Datasheet

Gas Discharge Tube (GDT)

Series / Models	SMD3225 Series
Product Code	10.12.01.XXXX
Version	A5
Date	2025-02-08
File Number	SP-GDT-003

Version History

Version	Date	Page	Description	Author
A0	2017-03-20	/	Initial draft	George Hu
A1	2018-04-03	Page 4	Add 10/700μS electrical characteristics	George Hu
A2	2018-10-31	All	Use a new document layout	XianTao Jiang
A3	2022-07-12	Page 4	Add Certifications table	George Hu
A4	2024-08-19	Page 4	Update Electrical Characteristics	Xia Wu
A5	2025-02-08	Page 1,2	Add cover and version history	Xia Wu

Gas Discharge Tube (GDT) SMD3225 Series

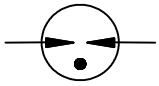
Description

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 SMD3225 series adopts a standard EIA1210 square GDT, which is currently the smaller size GDT in size on the market. The SMD3216 series GDT has ultra-low capacitance, can withstand high surge currents, and will not cause damage.

The SMD3225 series is suitable for installation on compact circuit boards and can be used to protect communication interfaces (such as Ethernet interfaces, RS-232 interfaces, etc.), prevent interface chip damage caused by induced lightning, electrostatic discharge, etc., and ensure stable and transmitted communication signals.

Electrical symbol



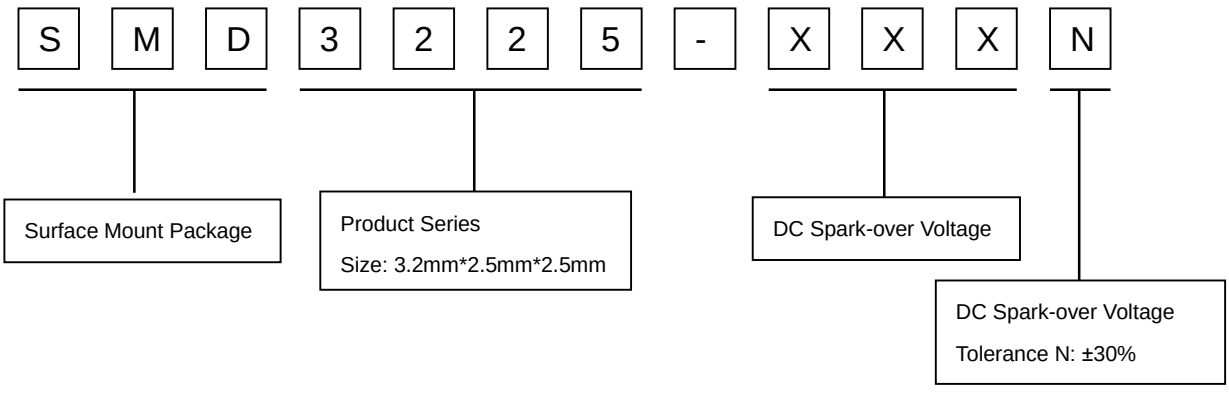
Features

- Excellent response to fast rising transients
- Stable breakdown voltage
- GHz working frequency
- 8/20μs Impulse current capability: 1KA
- Surface Mount package
- Non-Radioactive
- Ultra Low capacitance(<0.5pF) and insertion loss
- Very Small Size: 3.2mm*2.5mm*2.5mm (EIA 1210)

Applications

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

Part Number Code



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 [4)]				
		100V/μS	1KV/μS					Impulse Discharge Current @8/20μS		Alternating Discharge Current @50Hz 1S	Impulse Withstanding Voltage Capacity @10/700μS, 40W	Impulse Life @10/1000μS
		Max	Max	Min	Max	Typical	Typical	±5 times	1 time	5 times	±5 times	100 times
	V	V	V	GΩ	pF	V	V	KA	KA	A	KV	A
SMD3225-075N	75±30%	500	600	1	0.5	60	10	1	1.5	1	6	10
SMD3225-090N	90±30%	500	600	1	0.5	60	10	1	1.5	1	6	10
SMD3225-150N	150±30%	500	600	1	0.5	60	10	1	1.5	1	6	10
SMD3225-200N	200±30%	600	700	1	0.5	60	10	1	1.5	1	6	10
SMD3225-230N	230±30%	600	700	1	0.5	60	10	1	1.5	1	6	10
SMD3225-300N	300±30%	700	800	1	0.5	60	10	1	1.5	1	6	10
SMD3225-350N	350±30%	750	850	1	0.5	60	10	1	1.5	1	6	10
SMD3225-400N	400±30%	800	900	1	0.5	135	15	1	1.5	1	6	10
SMD3225-470N	470±30%	850	950	1	0.5	135	15	1	1.5	1	6	10
SMD3225-600N	600±30%	900	1000	1	0.5	135	15	1	1.5	1	6	10
SMD3225-800N	800±30%	1200	1400	1	0.5	135	15	1	1.5	1	6	10

Glow to Arc transition Current.....	<0.2A
Weight.....	~0.095g
Operation temperature	-40~+85°C
Recommended storage [5)]	
- Temperature	+5~+35°C
- Humidity	45~+80%
- Period.....	≤ 2 years
Climatic category (IEC 60068-1).....	40/85/21
Marking.....	Without
Surface treatment.....	Matte-tin plated
Moisture sensitivity level [6)]	1

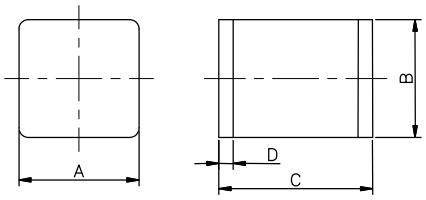
1) At delivery AQL 0.65 level II, DIN ISO 2859.
2) In ionized mode.
3) Insulation Resistance Measuring Voltage: nominal voltage 75~150V at DC 50V, others at DC 100V.
4) Tests according to ITU-T K.12 and UL 497B.
5) Specified in terms of corrosion against tin plating.
6) Tests according to JEDEC J-STD-020.
Terms and current waveforms in accordance with ITU-T K. 12, IEC61643-21 and IEC 61643-311.

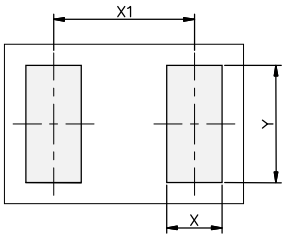
Certifications table

Part Number	c UL us UL1449 E508408
SMD3225-075N	◎
SMD3225-090N	◎
SMD3225-150N	◎
SMD3225-200N	◎
SMD3225-230N	◎
SMD3225-300N	◎
SMD3225-350N	◎
SMD3225-400N	◎
SMD3225-470N	◎
SMD3225-600N	◎
SMD3225-800N	◎

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

Dimensions



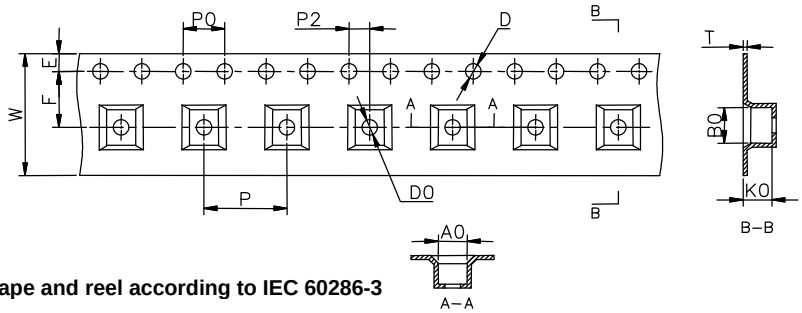


Recommended Soldering Pad Layout

Symbol	Millimeters	Inches
A	2.5±0.2	0.098±0.008
B	2.5±0.2	0.098±0.008
C	3.2±0.3	0.126±0.012
D	0.3±0.1	0.012±0.004
X	1.3	0.051
X1	3.3	0.130
Y	2.8	0.110

Packaging Information

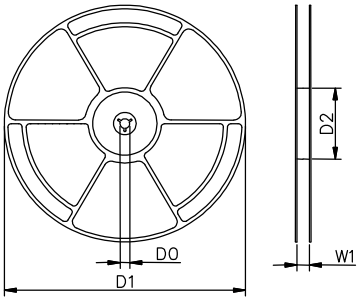
Tape Specifications

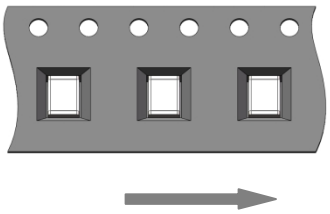


Tape and reel according to IEC 60286-3

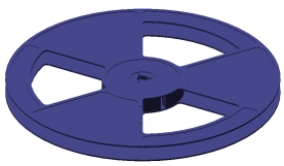
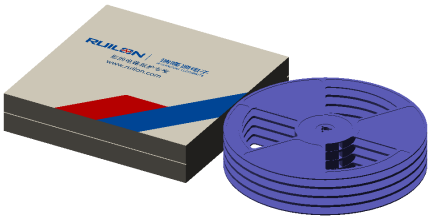
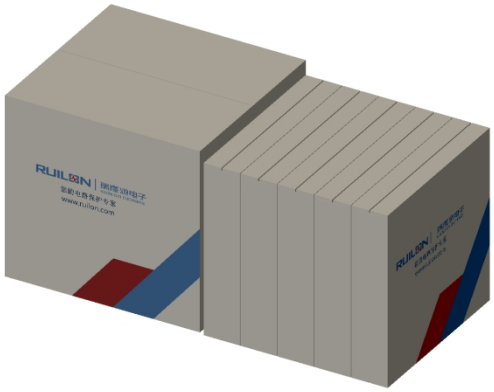
Symbol	Millimeters	Inches
W	12±0.3	0.472±0.012
A0	2.8±0.1	0.110±0.004
B0	3.5±0.1	0.138±0.004
K0	2.8±0.1	0.110±0.004
P	8.0±0.1	0.315±0.004
F	5.5±0.1	0.217±0.004
E	1.75±0.1	0.069±0.004
D	1.5+0.1/-0.0	0.059+0.004/-0.0
P0	4±0.1	0.157±0.004
P2	2±0.1	0.079±0.004
T	0.35±0.05	0.014±0.002
D0	13.3±0.15	0.524±0.006
D1	330±2	12.992±0.079
D2	100+1/-2	3.937+0.039/-0.079
W1	12.5±0.4	0.492±0.016

Reel Specifications

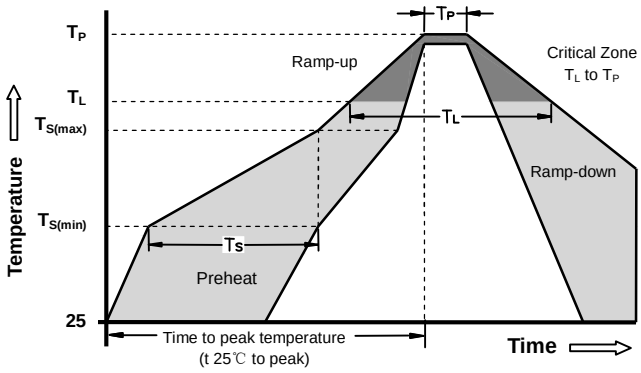




Direction of Unreeling

	Reel	Inner Box	Carton
Size	330×17mm	340×333×70mm	375×353×380mm
Quantity	MPQ/MOQ: 1 reel=2,500pcs	1 Inner Box=4 reels=10,000pcs	1 Carton=5 Inner boxes=50,000pcs
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 are no quality defects or changes in protection level during the temporary change of 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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