

# APPROVAL SHEET

**KFDIP Series – 2012(0805)- RoHS Compliance**

**MULTILAYER CERAMIC DIPLEXER**

**Halogens Free Product**

**2.4 GHz & 5 GHz ISM Band RF Application**

**P/N: KFDIP2004L167B1U**

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

**FEATURES**

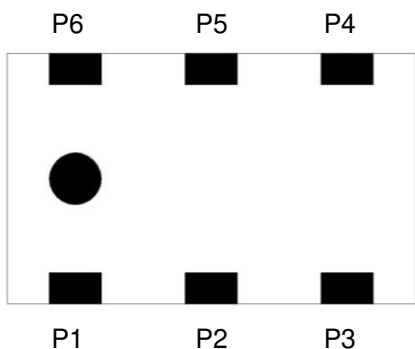
1. Miniature footprint: 2.0 X 1.25 X 0.4 mm<sup>3</sup>.
2. LTCC Process
3. Low Profile Thickness
4. Low Insertion Loss
5. High Rejection
6. RoHS Compliance
7. Halogens Free Product

**APPLICATIONS**

1. 2400 ~ 2500 MHz and 4900 ~ 5950 MHz working frequency

**CONSTRUCTION**

Top view



PIN	Connection	PIN	Connection
1	GND	4	Lower Freq. Port
2	Common(ANT) Port	5	GND
3	GND	6	Higher Freq. Port

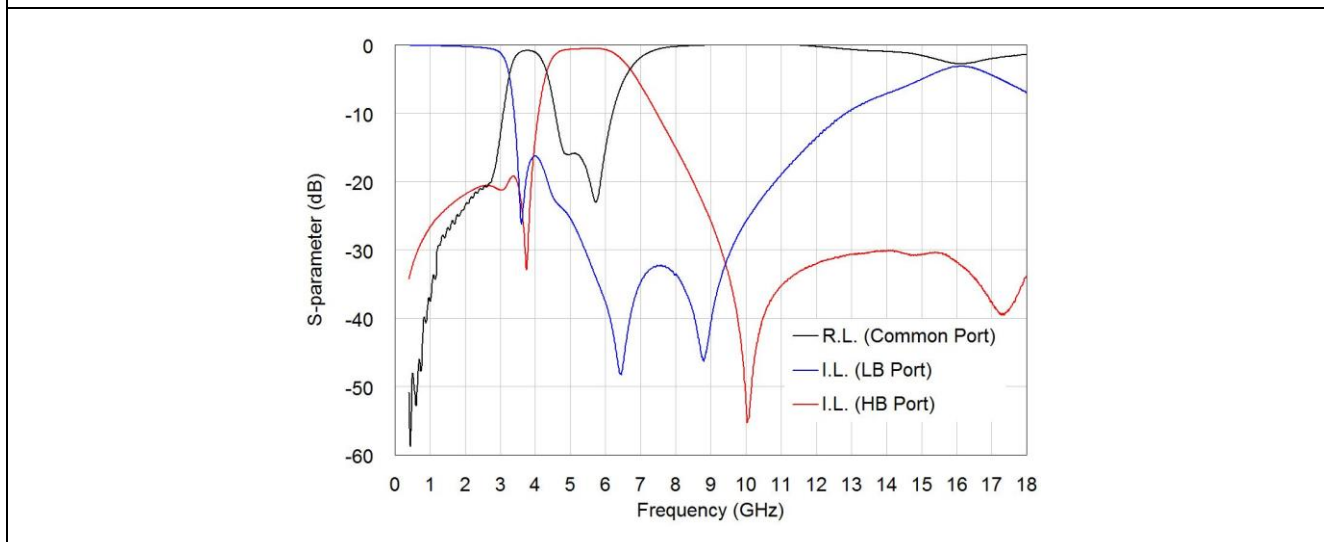
**DIMENSIONS**

Figure	Symbol	Dimension (mm)
<p>The figure shows three views of the component with dimension lines:                     <ul style="list-style-type: none"> <li><b>Top view:</b> Shows overall length L and width W.</li> <li><b>Bottom view:</b> Shows pad thickness E.</li> <li><b>Side view:</b> Shows total thickness T, and individual layer thicknesses A, B, and C. The total thickness T is the sum of A, B, and C.</li> </ul> </p>	L	2.00 ± 0.15
	W	1.25 ± 0.15
	T	0.40 ± 0.10
	A	0.20 ± 0.15
	B	0.30 ± 0.15
	C	0.35 ± 0.15
	D	0.65 ± 0.15
E	0.20 ± 0.15	

**ELECTRICAL CHARACTERISTICS**

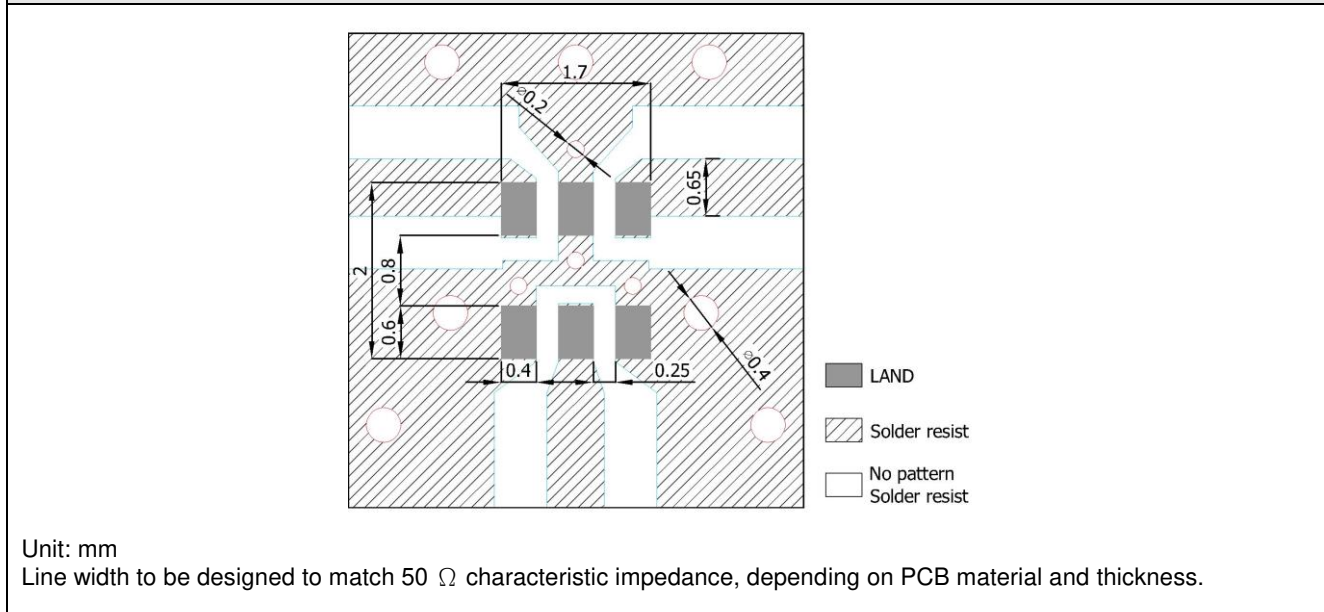
KFDIP2004L167B1U	Specification	
Frequency range	2400 ~ 2500 MHz	4900 ~ 5950 MHz
Insertion Loss	0.5 dB max.	1.0 dB max.
Attenuation	10 dB min. @ 3600 MHz 20 dB min. @ 4800 ~ 5000 MHz 20 dB min. @ 7200 ~ 7500 MHz	20 dB min. @ 824 ~ 915 MHz 20 dB min. @ 1800 ~ 2500 MHz 10 dB min. @ 3000 ~ 3900 MHz 4 dB min. @ 7250 MHz 20 dB min. @ 9800 ~ 11900 MHz 20 dB min. @ 14700 ~ 17850 MHz
Isolation	20 dB min. @ DC ~ 2500 MHz 20 dB min. @ 4900 ~ 5950 MHz	
VSWR	2.0 max.	
Impedance	50Ω	
Operation Temperature Range	-40°C ~ +85°C	
Moisture sensitivity levels	LEVEL 1 (Refer to : IPC/JEDEC J-STD-020)	

**Typical Electrical Chart**



**SOLDER 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 : $2 \pm 0.5$ 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 : $30 \pm 0.5$ 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 : $120\sim 150^{\circ}\text{C}$ , 1 minute. *Solder temperature : $270\pm 5^{\circ}\text{C}$ *Immersion time : $10\pm 1$ sec Solder : Sn3Ag0.5Cu for lead-free Measurement to be made after keeping at room temperature for $24\pm 2$ 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 : $5\text{N}(\leq 0603)$ ; $10\text{N}( >0603)$ *Test time : $10\pm 1$ 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 $5\pm 1$ sec. Measurement to be made after keeping at room temperature for $24\pm 2$ 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,

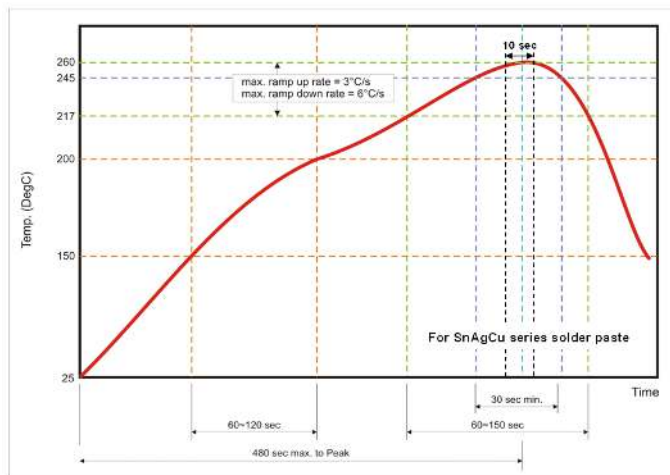


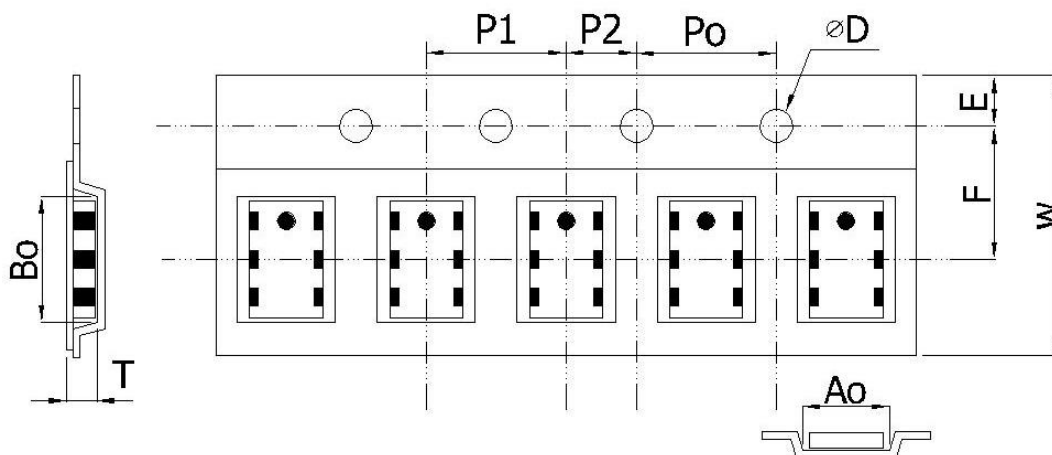
Fig 2. Infrared soldering profile

**ORDERING CODE**

<b>KF</b> Walsin RF device	<b>DIP</b> Product Code DIP : Diplexer	<b>20</b> Dimension code Per 2 digits of Length, Width, : e.g. : 20 = Length 20, Width 12,	<b>04</b> Dimension code 04= Thickness 04	<b>L</b> Application L : 2.4GHz/5GHz	<b>167B1U</b> Specification Design code
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Minimum Ordering Quantity: 2000 pcs per reel.

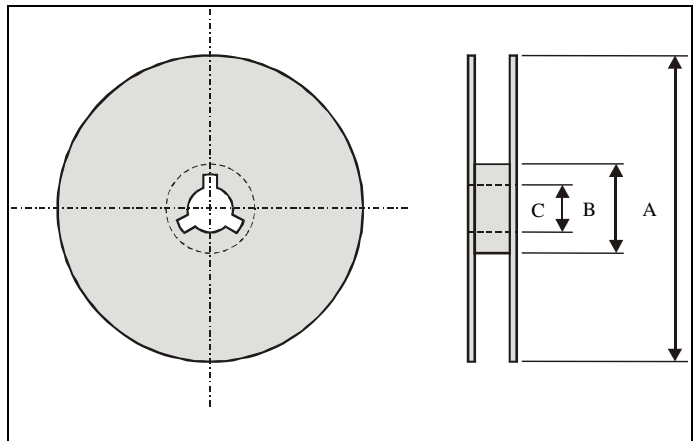
**PACKAGING**



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

Index	Ao	B0	ΦD	T	W
Dimension (mm)	1.40 ± 0.10	2.25 ± 0.10	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: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.