



May 2015 Ver.1.1  
TDK Corporation

Multilayer Balun

For LTE

HHM Series

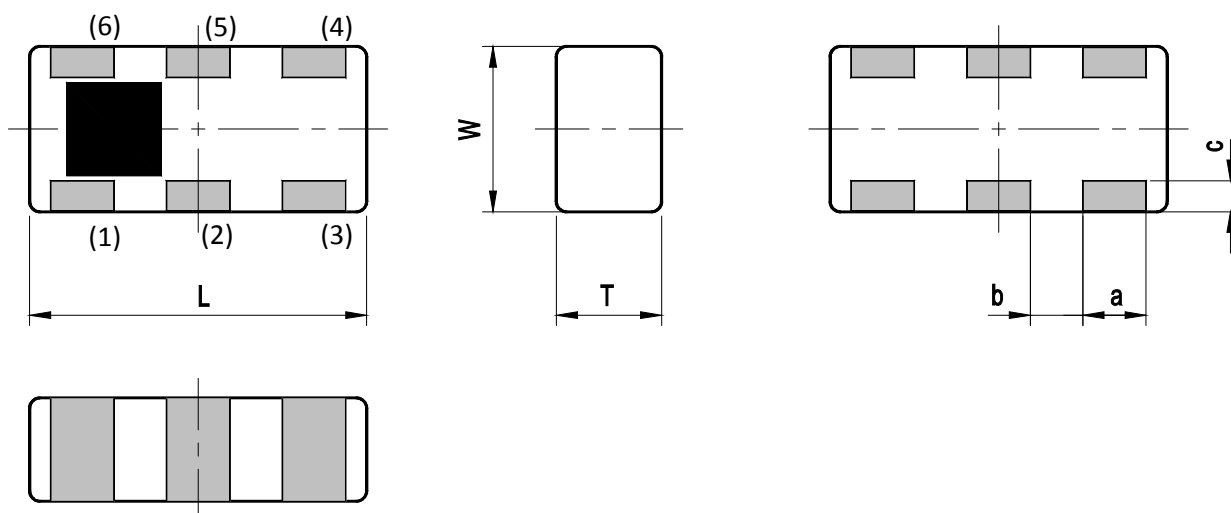
1608 TYPE

P/N: **HHM17165A1**

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## HHM17165A1

### SHAPES AND DIMENSIONS



Dimensions (mm)

| L       | W       | T       | a       | b       | c       |
|---------|---------|---------|---------|---------|---------|
| 1.60    | 0.80    | 0.60    | 0.30    | 0.25    | 0.15    |
| +/-0.10 | +/-0.10 | +/-0.10 | +/-0.10 | +/-0.10 | +/-0.10 |

Terminal functions

|     |                         |
|-----|-------------------------|
| (1) | Unbalanced Port         |
| (2) | DC feed + RF GND or GND |
| (3) | Balanced Port           |
| (4) | Balanced Port           |
| (5) | GND                     |

|     |      |
|-----|------|
| (6) | N.C. |
|-----|------|

Note:

These samples are marked with trial sample identification.

In mass production, this sample marking will be changed to show in the TDK full specification.

### TEMPERATURE RANGE

| Operating temperature | Storage temperature |
|-----------------------|---------------------|
| -40 to +85 °C         | -40 to +85 °C       |

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### ■ ELECTRICAL CHARACTERISTICS

( Measurement )

| Parameter                                   | Frequency (MHz) | TDK Spec   |      |      |
|---------------------------------------------|-----------------|------------|------|------|
|                                             |                 | Min.       | Typ. | Max. |
| Unbalanced Port<br>Characteristic Impedance |                 | 50         |      |      |
| Balanced Port<br>Characteristic Impedance   |                 | 13.9-j18.1 |      |      |
| Return Loss<br>at Unbalanced Port (dB)      | 2400 to 2800    | 10         | 13.3 | -    |
| Phase Balance (deg.)                        | 2400 to 2800    | 170        | 180  | 190  |
| Amplitude Balance (dB)                      | 2400 to 2800    | -1.00      | 0.42 | 1.00 |
| Insertion Loss (dB)                         | 2400 to 2800    | -          | 1.16 | 1.60 |
| Power Handling (W)                          |                 | -          |      | 1    |

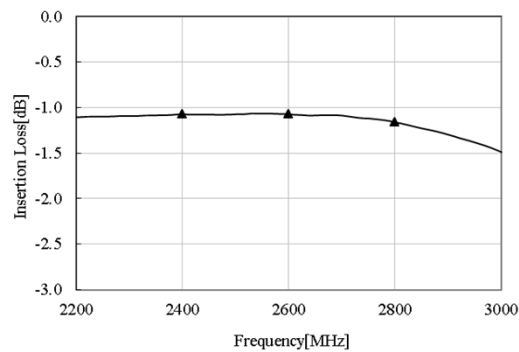
Ta = +25+/-5°C

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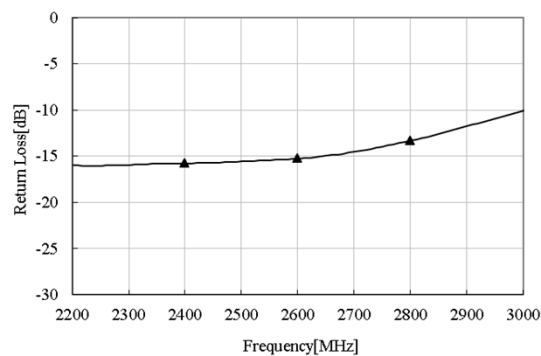
### ■ FREQUENCY CHARACTERISTICS

#### Insertion Loss



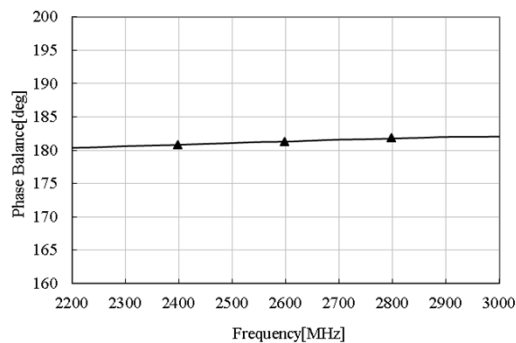
2400 MHz  
-1.07 dB  
2600 MHz  
-1.07 dB  
2800 MHz  
-1.16 dB

#### Return Loss



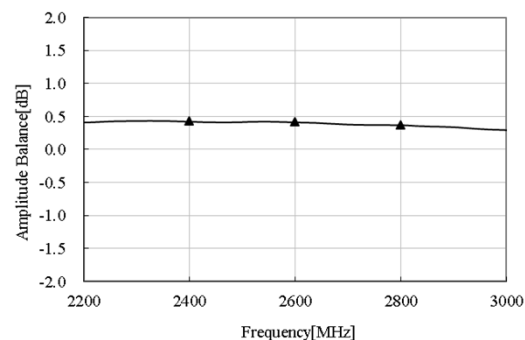
2400 MHz  
-15.8 dB  
2600 MHz  
-15.3 dB  
2800 MHz  
-13.3 dB

#### Phase Balance



2400 MHz  
180.8 deg  
2600 MHz  
181.3 deg  
2800 MHz  
181.8 deg

#### Amplitude Balance



2400 MHz  
0.42 dB  
2600 MHz  
0.41 dB  
2800 MHz  
0.37 dB

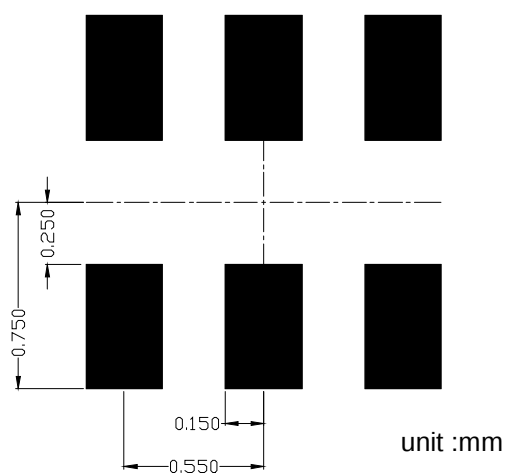
All specifications are subject to change without notice.

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### ■ RECOMMENDED LAND PATTERN



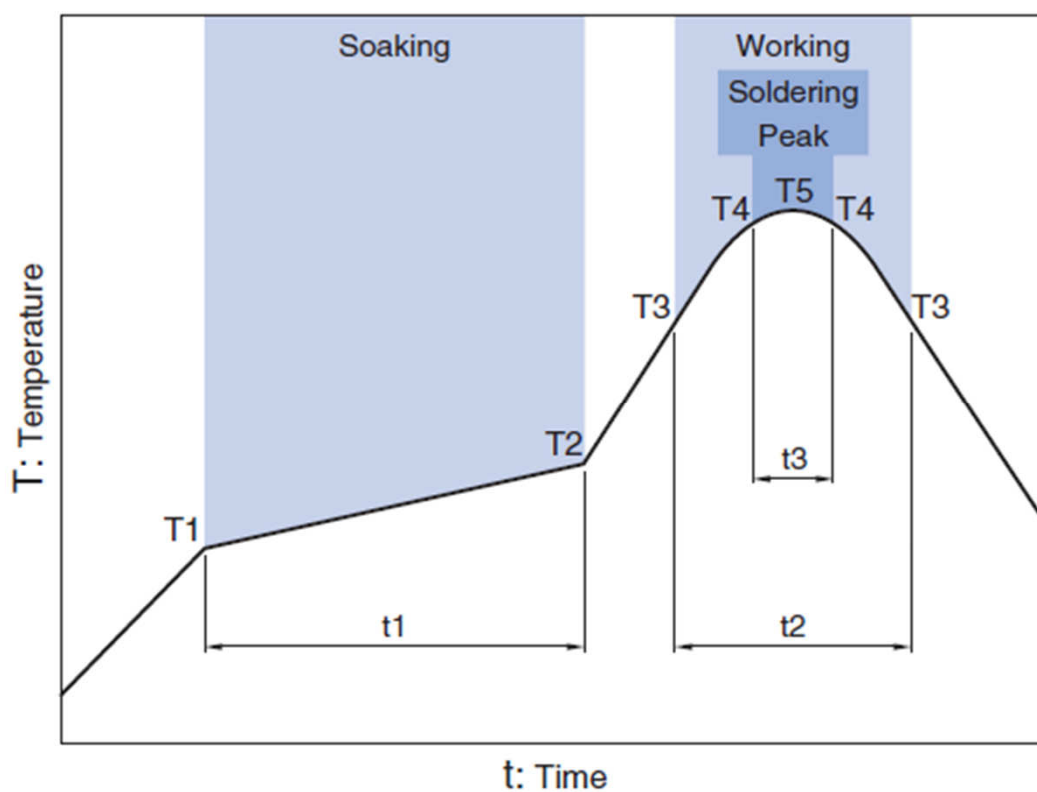
### ■ ENVIROMENT INFORMATION

RoHS Statement  
RoHS Compliance

## HHM17165A1

### ■ RECOMMENDED REFLOW PROFILE

Pb free solder



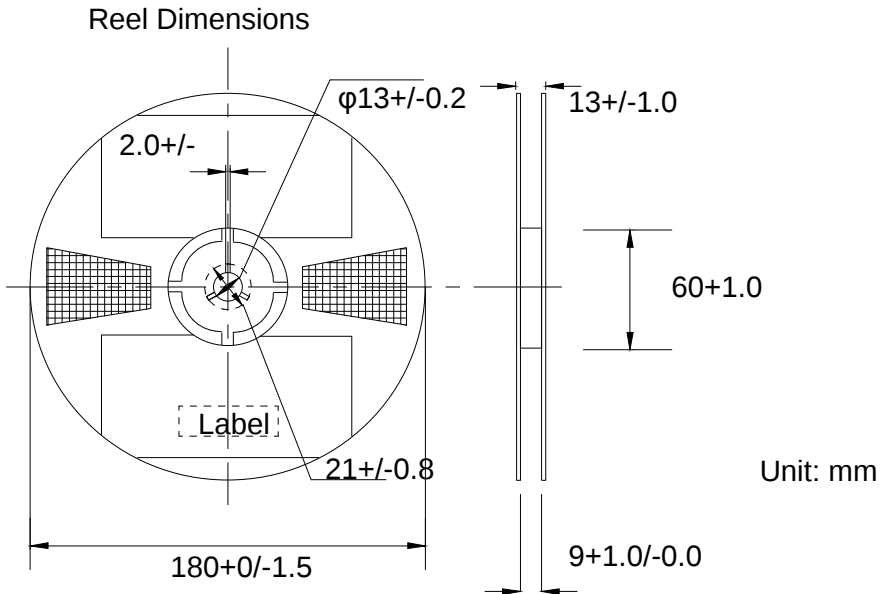
| Soaking |      |              | Working |                 | Soldering   |              | Peak      |
|---------|------|--------------|---------|-----------------|-------------|--------------|-----------|
| Temp.   |      | Time         | Temp.   | Time            | Temp.       | Time         | Temp.     |
| T1      | T2   | t1           | T3      | t2              | T4          | t3           | T5        |
| 150℃    | 180℃ | 60 to 120sec | 230℃    | more than 30sec | 247 to 253℃ | within 10sec | 260℃ Max. |

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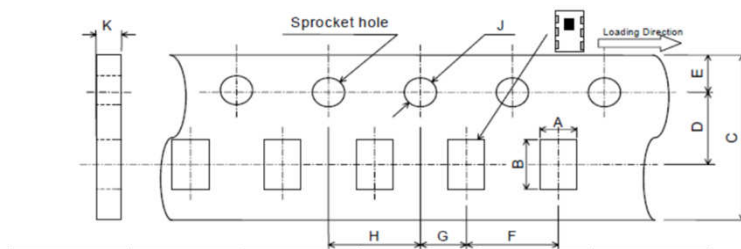
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## ■ PACKAGING STYLE



## Carrier Tape



| A           | B          | C         | D           | E          | F       |
|-------------|------------|-----------|-------------|------------|---------|
| 0.97+/-0.05 | 1.8+/-0.05 | 8.0+/-0.2 | 3.5+/-0.05  | 1.75+/-0.1 | 4.0±0.1 |
| G           | H          | J         | K           |            |         |
| 2.0+/-0.05  | 4.0+/-0.1  | 1.5+0.1/0 | 0.75+/-0.05 |            |         |

| STANDARD PACKAGE QUANTITY<br>( pieces/reel ) |
|----------------------------------------------|
| 4,000                                        |

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## REMINDERS FOR USING THESE PRODUCTS

Before using these products, be sure to request the delivery specifications.

### SAFETY REMINDERS

Please pay sufficient attention to the warnings for safe designing when using these products.



#### REMINDERS

The products listed on this specification sheet are intended for use in general electronic equipment (AV equipment, telecommunications equipment, home appliances, amusement equipment, computer equipment, personal equipment, office equipment, measurement equipment, industrial robots) under a normal operation and use condition.

The products are not designed or warranted to meet the requirements of the applications listed below, whose performance and/or quality require a more stringent level of safety or reliability, or whose failure, malfunction or trouble could cause serious damage to society, person or property. Please understand that we are not responsible for any damage or liability caused by use of the products in any of the applications below or for any other use exceeding the range or conditions set forth in this specification sheet.

1. Aerospace/Aviation equipment
2. Transportation equipment (cars, electric trains, ships, etc.)
3. Medical equipment
4. Power-generation control equipment
5. Atomic energy-related equipment
6. Seabed equipment
7. Transportation control equipment
8. Public information-processing equipment
9. Military equipment
10. Electric heating apparatus, burning equipment
11. Disaster prevention/crime prevention equipment
12. Safety equipment
13. Other applications that are not considered general-purpose applications

When using this product in general-purpose applications, you are kindly requested to take into consideration securing protection circuit/equipment or providing backup circuits, etc., to ensure higher safety.