

## Gas Discharge Tubes (GDT)

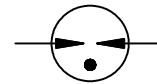
## SMD3216 Series

### Description

The SMD3216 series has been especially designed to meet data transmission protection requirements. The optimized design features a high level of protection against fast rising transients usually caused by lightning disturbances. For use in high frequency data lines, the series offers ultra low capacitances and shows only marginally signal losses up to high frequencies. The devices are extremely reliable and are able to withstand high surge currents without destruction.



### Electrical symbol



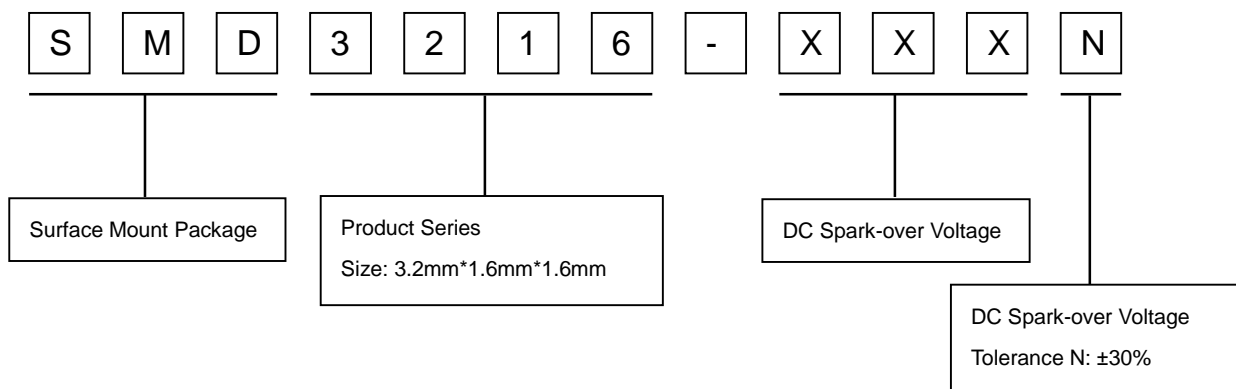
### Features

- I Excellent response to fast rising transients
- I Stable breakdown voltage
- I GHz working frequency
- I 8/20 $\mu$ s Impulse current capability: 500A
- I Surface Mount package
- I Non-Radioactive
- I Ultra Low capacitance(<0.3pF) and insertion loss
- I Very Small Size(EIA 1206)
- I Storage and operational temperature: -40~+90°C

### Applications

- I Ethernet, PoE, xDSL
- I Cable modem, splitters, line cards
- I Wireless antenna protection
- I CATV equipment
- I Switching power supply

### Part Number Code



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### Electrical Characteristics

Part Number	DC Spark-over Voltage <sup>1) 2)</sup> @100V/S	Impulse Spark-over Voltage		Insulation Resistance <sup>3)</sup>	Capacitance @1 MHz	Glow Voltage @10mA	Arc Voltage @1A	Service life		
		100V/μS	1KV/μS					Impulse Discharge Current @8/20μS		Impulse Withstanding Voltage Capacity @10/700μS, 40W
		Max	Max					±5 times	1 time	
		V	V					V	GΩ	pF
SMD3216-090N	90±30%	500	600	1	0.3	60	10	500	--	6
SMD3216-150N	150±30%	500	600	1	0.3	60	10	500	--	6
SMD3216-200N	200±30%	600	700	1	0.3	60	10	500	--	6
SMD3216-230N	230±30%	600	700	1	0.3	60	10	500	--	6
SMD3216-300N	300±30%	700	800	1	0.3	60	10	500	--	6
SMD3216-350N	350±30%	750	850	1	0.3	60	10	500	--	6
SMD3216-400N	400±30%	800	900	1	0.3	60	10	500	--	6
SMD3216-420N	420±30%	850	950	1	0.3	60	10	500	--	6
SMD3216-470N	470±30%	900	1000	1	0.3	60	10	500	--	6
SMD3216-600N	600±30%	1000	1200	1	0.3	60	10	500	--	6
Glow to Arc transition Current.....				<0.1A						
Weight.....				~0.03g						
Operation and storage temperature.....				-40~+90°C						
Climatic category (IEC 60068-1).....				40/90/21						
Marking.....				Without						
Surface treatment.....				Matte-tin plated						
Moisture sensitivity level <sup>4)</sup> .....				1						

<sup>1)</sup> At delivery AQL 0.65 level II, DIN ISO 2859.

<sup>2)</sup> In ionized mode.

<sup>3)</sup> Insulation Resistance Measuring Voltage:  
75V~150V at DC 50V  
Other at DC 100V

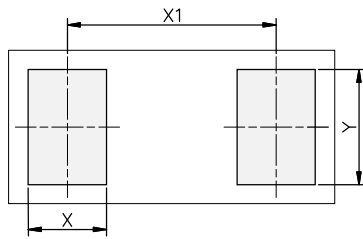
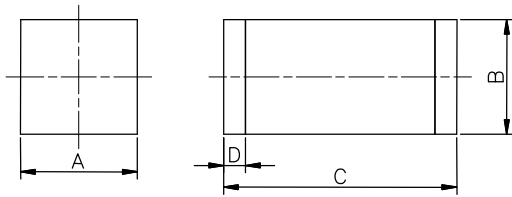
<sup>4)</sup> Tests according to JEDEC J-STD-020.

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

## Gas Discharge Tubes (GDT)

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### Dimensions

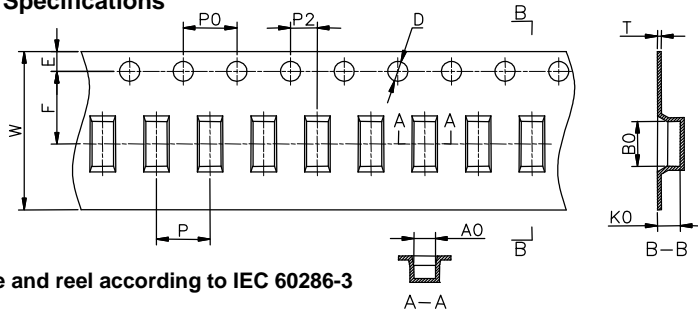


Recommended Soldering Pad Layout

Symbol	Millimeters	Inches
A	1.6±0.2	0.063±0.008
B	1.6±0.2	0.063±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	1.8	0.071

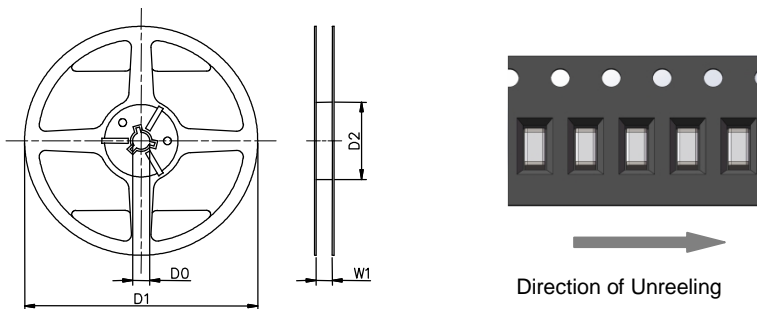
### Packaging Information

#### Tape Specifications



Tape and reel according to IEC 60286-3

#### Reel Specifications



Symbol	Millimeters	Inches
W	12±0.3	0.472±0.012
A0	1.86±0.1	0.073±0.004
B0	3.6±0.1	0.142±0.004
K0	1.7±0.1	0.067±0.004
P	4.0±0.1	0.157±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	178±2	7.007±0.079
D2	60+1/-2	2.362+0.039/-0.079
W1	12.5±0.4	0.492±0.016

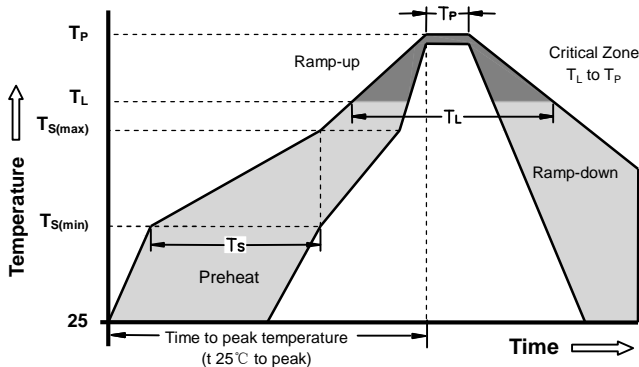
#### Packaging Quantity:

- 2,000 PCS per reel (7")
- 4 reels per inner box
- 8,000 PCS per inner box

## Gas Discharge Tubes (GDT)

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### Soldering Parameters - Reflow Soldering (Surface Mount Devices)



Reflow Condition		Pb - Free assembly
<b>Preheat</b>	-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
<b>Reflow</b>	- Temperature ( $T_L$ ) (Liquids)	217°C
	- Time (min to max) ( $t_s$ )	60 -150 Seconds
<b>Peak Temperature (<math>T_P</math>)</b>		260 +0/-5°C
<b>Time within 5°C of actual peak Temperature (<math>t_p</math>)</b>		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	<b>Gas discharge tube(GDT)</b>	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	<b>DC Spark-over Voltage</b>	The voltage at which the gas discharge tube sparks over with slowly increasing d.c. voltage.
3	<b>Impulse Spark-over Voltage</b>	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	<b>Arc voltage</b>	Voltage drop across the GDT during arc current flow.
6	<b>Glow voltage</b>	Peak value of voltage drop across the GDT when a glow current is flowing.
7	<b>Impulse discharge current 8/20µs</b>	Current impulse with a nominal virtual front time of 8 µs and a nominal time to half-value of 20 µs.
8	<b>Alternating Discharge Current</b>	The rms value of an approximately sinusoidal alternating current passing through the gas discharge tube.
9	<b>Insulation Resistance</b>	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	<b>Capacitance</b>	The capacitance shall be measured once at 1 MHz between all terminals unless otherwise specified.

**Cautions and warnings**

- I Do not operate surge arresters in power supply networks, whose maximum operating voltage exceeds the minimum spark-over voltage of the surge arresters.
- I Surge arresters 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 Surge arresters must be handled with care and must not be dropped.
- I Do not continue to use damaged surge arresters.
- 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 surge arresters should be soldered within 24 month after shipment.

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