

APPROVAL SHEET

RFBPF Series – 1608(0603)- RoHS Compliance

MULTILAYER CERAMIC BAND PASS FILTER

Halogens Free Product

2.4 GHz ISM Band Working Frequency

P/N: RFBPF1608060A7T

*Contents in this sheet are subject to change without prior notice.

Approval sheet

FEATURES

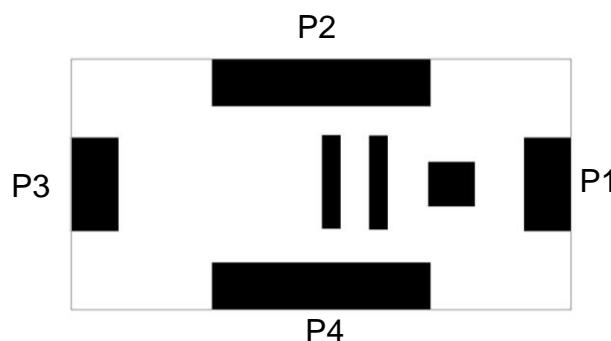
1. Miniature footprint: 1.6 X 0.8X 0.6 mm³
2. Low Profile Thickness
3. High Rejection and Low Insertion Loss
4. High attenuation on 3200 MHz & 2nd harmonic suppressed
5. LTCC process

APPLICATIONS

1. 2.4GHz ISM band RF applications
2. Bluetooth, Wireless LAN 802.11b/g/n, HomeRF

CONSTRUCTION

Top view



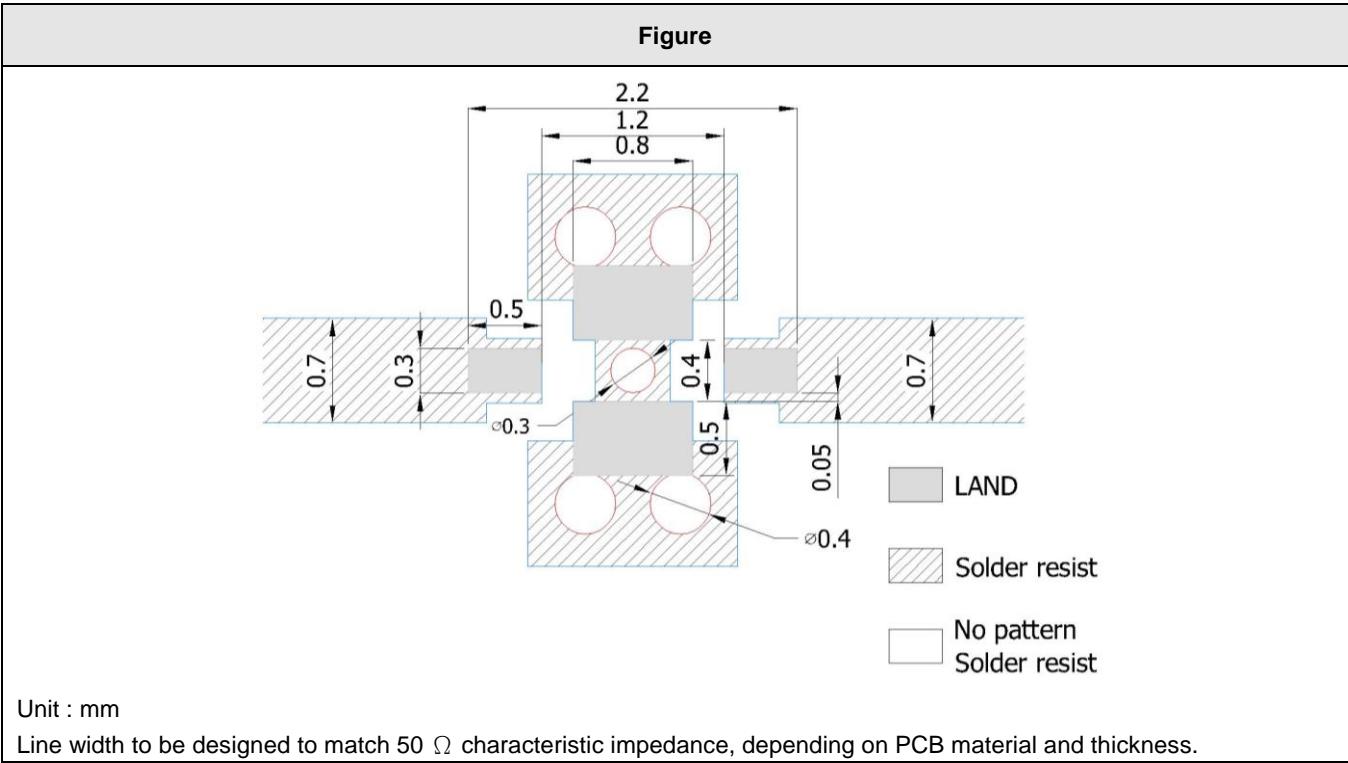
| PIN | Connection |
|-----|-------------|
| 1 | Input port |
| 2 | GND |
| 3 | Output port |
| 4 | GND |

DIMENSIONS

| Figure | Symbol | Dimension (mm) |
|-------------|--------|----------------|
| Top view | L | 1.60 ± 0.15 |
| Bottom view | W | 0.80 ± 0.15 |
| Bottom view | T | 0.60 ± 0.10 |
| Bottom view | A | 0.45 ± 0.15 |
| Bottom view | B | 0.70 ± 0.15 |
| Bottom view | C | 0.20 ± 0.15 |
| Bottom view | D | 0.20 ± 0.15 |
| Bottom view | E | 0.25 ± 0.15 |
| Side view | F | 0.30 ± 0.15 |

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ELECTRICAL CHARACTERISTICS

| RFBPF1608060A7T | Specification |
|--|---|
| Frequency range | 2400 ~ 2500 MHz |
| Insertion Loss | 3.0 dB max. |
| Attenuation | 25dB min. @ 695 ~ 800 MHz 20dB min. @ 1910 MHz 35dB min. @ 3200 MHz 20dB min. @ 4800 ~ 5000 MHz 20dB min. @ 7200 ~ 7500 MHz |
| VSWR | 2.0 max. |
| Impedance | 50 Ω |
| Operation Temperature Range | -40°C ~ +85°C |
| Moisture sensitivity levels | LEVEL 1 (Refer to : IPC/JEDEC J-STD-020) |
| Typical Electrical Chart | |
| <p>The chart displays S-Parameters in dB on the y-axis (from -80 to 0) against Frequency in GHz on the x-axis (from 0.5 to 7.5). The red line represents Return loss, which is consistently low, staying above -10 dB. The blue line represents Insertion Loss, which shows a sharp resonance peak reaching approximately -10 dB at 2.5 GHz, with a minimum insertion loss of about -70 dB at 1.3 GHz.</p> | |

SOLDER LAND PATTERN


RELIABILITY TEST

| Test item | Test condition / Test method | Specification |
|--|--|--|
| Solderability JIS C 0050-4.6 JESD22-B102D | *Solder bath temperature : $235 \pm 5^{\circ}\text{C}$ *Immersion time : 2 ± 0.5 sec Solder : Sn3Ag0.5Cu for lead-free | At least 95% of a surface of each terminal electrode must be covered by fresh solder. |
| Leaching (Resistance to dissolution of metallization) IEC 60068-2-58 | *Solder bath temperature : $260 \pm 5^{\circ}\text{C}$ *Leaching immersion time : 30 ± 0.5 sec Solder : SN63A | Loss of metallization on the edges of each electrode shall not exceed 25%. |
| Resistance to soldering heat JIS C 0050-5.4 | *Preheating temperature : $120\text{--}150^{\circ}\text{C}$, 1 minute. *Solder temperature : $270 \pm 5^{\circ}\text{C}$ *Immersion time : 10 ± 1 sec Solder : Sn3Ag0.5Cu for lead-free Measurement to be made after keeping at room temperature for 24 ± 2 hrs | No mechanical damage. Electrical specification shall satisfy the descriptions in electrical characteristics under the operational temperature range within $-40 \text{--} 85^{\circ}\text{C}$. Loss of metallization on the edges of each electrode shall not exceed 25%. |
| Drop Test JIS C 0044 Customer's specification. | *Height : 75 cm *Test Surface : Rigid surface of concrete or steel. *Times : 6 surfaces for each units : 2 times for each side. | No mechanical damage. Electrical specification shall satisfy the descriptions in electrical characteristics under the operational temperature range within $-40 \text{--} 85^{\circ}\text{C}$. |
| Vibration JIS C 0040 | *Frequency : 10Hz~55Hz~10Hz(1min) *Total amplitude : 1.5mm *Test times : 6hrs.(Two hrs each in three mutually perpendicular directions) | No mechanical damage. Electrical specification shall satisfy the descriptions in electrical characteristics under the operational temperature range within $-40 \text{--} 85^{\circ}\text{C}$. |
| Adhesive Strength of Termination JIS C 0051- 7.4.3 | *Pressurizing force : 5N(\leq 0603) ; 10N(>0603) *Test time : 10 ± 1 sec | No remarkable damage or removal of the termination. |
| Bending test JIS C 0051- 7.4.1 | The middle part of substrate shall be pressurized by means of the pressurizing rod at a rate of about 1 mm/s per second until the deflection becomes 1mm/s and then pressure shall be maintained for 5 ± 1 sec. Measurement to be made after keeping at room temperature for 24 ± 2 hours | No mechanical damage. Electrical specification shall satisfy the descriptions in electrical characteristics under the operational temperature range within $-40 \text{--} 85^{\circ}\text{C}$. |

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| | | |
|---|--|---|
| Temperature cycle JIS C 0025 | 1. 30±3 minutes at -40°C±3°C, 2. 10~15 minutes at room temperature, 3. 30±3 minutes at +85°C±3°C, 4. 10~15 minutes at room temperature, Total 100 continuous cycles Measurement to be made after keeping at room temperature for 24±2 hrs | No mechanical damage. Electrical specification shall satisfy the descriptions in electrical characteristics under the operational temperature range within -40 ~ 85°C. |
| High temperature JIS C 0021 | *Temperature : 85°C±2°C *Test duration : 1000+24/-0 hours Measurement to be made after keeping at room temperature for 24±2 hrs | No mechanical damage. Electrical specification shall satisfy the descriptions in electrical characteristics under the operational temperature range within -40 ~ 85°C. |
| Humidity (steady conditions) JIS C 0022 | *Humidity : 90% to 95% R.H. *Temperature : 40±2°C *Time : 1000+24/-0 hrs. Measurement to be made after keeping at room temperature for 24±2 hrs ※ 500hrs measuring the first data then 1000hrs data | No mechanical damage. Electrical specification shall satisfy the descriptions in electrical characteristics under the operational temperature range within -40 ~ 85°C. |
| Low temperature JIS C 0020 | *Temperature : -40°C±2°C *Test duration : 1000+24/-0 hours Measurement to be made after keeping at room temperature for 24±2 hrs | No mechanical damage. Electrical specification shall satisfy the descriptions in electrical characteristics under the operational temperature range within -40 ~ 85°C. |

SOLDERING CONDITION

Typical examples of soldering processes that provide reliable joints without any damage are given in Fig 2,

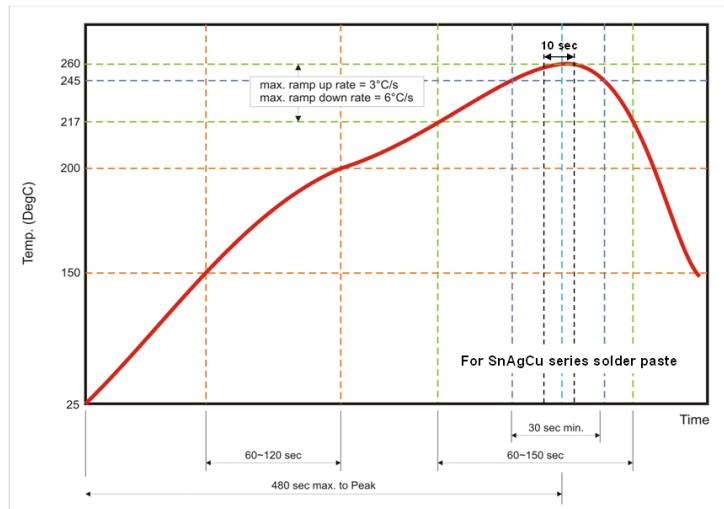


Fig 2. Infrared soldering profile

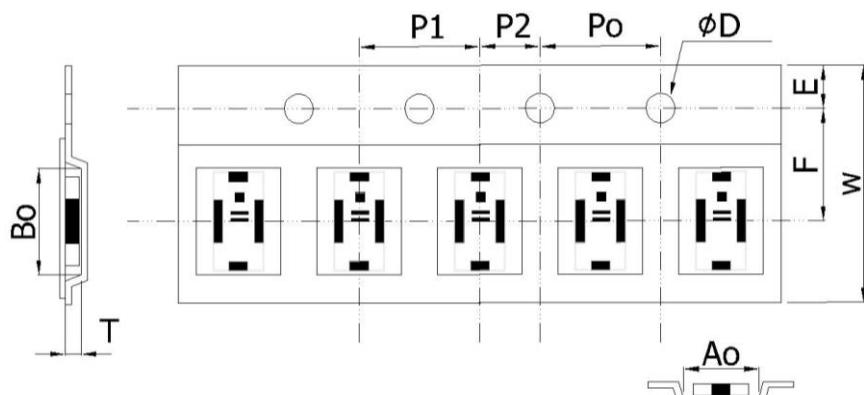
ORDERING CODE

| RF | BPF | 160806 | 0 | A | 7 | T |
|------------------------|--|--|--|---------------------------------------|------------------------------|-----------------------|
| Walsin RF device | Product Code BPF : Band Pass Filter r | Dimension code Per 2 digits of Length, Width, Thickness : e.g. : 160806 = Length 16, Width 08, Thickness 06 | Unit of dimension 0 : 0.1 mm 1 : 1.0 mm | Application A : 2.4GHZ ISM Band | Specification Design code | Packing T : Reeled |

Minimum Ordering Quantity: 4000 pcs per reel.

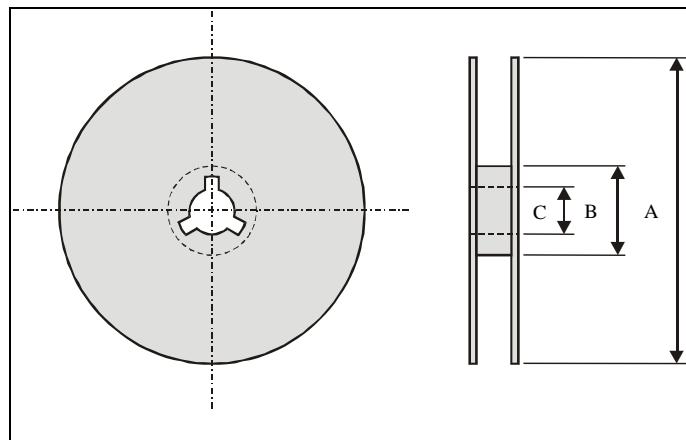
PACKAGING

Paper Tape specifications (unit :mm)



| Index | Ao | Bo | φD | T | W |
|----------------|------------------|-----------------|-----------------|-----------------|-----------------|
| Dimension (mm) | 0.975 ± 0.05 | 1.76 ± 0.05 | $1.55 + 0.05$ | 0.75 ± 0.10 | 8.0 ± 0.10 |
| Index | E | F | Po | P1 | P2 |
| Dimension (mm) | 1.75 ± 0.10 | 3.50 ± 0.05 | 4.00 ± 0.10 | 4.00 ± 0.10 | 2.00 ± 0.05 |

Reel dimensions



| Index | A | B | C |
|----------------|--------|-------|-------|
| Dimension (mm) | Φ178.0 | Φ60.0 | Φ13.0 |

Taping Quantity: 4000 pieces per 7" reel

CAUTION OF HANDLING

Limitation of Applications

Please contact us before using our products for the applications listed below which require especially high reliability for the prevention of defects, which might directly cause damage to the third party's life, body or property.

- (1) Aircraft equipment
- (2) Aerospace equipment
- (3) Undersea equipment
- (4) Medical equipment
- (5) Disaster prevention / crime prevention equipment
- (6) Traffic signal equipment
- (7) Transportation equipment (vehicles, trains, ships, etc.)
- (8) Applications of similar complexity and /or reliability requirements to the applications listed in the above.

Storage condition

- (1) Products should be used in 6 months from the day of WALSIN outgoing inspection, which can be confirmed.
- (2) Storage environment condition.
 - Products should be storage in the warehouse on the following conditions.
 - Temperature : -10 to +40°C
 - Humidity : 30 to 70% relative humidity
 - Don't keep products in corrosive gases such as sulfur. Chlorine gas or acid or it may cause oxidization of electrode, resulting in poor solderability.
 - Products should be storage on the palette for the prevention of the influence from humidity, dust and son on.
 - Products should be storage in the warehouse without heat shock, vibration, direct sunlight and so on.
 - Products should be storage under the airtight packaged condition.