



Datasheet

Gas Discharge Tube (GDT)

Series / Models	2RA-5 Series
Product Code	10.12.50.XXXX 10.12.51.XXXX
Version	A5
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File Number	SP-GDT-014

Gas Discharge Tube (GDT)

2RA-5 Series

Version History

Version	Date	Page	Description	Author
A0	2016-05-09	/	Initial draft	XianTao Jiang
A1	2020-03-16	Page 4	Update electrical characteristics	XianTao Jiang
A2	2022-10-28	Page 10	Update terms and definitions	George Hu
A3	2023-03-31	Page 5	Update certifications table	George Hu
A4	2023-11-02	Page 7	Update terms and definitions	Xia Wu
A5	2025-02-18	Page 1,2,3,4	1. Add cover and version history 2. Update Description 3. Delete some models	Xia Wu

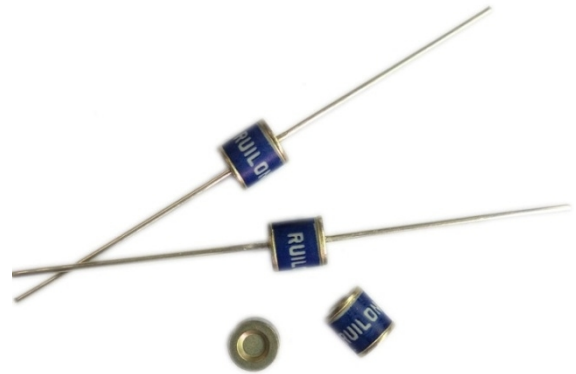
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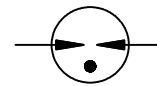
Description

Gas discharge tubes (GDTs) are generally in a high insulation resistance state, equivalent to an open circuit, which has almost no impact on the normal operation of the circuit. When transient overvoltage occurs in the circuit and the voltage amplitude exceeds the breakdown voltage of the GDT, the gas inside the GDT is ionized, causing the GDT to quickly conduct and limit the overvoltage to a lower level, thereby protecting electronic devices or circuit components connected in parallel from high voltage impact damage. After the overvoltage disappears, the GDT immediately returns to a high insulation resistance state, and the circuit resumes normal operation.

The 2RA-5 series GDT is a device that offers axial leads or surface mount packaging. It is not only small in size and easy to install on various compact printed circuit boards (PCBs), but also has excellent performance. When used in high-frequency communication circuits, the low capacitance characteristic minimizes its impact on the signal. High insulation resistance ensures that the performance of the circuit will not suffer additional losses under normal operating conditions. The 2RA-5 series GDT can not only be used to protect communication interfaces, but its ability to withstand high surge currents (8/20uS, 5KA) also makes it suitable for power protection.



Electrical symbol



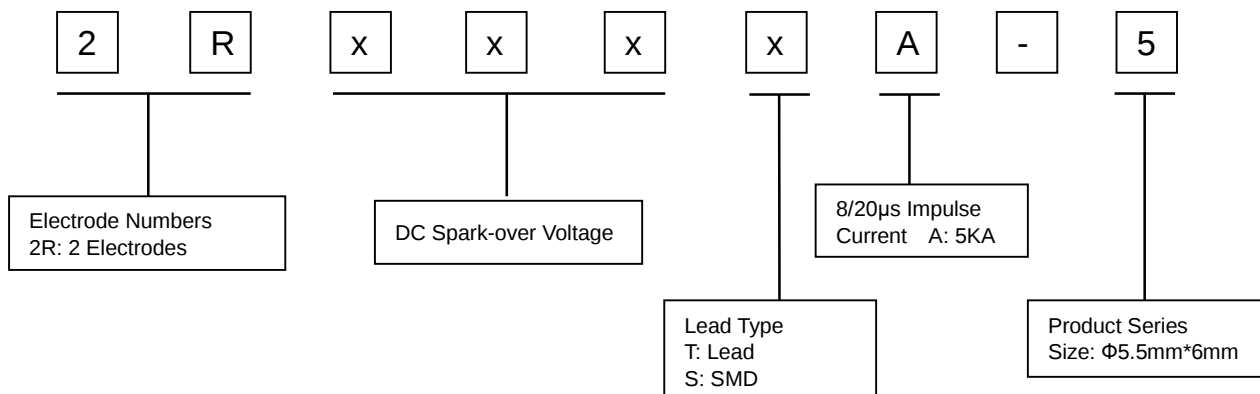
Features

- I Excellent response to fast rising transients
- I Stable breakdown voltage
- I GHz working frequency
- I 8/20μs Impulse current capability: 5KA
- I Non-Radioactive
- I Ultra Low capacitance (<1pF)
- I Size: Φ5.5mm*6mm

Applications

- I CATV equipment
- I Antennas
- I RS 485
- I Telecom Base Station
- I Power Supply AC Main
- I EV power Charging
- I Inverter/Variable
- I Frequency Drivers (VFDs)
- I IEEE 802.3 compliant Ethernet interfaces
- I Broad Band equipment
- I xDSL, ADSL, ADSL2, VDSL, and VDSL2
- I Medical Electronics
- I Test Equipment
- I General Telecom Equipment
- I Renewable Energy

Part Number Code



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Electrical Characteristics

Part Number		DC Spark-over Voltage ^{1) 2)} @100V/S	Impulse Spark-over Voltage		Insulation Resistance ³⁾	Capacitance @1MHz	Glow Voltage @10mA	Arc Voltage @1A	Life Ratings			
			100V/ μ S	1KV/ μ S					Impulse Discharge Current @8/20 μ S		Alternating Discharge Current @50Hz 1S	Impulse Life @10/1000 μ S
			Max	Max		Max	Typical	Typical	$\pm$ 5 times	1 time	10 times	300 times
DIP	SMD	V	V	V	G Ω	pF	V	V	KA	KA	A	A
2R075TA-5	2R075SA-5	75 $\pm$ 20%	500	600	1	1	60	10	5	10	5	100
2R090TA-5	2R090SA-5	90 $\pm$ 20%	500	600	1	1	60	10	5	10	5	100
2R150TA-5	2R150SA-5	150 $\pm$ 20%	500	600	1	1	60	10	5	10	5	100
2R230TA-5	2R230SA-5	230 $\pm$ 20%	600	700	1	1	60	10	5	10	5	100
2R350TA-5	2R350SA-5	350 $\pm$ 20%	800	900	1	1	60	10	5	10	5	100
2R420TA-5	2R420SA-5	420 $\pm$ 20%	850	950	1	1	60	10	5	10	5	100
2R470TA-5	2R470SA-5	470 $\pm$ 20%	900	1000	1	1	60	10	5	10	5	100
2R600TA-5	2R600SA-5	600 $\pm$ 20%	1000	1200	1	1	60	10	5	10	5	100
2R800TA-5	2R800SA-5	800 $\pm$ 20%	1200	1400	1	1	135	15	5	10	5	100
Glow to Arc transition Current.....						<0.5A						
Weight.....						DIP ~0.82g SMD ~0.55g						
Operation and storage temperature.....						-40~+125°C						
Climatic category (IEC 60068-1).....						40/125/21						
Marking, blue negative.....						RUILON XXX Y XXX -Nominal voltage Y -Year of production						
Surface treatment.....						DIP -Nickel Plated SMD -Matte-tin plated						
Moisture sensitivity level ⁴⁾						1						

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

2) In ionized mode.

3) Insulation Resistance Measuring Voltage: 75V~150V at DC 50V, other at DC 100V.

4) Tests according to JEDEC J-STD-020.

Terms in accordance with ITU-T K.12, IEC 61643-311, GB/T 9043, GB/T18802.311.

Gas Discharge Tube (GDT)

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Certifications table

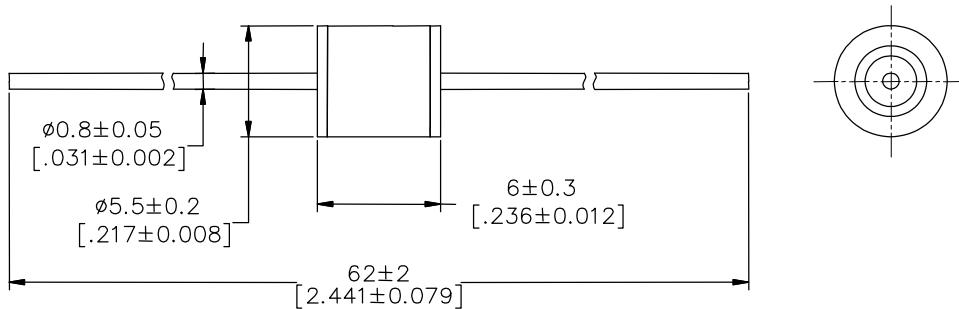
Part Number			
DIP	SMD	UL497B E465335	EN 61643-311 IEC 61643-311 J50571931
2R075TA-5	2R075SA-5	--	--
2R090TA-5	2R090SA-5	⊙	--
2R150TA-5	2R150SA-5	⊙	--
2R230TA-5	2R230SA-5	⊙	--
2R350TA-5	2R350SA-5	⊙	--
2R420TA-5	2R420SA-5	⊙	--
2R470TA-5	2R470SA-5	⊙	--
2R600TA-5	2R600SA-5	⊙	⊙
2R800TA-5	2R800SA-5	--	⊙

Notes:

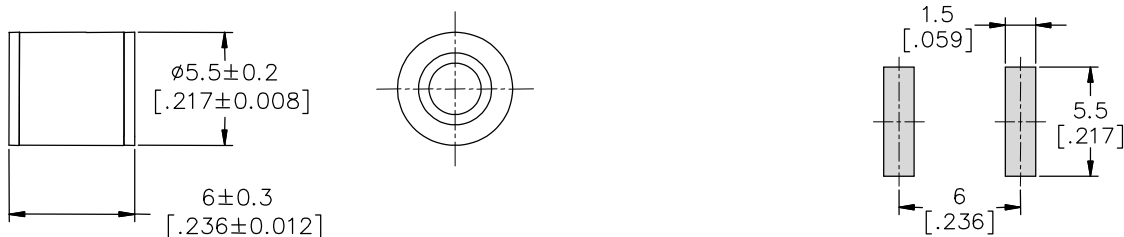
- ⊙ indicates that the product has passed the certification.
- indicates that the product is not certified.

Dimensions (Unit: mm/inch)

DIP axial leads series (2RxxxTA-5)



SMD Series (2RxxxSA-5)



Recommended Soldering Pad Layout

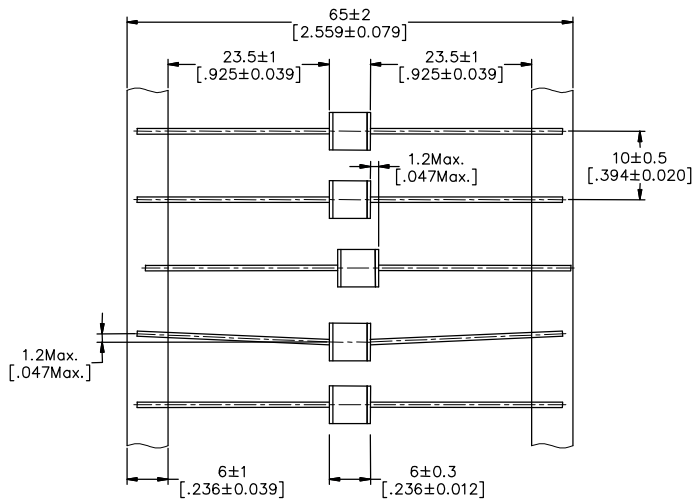
Gas Discharge Tube (GDT)

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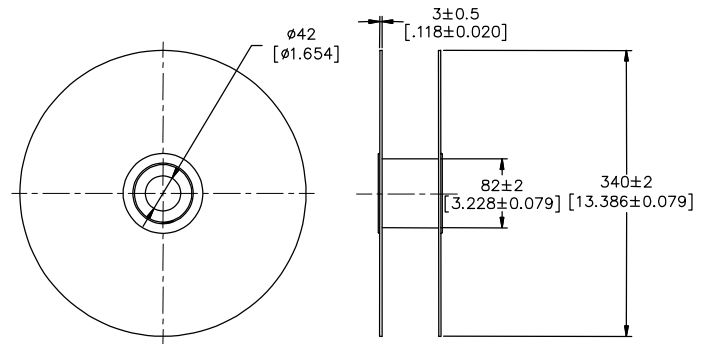
Packaging Information (Unit: mm/inch)

DIP axial leads series packaging (Default packaging)

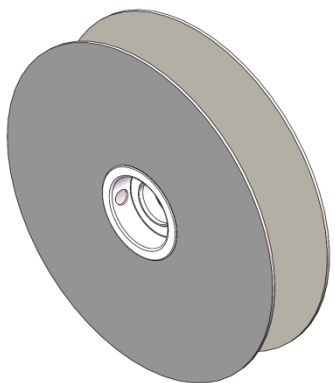
Tape



Reel



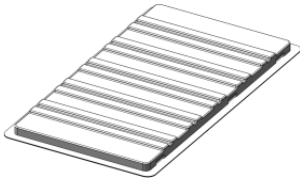
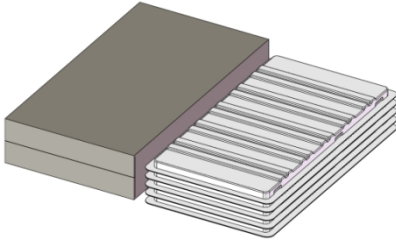
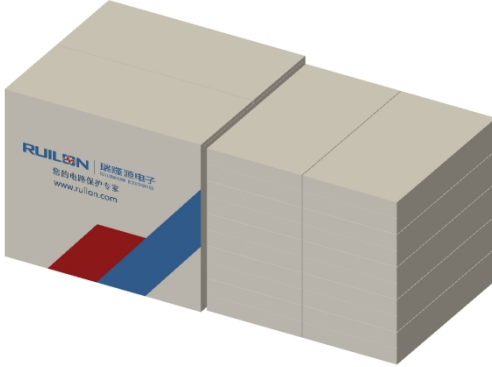
According to IEC 60286-1

	Reel	Carton
Size	340×78mm	350×350×407mm
Quantity	MPQ/MOQ: 1 reel=1,000pcs	1 Carton=5 reels =5,000pcs
Photos		

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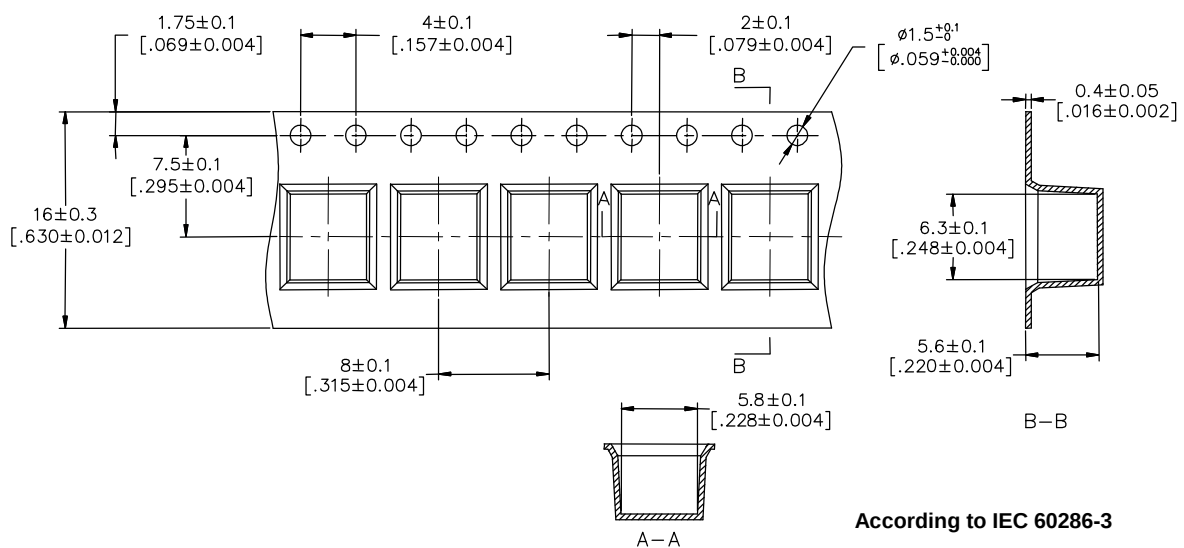
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DIP axial leads series packaging (Bulk)

	PVC tray	Inner Box	Carton
Size	265×148×10mm	275×150×50mm	315×290×272mm
Quantity	MPQ: 1 tray=100pcs	MOQ: 1 Inner Box=5 trays=500pcs	1 Carton=10 Inner boxes=5,000pcs
Photos			

SMD Packaging (Tape & Reel)

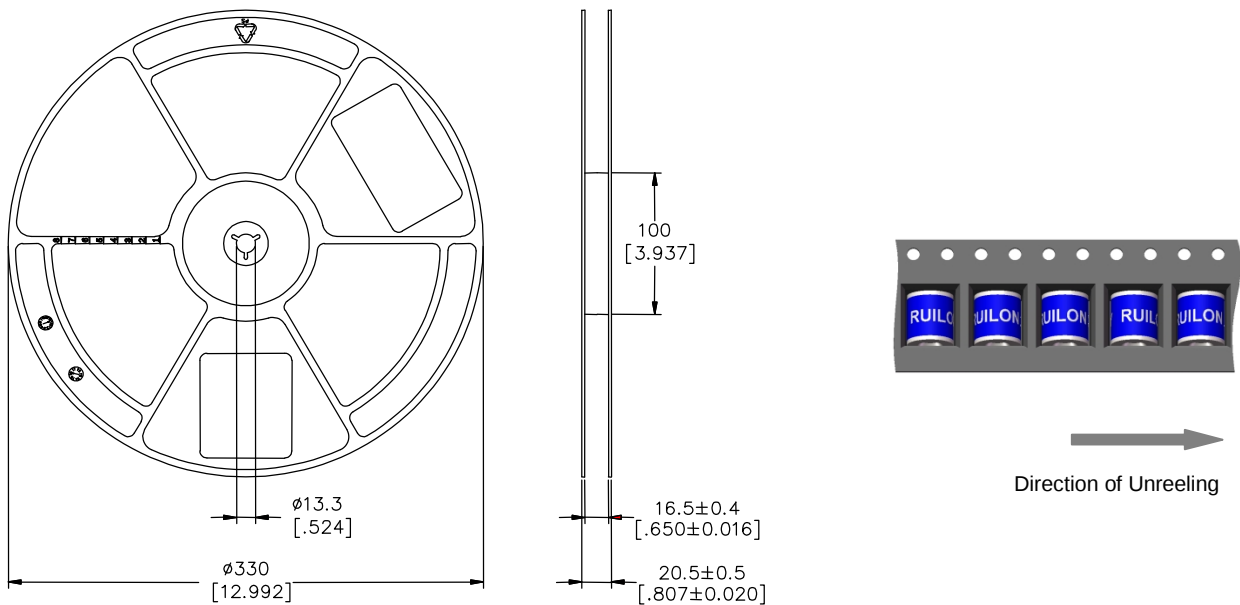
Tape



Gas Discharge Tube (GDT)

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Reel

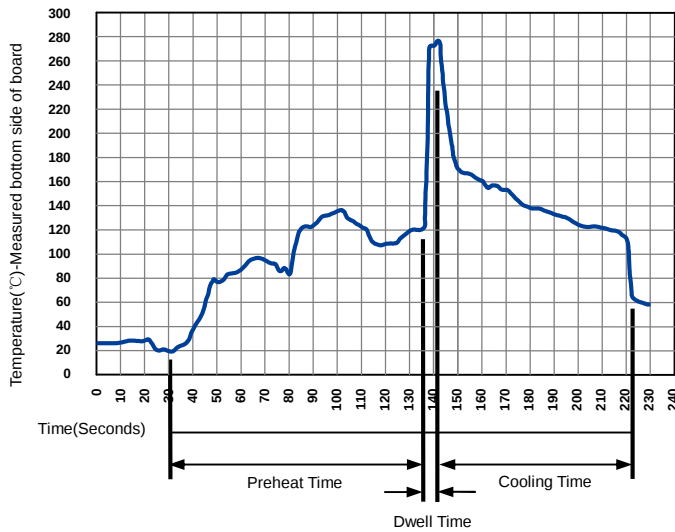


	Reel	Inner Box	Carton
Size	330 × 20.5mm	340 × 333 × 70mm	375 × 353 × 380mm
Quantity	MPQ/MOQ: 1 reel=1,000pcs	1 Inner Box=3 reels=3,000pcs	1 Carton=5 Inner boxes=15,000pcs
Photos			

Gas Discharge Tube (GDT)

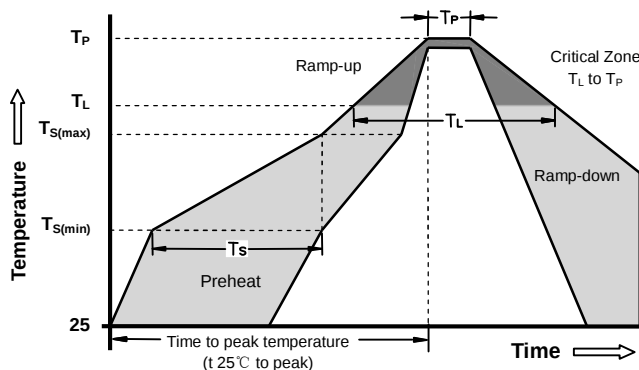
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Soldering Parameters - Wave soldering (Thru-Hole Devices)



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

Soldering Parameters - Reflow Soldering (Surface Mount Devices)



Reflow Condition		Pb - Free assembly
Preheat	-Temperature Min ($T_{s(min)}$)	150°C
	-Temperature Max ($T_{s(max)}$)	200°C
	- Time (min to max) (t_s)	60 -180 Seconds
Average ramp up rate (Liquids 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) (Liquids)	217°C
	- Time (min to max) (t_s)	60 -150 Seconds
Peak Temperature (T_P)		260 +0/-5°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

Surface mounted components (SMD) may exhibit a temporary increase in the DC spark-over voltage after the solder reflow process. The components will recover within 24 hours. There is no quality defect nor change in protection levels during the temporary change in DC spark-over voltage.

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Terms and definitions

NO.	Item	Definitions
1	Gas discharge tube(GDT)	A 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.
5	Arc voltage	Voltage drop across the GDT during arc current flow.
6	Glow voltage	Peak value of voltage drop across the GDT when a glow current is flowing.
7	Impulse discharge current 8/20μs	Current impulse with a nominal virtual front time of 8 μs and a nominal time to half-value of 20 μs.
8	Alternating Discharge Current	The rms value of an approximately sinusoidal alternating current passing through the gas discharge tube.
9	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.
10	Capacitance	The capacitance shall be measured once at 1 MHz between all terminals unless otherwise specified.

Cautions

- I Do not operate gas discharge tubes in power supply networks, whose maximum operating voltage exceeds the minimum spark-over voltage of the gas discharge tubes.
- I Gas discharge tubes may become hot in the event of longer periods of current stress (burn risk). In the event of overload the connectors may fail or the component may be destroyed.
- I Gas discharge tubes must be handled with care and must not be dropped.
- I Do not continue to use damaged gas discharge tubes.
- I The shown SMD pad dimensions represent a safe way to mount the arrester and are a recommendation of the manufacturer. During the reflow process it must be assured that no solder material reduces the insulation distance between the pads below the arrester.
- I SMD gas discharge tubes should be soldered within 24 month after shipment.
- I The electrical characteristics described in this datasheet are only typical characteristics, and all of these characteristics have been confirmed through testing and inspection. If the customer's usage requirements are different from this or have special requirements, please contact Ruilongyuan Electronics Co., Ltd. If protection failure or circuit damage occurs as a result, our company is not responsible for it.
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