

# BAL-2690D3U

## 50 / 30+j25 balun transformer for 2.45 GHz ISM band

### Features

- 50 Ω nominal input / 30+j25 output differential impedance
- Low insertion loss
- Low amplitude imbalance
- Low phase imbalance
- Small footprint: BAL-2690D3U < 1 mm<sup>2</sup>

#### **Benefits**

- Very low profile (<700 µm)
- High RF performances
- RF BOM and area reduction

### Applications

Balun transformer for applications such as:

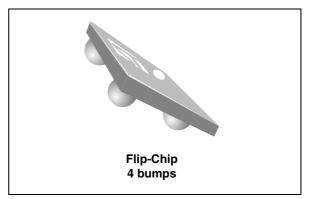
- Bluetooth STLC2690
- Mobile phone

### Description

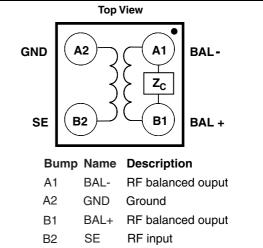
The BAL-2690D3U is a balun designed to transform single ended signals to differential signals in Bluetooth applications.

The BAL-2690D3U has been customized for the STLC2690 Bluetooth transceiver with 0.8 dB insertion losses in the bandwidth (2400 MHz - 2500 MHz) and with a specific requirement for the  $S_{CC22}$  parameter.

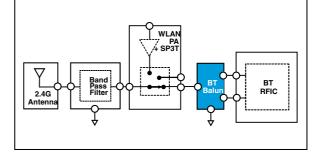
The BAL-2690D3U has been designed using STMicroelectronics IPD (integrated passive device) technology on non conductive glass substrate to optimize RF performances.



#### Figure 1. Top view



#### Figure 2. Application schematic



**TM**: IPAD is a trademark of STMicroelectronics.

## **1** Electrical characteristics

	Absolute maximum ratings (ininiting value		-		
Symbol	Test condition	Min.	Тур.	Max.	Unit
P <sub>IN</sub>	Input power R <sub>FIN</sub>	-	-	20	dBm
	ESD ratings MIL STD883G (HBM: C = 100 pF, R = 1.5k , air discharge)	2000			
V <sub>ESD</sub>	ESD ratings, machine model (MM: C = 200 pF, R = 25 $\Omega$ L = 500 nH)	500	-	-	V
	ESD ratings, charged device model (CDM) (JESD22-C101D)	500			
Т <sub>ОР</sub>	Operating temperature	-40	-	+85	°C

#### Table 1. Absolute maximum ratings (limiting values)

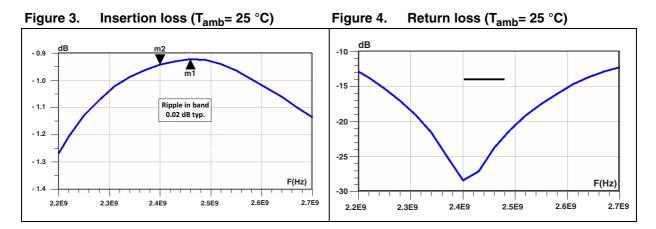
Table 2. Electrical characteristics (T <sub>amb</sub> = 25 °C) impedan	Table 2.	Electrical characteristics (T <sub>amb</sub> =	= 25 °C) impedance
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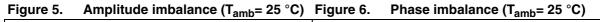
Symbol	Test condition	Min.	Тур.	Max.	Unit
Z <sub>OUT</sub>	Nominal differential output impedance	-	30 + j25	-	Ω
Z <sub>IN</sub>	Nominal input impedance	-	50	-	Ω

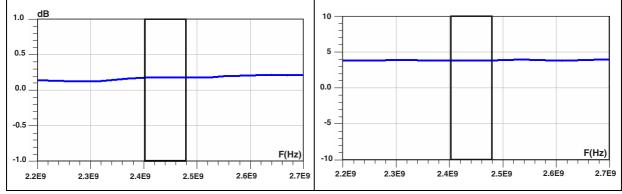
#### Table 3.RF performance

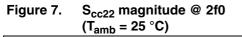
Symbol	Test condition			Тур.	Max.	Unit
F	Frequency range (bandwidth)			2441	2480	MHz
١L	Insertion loss in bandwidth			0.8	1.1	dB
ripple	Ripple in bandwidth			-	0.6	dB
RL	Return loss in bandwidth		14	-	-	dB
$\Phi_{imb}$	Phase imbalance		-10	-	10	0
A <sub>imb</sub>	Amplitude imbalance		-1	-	1	dB
R <sub>CMRR</sub>	Common mode rejection ratio (S <sub>SC12</sub> )		20	-	-	dB
S <sub>CC22</sub>	Magnitude for common mode harmonic rejection coefficient @ 2f <sub>O</sub>	From 4804 MHz to 4960 MHz, 25 Ω is	0.7	-	1	o
	Phase for common mode harmonic rejection coefficient @ 2f <sub>O</sub>	considered as reference for CM	-45	-	0	



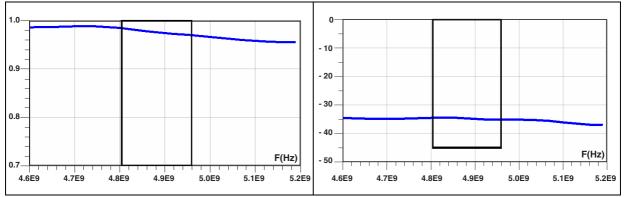


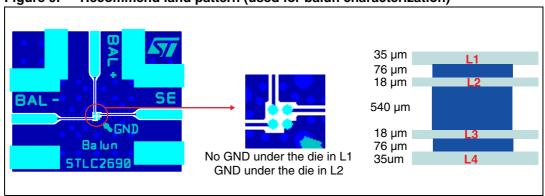






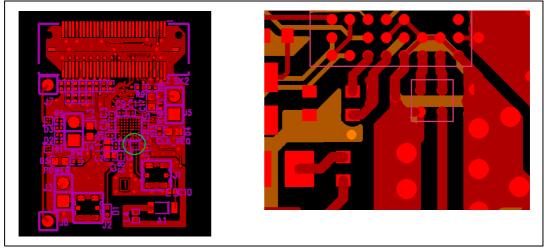














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### 2 Package information

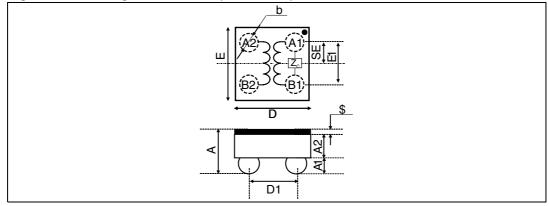
- Epoxy meets UL94, V0
- Lead-free package

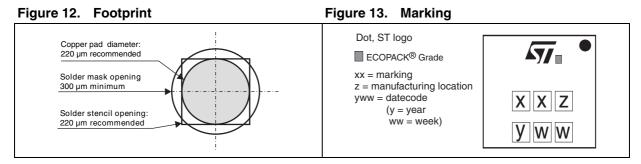
In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK<sup>®</sup> packages, depending on their level of environmental compliance. ECOPACK<sup>®</sup> specifications, grade definitions and product status are available at: <u>www.st.com</u>. ECOPACK<sup>®</sup>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

	Dimensions						
Ref.	Millimetres			Inches			
	Min.	Тур.	Max.	Min.	Тур.	Max.	
А	0.565	0.63	0.695	0.022	0.025	0.027	
A1	0.17	0.205	0.24	0.007	0.008	0.009	
A2	-	0.4	-	-	0.016	-	
b	0.215	0.255	0.295	0.008	0.010	0.012	
D	0.86	0.91	0.96	0.034	0.036	0.038	
D1	-	0.474	-	-	0.019	-	
E	0.86	0.91	0.96	0.034	0.036	0.038	
E1	-	0.474	-	-	0.019	-	
SE	-	0.237	-	-	0.009	-	
\$	-	0.025	-	-	0.001	-	

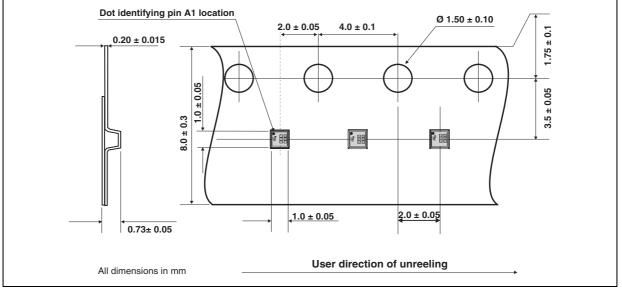
Table 4. Package dimensions (values)

#### Figure 11. Package dimensions (definitions)









Note: More packing information is available in the applications note: AN 2348: "Flip-Chip: package description and recommendations for use"



## **3** Ordering information

#### Table 5. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
BAL-2690D3U	RP	Flip-Chip	1.02 mg	5000	Tape and reel

## 4 Revision history

#### Table 6. Document revision history

Date	Revision	Changes	
25-Jan-2010	1	First issue.	
08-Feb-2010	2	Updated Table 1 and Figure 10.	



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