Datasheet

Gas Discharge Tube (GDT)

Series / Models	3RB-5S Series
Product Code	10.13.51.XXXX
Version	A5
Date	2026-10-29
File Number	SP-GDT-021

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Version History

Version	Date	Page	Description	Author
A0	2017-07-10	/	Initial draft	XianTao Jiang
A1	2019-07-15	Page 4	Update electrical characteristics	XianTao Jiang
A2	2023-11-02	Page 7	Update terms and definitions	George Hu
A3	2025-03-04	Page 1,2,3,4	1. Add cover and version history 2. Update Description 3. Delete some models	Xia Wu
A4	2025-06-05	Page 4	Update Electrical Characteristics(Impulse Life @10/1000μS)	Xia Wu
A5	2026-10-29	Page 4	Update Marking	Xia Wu

Gas Discharge Tube (GDT) 3RB-5S Series

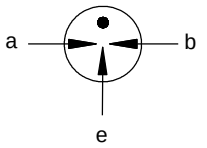
Description

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 3RB-5S series 3-electrode GDT is a surface mount packaged component. Not only is it small in size and easy to install on various compact printed circuit boards (PCBs), but it also has excellent performance. The low capacitance characteristic minimizes its impact on signals when used in high-frequency communication circuits. High insulation resistance ensures that the performance of the circuit will not suffer additional losses under normal operating conditions. The 3RB-5S series GDT can not only be used to protect communication interfaces, but its ability to withstand high surge currents (8/20uS, 10KA) also makes it suitable for power supply protection.



Electrical symbol



a = Tip
b = Ring
e = Ground
(center electrode)

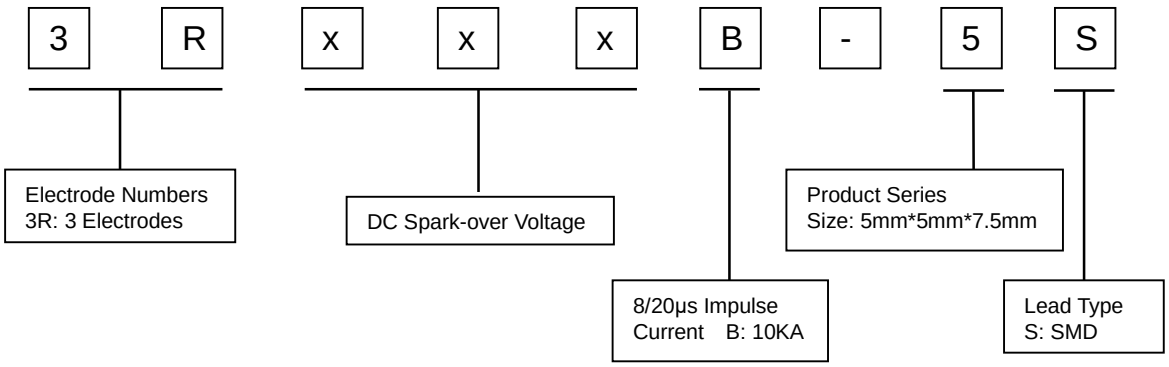
Features

- Excellent response to fast rising transients
- Stable breakdown voltage
- GHz working frequency
- 8/20μs Impulse current capability: 10KA
- Surface Mount package
- Non-Radioactive
- Ultra Low capacitance (<1pF)
- High insulation resistance
- Size: 5mm*5mm*7.5mm

Applications

- Communication equipment
- CATV equipment
- Data lines
- Power supplies
- Telecom SLIC protection
- Broadband equipment
- ADSL equipment, including ADSL2+
- XDSL equipment
- Satellite and CATV equipment
- Test equipment
- Consumer electronics

Part Number Code



Electrical Characteristics

Part Number	DC Spark-over Voltage [1) 2) 3)] @100V/S	Impulse Spark-over Voltage [3)]		Insulation Resistance [4)]	Capacitance @1MHz	Glow Voltage @10mA	Arc Voltage @1A	Life Ratings			
		100V/μS	1KV/μS					Impulse Discharge Current @8/20μs [5)]		Alternating Discharge Current @50Hz 1S [5)]	Impulse Life @10/1000μS
		Max	Max	Min	Max	Typical	Typical	±5 times	1 time	10 times	300 times
	V	V	V	GΩ	pF	V	V	KA	KA	A	A
3R075B-5S	75±20%	500	600	1	1	60	10	10	12	10	100
3R090B-5S	90±20%	500	600	1	1	60	10	10	12	10	100
3R150B-5S	150±20%	500	600	1	1	60	10	10	12	10	100
3R230B-5S	230±20%	600	700	1	1	60	10	10	12	10	100
3R350B-5S	350±20%	800	900	1	1	60	10	10	12	10	100
3R420B-5S	420±20%	850	950	1	1	60	10	10	12	10	100
3R470B-5S	470±20%	900	1000	1	1	60	10	10	12	10	100

Glow to Arc transition Current……....	~0.5A
Weight……....	~0.8g
Operation temperature……....	-40~+125°C
Recommended storage [6)]	
- Temperature ……..	+5~+35°C
- Humidity ……....	45~80%
- Period……....	≤ 2 years
Climatic category (IEC 60068-1)……....	40/125/21
Marking, red negative……....	**RUILON** **xxx Y** xxx -Nominal voltage Y -Year of production
Surface treatment……....	Matte-tin plated
Moisture sensitivity level [7)] …….....	1

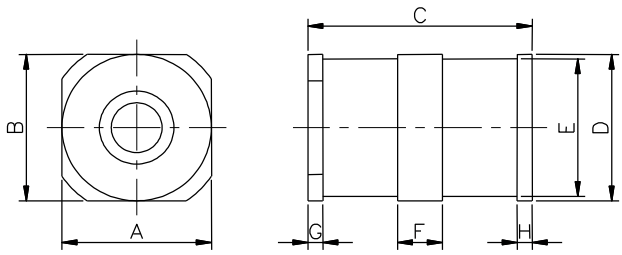
1) At delivery AQL 0.65 level II, DIN ISO 2859
2) In ionized mode
3) Tip or ring electrode to center electrode
4) Insulation Resistance Measuring Voltage: 75V~150V at DC 50V,Other at DC 100V
5) Total current through center electrode, half value through tip respectively ring electrode.
6) Specified in terms of corrosion against tin plating.
7) Tests according to JEDEC J-STD-020.
Terms in accordance with ITU-T Rec. K.12, IEC 61643-311, GB/T18802.311, GB/T 9043.

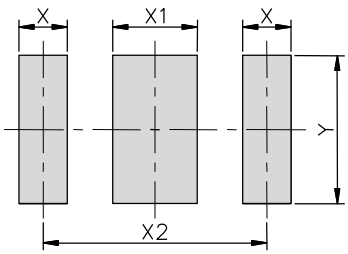
Certifications table

Part Number	UL497B E465335
3R075B-5S	--
3R090B-5S	--
3R150B-5S	--
3R230B-5S	◎
3R350B-5S	◎
3R420B-5S	◎
3R470B-5S	◎

Notes:
1. ◎ indicates that the product has passed the certification.
2. -- indicates that the product is not certified.

Dimensions



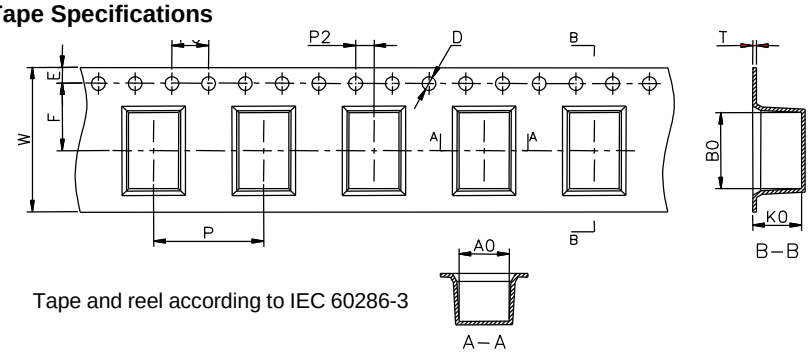


Recommended Soldering Pad Layout

Symbol	Millimeters	Inches
A	5.0±0.2	0.197±0.008
B	5.0±0.2	0.197±0.008
C	7.5±0.3	0.295±0.012
D	Φ5.0±0.2	Φ0.197±0.008
E	Φ4.7±0.1	Φ0.185±0.004
F	1.5±0.1	0.059±0.004
G	0.4±0.1	0.016±0.004
H	0.4±0.1	0.016±0.004
X	1.6	0.063
X1	2.8	0.110
X2	7.4	0.291
Y	5.0	0.197

Packaging Information

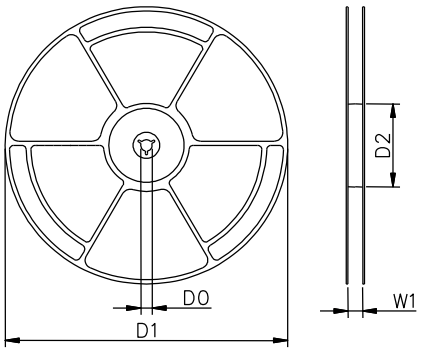
Tape Specifications

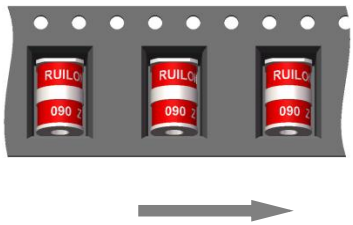


Tape and reel according to IEC 60286-3

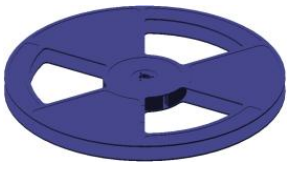
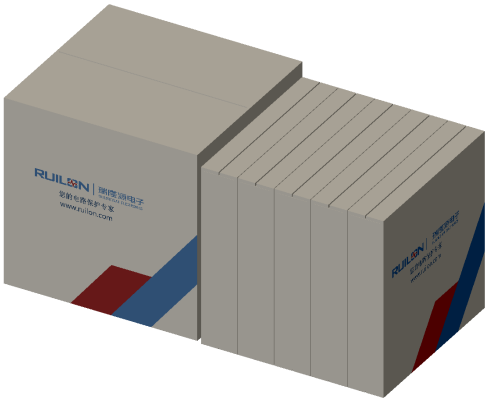
Symbol	Millimeters	Inches
W	16±0.3	0.630±0.012
A0	5.4±0.1	0.213±0.004
B0	8.4±0.1	0.331±0.004
K0	5.3±0.1	0.209±0.004
P	12±0.1	0.472±0.004
F	7.5±0.1	0.295±0.004
E	1.75±0.1	0.069±0.004
D	1.5+0.1/-0.0	0.059+0.004/-0.0
P0	4±0.1	0.157±0.004
P2	2±0.1	0.079±0.004
T	0.4±0.1	0.016±0.004
D0	13.3±0.15	0.524±0.006
D1	330±2	12.992±0.079
D2	100+1/-2	3.937+0.039/-0.079
W1	16.5±0.4	0.65±0.016

Reel Specifications

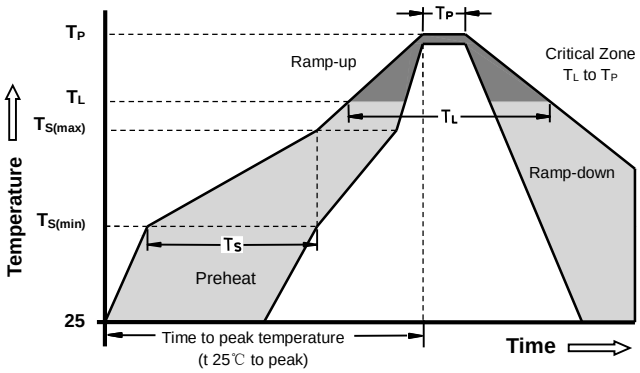




Direction of Unreeling

	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	1Carton=5 Inner boxes=15,000pcs
Photos			

Soldering Parameters - Reflow Soldering (Surface Mount Devices)



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 Seconds
Average ramp up rate (Liquids Temp T_L) to peak		3°C/second max
$T_{S(max)}$ to TL - 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.

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

- 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.
- 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.
- Gas discharge tubes must be handled with care and must not be dropped.
- Do not continue to use damaged gas discharge tubes.
- 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.
- SMD gas discharge tubes should be soldered within 24 month after shipment.
- 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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