
Diplexer



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■ INTRODUCTION

Diplexer is used for separating specific frequency in a mobile phone, Diplexer has six terminals composed of antenna port, low frequency port(AMPS), high frequency port(GPS,PCS) and three grounds. We produce diplexers for AMPS/GPS bands and AMPS/PCS bands. Diplexers for TV/CDMA bands and 2.45GHz/5GHz bands are under development. Our diplexers have two different kinds of pin structures called 01 or 02. Different types of pin structure help you to design a circuit in HHP.

■ FEATURE AND APPLICATION

● Feature

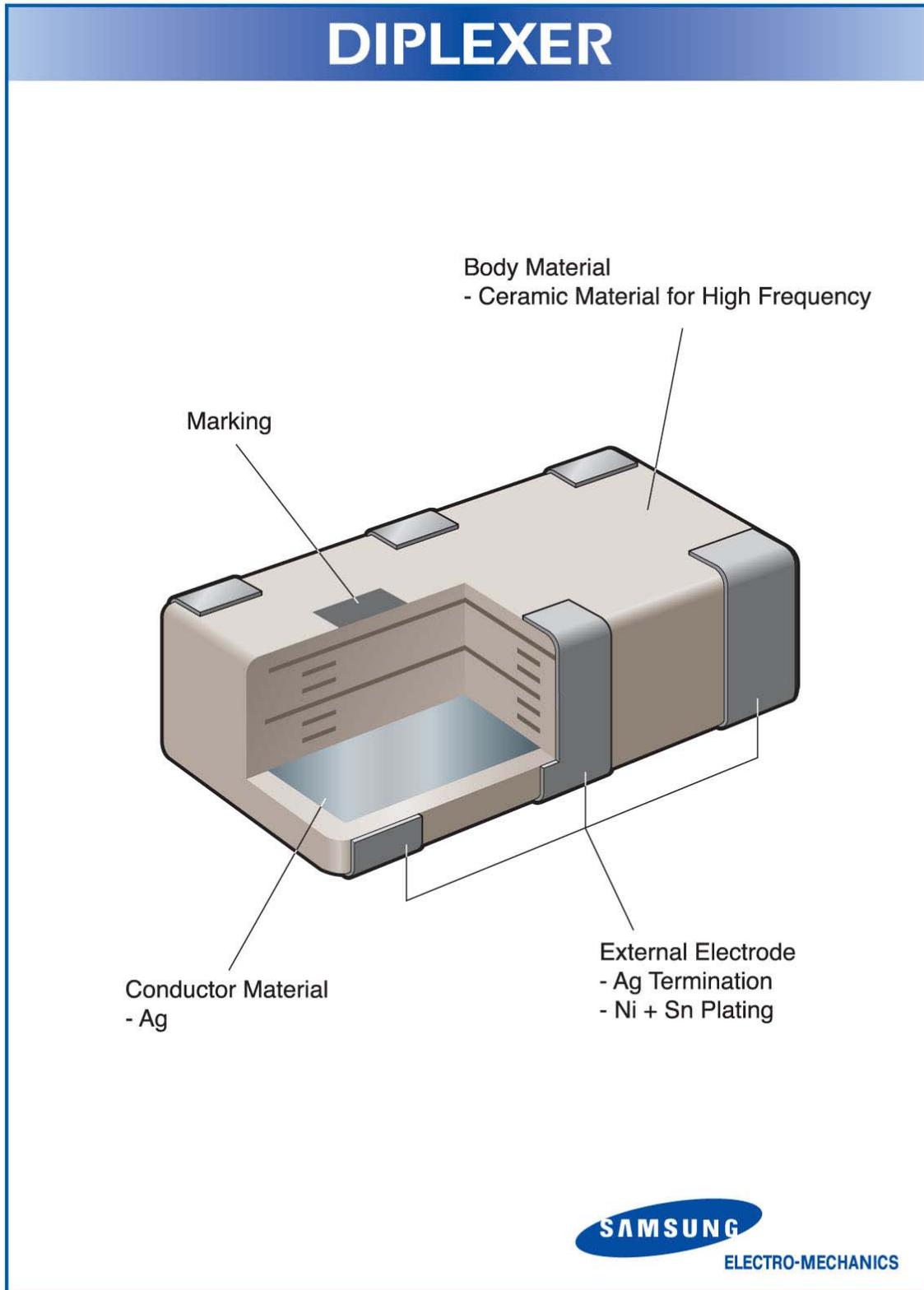
- Consist of low pass filter and high pass filter.
- Low insertion loss.
- Small size, 2.0x1.25x0.9mm. light weight.
- Available for dual-band system.
- Operating temperature: -40°C to +85°C-
- Storage temperature : +15°C to +35°C
- Reflow solderable. low-profiled SMD
- Available in tape and reel packings for automatic mounting

● Application

- Separating specific frequency in a mobile phone

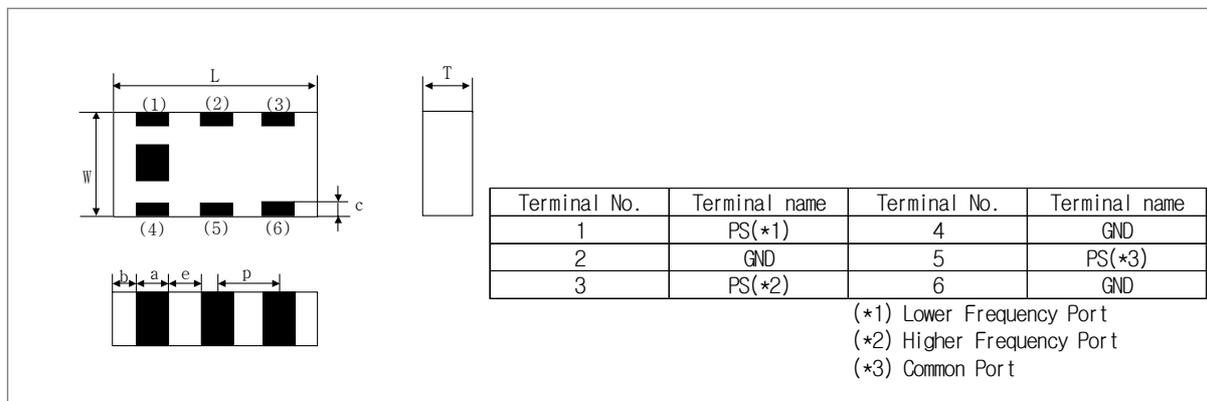
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■ STRUCTURE



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■ APPEARANCE AND DIMENSION



CODE	DIMENSION (mm)							
	L	W	T	a	b	c	e	p
21	2.00±0.15	1.25±0.15	0.95±0.10	0.3+0.1/-0.15	0.20±0.15	0.3+0.1/-0.2	0.35±0.10	0.65±0.05
31	3.2 ±0.15	1.6 ±0.15	1.1 ±0.10	0.55 ±0.15	0.35 ±0.15	0.3 +0.1/-0.2	0.40 ±0.15	1.00 ±0.10

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■ PART NUMBERING

DX **21** **T** **F** **A** **P** **01**
① ② ③ ④ ⑤ ⑥ ⑦

- ① Abbreviation of Diplexer
- ② Dimension
- ③ Material Code
- ④ The number of terminals
- ⑤ Center Frequency of Low Band
- ⑥ Center Frequency of High Band
- ⑦ Pin arrangement structure

② DIMENSION

CODE	DIMENSION (L×W)
21	2.0 × 1.25mm
31	3.2 × 1.60mm

③ MATERIAL

CODE	DESCRIPTION OF CODE
T	Material For High Frequency

④ THE NUMBER OF TERMINALS

CODE	DESCRIPTION OF CODE
F	6

⑤ CENTER FREQUENCY OF LOW BAND

CODE	DESCRIPTION OF CODE	FREQUENCY
A	AMPS BAND	859 ± 35 MHz
G	GSM 800	920 ± 40 MHz
E	EGSM 900	942.5 ± 17.5 MHz
I	I-DEN	806 ~ 941 MHz
K	KCDMA	824 ~ 894 MHz

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⑥ CENTER FREQUENCY OF HIGH BAND

CODE	DESCRIPTION OF CODE	FREQUENCY
P	PCS BAND	1920 ± 70 MHz
W	W-CDMA	2045 MHz
G	GPS	1575.7 MHz
D	DCS	1795 ± 85 MHz

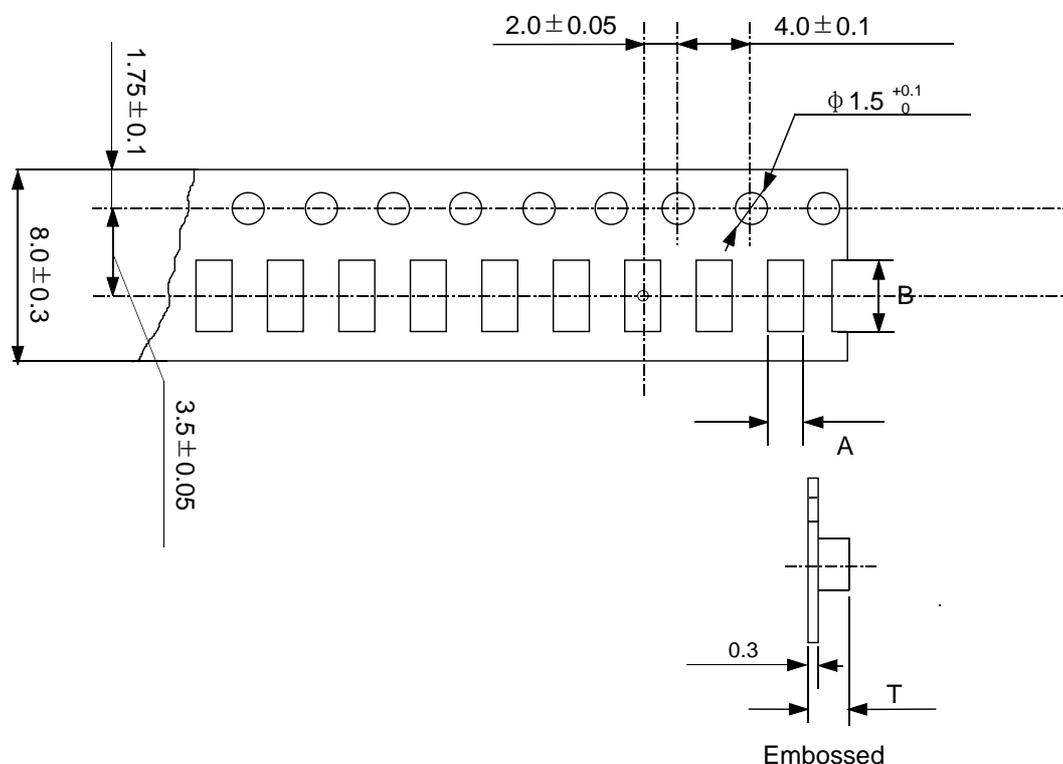
⑦ PIN ARRANGEMENT STRUCTURE

CODE	DESCRIPTION OF CODE
01	01 Pin Structure(low band/high band)
02	02 Pin Structure(high band/low band)
03	03 Pin Structure(low band/high band)

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PACKAGING

EMBOSSED PLASTIC TAPE



unit : mm

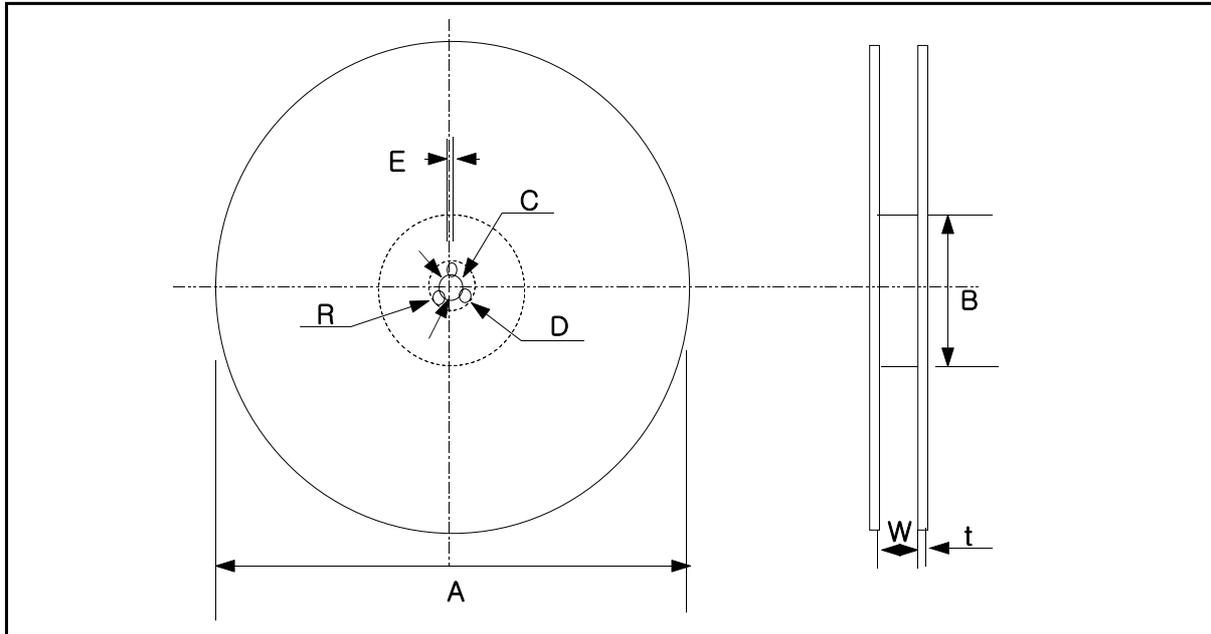
TYPE	TAPE MATERIAL	A	B	T	Tc (Chip Thickness)
31	EMBOSSED BOARD	2.0±0.2 [.079±.008]	3.6±0.2 [.142±.008]	2.0 [.079]	1.1±0.1
21	EMBOSSED TAPE	1.45±0.1	2.25±0.1	1.25 [±0.1]	0.95±0.1

QUANTITY

TYPE	THICKNESS OF BODY[MM]	STANDARD QUANTITY[PCS]
21	0.95	3000
31	1.0	3000

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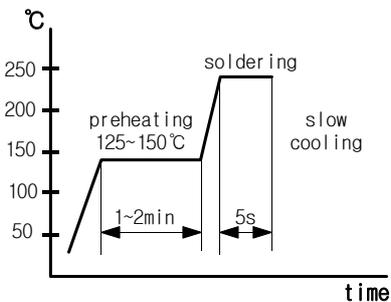
● REEL DIMENSION



unit : mm

A	B	C	D	E	W	T	R
$\phi 178 \pm 2$	$\phi 60 \pm 5.0$	$\phi 13 \pm 0.5$	$\phi 21 \pm 0.8$	2 ± 0.5	10.0 ± 1.5	0.8 ± 0.2	1.0

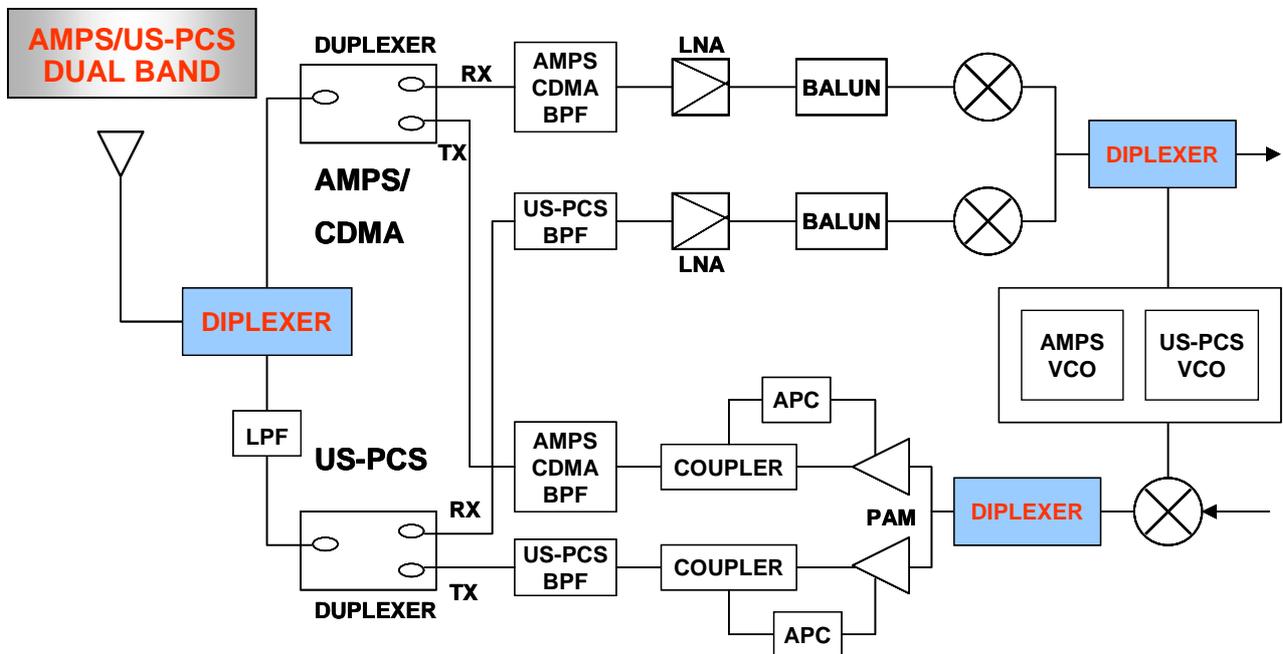
■ RELIABILITY TEST DATA

NO	ITEM	CONDITION	SPECIFICATION
1	THERMAL SHOCK	TEMP. CYCLE OF THE FOLLOWING BE SUBJECT FOR 100CYCLES. -40℃,30min ↔ +85℃,30min	ELECTRICAL CHARACTERISTICS SHALL BE SATISFIED.
2	HUMIDITY RESISTANCE	+40±3℃, RELATIVE HUMIDITY 90~95% FOR 1000hours.	ELECTRICAL CHARACTERISTICS SHALL BE SATISFIED.
3	HIGH TEMPERATURE RESISTANCE	+125±3℃ FOR 1000hours.	ELECTRICAL CHARACTERISTICS SHALL BE SATISFIED.
4	LOW TEMPERATURE RESISTANCE	-40±3℃ FOR 1000hours.	ELECTRICAL CHARACTERISTICS SHALL BE SATISFIED.
5	SOLDERABILITY	2% EUTECTIC SOLDER. THE ENTIRE SAMPLE SHALL BE DIPPED IN SOLDER AT 230±5℃ FOR 10s.	A NEW UNIFORM COATING OF SOLDER SHALL COVER A MINIMUM OF 90% OF THE SURFACE BEING IMMersed.
6	RESISTANCE TO SOLDERING HEAT	<p>PEAK : 220±5℃,40S THE SPECIMEN SHALL BE PASSED THROUGH THE REFLOW FURNACE WITH THE CONDITION SHOWN IN THE ABOVE PROFILE FOR 3 TIMES.</p>  <p>The graph shows a temperature profile for reflow soldering. The y-axis is temperature in degrees Celsius (°C) ranging from 50 to 250. The x-axis is time. The profile consists of three main stages: 1. Preheating: Temperature rises to 125-150°C and is held for 1-2 minutes. 2. Soldering: Temperature rises to a peak of 220±5°C and is held for 40 seconds. 3. Slow cooling: The temperature decreases from the peak.</p>	<p>ELECTRICAL CHARACTERISTICS SHALL BE SATISFIED.</p> <p>WITHOUT DISTINCT DEFORMATION IN APPEARANCE.</p>

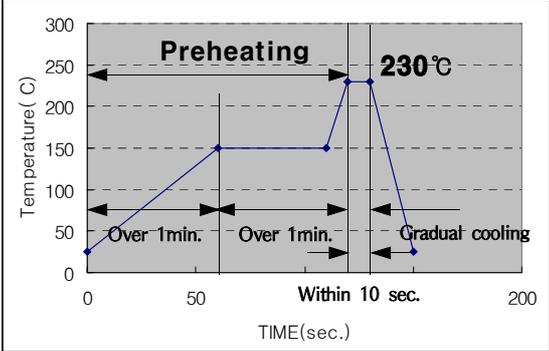
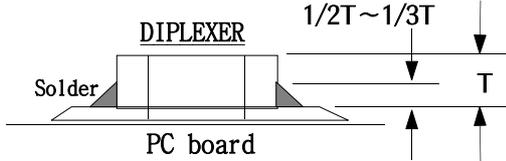
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■ BLOCK DIAGRAM

● FREQUENCY SEPARATOR IN DUAL BAND PHONE



APPLICATION MANUAL

STAGE	PRECAUTION	TECHNICAL CONSIDERATION
1. Soldering	<p>► Soldering</p> <p>1. Temperature, time, amount of solder, etc. are specified in accordance with the following recommended conditions.</p>	<p>1-1. Preheating when soldering</p> <p>Heating : Diplexer should be preheated within 100 to 130°C of the soldering.</p> <p>Cooling : The temperature difference between the components and cleaning process should not be greater than 100°C. Diplexer is susceptible to thermal shock when exposed to rapid or concentrated heating or rapid cooling. Therefore, the soldering process must be conducted with a great care so as to prevent malfunction of the components due to excessive thermal shock..</p> <p>※ Recommended conditions for soldering [Reflow soldering] Temperature Profile</p>  <p>※ 1. The ideal condition is to have solder mass (fillet) controlled to 1/2 to 1/3 of the thickness of the diplexer, as shown below:</p> 
2. Cleaning	<p>► Cleaning conditions</p> <p>1. When cleaning the PC board after the diplexer are all mounted, select the appropriate cleaning solution according to the type of flux used and purpose of the cleaning(e.g. to remove soldering flux or other materials from the production process.)</p> <p>2. Cleaning conditions should be determined after verifying, through a test run, that the cleaning process does not affect the diplexer's characteristics.</p>	<p>2. Because excessive dwell times can detrimentally affect solderability, soldering duration should be kept as close to recommended times as possible.</p> <p>1. The use of inappropriate solutions can cause foreign substances such as flux residue to adhere to the splitter, resulting in a degradation of the splitter's electrical properties (especially insulation resistance).</p> <p>2. Inappropriate cleaning conditions (insufficient or excessive cleaning) may detrimentally affect the performance of the splitters.</p> <p>(1)Excessive cleaning</p> <p>In the case of ultrasonic cleaning, too much power output can cause excessive vibration of the PC board which may lead to the cracking of the diplexer or the soldered portion, or decrease the terminal electrodes' strength. Thus the following conditions should be carefully checked;</p> <p>Ultrasonic output Below 20 w/l Ultrasonic frequency Below 40 kHz Ultrasonic washing period 5 min. or less</p>

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STAGE	PRECAUTION	TECHNICAL CONSIDERATION
3. Post cleaning processes	<p>▶ Application of resin coatings, molding, etc. to the PCB and components.</p> <ol style="list-style-type: none"> 1. With some type of resins a decomposition gas or chemical reaction vapor may remain inside the resin during the hardening period or while left under normal storage conditions resulting in the deterioration of the diplexer's performance. 2. When a resin's hardening temperature is higher than the diplexer's operating temperature, the stresses generated by the excess heat may lead to diplexer damage or destruction. 3. Stress caused by a resin's temperature generated expansion and contraction may damage diplexer <p>The use of such resins, molding materials etc. is not recommended.</p>	
4. Storage conditions	<p>▶ Storage</p> <ol style="list-style-type: none"> 1. To maintain the solderability of terminal electrodes and to keep the packaging material in good condition, care must be taken to control temperature and humidity in the storage area. Humidity should especially be kept as low as possible. <p>Recommended conditions Ambient temperature Below 40℃ Humidity Below 70% RH</p> <p>The ambient temperature must be kept below 30℃. Even under ideal storage conditions diplexer electrode solderability decreases as time passes, so diplexer should be used within 6 months from the time of delivery.</p> <p>※ The packaging material should be kept where no chlorine or sulfur exists in the air</p>	<ol style="list-style-type: none"> 1. If the parts are stocked in a high temperature and humidity environment, problems such as reduced solderability caused by oxidation of terminal electrodes and deterioration of taping/package materials may take place. For this reason, components should be used within 6 months from the time of delivery. If exceeding the above period, please check solderability before using the diplexer

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■ CROSS REFERENCE

BAND	FREQ.[MHz]		SAMSUNG	HITACHI	MURATA
	LOW	HIGH			
AMPS/ US-PCS	824~894	1850~1990	DX21TFAP01	SLF-S080ML	LFDP15N0039A
			DX21TFAP03		
			DX31TFAP01	SLF-080EL	LFDP20N0022A
			DX21TFAP03	SLF-080ML	
AMPS/GPS	824~925	1570~1580	DX21TFAG01	-	-
GSM/DCS	880~960	1710~1880	DX21TFGD01	SLF-S090ME	LFDP15N0044A

■ NOTICE

● REPORT BEFORE CHANGE

If it is required to change the specifications, materials or manufacturing methods of this specified diplexers, we shall inform on written statement with its quality and reliability data before changes may occur.

● PACKAGING

Package includes label with below item and outgoing inspection data on customer's request.

- Part No.& Lot No.
- Quantity
- Name and logo of manufacturer

● RESTRICTION OF ENVIRONMENTAL DESTRUCTIVE MATERIAL

Diplexers specified on this specification do not use any of under stated materials.

Cd, Hg, As, Br and its chemical composite, PCB and asbestos.

PBBS
PBBOs
PBDO
PBDE
PBB

● USAGE OF MATERIALS DESTRUCTIVE OZONOSPHERE

Diplexers specified on this specification do not use any of under stated ODS materials on its manufacturing stages.

Freon
Haron
1-1-1 TCE
CC1₄
HCFC