

APPROVAL SHEET

MULTILAYER CERAMIC DIPLEXER

RFDIP Series – 1608(0603) – RoHS Compliance

Halogens Free Product

2.4 GHz & 5 GHz ISM Band RF Application

P/N: RFDIP1606L16T

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

FEATURES

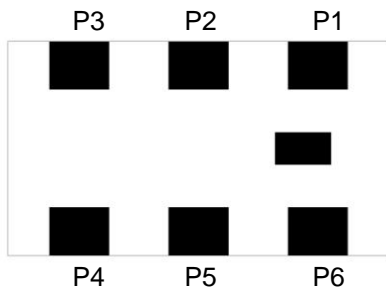
1. Miniature footprint: 1.6 X 0.8 X 0.7 mm³
2. Low Insertion Loss
3. High attenuation on 2nd harmonic suppressed
4. LTCC process

APPLICATIONS

1. ISM 2.4/ 5GHz band RF application
2. Wi-Fi 802.11a/b/g/n application

CONSTRUCTION

Top view



PIN	Connection	PIN	Connection
1	GND	4	High Band
2	Common	5	GND
3	GND	6	Low Band

DIMENSIONS

Figure	Symbol	Dimension (mm)
<p>Top view Bottom view Side view</p>	L	1.60 ± 0.15
	W	0.80 ± 0.15
	T	0.70 max
	A	0.175 ± 0.15
	B	0.25 ± 0.15
	C	0.25 ± 0.15
	D	0.50 ± 0.15
E	0.20 ± 0.15	

ELECTRICAL CHARACTERISTICS

RFDIP1606L16T	Specification	
Frequency range	2400~2500 MHz	4900~5950 MHz
Insertion Loss	0.60 dB max. at +25°C 0.70 dB max. at -40 ~ +85°C	0.80 dB max. at +25°C 0.95 dB max. at -40 ~ +85°C
Attenuation	29 dB min. (33dB typ.) @ 4800~5000 MHz 24 dB min. (27dB typ.) @ 7200~7500 MHz	32 dB min. (34dB typ.) @ 30~2700 MHz 15 dB min. (17dB typ.) @ 9800~11900 MHz 11 dB min. (16dB typ.) @ 14700~17850 MHz
Isolation	32 dB min. @ 30~2700 MHz 28 dB min. @ 4900~5950 MHz	
VSWR	1.8 max.	
Impedance	50 Ω	
Power Capacity	2W max.	
Moisture sensitivity levels	LEVEL 1 (Refer to : IPC/JEDEC J-STD-020)	
HBM ESD	Pass 1KV on all pins (Base on AEC-Q200-002)	
MM ESD	Pass 200V (Base on EIA/JESD22-A115)	

Operating & Storage Condition (Component)

Operation Temperature Range: -40 ~ +85 °C

Storage Temperature Range: -40 ~ +85 °C

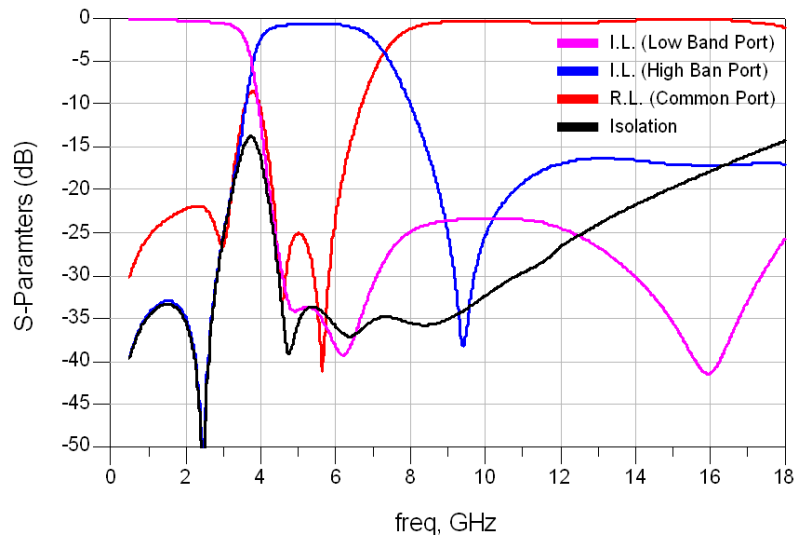
Storage Condition before Soldering (Included packaging material)

Storage Temperature Range: +5 ~ +40 °C

Humidity: 30 to 70% relative humidity

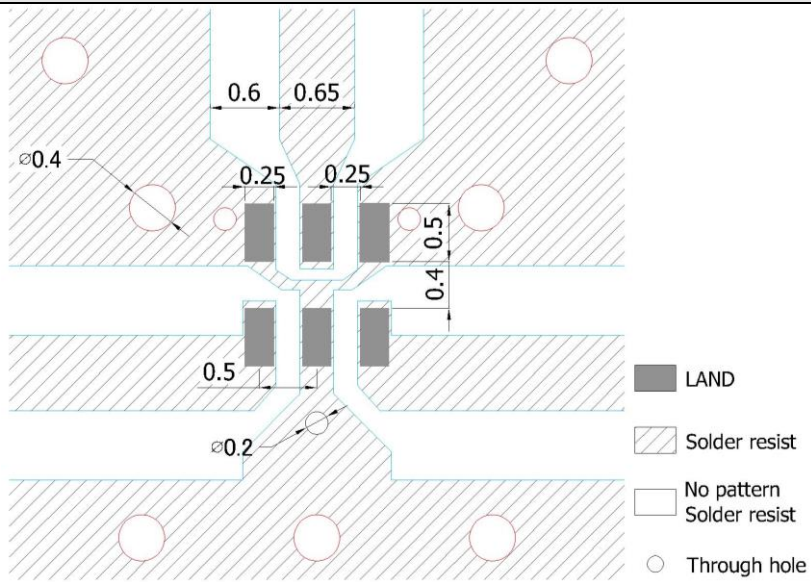
TYPICAL ELECTRICAL PERFORMANCE

S-Parameter



LAND PATTERN

Figure



Unit : mm

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

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.
Resistance to soldering heat JIS C 0050-5.4	*Preheating temperature : $120\sim 150^{\circ}\text{C}$, 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 $-40 \sim 85^{\circ}\text{C}$. 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 $-40 \sim 85^{\circ}\text{C}$.
Vibration JIS C 0040	*Frequency : $10\text{Hz}\sim 55\text{Hz}\sim 10\text{Hz}(1\text{min})$ *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 $-40 \sim 85^{\circ}\text{C}$.
Adhesive Strength of Termination JIS C 0051- 7.4.3	*Pressurizing force : 5N (LGA terminal series) ; $5\text{N}(\leq 0603)$; 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 $-40 \sim 85^{\circ}\text{C}$.

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<p>Temperature cycle JIS C 0025</p>	<p>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</p>	<p>No mechanical damage. Electrical specification shall satisfy the descriptions in electrical characteristics under the operational temperature range within -40 ~ 85°C.</p>
<p>High temperature JIS C 0021</p>	<p>*Temperature : 85°C±2°C *Test duration : 1000+24/-0 hours Measurement to be made after keeping at room temperature for 24±2 hrs</p>	<p>No mechanical damage. Electrical specification shall satisfy the descriptions in electrical characteristics under the operational temperature range within -40 ~ 85°C.</p>
<p>Humidity (steady conditions) JIS C 0022</p>	<p>*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</p>	<p>No mechanical damage. Electrical specification shall satisfy the descriptions in electrical characteristics under the operational temperature range within -40 ~ 85°C.</p>
<p>Low temperature JIS C 0020</p>	<p>*Temperature : -40°C±2°C *Test duration : 1000+24/-0 hours Measurement to be made after keeping at room temperature for 24±2 hrs</p>	<p>No mechanical damage. Electrical specification shall satisfy the descriptions in electrical characteristics under the operational temperature range within -40 ~ 85°C.</p>

SOLDERING CONDITION

Typical examples of soldering processes that provide reliable joints without any damage are given in Fig 2, This product could sustain by reflow process three times, and the temperature below 260°C.

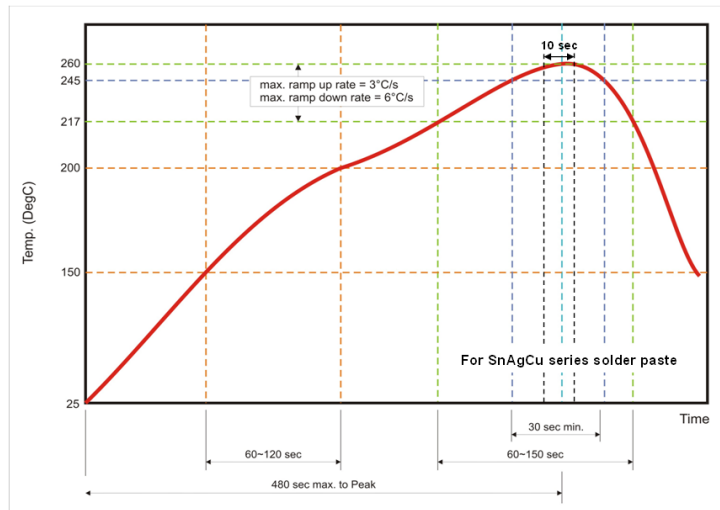


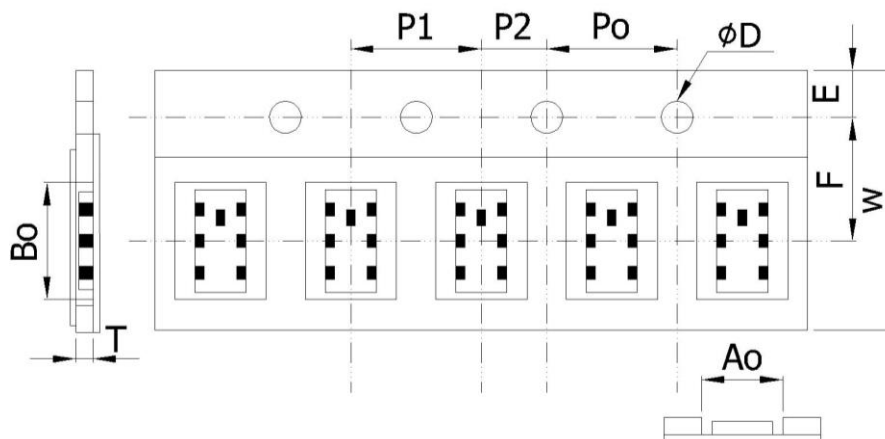
Fig 2. Infrared soldering profile

ORDERING CODE

RF Walsin RF device	DIP Product Code DIP :Diplexer	1606 Dimension code Per 2 digits of Length, Width, Thickness : e.g. : 1606 = Length 1.6 mm, Width 0.8 mm, Thickness 0.6 mm	L Application L : 2.4GHz/5GHz	16 Specification Design code	T Packing T : Reeled
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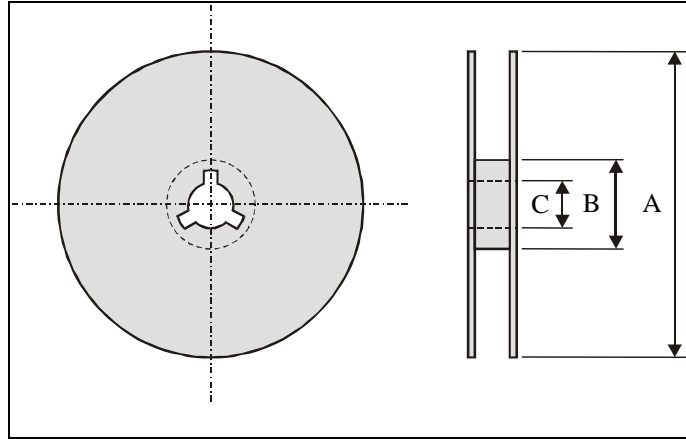
Minimum Ordering Quantity: 4000 pcs per reel.

PACKAGING



Paper Tape specifications (unit :mm)

Index	Ao	Bo	φD	T	W
Dimension (mm)	0.975 ± 0.10	1.76 ± 0.10	1.55 ± 0.05	0.75 ± 0.10	8.00 ± 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.
- (2) Storage environment condition.
 - Products should be storage in the warehouse on the following conditions.
 - Temperature : +5 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.