

APPROVAL SHEET

(RoHS Compliant & Halogen Free)

CUSTOMER : _____
CUSTOMER'S PART NO. : _____
DESCRIPTION : **Multi-layer Low Pass Filter**
PART NO. : **LTL-1608-JXVKB-C1**
DATE : _____
AUTHORIZED BY : *Derek Wei*

| | FULLY APPROVED | PARTIALLY APPROVED | REJECTED |
|-------------------|-----------------------|---------------------------|-----------------|
| SIGN | | | |
| SUGGESTION | | | |

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Revision History

| Version | Date | Description | Approved by | Prepared by |
|---------|------------|------------------------|-------------|-------------|
| 1 | 2020/10/07 | Initial specification. | CF | Charles |
| | | | | |
| | | | | |
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APPLICATION

For LTE application.

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

L T L - 1 6 0 8 - ### x x - C 1 - □ □
 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

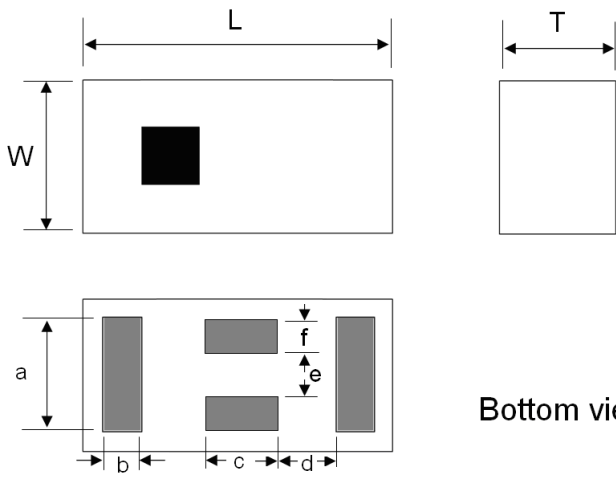
ELECTRICAL REQUIREMENTS

| Item | Frequency Range(MHz) | Min. | Typ. | Max. |
|---------------------|----------------------|------|------|------|
| Insertion Loss (dB) | 600~2700 | - | 0.7 | 0.8 |
| Return Loss (dB) | 600~2700 | 12 | 18 | - |
| Attenuation (dB) | 3420~3570 | 40 | 43 | - |
| | 5150~5960 | 25 | 27.5 | - |

Operating Temperature Range : -40~85°C

Power Capacity : 3W max.

PRODUCT DIMENSION

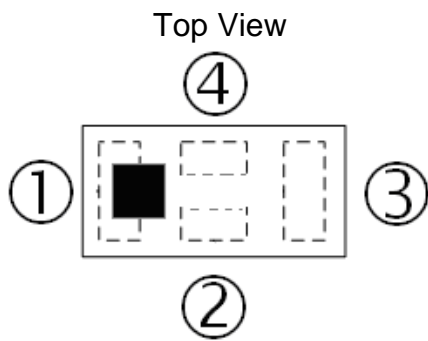


| L | W | T | a |
|------------------|-----------------|-----------------|-----------------|
| 1.60 ± 0.10 | 0.80 ± 0.10 | 0.60 ± 0.10 | 0.65 ± 0.10 |
| b | c | d | e |
| 0.225 ± 0.05 | 0.40 ± 0.05 | 0.30 ± 0.05 | 0.21 ± 0.05 |
| f | | | |
| 0.22 ± 0.05 | | | |

Bottom view

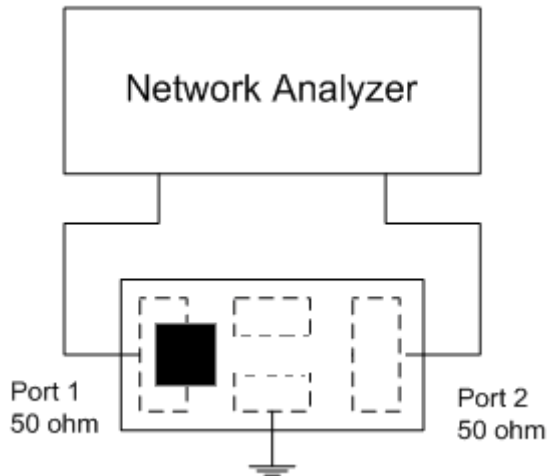
NOTE : Dimensions in mm

TERMINAL CONFIGURATION



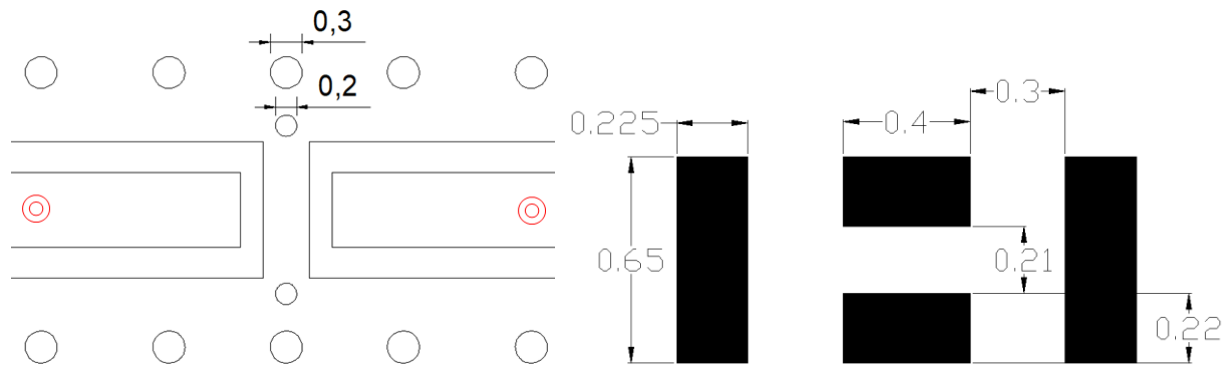
- ① I/O
- ② GND
- ③ I/O
- ④ GND

MEASURING DIAGRAM



Test Instrument :
Agilent E5071C Network Analyzer or equivalent.

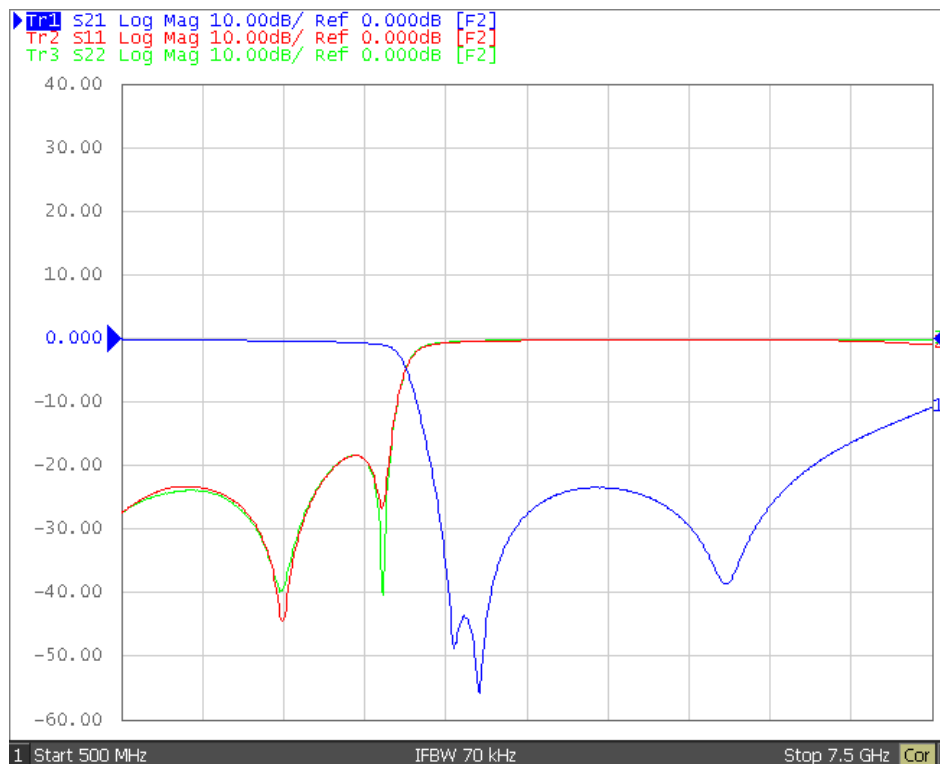
RECOMMENDED PCB LAYOUT AND LAND PATTERN



Unit : mm

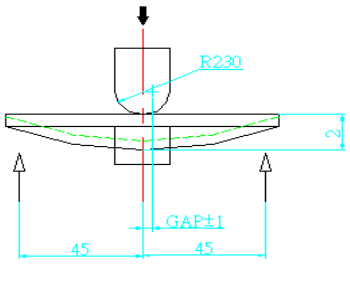
- ⊙ Line width should be designed to match 50 Ω characteristic impedance, depending on PCB material and thickness.

ELECTRICAL CHARACTERISTICS (T=25°C)



RELIABILITY TEST

Mechanical Test

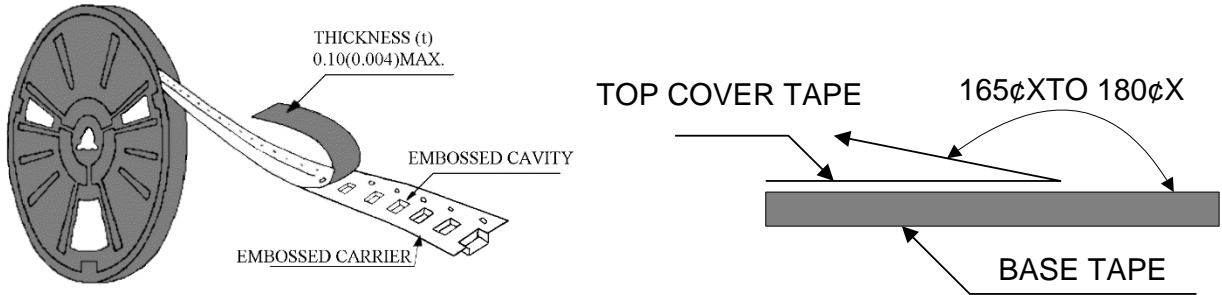
| Item | Test Condition | Specification |
|--|--|--------------------|
| Vibration | 10 Hz/min~55 Hz/min~10 Hz/min vibration frequency with 1.5 mm amplitude for two hours in x, y, z directions | No apparent damage |
| Drop shock | Dropped onto printed circuit board from 100cm height three times in x, y, z directions. The terminals shall be protected. | No apparent damage |
| Soldering heat resistance | 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 ± 0.5 seconds | No apparent damage |
| Bending test onto printed circuit board | 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 | No apparent damage |
| Solderability | 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 ± 0.5 seconds. | No apparent damage |

Environment Test

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

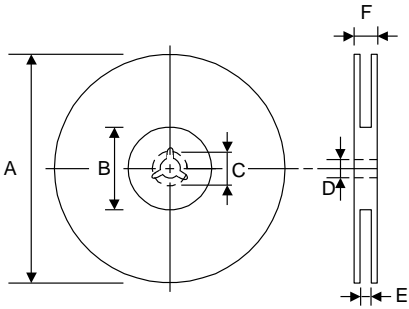
PACKAGING FOR SMC

Peel-off force



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

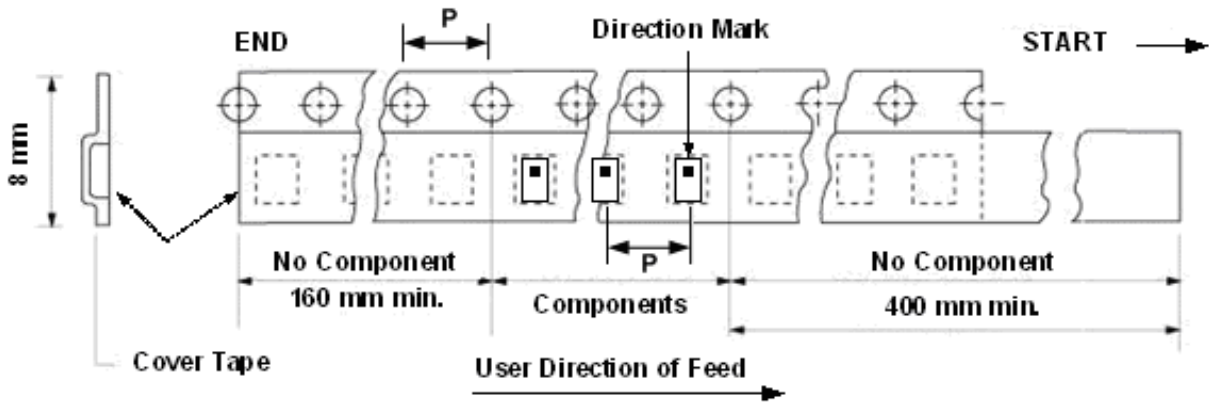
Dimension (Unit: mm)



| 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 | - |

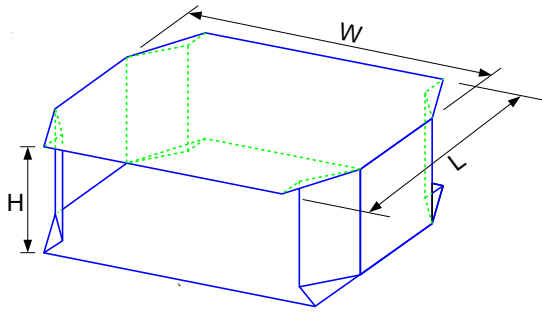
Taping quantity

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



P= 4 mm

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 |

MSL RATING

Level 1

OPERATION TEMPERATURE

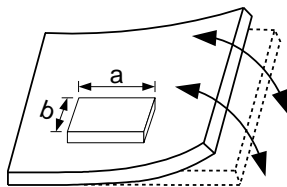
-40°C~85°C

STORAGE CONDITION

The temperature should be within -40°C~+85°C and humidity should be less than 75% RH. The product should be used within 6 months from the time of delivery.

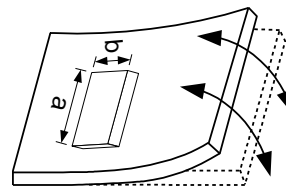
ATTENTION REGARDING PCB BENDING

- (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.



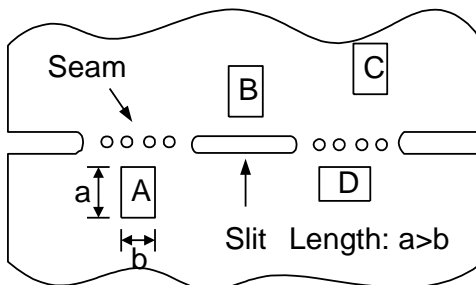
(Poor example)

Length: $a > b$

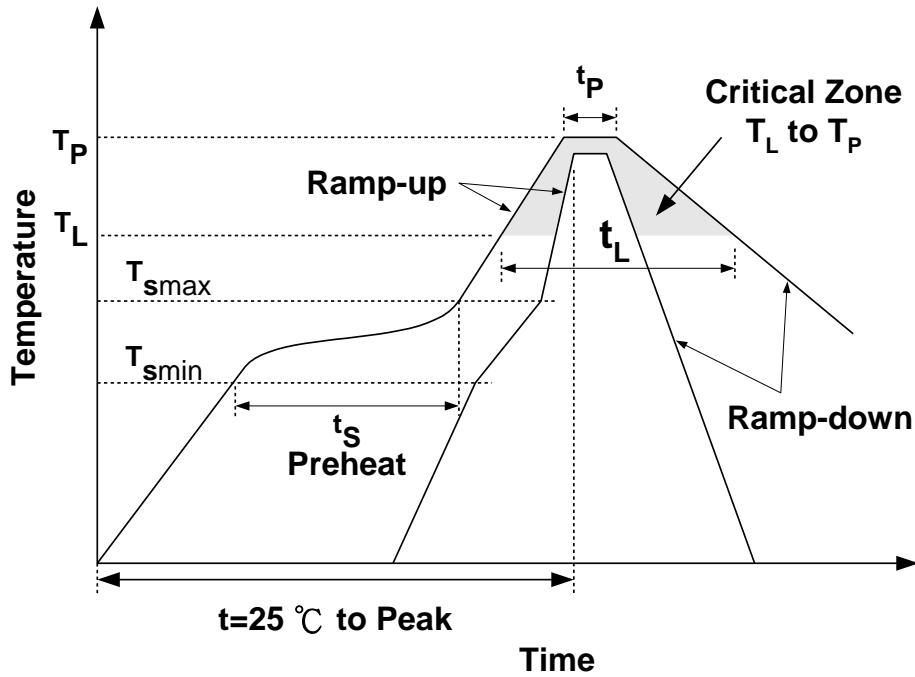


(Good example)

- (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.

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