



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 |

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 |

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.

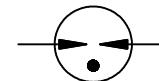
The SMD4042 series GDT is a surface mount packaged component. Not only is it small in size and easy to install on various compact printed circuit boards (PCBs), but it also has excellent performance. The low capacitance characteristic minimizes its impact on signals when used in high-frequency communication 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 (8/20μS, 5KA/3KA) also makes it suitable for power supply protection.

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



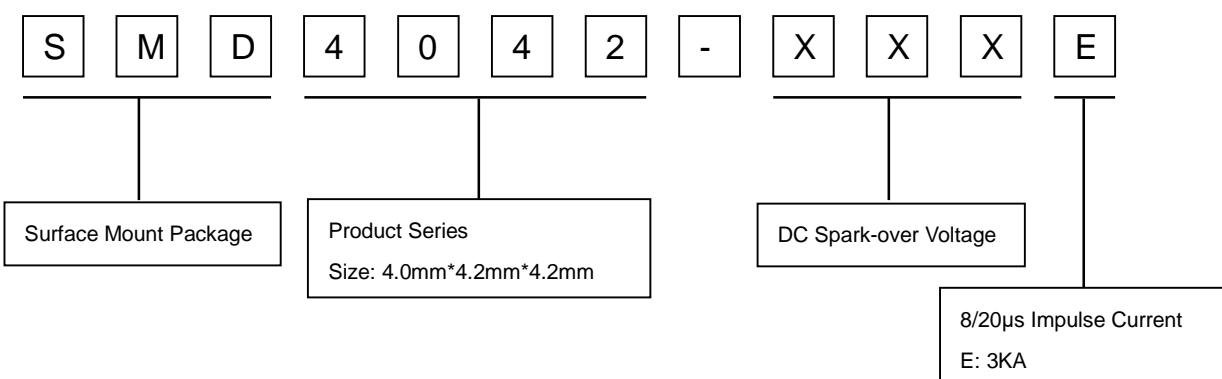
Electrical symbol



Applications

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

Part Number Code



Gas Discharge Tube (GDT)

SMD4042 Series

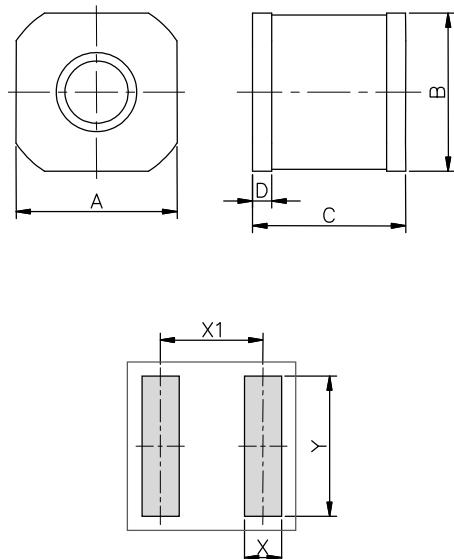
Electrical Characteristics

| 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 |
| | V | V | V | GΩ | pF | V | V | V | KA | KA | 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

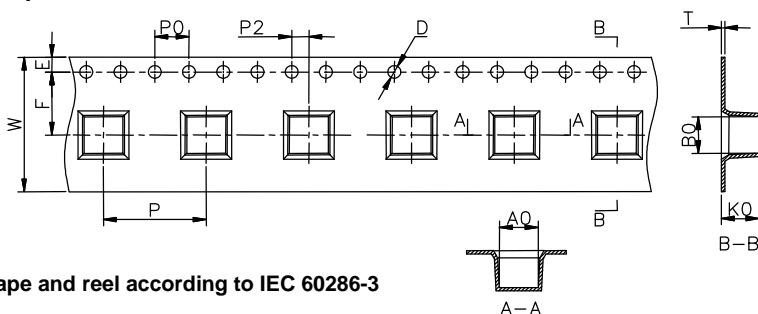


Recommended Soldering Pad Layout

| 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 |

Packaging Information

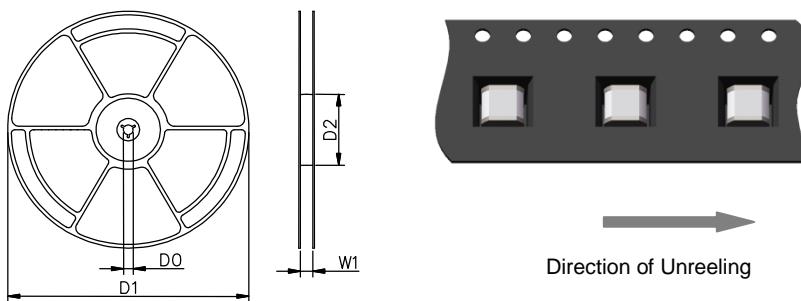
Tape Specifications



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 |

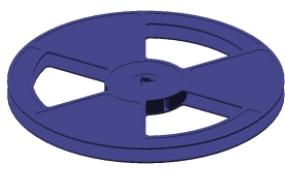
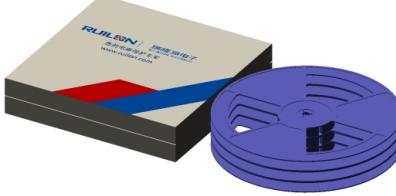
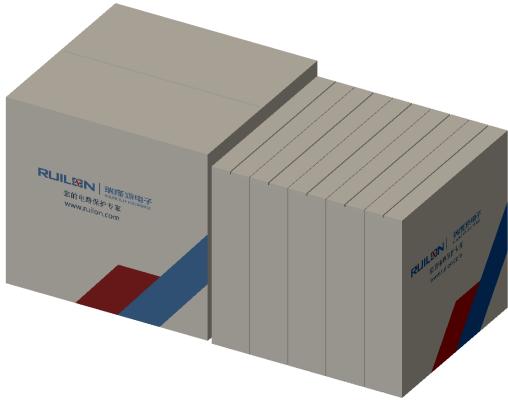
Reel Specifications



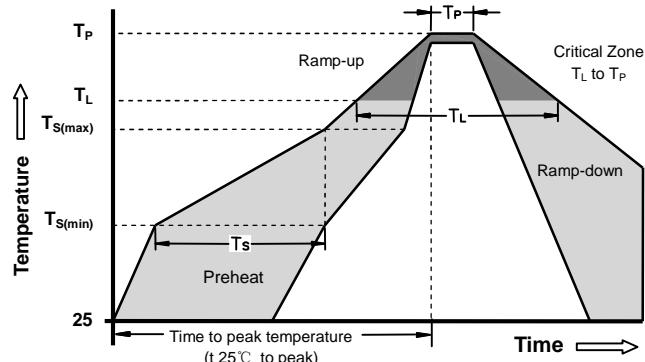
Direction of Unreeeling

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 | 1 Carton=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 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 |

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 μ s and a nominal time to half-value of 20 μ s. |
| 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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