

# Preliminary Specification

## (RoHS Compliant & Halogen Free)

**CUSTOMER** : \_\_\_\_\_  
**CUSTOMER'S PART NO.** : \_\_\_\_\_  
**DESCRIPTION** : **Multi-layer Chip Balun**  
**PART NO.** : **LTU-1608-1G9S1-A4**  
**DATE** : \_\_\_\_\_  
**AUTHORIZED BY** : *Yun-Wei Lin*

	<b>FULLY APPROVED</b>	<b>PARTIALLY APPROVED</b>	<b>REJECTED</b>
<b>SIGN</b>			
<b>SUGGESTION</b>			

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## ■ Revision History

Version	Date	Description	Approved by	Prepared by
1	2018/05/10	Initial specification.	Yunwei	K.C.

## APPLICATION

LTE, WLAN, Bluetooth, Home RF.

## FEATURES

### Compact Size

Miniaturized SMD packaged in low profile and lightweight.

### Low loss

Low insertion loss, high attenuation.

### High Soldering Heat Resistance

High quality termination allows both flow and re-flow soldering methods to be applied.

### Characteristics

Eliminate noise over a wide frequency range. Idea for high frequency and space limited designs.

### Available in tape and reel packaging for automatic mounting

## PRODUCT IDENTIFICATION

LTU - 1608 - ###xx - A4 - □□  
①                      ②                      ③                      ④                      ⑤

① Product Code

② Dimension Code

③ Series Type (### represents center frequency and xx represents material type)

④ Design Code

⑤ Pattern Code

## ELECTRICAL REQUIREMENTS

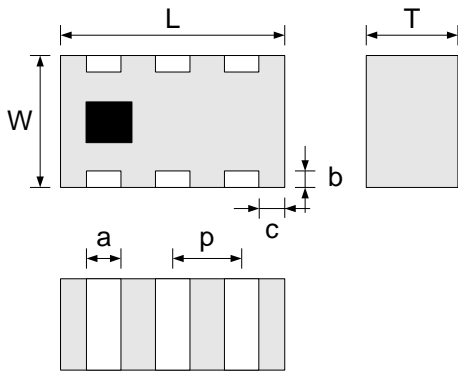
Part NO.	Frequency	VSWR	Insertion Loss in BW
LTU-1608-1G9S1-A4	1700 ~2170 MHz	2.0 max.	1.2dB max.
	Phase Difference at Balance Port	Amplitude Imbalance at Balance Port	Impedance Unbalance / Balance Port
	180°±12°	2.0 dB max	50 / 100

Operating Temperature Range: -40~85°C

Power Capacity: 3W max.



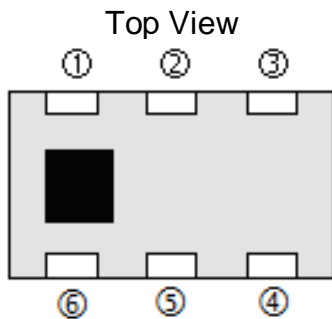
## PRODUCT DIMENSION



L	W	T	a
1.60±0.10	0.8±0.10	0.60±0.10	0.30±0.10
b	c	p	
0.30 +0.10/ -0.20	0.10±0.10	0.55±0.10	

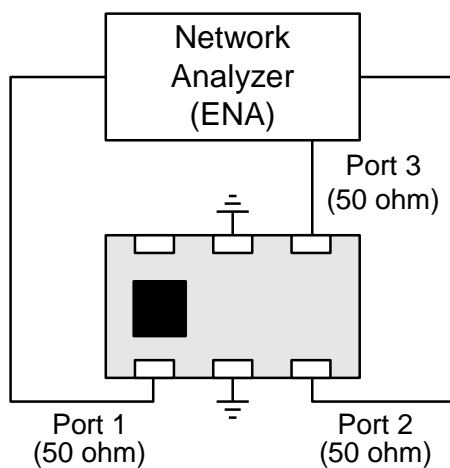
NOTE : Dimensions in mm

## TERMINAL CONFIGURATION



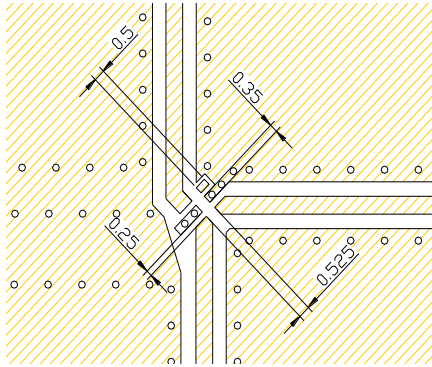
- ① N.C.
- ② GND
- ③ Balanced Port1
- ④ Balanced Port2
- ⑤ GND or DC Feed
- ⑥ Unbalanced Port

## MEASURING DIAGRAM

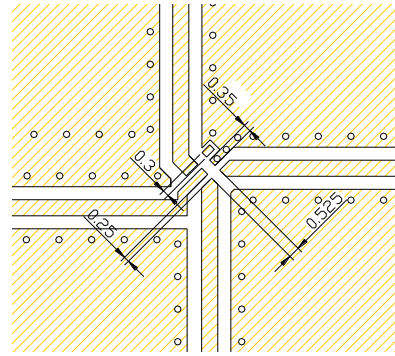


Test Instrument:  
Agilent E5071C Network Analyzer

## RECOMMENDED PCB LAYOUT

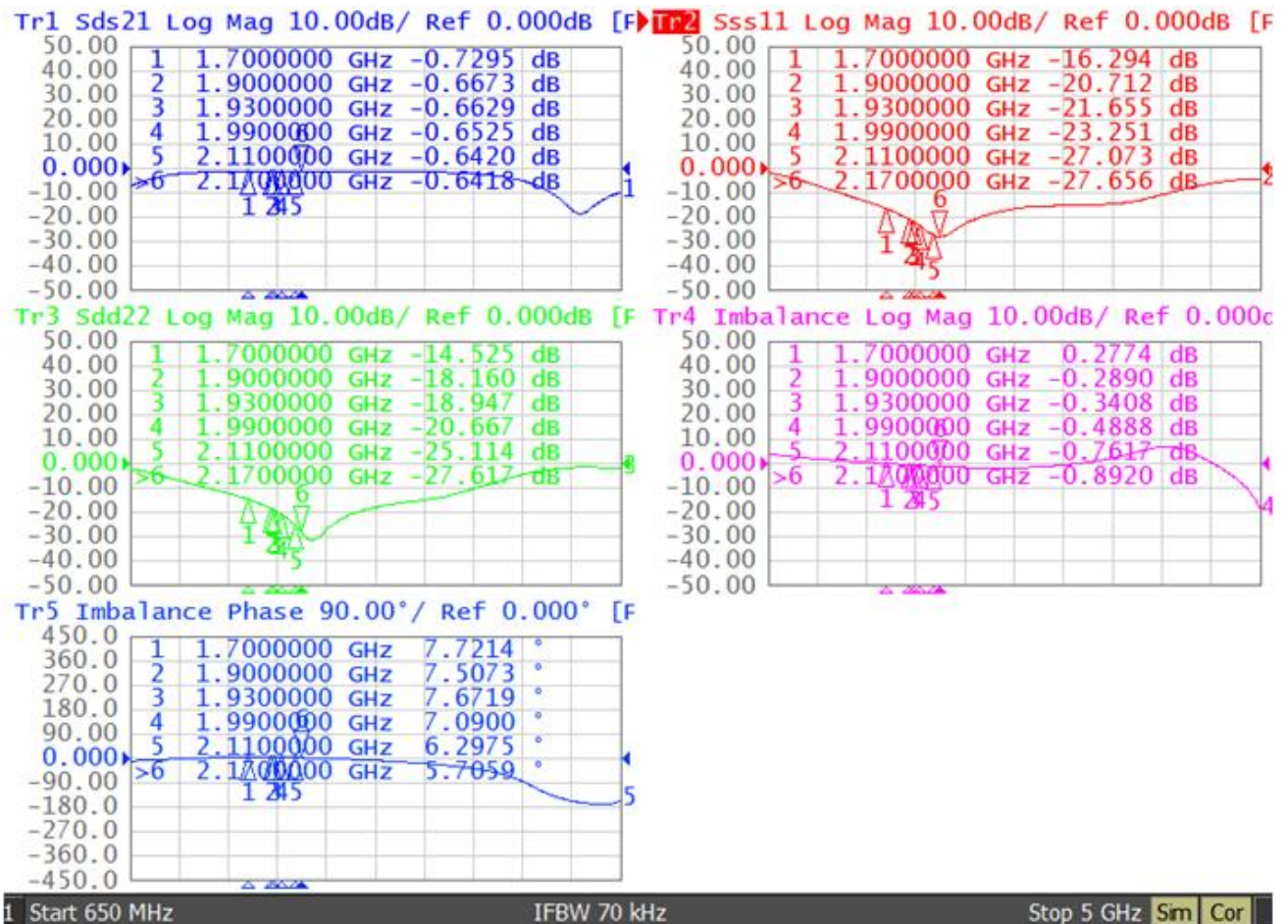


Without DC



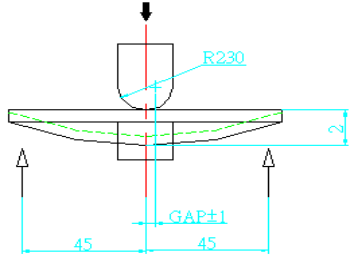
With DC

## ELECTRICAL CHARACTERISTICS (T=25°C)



## RELIABILITY TEST

### Mechanical Test

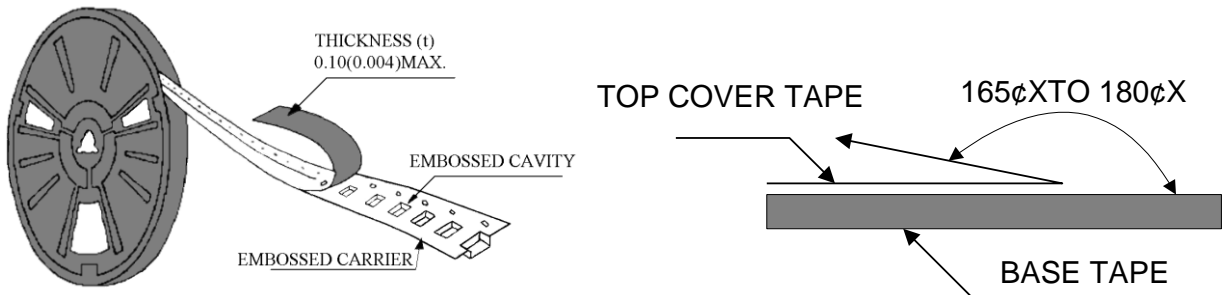
Item	Specification	Test Condition
<b>Vibration</b>	No apparent damage	10 Hz/min~55 Hz/min~10 Hz/min vibration frequency with 1.5 mm amplitude for two hours in x, y, z directions
<b>Drop shock</b>	No apparent damage	Dropped onto printed circuit board from 100cm height three times in x, y, z directions. The terminals shall be protected.
<b>Soldering heat resistance</b>	No apparent damage	Preheating temperature : $150\pm 10^{\circ}\text{C}$ Preheating time : 1 to 2 minutes Solder bath temperature : $260\pm 5^{\circ}\text{C}$ Bathing time : $5\pm 0.5$ seconds
<b>Bending test onto printed circuit board</b>	No apparent damage	Solder specimen LTCC components on the test printed circuit board (L: 100 x W: 40 x T: 1.6mm) in appended recommended PCB pattern. Apply the load in direction of the arrow until bending reaches 2 mm.  Unit: mm
<b>Solderability</b>	No apparent damage	The dipped surface of the terminal shall be at least 75% covered with solder after dipped in solder bath of $245\pm 5^{\circ}\text{C}$ for $3\pm 0.5$ seconds.

### Environment Test

Item	Specification	Test Condition
<b>Thermal shock</b>	No apparent damage Fulfill the electrical spec. after test	$-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$ for 100 cycles each cycle being 30 min
<b>Humidity resistance</b>	No apparent damage Fulfill the electrical spec. after test	$85\pm 2^{\circ}\text{C}$ , 80~90% R.H. for 500 hours
<b>High temperature resistance</b>	No apparent damage Fulfill the electrical spec. after test	$+85\pm 2^{\circ}\text{C}$ for 500 hours
<b>Low temperature resistance</b>	No apparent damage Fulfill the electrical spec. after test	$-40\pm 3^{\circ}\text{C}$ for 500 hours

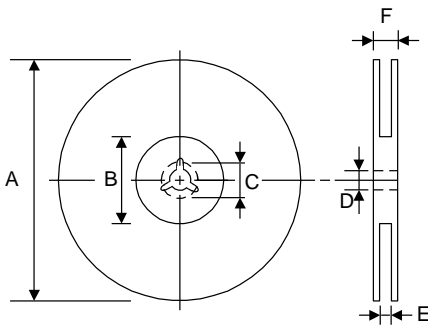
# PACKAGING FOR SMC

## Peel-off force



The force for peeling off cover tape is 10 grams in the arrow direction.

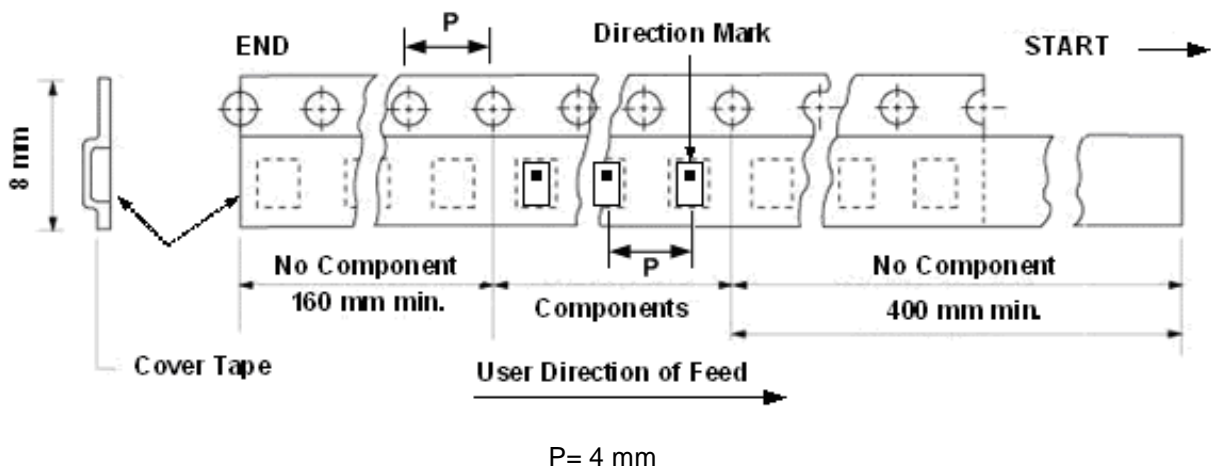
## Dimension (Unit: mm)



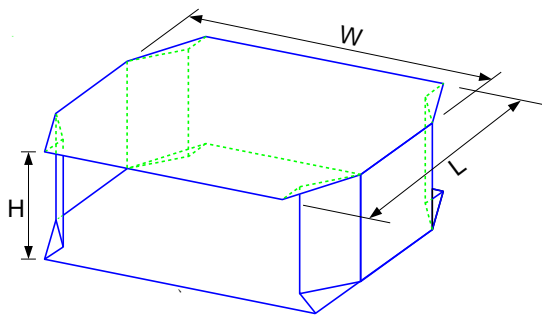
TYPE	A	B	C	D	E	F
8 mm	178±1	60 +0.5 -0	-	13 ±0.2	9 ±0.5	12 ±0.5
12 mm	178±0.3	60 ±0.2	19.3 ±0.1	13.5 ±0.1	13.6 ±0.1	-

## Taping quantity

SERIES	5824 5724	5320 5220	4532	4516	3225	3216 2520	2012 1608	1005
PCS/Reel	5000	3000	1000	2000	2500	3000	4000	10000



## TAPE PACKING CASE



Unit:cm

No. of Reels	W	L	H
2	18±0.5	18±0.5	2.4±0.2
3	18±0.5	18±0.5	3.6±0.2
4	18±0.5	18±0.5	4.8±0.2
5	18±0.5	18±0.5	6.0±0.2

## OPERATION TEMPERATURE

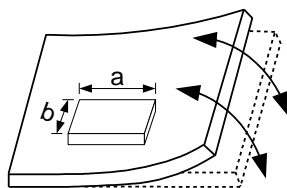
-40°C~+85°C

## STORAGE CONDITION

The temperature should be within -20 ~ 35°C and humidity should be less than 75% RH. The product should be used within 6 months from the time of delivery.

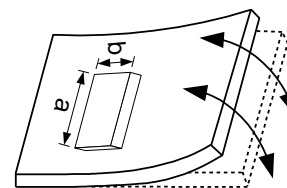
## ATTENTION REGARDING PCB BENDING

- (a) PCB shall be designed so that products are not subjected to the mechanical stress for board warpage. Product shall be located in the sideways direction to the mechanical stress.



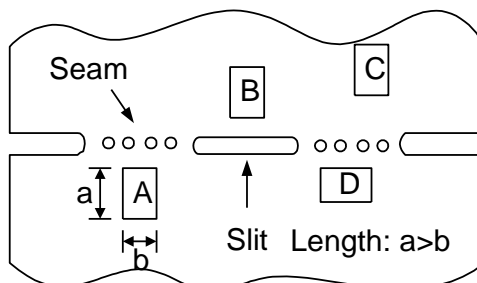
(Poor example)

Length:  $a > b$



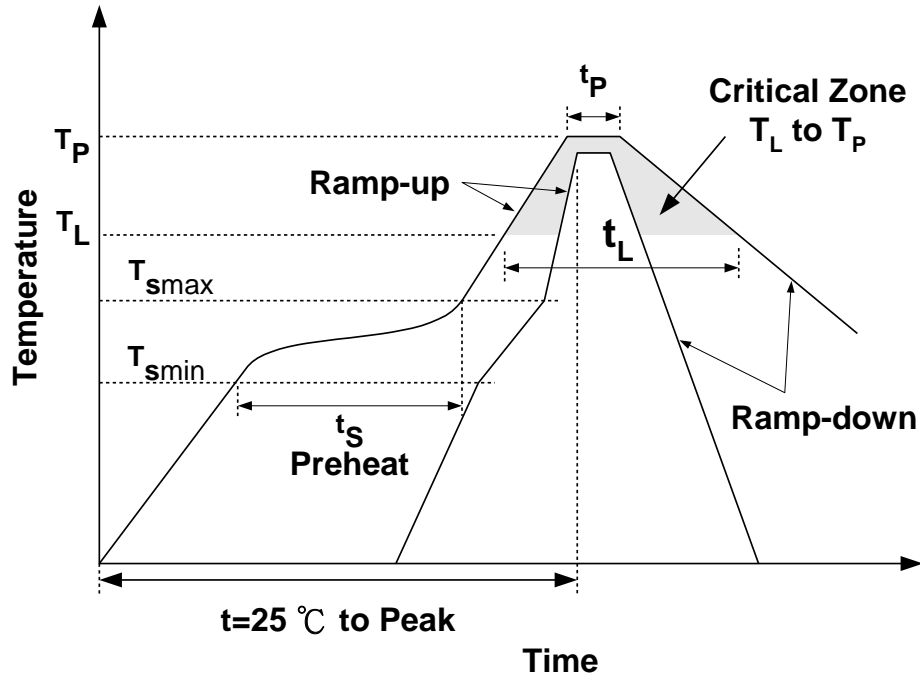
(Good example)

- (b) Products (A,B,C,D) shall be located carefully so that products are not subjected to the mechanical stress due to warping the board. Because they may be subjected to the mechanical stress in order of  $A > C > B \approx D$ .





## RECOMMENDED REFLOW SOLDERING PROFILE



Profile Feature		Sn-Pb	Pb-Free
Preheat	$t_s$	60~120 seconds	60~180 seconds
	$T_{smin}$	100°C	150°C
	$T_{smax}$	150°C	200°C
Average ramp-up rate ( $T_{smax}$ to $T_P$ )		3°C/second max.	3°C/second max.
Time main above	Temperature ( $T_L$ )	183°C	217°C
	Time ( $t_L$ )	60~150 seconds	60~150 seconds
Peak temperature ( $T_P$ )		230°C	250~260°C
Time within 5°C of actual peak temperature ( $t_P$ )		10 seconds	10 seconds
Ramp-down rate		6°C/sec max.	6°C/sec max.
Time 25°C to peak temperature		6 minutes max.	8 minutes max.

## NOTES

The contents of this data sheet are subject to change without notice. Please confirm the specifications and delivery conditions when placing your order.