

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

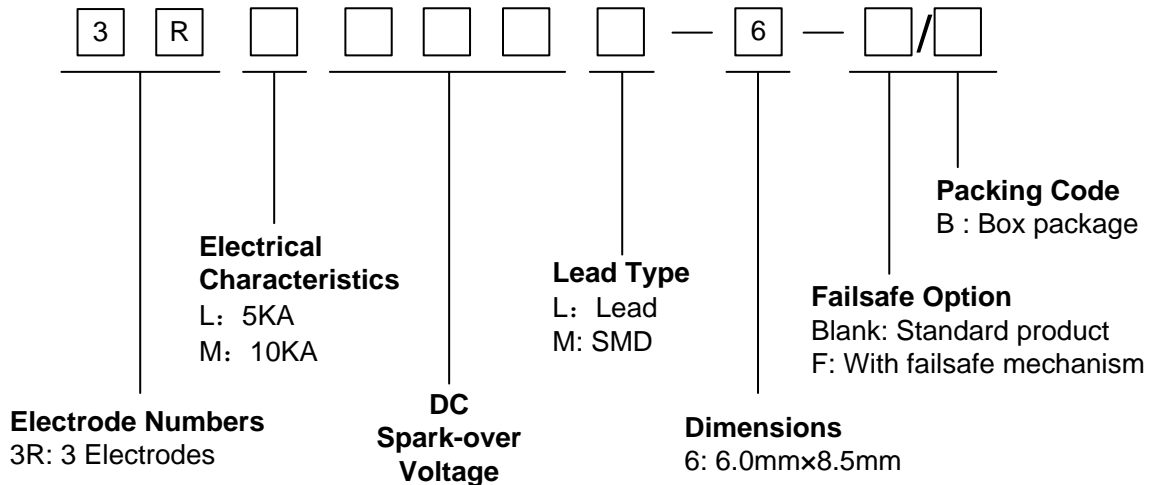
- Provide ultra-fast response to surge voltage from slow-rising surge of 100V/s to rapid-rising surge of 1KV/μs
- Stable breakdown voltage
- High insulation resistance
- Low capacitance (≤2pF)
- High holdover voltage
- Large absorbing transient current capability
- Micro-Gap Design
- Size: 6.0mm*8.5mm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

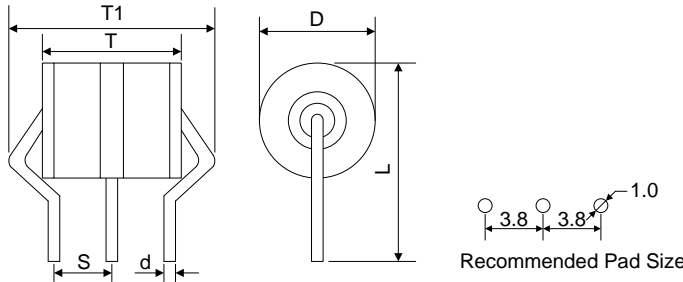
Marking

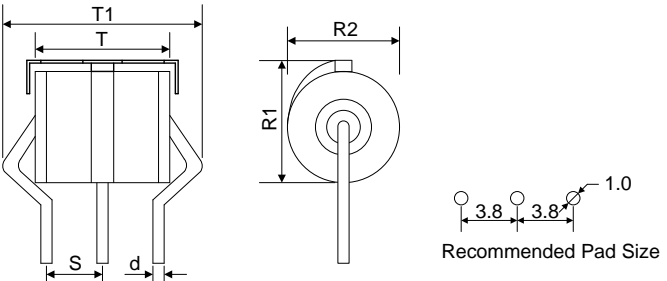
B : BrightKing Logo

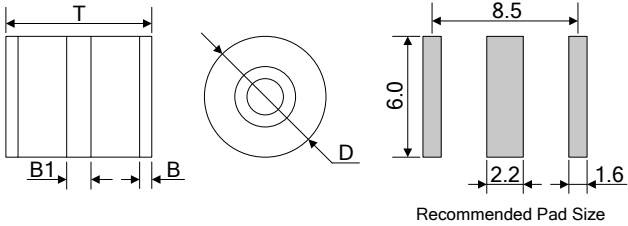
3RL090-6 : Device Marking Code

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 |

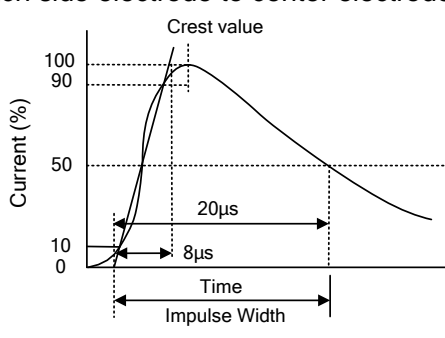
Electrical Characteristics (3RL-6)

| 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 10times | 50Hz, 1sec | 10/1000μs 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)

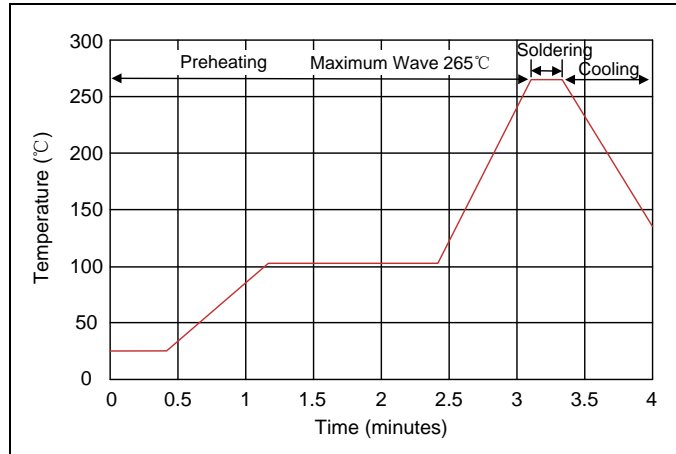
| Part Number | | DC Spark-over Voltage | Maximum Impulse Spark-over Voltage | Nominal Impulse Discharge Current | Alternating Discharge Current | Impulse Life | Minimum Insulation Resistance | | Maximum Capacitance | Device Marking Code |
|-------------|-----------|-----------------------|------------------------------------|-----------------------------------|-------------------------------|-------------------------|-------------------------------|---------------|---------------------|---------------------|
| | | 100V/s | 1000V/ μ s | 8/20 μ s 10times | 50Hz, 1sec | 10/1000 μ s 100A | Test Voltage | (G Ω) | 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 μs waveform, for 10 times with 3min interval time, which will be equally divided between each side electrode to center electrode.  <p>The graph shows a current waveform starting at 0, rising to a peak of 100% current. The rise time is marked as 8μs. The tail of the pulse is marked as 20μs. The crest value is indicated at the peak of the pulse. The x-axis is labeled 'Time' and 'Impulse Width', and the y-axis is labeled 'Current (%)'.</p> | |
| 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 | |

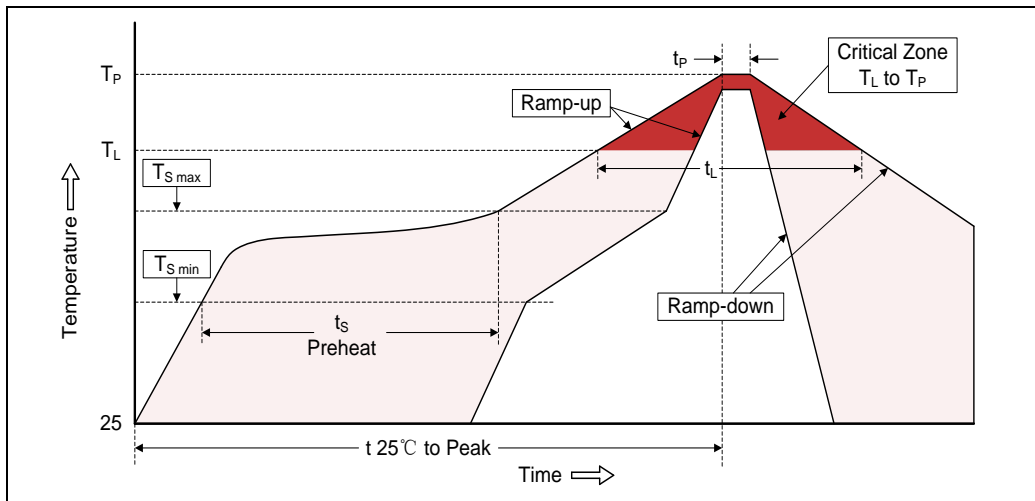
Recommended Soldering Conditions

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 -Temperature Min ($T_{S\ min}$) -Temperature Max ($T_{S\ max}$) -Time (min to max) (t_s) | 150°C 200°C 60-180 seconds |
| $T_{S\ max}$ to T_L -Ramp-up Rate | 3°C/second max. |
| Time maintained above: -Temperature (T_L) -Time (t_L) | 217°C 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. |