

SK8401

CMOS RF Front-end IC for 2.4GHz ZIGBEE/ISM Transmit/Receive

GENERAL DESCRIPTION

The SK8401 is a fully integrated, single-chip RF Front-End IC, which incorporates all the RF functionality needed for IEEE 802.15.4/ZigBee, wireless sensor network, and any other wireless systems in the 2.4GHz ISM band. The SK8401 integrates the PA, LNA Transmit and Receive switching circuitry in one CMOS single-chip device.

The SK8401 typical high power applications include home and industrial automation, smart power, and RF4CE among others. Combining superior performance, high sensitivity and efficiency, low noise, small form factor, and low cost, making SK8401 suitable for applications that requires extended range and bandwidth.

The SK8401 has simple and low-voltage CMOS control logic, and requires minimal external components for system implementation.

The SK8401 is available in QFN3x3-16 package.

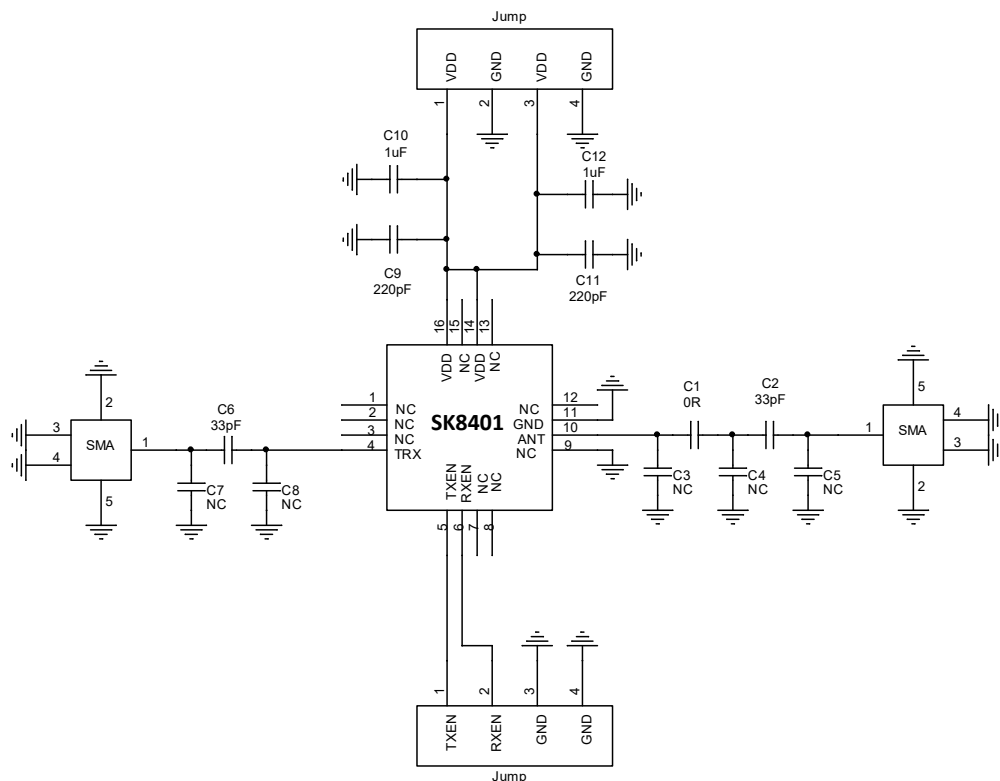
FEATURES

- 2.4 GHz high-power single-chip, single-die RF front-End IC
- Integrated PA with up to +22.5 dBm output power
- Integrated LNA with 3 dB noise figure
- Single-ended 50 Ω input and output ports
- Transmit/receive switch circuitry
- ESD protection circuitry on all ports
- Full on-chip matching and decoupling circuitry
- Market proven CMOS technology

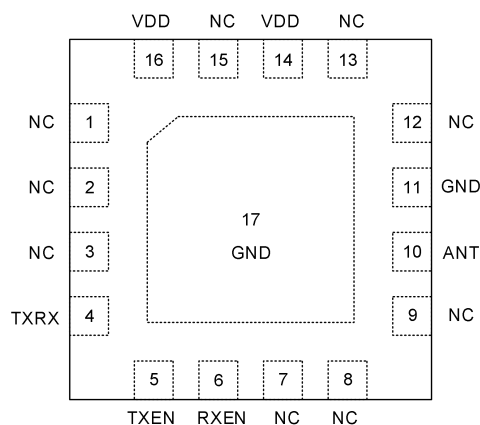
APPLICATIONS

- ZigBee Extended Range Devices
- Home and Industrial Automation
- ZigBee Smart Power
- RF4CE Remote Control
- Mobile and Battery ZigBee Systems
- Custom 2.4GHz Radio Systems

TYPICAL APPLICATION CIRCUIT



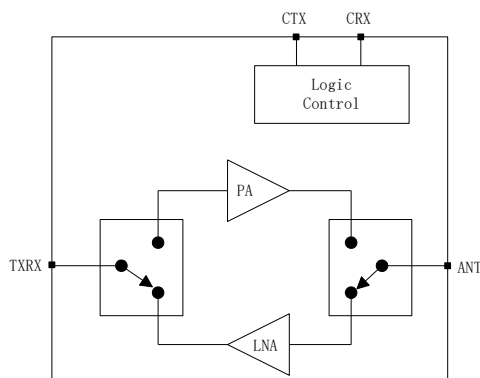
PIN CONFIGURATION



PIN DESCRIPTIONS

Pin Name	Pin Number	Description
NC	1,2,3,7,8,9,12,13,15	Not connected
TXRX	4	RF signal to/from the transceiver
TXEN	5	CMOS input to control TX enable
RXEN	6	CMOS input to control RX enable
ANT	10	Connect to 50 Ω antenna
VDD	14,16	Voltage supply connection
GND	11,17	Ground

BLOCK DIAGRAM



CONTROL LOGIC

Mode	TXEN	RXEN
TX active	1	X
RX active	0	1
Shutdown	0	0

"1" indicates high voltage state ($> 1.2\text{ V}$)

"0" indicates low voltage stage ($< 0.3\text{ V}$) at control pins

"X" indicates do not care: either "1" or "0" can be applied

ABSOLUTE MAXIMUM RATINGS

Parameter	Specification		Unit	Condition
	Min	Max		
Supply Voltage VDD	0	4	V	
DC control voltage	0	3.6	V	
DC VDD current consumption		350	mA	Through VDD pins when TXEN is on
Sleep current consumption		0.5	uA	
RF input power		5	dBm	
ESD (HBM)		+8000	V	
Junction Temperature		+150	℃	

RECOMMENDED OPERATING CONDITIONS

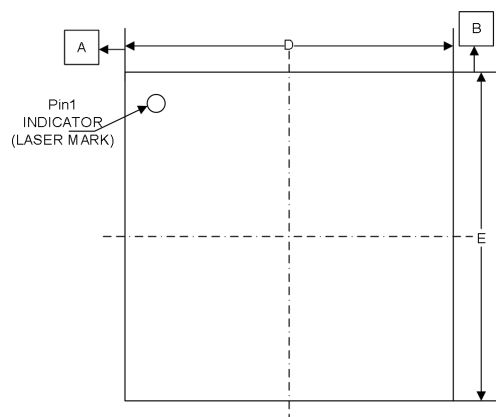
Parameter	Specification			Unit	Condition
	Min	Typ	Max		
Supply voltage VDD	3	3.3	3.6	V	All VDD pins
Control voltage "high"	1.2		VDD		
Control voltage "low"	0		0.3		
Ambient Temperature	-40	25	+85	℃	

ELECTRICAL CHARACTERISTICS

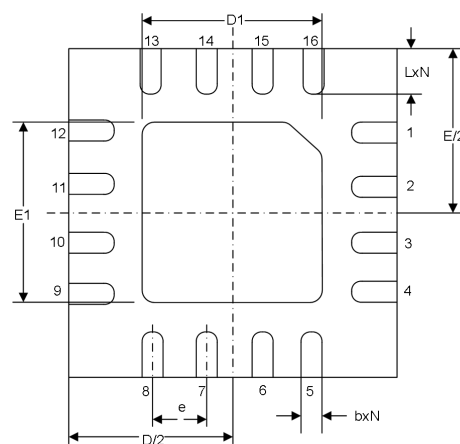
($V_{DD}=3.3V$, $T_A=25^{\circ}C$, Frequency=2.4GHz-2.5GHz)

Parameter	Specification Typical Value	Unit	Condition
TX			
Gain	24	dB	
Quiescent Current	22	mA	
Saturated Output Power	+22.5	dBm	
Output Current	100	mA	Pout=20 dBm at ANT
Input Return Loss	-11	dB	
Output Return Loss	-7	dB	
Input / output impedance	50	Ohm	Single-ended
Second Harmonic	-13	dBm/MHz	Pout=20 dBm at ANT
Third Harmonic	-20	dBm/MHz	Pout=20 dBm at ANT
Load VSWR for stability	6:1		Pout= +20 dBm
Load VSWR for ruggedness	No damage		Pout=+20 dBm
RX			
Small-Signal Gain	15	dB	
Noise Figure	3.1	dB	
Input P1dB	-8	dBm	
Input Return Loss	-11	dB	
Output Return Loss	-12	dB	
Quiescent Current	9	mA	

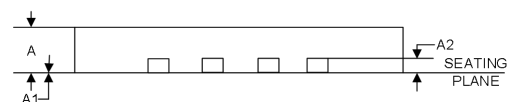
PACKAGE DIMENSIONS: QFN3x3-16



Top View



Bottom View



Side View

Dimensions Table (Units: mm)

Symbol	Min	Nom	Max
A	0.70	0.75	0.80
A1	0.00	0.02	0.05
A2		0.20	
b	0.18	0.25	0.30
D	2.90	3.00	3.10
D1	1.55	1.70	1.80
E	2.90	3.00	3.10
E1	1.55	1.70	1.80
e		0.5BSC	
L	0.30	0.40	0.50
N		16	

Land Pattern

