

APPROVAL SHEET

RFDIP Series – 1608(0603)- RoHS Compliance

MULTILAYER CERAMIC DIPLEXER

Halogens Free Product

2.4 GHz & 5 GHz ISM Band RF Application

P/N: RFDIP1606ELM9T20

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

FEATURES

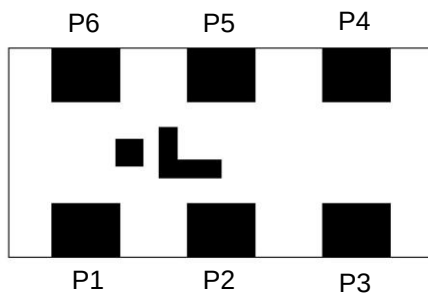
1. Miniature footprint: 1.6 X 0.8 X 0.6 mm³
2. Low Insertion Loss
3. High Rejection Rate
4. LTCC process

APPLICATIONS

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

CONSTRUCTION

Top view



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

DIMENSIONS

Figure	Symbol	Dimension (mm)
Top view 	L	1.60 ± 0.15
	W	0.80 ± 0.15
	T	0.60 ± 0.10
Side view 	A	0.175 ± 0.15
	B	0.25 ± 0.15
	C	0.25 ± 0.15
Bottom view 	D	0.50 ± 0.15
	E	0.20 ± 0.15

ELECTRICAL CHARACTERISTICS

RFDIP1606ELM9T20	Specification	
Frequency range	2400~2500 MHz	4900~5950 MHz
Insertion Loss	0.7 dB max. (0.56 dB typ.) at +25 °C 0.9 dB max. at -40 ~ +85 °C	1.0 dB max. (0.86 dB typ.) at +25 °C 1.2 dB max. at -40 ~ +85 °C
Attenuation	27 dB min. (37 dB typ.) @ 4800~5000 MHz 23 dB min. (32 dB typ.) @ 5000~5950 MHz 32 dB min. (39 dB typ.) @ 7200~7500 MHz	22 dB min. (26 dB typ.) @ 824~2170 MHz 28 dB min. (32 dB typ.) @ 2400~2500 MHz 28 dB min. (32 dB typ.) @ 9800 ~11900 MHz 15 dB min. (25 dB typ.) @ 15500 ~17500 MHz
Isolation	28 dB min. (33 dB typ.)	25 dB min. (31 dB typ.)
Return Loss	14 dB min. (23 dB typ.)	10 dB min. (15 dB typ.)
Impedance	Conjugate matched to MT7920 chipset	
Power Capacity	2W max.	
Moisture sensitivity levels	MSL is 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)

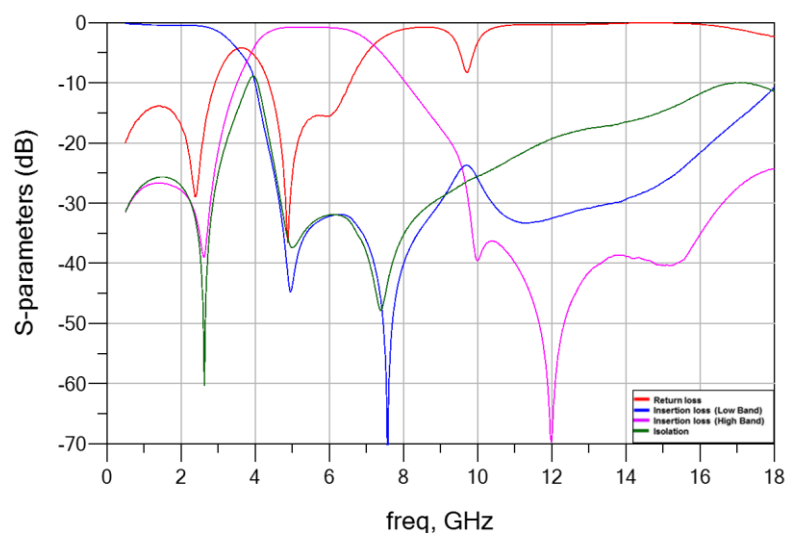
Operation Temperature Range: -40 ~ +85 °C

Storage Temperature Range: -40 ~ +85 °C

Storage Condition before Soldering (Included packaging material)

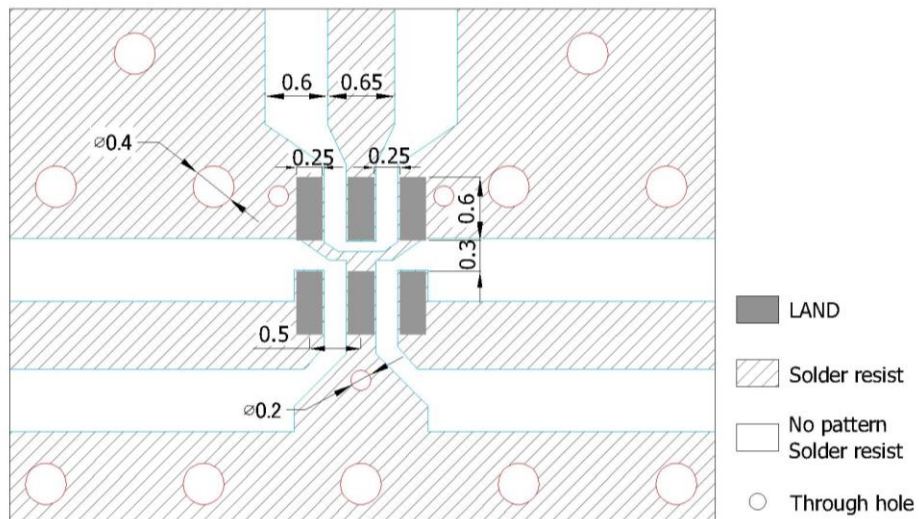
Storage Temperature Range: +5 ~ +40 °C

Humidity: 30 to 70% relative humidity

TYPICAL ELECTRICAL PERFORMANCE

LAND PATTERN

Figure



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 $-40 \sim 85^{\circ}\text{C}$.

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,
 This product could sustain by reflow process three times, and the temperature below 260℃.

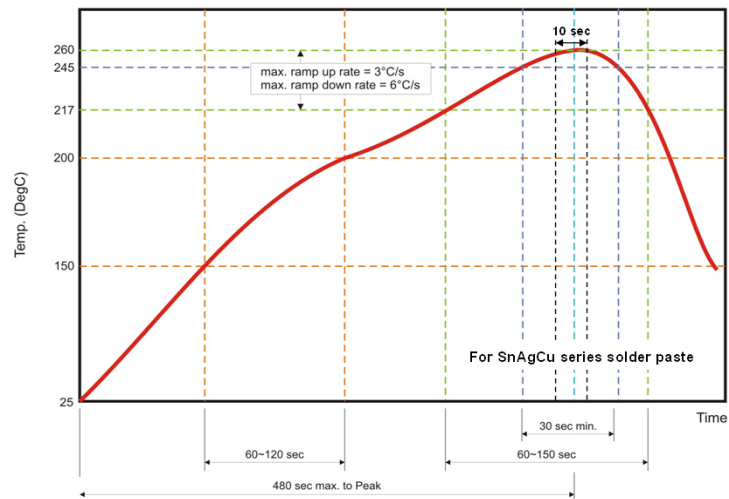


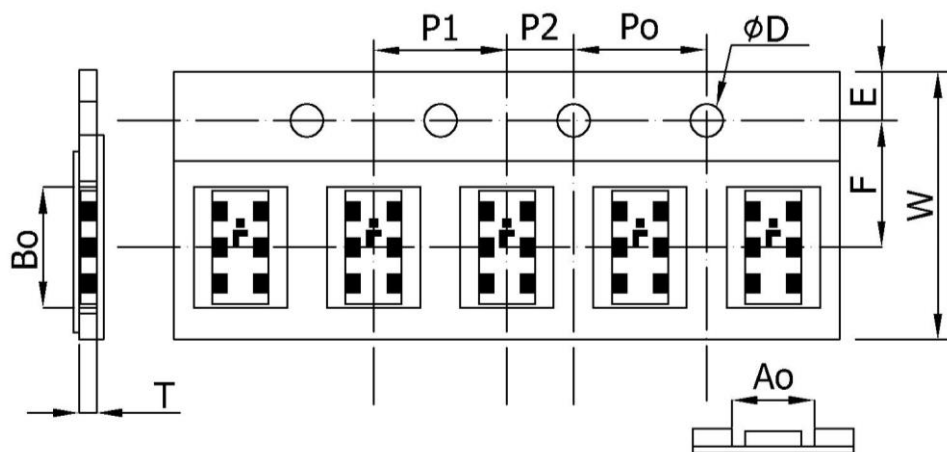
Fig 2. Infrared soldering profile

ORDERING CODE

RF	DIP	1606	E	L	M9T20
Walsin RF device	Product Code DIP :Diplexer	Dimension code Per 2 digits of Length, Width, Thickness : e.g. : 160806 = Length 1.6 mm, Width 0.8 mm, Thickness 0.6 mm	Pin Define Design code	Application L :2.4GHz/5GHz	Specification Design code

Minimum Ordering Quantity: 4000 pcs per reel.

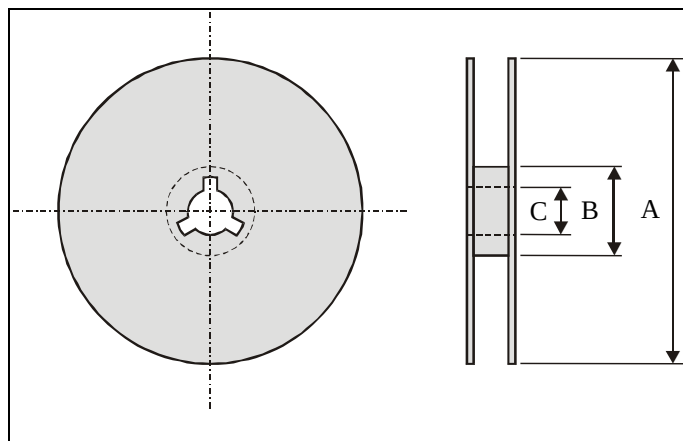
PACKAGING



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℃
 - 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.