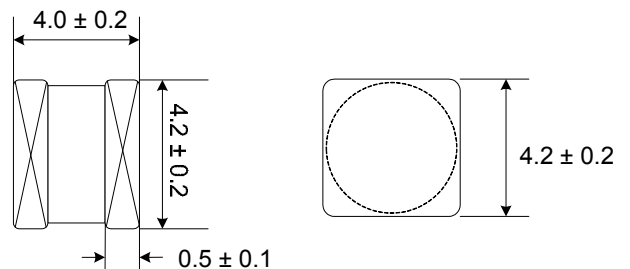


Gas discharge tubes (GDT) use noble gasses enclosed in ceramic tubes to provide an alternate circuit path for voltage spikes. The ceramic envelope and with nickel connectors allow for high loads and Ruilon offers products that function at 20KA, 40KA, 50KA, 60KA, 100KA & 150KA. The breakdown voltages of the devices have a wide range (up to 20% tolerance). Major applications are high frequency telecommunication lines, stations, security systems, HID and high quality Surge Protection Devices (SPD).



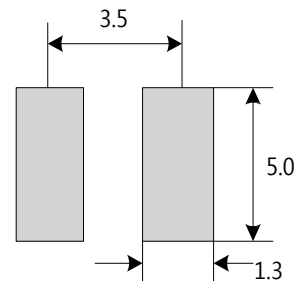
### Features

- Size: 4.2mm\*4.0mm
- DC Spark-over voltage: 75~2000V
- Stable breakdown voltage.
- High insulation resistance.
- Low capacitance (<1pF)
- High holdover voltage.
- Large absorbing transient current capability.
- Low Capacitance
- Micro-Gap Design



### Applications

- Cable Modem
- xDSL
- Set-Top Box
- Satellite and CATV equipment
- Power supplier
- Consumer electronics
- General telecom equipment



### Product Name

|                          |   |                       |   |   |   |                 |           |
|--------------------------|---|-----------------------|---|---|---|-----------------|-----------|
| 2                        | R | X                     | X | X | - | 4               | S         |
| ↓                        |   | ↓                     |   |   |   | ↓               | ↓         |
| Stable breakdown voltage |   | DC Spark-over Voltage |   |   |   | Dimensions      | Lead Type |
| 2R : 2 Electrodes        |   |                       |   |   |   | 4 : 4.2mm*4.0mm | S: SMD    |

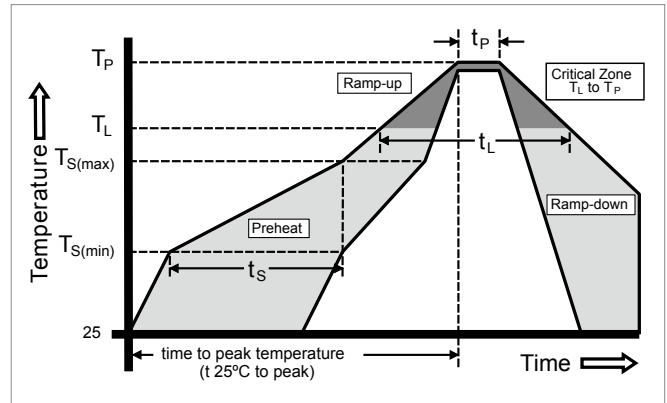


## Electrical Characteristics

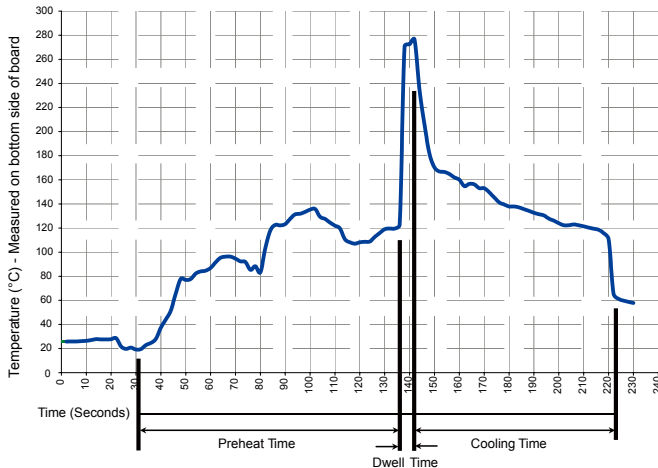
| Part Number | DC Spark-over Voltage | Maximum Impulse Breakdown Voltage |              | Max. Impulse Discharge Current (8/20 $\mu$ s) |          | Impulse Life (10/1000 $\mu$ s) | Normal Alternating Discharge Current |                 | DC Holdover Voltage | Minimum Insulation Resistance | Maximum Capacitance (1MHz) |
|-------------|-----------------------|-----------------------------------|--------------|---|----------|--------------------------------|--------------------------------------|-----------------|---------------------|-------------------------------|----------------------------|
|             | 100V/S                | 100V/ $\mu$ s                     | 1KV/ $\mu$ s | 1 times                                       | 10 times | 300 A                          | 50Hz 1Sec                            | Single 9 Cycles | <150ms              |                               |                            |
|             | (V)                   | (V)                               | (V)          | (KA)  |          | Times                          | (A)                                  |                 | (V)                 |                               |                            |
| 2R075-4S    | 75 $\pm$ 20%          | 700                               | 800          | 5   | 3        | 300                            | 3                                    | 6               | 52                  | 1                             | 0.5                        |
| 2R090-4S    | 90 $\pm$ 20%          | 700                               | 800          | 5   | 3        | 300                            | 3                                    | 6               | 52                  | 1                             | 0.5                        |
| 2R150-4S    | 150 $\pm$ 20%         | 600                               | 800          | 5   | 3        | 300                            | 3                                    | 6               | 80                  | 1                             | 0.5                        |
| 2R230-4S    | 230 $\pm$ 20%         | 600                               | 700          | 5   | 3        | 300                            | 3                                    | 6               | 150                 | 1                             | 0.5                        |
| 2R250-4S    | 250 $\pm$ 20%         | 600                               | 700          | 5   | 3        | 300                            | 3                                    | 6               | 150                 | 1                             | 0.5                        |
| 2R300-4S    | 300 $\pm$ 20%         | 600                               | 700          | 5   | 3        | 300                            | 3                                    | 6               | 150                 | 1                             | 0.5                        |
| 2R350-4S    | 350 $\pm$ 20%         | 650                               | 800          | 5   | 3        | 300                            | 3                                    | 6               | 150                 | 1                             | 0.5                        |
| 2R400-4S    | 400 $\pm$ 20%         | 700                               | 800          | 5   | 3        | 300                            | 3                                    | 6               | 150                 | 1                             | 0.5                        |
| 2R470-4S    | 470 $\pm$ 20%         | 800                               | 900          | 5   | 3        | 300                            | 3                                    | 6               | 150                 | 1                             | 0.5                        |
| 2R600-4S    | 600 $\pm$ 20%         | 900                               | 1000         | 5   | 3        | 300                            | 3                                    | 6               | 150                 | 1                             | 0.5                        |
| 2R800-4S    | 800 $\pm$ 20%         | 1300                              | 1400         | 3   | 2        | 100                            | 2                                    | 4               | 150                 | 1                             | 0.5                        |
| 2R1000-4S   | 1000 $\pm$ 20%        | 1500                              | 1600         | 3   | 2        | 100                            | 2                                    | 4               | 150                 | 1                             | 0.5                        |
| 2R1200-4S   | 1200 $\pm$ 20%        | 1700                              | 1800         | 3   | 2        | 100                            | 2                                    | 4               | 150                 | 1                             | 0.5                        |
| 2R1400-4S   | 1400 $\pm$ 20%        | 1700                              | 1800         | 3   | 2        | 100                            | 2                                    | 4               | 150                 | 1                             | 0.5                        |
| 2R1500-4S   | 1500 $\pm$ 20%        | 2000                              | 2100         | 3   | 2        | 100                            | 2                                    | 4               | 150                 | 1                             | 0.5                        |
| 2R1600-4S   | 1600 $\pm$ 20%        | 2000                              | 2100         | 3   | 2        | 100                            | 2                                    | 4               | 150                 | 1                             | 0.5                        |
| 2R1800-4S   | 1800 $\pm$ 20%        | 2500                              | 2600         | 3   | 2        | 100                            | 2                                    | 4               | 150                 | 1                             | 0.5                        |
| 2R2000-4S   | 2000 $\pm$ 20%        | 2700                              | 2600         | 3   | 2        | 100                            | 2                                    | 4               | 150                 | 1                             | 0.5                        |

| DC Spark-over Voltage | DC Measuring Voltage |
|-----------------------|----------------------|
| 75-90V                | 50V                  |
| 150-400V              | 100V                 |
| 470-800V              | 250V                 |
| 1000-2000V            | 500V                 |

|  |                                    |                         |
|--|------------------------------------|-------------------------|
| Reflow Condition                                       |                                    | Pb – Free assembly      |
| Pre Heat   | - Temperature Min ( $T_{s(min)}$ ) | 150°C                   |
|  | - Temperature Max ( $T_{s(max)}$ ) | 200°C                   |
|  | - Time (Min to Max) ( $t_s$ )      | 60 – 180 secs           |
| Average ramp up rate (Liquidus Temp ( $T_L$ ) to peak) |                                    | 3°C/second max          |
| $T_{s(max)}$ to $T_L$ - Ramp-up Rate                   |                                    | 5°C/second max          |
| Reflow   | - Temperature ( $T_L$ ) (Liquidus) | 217°C                   |
|  | - Temperature ( $t_L$ )            | 60 – 150 seconds        |
| Peak Temperature ( $T_p$ )                             |                                    | 260 <sup>+0/-5</sup> °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                   |



### Soldering parameters -wave soldering



### Recommended process parameters

| Wave Parameter  | Lead-Free Recommendation |
|---|--------------------------|
| <b>Preheat:</b><br>(Depends on Flux Activation Temperature) (Typical Industry Recommendation) |                          |
| Temperature Minimum:  | 100° C                   |
| Temperature Maximum:  | 150° C                   |
| Preheat Time:   | 60-180 seconds           |
| <b>Solder Pot Temperature:</b>  | 280° C Maximum           |
| <b>Solder Dwell Time:</b>   | 2-5 seconds              |