1 Features

- RF Transformer “Stabilized Matching Device“ is RF impedance matching components.
- You can adjust impedance matching easily between antenna and feeding point, when you use RF Transformer.
- RF Transformer has very few frequency characteristics. So it’s extremely useful for RF impedance matching.

2 Part Number Configuration

SMST ① 15 ② 08 ③ 19 ④ – 015 ⑤

① Product ID (SMST = Antenna Matching device)
② Dimension Code

(Unit : mm)

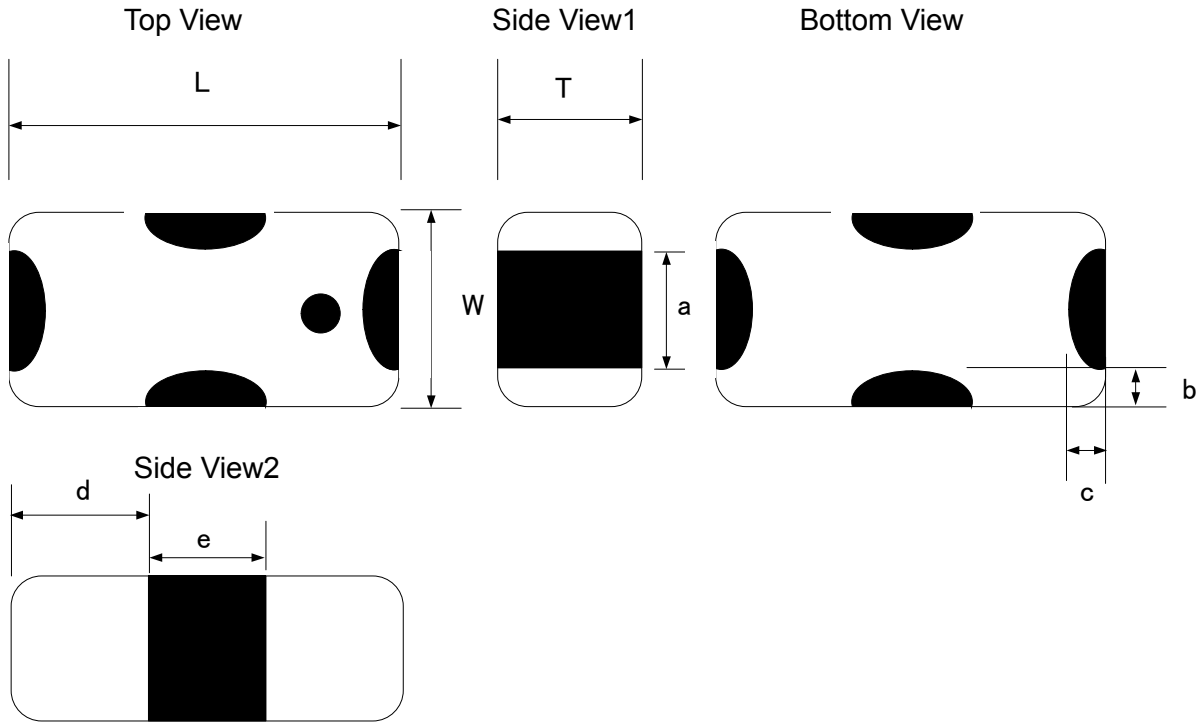
Code	Dimension
15	1.0 x 0.5

③ Low Band impedance value (@892MHz)
④ High Band impedance value (@1940MHz)
⑤ Serial Number

※RoHS Compliant
Halogen free
T/R only.

3 Construction Dimensions

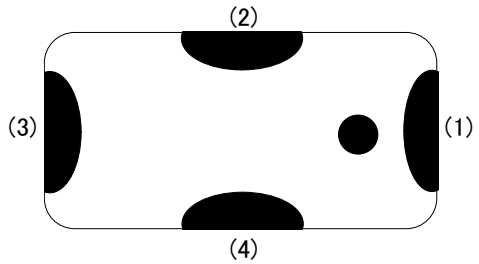
3.1 Dimensions



Unit:mm

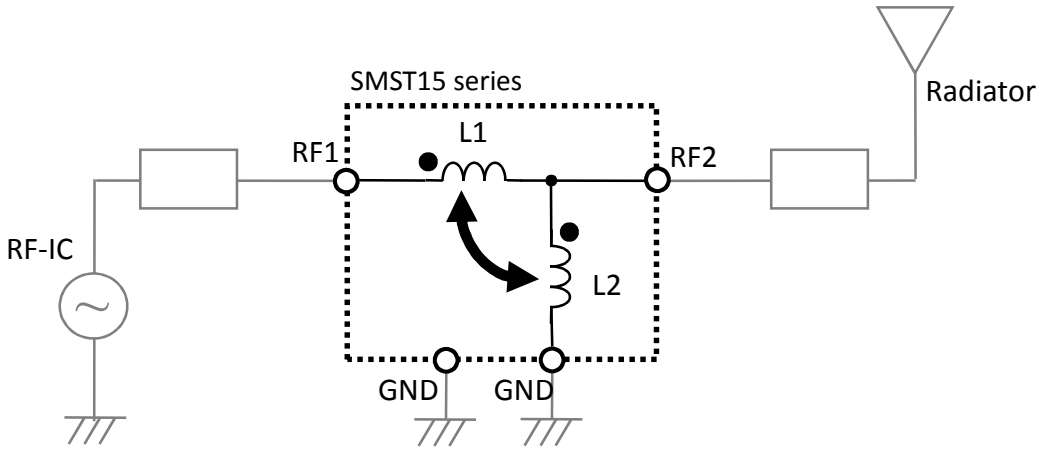
Mark	Size	Mark	Size
L	1.0 +/- 0.075	b	0.1 +/- 0.1
W	0.5 +/- 0.075	c	0.1 +/- 0.1
T	0.37 +0.03/- 0.05	d	0.35 +/- 0.10
a	0.3 +/- 0.1	e	0.3 +/- 0.1

3.2 Pin Configuration



Pin No.	Pin Name	Description
(1)	RF1	RF port（RFIC）
(2)	GND	Ground
(3)	RF2	RF port（Radiator）
(4)	GND	Ground

3.3 Circuit Diagram



4 Characteristics

4.1 Absolute maximum ratings

Rating	Symbol	Value	Unit
Operating Temperature	T_{OP}	-40 to +85	ºC
Storage Temperature	T_{STO}	-40 to +85	ºC
Input power	P_{IN}	35	dBm

4.2 Electrical Characteristics (T=25 +/-5 ºC)

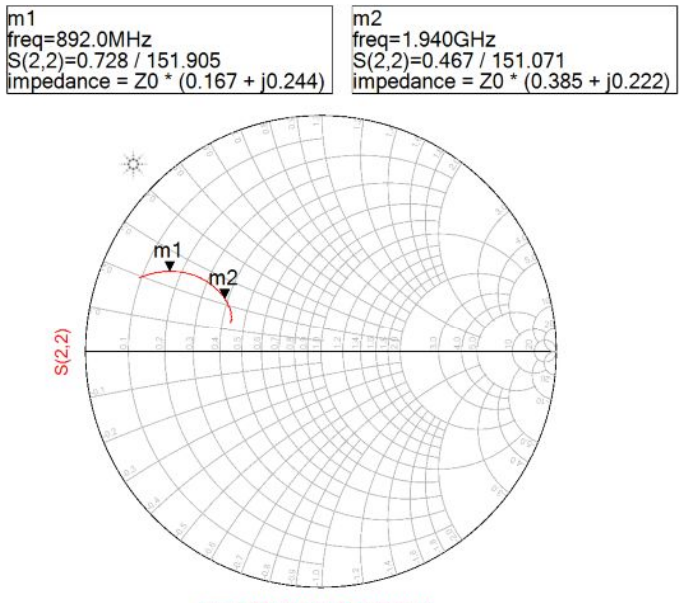
Parameter	Low Band (892MHz)		High Band (1940MHz)	
	Impedance	Insertion Loss*1	Impedance	Impedance
Symbol	**R_L**	**IL_L**	**R_L**	**IL_L**
Unit	**Ω**	**dB**	**Ω**	**dB**
Test condition	**RF1=50Ω**	**RF1=50Ω, RF2=R_L**	**RF1=50Ω**	**RF1=50Ω, RF2=R_L**
SMST150819-015	8	0.4	19	0.2
SMST150822-016	8	0.4	22	0.1
SMST151219-017	12	0.4	19	0.2
SMST151222-018	12	0.3	22	0.1
SMST150515-019	5	0.6	15	0.2

*1: RF2 端子を STAMA の複素共役で接続した場合の値

4.3 Typical Characteristics

[SMST150819-015]

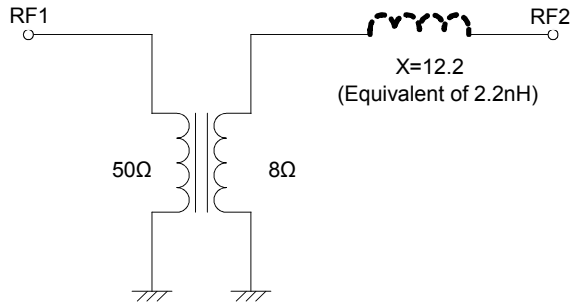
Smith chart



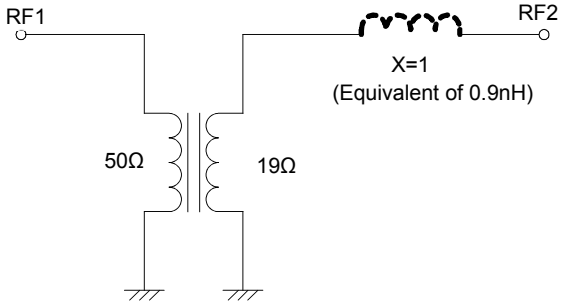
Freq(600MHz to 3GHz

Equivalent circuit

[Low Band]

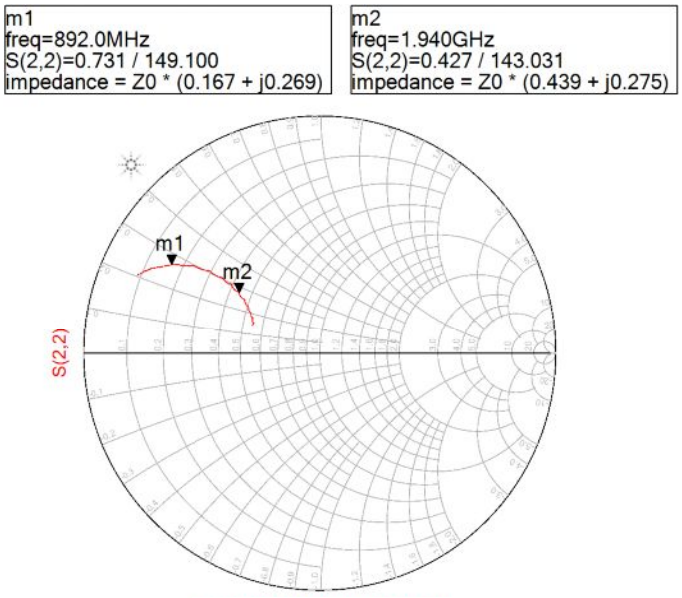


[High Band]



[SMST150822-016]

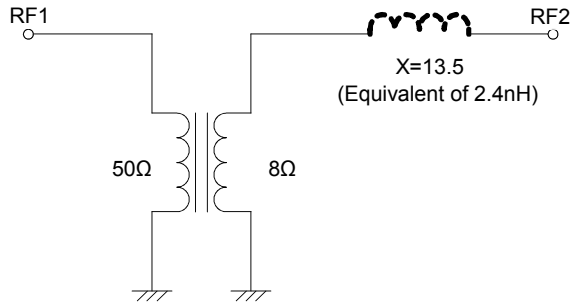
Smith chart



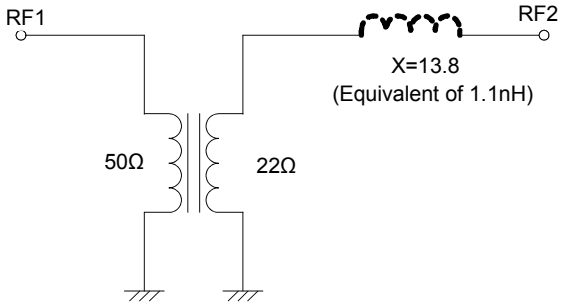
Freq(600MHz to 3GHz

Equivalent circuit

[Low Band]

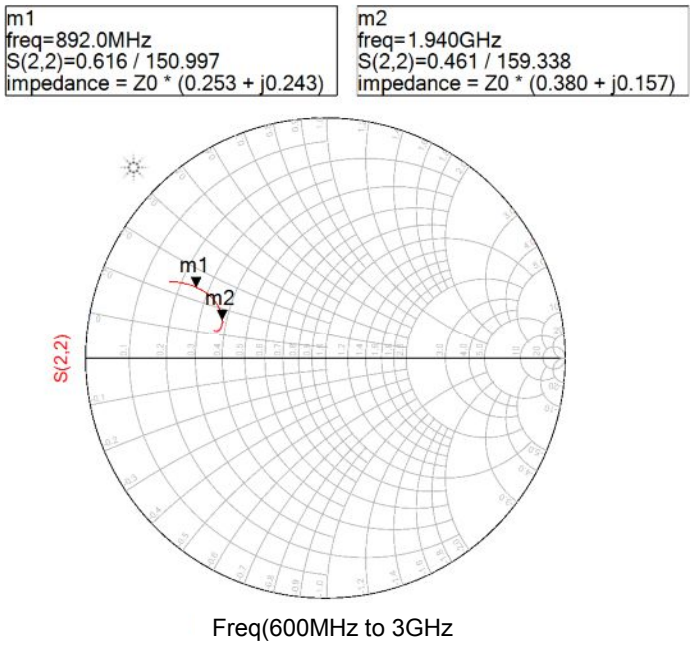


[High Band]



[SMST151219-017]

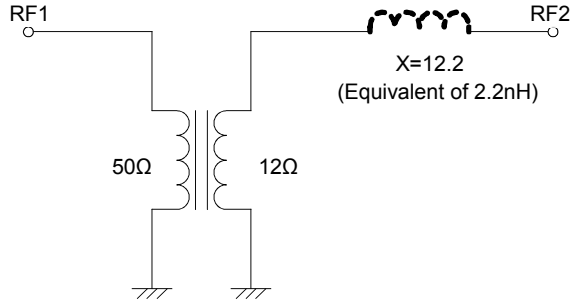
Smith chart



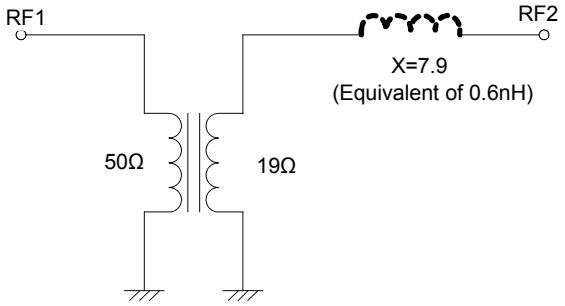
Freq(600MHz to 3GHz

Equivalent circuit

[Low Band]

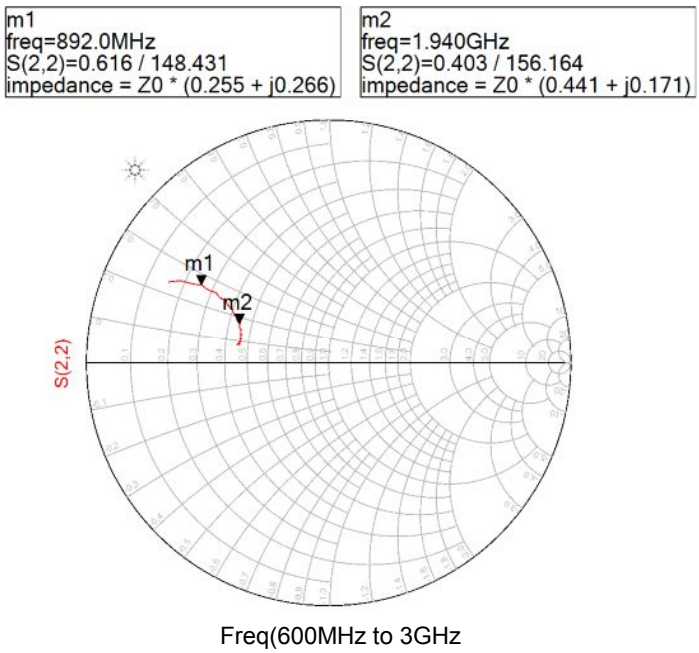


[High Band]



[SMST151222-018]

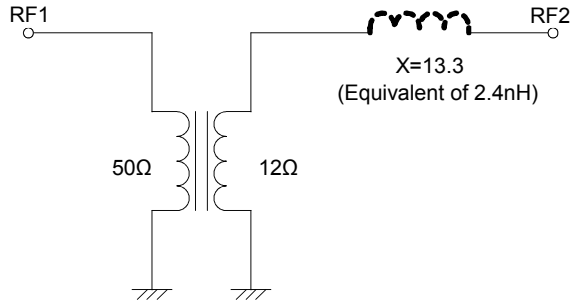
Smith chart



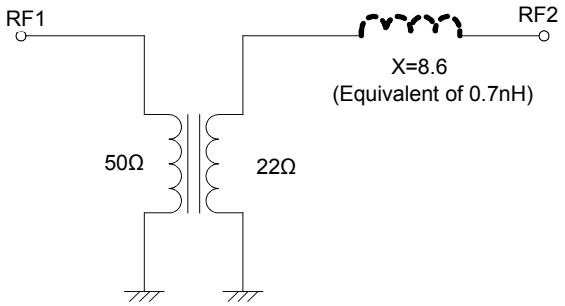
Freq(600MHz to 3GHz

Equivalent circuit

[Low Band]

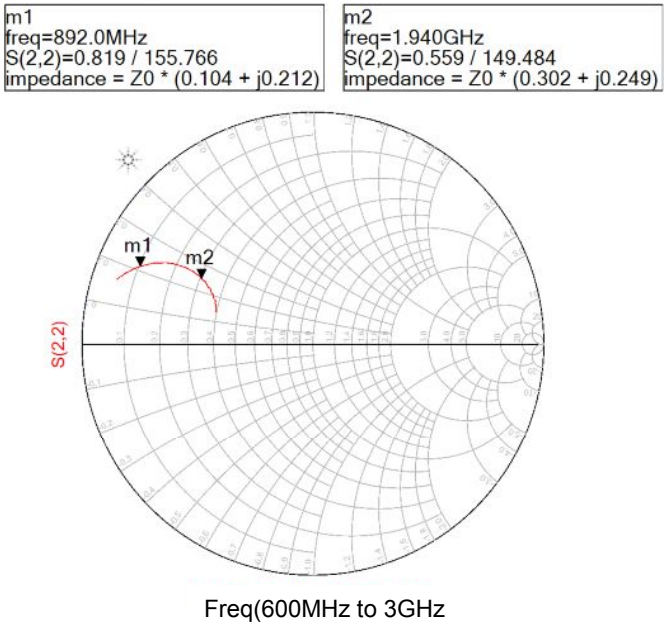


[High Band]



[SMST150515-019]

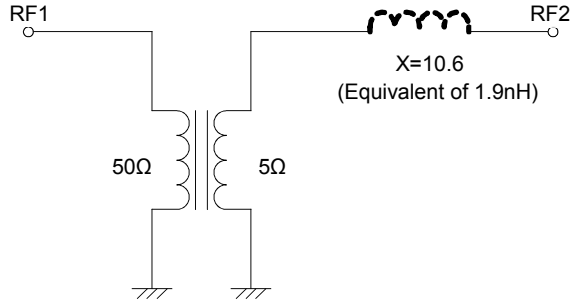
Smith chart



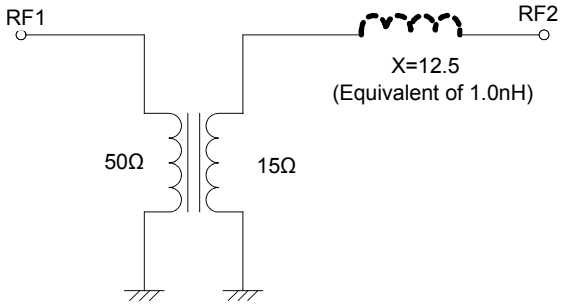
Freq(600MHz to 3GHz

Equivalent circuit

[Low Band]

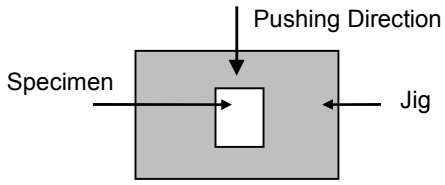


[High Band]



5 Reliability Test

【Mechanical Test】

No.	Items		Specifications	Test Methods
1	Vibration Resistance	Appearance	No severe damages	Solder specimens on the testing jig (glass fluorine boards) shown in appended Fig.1 by a Pb free solder. The soldering shall be done either by iron or reflow and be conducted with care so that the soldering is uniform and free of defect such as by heat shock. Frequency : 10~2000 Hz Acceleration : 196 m/s^2 Direction : X,Y,Z 3 axis Period : 2 h on each direction Total 6 h.
		Electrical Specifications	Satisfy specifications listed in paragraph 4-2 over operational temperature range	
2	Shock	Appearance	No severe damages	Solder specimens on the testing jig (glass fluorine boards) shown in appended Fig.1 by a Pb free solder. The soldering shall be done either by iron or reflow and be conducted with care so that the soldering is uniform and free of defect such as by heat shock Acceleration : 981 m/s^2 Period : 0.6 ms. Cycle : 3 times
		Electrical Specifications	Satisfy specifications listed in paragraph 4-2 over operational temperature range	
3	Deflection		No damage with 1.6mm deflection	Solder specimens on the testing jig (glass epoxy boards) by a Pb free solder. The soldering shall be done either by iron or reflow and be conducted with care so that the soldering is uniform and free of defect such as by heat shock.
4	Soldering strength (Push Strength)		3N Minimum	Solder specimens onto test jig shown below. Apply pushing force at 0.5mm/s until electrode pads are pealed off or ceramics are broken. Pushing force is applied to longitudinal direction. 
5	Solderability of Termination		95% of the terminations is to be soldered evenly and continuously.	Immerse specimens first an ethanol solution of rosin, then in a Pb free solder solution for 2±0.5 sec. at 245±5 °C. Preheat : 100~120 °C, 60 sec. Solder Paste : Sn-Ag-Cu Flux : Solution of ethanol and rosin (25 % rosin in weight proportion)
6	Resistance to Soldering Heat (Reflow)	Appearance	No severe damages	Preheat Temperature : 150-180 °C Preheat Period : 90+/-30 s High Temperature : 220 ℃ High Temp. Period : 30+/-10 s Peak Temperature : 260+5/-0 °C Specimens are soldered twice with the above condition, and then kept in room condition for 24 h before measurements.
		Electrical specifications	Satisfy specifications listed in paragraph 4-2 over operational temperature range	

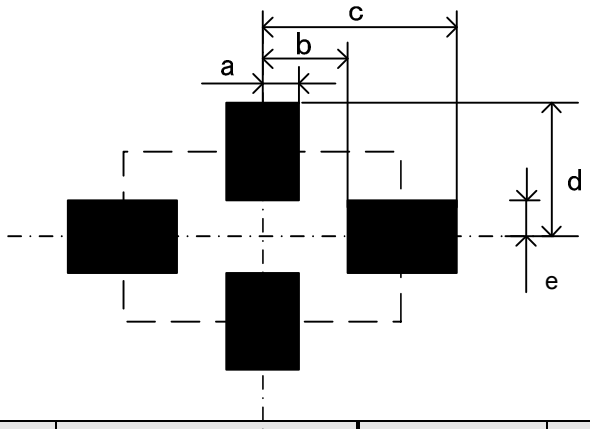
【Environmental Test】

No.	Items		Specifications	Test Methods
7	High Temp. Exposure	Appearance	No severe damages	Temperature : 85+2/-0 °C Period : 1000+48/-0 h Room Condition : 2 ~ 24 h
		Electrical specifications	Satisfy specifications listed in paragraph 4-2 over operational temperature range	
8	Temperature Cycle	Appearance	No severe damages	Set the specimens to the supporting jig in the same manner and under the same conditions as Fig.1 and conduct the 100 cycles according to the temperatures and time shown in the following table. Set it for 2 to 24 h at room temperature, then measure.
		Electrical specifications	Satisfy specifications listed in paragraph 4-2 over operational temperature range	
9	Humidity (Steady State)	Appearance	No severe damages	Temperature : 85±2 ℃ Humidity : 80～90 %RH Period : 1000+48/-0 h Room Condition : 2 ～ 24 h
		Electrical specifications	Satisfy specifications listed in paragraph 4-2 over operational temperature range	
10	Low Temp. Exposure	Appearance	No severe damages	Temperature : -40±2 ℃ Period : 1000+48/-0 h Room Condition : 2 ～ 24 h
		Electrical specifications	Satisfy specifications listed in paragraph 4-2 over operational temperature range	

Step	Temp(°C)	Time(min)
1	Min. Operating Temp.+0/-3	30±3
2	Max. Operating Temp.+0/-3	30±3

Fig.1 Land Pattern

TOP VIEW



Unit: mm

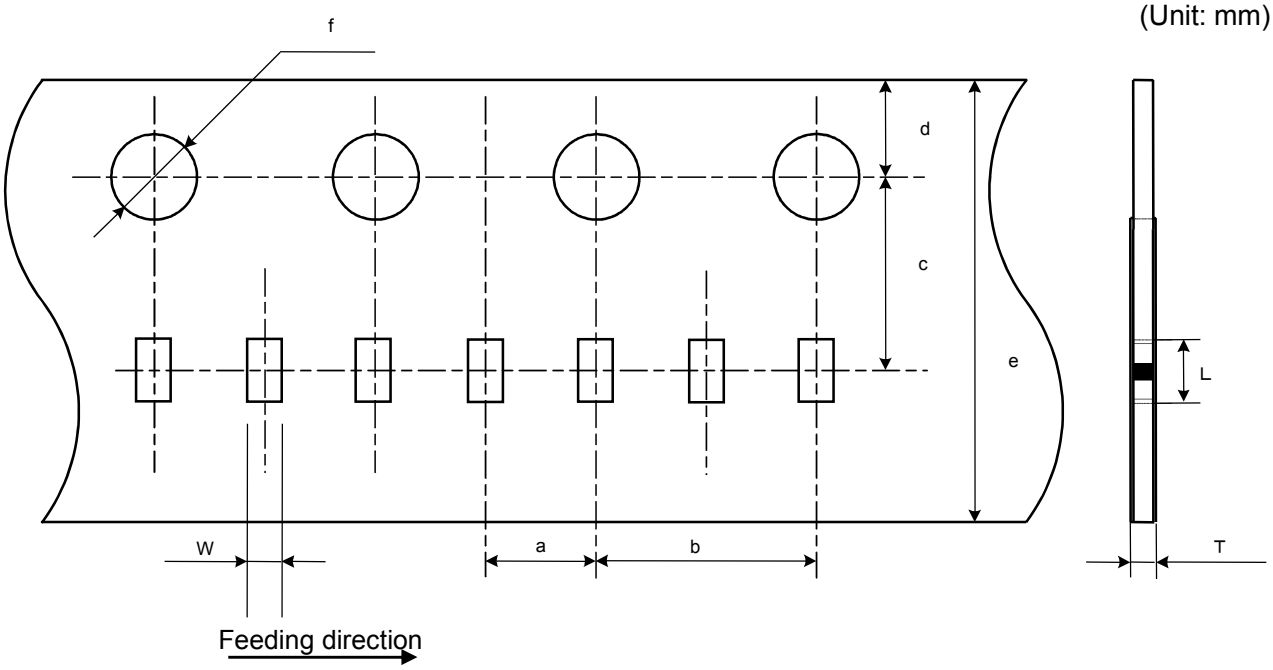
Mark	Size	Mark	Size
a	0.15	d	0.55
b	0.35	e	0.15
c	0.8		

1 Note: This footprint is for reference purpose only.

6 Tape and Reel Packing

1) Dimensions of Tape

(Unit: mm)

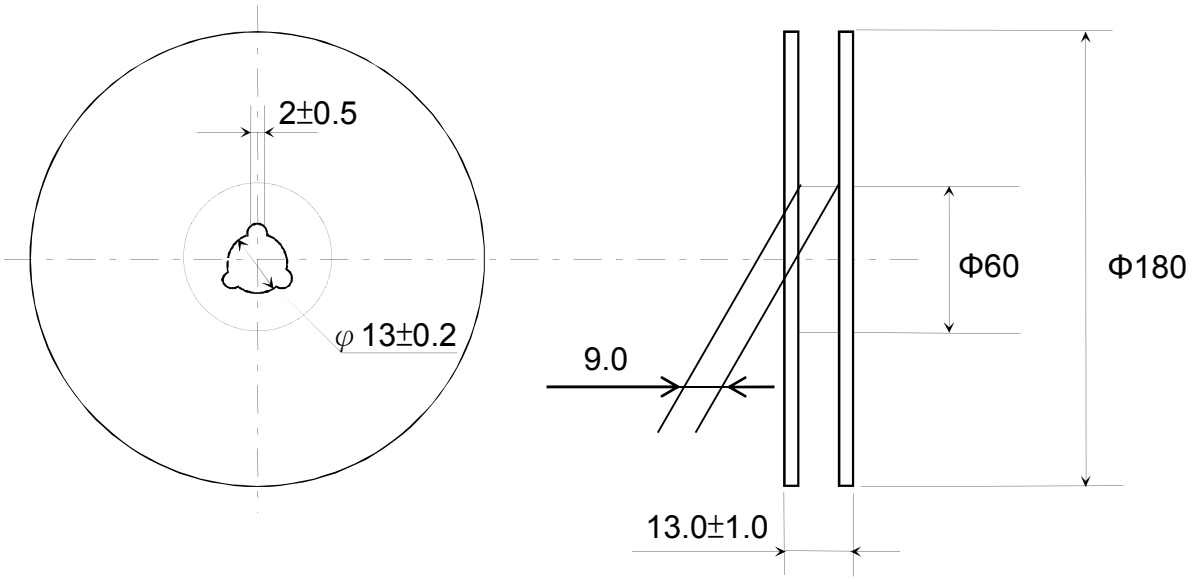


Unit : mm

Symbol	L	W	T	a	b	c	d	e	f
Size	1.13+/-0.05	0.63+/-0.05	0.42+/-0.02	2.0+/-0.05	4.0+/-0.10	(3.50)	1.75+/-0.1	8.00+/-0.2	φ1.5+/-0.1

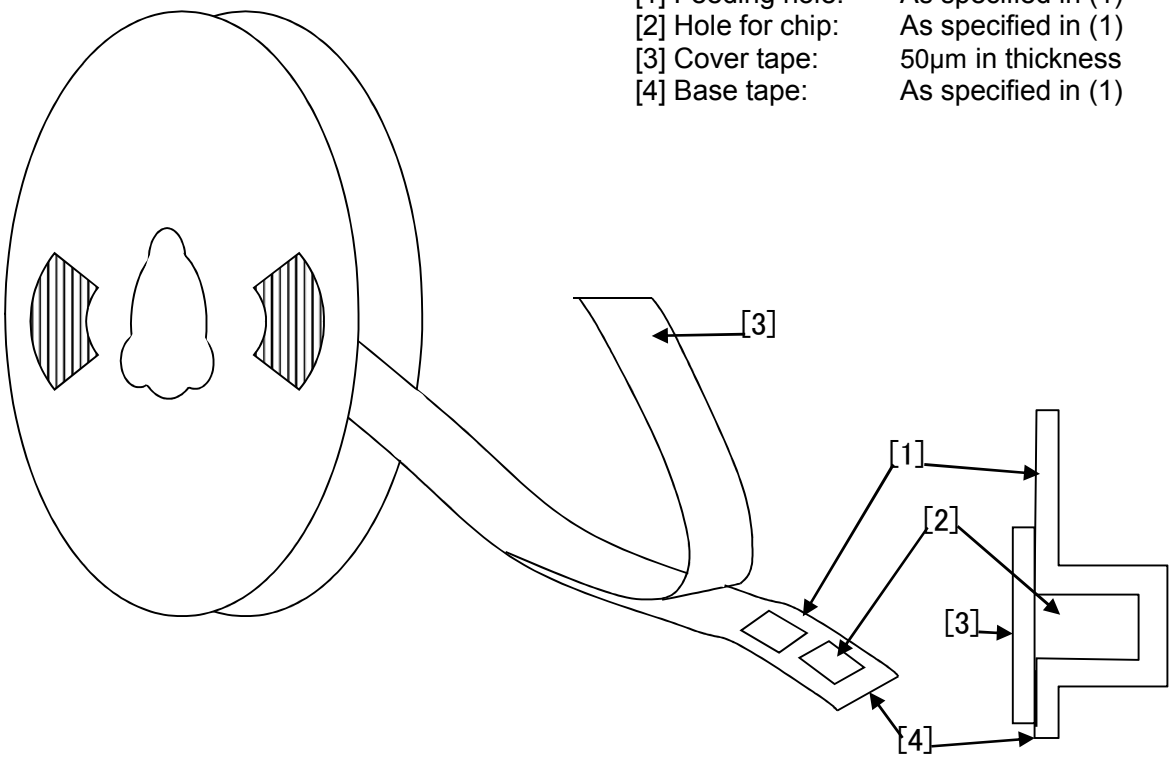
2) Dimensions of Reel

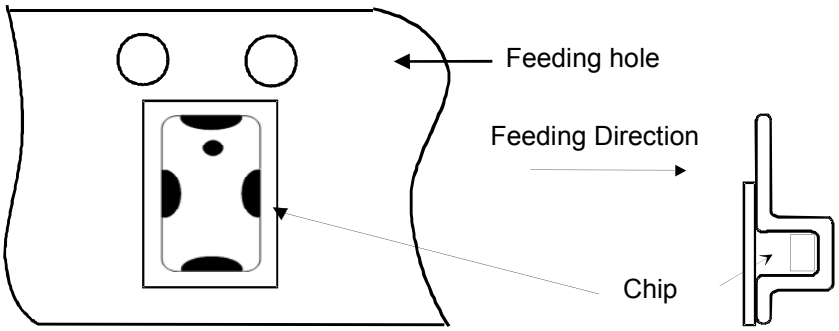
(Unit: mm)



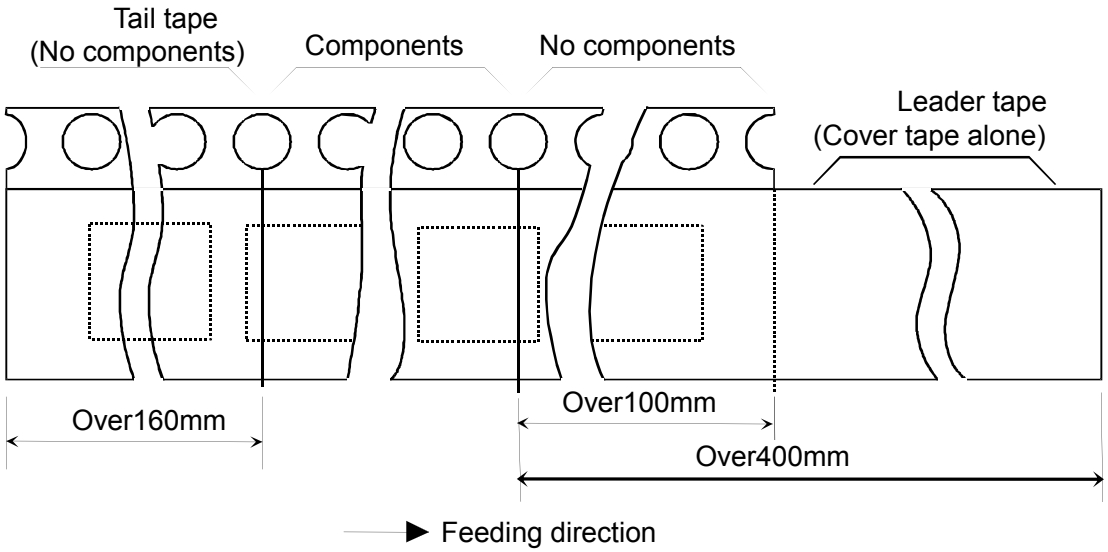
3) Taping Diagrams

[1] Feeding hole: As specified in (1)
[2] Hole for chip: As specified in (1)
[3] Cover tape: 50μm in thickness
[4] Base tape: As specified in (1)





4) Leader and Tail tape

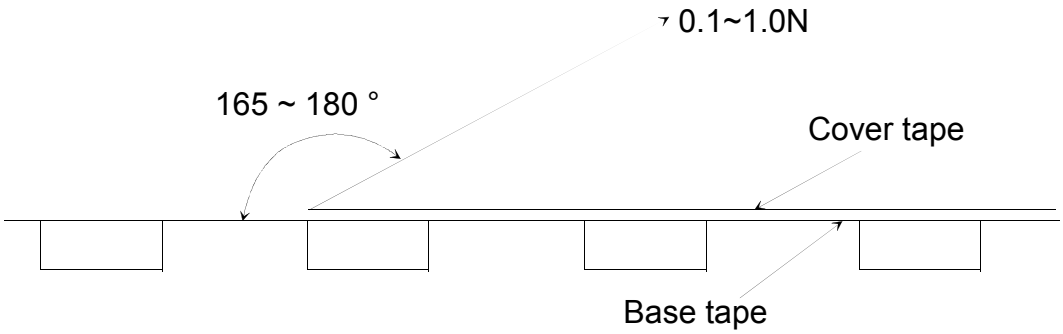


5) The tape for chips are wound clockwise, the feeding holes to the right side as the tape is pulled toward the user.

6) Packaging unit: 10,000 pcs

7) Material Base tape: Paper
Top tape: Plastic

8) Peeling of force : 0.1～1.0 N in the direction of peeling as shown below.



7

NOTICE

1. Storage Conditions:

To avoid damaging the solderability of the external electrodes, be sure to observe the following points.

- Store products where the ambient temperature is 15 to 35 °C and humidity 45 to 75% RH. (Packing materials, In particular, may be deformed at the temperature over 40 °C.).
- Store products in non corrosive gas (Cl_2, NH_3,SO_2, No_x, etc.).
- Stored products should be used within 6 months of receipt. Solderability should be verified if this period is exceeded.

This product is applicable to MSL1 (Based on IPC/JEDEC J-STD-020)

2. Handling Conditions:

Be careful in handling or transporting products because excessive stress or mechanical shock may break products due to the nature of ceramics structure.

Handle with care if products may have cracks or damages on their terminals, the characteristics of products may change. Do not touch products with bear hands that may result in poor solderability.

3. Standard PCB Design (Land Pattern and Dimensions):

All the ground terminals should be connected to the ground patterns. Furthermore, the ground pattern should be provided between IN and OUT terminals. Please refer to the specifications for the standard land dimensions.

The recommended land pattern and dimensions is as Murata's standard. The characteristics of products may vary depending on the pattern drawing method, grounding method, land dimensions, land forming method of the NC terminals and the PCB material and thickness. Therefore, be sure to verify the characteristics in the actual set. When using non-standard lands, contact Murata beforehand.

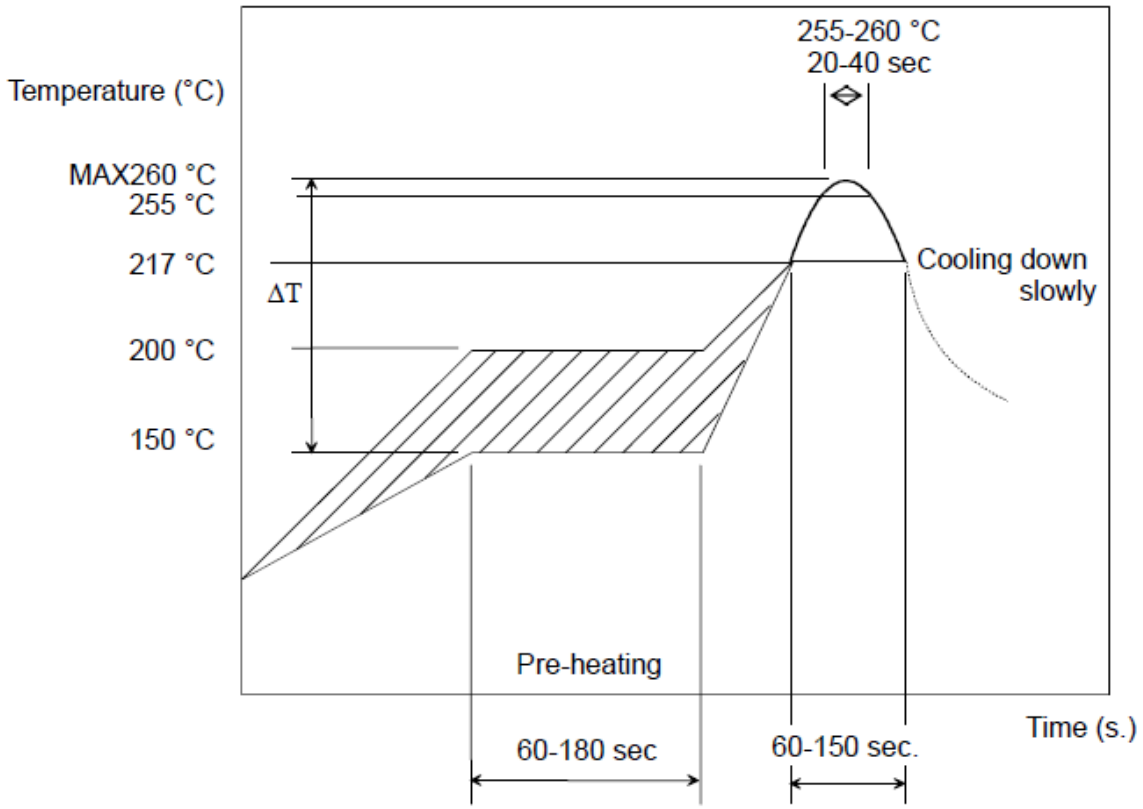
4. Notice for Chip Placer:

When placing products on the PCB, products may be stressed and broken by uneven forces from a worn-out chucking locating claw or a suction nozzle. To prevent products from damages, be sure to follow the specifications for the maintenance of the chip placer being used. For the positioning of products on the PCB, be aware that mechanical chucking may damage products.

5. Soldering Conditions:

Soldering is allowed up through 2 times.
Carefully perform preheating : △T less than 130 °C.
When products are immersed in solvent after mounting, pay special attention to maintain the temperature difference within 100 °C. Soldering must be carried out by the above mentioned conditions to prevent products from damage. Contact Murata before use if concerning other soldering conditions.
.

Reflow soldering standard conditions(Example)



Use rosin type flux or weakly active flux with a chlorine content of 0.2 wt % or less

6. Cleaning Conditions:

Any cleaning is not permitted..

7. Operational Environment Conditions:

Products are designed to work for electronic products under normal environmental conditions (ambient temperature, humidity and pressure). Therefore, products have no problems to be used under the similar conditions to the above-mentioned. However, if products are used under the following circumstances, it may damage products and leakage of electricity and abnormal temperature may occur.

- In an atmosphere containing corrosive gas (Cl_2, NH_3, SO_x, NO_x etc.).
- In an atmosphere containing combustible and volatile gases.
- Dusty place.
- Direct sunlight place.
- Water splashing place.
- Humid place where water condenses.
- Freezing place.

If there are possibilities for products to be used under the preceding clause, consult with Murata before actual use.

8. Limitation of Applications:

The product is designed and manufactured for consumer application only and is not available for any application listed below which requires especially high reliability for the prevention of such defect as may directly cause damage to the third party's life, body or property.

- Aircraft equipment.
- Aerospace equipment
- Undersea equipment.
- Power plant control equipment.
- Medical equipment.
- Transportation equipment (vehicles, trains, ships, etc.).
- Traffic signal equipment.
- Disaster prevention / crime prevention equipment.
- Data-procession equipment.
- Application of similar complexity and/ or reliability requirements to the applications listed in the above.

⚠ Note:

Please make sure that your product has been evaluated and confirmed against your specifications when our product is mounted to your product.

All the items and parameters in this product specification have been prescribed on the premise that our product is used for the purpose, under the condition and in the environment agreed upon between you and us. You are requested not to use our product deviating from such agreement.

We consider it not appropriate to include other terms and conditions for transaction warranty in product specifications, drawings or other technical documents. Therefore, even if your original part of this product specification includes such terms and conditions as warranty clause, product liability clause, or intellectual property infringement liability clause, we are not able to accept such terms and conditions in this product specification unless they are based on the governmental regulation or what we have agreed otherwise in a separate contact. We would like to suggest that you propose to discuss them under negotiation of contract.

Note:
This catalog is for reference only and not an official product specification document, therefore, please review and approve our official product specification before ordering this product.