# APPROVAL SHEET

## RFDIP 2012 (0805) Type L1 Series – RoHS Compliance

## MULTILAYER CERAMIC CHIP DIPLEXER

2.4 GHz & 5GHz ISM Band Working Frequency

## P/N: RFDIP2012100L1T

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

## FEATURES

1. Multilayer LTCC ( Low Temperature Cofired Ceramics ) Technology
2. Miniaturized Size 2.00 x 1.25 x 1.00 $mm^3$
3. Low Insertion Loss reduces power consumption
4. High band wide bandwidth design covers from 5.0GHz to 6.0GHz
5. Suitable for 2.4GHz/ 5GHz Working Frequency Operation

## APPLICATIONS

1. 2.4GHz/ 5GHz ISM Band WLAN 802.11b/ g/ a Application
2. Band switching for dual band system.

## CONSTRUCTION

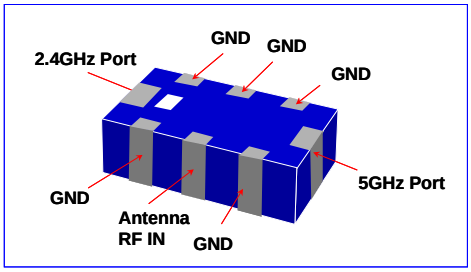



Fig 1. Outline of 2.4GHz/ 5GHz Diplexer (2012 size) – Type L1

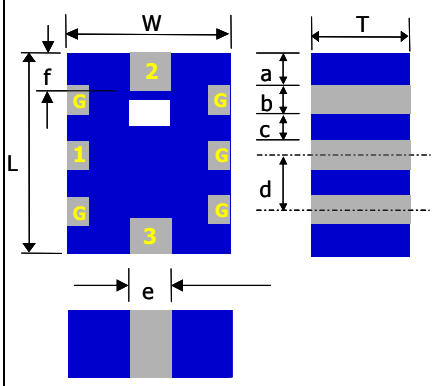
## DESCRIPTION

Walsin Technology Corporation develops a new ceramic chip Diplexer specified for 2.4 GHz/ 5GHz ISM Band application, as shown in above “CONSTRUCTION”. The Wireless LAN IEEE 802.11b/g typically located on the unlicensed frequency band which range covers from 2.4GHz to 2.4835GHz, to increase the data throughput rate, 802.11a is proposed and located on high band 5GHz. To fulfil the combo application requirements, the new ceramic chip Diplexer was released by Walsin Technology Corporation.

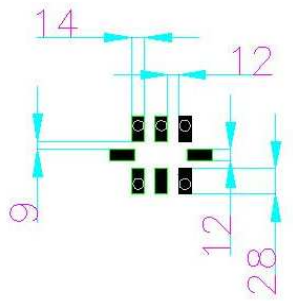
This new Diplexer covers both 2.4GHz/ 5GHz which can fulfill the WLAN IEEE802.11b/g/a combo application, and been designed through Walsin’s advanced LTCC (Low Temperature Co-fired Ceramic) technology and superior product design via 3D EM Simulation Skill.

This ceramic Diplexer has a rectangular ceramic body with a tiny dimension of 2.00 x 1.25 x 1.00 $mm^3$ meet the future SMT automation and miniaturization requirements on modern portable devices.

## DIMENSIONS

| Figure | Symbol | Dimension | Terminals | Connection |
|---|---|---|---|---|
|  | L | 2.00 ± 0.15 mm | G | Ground |
| | W | 1.25 ± 0.15 mm | 1 | Antenna RF Input |
| | T | 0.95 ± 0.10 mm | 2 | 2.4GHz Low Band Output |
| | a | 0.20 ± 0.20 mm | 3 | 5GHz High Band Output |
| | b | 0.30 ± 0.20 mm | | |
| | c | 0.35 ± 0.20 mm | | |
| | d | 0.65 ± 0.20 mm | | |
| | e | 0.30 ± 0.20 mm | | |
| | f | 0.25 ± 0.20 mm | | |

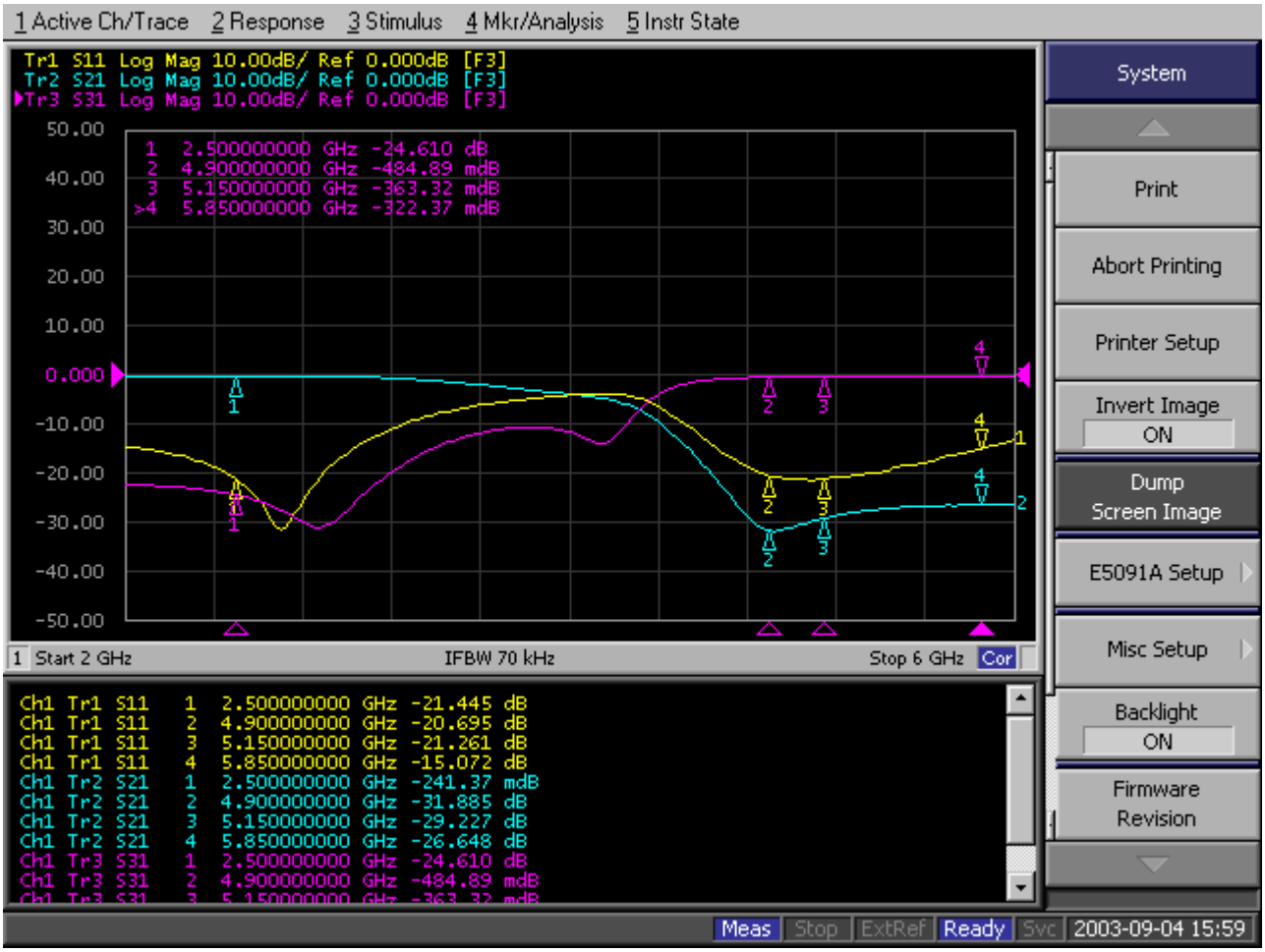
## SOLDER LAND PATTERN

| | |
|---|---|
|  Unit in mil | Line width to be design to match 50Ω characteristic impedance, depending on PCB material and thickness |

## ELECTRICAL CHARACTERISTICS

| RFDIP2012100L1T | Band_1 | Band_2 |
|---|---|---|
| Central Frequency | 2450 ± 50 MHz | 5400 ± 500 MHz |
| Impedance | 50 Ω | 50 Ω |
| Insertion Loss | Max. 0.7dB | Max. 0.9dB |
| Return Loss | Min. 10 dB | |
| Attenuation | -20dB @ 4.9GHz<br>-20dB @ 5.2GHz<br>-20dB @ 5.8GHz | -20dB @ 2.45GHz |
| Ripple | 0.5dB | |

## TYPICAL FREQUENCY CHARACTERISTICS



## RELIABILITY TEST

■ **Mechanical performance**

| Test item | Test condition / Test method | Specification |
|---|---|---|
| Solderability | Solder temp. : 235 ± 5°C<br>Immersion time: 2 ± 1 sec<br>Solder: SN63 | At least 80% of a surface of each terminal electrode must be covered by fresh solder. |
| Resistance to soldering heat | Solder: Sn63<br>Preheating temperature: 150 ± 10°C<br>Solder Temperature: 260 ± 5°C<br>Immersion time: 10 ± 1 sec<br>Measurement to be made after keeping at room temp. for 24±2 hrs. | No mechanical damage.<br>Ceramic surface shall not be exposed in the middle of the termination or on the terminated product edge by leaching. |
| Drop Test | Height : 75 cm<br>Times : 3 times | No mechanical damage.<br>Samples shall satisfy electrical specification after test.. |

■ **Environmental characteristics**

| Test item | Test condition / Test method | Specification |
|---|---|---|
| Humidity (steady conditions) | Humidity:90% to 95% R.H.<br>Tempertaure:40±2°C<br>Time: 500±24 hours.<br>Measurement: After placing for 24 hours Minimum. | No mechanical damage.<br>Samples shall satisfy electrical specification after test. |
| Temperature cycle | 1. 30±3 minutes at -40°C±3°C,<br>2. 10~15 minutes at room temperature,<br>3. 30±3 minutes at +85°±3°C,<br>4. 10~15 minutes at room temperature,<br>Total 100 continuous cycles<br>Measurement after placing for 48±2 hrs min. | No mechanical damage.<br>Samples shall satisfy electrical specification after test. |
| High temperature | Temperature: 85°C±2°C<br>Test duration: 24 hours<br>Measurement must be taken after subjection to the above conditions, followed by exposure in room environment for 1 to 2 hours. | No mechanical damage.<br>Samples shall satisfy electrical specification after test. |
| Low temperature | Temperature: -40°C±3°C<br>Test duration: 24 hours<br>Measurement must be taken after subjection to the above conditions, followed by exposure in room environment for 1 to 2 hours. | No mechanical damage.<br>Samples shall satisfy electrical specification after test. |

## SOLDERING CONDITION

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

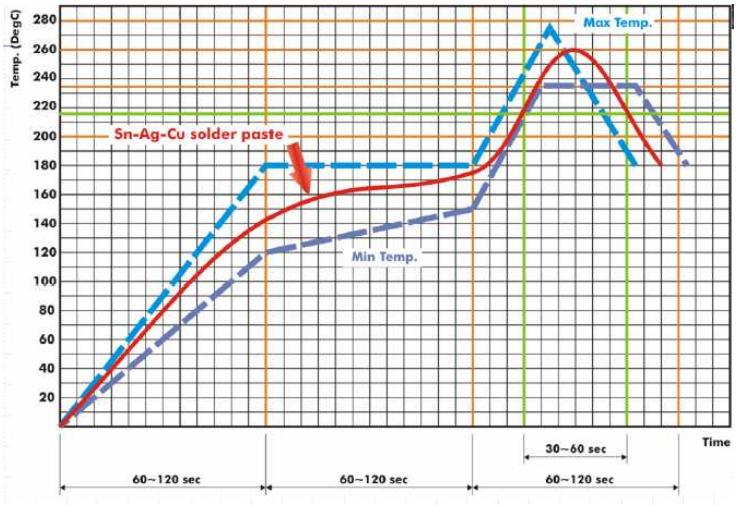



**Fig 2. Infrared soldering profile**

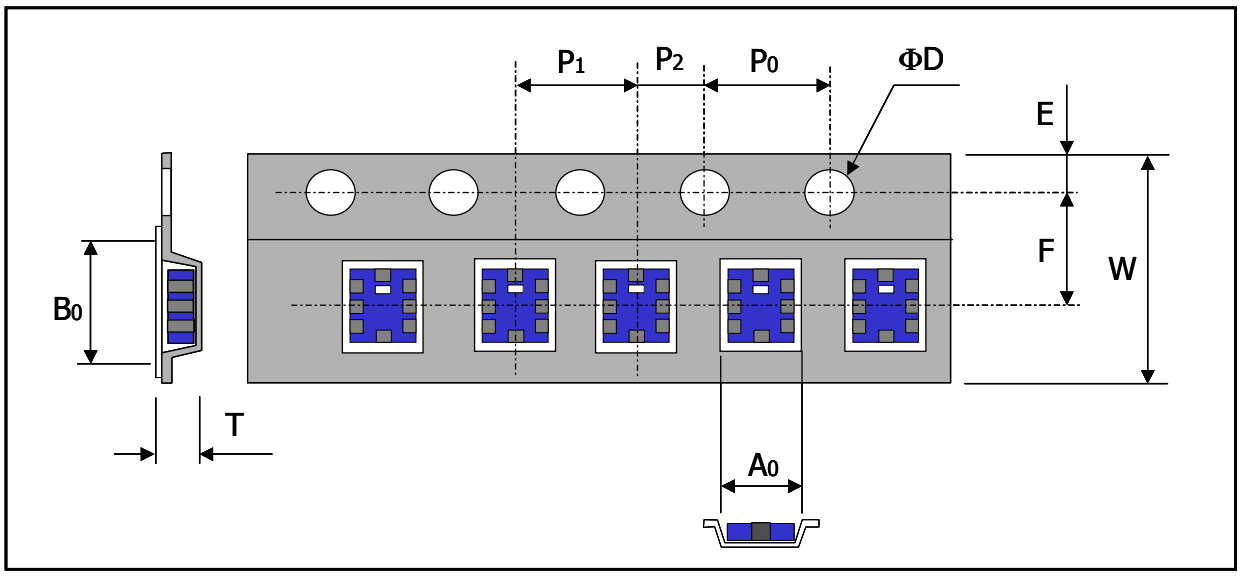
## ORDERING CODE

| RF | DIP | 201210 | 0 | L | 1 | T |
|---|---|---|---|---|---|---|
| **Walsin**<br>RF device | **Product Code**<br>DIP:<br>Diplexer | **Dimension code**<br>201210 =<br>Length 20,<br>Width 12,<br>Thickness 10 | **Unit of dimension**<br>0 : 0.1 mm<br>1 : 1.0 mm | **Application**<br>L : 2.4GHz/ 5GHz | **Specification**<br>Design Code | **Packing**<br>T : 7" Reeled |

**Minimum Ordering Quantity: 2000 pcs per reel.**

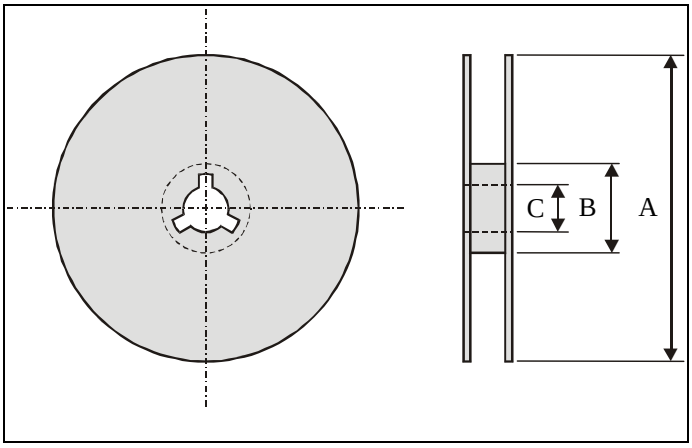
## PACKAGING

**Plastic Tape specifications** (unit :mm)




| Index | Ao | Bo | ΦD | T | W |
|---|---|---|---|---|---|
| Dimension (mm) | 1.45 ± 0.10 | 2.25 ± 0.10 | 1.55 ± 0.10 | 1.10 ± 0.10 | 8.0 ± 0.30 |
| 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 ± 0.10 |

## Reel dimensions




| Index | A | B | C |
|---|---|---|---|
| Dimension (mm) | Φ178 | Φ60.0 | Φ13.5 |

Typing Quantity: 2000 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.