

BL 1608 Series

Multilayer Chip Baluns

Features

- ❖ Monolithic SMD with small, low-profile and light-weight type.
- ❖ RoHS compliant

Applications

- ❖ 0.6 ~ 6 GHz wireless communication systems, including DECT/PACS/PHS/GSM/DCS phones, WLAN card, Bluetooth modules, Hyper-LAN, etc.



Specifications

Part Number	Frequency Range (MHz)	Unbalanced Impedance (ohm)	Balanced Impedance (ohm)	Insertion Loss (dB)	VSWR @BW	Phase Difference (degree)	Amplitude Difference (dB)
BL1608-10V4600KB_	3200 ~ 6000	50	100	0.7typ. / 1.2 max. @-40~85°C 1.05 typ. / 1.4 max. / 2.3 max. @105°C	1.7typ. / 2.3 max.	180 ± 15	2.0 max.

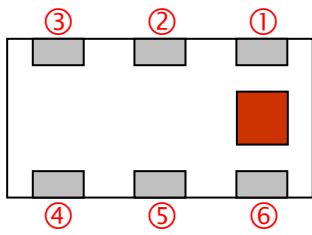
Q'ty/Reel (pcs) : 4000
 Operating Temperature Range : -40 ~ +105°C
 Storage Temperature Range : -40 ~ +105°C
 Storage Period : 12 months max.
 Power Capacity : 1W max.

Part Number

BL 1608 - 10 V 4600 KB □ /LF
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧

① Type	BL : Balun	② Dimensions (L x W)	1.6 x 0.8 mm
③ Balanced Impedance	10 : 100 ohm	④ Material Code	V
⑤ Central Frequency	4600 : 4600MHz	⑥ Specification Code	KB
⑦ Packaging	T: Tape & Reel B: Bulk	⑧ Soldering	/LF=lead-free

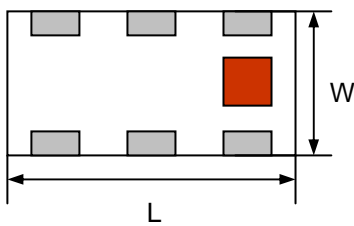
Terminal Configuration



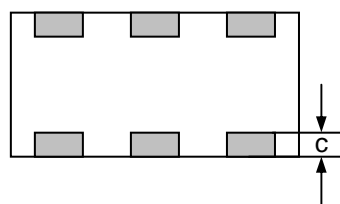
No.	Terminal Name	No.	Terminal Name
①	Unbalanced Port	④	Balanced Port
②	GND or DC feed + RF GND	⑤	GND
③	Balanced Port	⑥	NC

Dimensions and Recommended PC Board Pattern

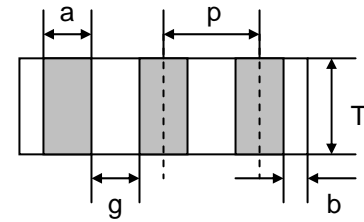
Unit : mm



<Top view>

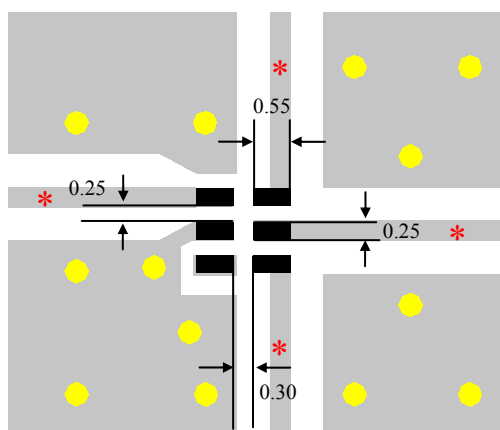


<Bottom view>



<Side view>

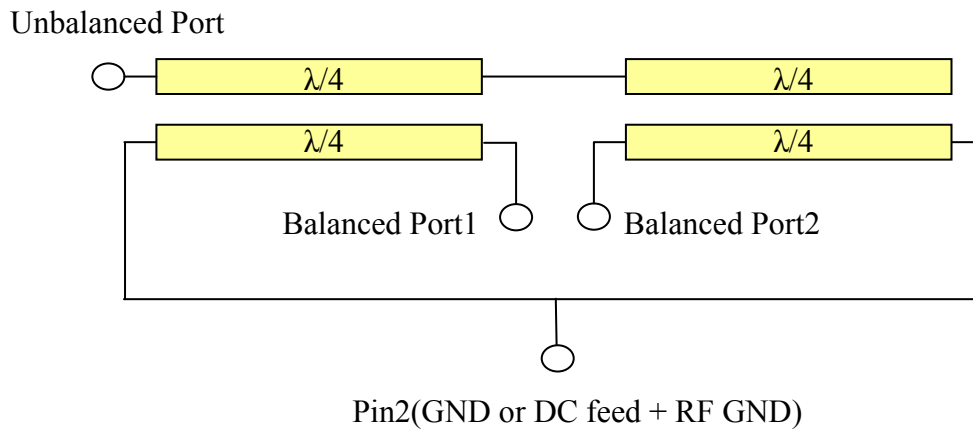
Mark	L	W	T	a	b	c	g	p
Dimensions	1.6 ± 0.1	0.8 ± 0.1	0.6 ± 0.1	0.2 ± 0.1	0.2 ± 0.15	0.15 ± 0.1	0.3 ± 0.1	0.50 ± 0.05



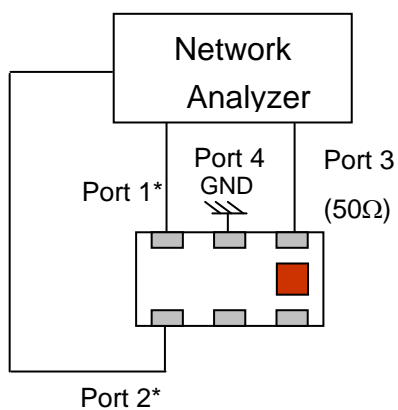
- Solder Resist
- Land
- Through-hole ($\phi 0.35$)

* Line width should be designed to match 50 Ω characteristic impedance, depending on PCB material and thickness.

Equivalent Circuit



Measuring Diagram



Port 3: Unbalanced Port

Ports 1 and 2: Balanced Port

Port 4: GND or DC feed + RF GND

$$IL = S_{ds21}$$

$$RL = S_{ss11}$$

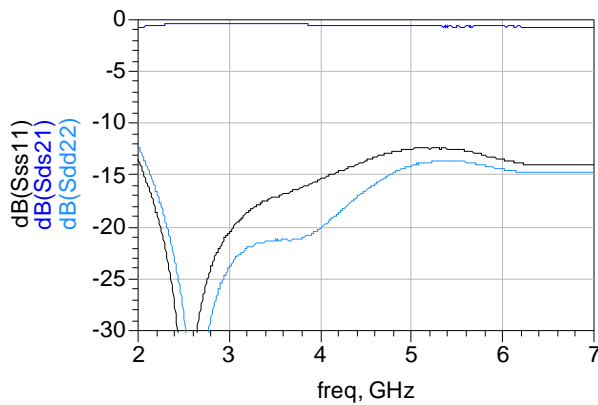
$$\text{Amp_balance} = \text{dB}(S(1,3)/S(2,3))$$

$$\text{Phase_balance} = \text{Phase}(S(1,3)/S(2,3))$$

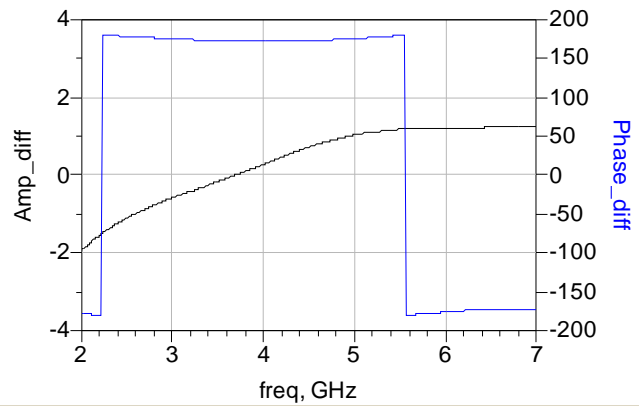
*Impedance for ports 1 and 2 = Balanced Impedance/2

Typical Electrical Characteristics (T=25°C)

Insertion and Return Loss

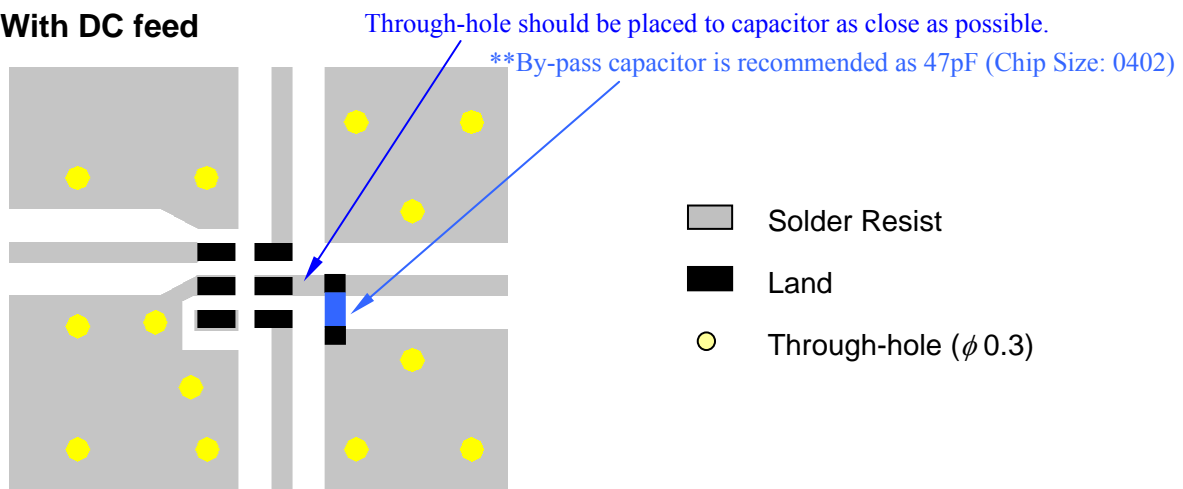


Amplitude and Phase Balance



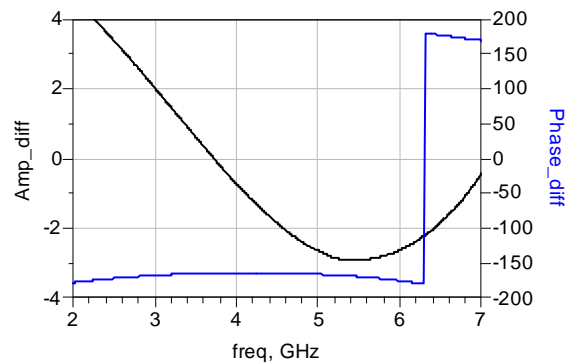
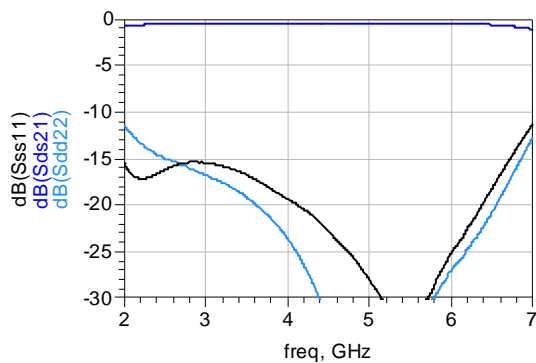
Application circuits for DC-Feed

With DC feed



*Line width should be designed to match 50Ω characteristic impedance, depending on PCB material and thickness.

** By-pass capacitor should be connected when feeding DC power. The behavior of the by-pass capacitor operating at RF frequency is the electrically short to GND, when the by-pass capacitor is enough big. In generally, the better grounding is along with the better imbalance. Hence, the by-pass capacitor should be placed to the pin2 of balun as close as possible. In real case, the imbalance depends on the grounding effect of the by-pass capacitor. The following graph is the measurement result with the by-pass capacitor, the imbalance is worse than that without by-pass capacitor, and is out of spec slightly.

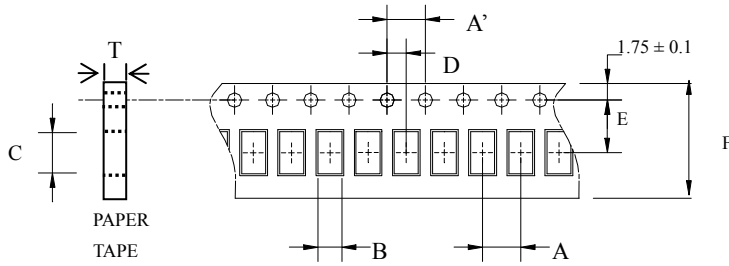


Notes

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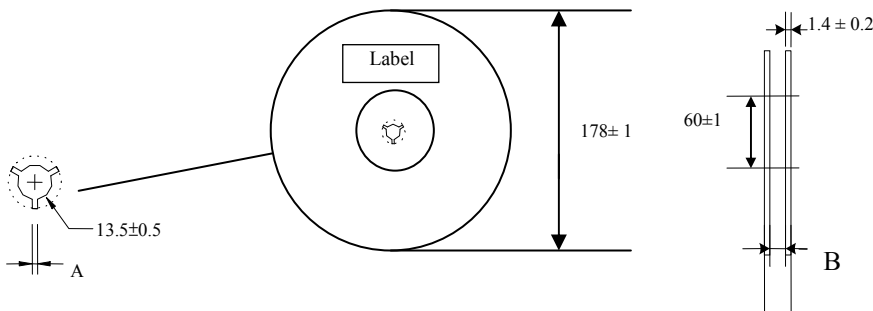
Taping Specifications

❖Tape Dimensions (Unit: mm) & Quantity



Type	A	A'	B	C	D	E	F	T	Quantity/reel	Tape material
1608	4.0±	4.0±	1.10±	1.92±	2.0±	3.5±	8.0±	0.75±	4,000pcs	Paper
	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05		

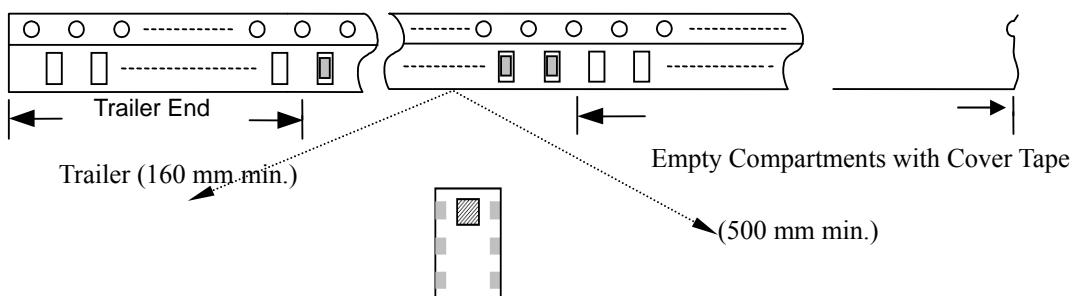
❖Reel Dimensions (Unit: mm)



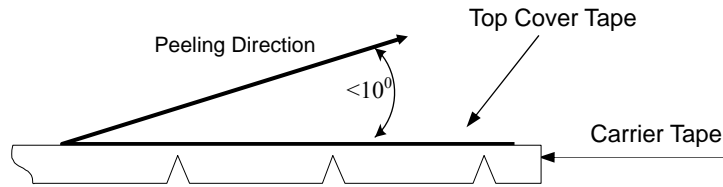
Label: Customer's Name,
ACX P/N, Q'ty, Date,
ACX Corp.

Type	A	B
1608	2.3±0.5	9.0±0.3

❖Leader and Trailer Tape



❖ **Peel-off Force**



Peel-off force should be in the range of 0.1 – 0.6 N at a peel-off speed of 300 ± 10 mm/min .

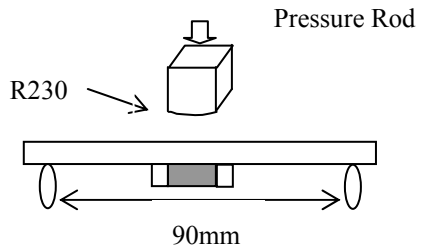
❖ **Storage Conditions**

- (1) Temperature: 5 ~35°C , relative humidity (RH): 45~75%.
- (2) Non-corrosive environment.

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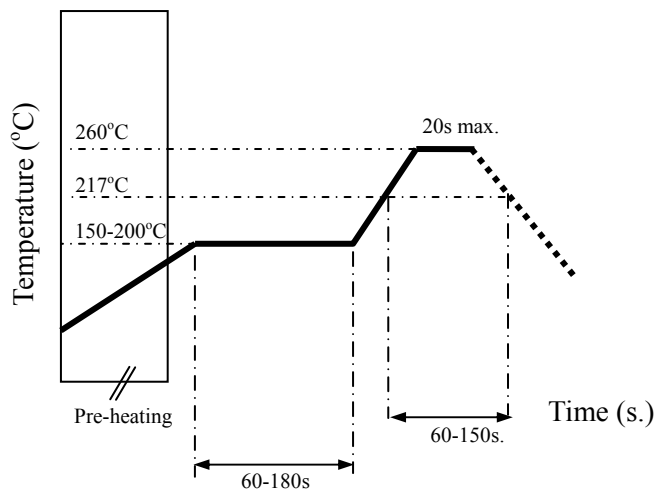
Mechanical & Environmental Characteristics

Item	Requirements	Procedure
Solderability	<ol style="list-style-type: none"> No apparent damage More than 95% of the terminal electrode shall be covered with new solder 	<ol style="list-style-type: none"> Preheat: $120 \pm 5^\circ\text{C}$ Solder: $245 \pm 5^\circ\text{C}$ for 5 ± 1 sec
Soldering strength (Termination Adhesion)	<ol style="list-style-type: none"> 10N minimum 	<ol style="list-style-type: none"> Solder specimen onto test jig. Apply push force at 0.5mm/s until electrode pads are peeled off or ceramic are broken. Pushing force is applied to longitude direction.
Deflection (Substrate Bending)	<ol style="list-style-type: none"> No apparent damage Fulfill the electrical specification 	<ol style="list-style-type: none"> Solder specimen onto test jig (FR4, 1.6mm) using the recommend soldering profile. Apply a bending force of 2mm deflection. 
Heat/Humidity Resistance	<ol style="list-style-type: none"> No apparent damage Fulfill the electrical specification after test 	<ol style="list-style-type: none"> Temperature: $85 \pm 2^\circ\text{C}$ Humidity: 90% ~ 95% RH Duration: 1000 ± 48hrs Recovery: 1-2hrs
Thermal shock (Temperature Cycle)	<ol style="list-style-type: none"> No apparent damage Fulfill the electrical specification after test 	<ol style="list-style-type: none"> One cycle/step 1 : $125 \pm 5^\circ\text{C}$ for 30 min step 2 : $-40 \pm 5^\circ\text{C}$ for 30 min No of cycles : 100 Recovery: 1-2 hrs
Low Temperature Resistance	<ol style="list-style-type: none"> No apparent damage Fulfill the electrical specification after test 	<ol style="list-style-type: none"> Temperature: $-40 \pm 5^\circ\text{C}$ Duration: 500 ± 24hrs Recovery: 1-2hrs

Soldering Conditions

❖ Typical Soldering Profile for Lead-free Process

Reflow Soldering :



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