

# DATA SHEET

## GAS DISCHARGE TUBES TELEPHONE INTERFACE

2R-5 series

RoHS compliant & free



Product specification— March 16, 2021 V.1



## Gas Discharge Tube (GDT) Data Sheet

### Features

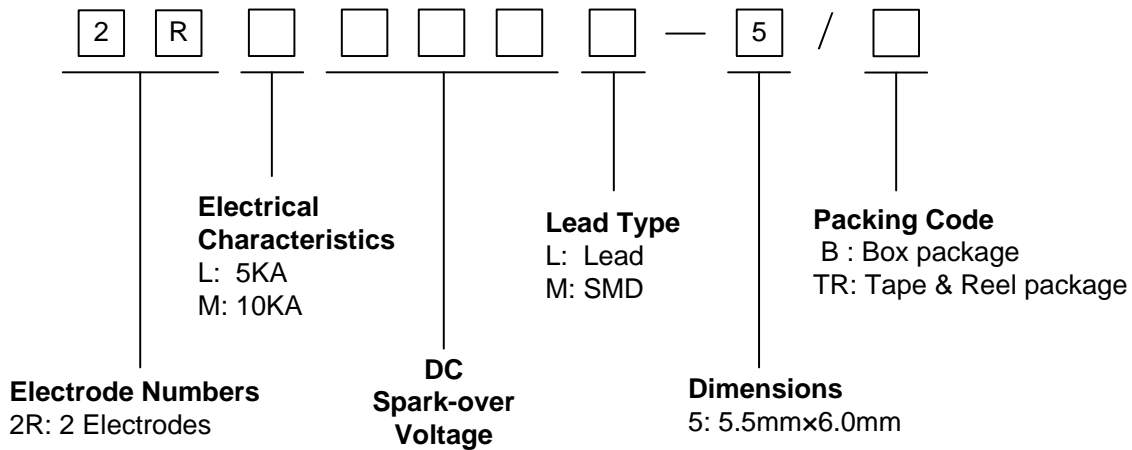
- Provide ultra-fast response to surge voltage from slow-rising surge of 100V/s to rapid-rising surge of 1KV/μs
- Stable breakdown voltage
- High insulation resistance
- Low capacitance (≤1.5pF)
- High holdover voltage
- Large absorbing transient current capability
- Micro-Gap Design
- Size: 5.5mm\*6.0mm
- Storage and operating temperature: -40°C ~ +85°C
- Meets MSL level 1, per J-STD-020
- Safety certification: UL



### Applications

- Repeaters, Modems
- Telephone Interface, Line cards
- Data communication equipment
- Line test equipment

### Part Number Code



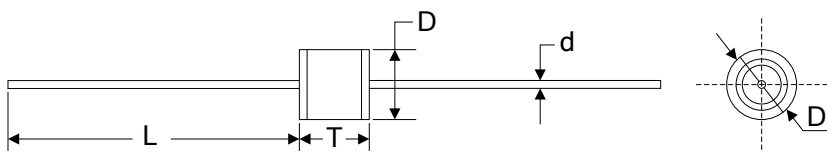
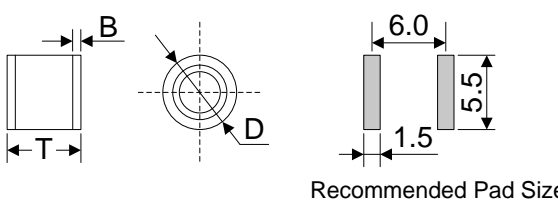
### Ordering Code for different package in 2RLxxxxL-5, 2RMxxxxL-5 series

Box package: Add suffix “/B” at the end of the part number, such as 2RL070L-5/B, 2RM070L-5/B  
 Tape & Reel package: Add suffix “/TR” at the end of the part number, such as 2RL070L-5/TR, 2RM070L-5/TR

### Marking

- B** : BrightKing Logo
- 2RL090-5 : Device Marking Code
- XXXX : Internal Control Code

**Dimensions**

| L Type   | Symbol  | Dimension (mm) |            |            |
|--|---|----------------|------------|------------|
|  |   | Spec.          | Tolerance  |            |
|  | D   | 5.5            | +0.3, -0.5 |            |
|  | T   | 6.0            | +0.3, -0.5 |            |
|  | d   | 0.8            | ±0.1       |            |
|  | L   | 30.0           | Max.       |            |
| M Type   |  | D              | 5.5        | +0.3, -0.5 |
|  |   | T              | 6.0        | +0.3, -0.5 |
|  |   | B              | 0.5        | ±0.1       |

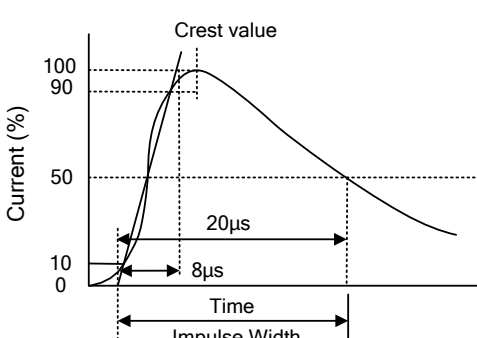
**Electrical Characteristics**

| Part Number |           | DC Spark-over Voltage | Maximum Impulse Spark-over Voltage | Nominal Impulse Discharge Current | Alternating Discharge Current | Impulse Life      | Minimum Insulation Resistance |      | Maximum Capacitance | Device Marking Code |
|-------------|-----------|-----------------------|------------------------------------|-----------------------------------|-------------------------------|-------------------|-------------------------------|------|---------------------|---------------------|
|             |           | 100V/s                | 1000V/μs                           | 8/20μs<br>10times                 | 50Hz, 1sec                    | 10/1000μs<br>100A | Test Voltage                  | (GΩ) | 1MHz                |                     |
|             |           | (V)                   | (V)                                | (KA)                              | (A)                           | (times)           | DC(V)                         |      | (pF)                |                     |
| 2RL070L-5   | 2RL070M-5 | 70±20%                | 800                                | 5.0                               | 5.0                           | 300               | 25                            | 1.0  | 1.5                 | 2RL070-5            |
| 2RL075L-5   | 2RL075M-5 | 75±20%                | 800                                | 5.0                               | 5.0                           | 300               | 25                            | 1.0  | 1.5                 | 2RL075-5            |
| 2RL090L-5   | 2RL090M-5 | 90±20%                | 700                                | 5.0                               | 5.0                           | 300               | 50                            | 1.0  | 1.5                 | 2RL090-5            |
| 2RL120L-5   | 2RL120M-5 | 120±20%               | 700                                | 5.0                               | 5.0                           | 300               | 50                            | 1.0  | 1.5                 | 2RL120-5            |
| 2RL145L-5   | 2RL145M-5 | 145±20%               | 700                                | 5.0                               | 5.0                           | 300               | 100                           | 1.0  | 1.5                 | 2RL145-5            |
| 2RL150L-5   | 2RL150M-5 | 150±20%               | 700                                | 5.0                               | 5.0                           | 300               | 100                           | 1.0  | 1.5                 | 2RL150-5            |
| 2RL230L-5   | 2RL230M-5 | 230±20%               | 700                                | 5.0                               | 5.0                           | 300               | 100                           | 1.0  | 1.5                 | 2RL230-5            |
| 2RL250L-5   | 2RL250M-5 | 250±20%               | 700                                | 5.0                               | 5.0                           | 300               | 100                           | 1.0  | 1.5                 | 2RL250-5            |
| 2RL300L-5   | 2RL300M-5 | 300±20%               | 900                                | 5.0                               | 5.0                           | 300               | 100                           | 1.0  | 1.5                 | 2RL300-5            |
| 2RL350L-5   | 2RL350M-5 | 350±20%               | 900                                | 5.0                               | 5.0                           | 300               | 100                           | 1.0  | 1.5                 | 2RL350-5            |
| 2RL400L-5   | 2RL400M-5 | 400±20%               | 1000                               | 5.0                               | 5.0                           | 300               | 100                           | 1.0  | 1.5                 | 2RL400-5            |
| 2RL470L-5   | 2RL470M-5 | 470±20%               | 1100                               | 5.0                               | 5.0                           | 300               | 250                           | 1.0  | 1.5                 | 2RL470-5            |
| 2RL600L-5   | 2RL600M-5 | 600±20%               | 1500                               | 5.0                               | 5.0                           | 300               | 250                           | 1.0  | 1.5                 | 2RL600-5            |
| 2RL800L-5   | 2RL800M-5 | 800±20%               | 1700                               | 5.0                               | 5.0                           | 300               | 250                           | 1.0  | 1.5                 | 2RL800-5            |

**Electrical Characteristics**

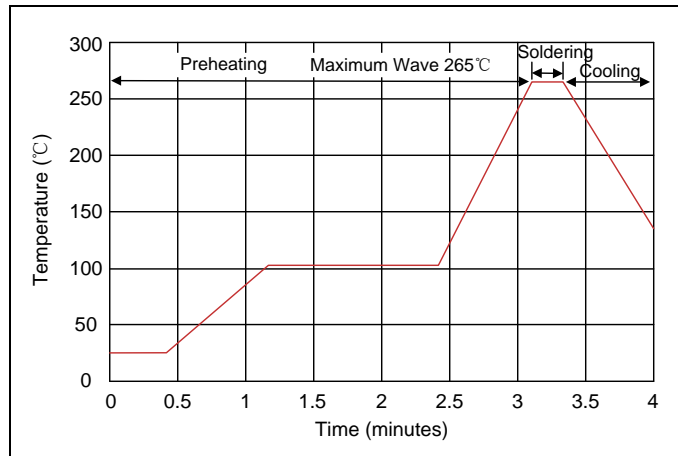
| Part Number |           | DC Spark-over Voltage | Maximum Impulse Spark-over Voltage | Nominal Impulse Discharge Current | Alternating Discharge Current | Impulse Life            | Minimum Insulation Resistance |               | Maximum Capacitance | Device Marking Code |
|-------------|-----------|-----------------------|------------------------------------|-----------------------------------|-------------------------------|-------------------------|-------------------------------|---------------|---------------------|---------------------|
|             |           | 100V/s                | 1000V/ $\mu$ s                     | 8/20 $\mu$ s<br>10times           | 50Hz, 1sec                    | 10/1000 $\mu$ s<br>100A | Test Voltage                  | (G $\Omega$ ) | 1MHz                |                     |
|             |           | (V)                   | (V)                                | (KA)                              | (A)                           | (times)                 | DC(V)                         |               | (pF)                |                     |
| 2RM070L-5   | 2RM070M-5 | 70 $\pm$ 20%          | 600                                | 10                                | 5.0                           | 500                     | 25                            | 1.0           | 1.5                 | 2RM070-5            |
| 2RM075L-5   | 2RM075M-5 | 75 $\pm$ 20%          | 600                                | 10                                | 5.0                           | 500                     | 25                            | 1.0           | 1.5                 | 2RM075-5            |
| 2RM090L-5   | 2RM090M-5 | 90 $\pm$ 20%          | 600                                | 10                                | 10                            | 500                     | 50                            | 1.0           | 1.5                 | 2RM090-5            |
| 2RM120L-5   | 2RM120M-5 | 120 $\pm$ 20%         | 600                                | 10                                | 10                            | 500                     | 50                            | 1.0           | 1.5                 | 2RM120-5            |
| 2RM145L-5   | 2RM145M-5 | 145 $\pm$ 20%         | 700                                | 10                                | 10                            | 500                     | 100                           | 1.0           | 1.5                 | 2RM145-5            |
| 2RM150L-5   | 2RM150M-5 | 150 $\pm$ 20%         | 700                                | 10                                | 10                            | 500                     | 100                           | 1.0           | 1.5                 | 2RM150-5            |
| 2RM230L-5   | 2RM230M-5 | 230 $\pm$ 20%         | 700                                | 10                                | 10                            | 500                     | 100                           | 1.0           | 1.5                 | 2RM230-5            |

**Electrical Ratings**

| Items                              | Test Condition/Description   | Requirement                 |
|------------------------------------|--|-----------------------------|
| DC Spark-over Voltage              | The voltage is measured with voltage ramp $dv/dt=100V/s$ .   | To meet the specified value |
| Maximum Impulse Spark-over Voltage | The maximum impulse spark-over voltage is measured with voltage ramp $dv/dt=1000V/\mu s$ .   |                             |
| Impulse Discharge Current          | Maximum 8/20 $\mu s$ surge current that can be applied between two electrodes, 5 positive and 5 negative surges, with 3 minutes interval time.<br><br> |                             |
| Alternating Discharge Current      | Rated RMS value of AC current at 50Hz, 1 sec. for 10 times with interval time 3 min.   |                             |
| Insulation Resistance              | The resistance of gas tube shall be measured between two electrodes.   |                             |
| Capacitance                        | The capacitance of gas tube shall be measured between two electrodes. Test frequency: 1MHz   |                             |

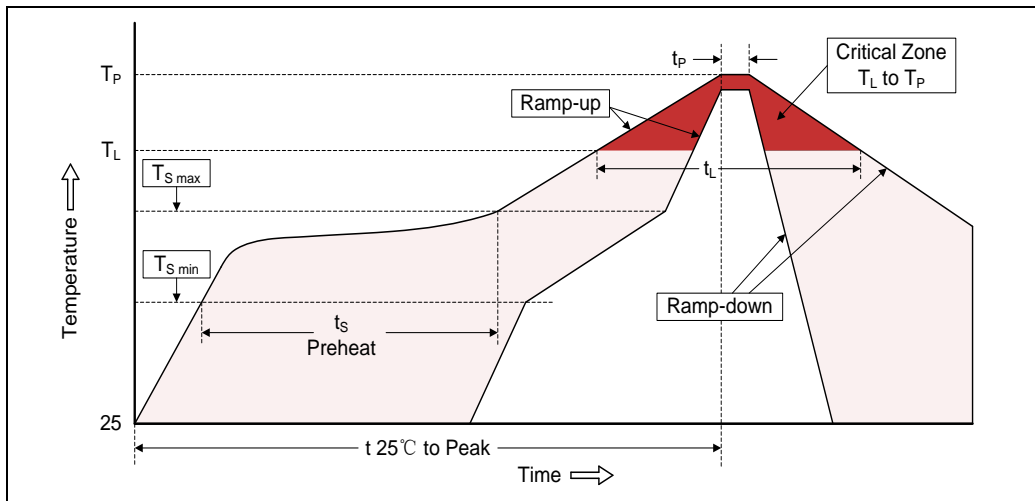
**Recommended Soldering Conditions**

**Wave Soldering**



| Item             | Conditions |
|------------------|------------|
| Peak Temperature | 265°C      |
| Dipping Time     | 10 seconds |
| Soldering        | 1 time     |

**Reflow Soldering**

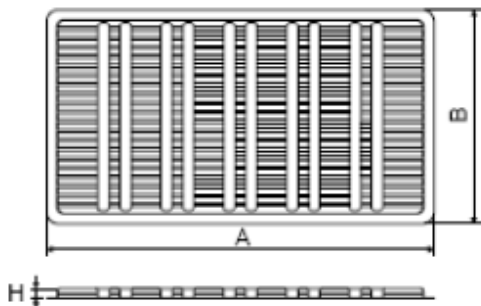


| Profile Feature   | Pb-Free Assembly                 |
|---|----------------------------------|
| Average ramp-up rate ( $T_L$ to $T_P$ )   | 3°C/second max.                  |
| Preheat<br>-Temperature Min ( $T_{S\ min}$ )<br>-Temperature Max ( $T_{S\ max}$ )<br>-Time (min to max) ( $t_s$ ) | 150°C<br>200°C<br>60-180 seconds |
| $T_{S\ max}$ to $T_L$<br>-Ramp-up Rate  | 3°C/second max.                  |
| Time maintained above:<br>-Temperature ( $T_L$ )<br>-Time ( $t_L$ )   | 217°C<br>60-150 seconds          |
| Peak Temperature ( $T_P$ )  | 260°C                            |
| Time within 5°C of actual Peak Temperature ( $t_p$ )  | 20-40 seconds                    |
| Ramp-down Rate  | 6°C/second max.                  |
| Time 25°C to Peak Temperature   | 8 minutes max.                   |

**Packaging**

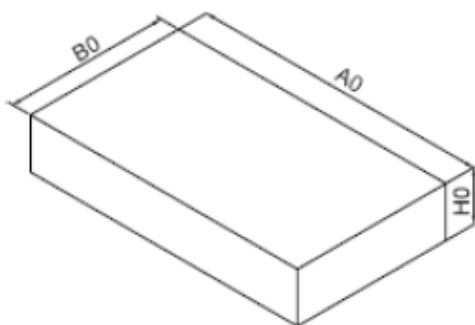
Axial Packing (Box)

Skin packing



| Symbol           | Dimension (mm) |           |
|------------------|----------------|-----------|
|                  | Spec.          | Tolerance |
| A                | 265.0          | ±5.0      |
| B                | 146.0          | ±5.0      |
| H                | 6.8            | ±0.5      |
| Quantity: 100pcs |                |           |

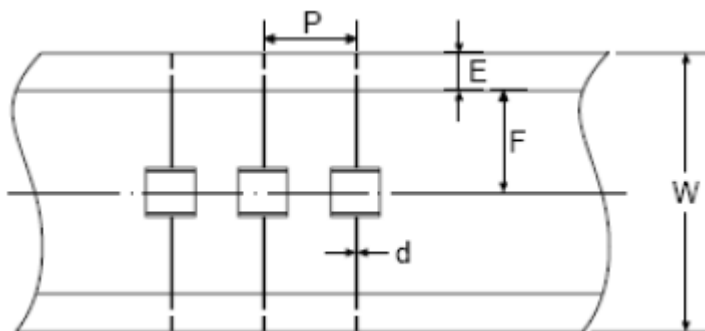
Inner box



|                  |       |      |
|------------------|-------|------|
| A0               | 270.0 | ±2.0 |
| B0               | 150.0 | ±2.0 |
| H0               | 50.0  | ±2.0 |
| Quantity: 500pcs |       |      |

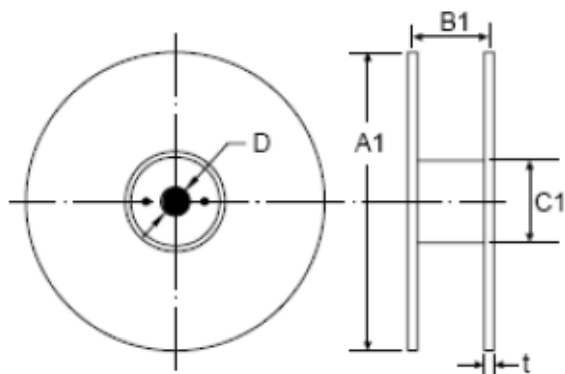
Axial Packing (Tape & Reel)

Tape



| Symbol | Dimension (mm) |           |
|--------|----------------|-----------|
|        | Spec.          | Tolerance |
| P      | 10.0           | ±0.5      |
| W      | 65.0           | ±1.0      |
| E      | 6.0            | ±0.5      |
| F      | 26.5           | ±0.5      |
| d      | 0.8            | ±0.1      |

Reel



|                   |       |      |
|-------------------|-------|------|
| A1                | 330.0 | ±2.0 |
| B1                | 70.0  | ±2.0 |
| C1                | 82.0  | ±2.0 |
| D                 | 25.0  | ±0.5 |
| t                 | 2.0   | ±0.2 |
| Quantity: 1000pcs |       |      |