

RTC7626 : 2.4 – 2.5 GHz Front End Module for 802.11b/g/n/ac

Description

The RTC7626 is a complete 802.11 b/g/n/ac WLAN RF front-end module with a Bluetooth port. The module provides all the functionality of the power amplifier, power detector, filter, switch, and low noise amplifier. With all the critical matching, a 50 Ω interface to the antenna, the module is easy to be used in WLAN and Bluetooth applications. The device is packaged in a thin 16L QFN 2.5x2.5x1.15 mm³.

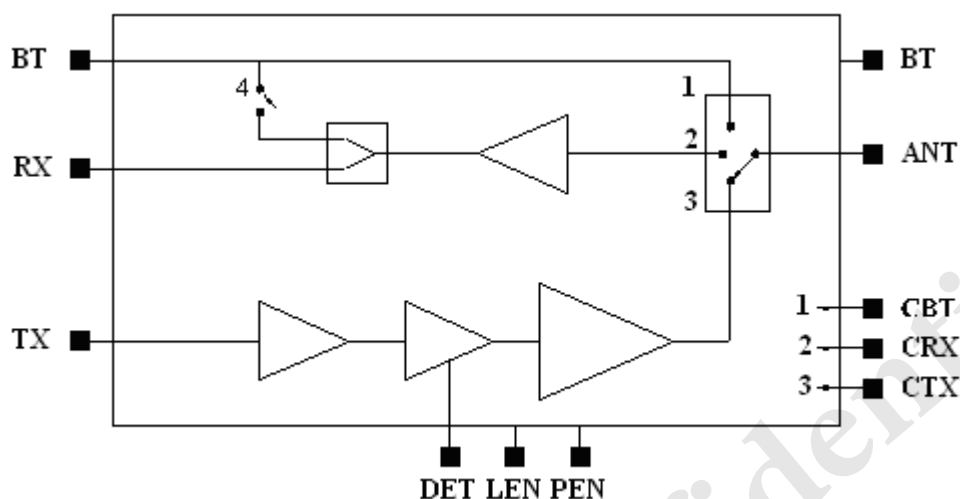
Feature

- ◆ Frequency range: 2.4 – 2.5 GHz
- ◆ 3.3 V single supply voltage
- ◆ Integrated high performance PA, LNA with bypass function, and SP3T switch
- ◆ Input & output fully 50 ohm matching
- ◆ Integrated positive slope power detector
- ◆ 20 dBm linear output power at 3.5% EVM, 802.11g 64 QAM, 54 Mbps
- ◆ Small 16L QFN 2.5x2.5x1.15 mm³ package
- ◆ RoHS / Halogen Free Compliant
- ◆ Moisture Sensitivity Level : MSL 3

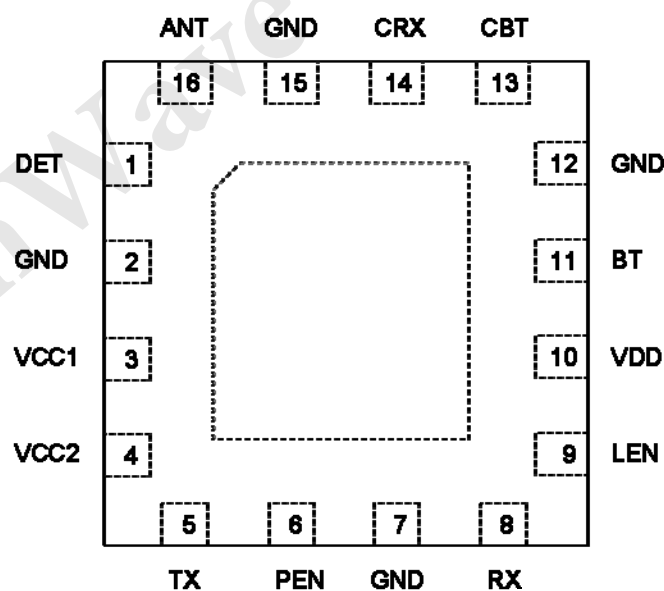
Application

- ◆ IEEE 802.11b/g/n/ac Wi-Fi Applications
- ◆ 2.4GHz to 2.5GHz ISM Band Solutions
- ◆ Portable Battery-Powered Equipment
- ◆ Wi-Fi Access Points, Gateways, and Set Top Boxes

Functional Block Diagram



Pin Out (top view through package)



Pin Function Description

Pin	Function	Description
1	DET	PA detector output
2	GND	Ground
3	VCC1	PA supply voltage
4	VCC2	PA supply voltage
5	TX	RF input port for PA
6	PEN	Digital enable voltage for PA and TX switch
7	GND	Ground
8	RX	RF output port for LNA
9	LEN	Control voltage for LNA
10	VDD	LNA supply voltage
11	BT	Bluetooth output
12	GND	Ground
13	CBT	Control voltage for BT switch
14	CRX	Control voltage for RX switch
15	GND	Ground
16	ANT	Antenna output
Exposed Pad		Must be connected to ground through PCB via

Truth Table

Mode	PEN	LEN	CRX	CBT
Standby	0	0	0	0
Transmit	1	0	0	0
Receive Gain	0	1	1	0
Receive Bypass	0	0	1	0
BT	0	0	0	1

1 : High, 0 : Low

Recommended Operating Range

Parameter	Symbol	Min	Typ	Max	Unit
Supply voltage	VCC, VDD	3.0	3.3	3.6	V
PA enable voltage (High)	PEN	2	3	3.3	V
PA enable voltage (Low)	PEN	0	0	0.3	V
LNA Enable Voltage (High)	LEN	2	3	3.3	V
LNA Enable Voltage (Low)	LEN	0	0	0.3	V
Switch control voltage (High)	CRX, CBT	2.8	3	3.3	V
Switch control voltage (Low)	CRX, CBT	0	0	0.3	V

Absolute Maximum Rating

Parameter	Symbol	Rating	Units
Supply voltage	VCC, VDD	4.2	V
PA Enable Voltage	PEN	3.6	V
LNA Enable Voltage	LEN	3.6	V
Switch Control Voltage	CRX, CBT	3.6	V
TX Input Power	Pin	+5	dBm
Operating Temperature	T _A	-30 to +85	°C
Storage Temperature	T _{ST}	-40 to +150	°C

Note : Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only, functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Operation between operation range maximum and absolute maximum for extended periods may affect device reliability.

Electrical Specification

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Operating Frequency	f		2.4		2.5	GHz
Transmit Mode T = 25°C, VCC = VDD = 3.3 V, PEN = 3.0 V, LEN = CRX = CBT = 0 V all unused RF ports terminated in a 50Ω load, unless otherwise noted						
Output Power, High Linearity Mode	Pout	802.11g, 64QAM/54Mbps, EVM = 3.5%	18	20		dBm
		802.11g/ mask compliant power, OFDM 54 Mbps	21	23		dBm
		802.11b/ mask compliant power, CCK 11 Mbps	20	22		dBm
Small Signal Gain	S21	Pin = -30 dBm	23	25		dB
Gain Flatness	ΔG	Gain variation over band			1	dB
P1dB	P1dB	1dB gain compression		24		dBm
Input Return Loss	S11	Pin = -30 dBm		10		dB
Output Return Loss	S22	Pin = -30 dBm		12		dB
2 nd harmonics	2fo	Pout = 22 dBm (802.11b, 1 Mbps)		-14		dBm/MHz
3 rd harmonics	3fo	Pout = 22 dBm (802.11b, 1 Mbps)		-40		dBm/MHz
Quiescent Current	Icq	Quiescent (no RF)		115		mA
PA Enable current	I _{en}	PEN = High		2		μA
Operating Current	Icc	Pout = 22 dBm 802.11g, 64QAM, 54 Mbps		160		mA
Receive Gain Mode T = 25°C, VCC = VDD = 3.3 V, PEN = 0 V, LEN = CRX = 3.0 V, CBT = 0 V, all unused RF ports terminated in a 50Ω load, unless otherwise noted						
RX Gain	S21	Pin = -30 dBm	14	16		dB
Input Return Loss	S11	Pin = -30 dBm		14		dB
Output Return Loss	S22	Pin = -30 dBm		9		dB

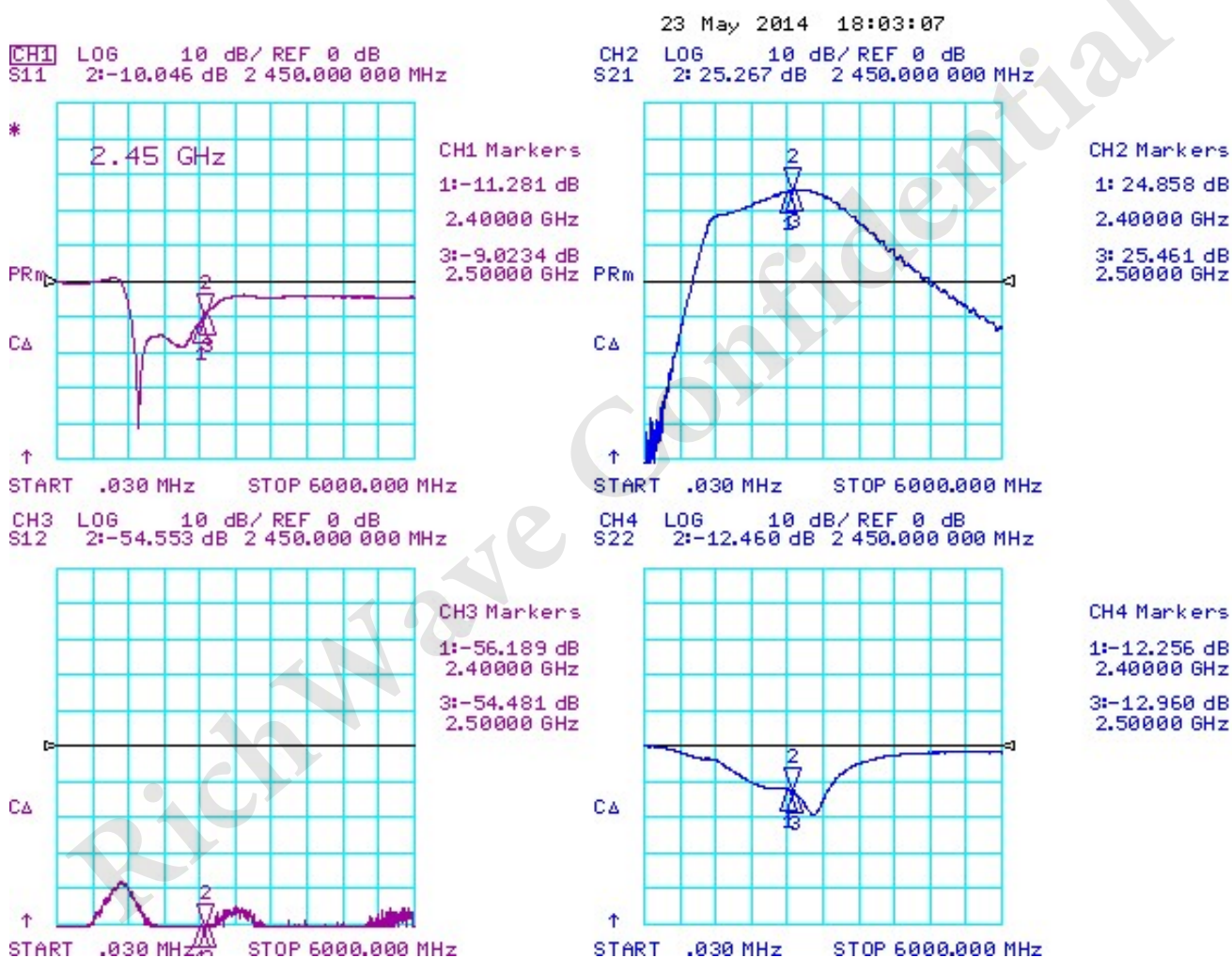
Noise Figure	NF			1.6		dB
Input P1dB	IP1dB	1dB Gain Compression		-3		dBm
Supply Current	I _{DD}	RX Gain Mode		12	15	mA
Receive Bypass Mode T = 25°C, VCC = VDD = 3.3 V, PEN = 0 V, CRX = 3.0 V, LEN = CBT = 0 V all unused RF ports terminated in a 50Ω load, unless otherwise noted						
Gain	S21			-6		dB
Input Return Loss	S11	Pin = -30 dBm		23		dB
Output Return Loss	S22	Pin = -30 dBm		13		dB
Bluetooth Mode T = 25°C, VCC = VDD = 3.3 V, PEN = 0 V, CRX = LEN = 0 V, CBT = 3.0 V all unused RF ports terminated in a 50Ω load, unless otherwise noted						
Insertion loss	IL			-0.8		dB
Input Return Loss	S11	Pin = -30 dBm		22		dB
Output Return Loss	S22	Pin = -30 dBm		21		dB
General Specifications						
Switch On/Off Time	ton, toff	On, Off (50% V to 90%/10% RF)		270		ns
Switch Control Current	I _{ctl}	Control Voltage = 3.0 V		5		μA
ESD (HBM)	ESD _{HBM}	JESD22-A114, All pin		TBD		V

Typical Performance Characteristics

(1) Transmit Mode

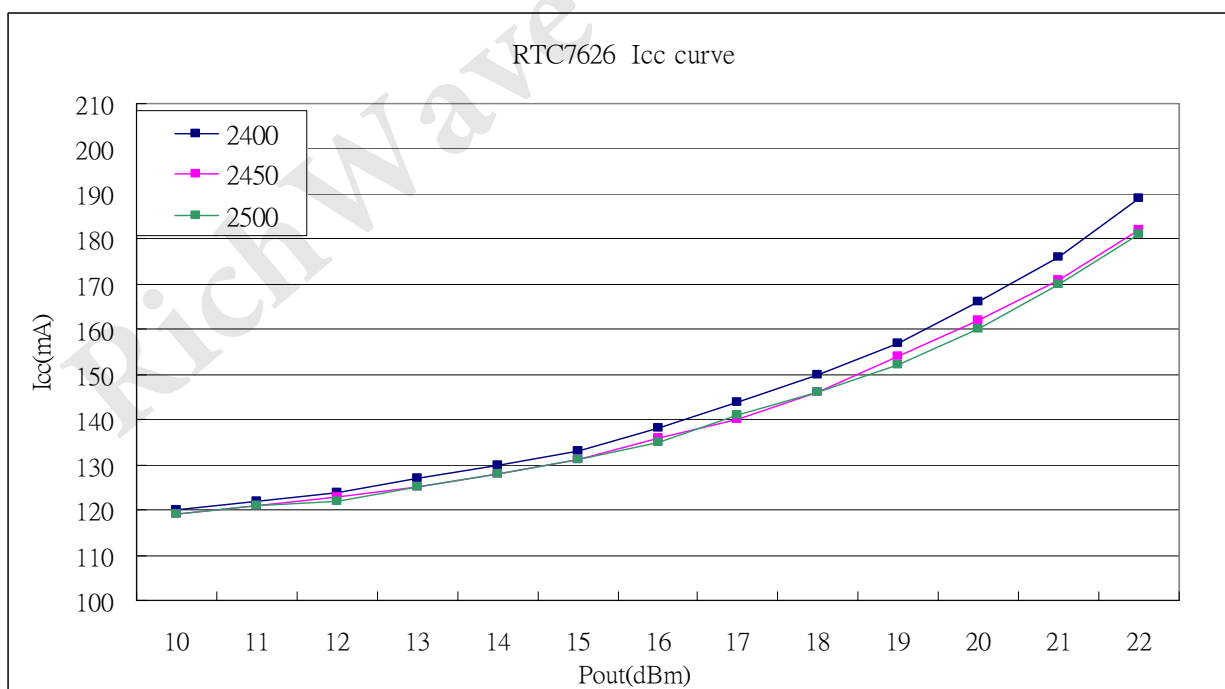
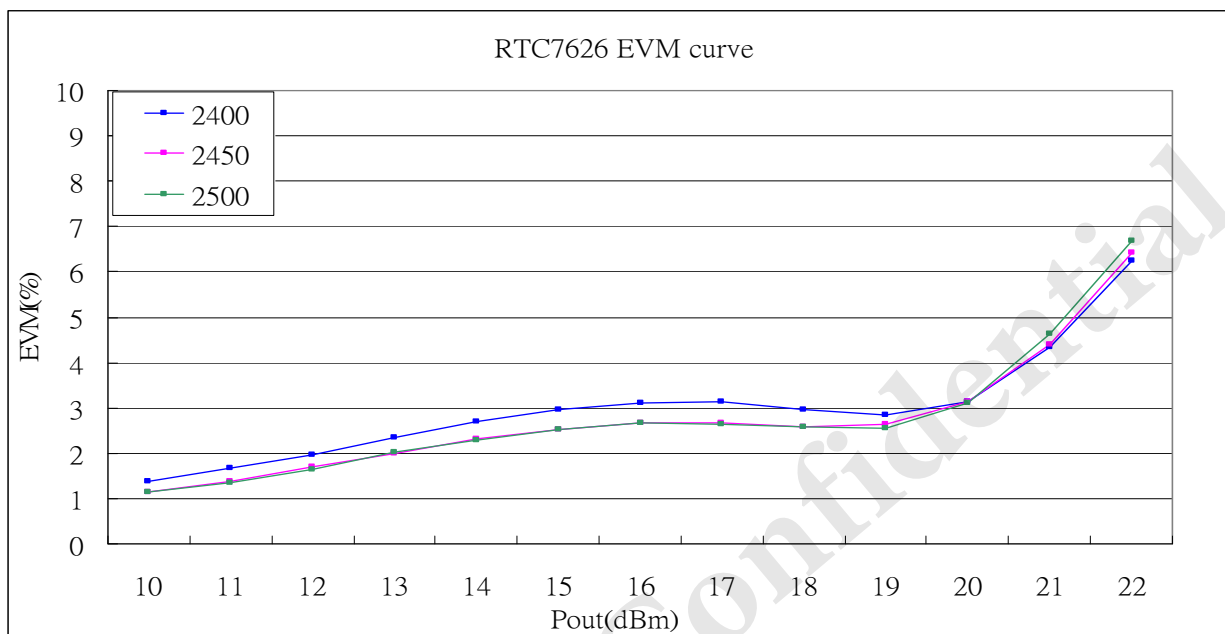
S Parameter

T = 25°C, VCC = VDD = 3.3 V, PEN = 3.0 V, LEN = CRX = CBT = 0 V



EVM & Icc

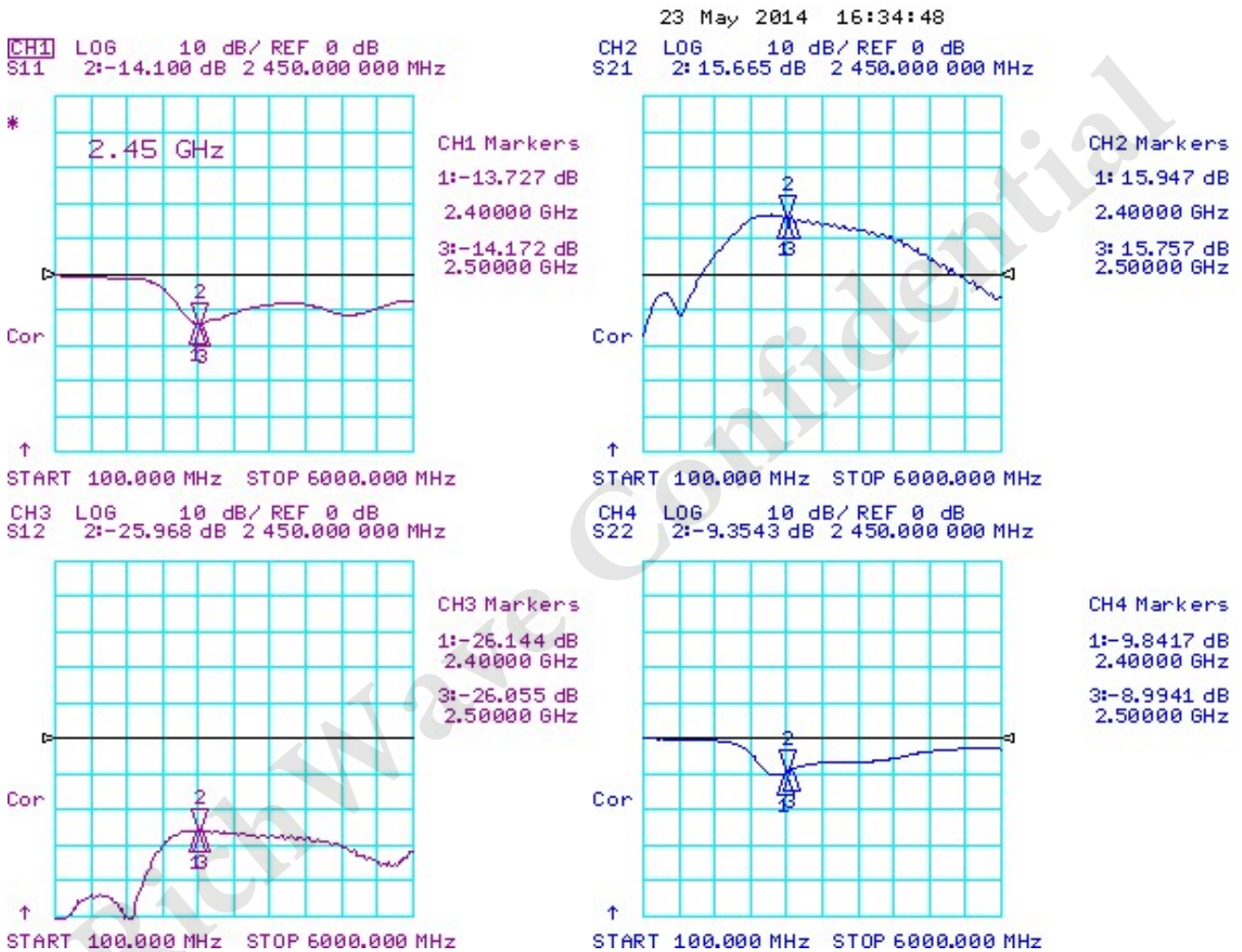
T = 25°C, VCC = VDD = 3.3 V, PEN = 3.0 V, LEN = CRX = CBT = 0 V



(2) Receive Gain Mode

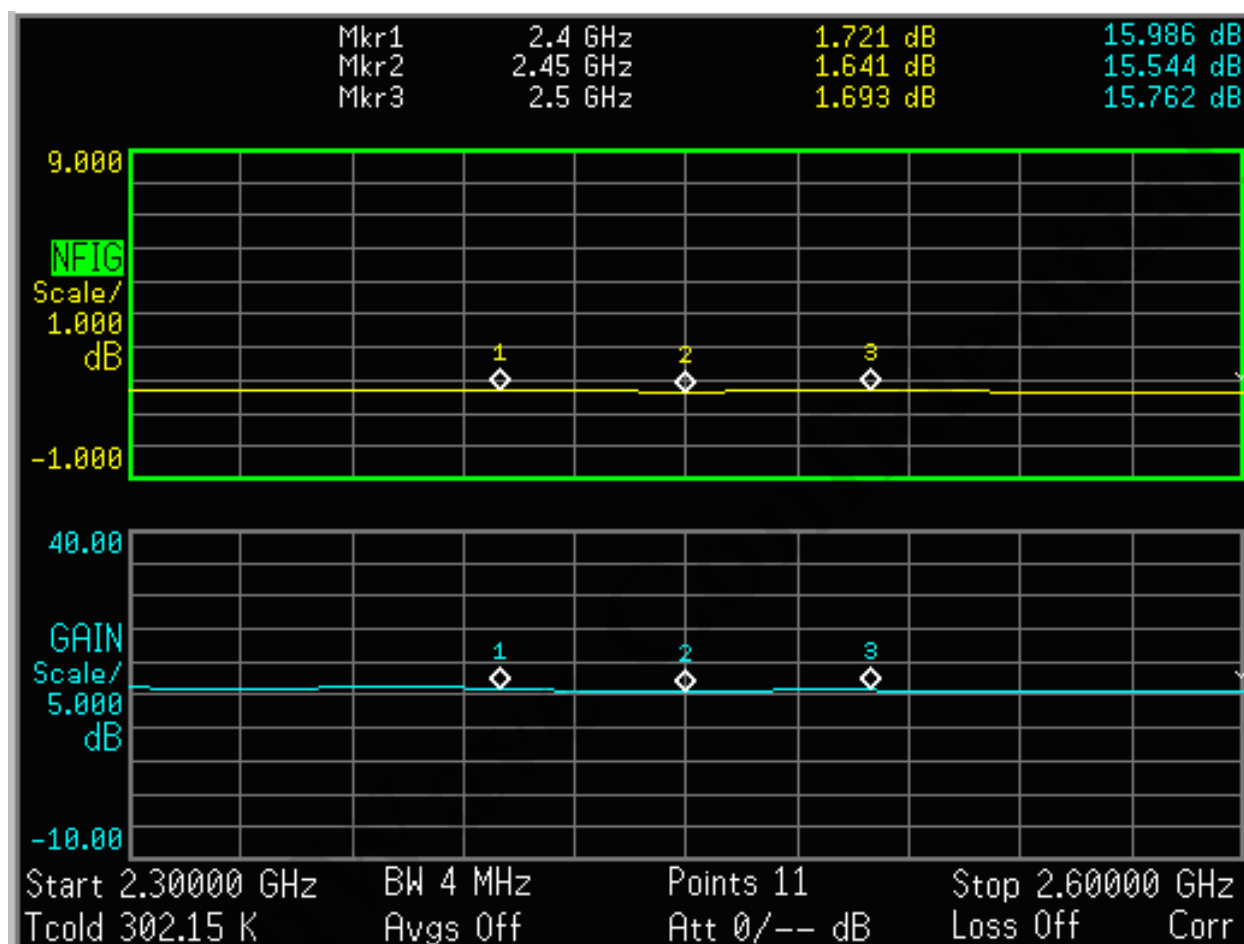
S Parameter

T = 25°C, VCC = VDD = 3.3 V, PEN = 0 V, LEN = CRX = 3.0 V, CBT = 0 V

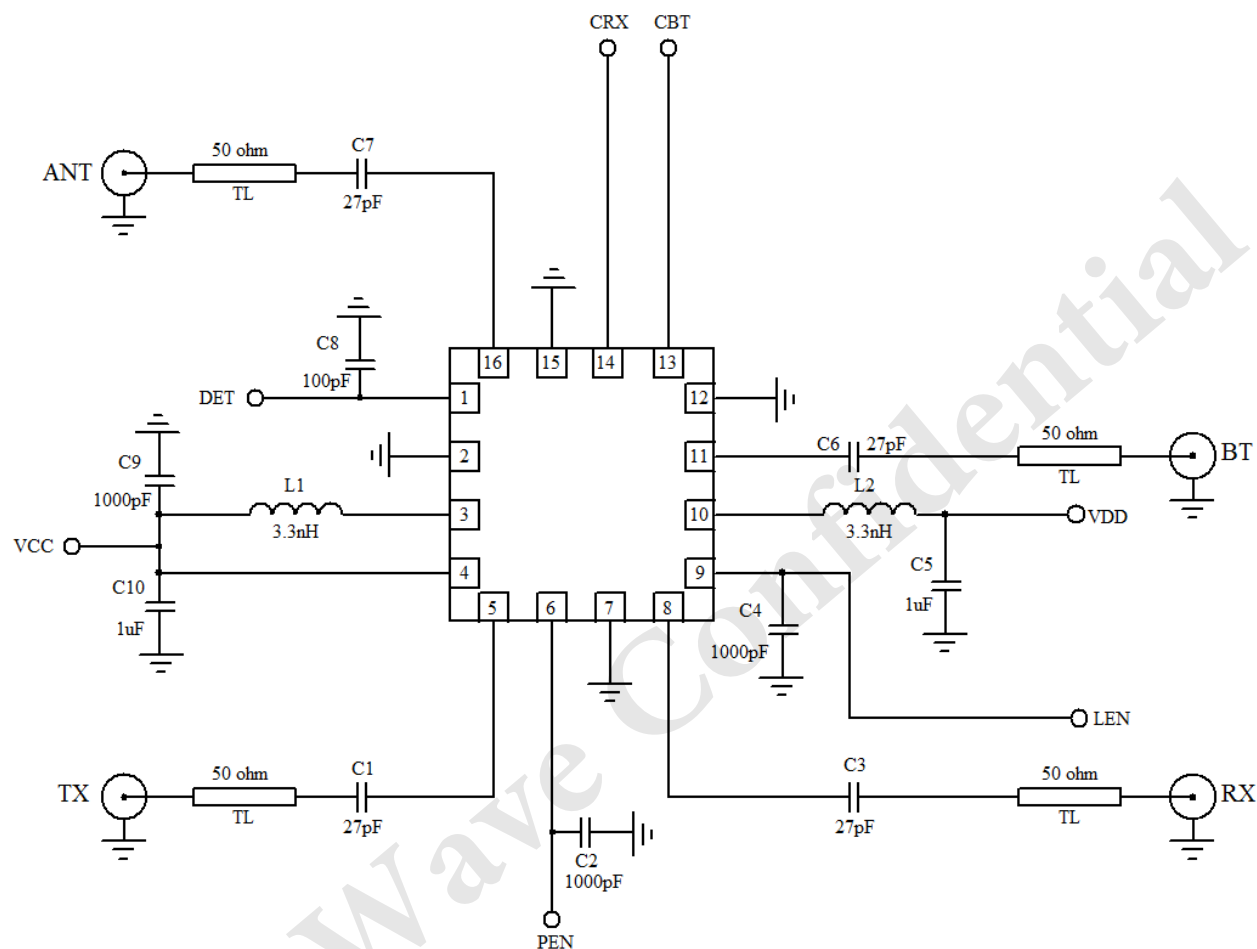


Noise Figure

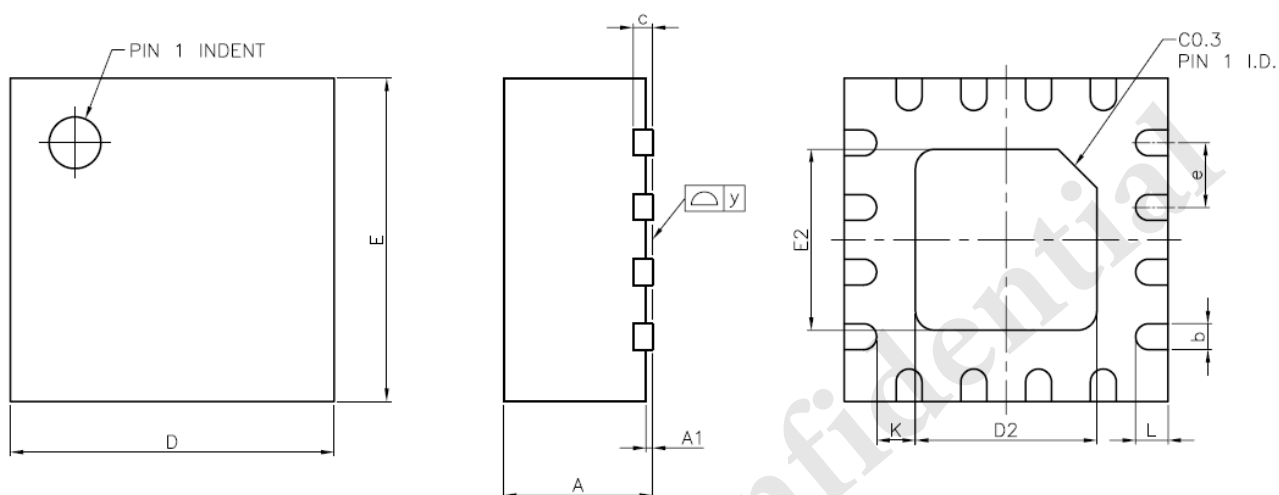
T = 25°C, VCC = VDD = 3.3 V, PEN = 0 V, LEN = CRX = 3.0 V, CBT = 0 V



Recommended Application Circuit



Package Outline Dimension



SYMBOLS	DIMENSIONS IN MILLIMETERS		
	MIN.	NOM.	MAX.
A	1.10	1.15	1.20
A1	0.00	0.02	0.05
b	0.15	0.20	0.25
c	---	0.15 REF.	---
D	2.40	2.50	2.60
D2	1.35	1.40	1.45
E	2.40	2.50	2.60
E2	1.35	1.40	1.45
e	---	0.50	---
K	---	0.30 REF.	---
L	0.20	0.25	0.30
y	0.00	---	0.075

Recommended Solder Reflow Profiles

Average ramp-up rate (200°C to peak)	3°C/second max.
Preheat temperature 175 (+/-25) °C	60~120secs
Temperature maintained above 217°C	60~150secs
Time within 5°C of actual peak temperature	30 seconds min.
Peak temperature range	(260 +2/-2)°C
Ramp down rate	6°C/second max.
Time 25°C to peak temperature	8 minutes max.

* Follow JEDEC spec J-STD-020D

