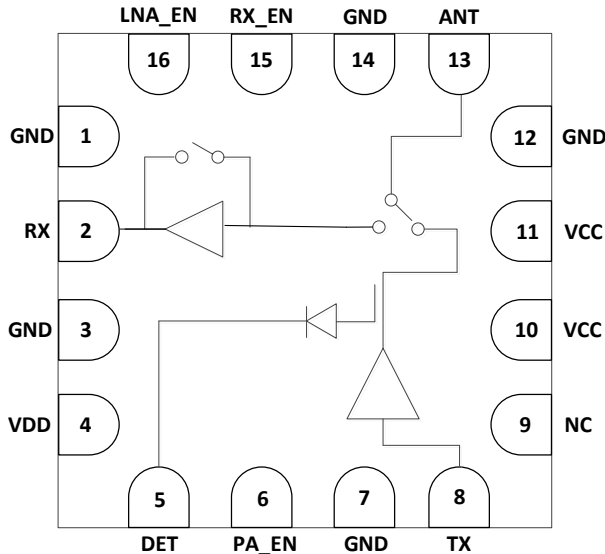


5GHz WLAN 802.11ac RFIC WITH PA, LNA AND SPDT



Description

KCT8534D 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. KCT8534D integrates a high-linearity power amplifier (PA), a low noise amplifier (LNA) with bypass, the associated matching network, and harmonic filters all in one device.

KCT8534D 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.

KCT8534D is assembled in a compact, low-profile 2.5x2.5x0.55mm 16-lead QFN package. KCT8534D 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

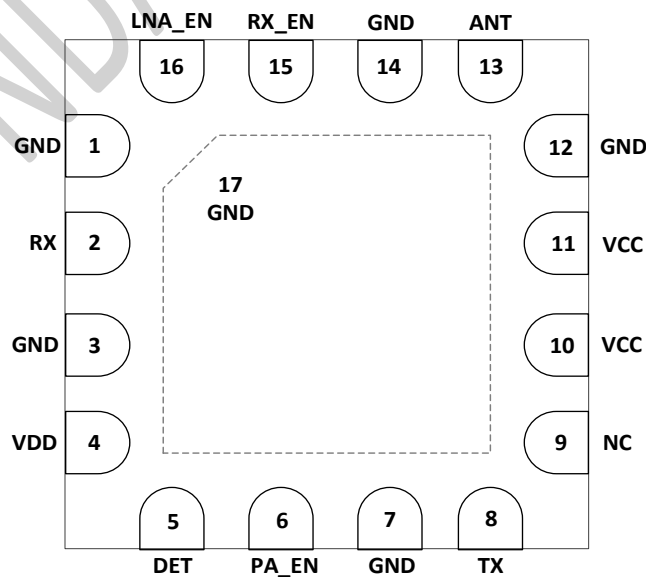
FEATURES

- ▶ Integrated high performance 5GHz PA, LNA with bypass and T/R switch
- ▶ Fully-matched input and output
- ▶ Integrated power detector
- ▶ Transmit gain: 30.5dB at 3.3V
- ▶ Receive gain: 14.0dB at 3.3V
- ▶ Noise Figure: 3.0dB at 3.3V
- ▶ Output power: +17.0dBm @ 1.8% DEVM, VHT80/MCS9, 3.3V
+19.5dBm @ 3% DEVM, HT20/MCS7, 3.3V
- ▶ ESD protection circuitry on all PINs
- ▶ Minimal external components required
- ▶ Small package: QFN-16L 2.5mm x 2.5mm x 0.55mm (MSL3, 260 °C per JEDEC J-STD-020)
- ▶ RoHS and REACH Compliant

PIN ASSIGNMENTS

Pin Number	Pin Name	Description
9	NC	Internally Not Connected
2	RX	RF Output Port from LNA or Bypass
4	VDD	LNA Supply Voltage
5	DET	Detector Output Voltage
6	PA_EN	PA Enable
8	TX	RF Input Port from the Transceiver
10,11	VCC	PA Supply Voltage
13	ANT	Antenna Port – RF Signal from the PA or RF Signal Applied to the LNA
15	RX_EN	Input to control RX Enable
16	LNA_EN	Input to control LNA Enable or Bypass Mode
1,3,7, 12, 14,17	GND	Ground – must be connected to ground in the application circuit

PIN-OUT DIAGRAM (Top View)



ABSOLUTE MAXIMUM RATINGS

Parameters	Units	Min	Max	Conditions
DC Supply Voltage	V	-0.5	+6.0	VDD and VCC
Control Pin Voltage	V	-0.5	+3.6	All Control Pins
Maximum TX Input Power (50ohm load, No Damage)	dBm		+16	
LNA On Maximum RX Input Power (No Damage)	dBm		+16	
Bypass Mode Maximum RX Input Power (No Damage)	dBm		+23	
Storage Temperature	°C	-40	+150	
Junction Temperature	°C		+175	
Thermal Resistance(θ_{JC})	°C/W		+37	

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	Typical	Max	Conditions
DC Supply Voltage	V	3.15	3.30	3.45	VDD and VCC
Control Pin Voltage "High"	V	1.8		3.6	
Control Pin Voltage "Low"	V	0		0.4	
Control Pin DC Current	μ A		400		
Operation Temperature	°C	-20	+25	+85	
Extended Operation Temperature	°C	-40		+85	Functional with reduced performance

KCT8534D ELECTRICAL SPECIFICATIONS

(VCC=VDD=3.3V, T = 25°C, All Unused Ports Terminated with 50 Ω , Unless Otherwise Noted)

Parameters	Units	Min	Typ	Max	Conditions
Frequency Range	GHz	5.15		5.85	
Transmit Mode					
Gain	dB		30.5		
Output Power	dBm		+17.0 +19.5 +23.0		VHT80/MCS9/200 μ s, 1.8% DEVM, Preamble only HT20/MCS7/200 μ s, 3% DEVM, Preamble only HT20/MCS0, Mask Compliance
Output Power of P1dB	dBm		26.5		

Parameters	Units	Min	Typ	Max	Conditions
Current	mA		155 225 265 360		100% duty modulated signal @ No RF @+17.0dBm @+19.5dBm @+23.0dBm
Harmonics 2 nd harmonics 3 rd harmonics	dBm/MHz		-35 -40		Pout =+23dBm, HT20/MCS0
Input Return Loss	dB		8		
Output Return Loss	dB		8		
Power Detector Output	V		0.18 0.43 0.55 0.72		100% duty modulated signal @ No RF @+17.0dBm @+19.5dBm @+23.0dBm
Power Detector Output Impedance	ohm		2K		
Isolation	dB		39 12		From ANT to RX Pin From TX to RX Pin
Receive Mode – LNA On					
Gain	dB		14		
Noise Figure	dB		3		
2.4GHz Notch Filter Rejection	dB		18		
Input Power of P1dB	dBm		-8		
Input Return Loss	dB		6		
Output Return Loss	dB		12		
Isolation	dB		30 42		From ANT to TX Pin From RX to TX Pin
LNA Current	mA		15		
Receive Bypass Mode					
Insertion Loss	dB		3.5		
Input Power of P1dB	dBm		22		
Input Return Loss	dB		10		
Output Return Loss	dB		13		
Isolation	dB		44 44		From ANT to TX Pin From RX to TX Pin
Bypass Current	mA		0.4		

CONTROL LOGIC TABLE

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

Note: "1" denotes high voltage state at Control Pins
"0" denotes low voltage state at Control Pins

PRODUCT QUALIFICATION

Parameters	Units	Min	Max	Conditions
ESD – Human Body Mode	V		2500	HBM
ESD – Charge Device Mode	V		2000	CDM
HTOL	/	1000 hours pass		Refer to JESD22-A108, JESD85

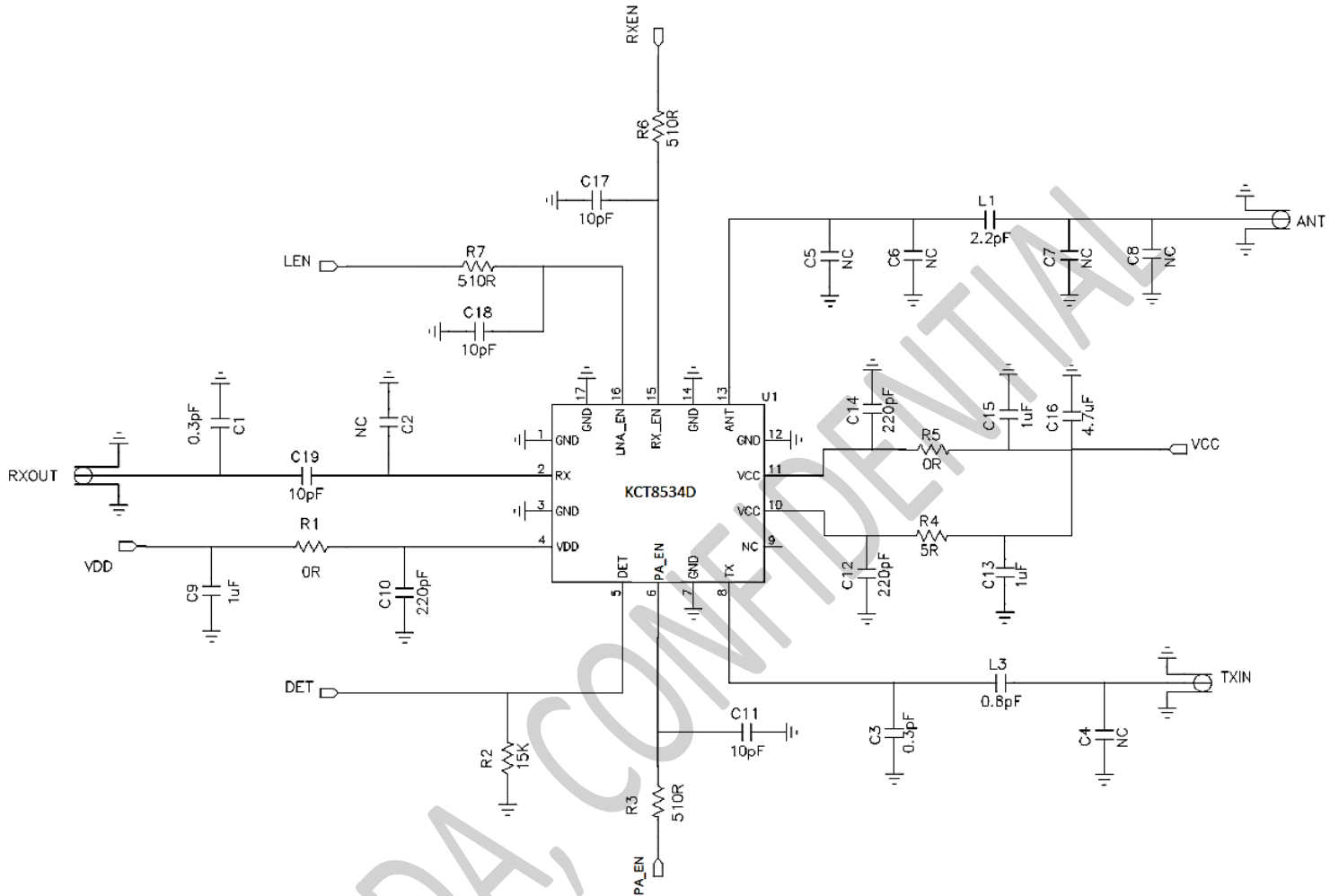
ESD HANDLING: *Although this device is designed to be as robust as possible, electrostatic discharge (ESD) can damage this device. This device must be protected at all times from ESD when handling or transporting. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection.*

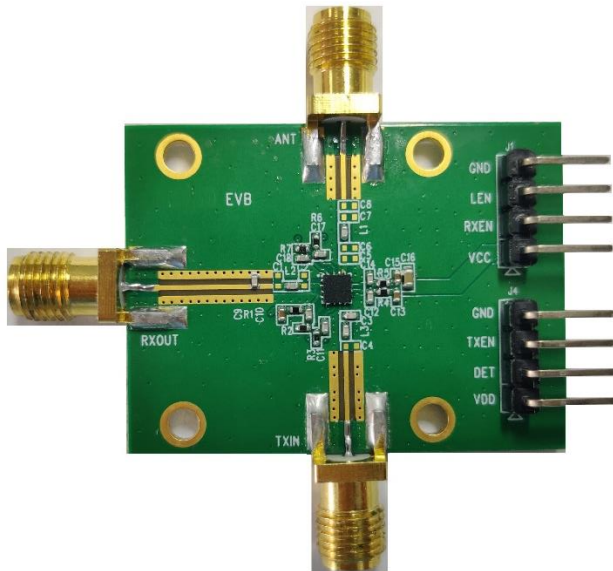
Industry-standard ESD handling precautions should be used at all times.

ORDERING INFORMATION

Product Description	Product Part Number	Package Type	Package Quantity
KCT8534D: 5GHz WLAN Front-End Module	KCT8534D	7" tape and reel	3000pcs / reel

APPLICATION SCHEMATIC

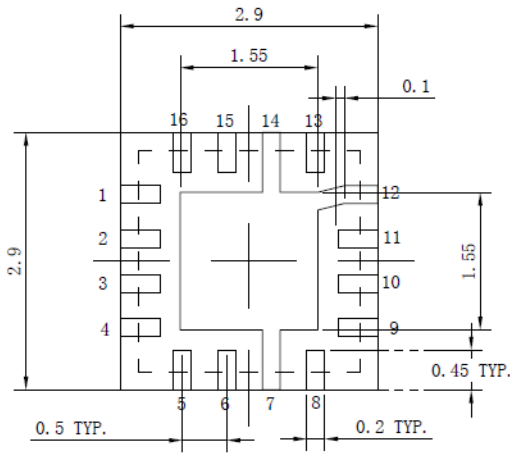


EVB PICTURE and EVB BOM

[EVB Assembly]

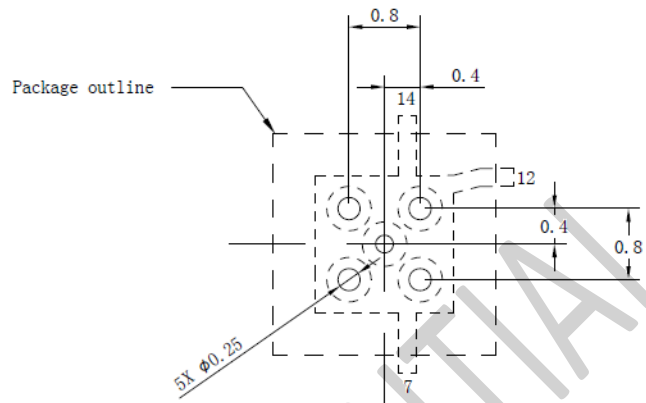
Designator	Value	Footprint	Notes
C1,C3	0.3PF	0402	Murata X5R/X7R series
L3	0.8PF	0402	Murata X5R/X7R series
L1	2.2PF	0402	Murata X5R/X7R series
C11,C17,C18,C19	10PF	0402	Murata X5R/X7R series
C10,C12,C14	220PF	0402	Murata X5R/X7R series
C9,C13,C15	1µF	0402	Murata X5R/X7R series
C16	4.7µF	0603	Murata X5R/X7R series
R1,R5	0 ohm	0402	Yageo RC0402 series
R4	5 ohm	0402	Yageo RC0402 series
R3,R6,R7	510 ohm	0402	Yageo RC0402 series Control pin protect resistor
R2	15K ohm	0402	Yageo RC0402 series

[EVB BOM]

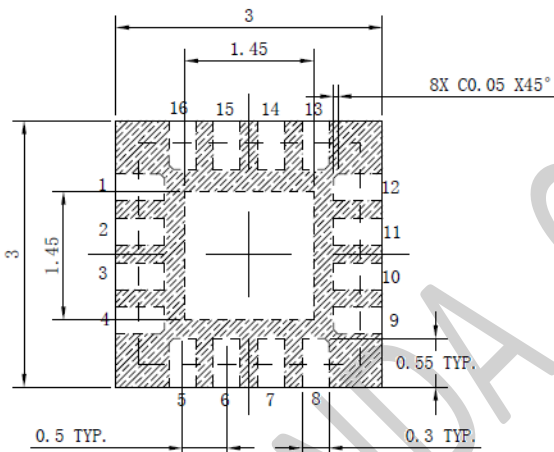
PCB LAYOUT FOOTPRINT (All Dimensions in mm)



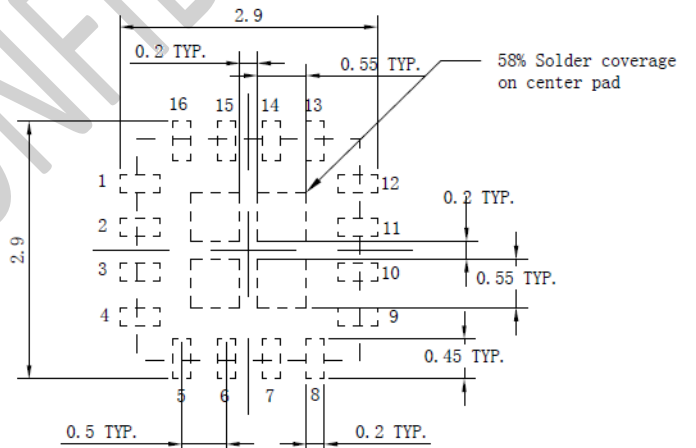
Board Metal



Via Pattern

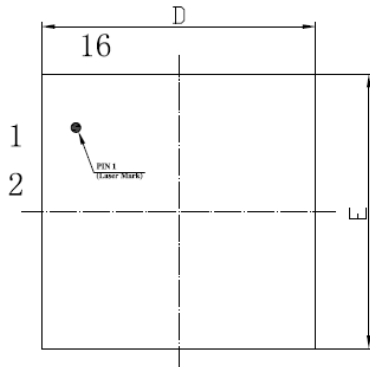


Solder Mask Pattern

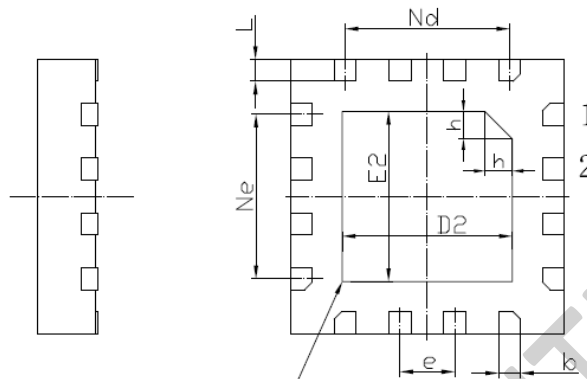


Stencil Pattern

Package Dimensions (All dimensions are in millimeters)

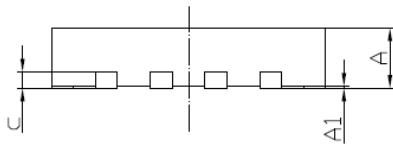


TOP VIEW



BOTTOM VIEW

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.50	0.55	0.60
A1	0	0.02	0.05
b	0.15	0.20	0.25
c	0.10	0.15	0.20
D	2.40	2.50	2.60
D2	1.45	1.55	1.65
e	0.50BSC		
Ne	1.50BSC		
Nd	1.50BSC		
E	2.40	2.50	2.60
E2	1.45	1.55	1.65
L	0.15	0.20	0.25
h	0.20	0.25	0.30
L/F 载体尺寸 (mil)	73X73		



SIDE VIEW

KCT NDA, CONFIDENTIAL