Datasheet

Gas Discharge Tube (GDT)

Series / Models	SMD4042 Series
Product Code	10.12.03.XXXX
Version	A5
Date	2025-11-26
File Number	SP-GDT-005

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Version History

Version	Date	Page	Description	Author
A0	2018-08-24	/	Initial draft	XianTao Jiang
A1	2022-05-26	Page 3	Update main photo	George Hu
A2	2023-03-31	Page 4	Add moisture sensitivity level	George Hu
A3	2024-08-19	Page 4	Update Electrical Characteristics	Xia Wu
A4	2025-02-10	Page 1,2,3,4	1. Add cover and version history 2. Update Description 3. Delete some models	Xia Wu
A5	2025-11-26	Page 4	Update SMD4042-090E Electrical Characteristics	Xia Wu

Gas Discharge Tube (GDT) SMD4042 Series

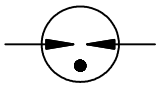
Description

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 SMD4042 series 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 SMD4042 series GDT can not only be used to protect communication interfaces, but its ability to withstand high surge currents (8/20uS, 5KA/3KA) also makes it suitable for power supply protection.



Electrical symbol



Features

- Excellent response to fast rising transients
- Stable breakdown voltage
- GHz working frequency
- 8/20μs Impulse current capability:5KA/3KA
- Surface Mount package
- Non-Radioactive
- Ultra Low capacitance (<0.8pF)
- Size: 4.0mm*4.2mm*4.2mm

Applications

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

Part Number Code

S	M	D	4	0	4	2	-	X	X	X	E

- SMD: Surface Mount Package
- 4042: Product Series; Size: 4.0mm*4.2mm*4.2mm
- XXX: DC Spark-over Voltage
- E: 8/20μs Impulse Current; E: 3KA

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/μS	1KV/μS					Impulse Discharge Current @8/20μS		Alternating Discharge Current @50Hz 1S	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
SMD4042-090E	90±20%	500	600	1	0.8	60	10	3	6	3	100
SMD4042-150E	150±20%	500	600	1	0.8	60	10	3	6	3	100
SMD4042-230E	230±20%	600	700	1	0.8	60	10	3	6	3	100
SMD4042-350E	350±20%	750	850	1	0.8	60	10	3	6	3	100
SMD4042-470E	470±20%	850	950	1	0.8	135	15	3	6	3	100
SMD4042-600E	600±20%	900	1000	1	0.8	135	15	3	6	3	100
SMD4042-800E	800±20%	1200	1400	1	0.8	135	15	3	6	3	100
SMD4042-1000E	1000±20%	1400	1600	1	0.8	135	15	3	5	3	100

Glow to Arc transition Current…….....	<0.3A
Weight…….....	~0.28g
Operation temperature ……	-40~+125°C
Recommended storage [4)]	
- Temperature ……	+5~+35°C
- Humidity ……	45~+80%
- Period……	≤ 2 years
Climatic category (IEC 60068-1)……	40/125/21
Marking……	Without
Surface treatment……	Matte-tin plated
Moisture sensitivity level [5)] ……	1

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

2) In ionized mode.

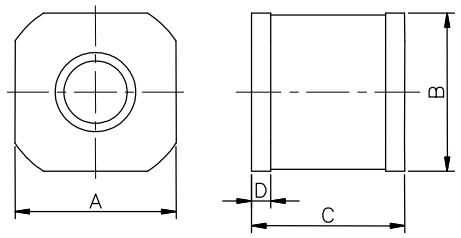
3) Insulation Resistance Measuring Voltage: nominal voltage 90~150V at DC 50V, others at DC 100V.

4) Specified in terms of corrosion against tin plating.

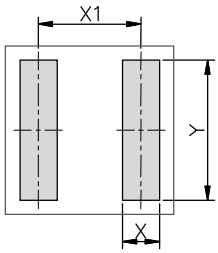
5) Tests according to JEDEC J-STD-020.

Terms and current waveforms in accordance with ITU-T K. 12, IEC61643-21 and IEC 61643-311.

Dimensions



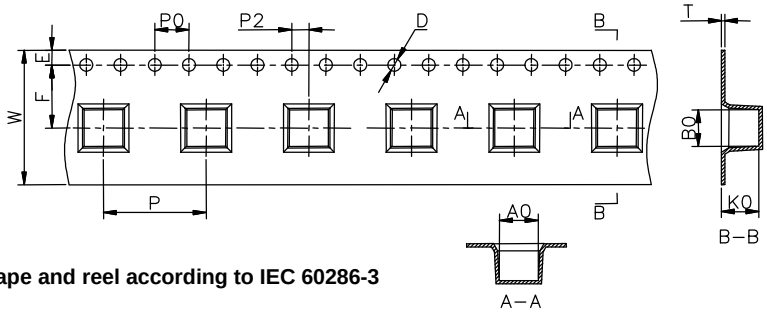
Symbol	Millimeters	Inches
A	4.2±0.2	0.165±0.008
B	4.2±0.2	0.165±0.008
C	4.0±0.2	0.157±0.008
D	0.5±0.1	0.020±0.004
X	1.3	0.051
X1	3.6	0.142
Y	5.0	0.197



Recommended Soldering Pad Layout

Packaging Information

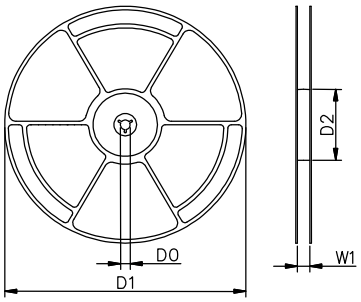
Tape Specifications

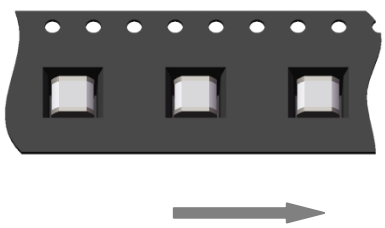


Tape and reel according to IEC 60286-3

Symbol	Millimeters	Inches
W	16±0.3	0.630±0.012
A0	4.5±0.1	0.177±0.004
B0	4.3±0.1	0.169±0.004
K0	4.4±0.1	0.173±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

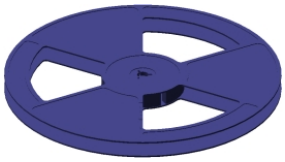
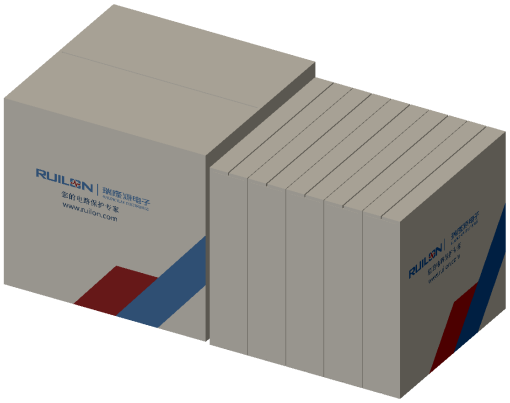
Reel Specifications



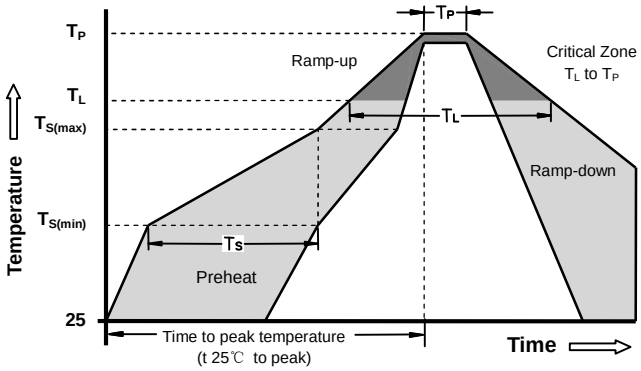


Direction of Unreeling

Gas Discharge Tube (GDT) SMD4042 Series

	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
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 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

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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