

# DATA SHEET

GAS DISCHARGE TUBES

TELEPHONE INTERFACE

2R-4 series

RoHS compliant & free



Product specification— July 12, 2023 V.1



## Gas Discharge Tube (GDT) Data Sheet

### Features

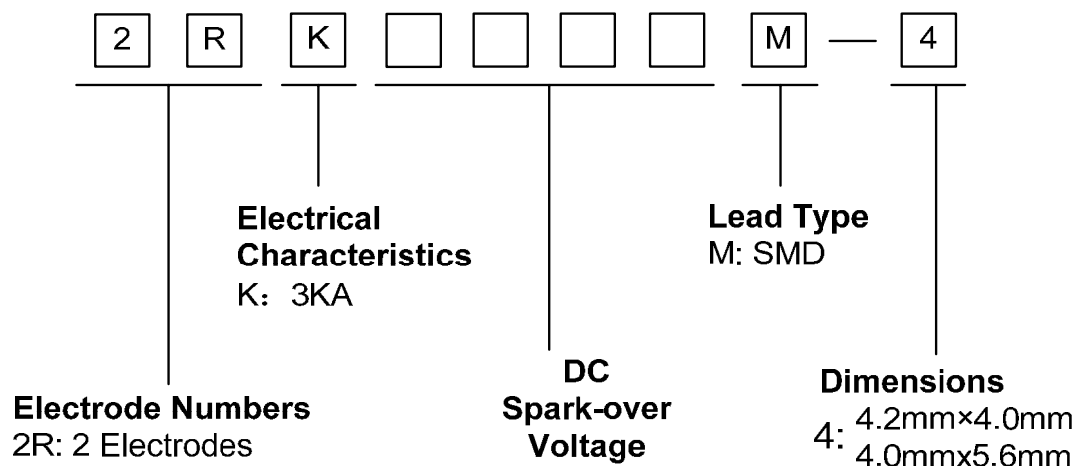
- Provide ultra-fast response to surge voltage from slow-rising surge of 100V/s to rapid-rising surge of 1KV/μs
- Stable breakdown voltage
- High insulation resistance
- Low capacitance ( $\leq 1\text{pF}$ )
- High holdover voltage
- Large absorbing transient current capability
- Micro-Gap Design
- Size: 4.2mm\*4.0mm
- Storage and operating temperature:  $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$
- 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

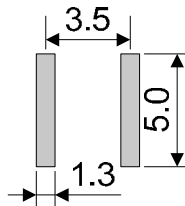
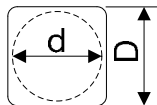
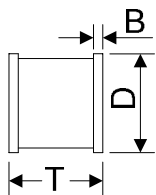


### Marking

090 : Device Marking Code  
XXXX : Internal Control Code

## Dimensions

Size: 4.2x4.0mm series



Recommended Pad Size

Symbol

Dimension (mm)

Spec.

Tolerance

D

4.2

±0.3

T

4.0

±0.3

B

0.4

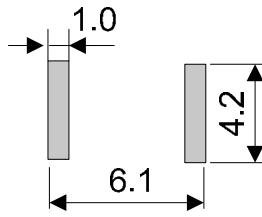
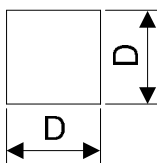
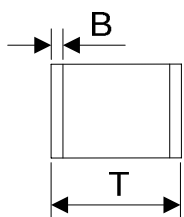
±0.2

d

3.9

±0.2

Size: 4.0x5.6mm series



Recommended Pad Size

Symbol

Dimension (mm)

Spec.

Tolerance

D

4.0

±0.3

T

5.6

±0.3

B

0.5

±0.2

## Electrical Characteristics

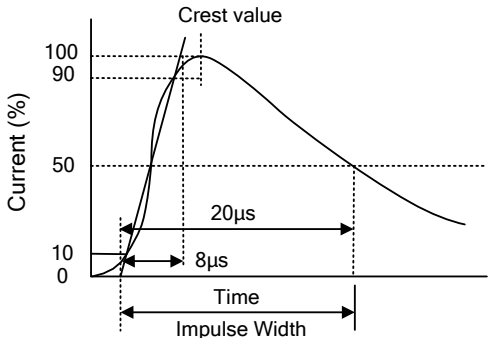
| Part Number | DC Spark-over Voltage | Maximum Impulse Spark-over Voltage | Nominal Impulse Discharge Current | Alternating Discharge Current | Impulse Life   | Minimum Insulation Resistance |      | Maximum Capacitance | Device Marking Code |
|-------------|-----------------------|------------------------------------|-----------------------------------|-------------------------------|----------------|-------------------------------|------|---------------------|---------------------|
|             | 100V/s                | 1000V/μs                           | 8/20μs 10times                    | 50Hz, 1sec                    | 10/1000μs 100A | Test Voltage                  | (GΩ) | 1MHz                |                     |
|             | (V)                   | (V)                                | (KA)                              | (A)                           | (times)        | DC(V)                         |      | (pF)                |                     |
| 2RK075M-4   | 75±20%                | 800                                | 3                                 | 3                             | 300            | 25                            | 1    | 1.0                 | 075                 |
| 2RK090M-4   | 90±20%                | 800                                | 3                                 | 3                             | 300            | 50                            | 1    | 1.0                 | 090                 |
| 2RK145M-4   | 145±20%               | 800                                | 3                                 | 3                             | 300            | 100                           | 1    | 1.0                 | 145                 |
| 2RK230M-4   | 230±20%               | 700                                | 3                                 | 3                             | 300            | 100                           | 1    | 1.0                 | 230                 |
| 2RK250M-4   | 250±20%               | 700                                | 3                                 | 3                             | 300            | 100                           | 1    | 1.0                 | 250                 |
| 2RK300M-4   | 300±20%               | 800                                | 3                                 | 3                             | 300            | 100                           | 1    | 1.0                 | 300                 |
| 2RK350M-4   | 350±20%               | 850                                | 3                                 | 3                             | 300            | 100                           | 1    | 1.0                 | 350                 |
| 2RK400M-4   | 400±20%               | 900                                | 3                                 | 3                             | 300            | 100                           | 1    | 1.0                 | 400                 |
| 2RK470M-4   | 470±20%               | 1000                               | 3                                 | 3                             | 300            | 250                           | 1    | 1.0                 | 470                 |
| 2RK600M-4   | 600±20%               | 1200                               | 3                                 | 3                             | 300            | 250                           | 1    | 1.0                 | 600                 |
| 2RK800M-4   | 800±20%               | 1400                               | 3                                 | 3                             | 300            | 250                           | 1    | 1.0                 | 800                 |
| 2RK1000M-4  | 1000±20%              | 1600                               | 3                                 | 3                             | 300            | 500                           | 1    | 1.0                 | 1000                |
| 2RK1200M-4  | 1200±20%              | 1900                               | 3                                 | 3                             | 300            | 500                           | 1    | 1.0                 | 1200                |

Note: Size 4.2x4.0mm series

| Part Number | DC Spark-over Voltage | Maximum Impulse Spark-over Voltage | Nominal Impulse Discharge Current | Impulse Life      | Minimum Insulation Resistance |               | Maximum Capacitance | AC Withstanding Voltage | Device Marking Code |
|-------------|-----------------------|------------------------------------|-----------------------------------|-------------------|-------------------------------|---------------|---------------------|-------------------------|---------------------|
|             | 100V/s                | 1000V/ $\mu$ s                     | 8/20 $\mu$ s 10times              | 8/20 $\mu$ s 100A | Test Voltage                  | (G $\Omega$ ) | 1MHz                |                         |                     |
|             | (V)                   | (V)                                | (KA)                              | (times)           | DC(V)                         |               | (pF)                |                         |                     |
| 2RK1400M-4  | 1400 $\pm$ 20%        | 2800                               | 3                                 | 300               | 500                           | 1             | 1.0                 | -                       | None                |
| 2RK1600M-4  | 1600 $\pm$ 20%        | 3000                               | 3                                 | 300               | 500                           | 1             | 1.0                 | -                       | None                |
| 2RK2000M-4  | 2000 $\pm$ 20%        | 3800                               | 3                                 | 300               | 1000                          | 1             | 1.0                 | -                       | None                |
| 2RK2500M-4  | 2500 $\pm$ 20%        | 4200                               | 3                                 | 300               | 1000                          | 1             | 1.0                 | 1250VAC, 3s             | None                |
| 2RK3000M-4  | 3000 $\pm$ 20%        | 4500                               | 3                                 | 300               | 1000                          | 1             | 1.0                 | 1500VAC, 3s             | None                |
| 2RK3600M-4  | 3600 $\pm$ 20%        | 4800                               | 3                                 | 300               | 1000                          | 1             | 1.0                 | 1850VAC, 3s             | None                |

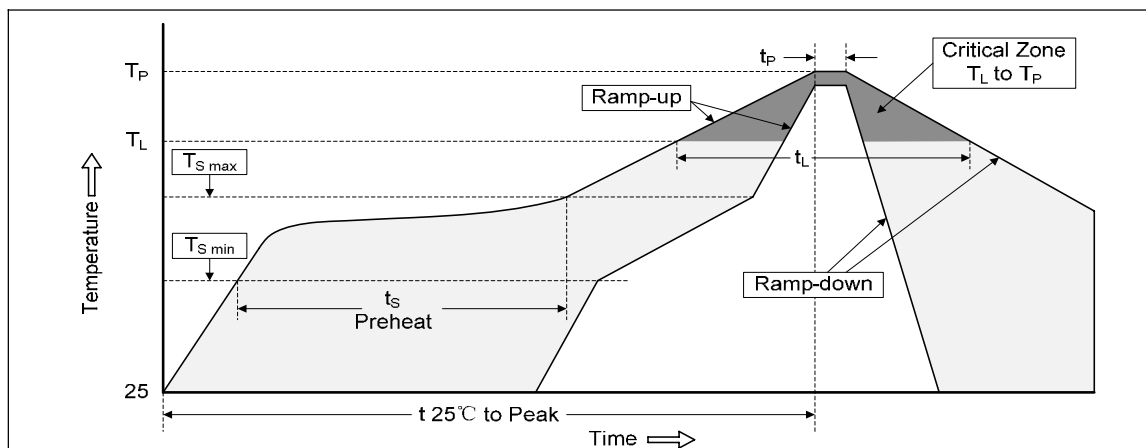
Note: Size 4.0x5.6mm series

### 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          | <p>Maximum 8/20<math>\mu s</math> surge current that can be applied between two electrodes, 5 positive and 5 negative surges, with 3 minutes interval time.</p>  |                             |
| 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

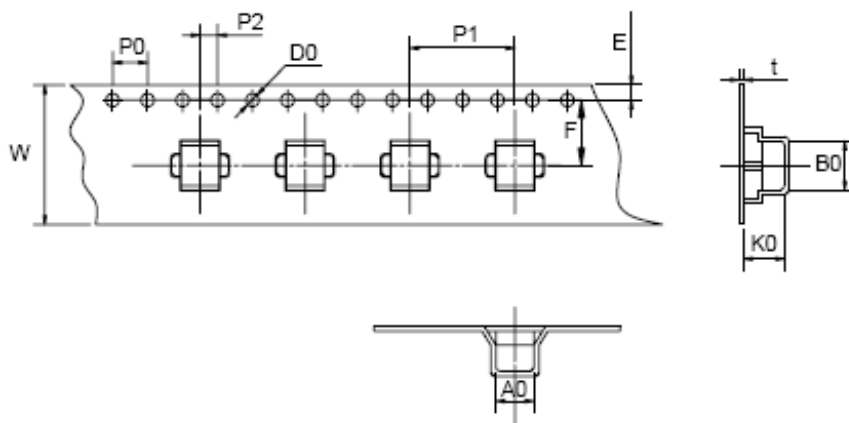
### Reflow Soldering



| Profile Feature                                                                                                                                                                                         | Pb-Free Assembly                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| Average ramp-up rate ( $T_L$ to $T_P$ )                                                                                                                                                                 | 3°C/second max.                  |
| Preheat <ul style="list-style-type: none"> <li>-Temperature Min (<math>T_{S\ min}</math>)</li> <li>-Temperature Max (<math>T_{S\ max}</math>)</li> <li>-Time (min to max) (<math>t_S</math>)</li> </ul> | 150°C<br>200°C<br>60-180 seconds |
| $T_{S\ max}$ to $T_L$ <ul style="list-style-type: none"> <li>-Ramp-up Rate</li> </ul>                                                                                                                   | 3°C/second max.                  |
| Time maintained above: <ul style="list-style-type: none"> <li>-Temperature (<math>T_L</math>)</li> <li>-Time (<math>t_L</math>)</li> </ul>                                                              | 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.                   |

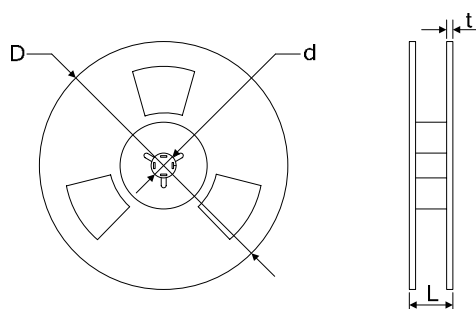
### Packaging

#### Tape



| Symbol | Dimension (mm) |           |
|--------|----------------|-----------|
|        | Spec.          | Tolerance |
| W      | 16.00          | ±0.20     |
| P0     | 4.00           | ±0.10     |
| P1     | 12.00          | ±0.20     |
| P2     | 2.00           | ±0.10     |
| D0     | 1.55           | ±0.05     |
| E      | 1.75           | ±0.10     |
| F      | 7.50           | ±0.10     |
| A0     | 4.27           | ±0.10     |
| K0     | 5.20           | ±0.10     |
| B0     | 4.45           | ±0.10     |
| t      | 0.50           | ±0.10     |

## Reel

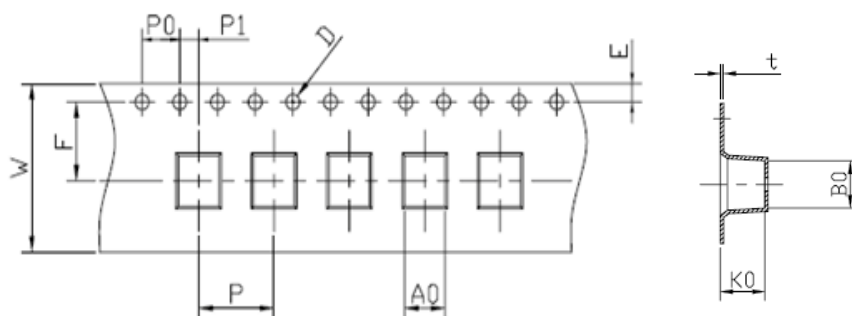


|   |        |       |
|---|--------|-------|
| D | 330.00 | ±2.00 |
| d | 13.00  | ±0.50 |
| L | 20.00  | ±2.00 |
| t | 2.00   | ±0.20 |

Quantity: 900pcs

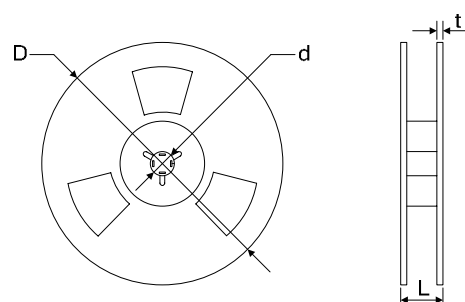
Note: Packaging for size 4.2x4.0mm series

## Tape



| Symbol | Dimension (mm) |           |
|--------|----------------|-----------|
|        | Spec.          | Tolerance |
| W      | 16.00          | ±0.20     |
| P      | 8.00           | ±0.20     |
| P0     | 4.00           | ±0.20     |
| P1     | 2.00           | ±0.20     |
| D      | 1.50           | ±0.10     |
| E      | 1.75           | ±0.10     |
| F      | 7.50           | ±0.10     |
| A0     | 4.30           | ±0.10     |
| B0     | 5.80           | ±0.10     |
| K0     | 4.30           | ±0.10     |
| t      | 0.40           | ±0.10     |

## Reel



|   |        |       |
|---|--------|-------|
| D | 330.00 | ±2.00 |
| d | 13.00  | ±0.50 |
| L | 20.00  | ±2.00 |
| t | 2.00   | ±0.20 |

Quantity: 1500pcs

Note: Packaging for size 4.0x5.6mm series

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