)

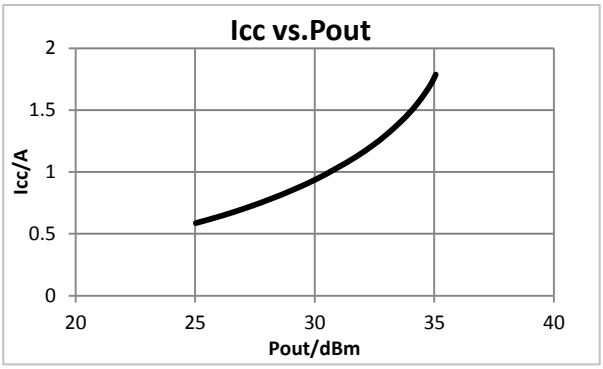


Figure8.Po vs Icc (CW signal)

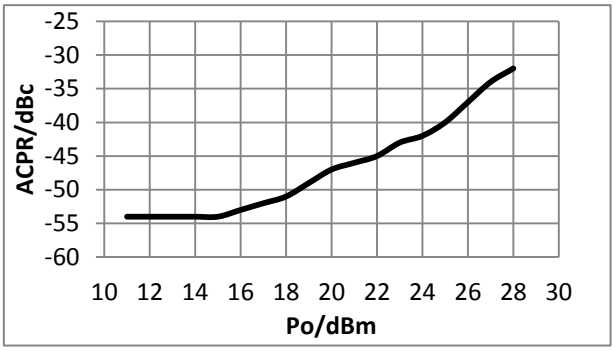


Figure9.Po vs ACPR
(TDD-LTE-20MHz_1.7_64QAM)

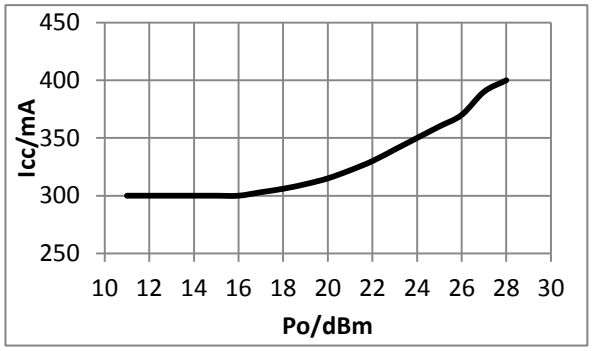


Figure10.Po vs Icc
(TDD-LTE-20MHz_1.7_64QAM)

Table 6. RF Electrical Specifications

(T=25℃, Vcc=Vccb=5V, Vref=2.9V， f=2015MHz， Unless Otherwise Noted)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
f	Frequency	-	2010		2025	MHz
P1dB	1dB gain compression point	1dB gain compression		34		dBm
S21	Small signal gain	Pin=-20dBm		35		dB
△S21	Small signal gain variation	Gain variation over band		0.7		dB
S11	Input return loss	-			-9	dB
Pout	Output power for TDD-LTE	TDD-LTE-15MHz_1.7_64QAM, EVM<4%		28		dBm

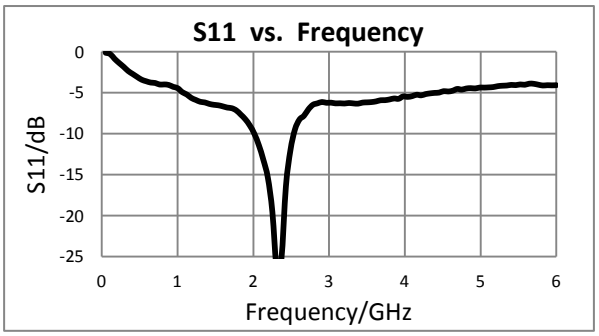


Figure11.S11 vs Freq

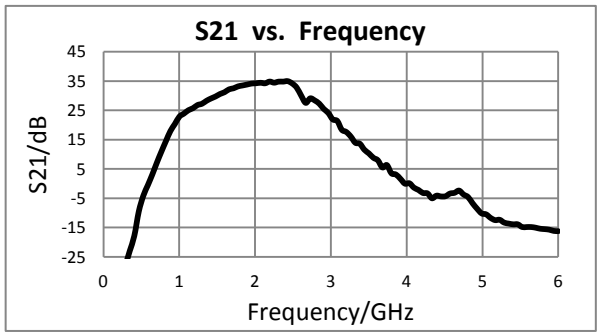


Figure12.S21 vs Freq

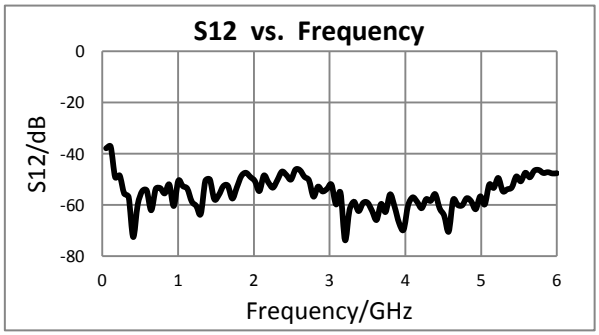


Figure13.S12 vs Freq

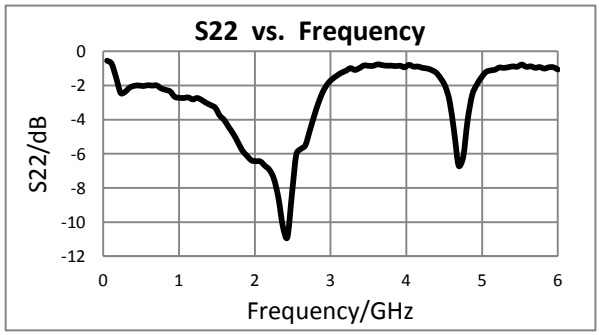


Figure14.S22 vs Freq

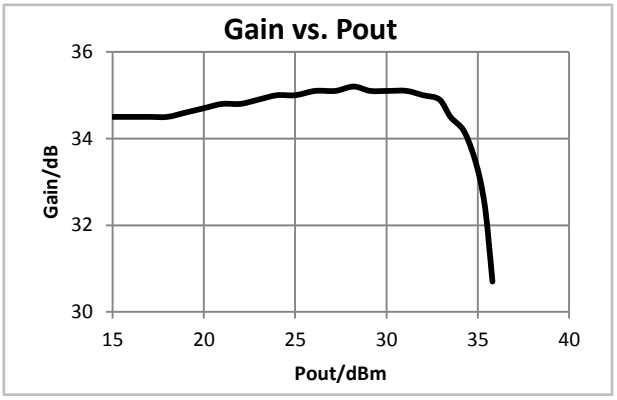


Figure15.Po vs Gain (CW signal)

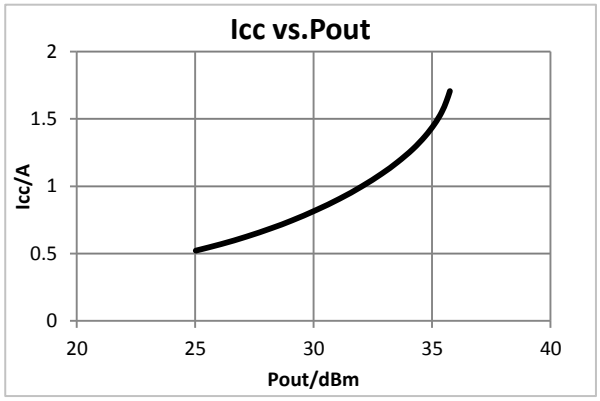


Figure16.Po vs Icc (CW signal)

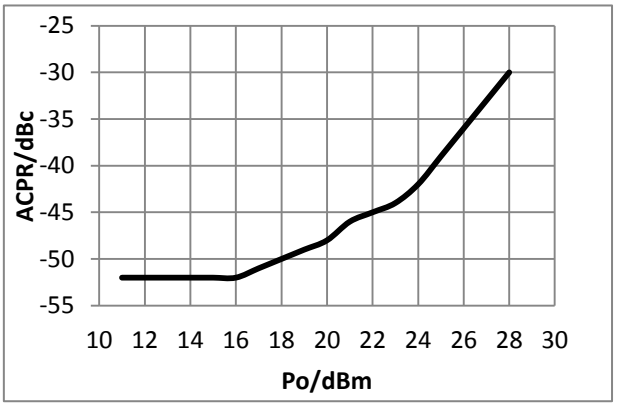


Figure17.Po vs ACPR
(TDD-LTE-20MHz_1.7_64QAM)

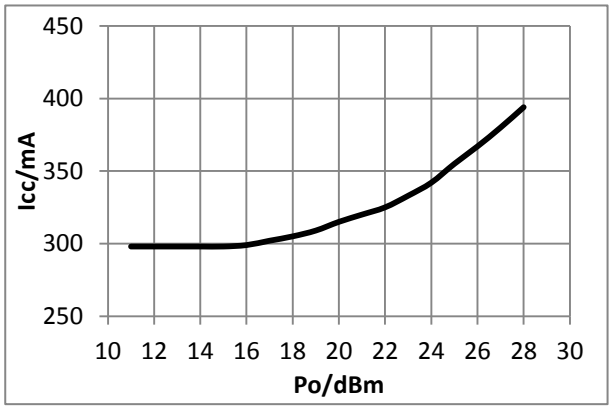


Figure18.Po vs Icc
(TDD-LTE-20MHz_1.7_64QAM)

Table 7. RF Electrical Specifications

(T=25℃, Vcc=Vccb=5V, Vref=2.9V，f=2350MHz，Unless Otherwise Noted)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
f	Frequency	-	2320		2370	MHz
P1dB	1dB gain compression point	1dB gain compression		34		dBm
S21	Small signal gain	Pin=-20dBm		35		dB
△S21	Small signal gain variation	Gain variation over band		0.5		dB
S11	Input return loss	-			-10	dB
Pout	Output power for TDD-LTE	TDD-LTE-20MHz_1.7_64QAM, EVM<4%		28		dBm

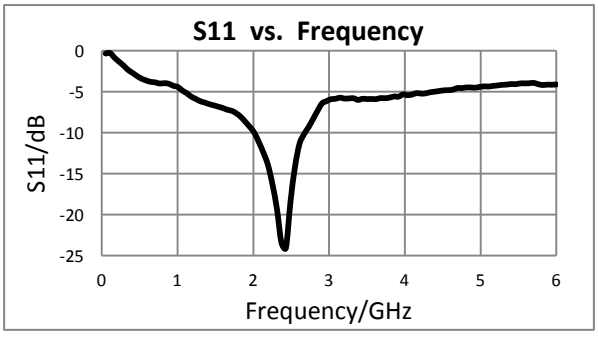


Figure19.S11 vs Freq

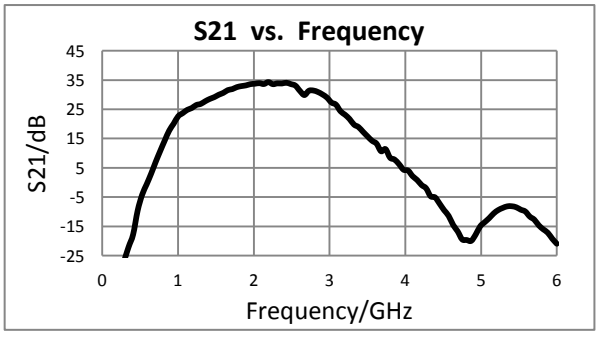


Figure20.S21 vs Freq

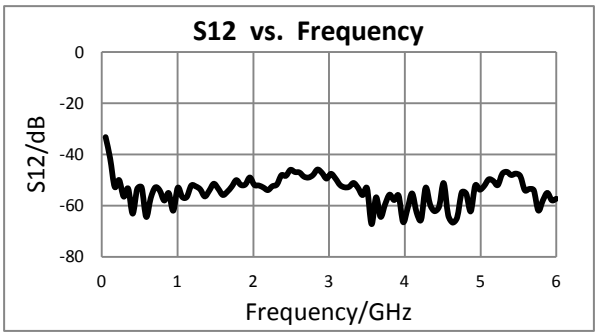


Figure21.S12 vs Freq

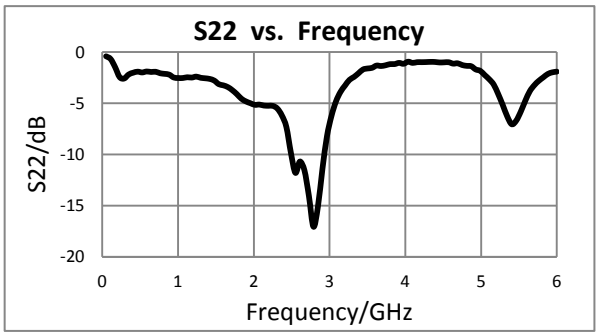


Figure22.S22 vs Freq

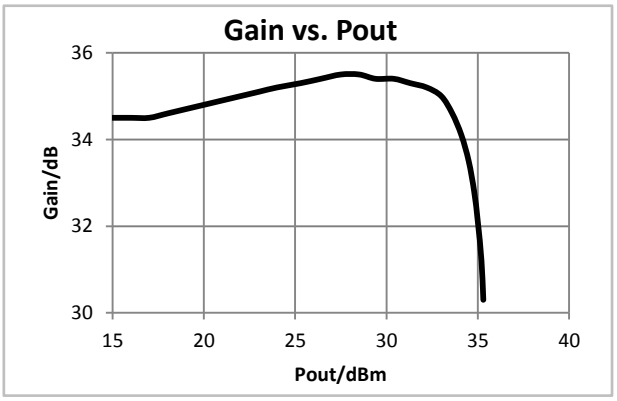


Figure23.Po vs Gain (CW signal)

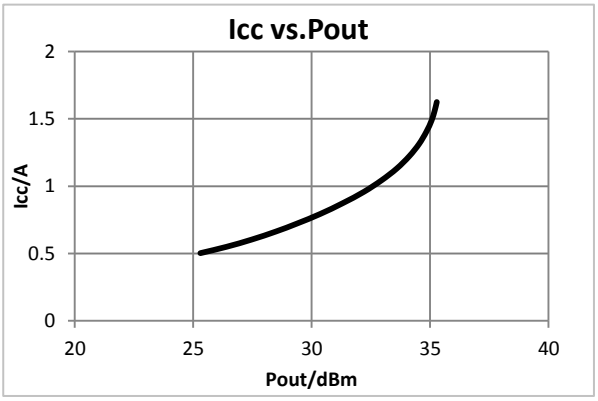


Figure24.Po vs Icc (CW signal)

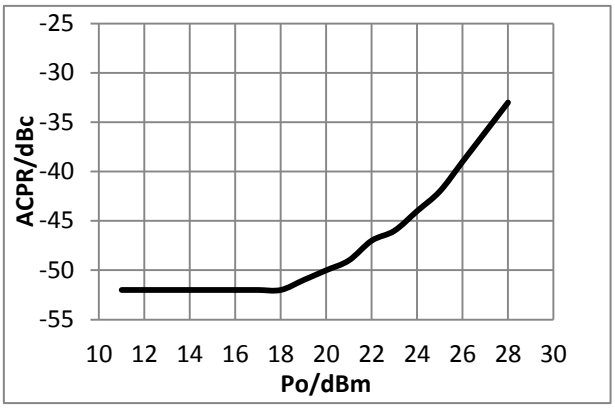


Figure25.Po vs ACPR

(TDD-LTE-20MHz_1.7_64QAM)

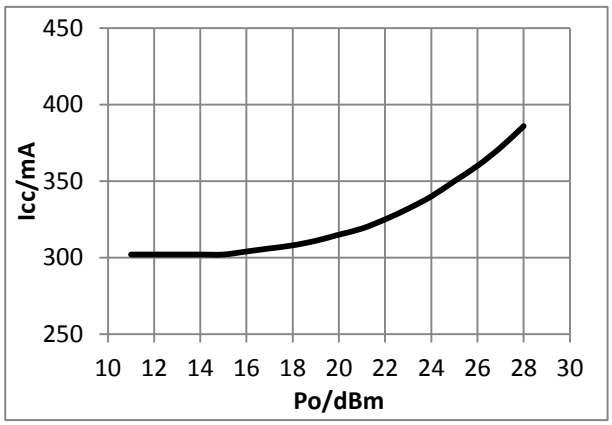


Figure26.Po vs Icc

(TDD-LTE-20MHz_1.7_64QAM)

Table 8. RF Electrical Specifications

(T=25℃, Vcc=Vccb=5V, Vref=2.9V，f=2600MHz，Unless Otherwise Noted)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
f	Frequency	-	2575		2635	MHz
P1dB	1dB gain compression point	1dB gain compression		33		dBm
S21	Small signal gain	Pin=-20dBm		34		dB
△S21	Small signal gain variation	Gain variation over band		0.5		dB
S11	Input return loss	-			-10	dB
Pout	Output power for TDD-LTE	TDD-LTE-20MHz_1.7_64QAM, EVM<4%		28		dBm

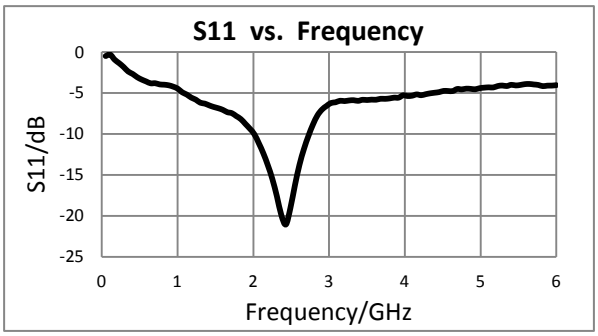


Figure27.S11 vs Freq

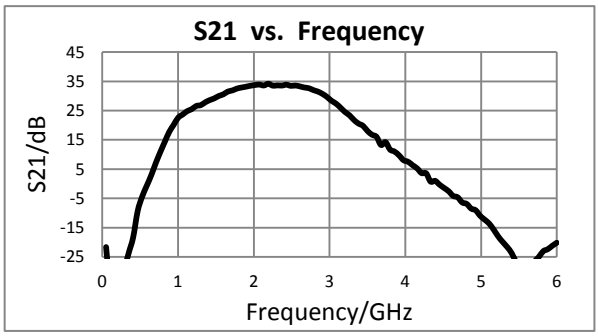


Figure28.S21 vs Freq

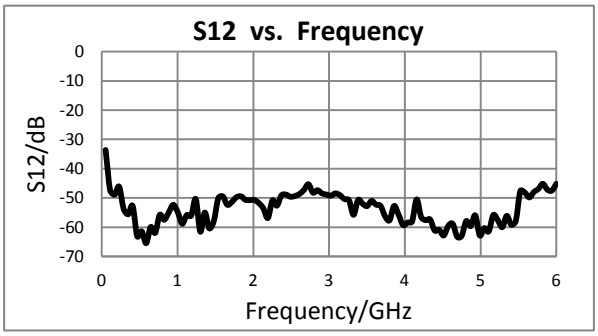


Figure29.S12vs Freq

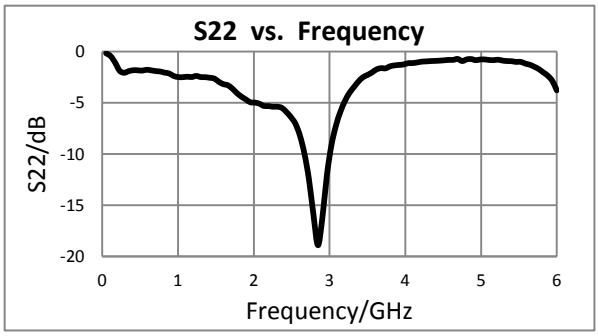


Figure30.S22 vs Freq

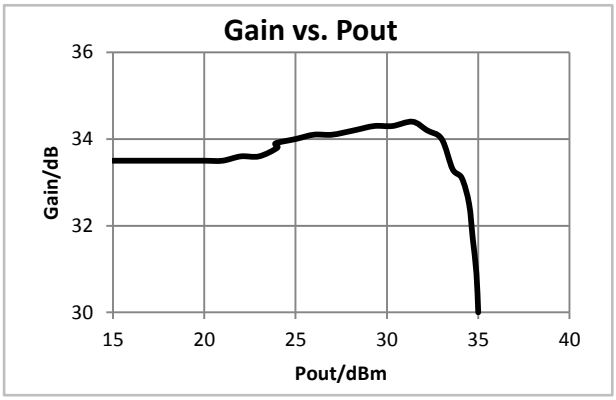


Figure31.Po vs Gain (CW signal)

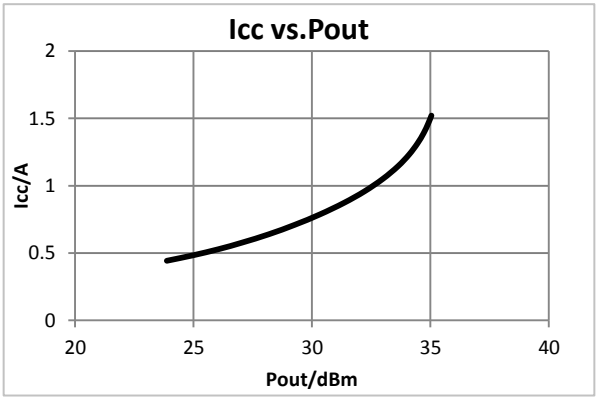


Figure32.Po vs Icc (CW signal)

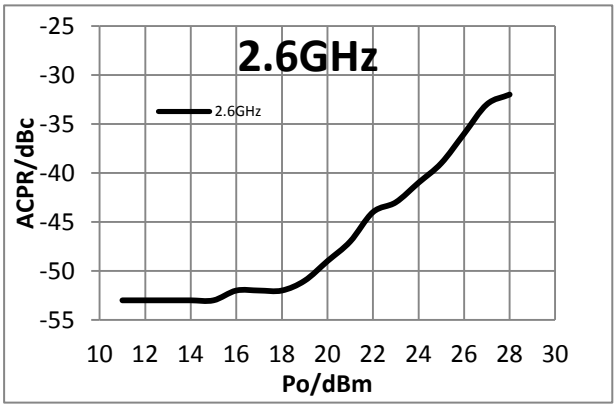


Figure33.Po vs ACPR

(TDD-LTE-20MHz_1.7_64QAM)

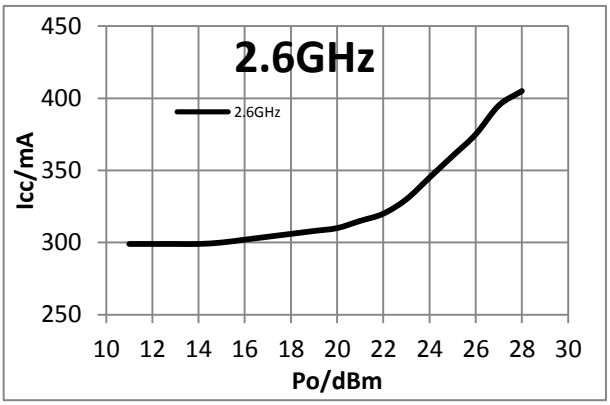
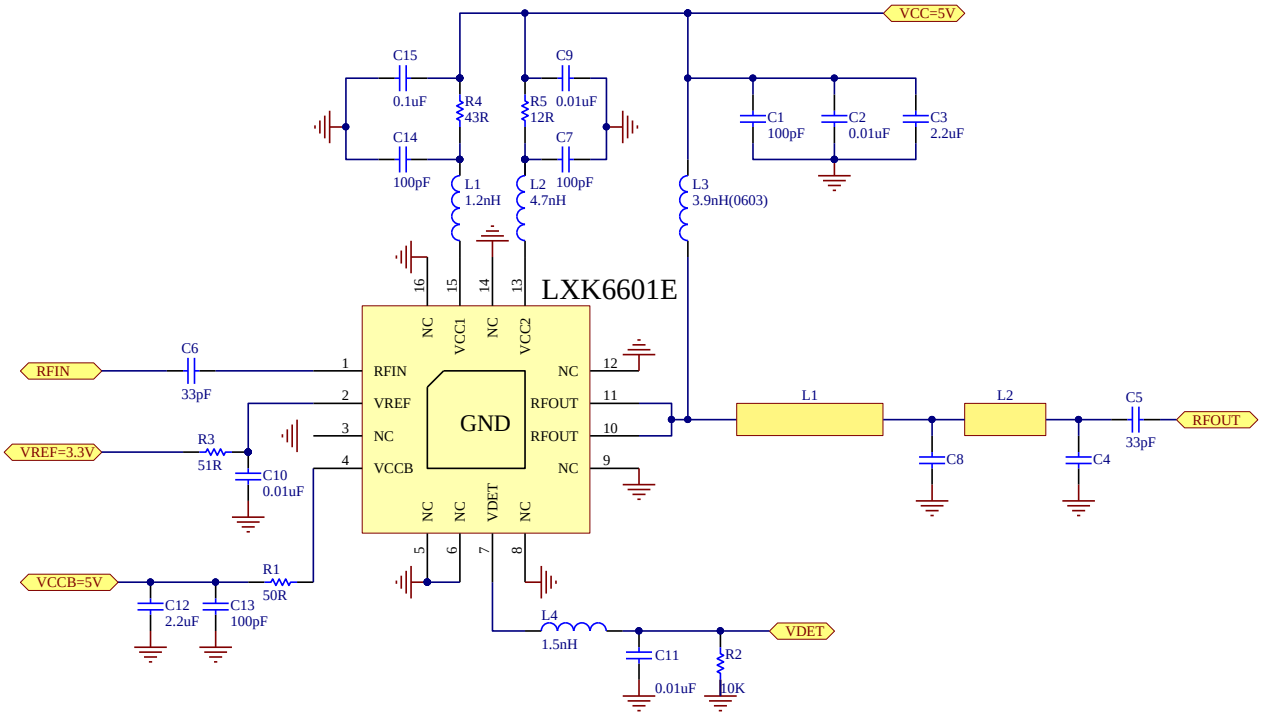


Figure34.Po vs Icc

(TDD-LTE-20MHz_1.7_64QAM)

Application Schematic



L1	50Ω,68mil, edge of RFOUT pin to center of capacitor C8	
L2	50Ω, 68mil, center of capacitor C8 to center of capacitor C4	
C4	1880~1900MHz	2.2pF
	2010~2025MHz	2.2 pF
	2320~2370MHz	1.2 pF
	2575~2635MHz	1.2 pF
C8	1880~1900MHz	3.6 pF
	2010~2025MHz	2.7 pF
	2320~2370MHz	2.2 pF
	2575~2635MHz	1.8 pF

PCB Material: Rogers 4350B,H=10 mil

Figure 35. LXK6601E Application Schematic.

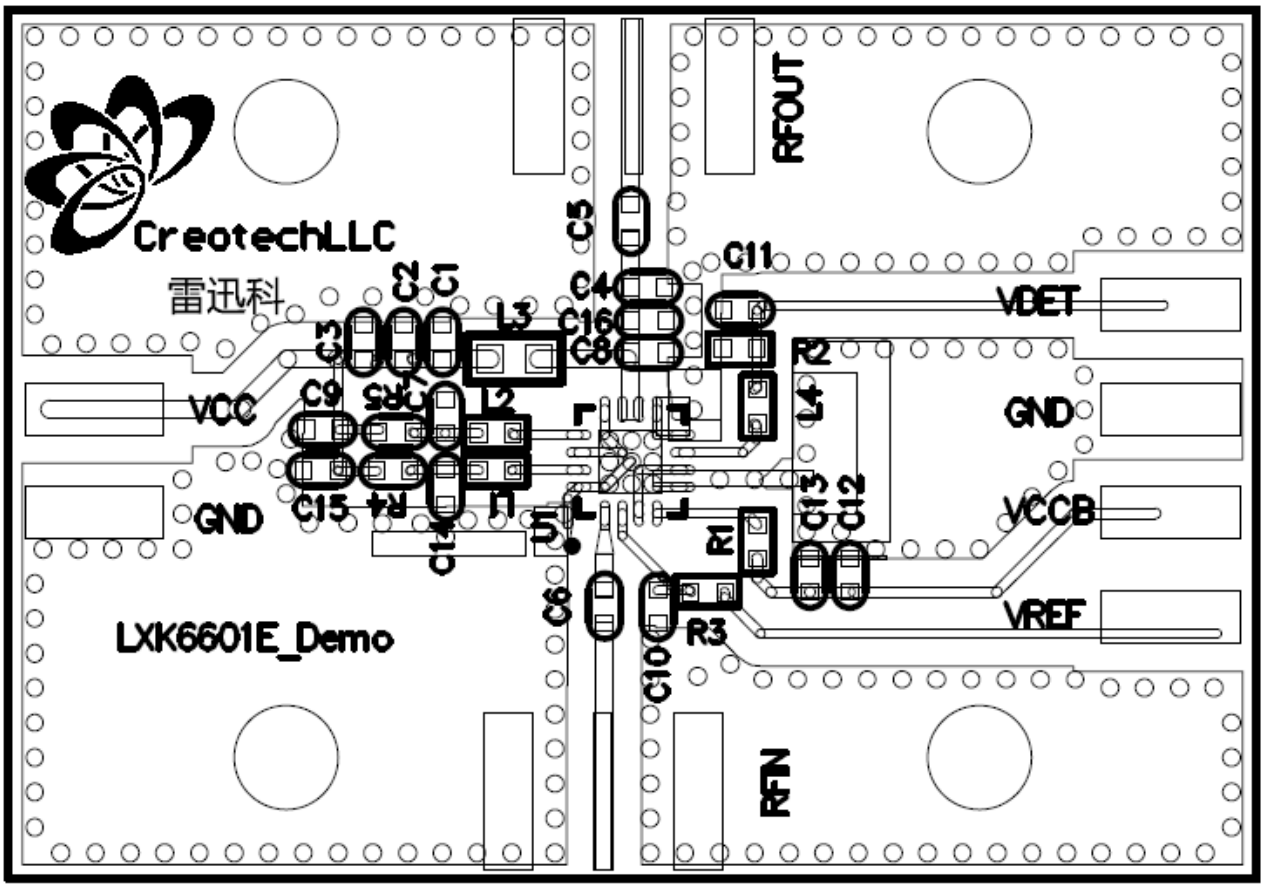
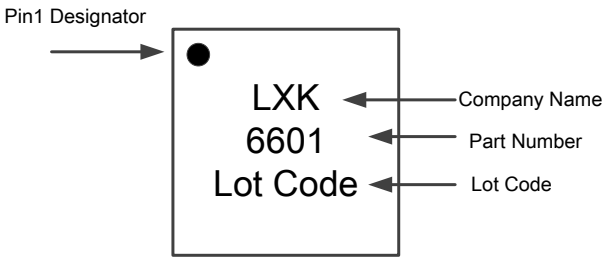
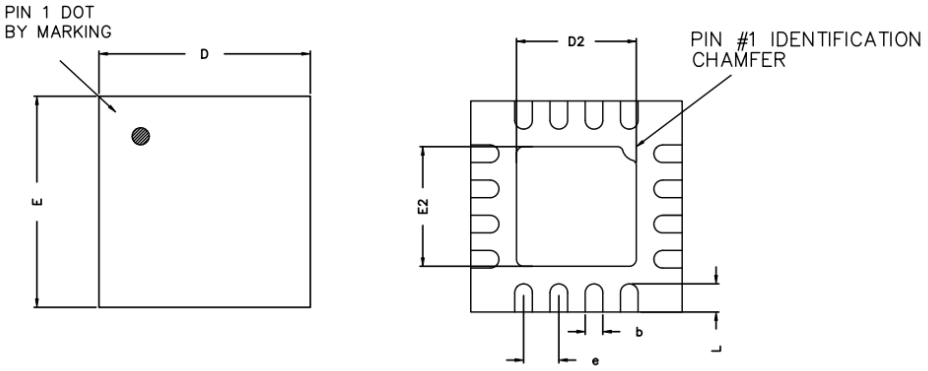


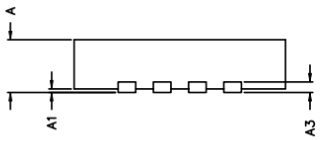
Figure 36. LXK6601E Evaluation Board Assembly Drawing

Package Diagram:





TOP VIEW BOTTOM VIEW



SIDE VIEW

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	0.30	0.40	0.50
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
LXK6601E PA	LXK6601E	EVB-LXK6601E-01

Document Change History

Revision	Date	Notes
1.0	Jul. 29, 2014	Created
2.0	Nov. 26, 2014	update
3.0	May. 28, 2015	update
4.0	Aug. 5, 2015	update
4.0	Jun. 2, 2016	update