

LXK6625: High Efficiency 0.1~1 GHz 2W Power Amplifier

Applications

- Walkie-Talkie
- RFID
- Small Cells/Repeaters/DAS

Features

- Frequency band: 100 to 1000MHz
- PA output power (Psat): 34 dBm
- Power added efficiency: 59%
- High gain: 36 dB
- Active bias circuit
- Temperature compensation
- QFN (16-pin, 4mm x 4mm x 0.9mm)

Product Description

The LXK6625 is a high-power, high-gain, high-efficiency power amplifier (PA). The device has been designed for use as the final RF amplifier in Walkie-Talkie, RFID and Small Cell/Repeaters/DAS applications. The input can be matched for optimum performance, and the output can be easily matched to obtain optimum power and efficiency characteristics.

The LXK6625 is housed in a miniature 16-pin, 4mm x 4mm x 0.9mm QFN package. The compact footprint coupled with high gain and high efficiency makes LXK6625 an ideal choice as a power amplifier for Walkie-Talkie.

A functional block diagram of LXK6625 is shown in Figure 1. The 16-pin, 4x4 QFN package and pinout are provided in Figure 2. Signal pin assignments and functional pin descriptions are provided in Table 1.

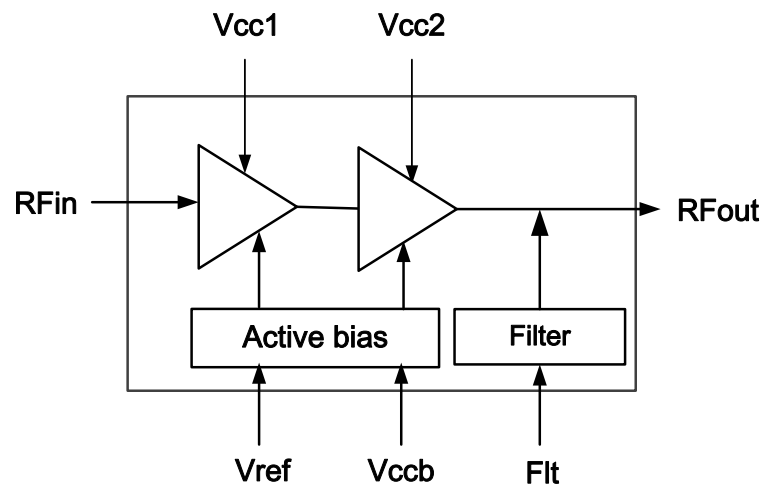


Figure 1. LXK6625 Functional Block Diagram

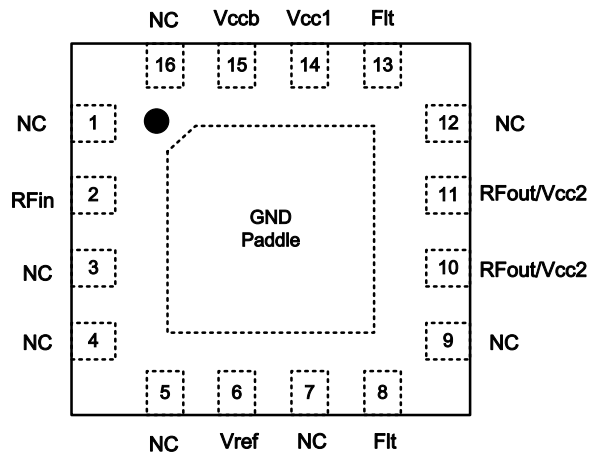


Figure 2. L XK6625 Pinout - 16 pin 4x4 QFN

Table 1. L XK6625 Pin Names and Descriptions

Pin	Name	Description
1	NC	Not Connected
2	RFin	RF input
3	NC	Not connected
4	NC	Not Connected
5	NC	Not connected
6	Vref	Reference voltage for bias
7	NC	Not Connected
8	Flt	Filter
9	NC	Not connected
10	RFout/Vcc2	RF output/ power supply for stage-2
11	RFout/Vcc2	RF output/ power supply for stage-2
12	NC	Not connected
13	Flt	Filter
14	Vcc1	power supply for stage-1
15	Vccb	power supply for bias
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	Minimum	Maximum	Units
P _{in}	RF input power (CW)		10	dBm
V _{CC1} , V _{CC2}	Supply voltage for stage-1&2		6.0	V
V _{ccb}	Supply voltage for bias circuit		6.0	V
V _{ref}	Reference voltage for bias circuit		3.5	V
I _{CC}	Total Supply Current		1.5	A
T _{STG}	Storage temperature	-40	125	°C
T _A	Operating temperature	-40	85	°C
T _J	Junction temperature		150	°C
ESD	ESD Rating – Human Body Model(HBM)		Class 1C	

Table 3. Recommended Operating Conditions

Symbol	Parameter	Minimum	Typical	Maximum	Units
f	Operating frequency	100		1000	MHz
V _{CC1} , V _{CC2}	Supply voltage for stage-1&2	3.6	3.7	3.8	V
V _{ref}	Reference voltage for bias circuit	2.95	3.0	3.05	V
V _{ccb}	Supply voltage for bias circuit	3.6	3.7	3.8	V
T _A	Operating temperature	-40	25	85	°C

Table 4. DC Electrical Specifications

(T=25°C , V_{cc1}=V_{cc2}=V_{ccb}=3.7V, V_{ref}=3.0V)

Symbol	Parameter	Condition	Minimu	Typical	Maximu	Units
V _{cc1}	Supply voltage for stage-1		3.6	3.7	3.8	V
V _{cc2}	Supply voltage for stage-2		3.6	3.7	3.8	V
V _{ccb}	Supply voltage for bias circuit		3.6	3.7	3.8	V
V _{ref}	Reference voltage for bias		2.95	3.0	3.05	V
I _{cq}	Total collector supply current for PA	Quiescent(No RF)		130		mA
I _{ref}	Reference current for bias	Quiescent(No RF)		3		mA

Table 5. Typical Electrical Specifications

(T=25°C , f=435MHz , Vcc1=Vcc2=Vccb=3.7V, Vref=3.0V)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
f	Frequency	-	400	435	470	MHz
S21	Small signal gain	Pin=-30dBm		36		dB
Δ S21	Small signal gain variation	Gain variation over band		1.5		dB
S11	Input return loss	-			-10	dB
S22	Output return loss	-		-8		dB
S12	Reverse Isolation	-		-45		dB
Psat	Saturation power	Pin=4dBm		34		dBm
Harmonics	2f	POUT = Psat		-13		dBm
	3f			-30		
STAB	Stability	CW, POUT = 34 dBm, 0.1 GHz to 20 GHz, Load VSWR = 4:1	All non-harmonically related outputs < - 42dBm/MHz			
RU	Ruggedness	CW, PIN = +7 dBm, Load VSWR = 6:1	No damage			
Icc	Total Current at out=34dBm	CW		1150		mA
Iref	Reference current for bias			3		mA

Table 6. Typical Electrical Specifications

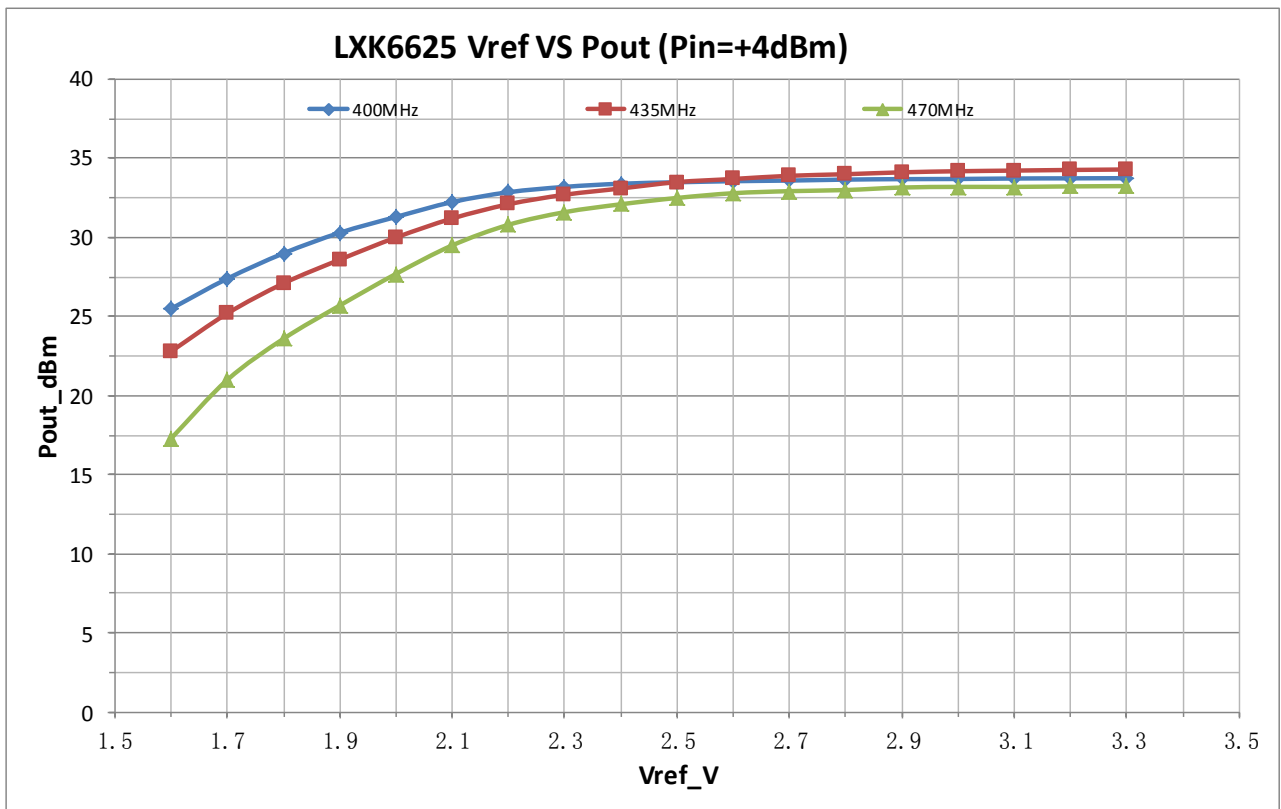
(T=25°C , f=155MHz , Vcc1=Vcc2=Vccb=3.7V, Vref=3.0V)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
f	Frequency	-	136	155	174	MHz
S21	Small signal gain	Pin=-30dBm		35		dB
Δ S21	Small signal gain variation	Gain variation over band		1.5		dB
S11	Input return loss	-			-15	dB
S22	Output return loss	-		-6		dB
S12	Reverse Isolation	-		-40		dB
Psat	Saturation power	Pin=4dBm		34		dBm
Harmonics	2f	POUT = Psat		10		dBm
	3f			-19		
STAB	Stability	CW, POUT = 34 dBm, 0.1 GHz to 20 GHz, Load VSWR = 4:1	All non-harmonically related outputs < - 42dBm/MHz			
RU	Ruggedness	CW, PIN = +7 dBm, Load VSWR = 6:1	No damage			
Icc	Total Current at out=34dBm	CW		1200		mA
Iref	Reference current for bias			3		mA

Table 7. Typical Electrical Specifications

(T=25°C , f=900MHz , Vcc1=Vcc2=Vccb=5.0V, Vref=3.0V)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
f	Frequency	-	870	900	960	MHz
S21	Small signal gain	Pin=-30dBm		32		dB
ΔS21	Small signal gain variation	Gain variation over band		1.5		dB
S11	Input return loss	-			-15	dB
S22	Output return loss	-		-8		dB
S12	Reverse Isolation	-		-50		dB
Psat	Saturation power	Pin=7dBm		33		dBm
Harmonics	2f	POUT = Psat		-10		dBm
	3f			-17		
STAB	Stability	CW, POUT = 33 dBm, 0.1 GHz to 20 GHz, Load VSWR = 4:1	All non-harmonically related outputs < - 42dBm/MHz			
RU	Ruggedness	CW, PIN = +7 dBm, Load VSWR = 6:1	No damage			
Icc	Total Current at out=33dBm	CW		1100		mA
Iref	Reference current for bias			3		mA



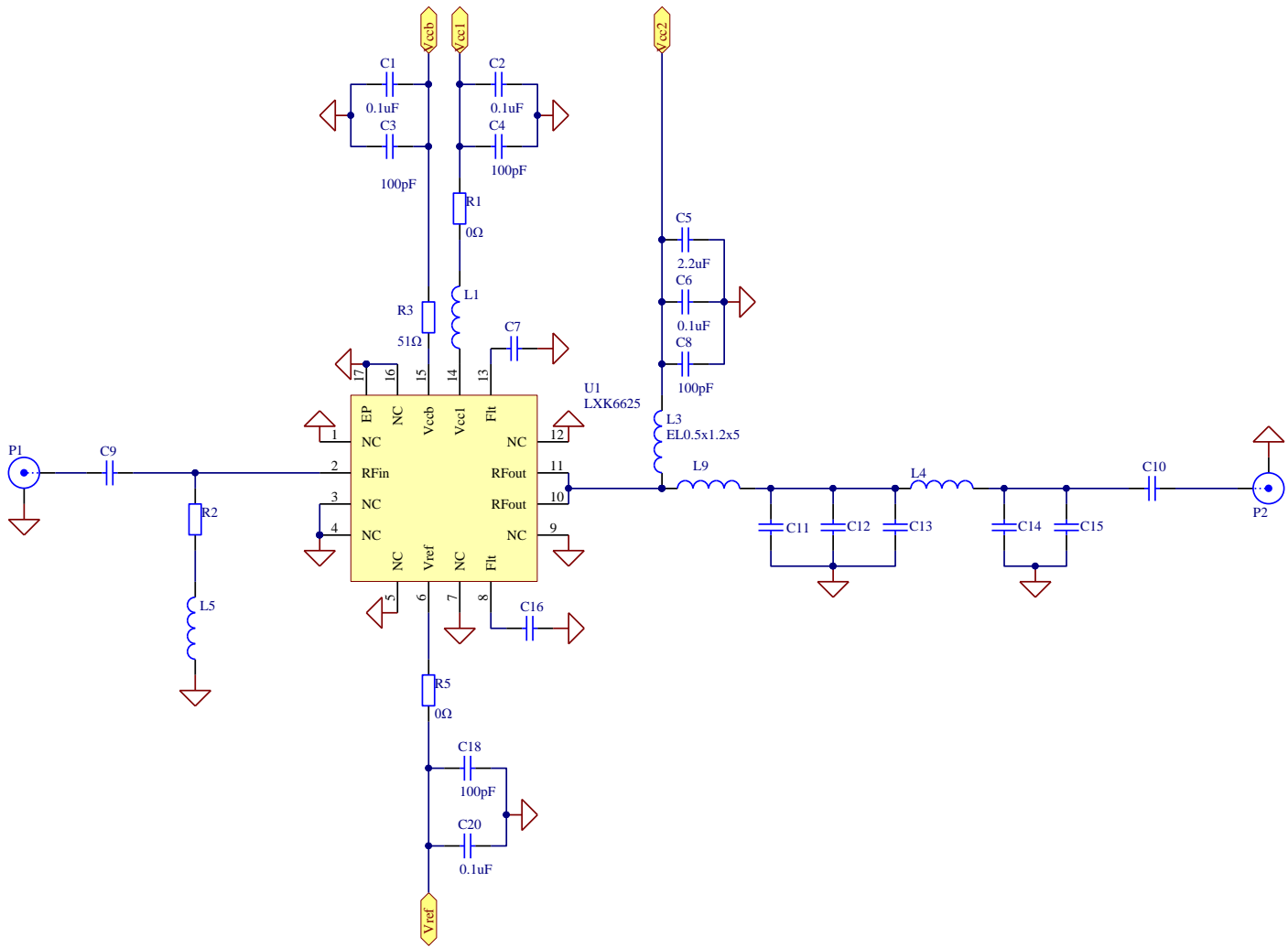


Figure 4. L XK6625 application schematic.

Table 8. L XK6625 Application Schematic Bill of Materials

Component	Value		
	136~174MHz	400~470MHz	870~960MHz
R2 (ohm)	0	5.1	5.1
L1 (nH)	270	10	2.2
L4 (nH)	EL0.5x1.2x5	EL0.5x1.2x5	10
L5 (nH)	56	15	4.7
L9 (nH)	EL0.5x1.2x1	EL0.5x1.2x1	1.2
C7 (pF)	NC	4.7	NC
C9 (pF)	33	15	15
C10 (pF)	330	150	150
C11 (pF)	56	5.6	3.6
C12 (pF)	100	15	3.6
C13 (pF)	10	27	5.6
C14 (pF)	47	6.8	2.2
C15 (pF)	NC	3.6	NC
C16 (pF)	NC	5.6	2.0

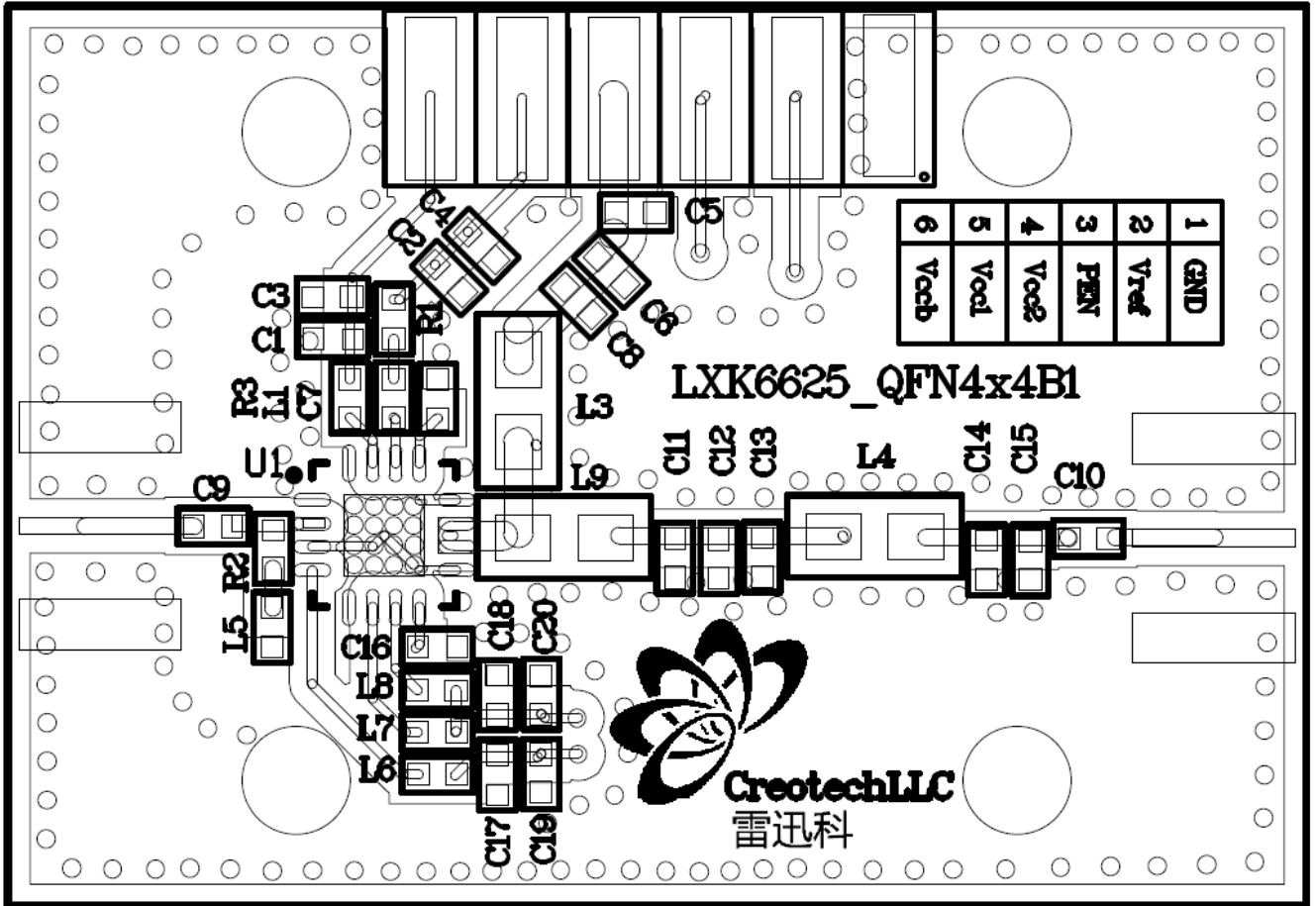
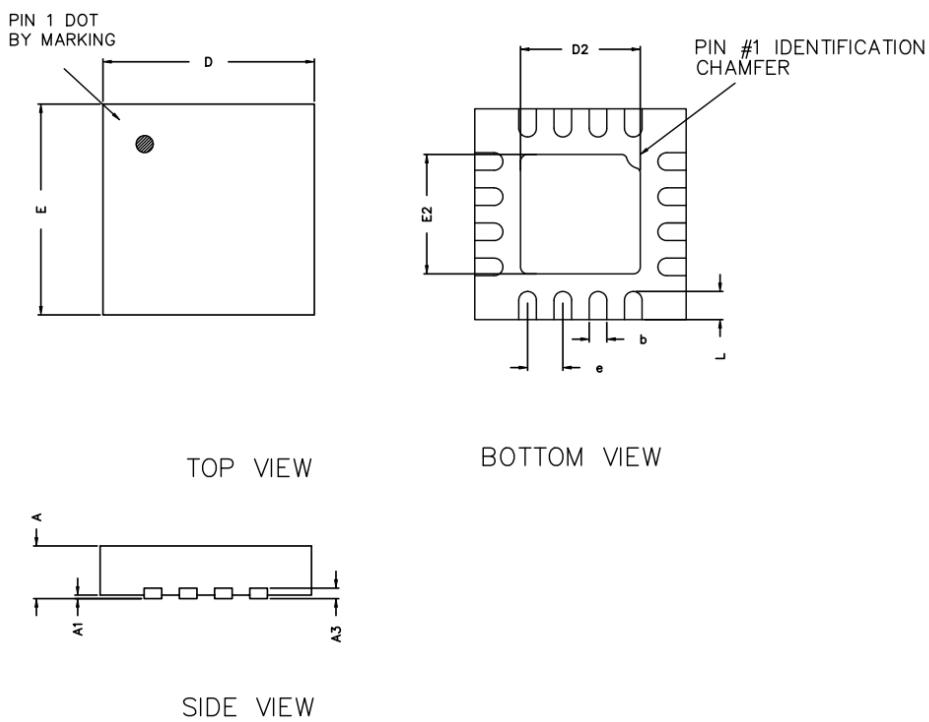
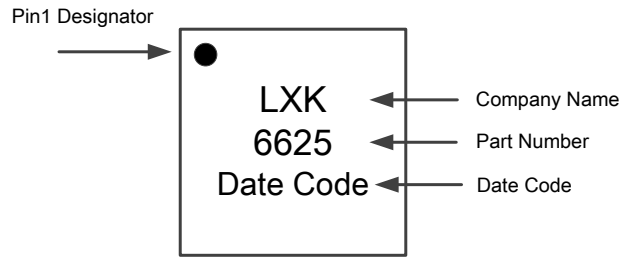


Figure 5. L XK6625 Evaluation Board Assembly Drawing

Package diagram:



COMMON DIMENSIONS(MM)			
REF.	MIN.	NOM.	MAX
A	0.80	0.90	1.00
A1	0.00	0.02	0.05
A3	0.20 REF		
D	3.95	4.00	4.05
E	3.95	4.00	4.05
b	0.25	0.30	0.35
L	0.30	0.40	0.50
D2	2.55	2.70	2.80
E2	2.55	2.70	2.80
e	0.65 BSC		

Ordering Information

Model Name	Manufacturing Part Number	Evaluation Board Part Number
LXK6625 PA	LXK6625	EVB-LXK6625-01

Document Change History

Revision	Date	Notes
1.0	JUN. 24, 2016	Created.
1.1	July. 7, 2016	Modify.
1.2	Aug. 8, 2016	Update

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