

Gas Discharge Tubes (GDT)

2R-8TH Series


Description

RUILON 2R-8TH Gas Discharge Tubes (GDT) series is a flat product made of patented technology and advanced welding technology, which greatly reduces the installation space in use.

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. 2RB-8TH Gas Discharge Tubes (GDT) series has a surge rating of 10KA / 5KA / 4KA, 8/20μs. This GDT series is perfectly suited for broadband equipment applications. The GDT's low off-state capacitance is compatible with high bandwidth applications and this capacitance loading value does not vary if the voltage across the GDT changes.



Agency Approvals

| Agency | Standards | Certificate No. |
|---|-----------|-----------------|
|  | UL1449 | E508408 |

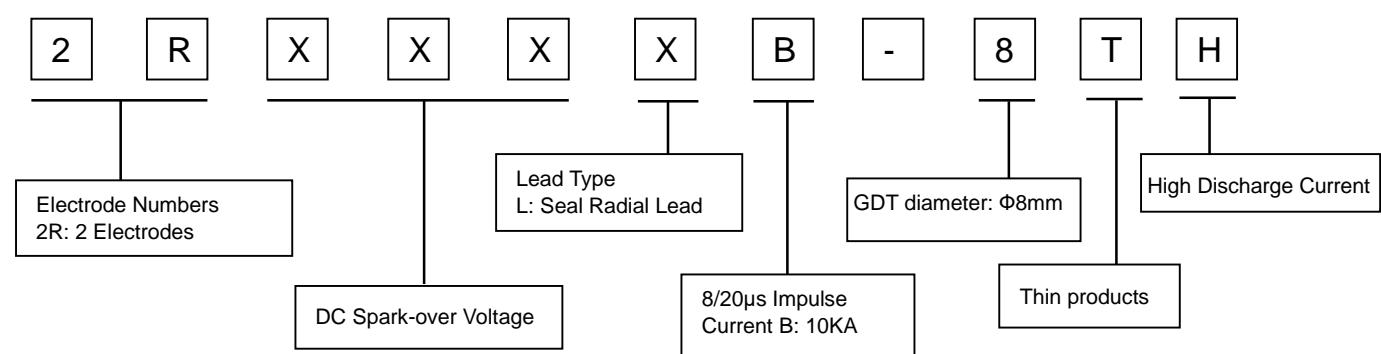
Features

- I Patented technology
- I Occupy smaller PCB area
- I Excellent response to fast rising transients
- I Stable breakdown voltage
- I GHz working frequency
- I 8/20μs Impulse current capability: 10KA / 5KA / 4KA
- I Non-Radioactive
- I Ultra Low capacitance (<3pF)
- I GDT diameter: Φ8mm
- I Storage and operational temperature: -40~+125°C

Applications

- I Telecom CPE
- I Communication equipment
- I Surge Protective Devices
- I High density PCB assemblies






Part Number Code



Gas Discharge Tubes (GDT)




2R-8TH Series

Electrical Characteristics

| Model | | 2R090LB-8TH | 2R230LB-8TH | 2R350LB-8TH | 2R470LB-8TH | Units |
|--|--|--|---|--|--|-----------------|
| DC Spark-over Voltage ^{1) 2)} | at 100V/S | 90±30% | 230±30% | 350±30% | 470±30% | V |
| Impulse Spark-over Voltage | at 100V/μS | <500 | <600 | <500 | <600 | V |
| | at 1KV/μS | <600 | <700 | <600 | <700 | V |
| Front of wave spark-over voltage | at 1.2/50 μs, 6 kV | <800 | <850 | <750 | <850 | V |
| Service life (According to IEC 61643-311) | | | | | | |
| Nominal impulse discharge current | 8/20μs ±5 times | 10 | 10 | 10 | 10 | KA |
| Maximum discharge current | 8/20μs 1 time | 20 | 20 | 20 | 20 | KA |
| Impulse discharge current | 10/350μs 2 times | 2 | 2 | 2 | 2 | KA |
| Alternating Discharge Current | 50Hz, 1S 10 times | 5 | 5 | 5 | 5 | A |
| Impulse Life | 10/1000μS 300 times | 100 | 100 | 100 | 100 | A |
| Glow Voltage | at 10mA | ~60 | ~135 | ~135 | ~160 | V |
| Arc Voltage | at 1A | ~10 | ~15 | ~15 | ~18 | V |
| Insulation Resistance | | >1 | >1 | >1 | >1 | GΩ |
| Insulation Resistance Measuring Voltage | | 50 | 100 | 100 | 100 | V _{DC} |
| Capacitance | at 1MHz | <3 | <3 | <3 | <3 | pF |
| Weight | | ~1.1 | ~1.1 | ~1.1 | ~1.1 | g |
| Operation and storage temperature | | -40~+125 | -40~+125 | -40~+125 | -40~+125 | °C |
| Climatic category (IEC60068-1) | | 40/125/21 | 40/125/21 | 40/125/21 | 40/125/21 | |
| Agency Approvals | UL1449 (E508408)  | ◎ | ◎ | ◎ | ◎ | |
| Marking, Laser marking | | RUILON 2R090LB-8TH  | RUILON 2R230LB-8TH  | RUILON 2R350LB-8TH  | RUILON 2R470LB-8TH  | |
| Surface treatment | Body | GDT & red epoxy resin coating | | | | |
| | Wire | | | | | |
| | | Tinned copper wire | | | | |

Gas Discharge Tubes (GDT)

2R-8TH Series

| Model | | 2R600LB-8TH | 2R800LB-8TH | 2R1000L-8TH | 2R1500L-8TH | Units |
|--|--|--|--|------------------------------|------------------------------|-----------------|
| DC Spark-over Voltage ^{1) 2)} | at 100V/S | 600±20% | 800±20% | 1000±20% | 1500±20% | V |
| Impulse Spark-over Voltage | at 100V/μS | <750 | <1000 | <1200 | <1800 | V |
| | at 1KV/μS | <850 | <1100 | <1300 | <2000 | V |
| Front of wave spark-over voltage | at 1.2/50 μs, 6 kV | <1000 | <1300 | <1500 | <2300 | V |
| Service life (According to IEC 61643-311) | | | | | | |
| Nominal impulse discharge current | 8/20μs ±5 times | 10 | 10 | 10 | 10 | KA |
| Maximum discharge current | 8/20μs 1 time | 20 | 20 | 20 | 20 | KA |
| Impulse discharge current | 10/350μs 2 times | 2 | 2 | 2 | 2 | KA |
| Alternating Discharge Current | 50Hz, 1S 10 times | 5 | 5 | 5 | 5 | A |
| Impulse Life | 10/1000μS 300 times | 100 | 100 | 100 | 100 | A |
| | 1.2/50μS, 2Ω 40 times | 20 | 20 | 20 | 20 | KV |
| | 1.2/50μS, 12Ω 80 times | 20 | 20 | 20 | 20 | KV |
| According to IEC 61643-11 | | | | | | |
| Maximum continuous operating voltage | at 50/60Hz U_C | - | 255 | 275 | 320 | Vrms |
| Nominal impulse discharge current | 8/20μs 15 times I_n | - | 5 | 5 | 5 | KA |
| Maximum discharge current | 8/20μs 1 time I_{max} | - | 10 | 10 | 10 | KA |
| Impulse discharge current | 10/350μs 5 times I_{imp} | - | 1 | 1 | 1 | KA |
| Follow current | at 50/60Hz I_f | - | 100 | 100 | 100 | A |
| Glow Voltage | at 10mA | ~180 | ~180 | ~200 | ~200 | V |
| Arc Voltage | at 1A | ~18 | ~18 | ~18 | ~20 | V |
| AC withstand voltage | at 5mA 1minute | -- | -- | 500 | 750 | V |
| Insulation Resistance | | >1 | >1 | >1 | >1 | GΩ |
| | Insulation Resistance Measuring Voltage | 100 | 100 | 100 | 100 | V _{DC} |
| Capacitance | at 1MHz | <3 | <3 | <3 | <3 | pF |
| Weight | | ~1.1 | ~1.1 | ~1.1 | ~1.1 | g |
| Operation and storage temperature | | -40~+125 | -40~+125 | -40~+125 | -40~+125 | °C |
| Climatic category (IEC60068-1) | | 40/125/21 | 40/125/21 | 40/125/21 | 40/125/21 | |
| Agency Approvals | UL1449 (E508408)  | ◎ | ◎ | -- | -- | |
| Marking, Laser marking | | RUILON 2R600LB-8TH  | RUILON 2R800LB-8TH  DAC | RUILON 2R1000L-8TH DAC | RUILON 2R1500L-8TH DAC | |
| | | | | | | |
| Surface treatment | Body | GDT & red epoxy resin coating | | | | |
| | Wire | Tinned copper wire | | | | |

Gas Discharge Tubes (GDT)

2R-8TH Series

| Model | | 2R2000L-8TH | 2R2500L-8TH | 2R3000L-8TH | 2R3600L-8TH | Units |
|--|--------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-----------------|
| DC Spark-over Voltage ^{1) 2)} | at 100V/S | 2000±20% | 2500±20% | 3000±20% | 3600±20% | V |
| Impulse Spark-over Voltage | at 100V/μS | <2500 | <3000 | <3600 | <4300 | V |
| | at 1KV/μS | <2700 | <3200 | <3800 | <4500 | V |
| Front of wave spark-over voltage | at 1.2/50 μs, 6 kV | <3000 | <3500 | <4000 | <4800 | V |
| Service life (According to IEC 61643-311) | | | | | | |
| Nominal impulse discharge current | 8/20μs ±5 times | 5 | 5 | 4 | 4 | KA |
| Maximum discharge current | 8/20μs 1 time | 10 | 10 | 5 | 5 | KA |
| Alternating Discharge Current | 50Hz, 1S 10 times | 2.5 | 2.5 | 2 | 2 | A |
| Glow Voltage | at 10mA | ~250 | ~250 | ~250 | ~250 | V |
| Arc Voltage | at 1A | ~30 | ~30 | ~30 | ~30 | V |
| AC withstand voltage | at 5mA 1minute | 1000 | 1300 | 1600 | 1900 | V |
| Insulation Resistance | | >1 | >1 | >1 | >1 | GΩ |
| Insulation Resistance Measuring Voltage | | 500 | 500 | 500 | 500 | V _{DC} |
| Capacitance | at 1MHz | <3 | <3 | <3 | <3 | pF |
| Weight | | ~1.1 | ~1.1 | ~1.1 | ~1.1 | g |
| Operation and storage temperature | | -40~+125 | -40~+125 | -40~+125 | -40~+125 | °C |
| Climatic category (IEC60068-1) | | 40/125/21 | 40/125/21 | 40/125/21 | 40/125/21 | |
| Agency Approvals | | -- | -- | -- | -- | |
| Marking, Laser marking | | RUILON 2R2000L-8TH | RUILON 2R2500L-8TH | RUILON 2R3000L-8TH | RUILON 2R3600L-8TH | |
| Surface treatment | Body | GDT & red epoxy resin coating | | | | |
| | Wire | Tinned copper wire | | | | |

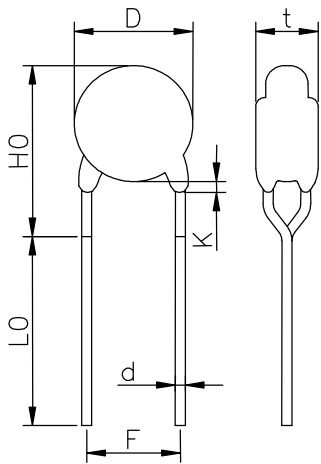
¹⁾ At delivery AQL 0.65 level II, DIN ISO 2859.

²⁾ In ionized mode.

Gas Discharge Tubes (GDT)

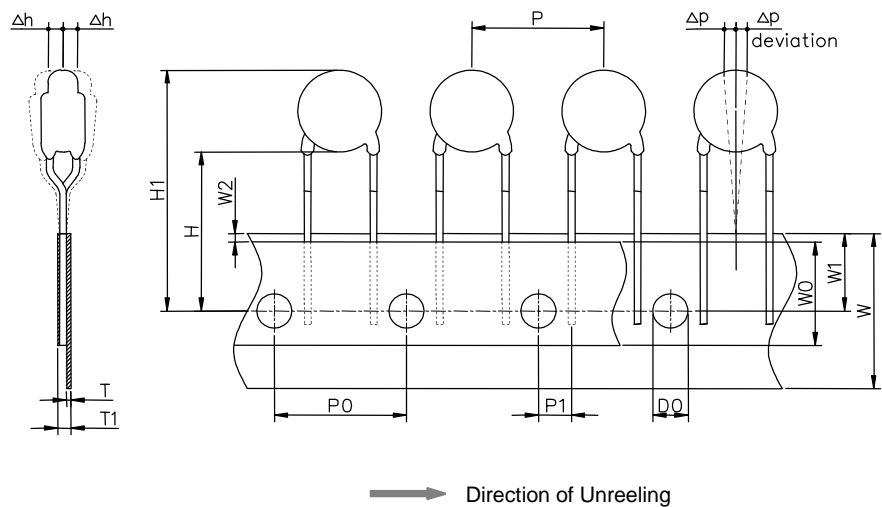
2R-8TH Series

Dimensions



| Symbol | Millimeters | Inches |
|--------|-------------|--------------|
| D | Φ10 Max | Φ0.394 Max |
| d | Φ0.8±0.05 | Φ0.031±0.002 |
| F | 7.5±0.5 | 0.295±0.020 |
| H0 | 14.5 Max | 0.571 Max |
| K | 3 Max | 0.118 Max |
| L0 | 15 Min | 0.591 Min |
| t | 7 Max | 0.276 Max |

Packaging Information

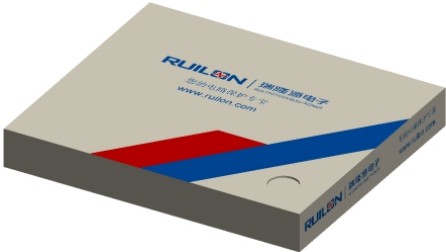



Packing and dimensions according to IEC 60286-2

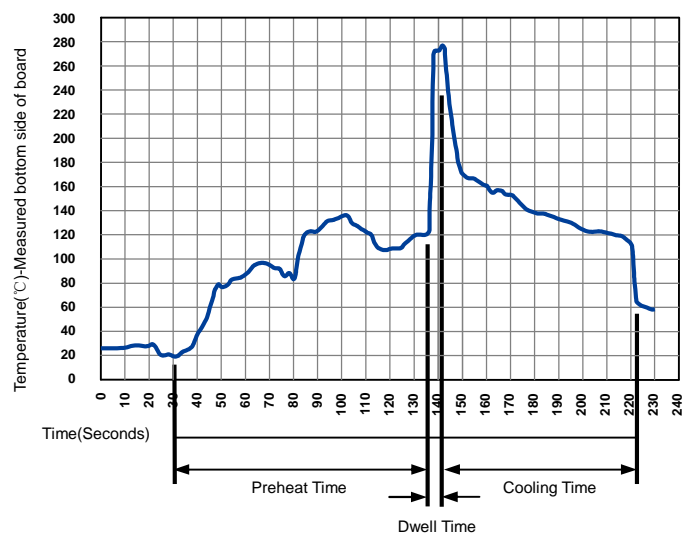
| Symbol | Millimeters | Inches |
|--------|-------------|--------------------|
| P | 15.0±1.0 | 0.591±0.039 |
| P0 | 15.0±0.3 | 0.591±0.012 |
| P1 | 3.75±0.7 | 0.148±0.028 |
| H | 18+2/-0 | 0.709+0.079/-0 |
| H1 | 33 Max | 1.299 Max |
| T | 0.9 Max | 0.035Max |
| T1 | 1.7 Max | 0.067 Max |
| W | 18+1/-0.5 | 0.709+0.039/-0.020 |
| W0 | 5.0 Min | 0.197 Min |
| W1 | 9+0.75/-0.5 | 0.354+0.030/-0.020 |
| W2 | 3.0 Max | 0.118 Max |
| D0 | Φ4±0.2 | Φ0.157±0.008 |
| Δh | 2.0 Max | 0.079 Max |
| Δp | 1.3 Max | 0.051 Max |

Gas Discharge Tubes (GDT)

2R-8TH Series

| | | |
|----------|---|--|
| | Inner Box | Carton |
| Size | 335×265×42mm | 550×350×240mm |
| Quantity | MPQ/MOQ: 1 Inner Box=1,000pcs | 1Carton=10 Inner Box=10,000pcs |
| Photos |  |  |

Soldering Parameters - Wave soldering (Thru-Hole Devices)

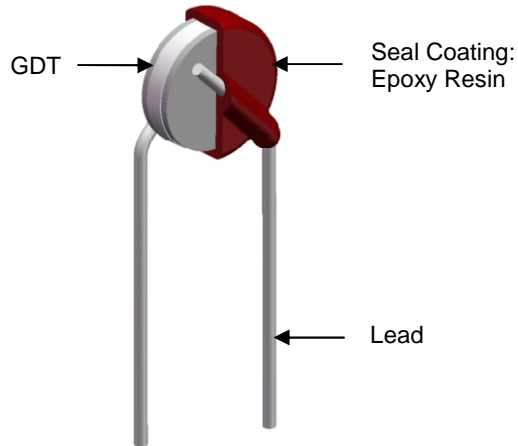


| Wave Soldering Condition | | Pb-Free assembly |
|--------------------------|-------------------|------------------|
| Preheat | Temperature Min | 100°C |
| | Temperature Max | 150°C |
| | Time (Min to Max) | 60-180 Seconds |
| Solder Pot Temperature | | 280°C Max |
| Solder Dwell Time | | 2-5 Seconds |

Gas Discharge Tubes (GDT)

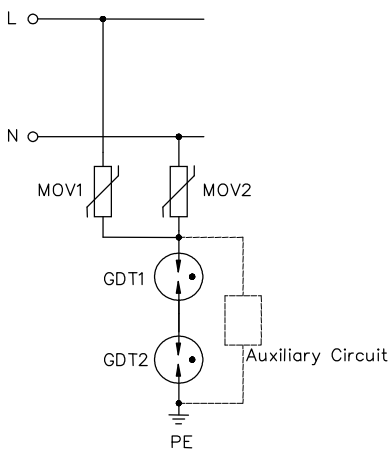
2R-8TH Series

Construction (L Series)



Application Circuit

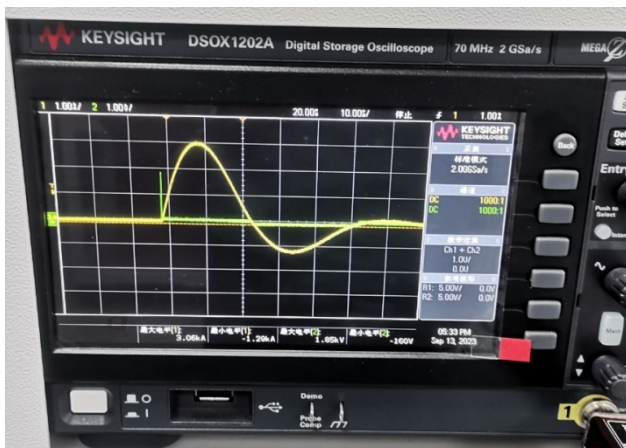
Use for AC1500V withstand voltage



| Symbol | Model |
|--------|-------------|
| MOV1 | 14D471 |
| MOV2 | 14D471 |
| GDT1 | 2R1500L-8TH |
| GDT2 | 2R1500L-8TH |

| Electrical Characteristics (With auxiliary circuit) | | | |
|---|--|--------------------|------------|
| DC Spark-over Voltage | | at 100V/S | 2400~3600V |
| Impulse Spark-over Voltage | | at 100V/μS | <2000V |
| | | at 1KV/μS | <2300V |
| Front of wave spark-over voltage | | at 1.2/50 μs, 6 kV | <2500V |
| AC withstand voltage | | at 5mA 1minute | 1500V |
| Service life | | | |
| Nominal impulse discharge current | | 8/20μs ±5 times | 10KA |
| Maximum discharge current | | 8/20μs 1 times | 15KA |
| Alternating Discharge Current | | 50Hz, 1S 10 times | 3KA |

1.2/50 μs, 6 kV Waveform (+)



1.2/50 μs, 6 kV Waveform (-)



Gas Discharge Tubes (GDT)

2R-8TH Series

Terms and definitions

| NO. | Item | Definitions |
|-----|--|--|
| 1 | Gas discharge tube(GDT) | Gap, or several gaps, in an enclosed discharge medium, other than air at atmospheric pressure, designed to protect apparatus or personnel, or both, from high transient voltages. Also referred to as "gas tube surge arrester". |
| 2 | DC Spark-over Voltage | The voltage at which the gas discharge tube sparks over with slowly increasing d.c. voltage. |
| 3 | Impulse Spark-over Voltage | The highest voltage which appears across the terminals of a gas discharge tube in the period between the application of an impulse of given wave-shape and the time when current begins to flow. |
| 4 | Impulse discharge current 8/20μs | Current impulse with a nominal virtual front time of 8 μ s and a nominal time to half-value of 20 μ s. |
| 5 | Impulse discharge current 10/350μs | Current impulse with a nominal virtual front time of 10 μ s and a nominal time to half-value of 350 μ s. |
| 6 | 1,2/50 voltage impulse | Voltage impulse with a nominal virtual front time of 1,2 μ s and a nominal time to half-value of 50 μ s. |
| 7 | Maximum continuous operating voltage U_c | Maximum r.m.s. voltage, which may be continuously applied to the GDT's mode of protection. |
| 8 | Nominal discharge current I_n | Crest value of the current through the GDT having a current waveshape of 8/20. |
| 9 | Maximum discharge current I_{max} | Crest value of a current through the SPD having an 8/20 waveshape and magnitude according to the manufacturers specification. I_{max} is equal to or greater than I_n . |
| 10 | Impulse discharge current for class I test I_{imp} | Crest value of a discharge current through the SPD with specified charge transfer Q and specified energy W/R in the specified time. |
| 11 | Follow current I_f | Peak current supplied by the electrical power system and flowing through the SPD after a discharge current impulse. |
| 12 | Insulation Resistance | Insulation resistance shall be measured from each terminal to every other terminal of the GDT. The test is performed with DC50V when normal spark-over Voltage 70~150V, others with DC100V. |
| 13 | Capacitance | The capacitance shall be measured once at 1 MHz between all terminals unless otherwise specified. |
| 14 | Class I tests | Tests carried out with the impulse discharge current I_{imp} , with an 8/20 current impulse with a crest value equal to the crest value of I_{imp} , and with a 1,2/50 voltage impulse. |
| 15 | Class II tests | Tests carried out with the nominal discharge current I_n , and the 1,2/50 voltage impulse. |

Cautions and warnings

- I Surge arresters must not be operated directly in power supply networks.
- I Surge arresters may become hot in case of longer periods of current stress (danger of burning).
- I If the contacts of the surge arresters are defective, current stress can lead to the formation of sparks and loud noises.
- I Surge arresters may be used only within their specified values. In case of overload, the head contacts may fail or the component may be destroyed.
- I Damaged surge arresters must not be re-used.