



Multilayer Antenna

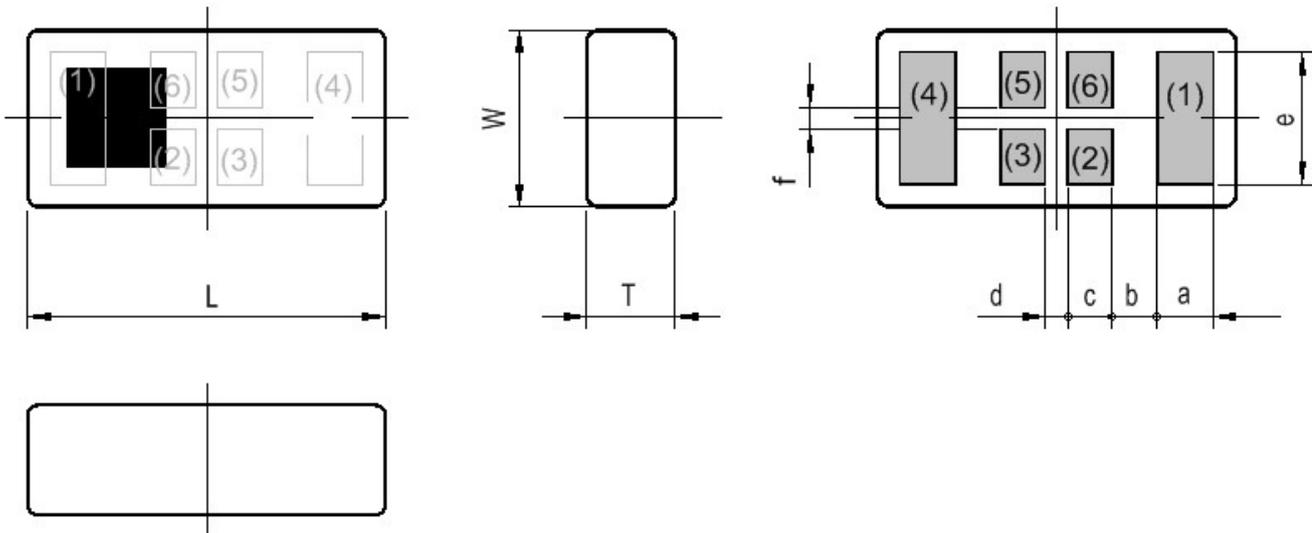
For 2.4GHz W-LAN & Bluetooth

ANT Series 1.6x0.8mm [EIA 0603] TYPE

P/N: **ANT016008LCS2442MA1**

ANT016008LCS2442MA1

■ SHAPES AND DIMENSIONS



Dimensions (mm)

| L | W | T | a | b | c | d | e | f |
|---------|---------|------|---------|---------|---------|--------|---------|--------|
| 1.60 | 0.80 | 0.40 | 0.215 | 0.25 | 0.20 | (0.10) | 0.63 | (0.10) |
| +/-0.10 | +/-0.10 | Max | +/-0.10 | +/-0.10 | +/-0.10 | | +/-0.10 | |

Terminal functions

| | |
|-----|--------------------|
| (1) | Radiator electrode |
| (2) | Dummy pad |
| (3) | Dummy pad |
| (4) | Feed point |
| (5) | Dummy pad |

| | |
|-----|-----------|
| (6) | Dummy pad |
|-----|-----------|

*Terminal (2),(3),(5) and (6) :Connected in inner structure

■ TERMINATION FINISH

| Material |
|----------|
| Au plate |

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ELECTRICAL CHARACTERISTICS

(Measurement)

| Parameter | Frequency (MHz) | TDK Spec | | |
|--------------------------------|-----------------|--------------|------|------|
| | | Min. | Typ. | Max. |
| VSWR | 2400 to 2484 | - | 1.60 | 3.0 |
| Antenna Gain (dBi)** | 2400 to 2484 | - | 1.6 | - |
| Polarization | | Linear | | |
| PCB Size (mm) | | 50 x 20 | | |
| Antenna keep-out Area (mm) | | 5 x 3 | | |
| Characteristic Impedance (ohm) | | 50 (Nominal) | | |

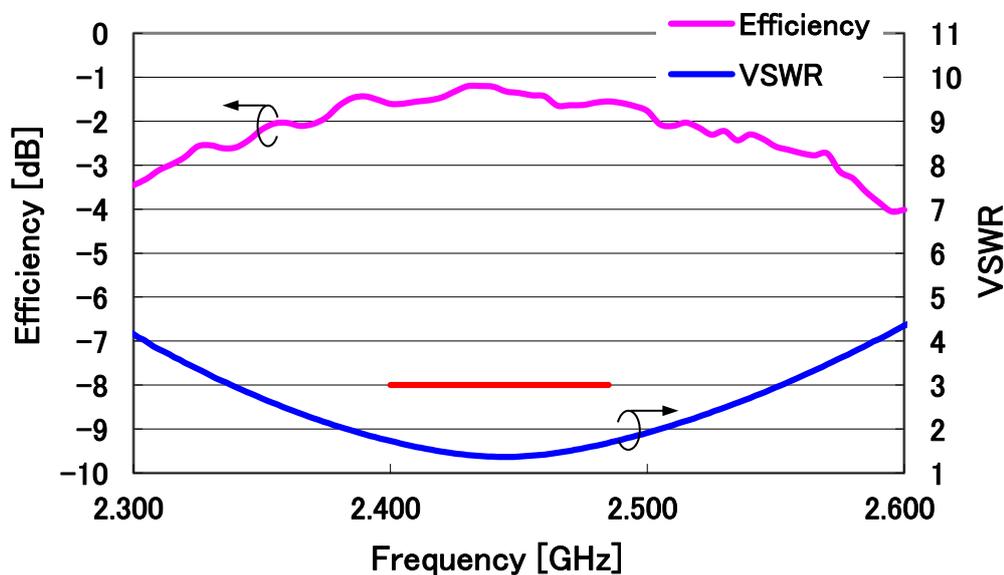
* This is typical antenna performance with the standard PCB.

** Reference value

FREQUENCY CHARACTERISTICS

Note: Tested antenna has been soldered. Evaluation board size is 50x20x1 mm.

Efficiency and VSWR



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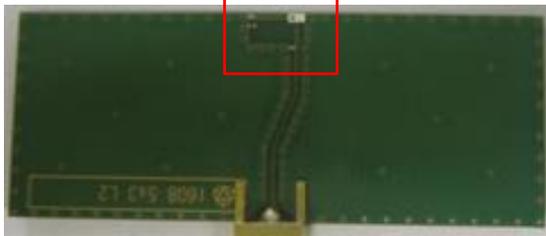
■ MAXIMUM RATINGS

| Parameter | TDK Spec | Conditions |
|---|---------------|----------------------|
| Operating temperature (°C) | -40 to +85 °C | |
| Storage temperature (°C) | -40 to +85 °C | |
| Power Handling (W) *1 | 0.8 | CW |
| Human Body Model : HBM @Each Port (V) | +/-1000 | 100pF / 1500ohm |
| Machine Model : MM @Each Port (V) | +/-150 | 200pF / 0ohm |
| Charged Device Model : CDM @Each Port (V) | +/-500 | Humidity : 60%RH max |

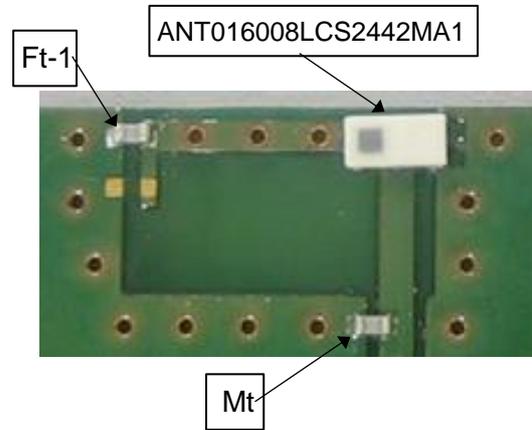
*1 : Refer to 3GPP TS 38.101-1 V15.2.0

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EVALUATION BOARD



PCB size : 50mm x 20mm x 1mm
Antenna area : 5 x 3 mm



| | Element Value |
|------|---------------|
| Ft-1 | 6.2pF |
| Mt | 0.8pF |

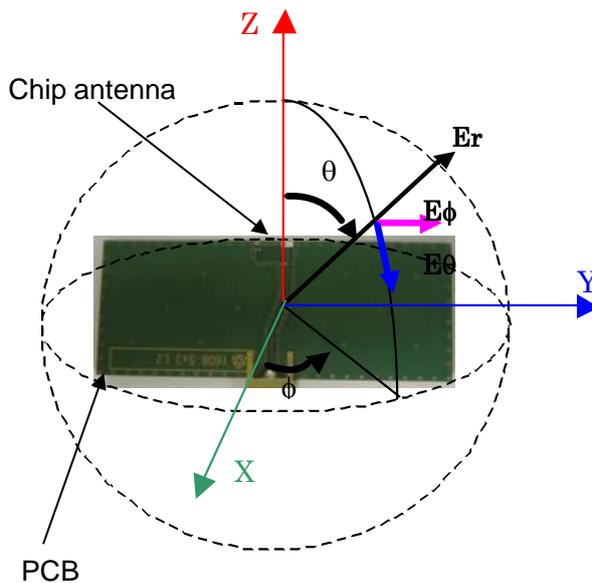
This evaluation board layout example is defined based on TDK standard.
Other board layouts can be used by optimizing their design.
Matching element values can be selected depending on the board layouts.
Getting more support, please access our website.

[Contact | TDK](#)

The following URL is a link to TDK's simple antenna simulator.

[Chip Antenna Simulation | RF Components - Chip Antennas | TDK Product Center](#)

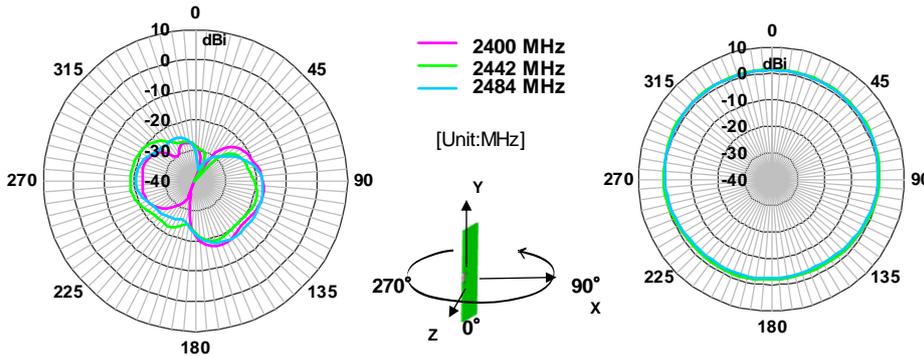
Measurement condition for Radiation pattern



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Radiation Pattern

Note: Tested antenna has been soldered. Evaluation board size is 50x20x1 mm.
2.4GHz band

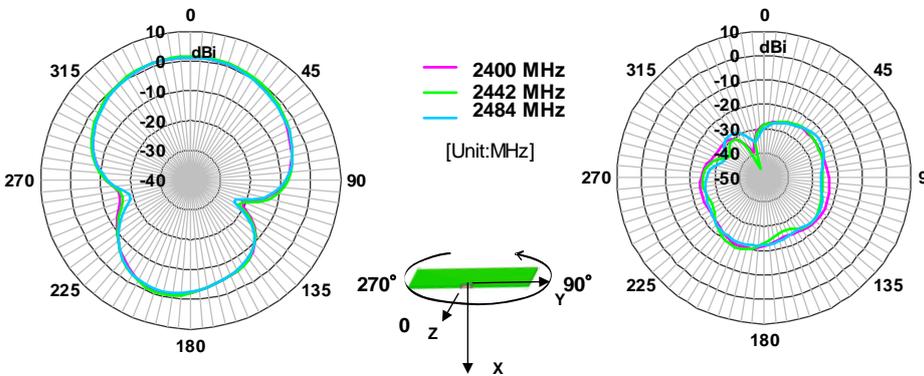


Horizontal Polarization

| Frequency [MHz] | 2400 | 2442 | 2484 |
|-----------------|-------|-------|-------|
| Average[dBi] | -21.5 | -21.5 | -21.3 |
| Maximum[dBi] | -16.9 | -18.5 | -17.2 |
| Minimum[dBi] | -46.0 | -40.8 | -36.4 |

Vertical Polarization

| Frequency [MHz] | 2400 | 2442 | 2484 |
|-----------------|------|------|------|
| Average[dBi] | 0.0 | 0.3 | -0.2 |
| Maximum[dBi] | 1.3 | 1.6 | 1.2 |
| Minimum[dBi] | -2.4 | -2.2 | -3.0 |

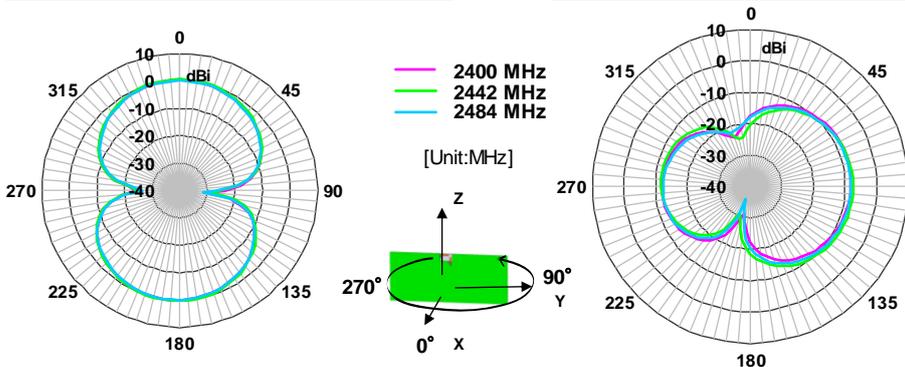


Horizontal Polarization

| Frequency [MHz] | 2400 | 2442 | 2484 |
|-----------------|-------|-------|-------|
| Average[dBi] | -2.9 | -2.6 | -3.1 |
| Maximum[dBi] | 1.3 | 1.6 | 1.2 |
| Minimum[dBi] | -21.5 | -21.9 | -23.6 |

Vertical Polarization

| Frequency [MHz] | 2400 | 2442 | 2484 |
|-----------------|-------|-------|-------|
| Average[dBi] | -24.1 | -24.7 | -24.8 |
| Maximum[dBi] | -20.2 | -19.1 | -21.5 |
| Minimum[dBi] | -39.2 | -46.1 | -34.9 |



Horizontal Polarization

| Frequency [MHz] | 2400 | 2442 | 2484 |
|-----------------|-------|-------|-------|
| Average[dBi] | -3.1 | -2.7 | -3.2 |
| Maximum[dBi] | 0.2 | 0.6 | 0.1 |
| Minimum[dBi] | -29.8 | -28.5 | -31.3 |

Vertical Polarization

| Frequency [MHz] | 2400 | 2442 | 2484 |
|-----------------|-------|-------|-------|
| Average[dBi] | -12.2 | -11.8 | -12.3 |
| Maximum[dBi] | -8.0 | -7.5 | -8.2 |
| Minimum[dBi] | -31.2 | -30.5 | -35.8 |

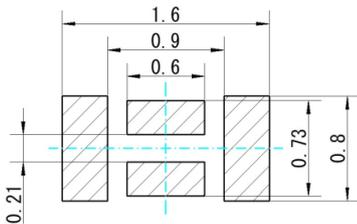
All specifications are subject to change without notice.
Before using these products, be sure to request the delivery specifications.

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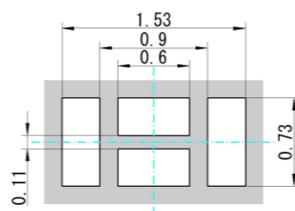
RECOMMENDED LAND PATTERN

Recommend land pattern and solder resist pattern

< Land pattern >

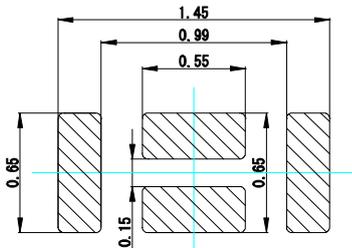


< Solder resist pattern >



- Center line of Chip
- Land Pattern
- Resist Pattern

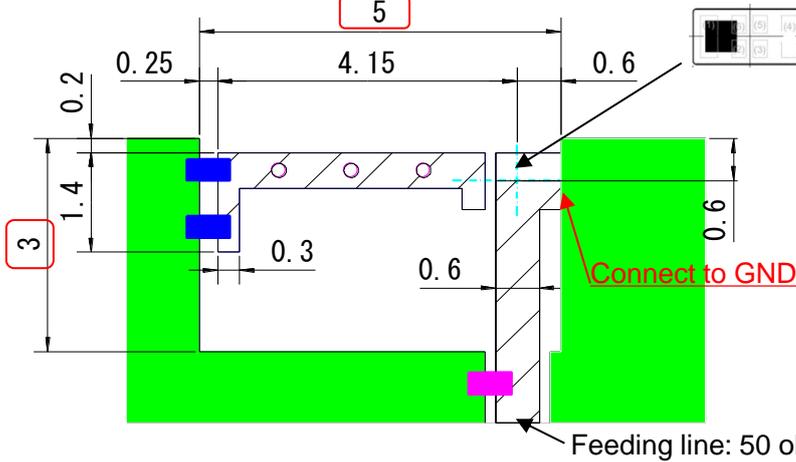
Recommend aperture size of metal mask for solder



- Center line of Chip
- Aperture of metal

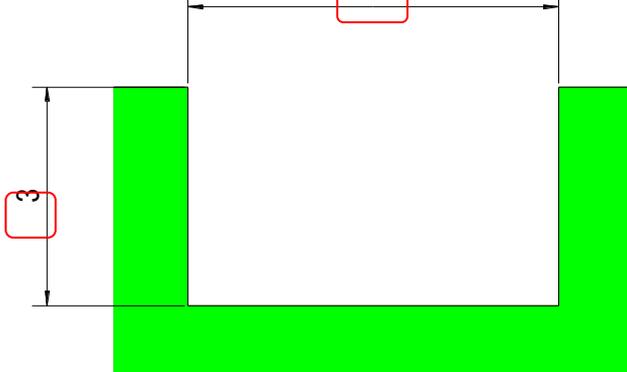
Example of Antenna pattern layout (TDK Standard PCB)

<Top Layer (Parts mounted side) >

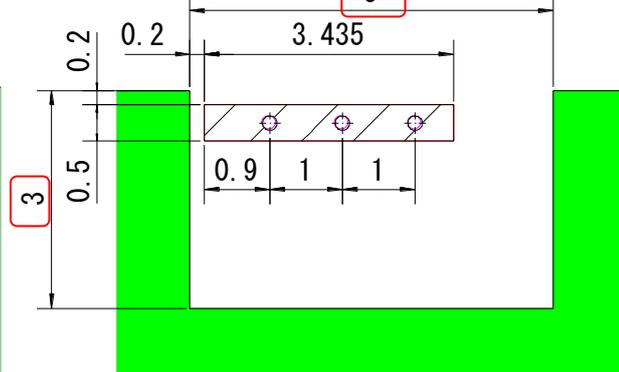


- Center line of Chip antenna
 - Antenna keep out area (All Layer GND off)
 - Ft : Frequency tuning component
 - Mt : Impedance matching component
 - Antenna Pattern
 - VIA : $\Phi 0.2\text{mm}$
 - GND
- [Unit : mm]

<Inner Layer >



<Bottom Layer >

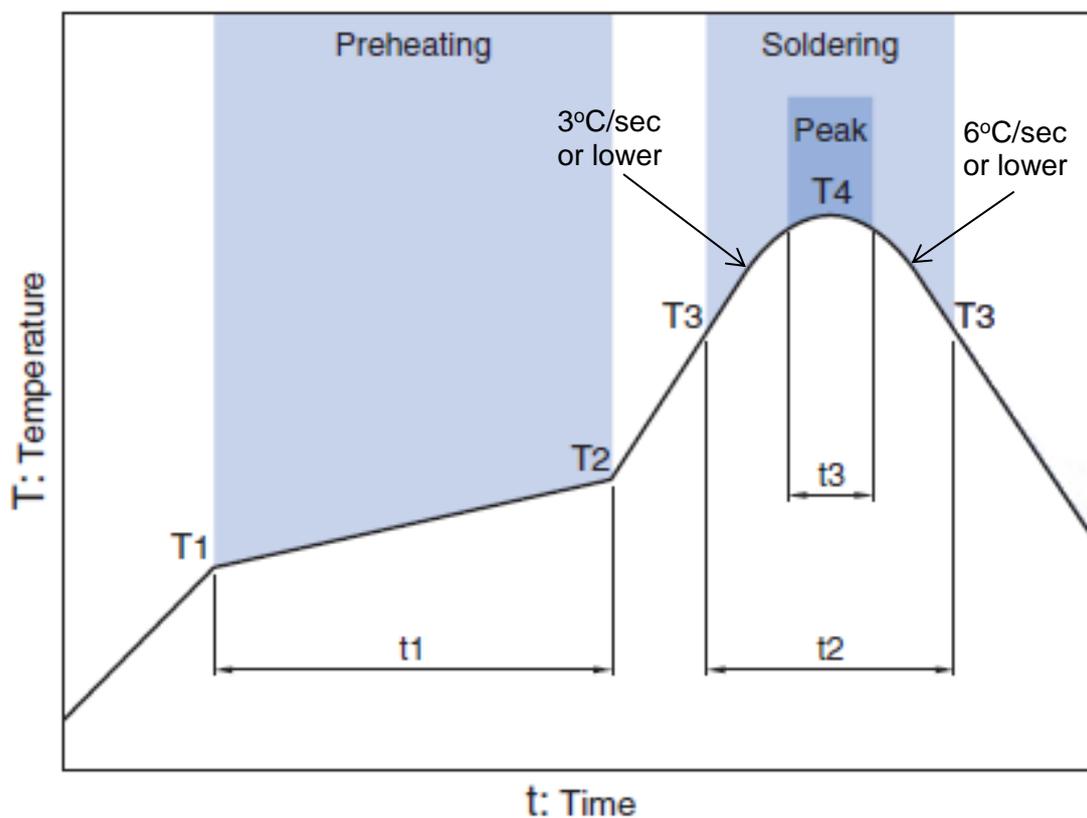


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■ ENVIROMENT INFORMATION

RoHS Statement
RoHS Compliance

RECOMMENDED REFLOW PROFILE



| Preheating | | | Soldering | | | |
|------------|-------|--------------|--------------------------|--------------|--------------|------------|
| | | | Critical zone (T3 to T4) | | Peak | |
| Temp. | | Time | Temp. | Time | Temp. | Time |
| T1 | T2 | t1 | T3 | t2 | T4 | t3 * |
| 150°C | 200°C | 60 to 120sec | 217°C | 60 to 120sec | 240 to 260°C | 30 sec Max |

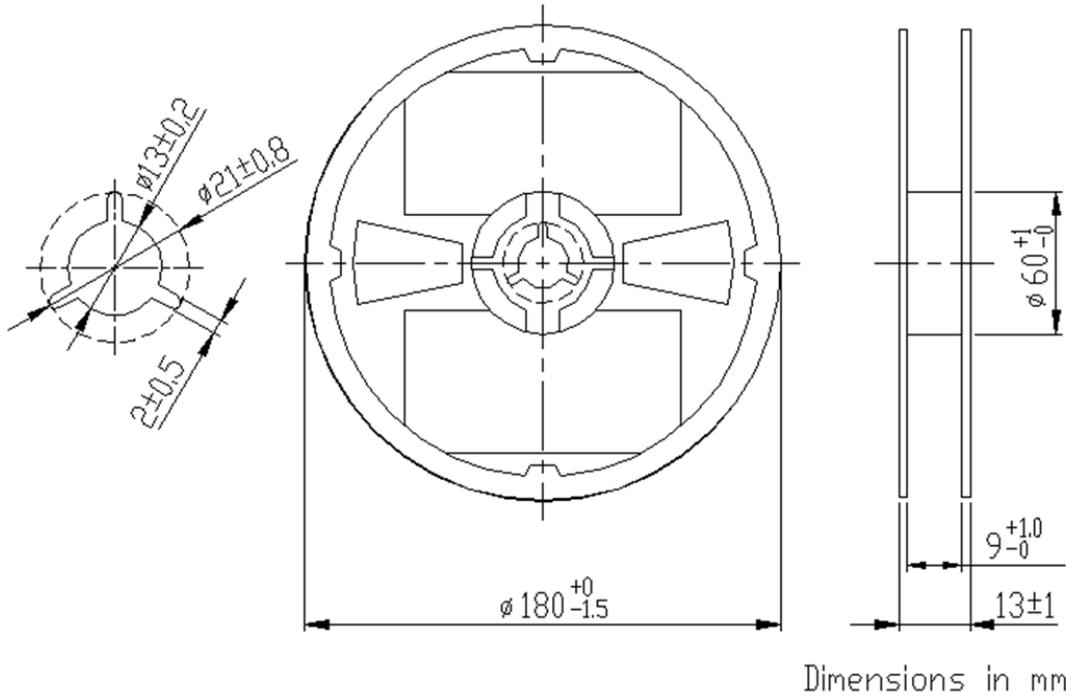
* t3 : Time within 5°C of actual peak temperature

The maximum number of reflow is 3.

Note: Lead free solder is recommended.
Recommended solder is Sn-3.0Ag-0.5Cu. (M705 by Senju Metal Industry)

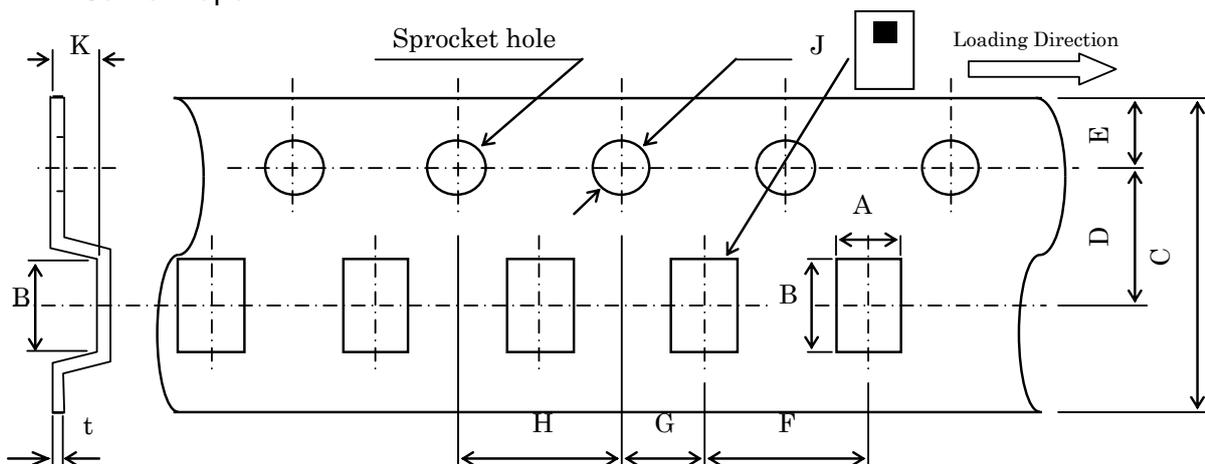
ANT016008LCS2442MA1**PACKAGING STYLE**

Reel Dimensions



Carrier Tape

Material of the carrier tape : PS



Dimensions (mm)

| A | B | C | D | E | F | G | H | J | K | t |
|---------|---------|--------|---------|--------|--------|---------|--------|---------|------|---------|
| 0.97 | 1.8 | 8.0 | 3.5 | 1.75 | 4.0 | 2.0 | 4.0 | 1.5 | 0.55 | 0.25 |
| +/-0.05 | +/-0.05 | +/-0.2 | +/-0.05 | +/-0.1 | +/-0.1 | +/-0.05 | +/-0.1 | +0.1/-0 | MAX | +/-0.05 |

STANDARD PACKAGE QUANTITY
(pieces/reel)

4,000

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 catalog 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 catalog.

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

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.