

50Ω / Conjugate match to
 nRF51822-QFAAG0, nRF51822-QFABB0, nRF51422-QFAAE0
 balun transformer, with integrated harmonic filter

Preliminary Datasheet

Features

- 2.45 GHz Balun with integrated matching network
- Matching optimized for following chipsets:
 nRF51822-QFAAG0, nRF51822-QFABB0,
 nRF51422-QFAAE0
- Low Insertion Loss
- Low Amplitude Imbalance
- Low Phase Imbalance
- Coated Flip-Chip on Glass
- Small Footprint < 1.5 mm²

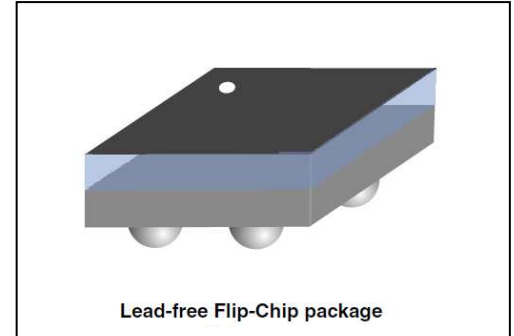
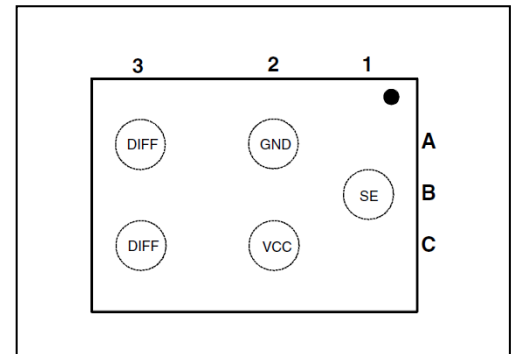


Figure 1. Pin Configuration (Top view)



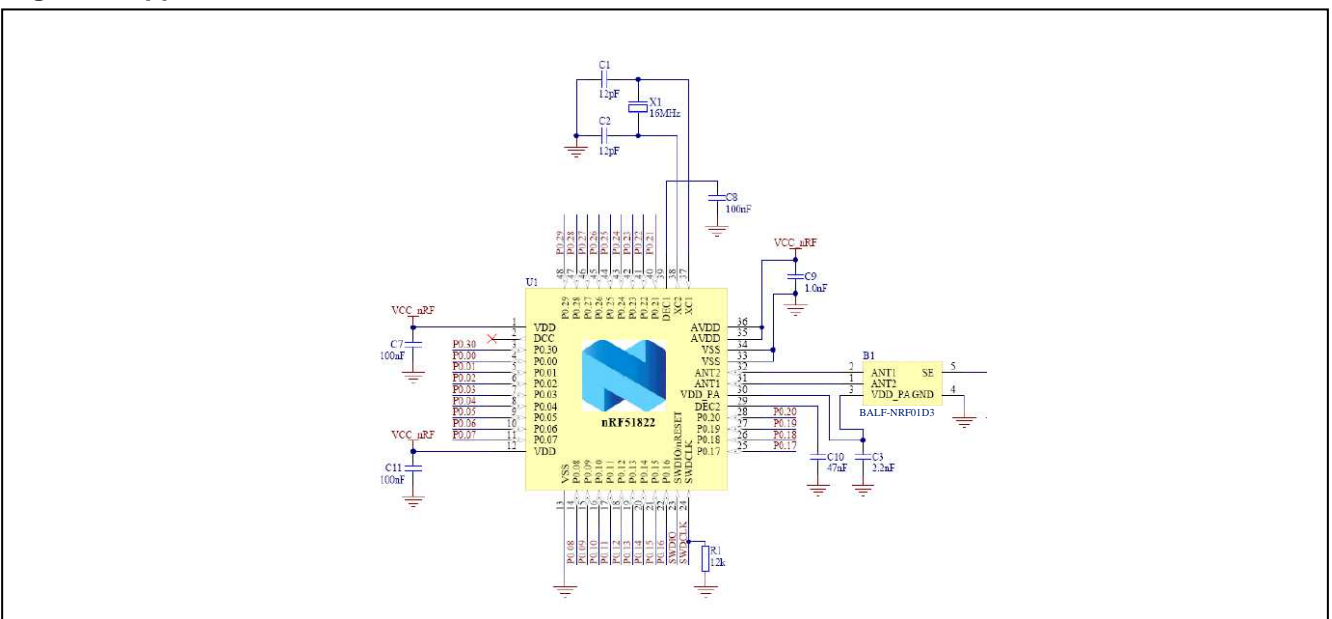
Benefits

- Very low profile (<560 μm after reflow)
- High RF performance
- PCB space saving versus discrete solution
- BOM count reduction
- Efficient manufacturability

Description

STMicroelectronics BALF-NRF01D3 is an ultra-miniature balun. The BALF-NRF01D3 integrates also a matching network in a monolithic glass substrate. Matching impedance has been customized for the nRF51822-QFAAG0, nRF51822-QFABB0, nRF51422-QFAAE0 RF transceivers. It is using STMicroelectronics IPD technology on non conductive glass substrate which optimizes RF performances.

Figure 2. Application schematic



1 Characteristics

Table 1. Absolute maximum ratings (limiting values)

Symbol	Parameter	Value	Unit
P_{IN}	Input power RF_{IN}	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 (JEDEC22-C101-C)	500	
	ESD ratings machine model (MM: C = 200 pF, R = 25 Ω , L = 500 nH)	500	
T_{OP}	Operating temperature	-40 to +125	$^{\circ}C$

Table 2. Electrical characteristics (values, $T_{amb} = 25^{\circ}C$)

Symbol	Definition	Min	Typ	Max	Unit
Z_{OUT}	Nominal differential output impedance	Conjugate match to nRF51822-QFAAG0, nRF51822-QFABB0, nRF51422-QFAAE0			Ω
Z_{IN}	Nominal input impedance		50		Ω
F	Frequency range (bandwidth)	2400		2540	MHz
I_L	Insertion loss in bandwidth		2.0		dB
R_{LSE}	Single Ended Return loss in bandwidth		15		dB
Φ_{imb}	Phase imbalance		5		$^{\circ}$
A_{imb}	Amplitude imbalance		0.4		dB
2f0	Second harmonic rejection		15		dB
3f0	Third harmonic rejection		28		dB

BALF-NRF01D3

Simulation results (Tamb = 25°C)

Figure 3 Insertion Loss at 2.4-2.54GHz

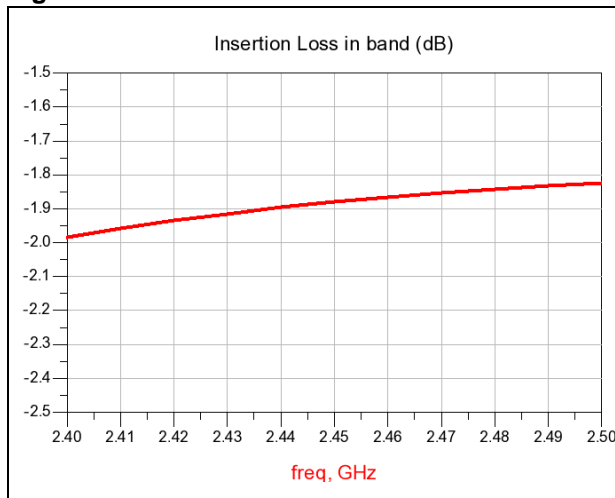


Figure 4 Differential Transmission

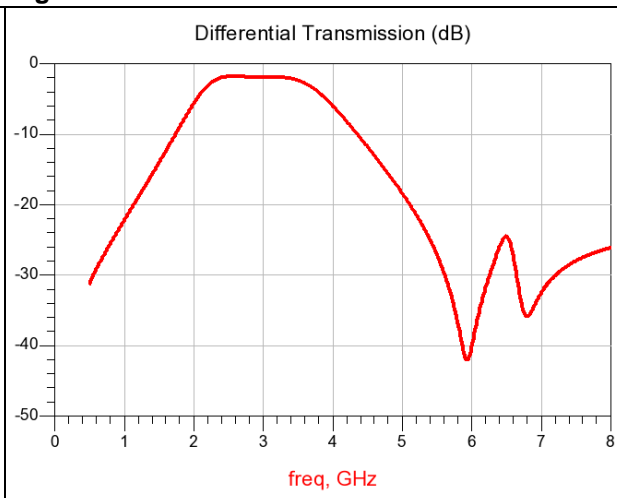


Figure 5 Return Loss on SE Port

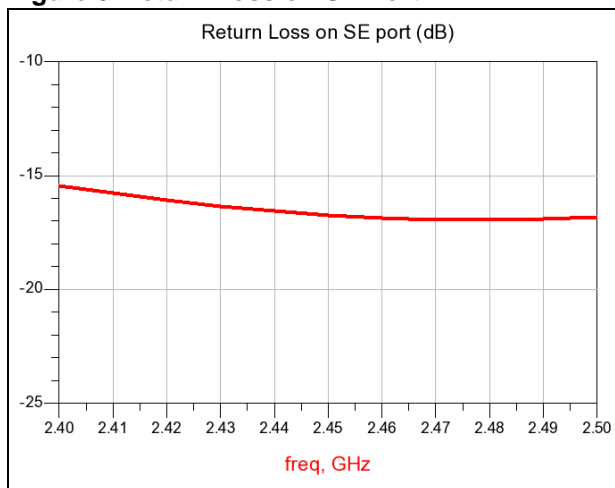


Figure 6 Amplitude imbalance

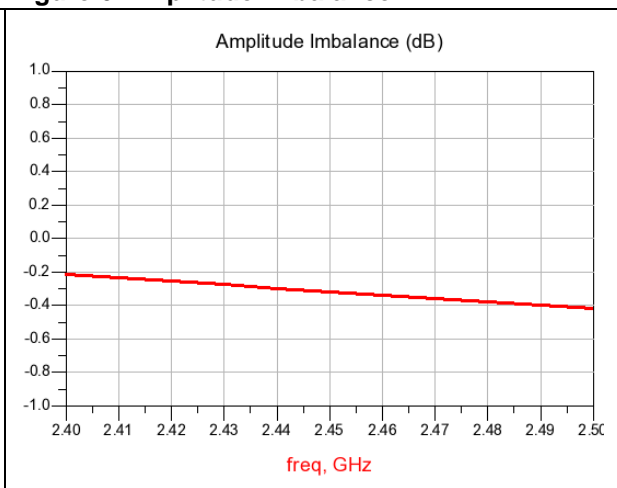
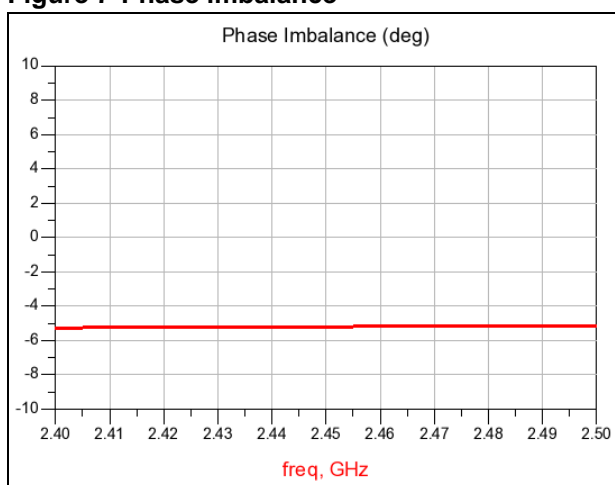


Figure 7 Phase imbalance



2 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 8 Mechanical Specifications & Pads coordinates

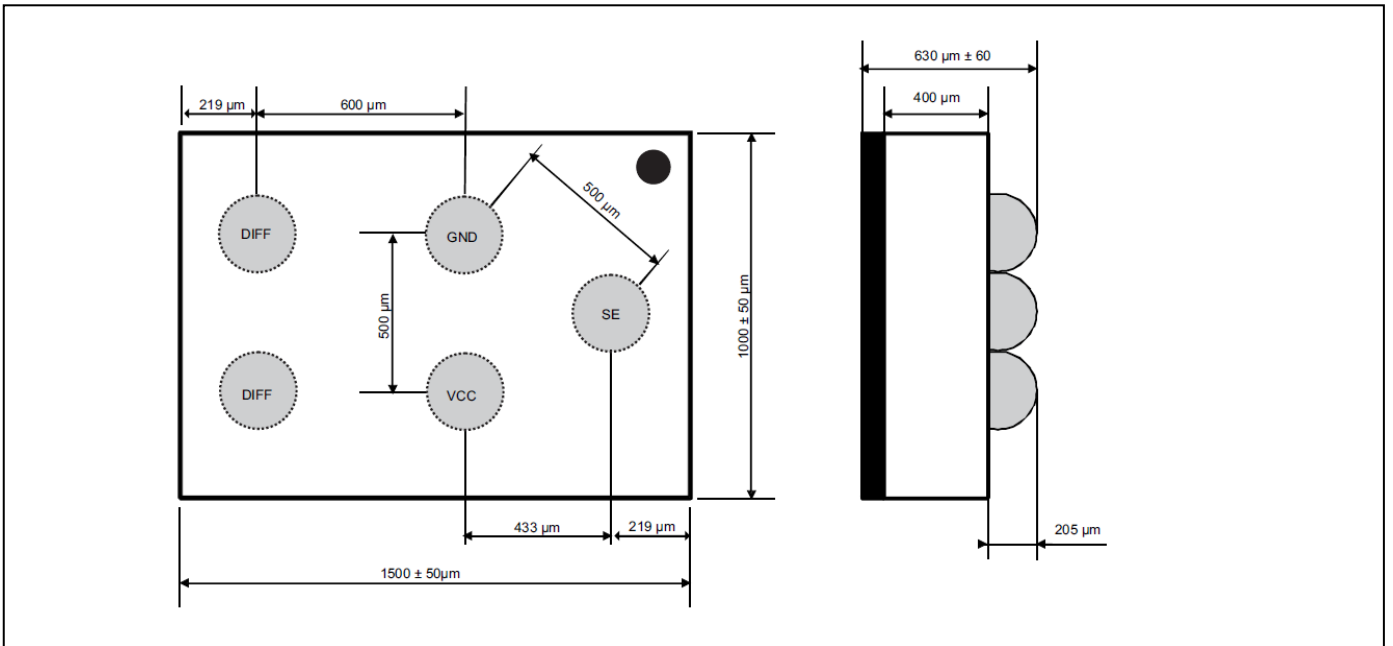
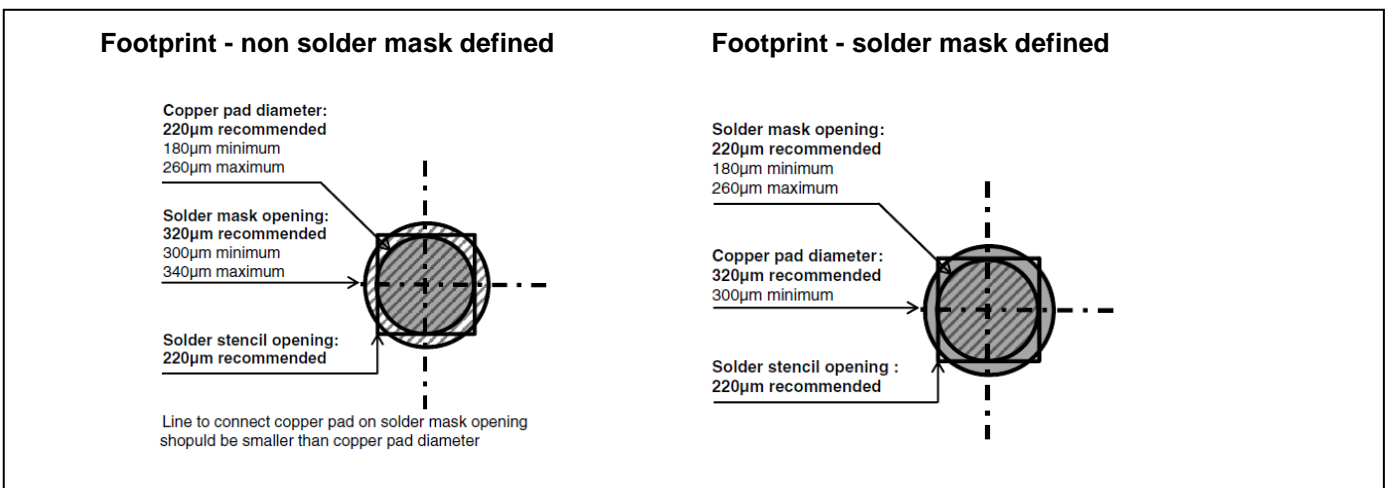


Figure 9 Footprint



BALF-NRF01D3

Figure 10 PCB layout recommendation

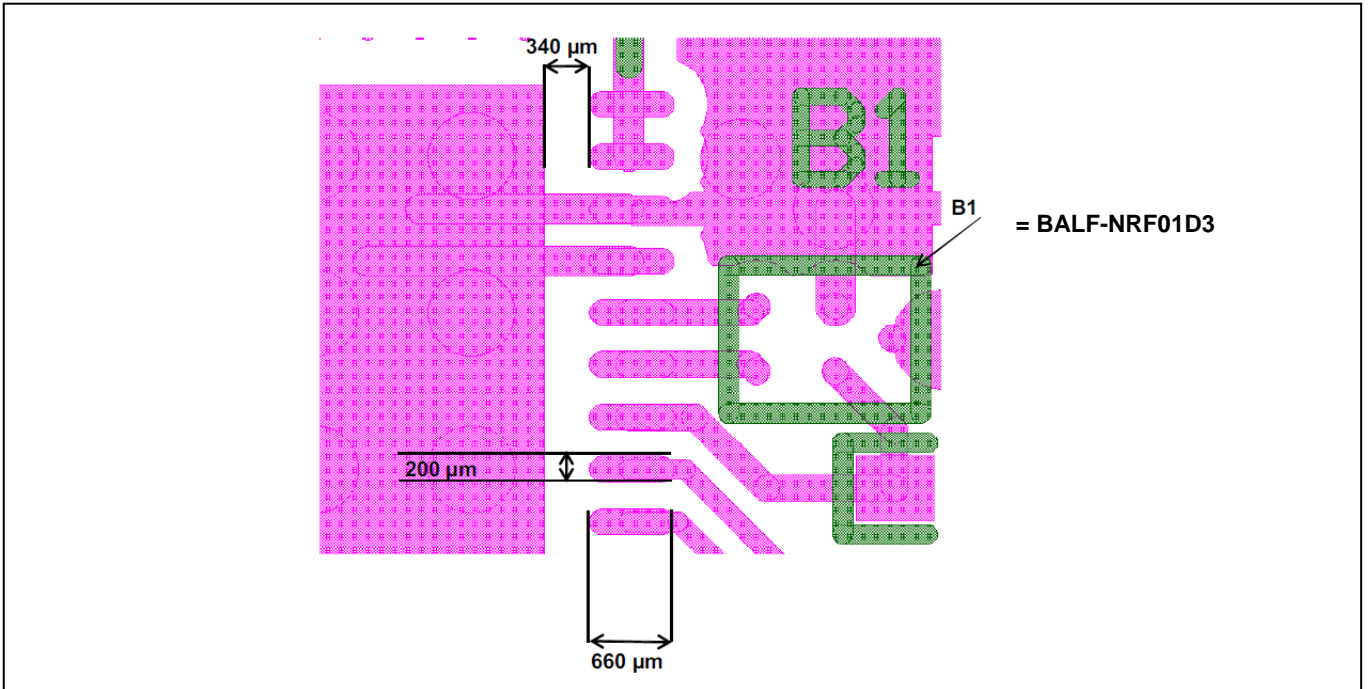


Figure 11 Marking Specification

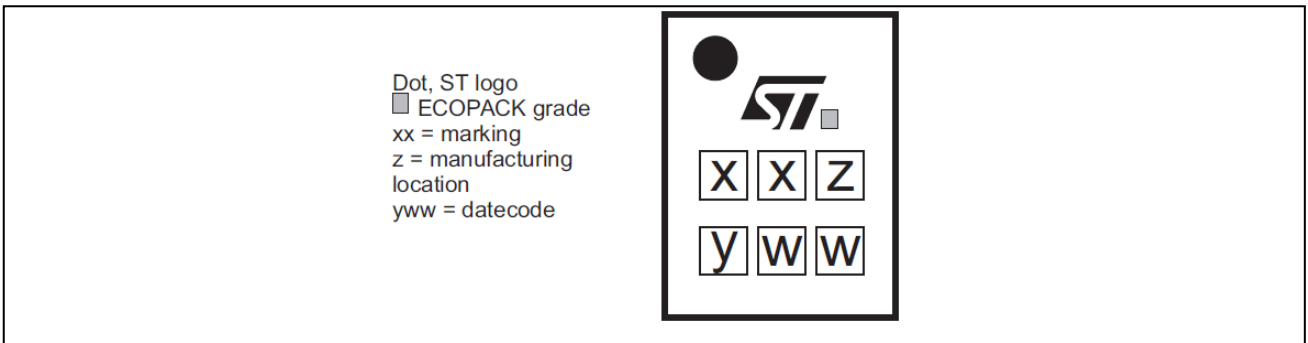
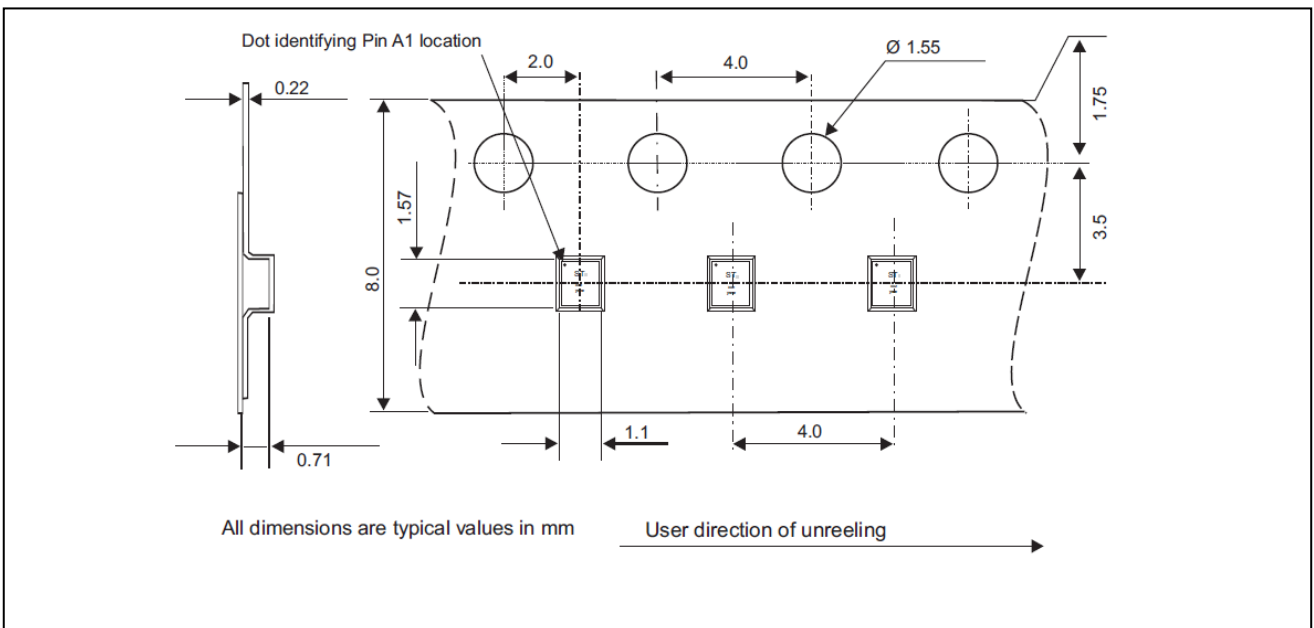


Figure 12 Tape and reel specifications



Note: More information is available in the application notes

AN2348 Flip-Chip: "Package description and recommendations for use"

AN4xxx: "BALF-NRF01D3 matched balun with integrated harmonics filter for Nordic Semiconductor chips with ultralow power transceivers"

3. Ordering information

Ordering code	Marking	Package	Weight	Base qty	Delivery mode
BALF-NRF01D3	<i>TBD</i>	WLCSP	<i>TBD</i>	5000	Tape and reel (7")

4. Revision history

Date	Revision	Description of changes
January 2014	0A	Initial release

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