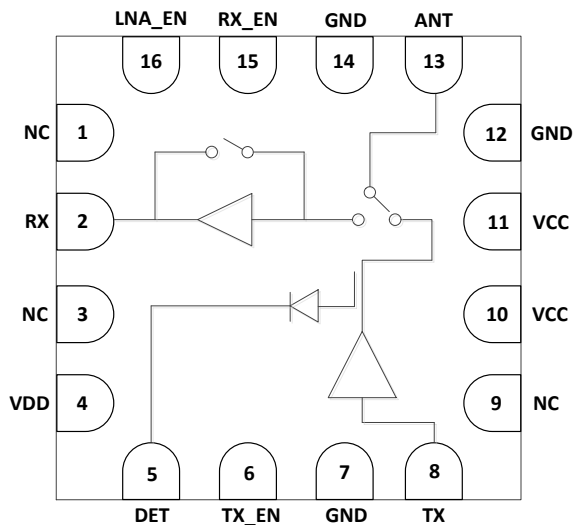


# KCT8522C

## PRODUCT DATASHEET

### 5GHz High-Power WLAN 802.11ac RFIC with PA, LNA and SPDT



#### Description

KCT8522C is a highly integrated RF Front-End Integrated Circuit incorporates key RF functionality needed for IEEE 802.11a/n/ac WLAN systems operating in the 5.15-5.85GHz range. KCT8522C integrates a high-efficiency high-linearity power amplifier (PA), a low noise amplifier (LNA) with bypass, the associated matching network, LO rejection, and harmonic filters all in one device.

KCT8522C has simple and low-voltage control logic, and requires minimal external components. A power detector is also integrated for accurate monitoring of output power from the PA.

KCT8522C is assembled in a compact, low-profile 3x3x0.55mm 16-lead QFN package. KCT8522C is the ideal RF front-end solution for implementing 5GHz high-power WLAN systems supporting multiple standards including 802.11a/n/ac.

#### Applications

- ▶ 802.11ac Wi-Fi Devices
- ▶ Tablets / MIDs
- ▶ Wi-Fi Media Gateways
- ▶ Consumer Electronics
- ▶ Notebook / Netbook / Ultrabook
- ▶ Access Points / Routers
- ▶ Set Top Boxes / Wireless IPTVs
- ▶ Other 5GHz ISM Platforms

#### FEATURES

- ▶ Integrated high performance 5GHz PA, LNA with bypass and T/R switch
- ▶ Fully-matched input and output
- ▶ Integrated power detector
- ▶ Transmit gain : 29dB
- ▶ Receive gain: 13dB
- ▶ Output power: +21dBm @ 1.8% DEVM, VHT80/MCS9, 5V
- ▶ Output power: +22.5dBm @ 3% DEVM, HT40/MCS7, 5V
- ▶ ESD protection circuitry on all PINs
- ▶ DC decoupled RF ports
- ▶ Minimal external components required
- ▶ Small package: QFN16 3mm x 3mm x0.55mm (MSL3, 260 °C per JEDEC J-STD-020)
- ▶ RoHS and REACH Compliant

This product datasheet is a general list of parameters to provide information on the capabilities of this device and is subject to change without notice.

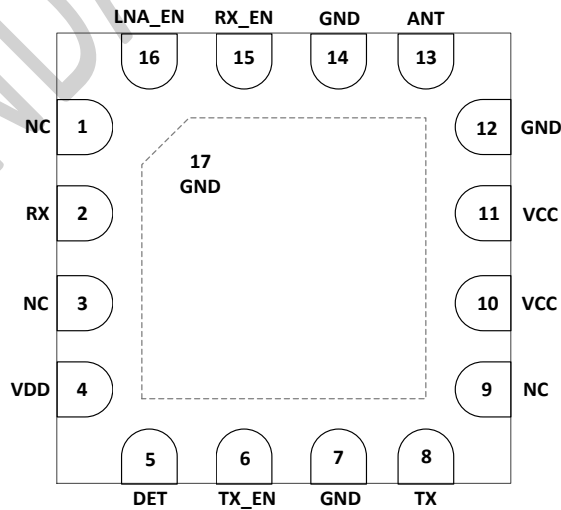
# KCT8522C

## PRODUCT DATASHEET

### PIN ASSIGNMENTS

Pin Number	Pin Name	Description
1,3,9	NC	Internally Not Connected
2	RX	RF Output Port from LNA or Bypass – DC Shorted to GND
4	VDD	LNA/Switch/Regulator Supply Voltage
5	DET	Detector Output Voltage
6	TX_EN	Input to Control TX Enable
8	TX	RF Input Port from the Transceiver – DC Shorted to GND
10,11	VCC	PA Supply Voltage
13	ANT	Antenna Port – RF Signal from the PA or RF Signal Applied to the LNA – DC Shorted to GND
15	RX_EN	Input to Control RX Enable
16	LNA_EN	Input to Control LNA Enable or Bypass Mode
7, 12, 14	GND	Ground – Must Be Connected to GND in the Application Circuit

### PIN-OUT DIAGRAM



This product datasheet is a general list of parameters to provide information on the capabilities of this device and is subject to change without notice.

# KCT8522C

## PRODUCT DATASHEET

### ABSOLUTE MAXIMUM RATINGS

Parameters	Units	Min	Max	Conditions
DC Supply Voltage	V	0	+6.0	VDD and VCC
Control Pin Voltage	V	0	3.6	All Control Pins
DC Current Consumption	mA		600	
Maximum TX Input Power (50 ohm load, No Damage)	dBm		+12	
LNA On Maximum RX Input Power (No Damage)	dBm		+12	
Bypass Mode Maximum RX Input Power (No Damage)	dBm		+25	
Storage Temperature	°C	-40	150	
ESD – Human Body Mode	V		2500	HBM
ESD – Charge Device Mode	V		1000	CDM
ESD – Machine Mode	V		50	MM
Moisture Sensitivity		MSL3		

**NOTE:** Sustained operation at or above the Absolute Maximum Ratings for any one or combinations of the above parameters may result in permanent damage to the device and is not recommended.

All Maximum RF Input Power Ratings assume 50-ohm terminal impedance.

### NOMINAL OPERATING CONDITIONS

Parameters	Units	Min	Typ	Max	Conditions
DC Supply Voltage	V	4.5	5	5.5	VDD and VCC
Control Pin Voltage "High"	V	1.8		3.6	
Control Pin Voltage "Low"	V	0		0.4	
Control Pin DC Current	uA		50		
Leakage Current - Nominal	uA		20		RF Off; TX_EN=Low; LNA_EN=Low
Operation Temperature	°C	-40	+25	+85	

### KCT8522C ELECTRICAL SPECIFICATIONS

(VDD=VCC= 5V, T = 25°C, Unless Otherwise Noted)

Parameters	Units	Min	Typ	Max	Conditions
Frequency Range	GHz	5.15		5.85	
<b>Transmit Mode</b>					
Gain	dB	28	29	30	

This product datasheet is a general list of parameters to provide information on the capabilities of this device and is subject to change without notice.

Rev A

Dec. 29, 2017

# KCT8522C

## PRODUCT DATASHEET

Parameters	Units	Min	Typ	Max	Conditions
Output Power	dBm		+21 +22.5 +25		VHT80/MCS9, 1.8% DEVM, Preamble only HT40/MCS7, 3% DEVM, Preamble Only HT20/MCS0, Mask Compliance
EVM Floor	dB		-40		Pout=18dBm, VHT80/MCS9, DEVM, Preamble Only
Current Consumption	mA		250 300 350 400	260 320 380 450	CW Signal @ No RF @+20dBm @+23dBm @+25dBm
Harmonics	dBm/MHz		-35 -55		Pout = +22dBm, HT20/MCS0 2 <sup>nd</sup> harmonics 3 <sup>rd</sup> harmonics
Input Return Loss	dB	8	10		
Output Return Loss	dB		12		
Power Detector Output	V		0.35 0.6 0.9		@ No RF @+20dBm @+24dBm
Power Detector Variations	dB	-0.5 -1.5		0.5 1.5	Power Range from 0dBm~+25dBm Nominal Load VSWR=3:1
Power Detector Output Impedance	ohm		1K		
PA Switching Time	ns		300		
PA Turn-On Time from TX_EN edge	ns		350		
PA Turn-Off Time from TX_EN edge	ns		350		
Load Stability VSWR=3:1	dBm	18 19 21			VHT80/MCS9, 1.8% DEVM, Preamble only HT40/MCS7, 3% DEVM, Preamble Only HT20/MCS0, Mask Compliance
Ruggedness		VSWR=10:1			Pin =0dBm, No Permanent Damage
<b>Receive Mode - LNA On</b>					
Gain	dB	11	13	15	

This product datasheet is a general list of parameters to provide information on the capabilities of this device and is subject to change without notice.

# KCT8522C

## PRODUCT DATASHEET

Parameters	Units	Min	Typ	Max	Conditions
Input Power of P1dB	dBm		-12		
Noise Figure	dB		3.0	3.5	
Input Return Loss	dB		13	15	
Output Return Loss	dB		9	10	
Switching Time	ns		200		LNA $\leftrightarrow$ Bypass
LNA _EN Control Current	$\mu$ A		35		
LNA Turn On Time	ns		300		
Current Consumption	mA		15		
<b>Receive Bypass Mode</b>					
Insertion Loss	dB		3.5		
Input Power of P1dB	dBm		+13		
Input Return Loss	dB		14		
Output Return Loss	dB		8		
ANT-RX Isolation	dB		35		Transmit Mode; TX_EN=High; Maximum Power
Bypass Current	$\mu$ A		20		

### CONTROL LOGIC TABLE

TX_EN	LNA_EN	RX_EN	Mode of Operation
1	X	X	Transmit Mode
0	1	1	Receive LNA Mode
0	0	1	Bypass Mode
0	0	0	Shutdown Mode
All Others			Unsupported (No Damage)

Note: "1" denotes high voltage state (> 1.8V)

"0" denotes low voltage state (<0.4V) at Control Pins

"X" denotes the don't care state

1K $\Omega$  – 10K $\Omega$  series resistor may be required for each control line

This product datasheet is a general list of parameters to provide information on the capabilities of this device and is subject to change without notice.

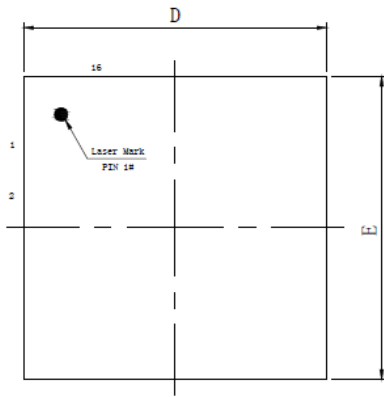
Rev A

Dec. 29, 2017

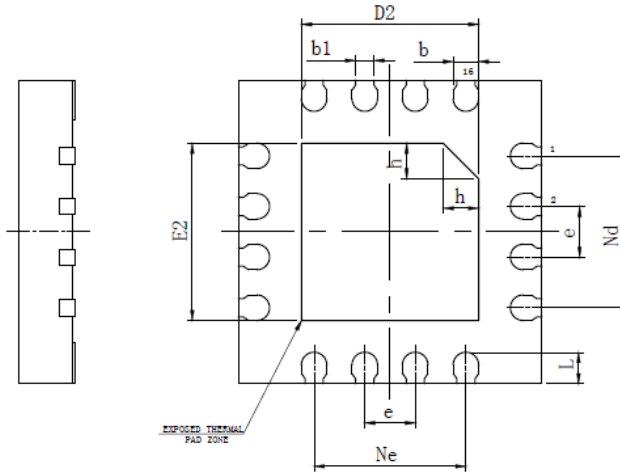
# KCT8522C

## PRODUCT DATASHEET

PACKAGE DIMENSIONS (All Dimensions in mm):

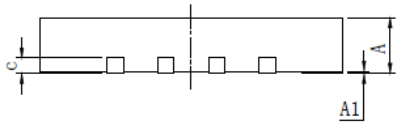


TOP VIEW



BOTTOM VIEW

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.50	0.55	0.60
A1	0	0.02	0.05
b	0.20	0.25	0.30
b1	0.18REF		
c	0.15REF		
D	2.90	3.00	3.10
e	0.50BSC		
Ne	1.50BSC		
Nd	1.50BSC		
E	2.90	3.00	3.10
E2	1.65	1.75	1.85
L	0.25	0.30	0.35
h	0.30	0.35	0.40
载体尺寸	2.16*2.16		



SIDE VIEW

KCT NDA C

This product datasheet is a general list of parameters to provide information on the capabilities of this device and is subject to change without notice.

Rev A

Dec. 29, 2017