

50 ohm balun transformer for 2G45 ISM matched Nordic's chipset: nRF24LE1 QFN32, nRF24AP2-1CH and nRF24AP2-8CH

Datasheet – production data

Features

- 50 Ω nominal input / conjugate match to nRF24LE1 QFN32, nRF24AP2-1CH and nRF24AP2-8CH
- Low insertion loss
- Low amplitude imbalance
- Low phase imbalance
- Small footprint: < 1.5 mm²

Benefits

- Very low profile: < 595 μ m after reflow
- High RF performance
- RF BOM and area reduction

Applications

- 2.45 GHz impedance matched balun filter
- Optimized for Nordic's Chipset nRF24LE1/AP2

Description

STMicroelectronics BAL-NRF01D3 is an ultraminiature balun. The BAL-NRF01D3 integrates matching network and harmonics filter. Matching impedance has been customized for the following Nordic Semiconductor circuits: nRF24LE1 QFN-32 pins, nRF24AP2-1CH and nRF24AP2-8CH. The BAL-NRF01D3 uses STMicroelectronics IPD technology on non conductive glass substrate which optimize RF performances. The BAL-NRF01D3 has been tested and approved by Nordic Semiconductor in their nRF2723 nRFgo module.

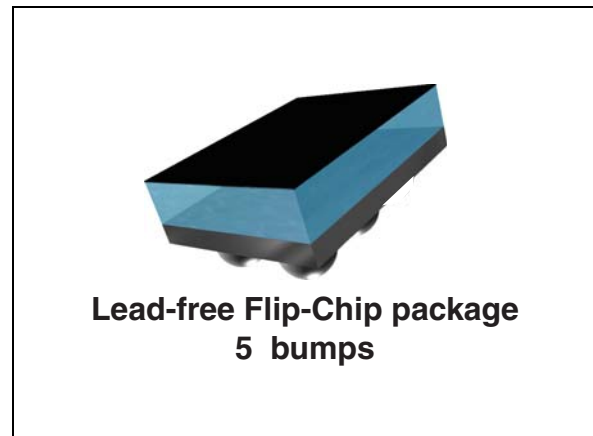
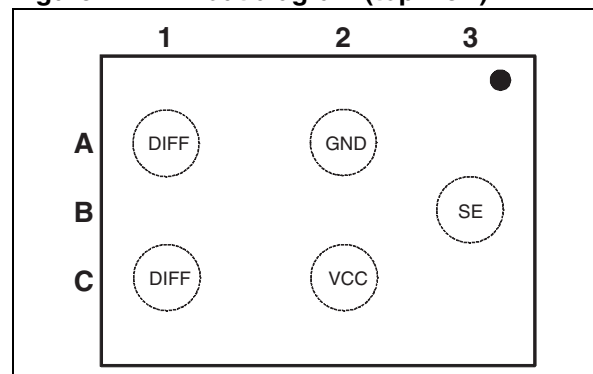


Figure 1. Pinout diagram (top view)



1 Characteristics

Table 1. Absolute maximum ratings (limiting values)

Symbol	Parameter	Value			Unit
		Min.	Typ.	Max.	
P_{IN}	Input Power RFIN			20	dBm
V_{ESD}	ESD ratings MIL STD883C (HBM: C = 100 pF, R = 1.5 k Ω , air discharge)	2000			V
	ESD ratings charge device model (JESD22-C101-C)	500			
	ESD ratings machine model (MM: C = 200 pF, R = 25 Ω , L = 500 nH)	200			
T_{OP}	Operating temperature	-40		+85	$^{\circ}$ C

Table 2. Impedances ($T_{amb} = 25^{\circ}$ C)

Symbol	Parameter	Value			Unit
		Min.	Typ.	Max.	
Z_{OUT}	Nominal differential output impedance		conjugate match to nRF24LE1/AP2		Ω
Z_{IN}	Nominal input impedance		50		Ω

Table 3. RF performance ($T_{amb} = 25^{\circ}$ C)

Symbol	Parameter	Test condition	Value			Unit
			Min.	Typ.	Max.	
F	Frequency range (bandwidth)		2400		2540	MHz
I_L	Insertion loss in bandwidth			2.25		dB
R_L	Return loss in bandwidth			10		dB
ϕ_{imb}	Phase imbalance			3		$^{\circ}$
Aimb	Amplitude imbalance			0.1		dB
2f0	2nd harmonic filtering	4880 MHz		10		dB
3f0	3rd harmonic filtering	7320 MHz		20		dB

1.1 On-board simulations

Figure 2. Insertion loss ($T_{amb} = 25\text{ }^{\circ}\text{C}$)

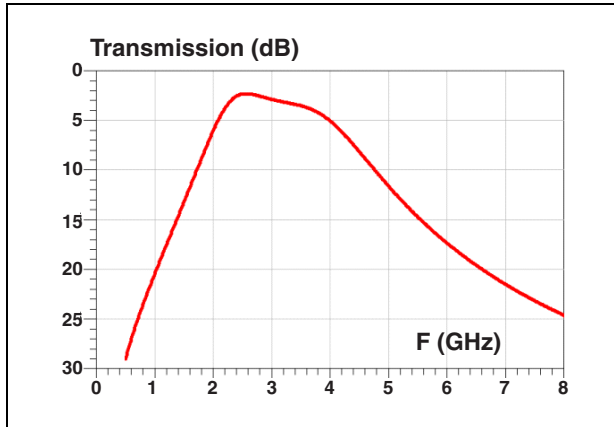


Figure 3. Return loss @ single port ($T_{amb} = 25\text{ }^{\circ}\text{C}$)

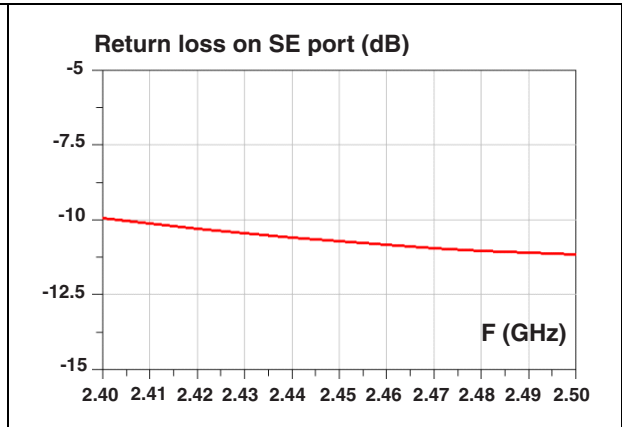


Figure 4. Amplitude imbalance ($T_{amb} = 25\text{ }^{\circ}\text{C}$) Figure 5. Phase imbalance ($T_{amb} = 25\text{ }^{\circ}\text{C}$)

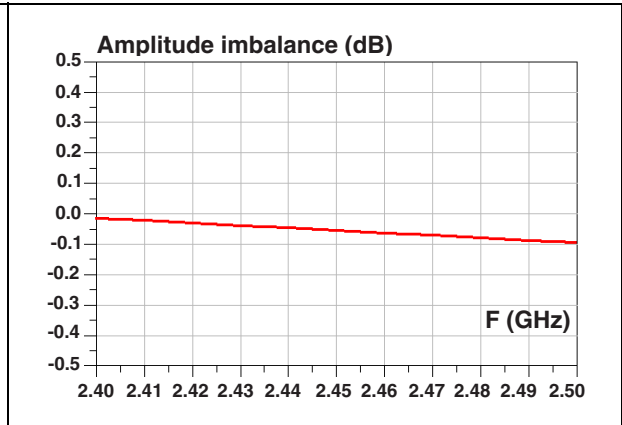
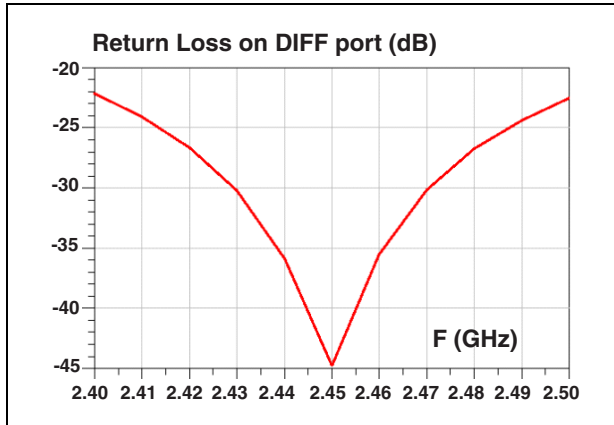
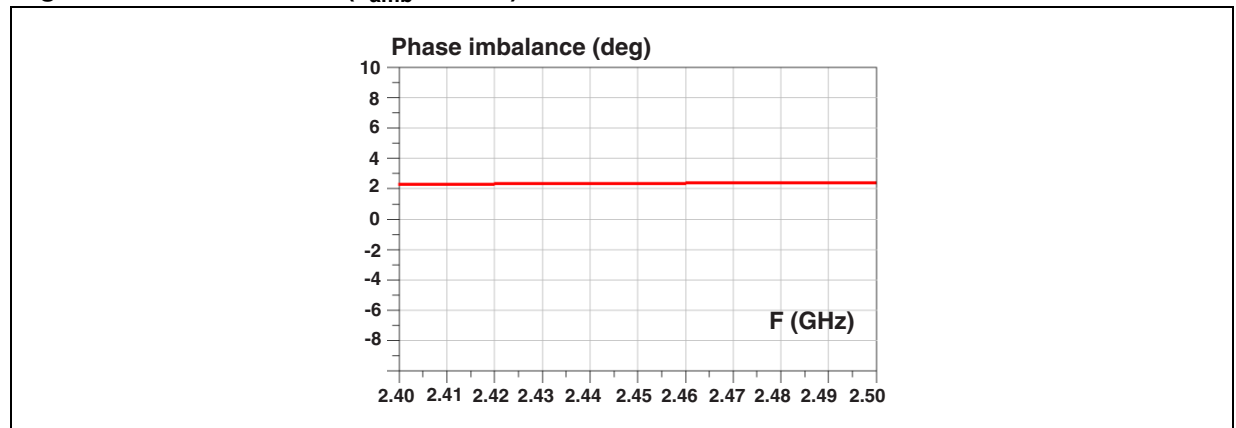


Figure 6. Transmission ($T_{amb} = 25\text{ }^{\circ}\text{C}$)



3 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

Figure 9. Package dimensions (bump side view)

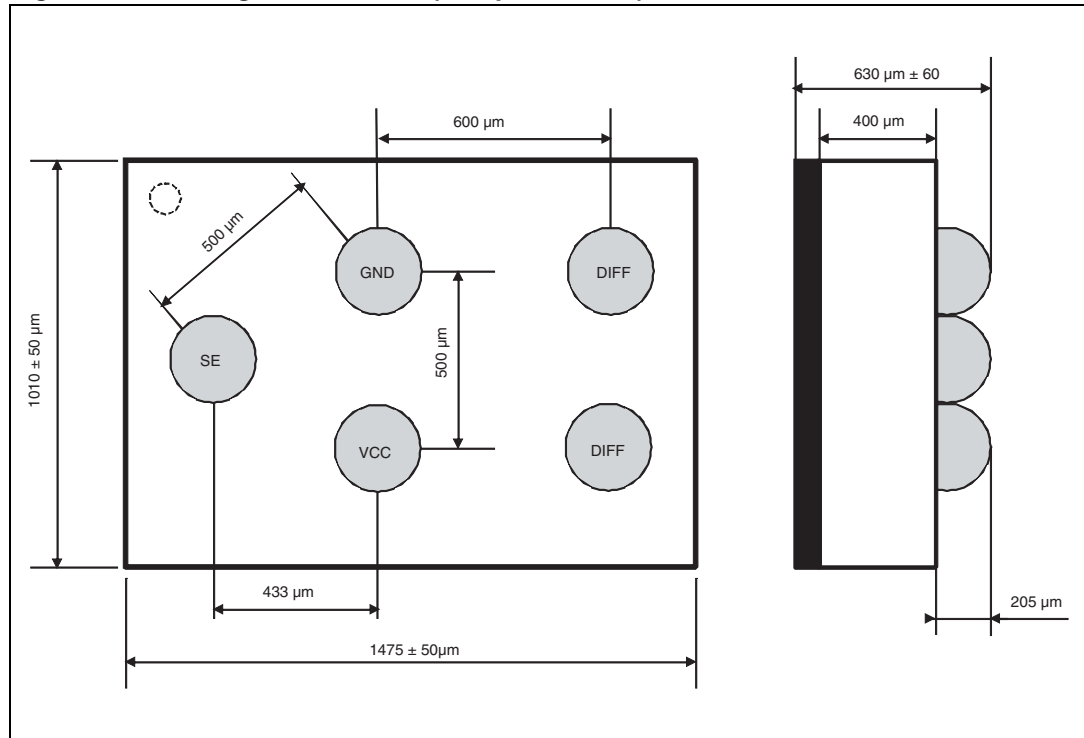


Figure 10. Footprint

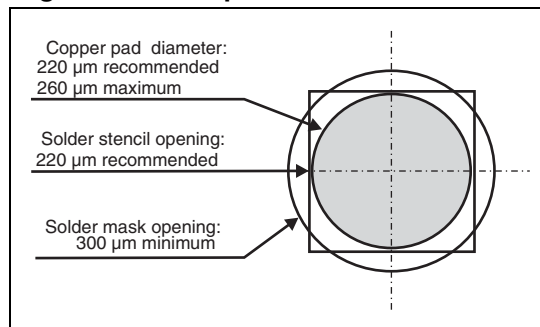
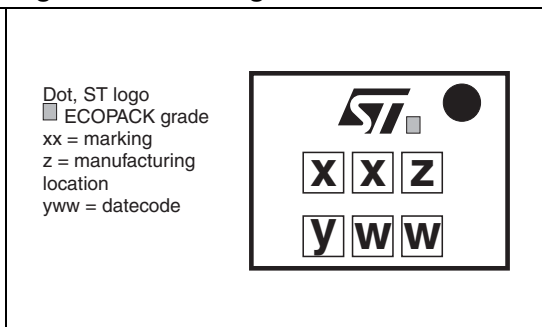


Figure 11. Marking



4 Ordering information

Table 4. Ordering information

Order code	Marking	Weight	Base Qty	Delivery mode
BAL-NRF01D3	SC	1.82 mg	5000	Tape and Reel

5 Revision history

Table 5. Document revision history

Date	Revision	Changes
15-Oct-2012	1	Initial release.

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