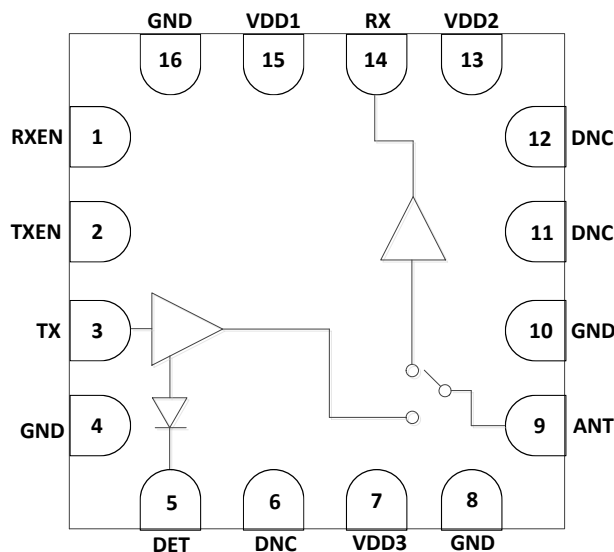




700 / 800 / 900MHz 0.5 WATT BROADBAND CMOS RFEIC



Description

KCT8101L is a broadband, highly integrated, single-chip, single-die RF Front-End Integrated Circuit which incorporates key RF functionality needed for a TDD-mode RF Front-end operating in the 700/800/900MHz frequency bands. KCT8101L integrates a high-efficiency, and high-linearity power amplifier (PA), a low noise amplifier (LNA), Transmit and Receive switching circuitry and the associated matching network in a CMOS single-chip device.

KCT8101L has simple and low-voltage CMOS control logic, and requires minimal external components. It is designed for high output power, and consumes low current in receive mode.

KCT8101L is assembled in a compact, low-profile 3x3x0.75mm 16-lead QFN package. KCT8101L is the ideal RF front-end solution for implementing sub-GHz from 780 to 960MHz supporting multiple standards including IEEE 802.15.4, 802.11p and 802.11ah.

Applications

- ▶ N. America 900MHz ISM Systems
- ▶ Smart Grid/AMR/AMI
- ▶ Remote Sensor and Control
- ▶ E Europe 870MHz SRD Systems
- ▶ Smart Home Appliances
- ▶ Other 700/800/900MHz Radios

FEATURES

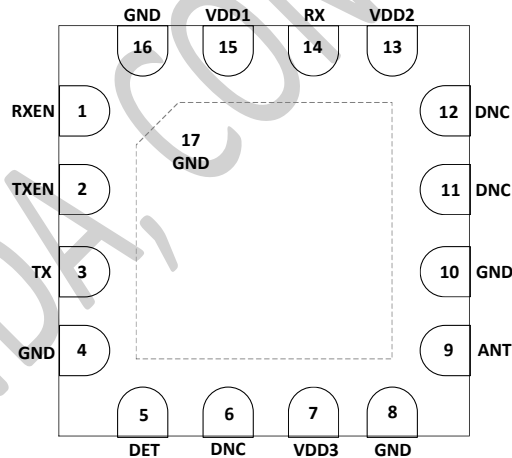
- ▶ 700/800/900MHz Single-chip, Single-die RF Front-end IC with 27.5dBm Output Power
- ▶ Full on-chip 50Ω Input / Output matching and Decoupling Circuitry
- ▶ Transmit gain: 28dB
- ▶ Receive gain: 15dB
- ▶ Transmit / Receive Switch Circuitry
- ▶ Low Voltage CMOS Control Logic
- ▶ Low Noise Figure for the Receive Channel
- ▶ Very Low DC Power Consumption
- ▶ ESD Protection Circuitry on All Ports
- ▶ Minimal External Components Required
- ▶ Small Package: QFN 16-pin 3×3×0.75mm, with Exposed Ground Pad (MSL3, 260 °C per JEDEC J-STD-020)
- ▶ RoHS and REACH Compliant



PIN ASSIGNMENTS

Pin Number	Pin Name	Description
1	RXEN	CMOS Input to Enable Receive Mode
2	TXEN	CMOS Input to Enable Transmit Mode
3	TX	RF TX Signal from the Transceiver to the PA; DC shorted to Ground
4,8,10,16	GND	Must be connected to Ground in the Application Circuit
5	DET	Detector Output Voltage
6,11,12	DNC	Do Not Connect-must be floating in the Application Circuit
7	VDD3	Voltage Supply Connection for the Power Stage of PA
9	ANT	RF Signal from the PA or RF Signal Applied to the LNA; DC shorted to Ground
13	VDD2	Voltage Supply Connection for the LNA
14	RX	RF RX Signal from the LNA to the Transceiver; DC shorted to Ground
15	VDD1	Voltage Supply Connection for the Driver Stage of PA

PIN-OUT DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Parameters	Units	Min	Max	Conditions
DC VDD Voltage Supply	V	0	5.0	All VDD Pins
DC Control Pin Voltage	V	0	3.6	
TX RF Input Power	dBm		+8	
ANT RF Input Power	dBm		+5	When RX is "ON"
Junction Temperature	°C		+150	

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.



Parameters	Units	Min	Max	Conditions
Storage Ambient Temperature Range	°C	-50	+150	No RF and DC Voltages Applied Appropriate care required according to JEDEC Standards

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 VDD Supply Voltage (Note 1)	V	2.0	3.3	3.8	All VDD Pins
Extended Supply Voltage	V	1.8		4.5	Functional with Reduced Performance
Control Voltage "High"	V	1.8		3.6	RXEN, TXEN
Control Voltage "Low"	V			0.4	RXEN, TXEN
Operating Ambient Temperature	°C	-40		+85	See Note 2
θ_{ja}	°C/W		38		

NOTE 1: For normal operation of the KCT8101L, VDD must be continuously applied to all VDD supply pins.

NOTE 2: For operation above +85 °C, use the θ_{ja} as guidance for system design to assure the junction temperature will not exceed the maximum of +150 °C.

DC Characteristics (VDD = 3.3V, T = +25 °C)

Parameters	Units	Min	Typical	Max	Conditions
DC Control Pin Current Consumption	μA		14		RXEN, TXEN
DC Shutdown Current	μA		1.5		
Transmit-Receive Switching Time	μsec			1	
Shut-Down and "ON" State Switching Time	μsec			1	

KCT8101L ELECTRICAL SPECIFICATIONS

(VDD= 3.3V, T = 25 °C, Unless Otherwise Noted)

Parameters	Units	Min	Typical	Max	Conditions
Frequency Range	MHz	780		960	All RF Pins Terminated by 50 Ohm
Extended Frequency Range	MHz	700		980	Functional with Reduced Performance
Transmit Mode					
Saturated Output Power	dBm	26	27.5		In Band
Small Signal Gain	dB		28		
Large Signal Current	mA		460	550	Pout=+26dBm, CW

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.



Parameters	Units	Min	Typical	Max	Conditions
Quiescent Current	mA		50		
Input Return Loss (S11)	dB	5	10		
Input Return Loss (S22)	dB		6		
Input/ Output Impedance Single-Ended	Ohm		50		
Power Detector Voltage	mV	200		1300	Pout=+5 to +27dBm, 10kΩ load
VSWR for Stability			6:1		For all non-harmonic related spurs below -5dBm/MHz, P _{IN} fixed for Pout=+27dBm with 50ohm load
VSWR for Ruggedness			10:1		No Damage, P _{IN} ≤ +5dBm
Receive Mode					
Gain	dB	14	15		
Noise Figure	dB		3		
Input Return Loss (S11)	dB	9	11		
Output Return Loss (S22)	dB	8	10		
RF Port Impedance	Ohm		50		At RX and ANT Pins
DC Current	mA		14		
Input P1dB	dBm		-5		

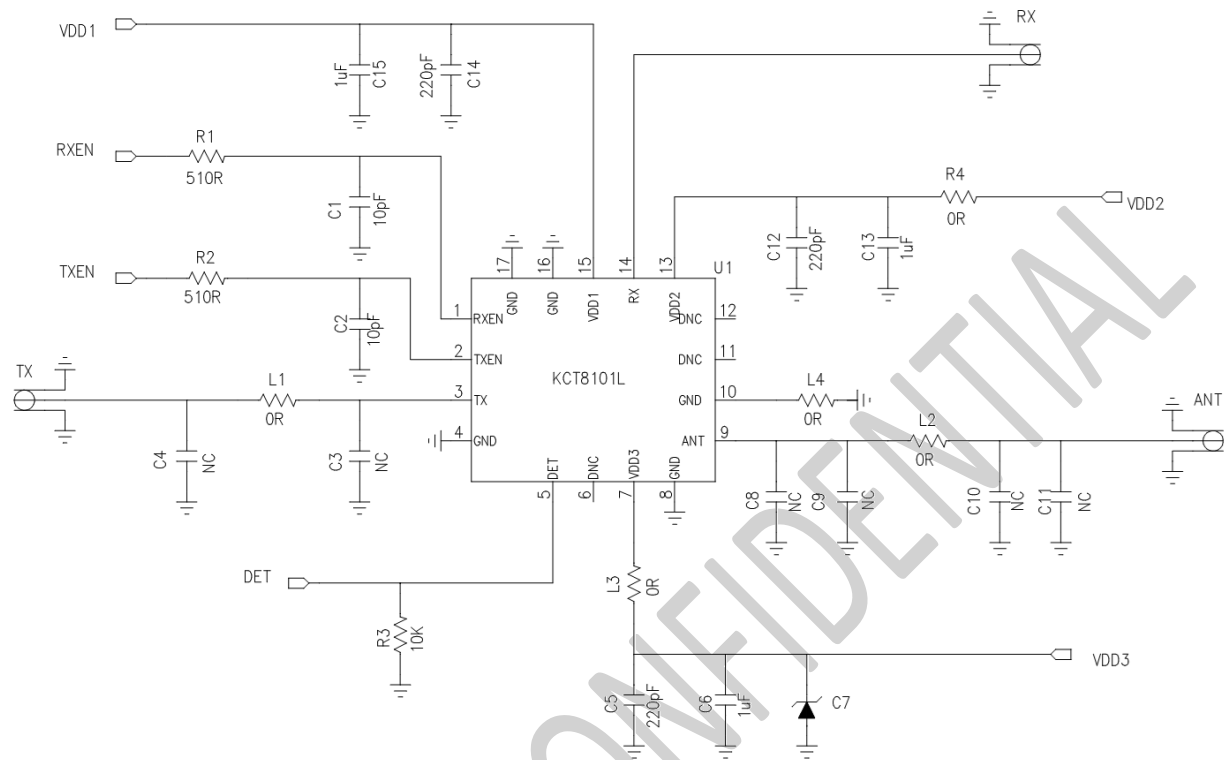
CONTROL LOGIC TABLE

TX_EN	RX_EN	Mode of Operation
1	X	TX Mode
0	1	RX Mode
0	0	Shutdown Mode

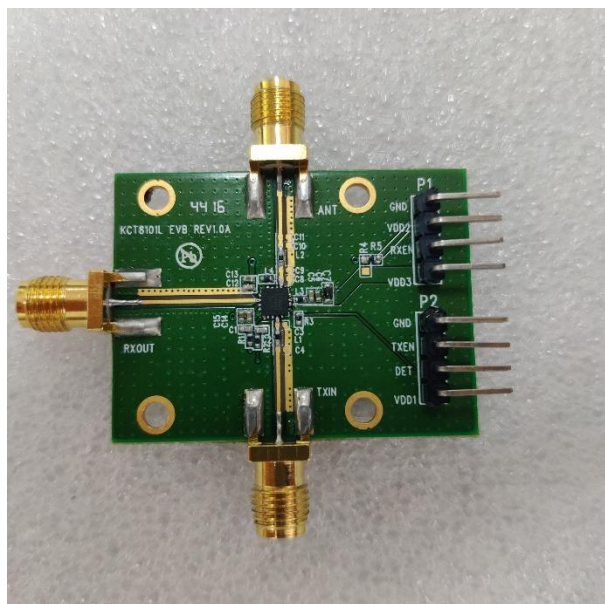
Note: "1" denotes high voltage state (> 1.8V)
 "0" denotes low voltage state (<0.4V) at Control Pins
 "X" denotes the don't care state (Floating control pins is not allowed)



APPLICATION SCHEMATIC



EVB PICTURE and EVB BOM

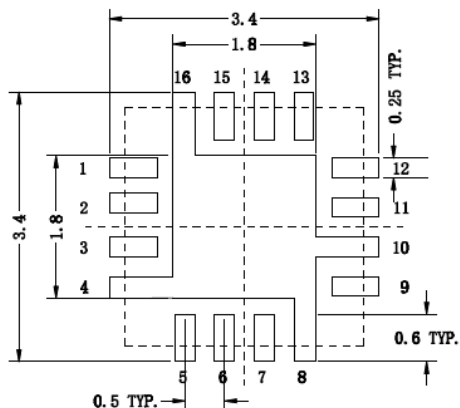


[EVB Assembly]

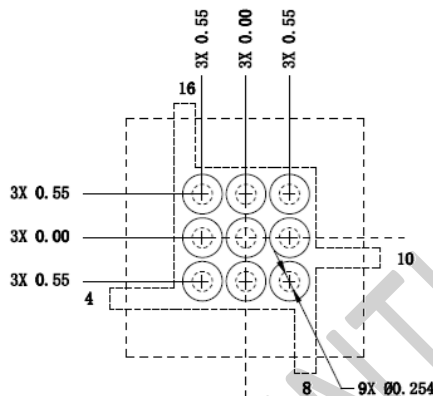
Reference	Value	Footprint	Notes
C1,C2	10pF	0402	X5R/X7R
C5,C12,C14	220pF	0402	X5R/X7R
C6,C13,C15	1uF	0402	X5R/X7R
C7 (TVS)	7V	SOD-523	ESD
L1,L2,L3,L4,R4	0ohm	0402	Series Pad
R1,R2	510ohm	0402	Series Pad
R3	10K	0402	Det. load

[EVB BOM]

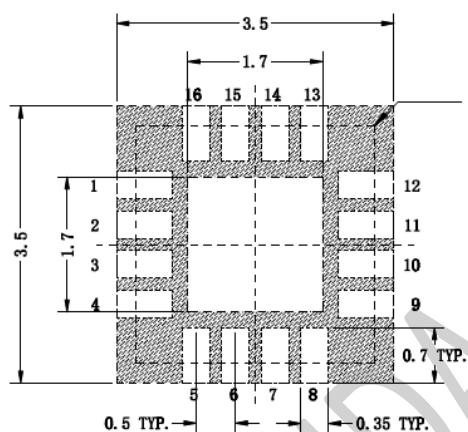
PCB LAYOUT FOOTPRINT (All Dimensions in mm)



Board Metal

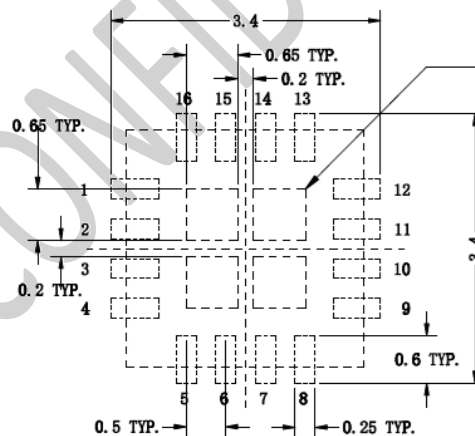


Via Pattern



Solder Mask Pattern

Package outline

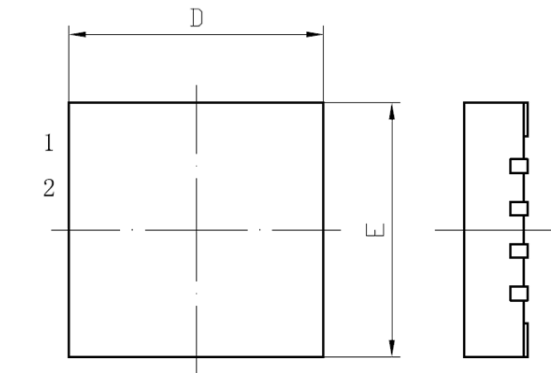


Stencil Pattern

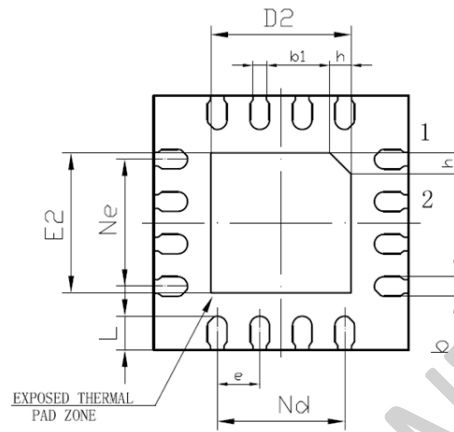
58% Solder Coverage
on Center Pad



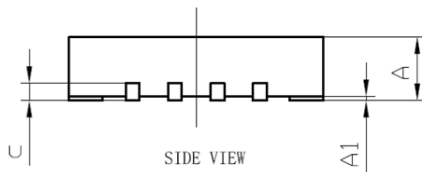
PACKAGE DIMENSIONS (All Dimensions in mm)



TOP VIEW



BOTTOM VIEW



SIDE VIEW

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	0	0.02	0.05
b	0.18	0.25	0.30
b1	0.16REF		
c	0.18	0.20	0.25
D	2.90	3.00	3.10
D2	1.55	1.65	1.75
e	0.50BSC		
Ne	1.50BSC		
Nd	1.50BSC		
E	2.90	3.00	3.10
E2	1.55	1.65	1.75
L	0.35	0.40	0.45
h	0.20	0.25	0.30
L/F载体尺寸 (mil)	75x75		