



# Datasheet

## Gas Discharge Tube (GDT)

|                 |                                |
|-----------------|--------------------------------|
| Series / Models | 2RA-5 Series                   |
| Product Code    | 10.12.50.XXXX<br>10.12.51.XXXX |
| Version         | A6                             |
| Date            | 2026-03-02                     |
| File Number     | SP-GDT-014                     |

# Gas Discharge Tube(GDT)

## 2RA-5 Series

### Version History

| Version | Date       | Page         | Description                                                                        | Author        |
|---------|------------|--------------|------------------------------------------------------------------------------------|---------------|
| A0      | 2016-05-09 | /            | Initial draft                                                                      | XianTao Jiang |
| A1      | 2020-03-16 | Page 4       | Update electrical characteristics                                                  | XianTao Jiang |
| A2      | 2022-10-28 | Page 10      | Update terms and definitions                                                       | George Hu     |
| A3      | 2023-03-31 | Page 5       | Update certifications table                                                        | George Hu     |
| A4      | 2023-11-02 | Page 7       | Update terms and definitions                                                       | Xia Wu        |
| A5      | 2025-02-18 | Page 1,2,3,4 | 1. Add cover and version history<br>2. Update Description<br>3. Delete some models | Xia Wu        |
| A6      | 2026-03-02 | Page 7       | Update the packaging quantity for the DIP axial lead series (bulk)                 | Xia Wu        |

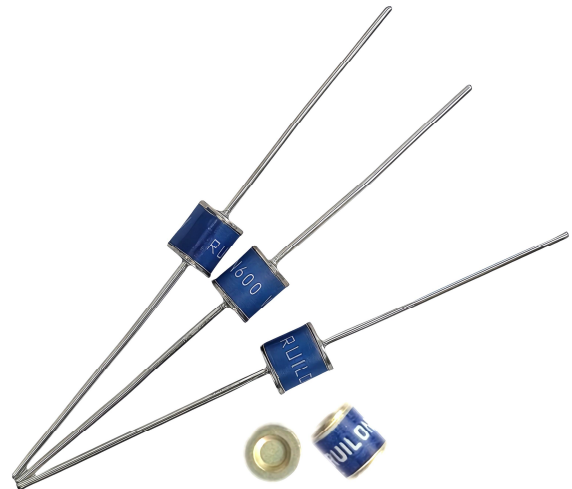
## Gas Discharge Tube(GDT)

## 2RA-5 Series

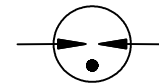
### Description

Gas discharge tubes (GDTs) are generally in a high insulation resistance state, equivalent to an open circuit, which has almost no impact on the normal operation of the circuit. When transient overvoltage occurs in the circuit and the voltage amplitude exceeds the breakdown voltage of the GDT, the gas inside the GDT is ionized, causing the GDT to quickly conduct and limit the overvoltage to a lower level, thereby protecting electronic devices or circuit components connected in parallel from high voltage impact damage. After the overvoltage disappears, the GDT immediately returns to a high insulation resistance state, and the circuit resumes normal operation.

The 2RA-5 series GDT is a device that offers axial leads or surface mount packaging. It is not only small in size and easy to install on various compact printed circuit boards (PCBs), but also has excellent performance. When used in high-frequency communication circuits, the low capacitance characteristic minimizes its impact on the signal. High insulation resistance ensures that the performance of the circuit will not suffer additional losses under normal operating conditions. The 2RA-5 series GDT can not only be used to protect communication interfaces, but its ability to withstand high surge currents (8/20uS, 5KA) also makes it suitable for power protection.



### Electrical symbol



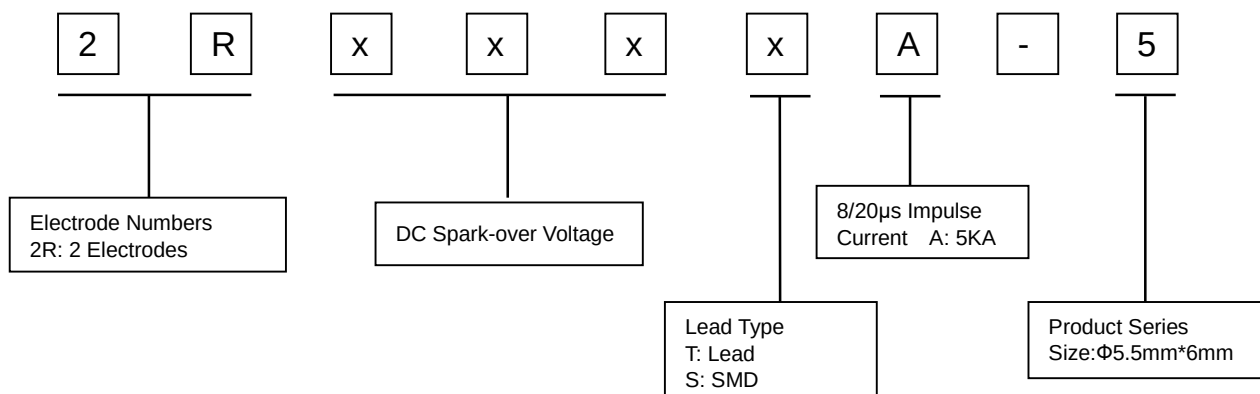
### Features

- I Excellent response to fast rising transients
- I Stable breakdown voltage
- I GHz working frequency
- I 8/20μs Impulse current capability: 5KA
- I Non-Radioactive
- I Ultra Low capacitance (<1pF)
- I Size: Φ5.5mm\*6mm

### Applications

- I CATV equipment
- I Antennas
- I RS 485
- I Telecom Base Station
- I Power Supply AC Main
- I EV power Charging
- I Inverter/Variable
- I Frequency Drivers (VFDs)
- I IEEE 802.3 compliant Ethernet interfaces
- I Broad Band equipment
- I xDSL, ADSL, ADSL2, VDSL, and VDSL2
- I Medical Electronics
- I Test Equipment
- I General Telecom Equipment
- I Renewable Energy

### Part Number Code



# Gas Discharge Tube(GDT)

## 2RA-5 Series

### Electrical Characteristics

| Part Number                                    |           | DC<br>Spark-over<br>Voltage <sup>1) 2)</sup><br>@100V/S | Impulse<br>Spark-over<br>Voltage |        | Insulation<br>Resistance <sup>3)</sup> | Capacitance<br>@1MHz                                                | Glow<br>Voltage<br>@10mA | Arc<br>Voltage<br>@1A | Life Ratings                               |        |                                                 |                            |
|------------------------------------------------|-----------|---------------------------------------------------------|----------------------------------|--------|----------------------------------------|---------------------------------------------------------------------|--------------------------|-----------------------|--------------------------------------------|--------|-------------------------------------------------|----------------------------|
|                                                |           |                                                         | 100V/μS                          | 1KV/μS |                                        |                                                                     |                          |                       | Impulse<br>Discharge<br>Current<br>@8/20μS |        | Alternating<br>Discharge<br>Current<br>@50Hz 1S | Impulse Life<br>@10/1000μS |
|                                                |           |                                                         | Max                              | Max    |                                        |                                                                     |                          |                       | ±5 times                                   | 1 time | 10 times                                        | 300 times                  |
| DIP                                            | SMD       | V                                                       | V                                | V      | GΩ                                     | pF                                                                  | V                        | V                     | KA                                         | KA     | A                                               | A                          |
| 2R075TA-5                                      | 2R075SA-5 | 75±20%                                                  | 500                              | 600    | 1                                      | 1                                                                   | 60                       | 10                    | 5                                          | 10     | 5                                               | 100                        |
| 2R090TA-5                                      | 2R090SA-5 | 90±20%                                                  | 500                              | 600    | 1                                      | 1                                                                   | 60                       | 10                    | 5                                          | 10     | 5                                               | 100                        |
| 2R150TA-5                                      | 2R150SA-5 | 150±20%                                                 | 500                              | 600    | 1                                      | 1                                                                   | 60                       | 10                    | 5                                          | 10     | 5                                               | 100                        |
| 2R230TA-5                                      | 2R230SA-5 | 230±20%                                                 | 600                              | 700    | 1                                      | 1                                                                   | 60                       | 10                    | 5                                          | 10     | 5                                               | 100                        |
| 2R350TA-5                                      | 2R350SA-5 | 350±20%                                                 | 800                              | 900    | 1                                      | 1                                                                   | 60                       | 10                    | 5                                          | 10     | 5                                               | 100                        |
| 2R420TA-5                                      | 2R420SA-5 | 420±20%                                                 | 850                              | 950    | 1                                      | 1                                                                   | 60                       | 10                    | 5                                          | 10     | 5                                               | 100                        |
| 2R470TA-5                                      | 2R470SA-5 | 470±20%                                                 | 900                              | 1000   | 1                                      | 1                                                                   | 60                       | 10                    | 5                                          | 10     | 5                                               | 100                        |
| 2R600TA-5                                      | 2R600SA-5 | 600±20%                                                 | 1000                             | 1200   | 1                                      | 1                                                                   | 60                       | 10                    | 5                                          | 10     | 5                                               | 100                        |
| 2R800TA-5                                      | 2R800SA-5 | 800±20%                                                 | 1200                             | 1400   | 1                                      | 1                                                                   | 135                      | 15                    | 5                                          | 10     | 5                                               | 100                        |
| Glow to Arc transition Current.....            |           |                                                         |                                  |        |                                        | <0.5A                                                               |                          |                       |                                            |        |                                                 |                            |
| Weight.....                                    |           |                                                         |                                  |        |                                        | DIP ~0.82g<br>SMD ~0.55g                                            |                          |                       |                                            |        |                                                 |                            |
| Operation and storage temperature.....         |           |                                                         |                                  |        |                                        | -40~+125°C                                                          |                          |                       |                                            |        |                                                 |                            |
| Climatic category (IEC 60068-1).....           |           |                                                         |                                  |        |                                        | 40/125/21                                                           |                          |                       |                                            |        |                                                 |                            |
| Marking, blue negative.....                    |           |                                                         |                                  |        |                                        | <b>RUILON XXX Y</b><br>XXX -Nominal voltage<br>Y-Year of production |                          |                       |                                            |        |                                                 |                            |
| Surface treatment.....                         |           |                                                         |                                  |        |                                        | DIP -Nickel Plated<br>SMD -Matte-tin plated                         |                          |                       |                                            |        |                                                 |                            |
| Moisture sensitivity level <sup>4)</sup> ..... |           |                                                         |                                  |        |                                        | 1                                                                   |                          |                       |                                            |        |                                                 |                            |

1) At delivery AQL 0.65 level II, DIN ISO 2859.

2) In ionized mode.

3) Insulation Resistance Measuring Voltage: 75V~150V at DC 50V, other at DC 100V.

4) Tests according to JEDEC J-STD-020.

Terms in accordance with ITU-T K.12, IEC 61643-311, GB/T 9043, GB/T18802.311.

# Gas Discharge Tube(GDT)

## 2RA-5 Series

### Certifications table

| Part Number |           | <br>UL497B<br>E465335 | <br>EN 61643-311<br>IEC 61643-311<br>J50571931 |
|-------------|-----------|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| DIP         | SMD       |                                                                                                        |                                                                                                                                   |
| 2R075TA-5   | 2R075SA-5 | --                                                                                                     | --                                                                                                                                |
| 2R090TA-5   | 2R090SA-5 | ⊙                                                                                                      | --                                                                                                                                |
| 2R150TA-5   | 2R150SA-5 | ⊙                                                                                                      | --                                                                                                                                |
| 2R230TA-5   | 2R230SA-5 | ⊙                                                                                                      | --                                                                                                                                |
| 2R350TA-5   | 2R350SA-5 | ⊙                                                                                                      | --                                                                                                                                |
| 2R420TA-5   | 2R420SA-5 | ⊙                                                                                                      | --                                                                                                                                |
| 2R470TA-5   | 2R470SA-5 | ⊙                                                                                                      | --                                                                                                                                |
| 2R600TA-5   | 2R600SA-5 | ⊙                                                                                                      | ⊙                                                                                                                                 |
| 2R800TA-5   | 2R800SA-5 | --                                                                                                     | ⊙                                                                                                                                 |

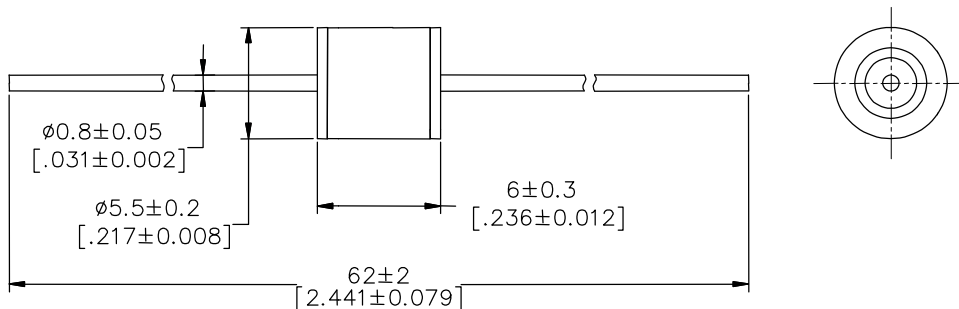
Notes:

⊙ indicates that the product has passed the certification.

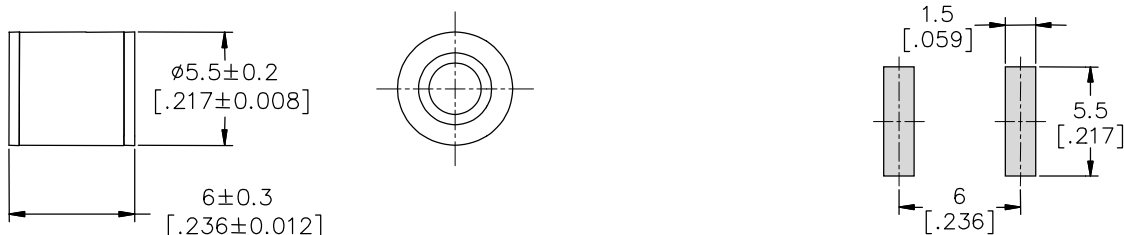
--indicates that the product is not certified.

### Dimensions(Unit: mm/inch)

#### DIP axial leads series (2RxxxTA-5)



#### SMD Series (2RxxxSA-5)



#### Recommended Soldering Pad Layout

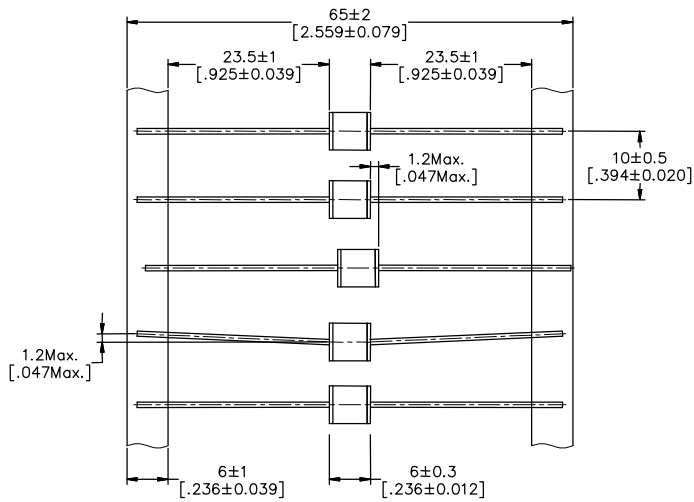
# Gas Discharge Tube(GDT)

## 2RA-5 Series

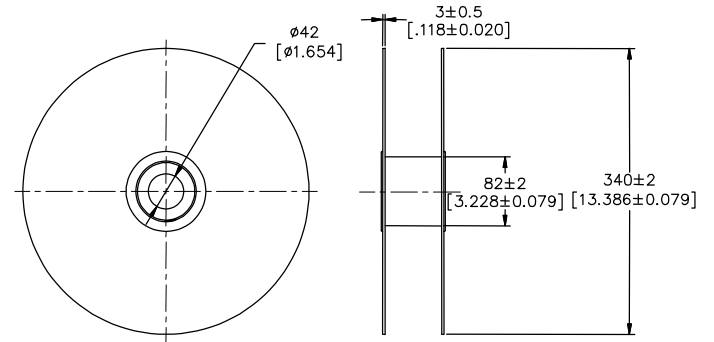
### Packaging Information(Unit: mm/inch)

#### DIP axial leads series packaging (Default packaging)

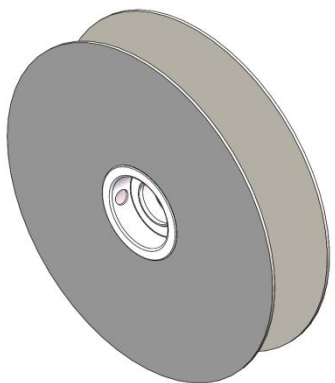
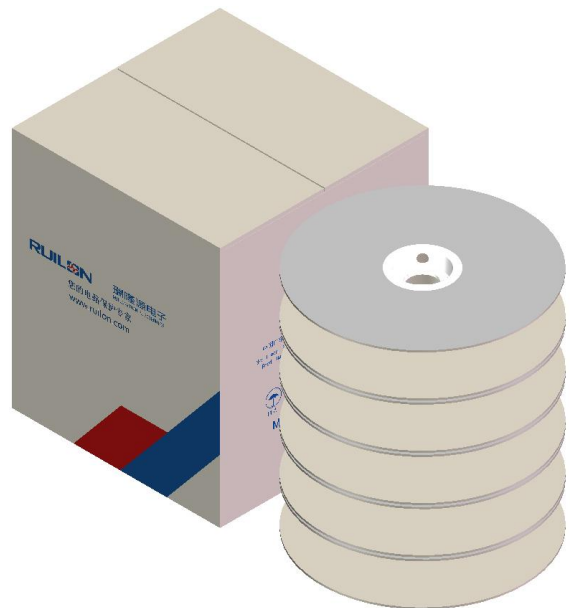
##### Tape



##### Reel



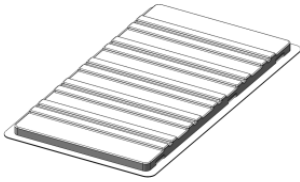
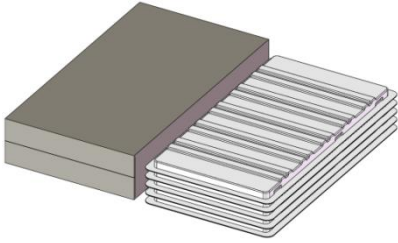
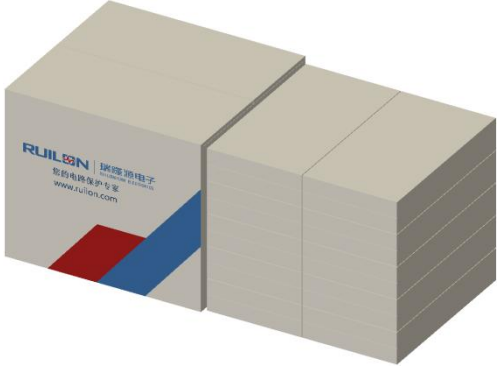
According to IEC 60286-1

|          | Reel                                                                                | Carton                                                                               |
|----------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Size     | 340×78mm                                                                            | 350×350×407mm                                                                        |
| Quantity | MPQ/MOQ: 1 reel=1,000pcs                                                            | 1Carton=5reels =5,000pcs                                                             |
| Photos   |  |  |

# Gas Discharge Tube(GDT)

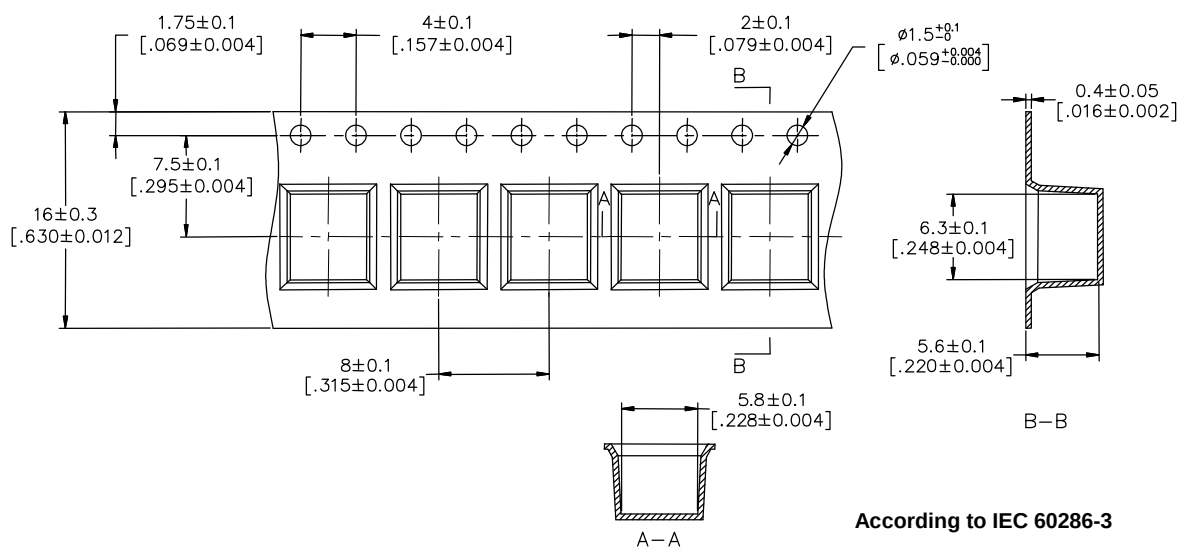
## 2RA-5 Series

### DIP axial leads series packaging(Bulk)

|          | PVC tray                                                                          | Inner Box                                                                         | Carton                                                                             |
|----------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| Size     | 265×148×10mm                                                                      | 275×150×50mm                                                                      | 315×290×272mm                                                                      |
| Quantity | MPQ: 1 tray=100pcs                                                                | MOQ: 1 Inner Box=6 trays=600pcs                                                   | 1Carton=10 Inner boxes=6,000pcs                                                    |
| Photos   |  |  |  |

### SMD Packaging(Tape & Reel)

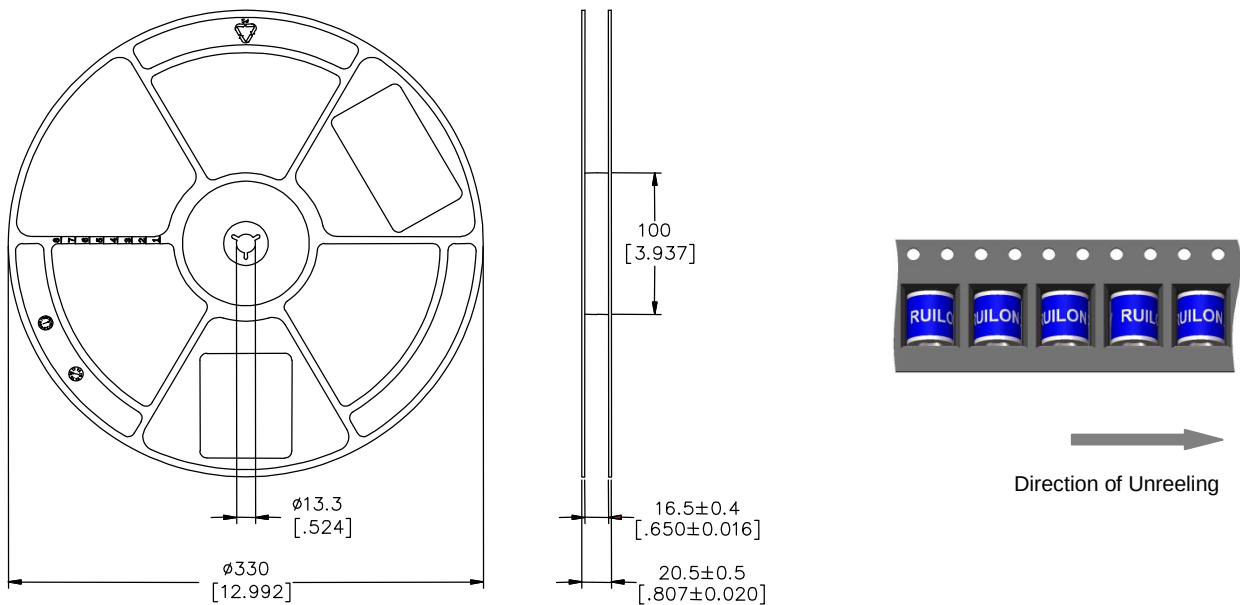
#### Tape



Gas Discharge Tube(GDT)

2RA-5 Series

Reel



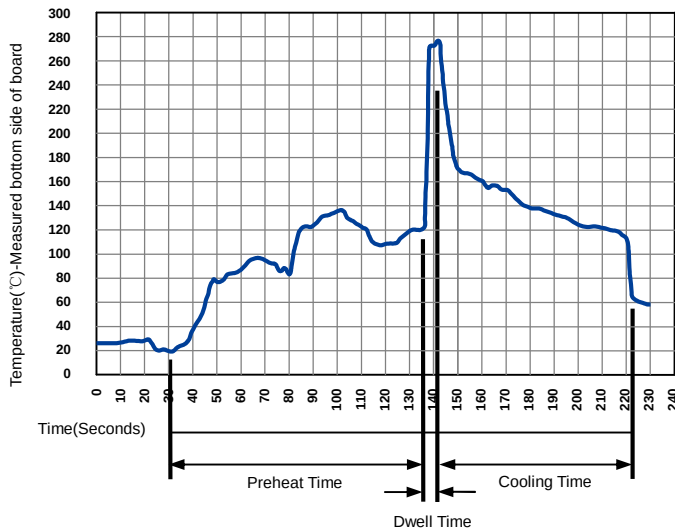
|          | Reel                     | Inner Box                    | Carton                          |
|----------|--------------------------|------------------------------|---------------------------------|
| Size     | 330×20.5mm               | 340×333×70mm                 | 375×353×380mm                   |
| Quantity | MPQ/MOQ: 1 reel=1,000pcs | 1 Inner Box=3 reels=3,000pcs | 1Carton=5 Inner boxes=15,000pcs |
| Photos   |                          |                              |                                 |



## Gas Discharge Tube(GDT)

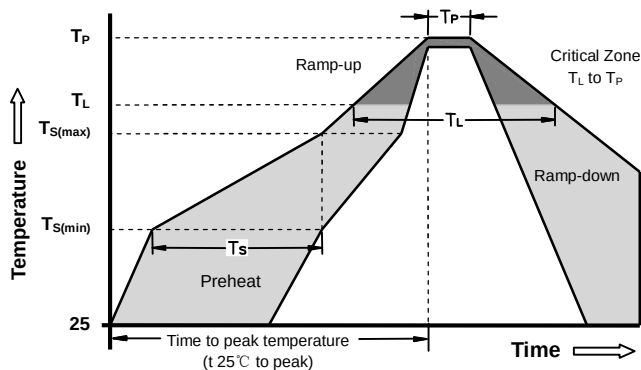
## 2RA-5 Series

### Soldering Parameters - Wave soldering(Thru-Hole Devices)



| Wave Soldering Condition |                   | Pb-Free assembly |
|--------------------------|-------------------|------------------|
| Preheat                  | Temperature Min   | 100°C            |
|                          | Temperature Max   | 150°C            |
|                          | Time (Min to Max) | 60-180 Seconds   |
| Solder Pot Temperature   |                   | 280°C Max        |
| Solder Dwell Time        |                   | 2-5 Seconds      |

### Soldering Parameters - Reflow Soldering (Surface Mount Devices)



| Reflow Condition                                     |                                   | Pb - Free assembly |
|------------------------------------------------------|-----------------------------------|--------------------|
| Preheat                                              | -Temperature Min ( $T_{s(min)}$ ) | 150°C              |
|                                                      | -Temperature Max ( $T_{s(max)}$ ) | 200°C              |
|                                                      | - Time (min to max) ( $t_s$ )     | 60 -180 Seconds    |
| Average ramp up rate (Liquids Temp $T_L$ ) to peak   |                                   | 3°C/second max     |
| $T_{S(max)}$ to $T_L$ - Ramp-up Rate                 |                                   | 5°C/second max     |
| Reflow                                               | - Temperature ( $T_L$ ) (Liquids) | 217°C              |
|                                                      | - Time (min to max) ( $t_s$ )     | 60 -150 Seconds    |
| Peak Temperature ( $T_P$ )                           |                                   | 260 +0/-5°C        |
| Time within 5°C of actual peak Temperature ( $t_p$ ) |                                   | 10- 30 Seconds     |
| Ramp-down Rate                                       |                                   | 6°C/second max     |
| Time 25°C to peak Temperature ( $T_P$ )              |                                   | 8 minutes Max      |
| Do not exceed                                        |                                   | 260°C              |

Surface mounted components (SMD) may exhibit a temporary increase in the DC spark-over voltage after the solder reflow process. The components will recover within 24 hours. There is no quality defect nor change in protection levels during the temporary change in DC spark-over voltage.

# Gas Discharge Tube(GDT)

## 2RA-5 Series

### Terms and definitions

| NO. | Item                                        | Definitions                                                                                                                                                                                                                        |
|-----|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | <b>Gas discharge tube(GDT)</b>              | A gap, or several gaps, in an enclosed discharge medium, other than air at atmospheric pressure, designed to protect apparatus or personnel, or both, from high transient voltages. Also referred to as "gas tube surge arrester". |
| 2   | <b>DC Spark-over Voltage</b>                | The voltage at which the gas discharge tube sparks over with slowly increasing d.c. voltage.                                                                                                                                       |
| 3   | <b>Impulse Spark-over Voltage</b>           | The highest voltage which appears across the terminals of a gas discharge tube in the period between the application of an impulse of given wave-shape and the time when current begins to flow.                                   |
| 5   | <b>Arc voltage</b>                          | Voltage drop across the GDT during arc current flow.                                                                                                                                                                               |
| 6   | <b>Glow voltage</b>                         | Peak value of voltage drop across the GDT when a glow current is flowing.                                                                                                                                                          |
| 7   | <b>Impulse discharge current<br/>8/20μs</b> | Current impulse with a nominal virtual front time of 8 μs and a nominal time to half-value of 20 μs.                                                                                                                               |
| 8   | <b>Alternating Discharge Current</b>        | The rms value of an approximately sinusoidal alternating current passing through the gas discharge tube.                                                                                                                           |
| 9   | <b>Insulation Resistance</b>                | Insulation resistance shall be measured from each terminal to every other terminal of the GDT. The test is performed with DC50V when normal spark-over Voltage 70~150V, others with DC100V.                                        |
| 10  | <b>Capacitance</b>                          | The capacitance shall be measured once at 1 MHz between all terminals unless otherwise specified.                                                                                                                                  |

## Cautions

- I Do not operate gas discharge tubes in power supply networks, whose maximum operating voltage exceeds the minimum spark-over voltage of the gas discharge tubes.
- I Gas discharge tubes may become hot in the event of longer periods of current stress (burn risk). In the event of overload the connectors may fail or the component may be destroyed.
- I Gas discharge tubes must be handled with care and must not be dropped.
- I Do not continue to use damaged gas discharge tubes.
- I The shown SMD pad dimensions represent a safe way to mount the arrester and are a recommendation of the manufacturer. During the reflow process it must be assured that no solder material reduces the insulation distance between the pads below the arrester.
- I SMD gas discharge tubes should be soldered within 24 month after shipment.
- I The electrical characteristics described in this datasheet are only typical characteristics, and all of these characteristics have been confirmed through testing and inspection. If the customer's usage requirements are different from this or have special requirements, please contact Ruilongyuan Electronics Co., Ltd. If protection failure or circuit damage occurs as a result, our company is not responsible for it.
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