



**MULTILAYER CERAMIC COMBO (BPF+BALUN)  
FOR BLUETOOTH & WLAN IEEE 802.11b/g/n (2.45GHz ISM Band)  
Product Specification<sup>1</sup>**

QUICK REFERENCE DATA

**Specifications**

Frequency Range	2400-2500 MHz
Unbalanced Impedance	50 Ohm
Balanced Impedance	Conjugate match to CSR BC03/04 series
Unbalanced port V.S.W.R.	2.0 (Max)
Balanced port V.S.W.R.	2.0 (Max)
Insertion Loss	3.0dB (Typ.) at 25 Deg. C 3.5dB (Max) at 25 Deg. C 3.8dB (Max) at -40 ~ +85 Deg. C
Ripple	1.0 dB (Max)
Amplitude Balance	1.0 dB (Max) at 25 Deg. C 1.4 dB (Max) at -40 ~ +85 Deg. C
Phase Differential	180 ± 5 degree at 25 Deg. C 180 ± 10 degree at -40 ~ +85 Deg. C
Attenuation	40dB(Min) @880~960MHz
	25dB(Min) @1300~1600MHz
	35dB(Min) @4800~5000MHz
	30dB(Min) @7200~7500MHz
Dimension	2.0 x 1.25 x 0.9 mm
DC Working Voltage	0~25 Volt



*Special Environmental Concerns- Green Products Design: Termination is lead free (Pb free) and packing materials can be re-cycled*

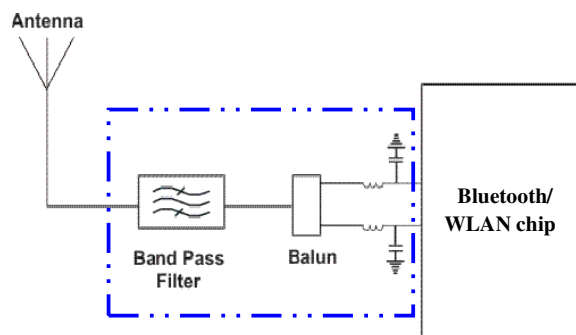
<sup>1</sup> All the technical data and information contained herein are subject to change without prior notice

2012/2.45GHz Multilayer Ceramic Combo (BPF+Balun)				CBA4711714982454K				→	1	Sep. 2006
								→	2	Mar. 2010
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## Appearance



## Features and Applications



Integration of the BPF, the Balanced-to-Unbalanced Transformer (Balun) and the matching circuit into one single package to provide:

1. Ease of design by internal matching between BPF and Balun
2. Balanced outputs match to the RFIC
3. Miniaturized 2.0x1.25x0.9 mm to meet the Bluetooth/WLAN compact requirements
4. Combined low insertion loss 3.0dB (typically) and reduce on board soldering loss
5. Low amplitude difference (<1.0 dB) and phase difference (<5.0 degree) of the balanced signal operation
6. High attenuations in following bands: mobile phone bands of 880~960MHz, 1300~1600MHz, 1710~1990MHz and second/third harmonic bands

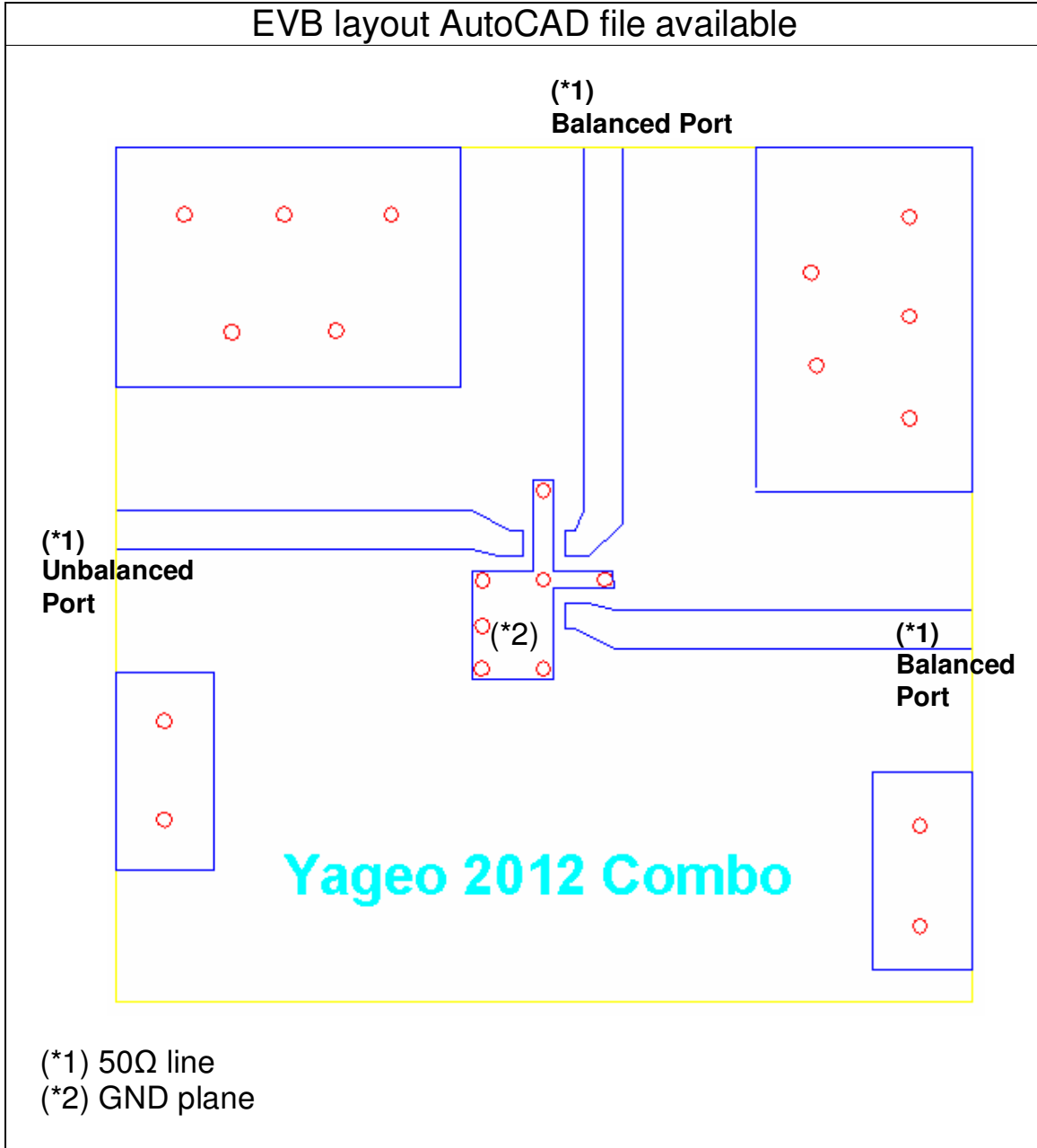
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## Dimensions and Port Configurations

Figure	Dimension	Port
<p>The figure shows a top view and a side view of a rectangular ceramic component. The top view is labeled '1' and shows a central circular hole. Dimensions include overall length L, overall width W, and thickness T. Port locations are marked with P1 through P8. Spacing dimensions D1 through D4 are also indicated. The side view shows the thickness T and width W.</p>	<p>L 2.0+/-0.15mm  W 1.25+/-0.15mm  T 0.9+/-0.15mm  P1 0.3+/-0.15mm  P2 0.3+/-0.15mm  P3 0.3+/-0.15mm  P4 0.5+/-0.15mm  P5 0.3+/-0.15mm  P6 0.3+/-0.15mm  P7 0.3+/-0.15mm  P8 0.5+/-0.15mm  D1 0.2+/-0.15mm  D2 0.65+/-0.15mm  D3 0.35+/-0.15mm  D4 0.3+/-0.15mm</p>	<p>Balanced  Ground  Balanced  Ground  Unbalanced  DC  Not Connect  Ground</p>

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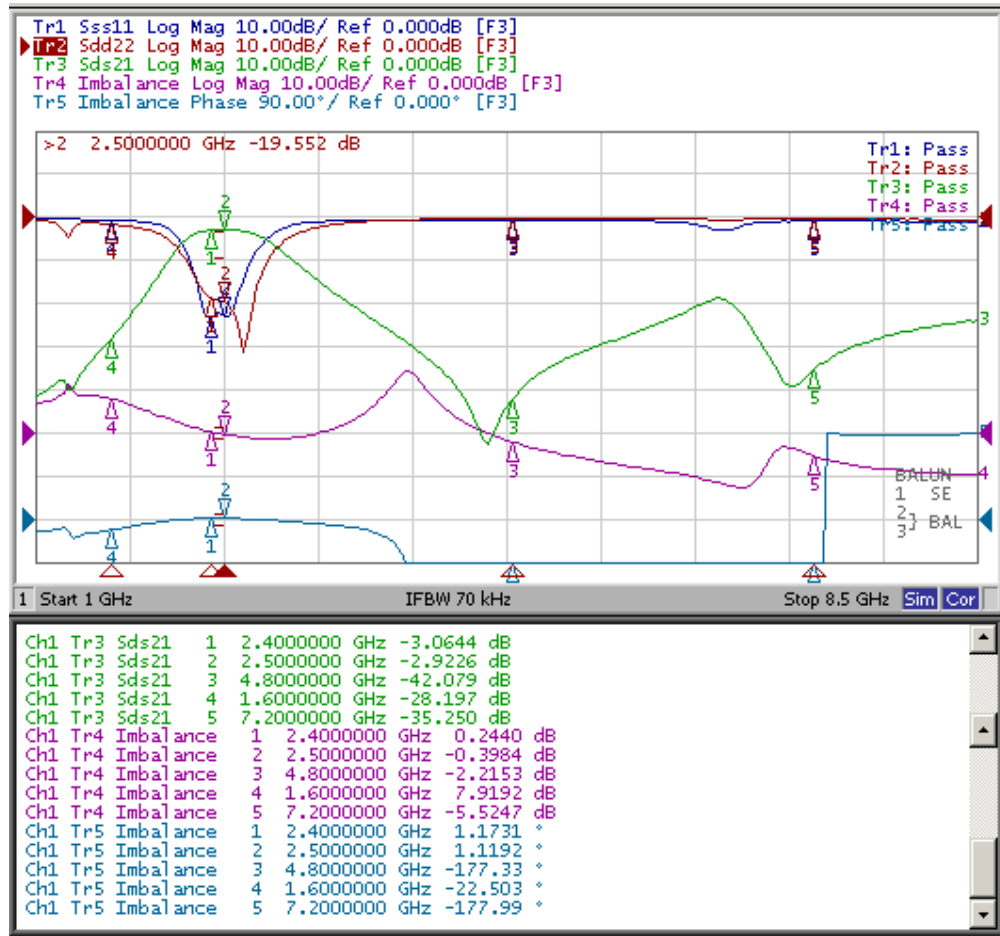
**Recommended PCB Pattern**



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## Frequency Characteristics

1. Unbalanced port return loss (S<sub>11</sub>, single-ended port return loss)
2. Balanced port return loss (S<sub>dd22</sub>, differential port return loss)
3. Insertion loss (S<sub>ds21</sub>, differential port to single-ended port)
4. Imbalance of amplitude (S<sub>21</sub>/S<sub>31</sub>, amplitude difference)
5. Imbalance of phase (S<sub>21</sub>/S<sub>31</sub>, phase difference)



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**RELIABILITY DATA (Reference to IEC Specification)**

IEC 384-10/ CECC 32 100 CLAUSE	IEC 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS
4.4		Mounting	The filter can be mounted on printed-circuit boards or ceramic substrates by applying wave soldering, reflow soldering (including vapour phase soldering) or conductive adhesive	No visible damage
4.5		Visual inspection and dimension check	Any applicable method using x 10 magnification	In accordance with specification (chip off 1mm)
4.6.1		Filter	VSWR < 2 at 20 °C	Standard test board
4.8		Adhesion	A force of 3 N applied for 10 s to the line joining the terminations and in a plane parallel to the substrate	No visible damage
4.9		Bond strength of plating on end face	Mounted in accordance with CECC 32 100, paragraph 4.4	No visible damage
			Conditions: bending 0.5 mm at a rate of 1mm/s, radius jig. 340 mm, 2mm warp on FR4 board of 90 mm length	No visible damage

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IEC 384-10/ CECC 32 100 CLAUSE	IEC 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS
4.10	20(Tb)	Resistance to soldering heat	260 ± 5 °C for 10 ± 0.5 s in a static solder bath	No visible damage and complies with electrical performance
		Resistance to leaching	260 ± 5 °C for 30 ± 1 s in a static solder bath	Using visual enlargement of × 10, dissolution of the termination shall not exceed 10%
4.11	20(Ta)	Solderability	Zero hour test, and test after storage (20 to 24 months) in original atmosphere; un-mounted chips completely immersed for 2 ± 0.5 s in 235 ± 5°C.	The termination must be well tinned, at least 75% is well tinned at termination
4.12	4(Na)	Rapid change of temperature	-40 °C (30 minutes) to +85 °C (30 minutes); 200 cycles	No visible damage and complies with electrical performance
4.14	3(Ca)	Damp heat	500 ± 12 hours at 40 °C; 90 to 95 % RH	No visible damage and complies with electrical performance
4.15		Endurance	500 ± 12 hours at 85 °C;	No visible damage and complies with electrical performance

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**ORDERING INFORMATION:**

These code numbers can be determined by the following rules:

CBA47 11 7 14 98 245 4K  
 F C MS T A P

F. Family Code

**CBA47** = Combo

C. Packing Type Code

**11** = 180 mm/ 7" blister

M. Materials Code

**7** = High Frequency Material

S. Size Code

**11** = 3.2 \* 2.5

**12** = 3.2 \* 1.6

**13** = 2.5 \* 2.0

**14** = 2.0 \* 1.2

**15** = 1.6 \* 0.8

T. Type

**98** = Balance Filter

A. Working Frequency

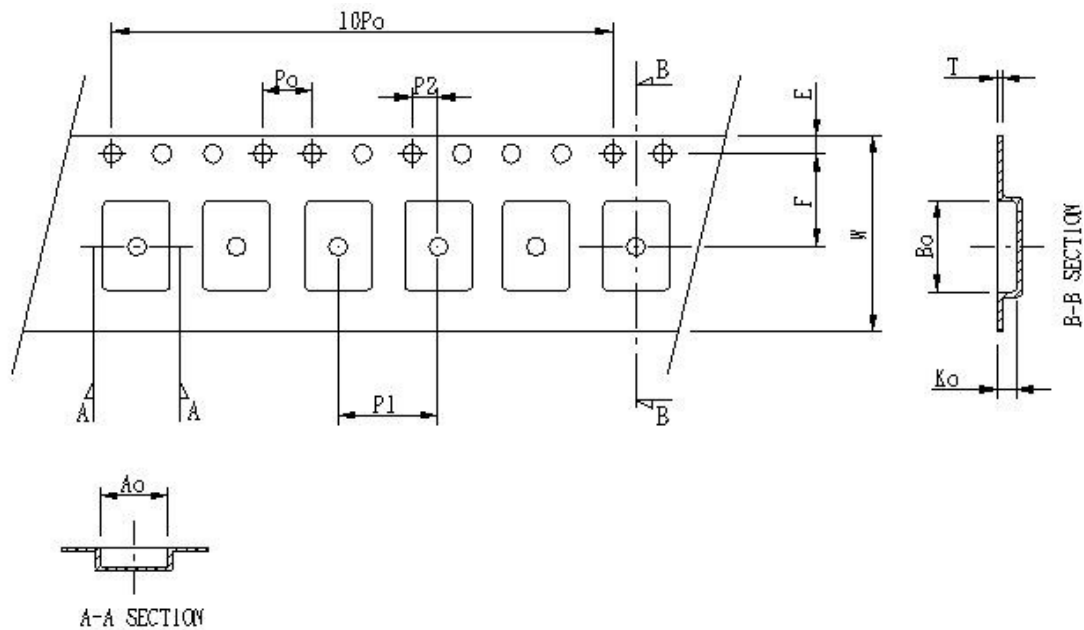
**245** = 2.45 GHz

P. Packing

**4K** = 4000pcs/reel

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## Taping Blister Tape

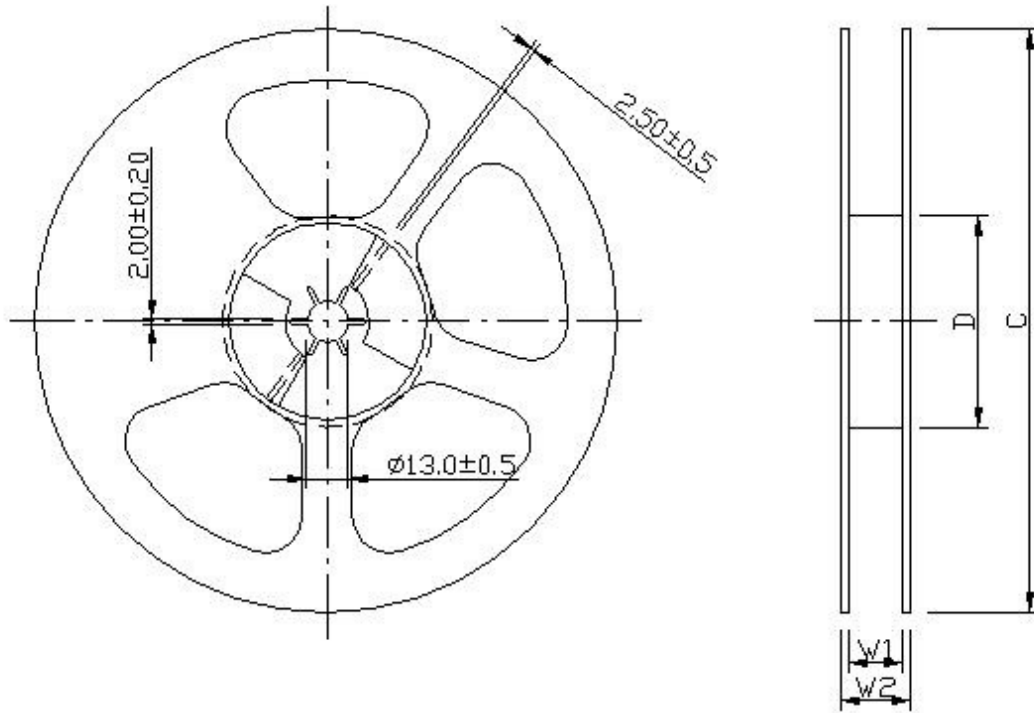


### DIMENSION:

Serial no	Checking note	Index	Spec(mm)
1	Sprocket hole	$D_o$	$1.50 \pm 0.10$
2	Pocket hole	$D_1$	$\geq 1$
3	Distance sprocket hole/sprocket hole	$P_o$	$4.0 \pm 0.10$
4	Distance pocket/pocket	$P_1$	$4.0 \pm 0.10$
5	Distance sprocket hole/pocket	$P_2$	$2.0 \pm 0.10$
6	Tape width	$W$	$8.1 \pm 0.20$
7	Distance sprocket hole/outside	$E$	$1.75 \pm 0.10$
8	Distance sprocket hole/pocket	$F$	$3.5 \pm 0.05$
9	Pocket length nominal clearance	$A_o$	$1.42 \pm 0.10$
10	Pocket length nominal clearance	$B_o$	$2.24 \pm 0.10$
11	Pocket depth minimum clearance	$K_o$	$1.04 \pm 0.10$
12	Thickness of tape	$T$	$0.22 \pm 0.05$
13	10x sprocket hole pitch	$10P_o$	$40.0 \pm 0.20$

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## 7”(180mm) Reel Specifications



Product size code	Units per Reel	Tape Width (mm)	C (mm)	D (mm)	W <sub>1</sub> (mm)	W <sub>2</sub> (mm)
Combo	4000	8	180.0±1.0	62±1.5	8.4+/-0.15	14.4 max

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**Revision Control:**

Revision	Date	Content	Remark
1	Sep. 2006	New Issued	
2	Mar. 2010	Revise the Dimensions information and Port Configurations	

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