



# SMD CERAMIC ANTENNA

## Data Sheet

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# TS1608E245D02

For 2400-2500MHz  
1.6x0.8x0.8mm [EIA1608]

## Feature

- Light weight, compact
- Wide bandwidth, low cost
- Built-in antenna with high gain
- Operating Temp. : -40°C~+85°C

## Application

- Bluetooth
- WLAN 2.4
- WiFi 5/6/6E
- UWB



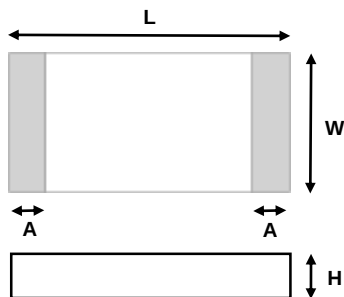
**TS1608E245D02**

## Electrical Characteristics per line(TA=25°C)

| Parameter        | Specification | Units    |
|------------------|---------------|----------|
| Frequency Band   | 2400~2500     | MHz      |
| Polarization     | Linear        |          |
| *Peak Gain       | 2.78          | dBi      |
| *Peak Efficiency | 80.25         | %        |
| Impedance        | 50            | $\Omega$ |

Test condition: Test board size 70\*60 mm;  
Matching circuit: Pi matching circuit will be required.

## Product Dimension

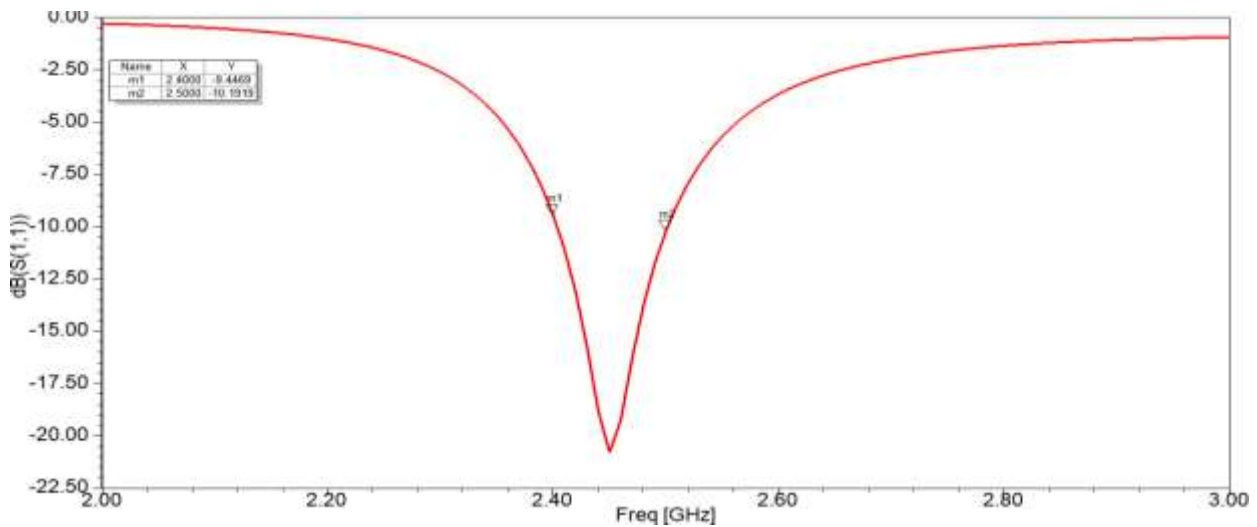


Units:mm

| L         | W         | A         | H         |
|-----------|-----------|-----------|-----------|
| 1.60±0.20 | 0.80±0.20 | 0.30±0.20 | 0.80±0.20 |

## Typical Characteristics

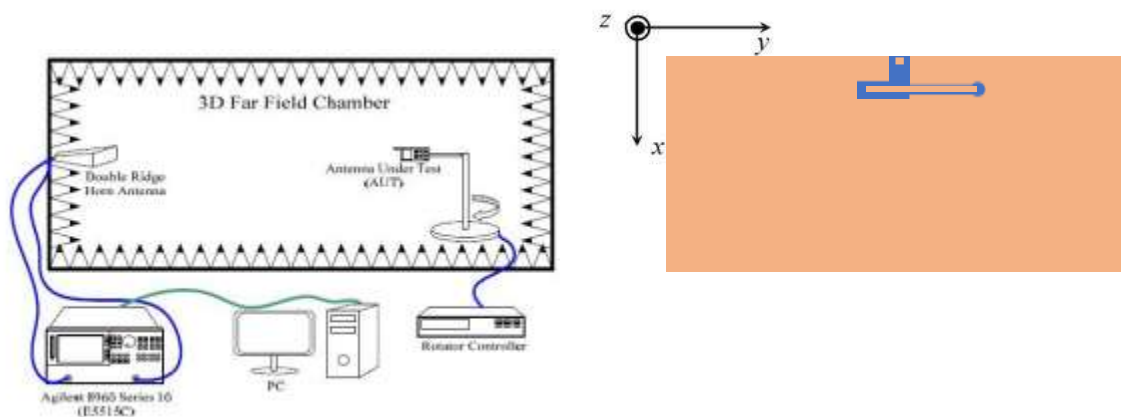
Fig. 1 Return Loss



## Radiation Pattern

The Gain pattern is measured in FAR -field chamber. DUT is placed on the table of rotator, a standard horn antenna and Vector Network Analyzer is used to collect data.

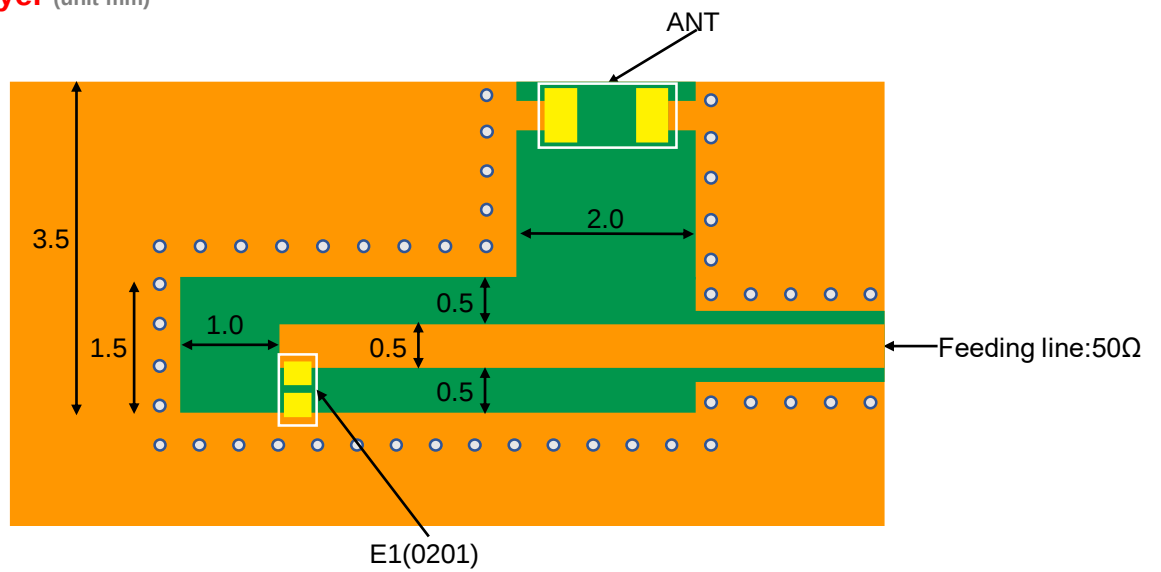
Fig.2 FAR-field Chamber



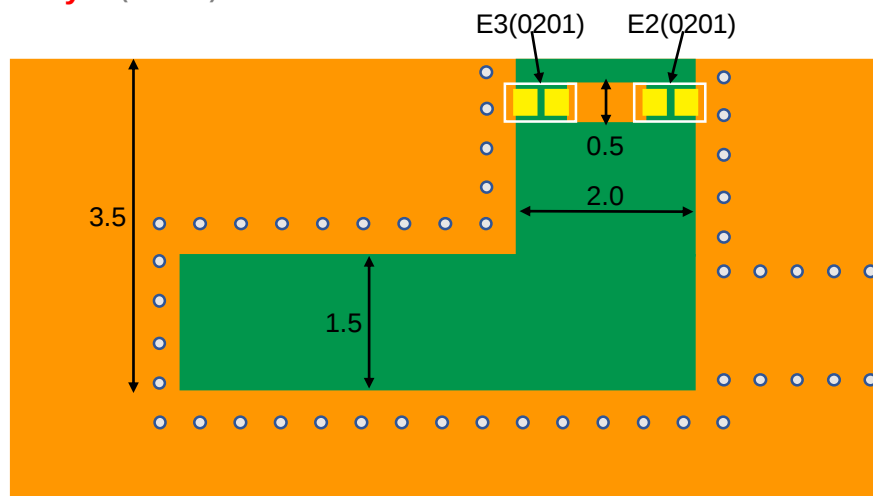
## Recommend PCB Layout1

Test condition: Test board size 70\*60 mm;

### Top Layer (unit mm)



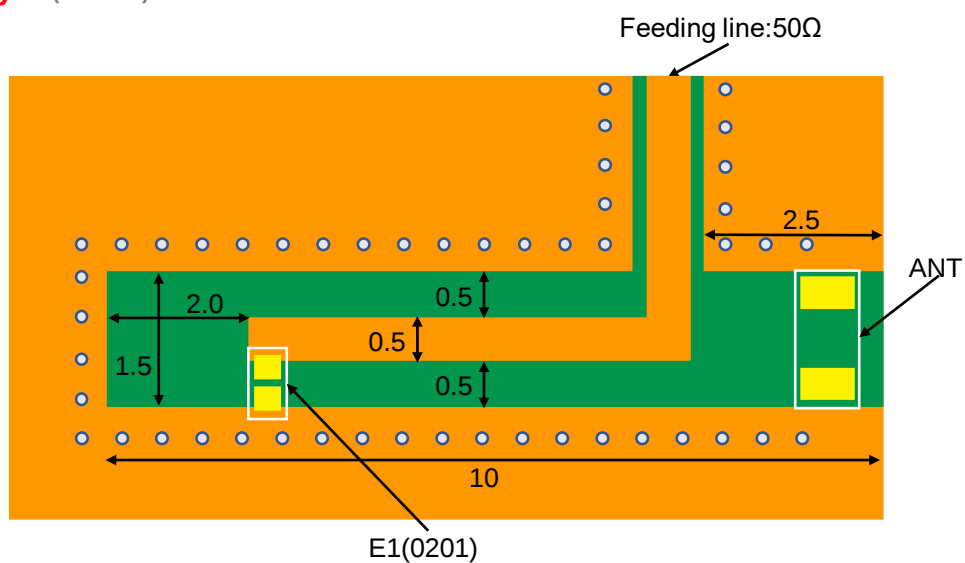
### Bottom Layer (unit mm)



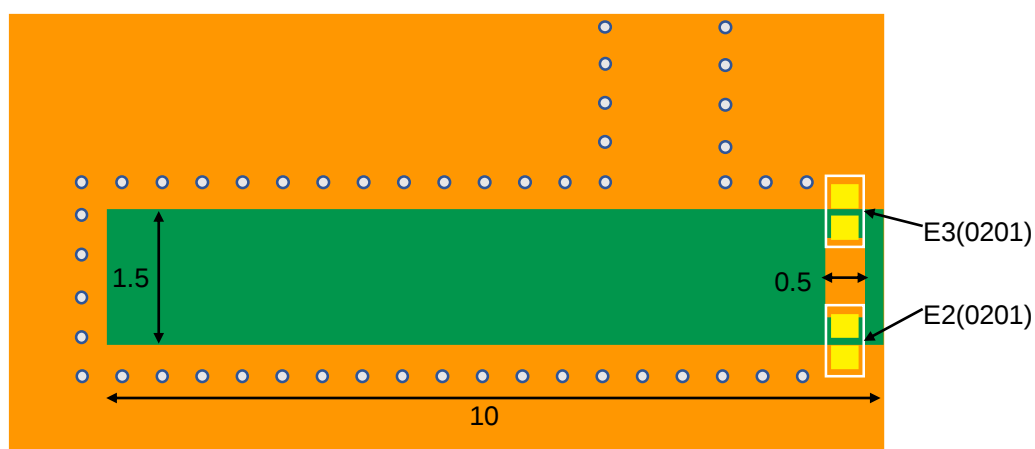
## Recommend PCB Layout2

Test condition: Test board size 70\*60 mm;

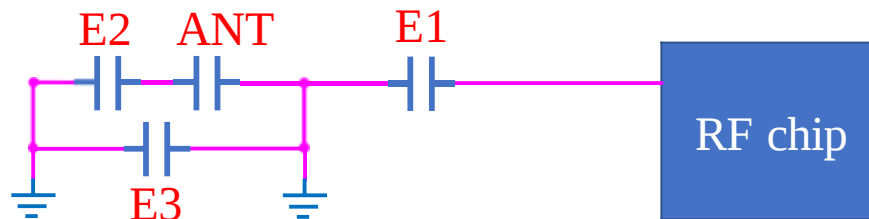
### Top Layer (unit mm)



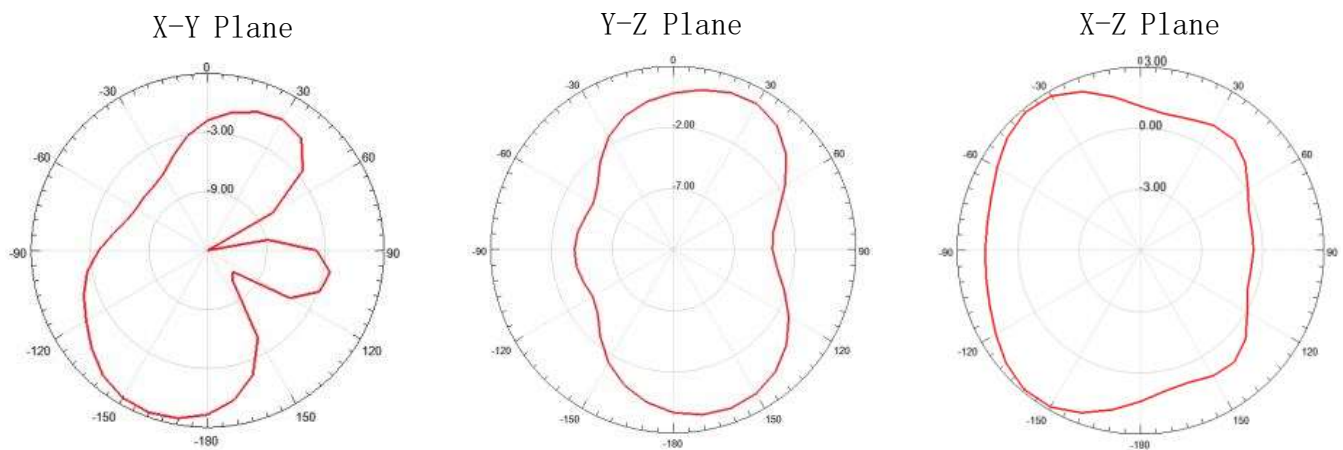
### Bottom Layer (unit mm)



### Equivalent circuit:



### 2D Gain Pattern



### Radiation Performance:

| Frequency  | 2400MHz | 2450MHz | 2500MHz |
|------------|---------|---------|---------|
| Avg. gain  | -1.92   | -1.35   | -1.56   |
| Peak gain  | 1.79    | 2.78    | 2.66    |
| Efficiency | 74.55   | 80.25   | 76.98   |

## • Dependability Test

|                       |              |
|-----------------------|--------------|
| Test Temperature      | 25°C ± 5°C   |
| Operating Temperature | -25°C~+125°C |
| Temperature           | 5~40°C       |
| Relative Humidity     | 20~70%       |

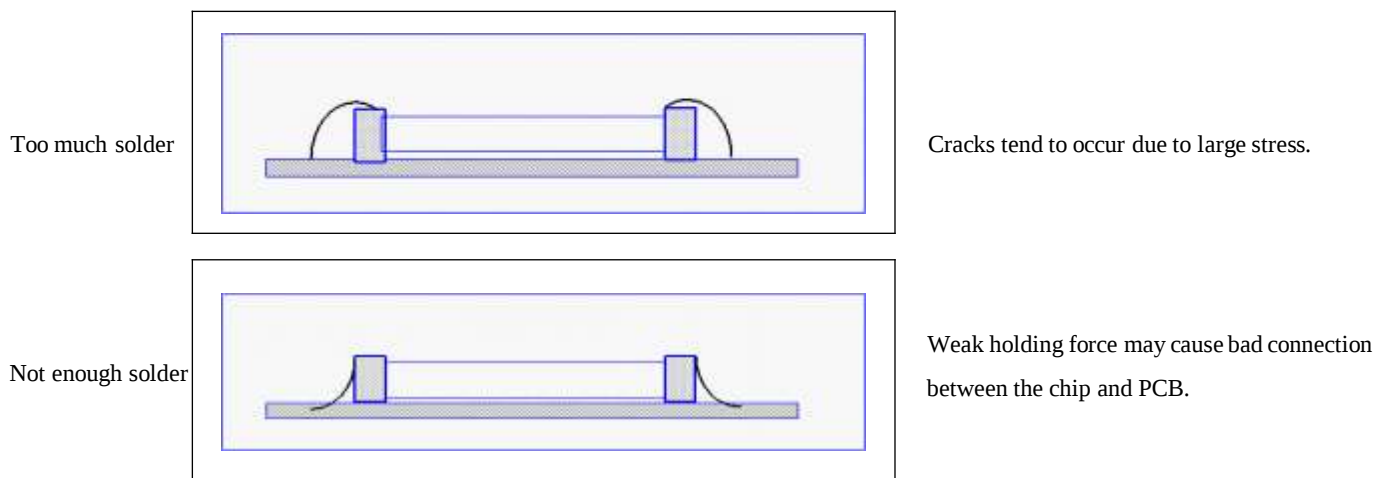
## • Moisture Proof

Temperature: 40 ± 2°C Humidity: 90~95%RH  
 Duration: 500h  
 Recovery conditions: Room temperature Recovery Time: 24h (Class1) or 48h (Class2)

## • Solderability

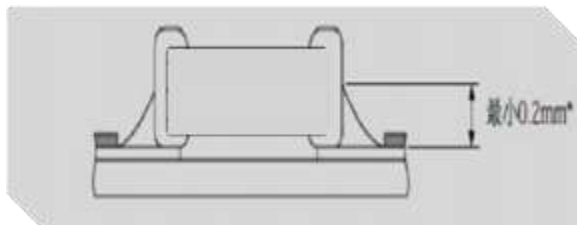
At least 95% of the terminal electrode is covered by new solder.  
 Preheating conditions: 80 to 120°C; 10~30s.  
 Solder Temperature: 235 ± 5°C Duration: 2 ± 0.5s, Solder Temperature: 245 ± 5°C Duration: 2 ± 0.5s

## • Optimum Solder Amount for Reflow Soldering

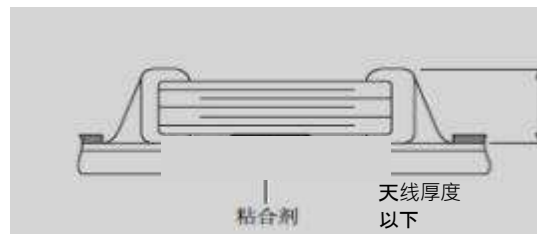


## Recommended Soldering Amounts

The optimal solder fillet amounts for re-flow soldering



The optimal solder fillet amounts for wave soldering



## • Temperature Cycle Test

$10 \pm 1S$  Applied Force: 5N Duration:  $10 \pm 1S$

Preheating conditions: up-category temperature, 1h

Recovery time:  $24 \pm 1h$

Initial Measurement

Cycling Times: 5 times, 1 cycle, 4 steps:

| Stage  | Temperature(°C)                     | Time (minutes) |
|--------|-------------------------------------|----------------|
| Step 1 | Lower temperature limit "           | 30             |
| Step 2 | normal atmospheric temperature(+20) | 2-3            |
| Step 3 | Upper line temperature              | 30             |
| Step 4 | normal atmospheric temperature(+20) | 2-3            |

## • Resistance to Soldering Heat

Preheating 80 to 120°C; 10~30s.SolderTemperature:  $235 \pm 5^\circ C$ ; Duration:  $2 \pm 0.5s$ ;

SolderTemperature:  $245 \pm 5^\circ C$  Duration:  $2 \pm 0.5s$ ; Preheating 100 to 200°C;  $10 \pm 2min$ .

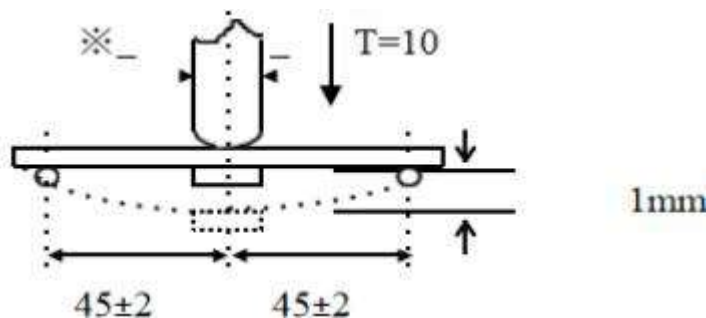
Solder Temperature:  $265 \pm 5^\circ C$ ; Duration:  $10 \pm 1s$

Clean the capacitor with solvent and examine it with a 10X(min.) microscope.

Recovery Time:  $24 \pm 2h$

Recovery condition: Room temperature

## • Resistance to Flexure of Substrate



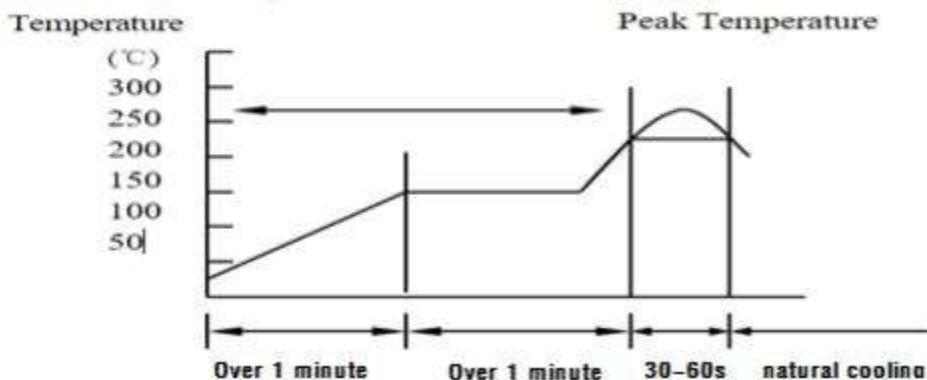
Test Board:  $Al_2O_3$  or PCB Warp: 1mm Speed: 0.5mm/sec.

Unit: mm

The measurement should be made with the board in the bending position.

### The temperature profile for soldering

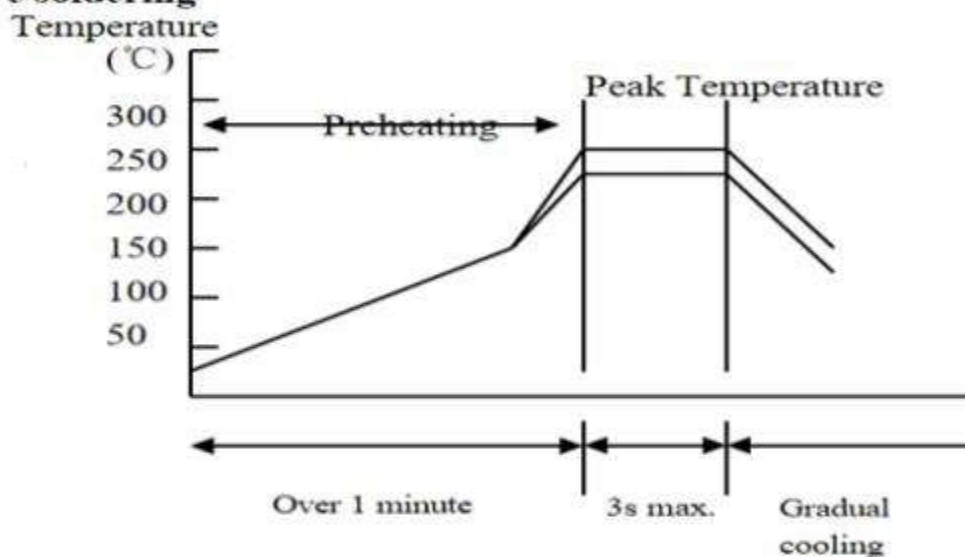
#### Re-flow soldering



|                  | Pb-Sn soldering | Lead-free soldering |
|------------------|-----------------|---------------------|
| Peak temperature | 230°C ~ 250°C   | 240°C ~ 260°C       |

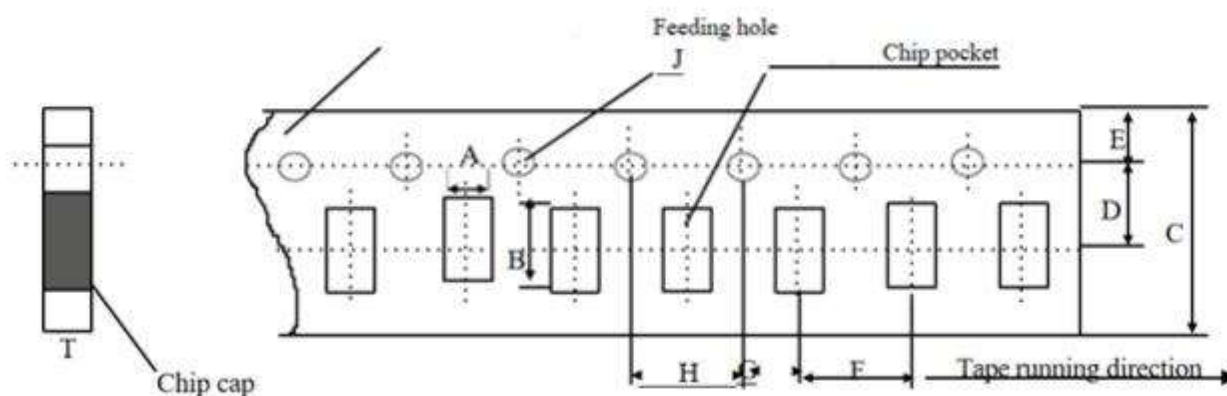
While in preheating, please keep the temperature difference between soldering temperature and surface temperature of chips as:  $T \leq 150^{\circ}\text{C}$ .

#### Wave soldering



|                  | Pb-Sn soldering | Lead-free soldering |
|------------------|-----------------|---------------------|
| Peak temperature | 230°C ~ 260°C   | 240°C ~ 270°C       |

## • Dimensions of paper taping

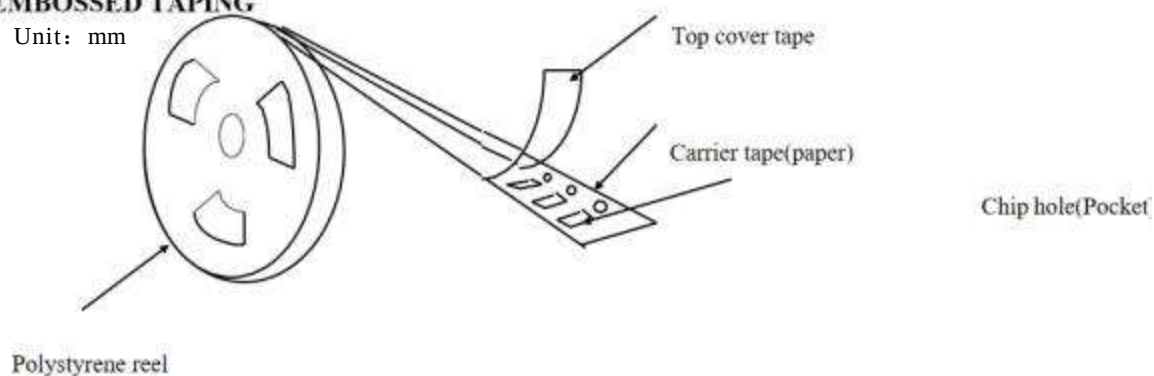


| Code      | A             | B             | C             | D*            | E             | F             | G*            | H             | J               | T           |
|-----------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-----------------|-------------|
| papersize |               |               |               |               |               |               |               |               |                 |             |
| Size      | 1.10<br>±0.10 | 1.90<br>±0.10 | 8.00<br>±0.10 | 3.50<br>±0.05 | 1.75<br>±0.10 | 4.00<br>±0.10 | 2.00<br>±0.10 | 4.00<br>±0.10 | 1.50<br>-0+0.10 | 1.10<br>Max |

Reel (4000 pcs/Reel)

## EMBOSED TAPING

Unit: mm



## • Storage Period

The guaranteed period for solderability is 6 months (Under deliver package condition).  
Temperature: 5~40°C /Relative Humidity: 20~70%

## Part Number System

TS - 1608 - E - 2450 - D - 02

Brand      Dimension      Material      Frequency      Feeding mode      Type

## 订货信息 Order Information

| Device        | Package | Carrier   | Quantity | HSF Status     |
|---------------|---------|-----------|----------|----------------|
| TS1608E245D02 | 1608    | Tape&Reel | 4000pcs  | RoHS compliant |

## Revision history

| Date      | Revision | Description of changes |
|-----------|----------|------------------------|
| 2023-1-15 | 1.0      | First Version          |

The contents of this data sheet are subject to change without notice .  
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