

## 1 Features

- RF Transformer “Stabilized Matching Device” is RF impedance matching component.
- 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 18 04 NA – 005  
①      ②    ③    ④                      ⑤

① Product ID (SMST = Antenna Matching device)

② Dimension Code

(Unit : mm)

Code	Dimension
18	1.6 x 0.8

③ Low Band Impedance (@800MHz)

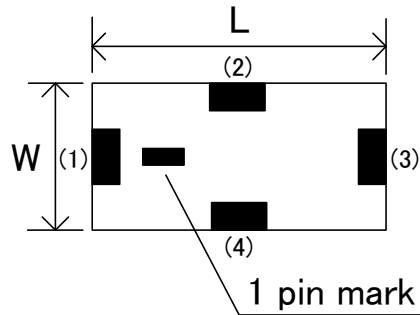
④ High Band Impedance (@1940MHz)

⑤ Serial Number

※RoHS Compliant  
Halogen free  
T/R only.

**3 Construction Dimensions**  
**3.1 Dimensions**

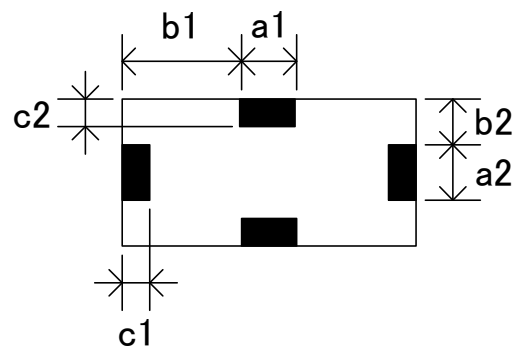
TOP VIEW



SIDE VIEW



BOTTOM VIEW



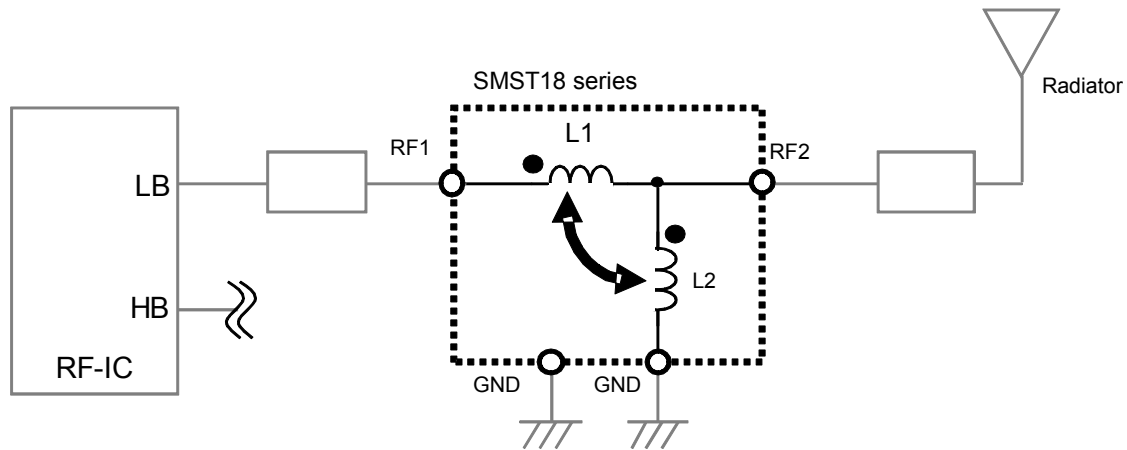
Unit: mm

Mark	Size	Mark	Size
L	1.6 +/- 0.1	b1	0.65 +/- 0.15
W	0.8 +/- 0.15	b2	0.25 +/- 0.15
T	0.6 +/- 0.1	c1	0.15 +/- 0.10
a1	0.30 +/- 0.15	c2	0.15 +/- 0.10
a2	0.30 +/- 0.15		

**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

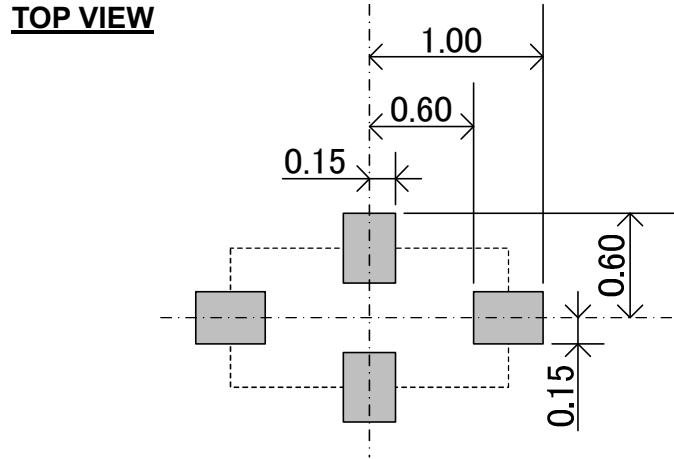
Rating	Symbol	Value	Unit
Operating Temperature	$T_{OP}$	-40 to +85	°C
Storage Temperature	$T_{STO}$	-40 to +85	°C
Input power	$P_{IN}$	35	dBm

### 4.2 Electrical Characteristics (T=25°C)

Parameter	Low Band (800MHz)	
	Impedance	Insertion Loss*1
Symbol	$R_L$	$IL_L$
Unit	$\Omega$	dB
Test condition	RF1=50 $\Omega$	RF1=50 $\Omega$ , RF2= $R_L$
SMST1804NA-005	3.8	0.47
SMST1805NA-006	5.2	0.42
SMST1806NA-007	5.9	0.39
SMST1807NA-008	6.9	0.35
SMST1808NA-009	7.9	0.30
SMST1809NA-010	9.2	0.29
SMST1810NA-011	10.0	0.25
SMST1811NA-012	10.9	0.33
SMST1812NA-013	12.2	0.32

\*1: When RF2 is terminated by the complex conjugate of the component

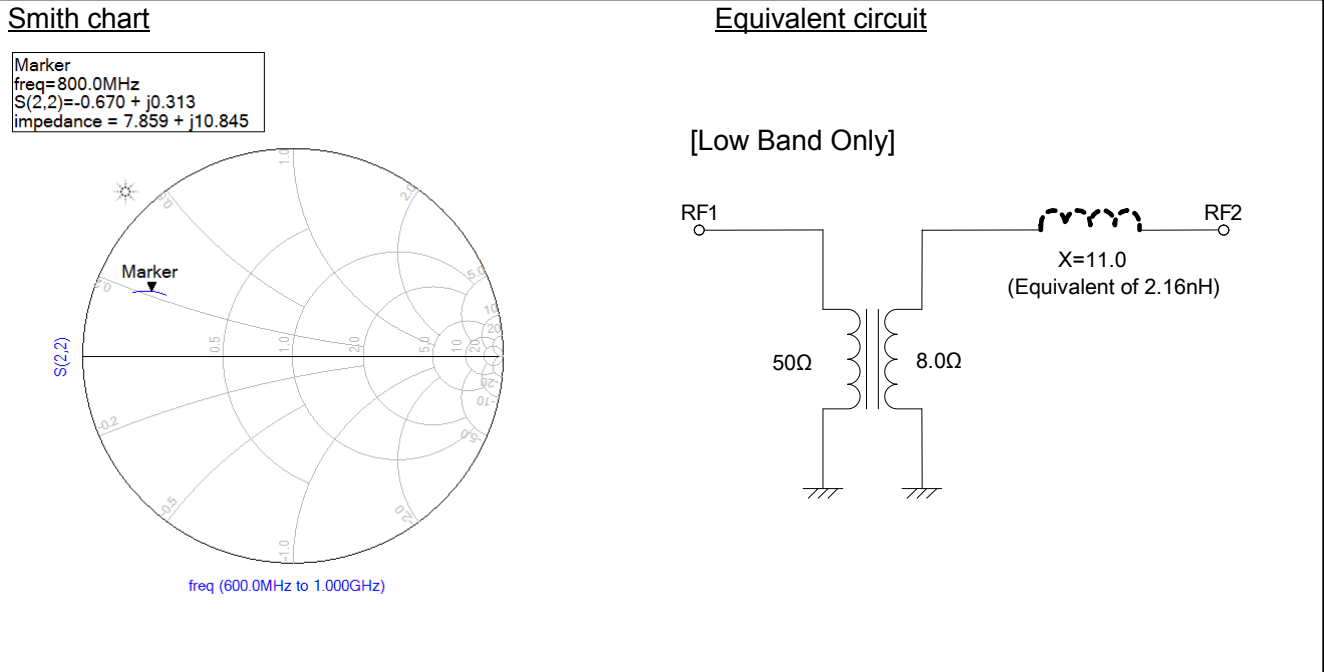
Fig.1 Land Pattern



Note: This footprint is for reference purpose only.

### 4.3 Typical Characteristics

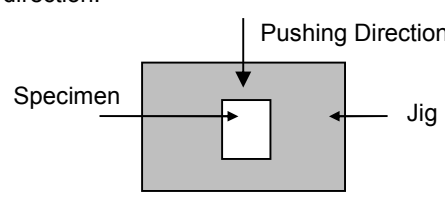
Example: SMST1808NA-009 (8ohm)



Specification	X(ohm)	inductance value(nH)
SMST1804NA-005	8.2	1.6
SMST1805NA-006	8.6	1.7
SMST1806NA-007	10.3	2.1
SMST1807NA-008	10.4	2.1
SMST1808NA-009	10.4	2.1
SMST1809NA-010	10.5	2.1
SMST1810NA-011	9.9	2.0
SMST1811NA-012	11.3	2.3
SMST1812NA-013	11.2	2.2

**5 Reliability Test**

**【Mechanical Test】**

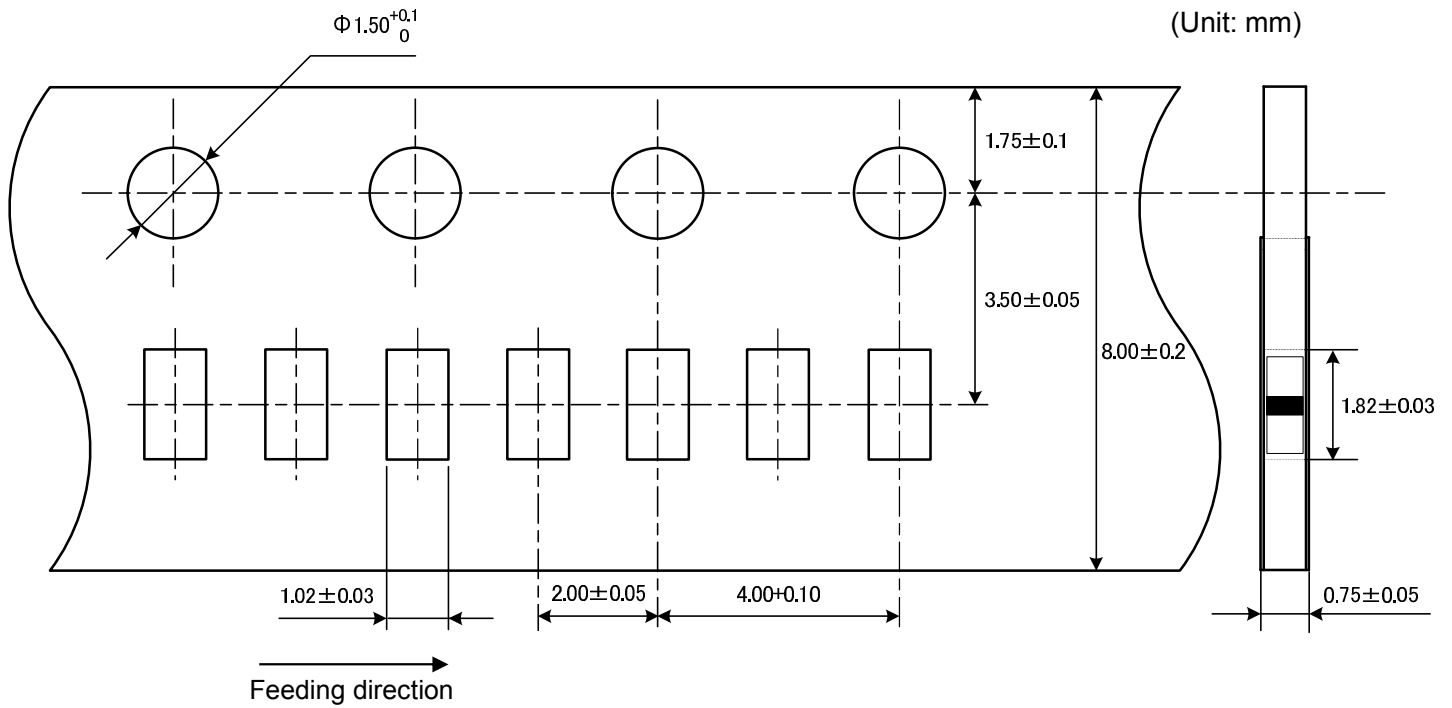
No.	Items	Specifications	Test Methods
1	Vibration Resistance	Appearance	No severe damages
		Electrical Specifications	
2	Shock	Appearance	No severe damages
		Electrical Specifications	
3	Deflection	No damage with 1.6mm deflection	Solder specimens on the testing jig (glass epoxy boards) by a Pb free solder. 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 peeled off or ceramics are broken. Pushing force is applied to longitudinal direction. 
5	Solderability of Termination	75% 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
		Electrical specifications	
Preheat Temperature : 150-180 °C Preheat Period : 90+/-30 s High Temperature : 220 °C 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.			

**【Environmental Test】**

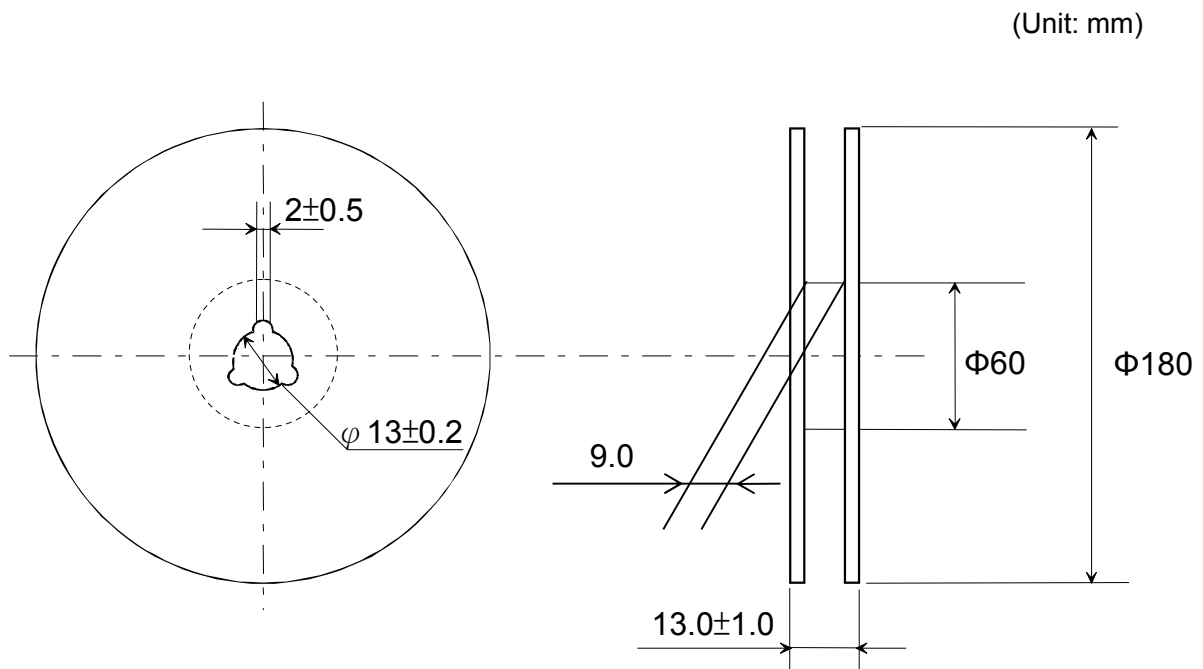
No.	Items	Specifications	Test Methods									
7	High Temp. Exposure	Appearance	Temperature : 85±2/-0 °C Period : 1000+48/-0 h Room Condition : 2 ~ 24 h									
		Electrical specifications		Satisfy specifications listed in paragraph 4-2 over operational temperature range								
8	Temperature Cycle	Appearance	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. <table border="1" style="margin: 10px auto;"> <thead> <tr> <th>Step</th> <th>Temp(°C)</th> <th>Time(min)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Min. Operating Temp.+0/-3</td> <td>30±3</td> </tr> <tr> <td>2</td> <td>Max. Operating Temp.+0/-3</td> <td>30±3</td> </tr> </tbody> </table>	Step	Temp(°C)	Time(min)	1	Min. Operating Temp.+0/-3	30±3	2	Max. Operating Temp.+0/-3	30±3
		Step		Temp(°C)	Time(min)							
1	Min. Operating Temp.+0/-3	30±3										
2	Max. Operating Temp.+0/-3	30±3										
Electrical specifications	Satisfy specifications listed in paragraph 4-2 over operational temperature range											
9	Humidity (Steady State)	Appearance	Temperature : 85±2 °C 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	Temperature : -40±2 °C Period : 1000+48/-0 h Room Condition : 2 ~ 24 h									
		Electrical specifications		Satisfy specifications listed in paragraph 4-2 over operational temperature range								

**6 Tape and Reel Packing**

1) Dimensions of Tape



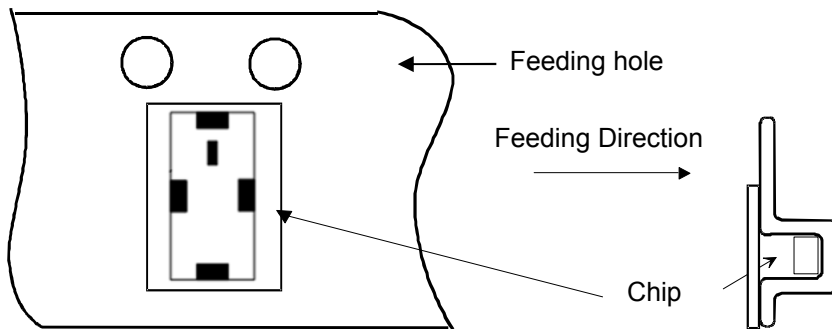
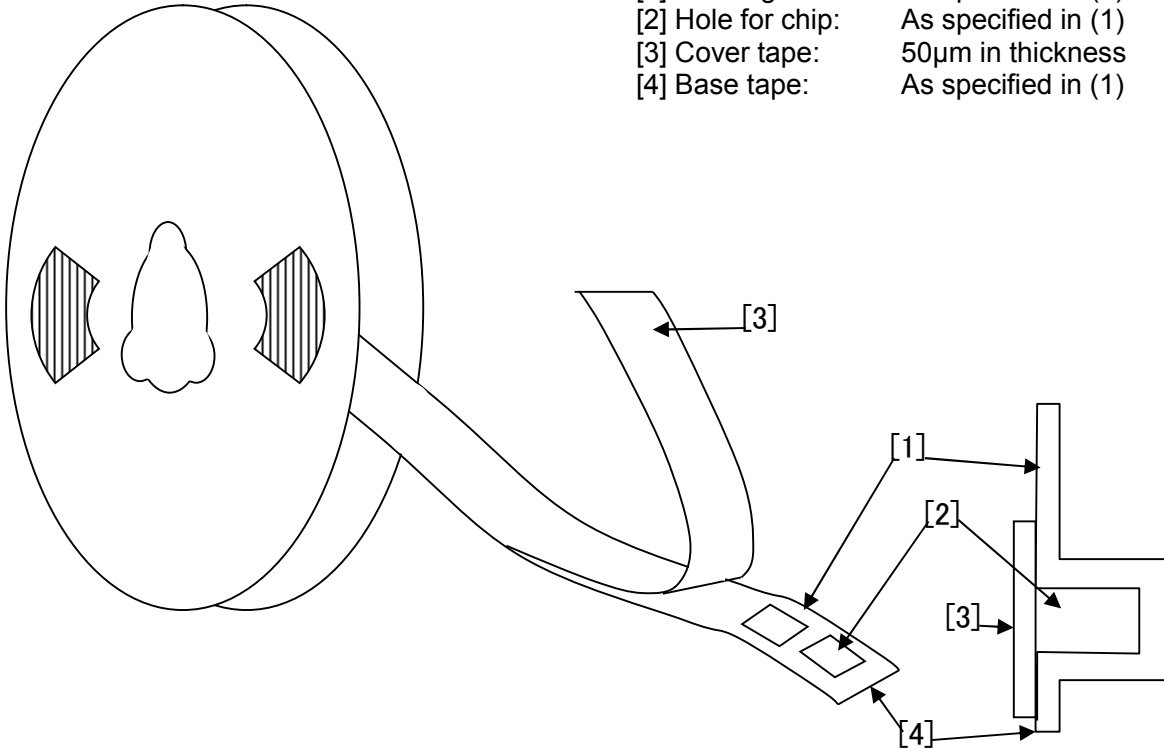
2) Dimensions of Reel



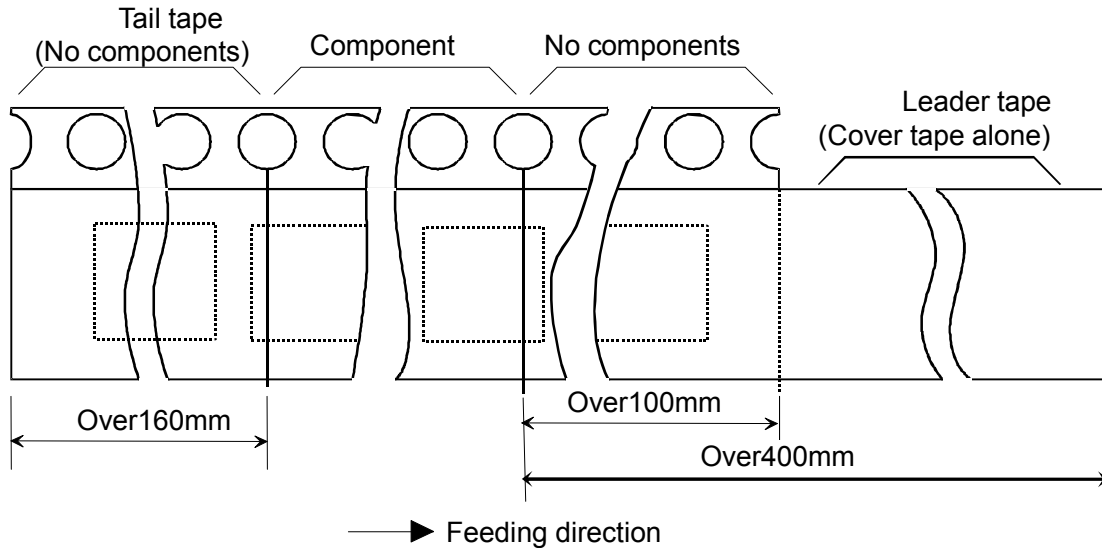


3) Taping Diagrams

- [1] Feeding hole: As specified in (1)
- [2] Hole for chip: As specified in (1)
- [3] Cover tape: 50 $\mu$ m in thickness
- [4] Base tape: As specified in (1)



4) Leader and Tail tape



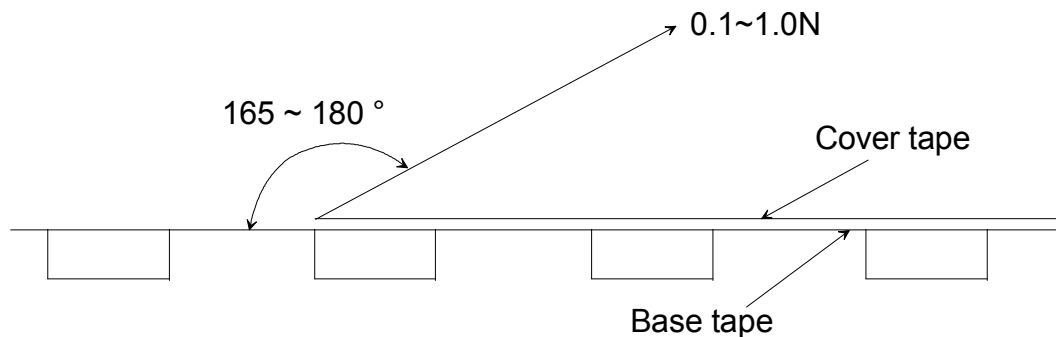
5) The tape for chips are wound clockwise, the feeding holes to the right side as the tape is pulled toward the user.

6) Packaging unit: 4000 pcs

7) Material      Base tape:      Paper  
                      Reel:            Plastic

Base tape, Reel and Cover tape have an anti-ESD function.

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



## 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<sub>2</sub>, NH<sub>3</sub>, SO<sub>2</sub>, NO<sub>x</sub>, 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 bare 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.

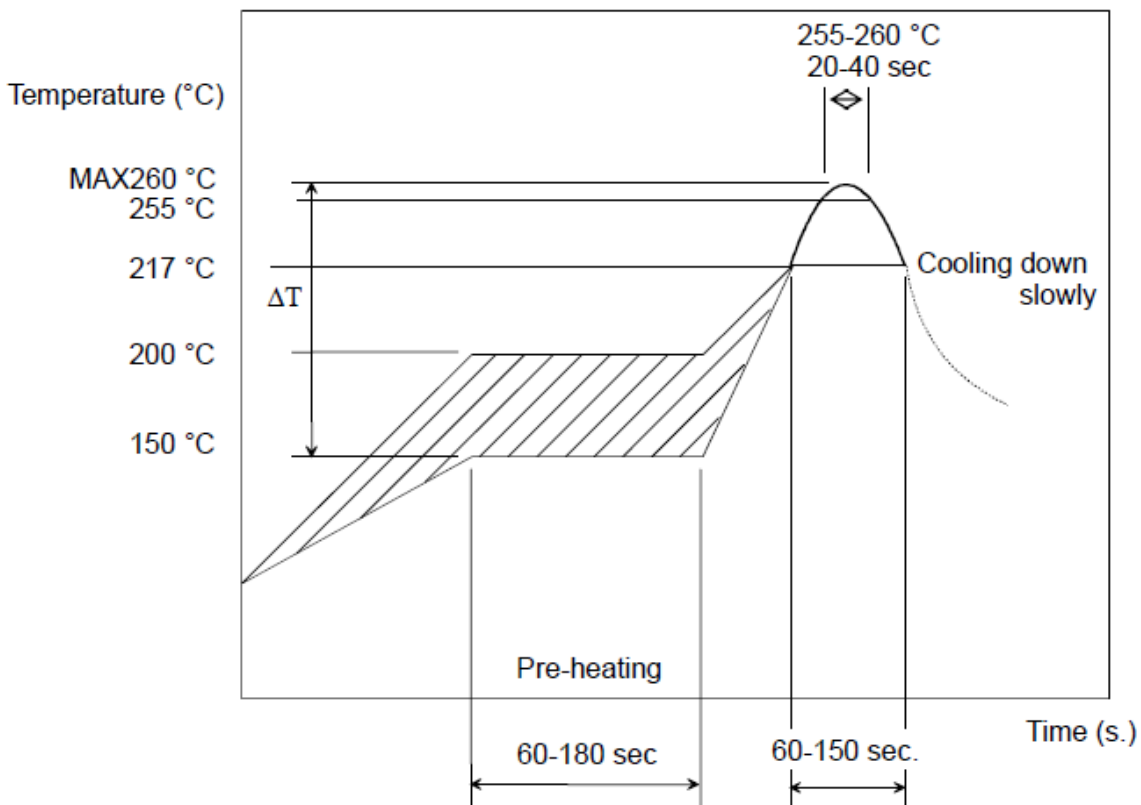
### 5. Soldering Conditions:

Soldering is allowed up through 2 times.

Carefully perform preheating :  $\Delta T$  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<sub>2</sub>, NH<sub>3</sub>, SO<sub>x</sub>, NO<sub>x</sub> etc.).
- In an atmosphere containing combustible and volatile gases.
- In a dusty environment.
- Direct sunlight
- Water splashing place.
- Humid place where water condenses.
- In a freezing environment.

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

If product malfunctions may result in serious damage, including that to human life, sufficient fail-safe measures must be taken, including the following:

- (1) Installation of protection circuits or other protective device to improve system safety
- (2) Installation of redundant circuits in the case of single-circuit failure

## 8. Limitation of Applications:

The products are designed and produced for application in ordinary electronic equipment (AV equipment, OA equipment, telecommunication, etc). If the products are to be used in devices requiring extremely high reliability following the application listed below, you should consult with the Murata staff in advance.

- 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-processing equipment.
- Application which malfunction or operational error may endanger human life and property of assets.
- Application which related to occurrence the serious damage
- 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.

Product specifications are subject to change or our products in it may be discontinued without advance notice.

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.

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