DATA SHEET
SE2601T: 2.4 GHz WLAN Switch/LNA Front-End
Preliminary

Applications

- IEEE802.11b DSSS WLAN
- IEEE802.11g,n OFDM WLAN
- Embedded applications

Features

- Integrates SP3T Switch and LNA with by-pass mode
- 12 dB gain,
- 1.8 dB NF
- 0.7 dB Bluetooth path loss
- 2x2x 0.6mm, QFN Package, MSL 1
- Lead free, Halogen free and RoHS compliant

Product Description

The SE2601T is a single chip integrated front-end with a Bluetooth port to complement WLAN chipsets with integrated Power Amplifier. The Front-end integrates SP3T Switch and Low Noise Amplifier with bypass mode in an ultra compact package. It is capable of switching between WLAN RX, WLAN TX and Bluetooth™

Ordering Information

Part No.	Package	Remark
SE2601T	QFN	Samples
SE2601T-R	QFN	Tape and Reel
SE2601T-EK1	N/A	Evaluation kit

Functional Block Diagram

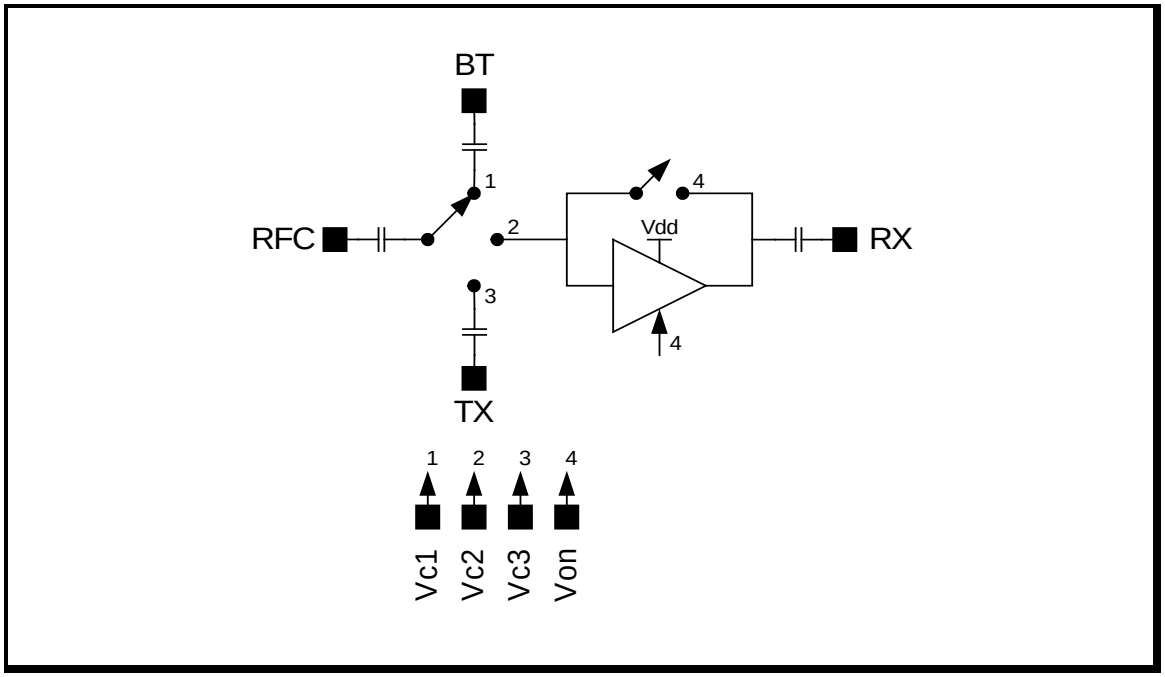
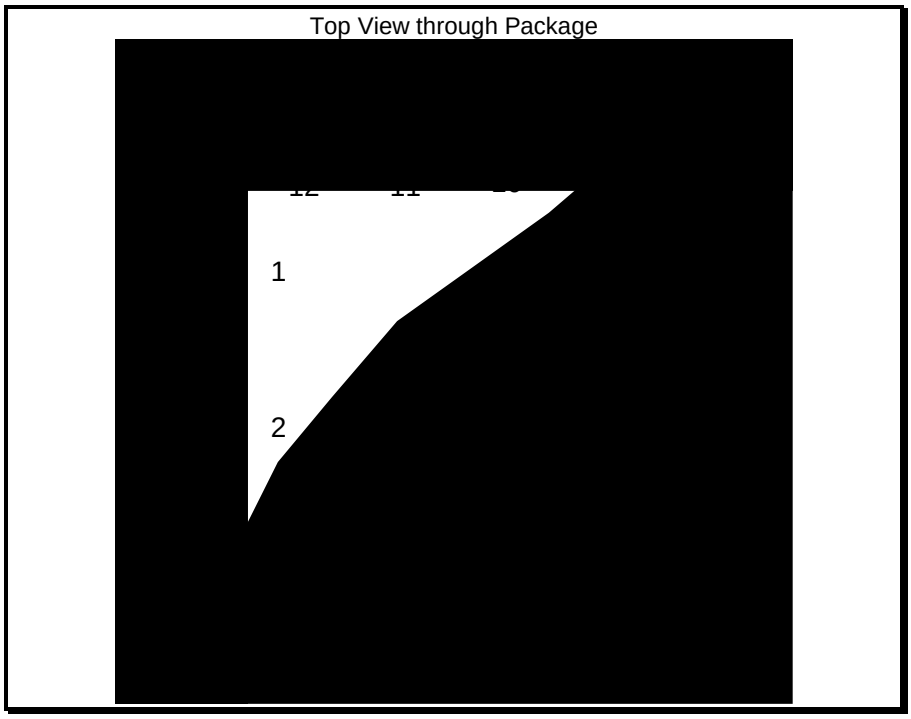


Figure 1: Functional Block Diagram



Pin Out Description

Pad	Label	Function
1	GND	Ground
2	GND	Ground
3	Von	LNA control pin
4	RX	WLAN Receive port
5	VDD	Positive power supply voltage
6	Vc2	RX switch control pin
7	GND	Ground
8	BT	Bluetooth port
9	Vc1	BT switch control pin
10	RFC	RF Common (antenna port)
11	VC3	TX switch control pin
12	TX	WLAN Transmit port

Absolute Maximum Ratings

These are stress ratings only. Exposure to stresses beyond these maximum ratings may cause permanent damage to, or affect the reliability of the device. Avoid operating the device outside the recommended operating conditions defined below. This device is ESD sensitive. Handling and assembly of this device should be at ESD protected workstations.

Symbol	Definition	Min.	Max.	Unit
Vdd	Supply Voltage on Vdd	0	3.6	V
$V_{ON, cc}$	DC input on control pins	-0.5	Vdd+0.5	V
P_{TXIN}	TX Input Power, ANT terminated in 50Ω match	-	27	dBm
T_A	Operating Temperature Range	-40	85	°C
T_{STG}	Storage Temperature Range	-40	150	°C
ESD_{HBM}	JEDEC JESD22-A114 all pins	1000		V

Recommended Operating Conditions

Symbol	Parameter	Min.	Typ.	Max.	Unit
T_A	Ambient temperature	-40	25	85	°C
V_{dd}	Supply voltage, relative to GND = 0 V	2.7	3.3	3.6	V
$V_{ON, cc}$	Control voltage, relative to GND = 0 V	0	-	Vdd	V

DC Electrical Characteristics

Conditions: V_{dd} = 3.3 V, T_A = 25 °C, as measured on Skyworks SE2601T EK1 evaluation board (de-embedded to device), all unused ports terminated with 50 ohms, unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_{dd}	LNA current	Gain mode	-	10	13	mA
I_{dd}	LNA current	Bypass mode			60	µA
I_{ON}	LNA control current		-		20	uA
I_{C1}	BT port control current		-		20	µA
Ic3	TX port control current		-		20	µA
VIH	Logic input high		2.7		3.6	V
VIL	Logic input low		0		0.3	V

Control Logic Table

Mode#	Mode Description	Vc1	Vc2	Vc3	Von
0	All Off	0	0	0	0
1	Tx	0	0	1	0
2	BT	1	0	0	0
3	Rx – high gain	0	1	0	1
4	Rx - bypass	0	1	0	0

AC Electrical Characteristics

Transmit Characteristics (RFC-TX port)

Conditions: V_{dd} = 3.3 V, T_A = 25 °C, as measured on Skyworks Solutions' SE2601T EK1 evaluation board (de-embedded to device), all unused ports terminated with 50 ohms, unless otherwise noted. Vc1 = Vc2 = Von = 0.

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
F_{OUT}	Frequency Range	-	2400	-	2500	MHz
TX_{IL}	Insertion Loss		-	0.7	0.9	dB
S_{11}	Input Return Loss			-16	-13	dB
S_{22}	Output Return Loss			-16	-13	dB
$ISOL_{SW}$	Switch Isolation	Vc3 = 0	23			dB
IP1dB	Input P1dB		31			dBm

Bluetooth Characteristics (RFC-BT port)

Conditions: V_{dd} = 3.3 V, T_A = 25 °C, as measured on Skyworks Solutions' SE2601T EK1 evaluation board (de-embedded to device), all unused ports terminated with 50 ohms, unless otherwise noted. Vc2 = Vc3 = Von = 0.

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
F_{OUT}	Frequency Range	-	2400	-	2500	MHz
BT_{IL}	Insertion Loss		-	0.7	0.9	dB
S_{11}	BT Port Return Loss			-16	-14	dB
S_{22}	BT Port Return Loss			-16	-14	dB
IP1dB	Input P1dB		31			dBm
$ISOL_{SW}$	Switch Isolation	Vc1 = 0	25			dB

Receive Characteristics (RF- RX port)

Conditions: V_{dd} = 3.3 V, T_A = 25 °C, as measured on Skyworks Solutions' SE2601T EK1 evaluation board (de-embedded to device), all unused ports terminated with 50 ohms, unless otherwise noted. Vc1 = Vc3 = 0.

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
F_{OUT}	Frequency Range	-	2400	-	2500	MHz
S_{21}	Receive Gain, LNA enabled.		11	12	13	dB
NF	Noise Figure		-	1.8	2.0	dB
S_{11}	Input Return Loss			-10	-8	dB
S_{22}	Output Return Loss			-10	-8	dB
IP1dB	Input P1dB		-7	-6		dBm
S21-BYP	Receive Gain, LNA bypassed		-4	-3		dB

Package Handling Information

Branding Information

The device branding is shown in Figure 4.

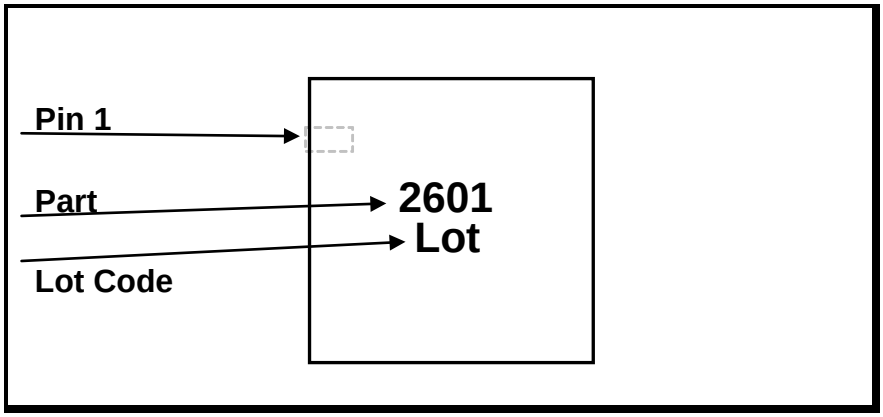


Figure 4: SE2601T Branding and Pin 1 Location

Package Diagram

The package diagram is shown in Figure 5.

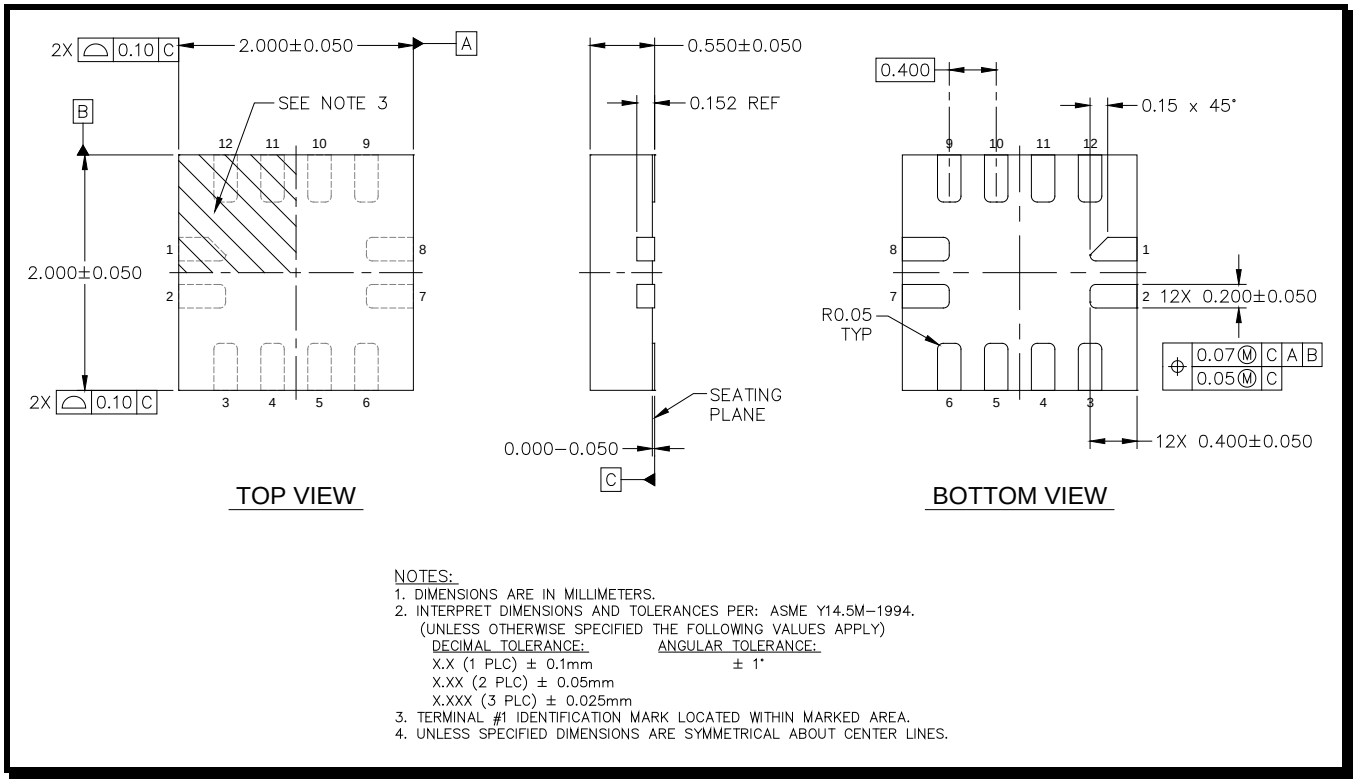


Figure 5: SE2601T Package Diagram

Recommended PCB Footprint Recommendations

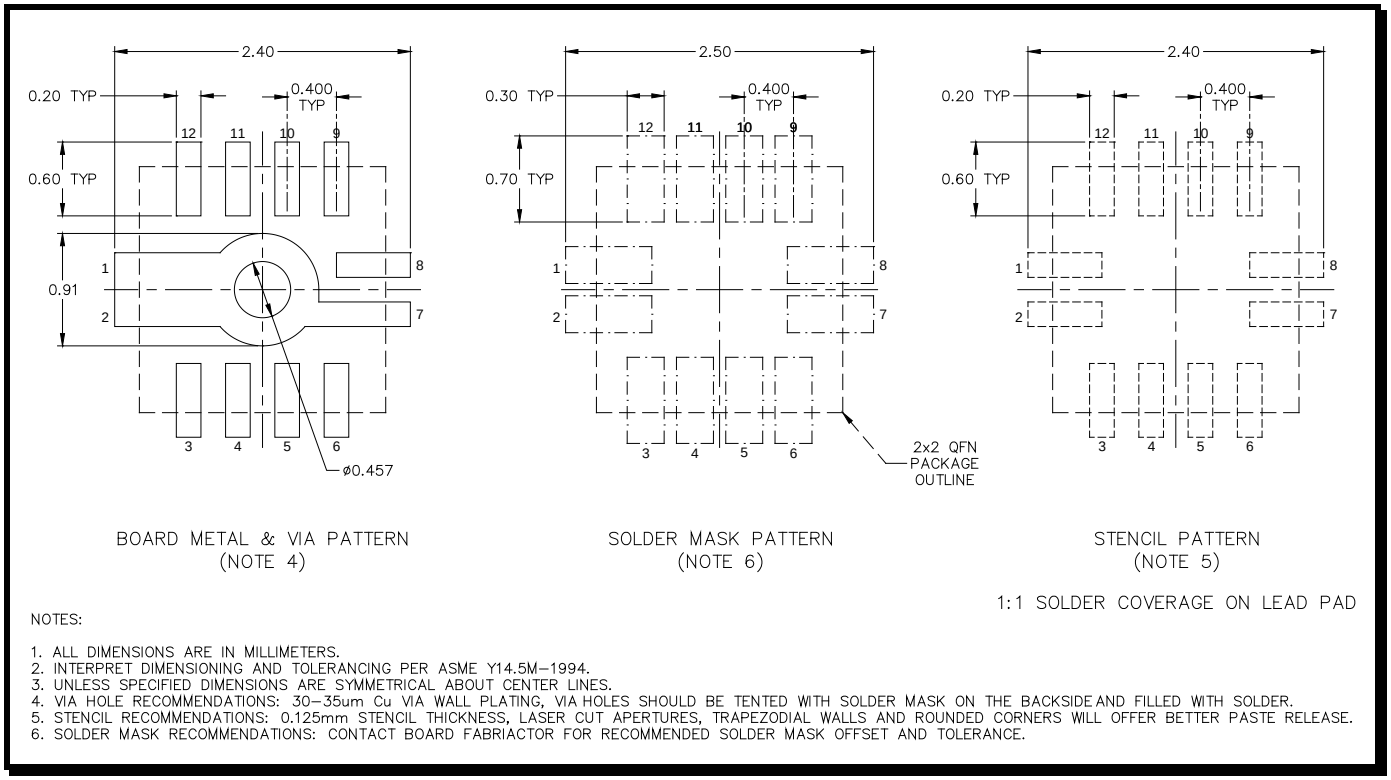


Figure 6: SE2601T PCB Footprint Recommendations

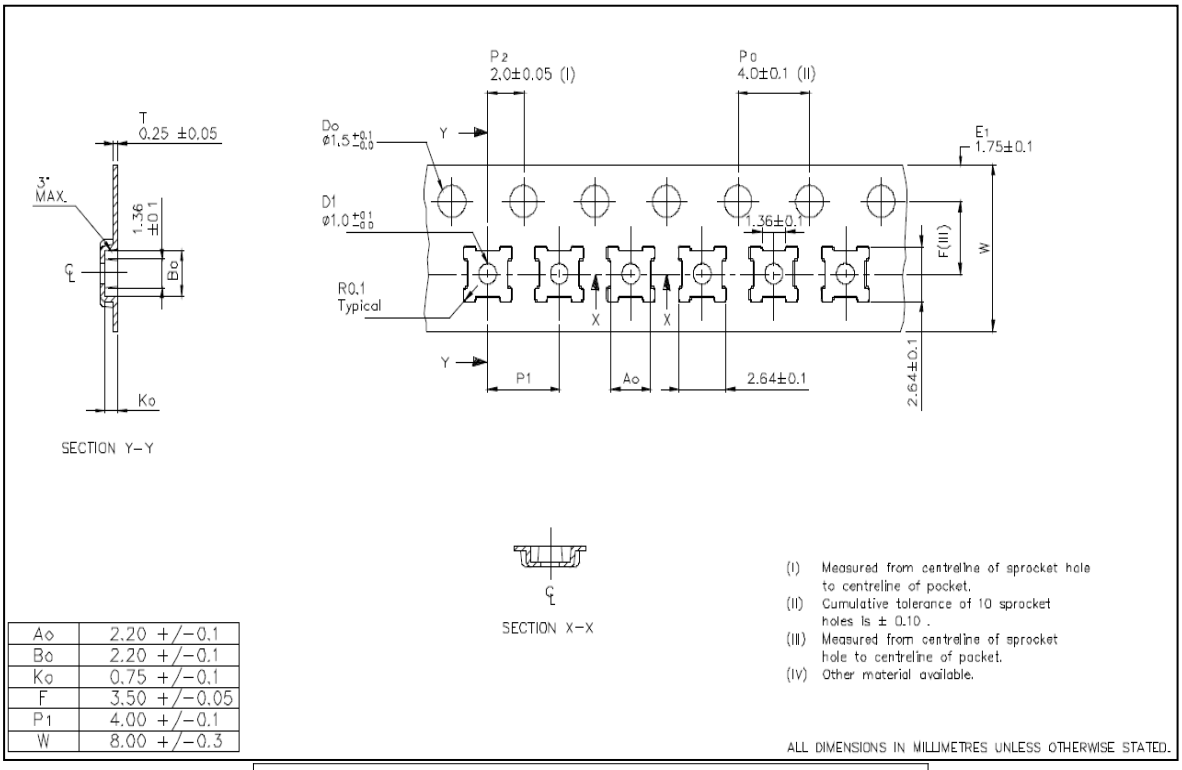
Package Handling Information

Because of its sensitivity to moisture absorption, instructions on the shipping container label must be followed regarding exposure to moisture after the container seal is broken, otherwise, problems related to moisture absorption may occur when the part is subjected to high temperature during solder assembly. The SE2601T is capable of withstanding a Pb free solder reflow. Care must be taken when attaching this product, whether it is done manually or in a production solder reflow environment. If the part is manually attached, precaution should be taken to insure that the device is not subjected to temperatures above its rated peak temperature for an extended period of time. For details on both attachment techniques, precautions, and handling procedures recommended, please refer to:

- "*QFN solder reflow and rework information application note*", *Document Number QAD-00045*
- "*Handling, packing, shipping and use of moisture sensitive QFN application note*", *Document Number QAD-00044*

Tape and Reel Specification

Parameter	Value
Devices Per Reel	3000
Reel Diameter	7 inches
Tape Width	8 millimeters



Ao	2.20 +/−0.1
Bo	2.20 +/−0.1
Ko	0.75 +/−0.1
F	3.50 +/−0.05
P1	4.00 +/−0.1
W	8.00 +/−0.3

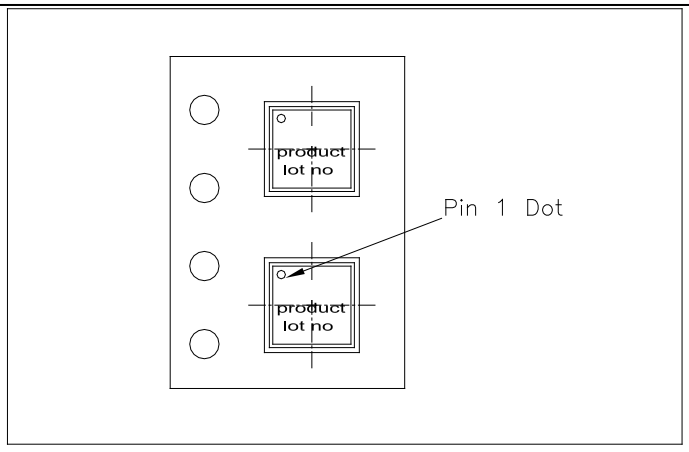


Figure 7: SE2601T Tape and Reel Specification

Document Change History

Revision	Date	Notes
1.0	09/08/2009	Created
1.1	09/10/2009	Corrected package height on page 1
1.2	12/18/2009	Updated ESD specification, Package Outline and added recommended PCB footprint
1.3	Jan-06-2010	Updated ESD specification and corrected typo
1.4	March-01-2010	Added Tape and reel specification
1.5	June-10-2010	Updated tape and reel information
1.6	August-02-2010	Updated ESD specification
1.7	January-23-2011	Updated BT IP1dB and VIH specification
1.8	April-10-2012	Updated with Skyworks logo and disclaimer statement