

# DATA SHEET

## GAS DISCHARGE TUBES TELEPHONE INTERFACE

3R-6 series

RoHS compliant & free



Product specification—April 26, 2021 V.1



## Gas Discharge Tube (GDT) Data Sheet

### Features

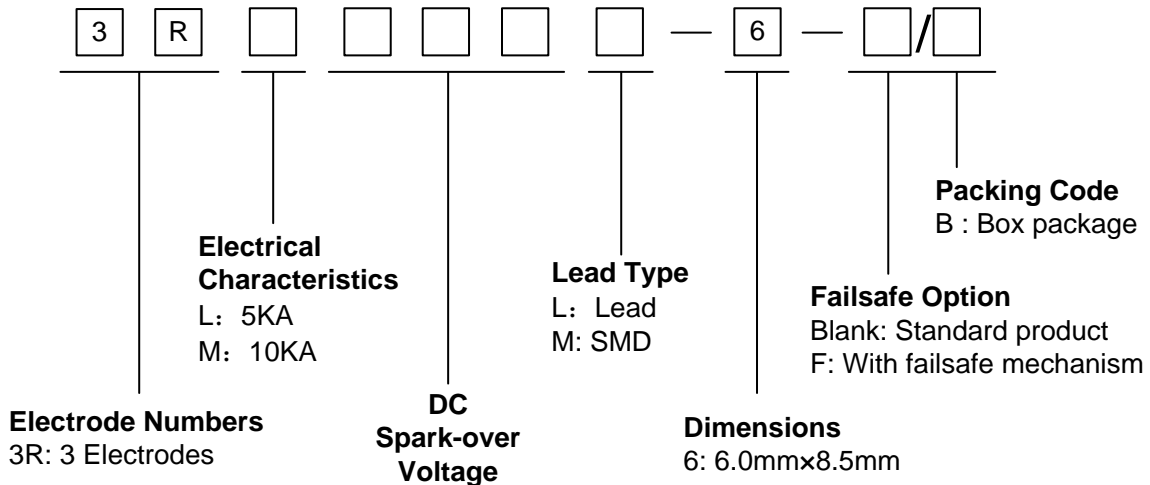
- Provide ultra-fast response to surge voltage from slow-rising surge of 100V/s to rapid-rising surge of 1KV/μs
- Stable breakdown voltage
- High insulation resistance
- Low capacitance (≤2pF)
- High holdover voltage
- Large absorbing transient current capability
- Micro-Gap Design
- Size: 6.0mm\*8.5mm
- 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                  | Lead type | Failsafe option         | Package     |
|--------------------------------|-----------|-------------------------|-------------|
| 3RLXXXL-6/B<br>3RMXXXL-6/B     | Lead      |                         | Box(Tray)   |
| 3RLXXXL-6-F/B<br>3RMXXXL-6-F/B | Lead      | With failsafe mechanism | Box(Tray)   |
| 3RLXXXM-6<br>3RMXXXM-6         | SMD       |                         | Tape & Reel |

**Marking**

**B** : BrightKing Logo

3RL090-6 : Device Marking Code

XXXX : Internal Control Code

**Dimensions**

| L Type | Symbol | Dimension (mm) |            |
|--------|--------|----------------|------------|
|        |        | Spec.          | Tolerance  |
|        | D      | 6.0            | +0.2, -0.5 |
|        | T      | 8.5            | ±0.5       |
|        | T1     | 15.0           | Max.       |
|        | L      | 16.0           | Max.       |

|  |    |     |      |
|--|----|-----|------|
|  | S  | 3.8 | ±0.3 |
|  | d  | 0.8 | ±0.1 |
|  | R1 | 7.8 | ±0.4 |
|  | R2 | 6.3 | ±0.3 |

|  |    |     |      |
|--|----|-----|------|
|  | D  | 6.0 | ±0.2 |
|  | T  | 8.5 | ±0.5 |
|  | B  | 1.0 | ±0.1 |
|  | B1 | 1.5 | ±0.2 |

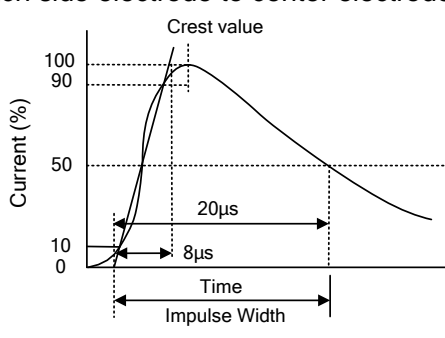
**Electrical Characteristics (3RL-6)**

| 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)                |                     |
| 3RL075L-6   | 3RL075M-6 | 75±20%                | 750                                | 5.0                               | 5.0                           | 200               | 25                            | 1.0  | 2.0                 | 3RL075-6            |
| 3RL090L-6   | 3RL090M-6 | 90±20%                | 750                                | 5.0                               | 5.0                           | 200               | 50                            | 1.0  | 2.0                 | 3RL090-6            |
| 3RL150L-6   | 3RL150M-6 | 150±20%               | 800                                | 5.0                               | 5.0                           | 200               | 100                           | 1.0  | 2.0                 | 3RL150-6            |
| 3RL230L-6   | 3RL230M-6 | 230±20%               | 800                                | 5.0                               | 5.0                           | 200               | 100                           | 1.0  | 2.0                 | 3RL230-6            |
| 3RL250L-6   | 3RL250M-6 | 250±20%               | 800                                | 5.0                               | 5.0                           | 200               | 100                           | 1.0  | 2.0                 | 3RL250-6            |
| 3RL300L-6   | 3RL300M-6 | 300±20%               | 900                                | 5.0                               | 5.0                           | 200               | 100                           | 1.0  | 2.0                 | 3RL300-6            |
| 3RL350L-6   | 3RL350M-6 | 350±20%               | 900                                | 5.0                               | 5.0                           | 200               | 100                           | 1.0  | 2.0                 | 3RL350-6            |
| 3RL470L-6   | 3RL470M-6 | 470±20%               | 950                                | 5.0                               | 5.0                           | 200               | 250                           | 1.0  | 2.0                 | 3RL470-6            |
| 3RL600L-6   | 3RL600M-6 | 600±20%               | 1300                               | 5.0                               | 5.0                           | 200               | 250                           | 1.0  | 2.0                 | 3RL600-6            |

**Electrical Characteristics (3RM-6)**

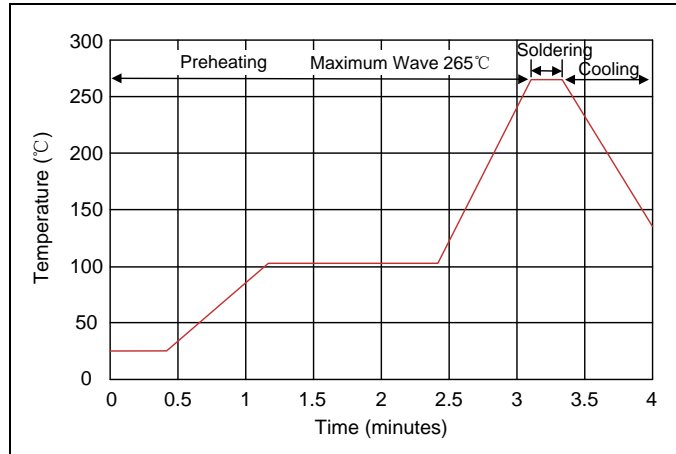
| Part Number |           | DC Spark-over Voltage | Maximum Impulse Spark-over Voltage | Nominal Impulse Discharge Current | Alternating Discharge Current | Impulse Life            | Minimum Insulation Resistance |               | Maximum Capacitance | Device Marking Code |
|-------------|-----------|-----------------------|------------------------------------|-----------------------------------|-------------------------------|-------------------------|-------------------------------|---------------|---------------------|---------------------|
|             |           | 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)                |                     |
| 3RM075L-6   | 3RM075M-6 | 75 $\pm$ 20%          | 750                                | 10                                | 10                            | 300                     | 25                            | 1.0           | 2.0                 | 3RM075-6            |
| 3RM090L-6   | 3RM090M-6 | 90 $\pm$ 20%          | 750                                | 10                                | 10                            | 300                     | 50                            | 1.0           | 2.0                 | 3RM090-6            |
| 3RM150L-6   | 3RM150M-6 | 150 $\pm$ 20%         | 800                                | 10                                | 10                            | 300                     | 100                           | 1.0           | 2.0                 | 3RM150-6            |
| 3RM230L-6   | 3RM230M-6 | 230 $\pm$ 20%         | 800                                | 10                                | 10                            | 300                     | 100                           | 1.0           | 2.0                 | 3RM230-6            |
| 3RM250L-6   | 3RM250M-6 | 250 $\pm$ 20%         | 800                                | 10                                | 10                            | 300                     | 100                           | 1.0           | 2.0                 | 3RM250-6            |
| 3RM300L-6   | 3RM300M-6 | 300 $\pm$ 20%         | 900                                | 10                                | 10                            | 300                     | 100                           | 1.0           | 2.0                 | 3RM300-6            |
| 3RM350L-6   | 3RM350M-6 | 350 $\pm$ 20%         | 900                                | 10                                | 10                            | 300                     | 100                           | 1.0           | 2.0                 | 3RM350-6            |
| 3RM470L-6   | 3RM470M-6 | 470 $\pm$ 20%         | 950                                | 10                                | 10                            | 300                     | 250                           | 1.0           | 2.0                 | 3RM470-6            |
| 3RM600L-6   | 3RM600M-6 | 600 $\pm$ 20%         | 1300                               | 10                                | 10                            | 300                     | 250                           | 1.0           | 2.0                 | 3RM600-6            |

**Electrical Ratings**

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

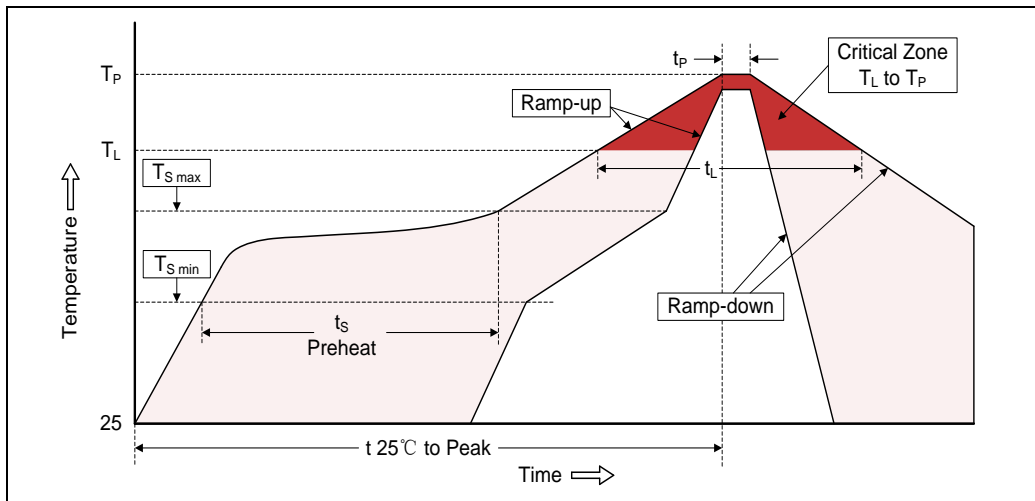
**Recommended Soldering Conditions**

**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.                   |