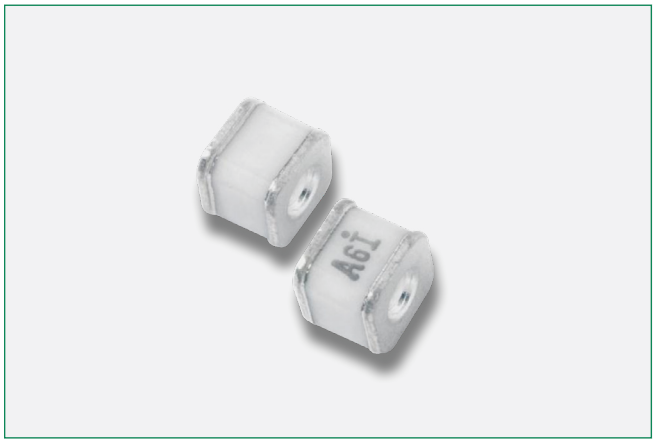
SH Series
Gas Discharge Tubes



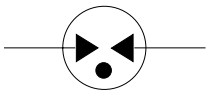
Additional Information

Resources | Accessories | Samples

Agency Approvals

Agency	Agency File Number
	E128662

Two Electrode GDT Graphical Symbol



Description

The Littelfuse SH Gas Discharge Tubes (GDT) series provides high levels of protection against fast rising transients caused by lightning disturbances. It has a surge rating of 5kA, 8/20µs. Offered in a Squared Surface Mount package, which helps to make pick and place on PCB process easier.

This GDT series is perfectly suited for broadband equipment applications. The GDT's low off-state capacitance is compatible with high bandwidth applications and this capacitance loading value does not vary if the voltage across the GDT changes.

The Littelfuse SH Gas Discharge Tube (GDT) series are specifically designed for protection of electrical, multimedia, and communication equipment against over voltage transients in surface mount assembly applications.

Features

- Excellent response to fast rising transients
- GHz working frequency
- 5kA, 8/20µs surge capability as defined by IEC 61000-4-5 2nd Edition
- UL Recognized
- Offered with squared body package
- Non-Radioactive
- Ultra Low capacitance (<0.7pF)
- Lead-free and RoHS compliant

Applications

- CATV equipment
- Antennas
- RS 485
- Telecom Base Station
- Power Supply AC Main
- G.fast
- 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

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SH Series
Gas Discharge Tubes

Electrical Characteristics

Part Number	Component Specifications (at 25°C)								Life Ratings				
	DC Breakdown in Volts (@100V/s)			Maximum Impulse Break-down Voltage		Maximum Impulse Discharge Current (8/20µs)	Insulation Resistance	Capacitance (@1MHz)	Impulse Discharge Current (8/20µs)	AC Dischage Current (50Hz, 1sec)	AC Dischage Current (9 Cycles @50Hz)	DC Holdover Voltage (<150ms)*	Impulse Life (10/1000µs) (100A)
	MIN	TYP	MAX	@100V/µs	1000V/µs	1 Time	MIN	MAX	MAX	MIN	MIN		MIN
SH75	60	75	90	600	700	6kA	1GΩ @50V	0.7pf	10 Shots @ (5kA) 1 Shot at 6kA**	5A	15A	52V	300 Shots
SH90	72	90	108	600	700							52V	
SH145	116	145	174	600	700		1GΩ @100V					52V	
SH230	186	230	276	600	700							80V	
SH250	200	250	300	600	700							135V	
SH300	240	300	360	650	800							135V	
SH350	280	350	420	750	900							135V	
SH400	360	400	480	850	1000							135V	
SH470	376	470	564	900	1100		1GΩ @250V					135V	
SH600	480	600	720	1000	1200							135V	

Note:
* Reference REA PE-80, 0.2A, tested to ITU-T Rec K.12 and REA PE 80 <150 ms.
** DC spark-over may exceed ± 25% after discharge, but will continue to protect without venting

Product Characteristics

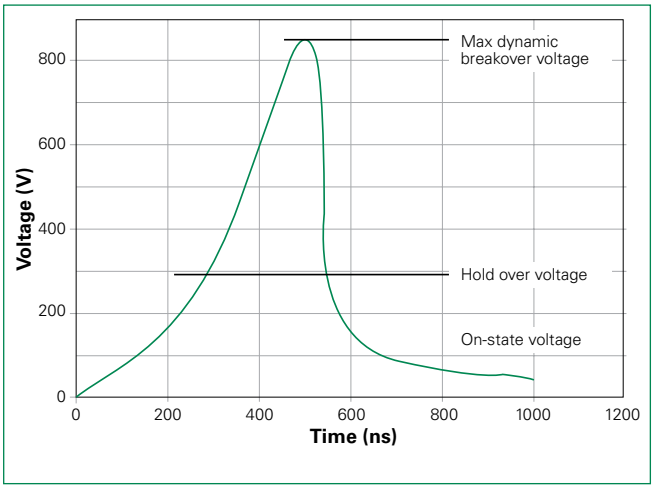
Materials	Device Tin Plated 3 -15 Microns Construction: Ceramic Insulator
Storage and Operational Temperature	-40 to +90°C

Typical Insertion Loss

@1.0GHz = 0.08dB
@1.4GHz = 0.16dB
@1.8GHz = 0.26dB
@2.0GHz = 0.33dB
@2.4GHz = 0.47dB
@2.8GHz = 0.59dB
@3.1GHz = 0.70dB
@3.5GHz = 0.89dB
@4.0GHz = 1.24dB

Note: Insertion data for customer reference only, application testing needed for verification.

Voltage Vs. Time Characteristic



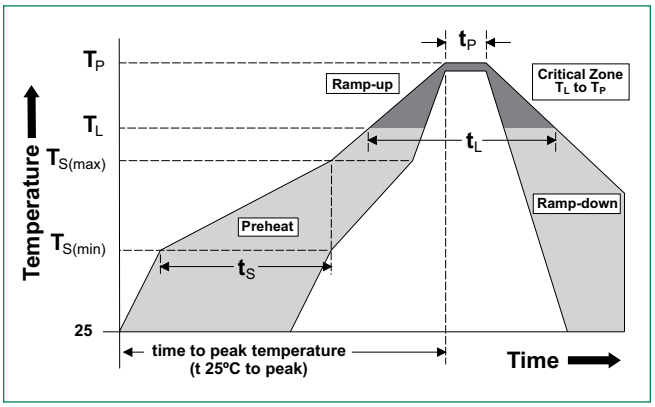
Note: Tested per 1kV/µs waveform

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SH Series
Gas Discharge Tubes

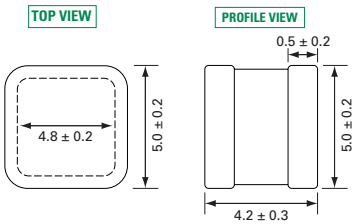
Soldering Parameters - Reflow Soldering (Surface Mount Devices)

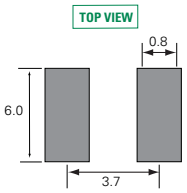
Reflow Condition		Pb – Free assembly
Pre Heat	**- Temperature Min ($T_{s(min)}$)**	150°C
	- Temperature Max ($T_{s(max)}$)	200°C
	- Time (Min to Max) (t_s)	60 – 180 secs
Average ramp up rate (Liquidus Temp (T_L) to peak		3°C/second max
$T_{S(max)}$ to T_L - Ramp-up Rate		5°C/second max
Reflow	**- Temperature (T_L) (Liquidus)**	217°C
	- Temperature (t_L)	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



Product Dimensions

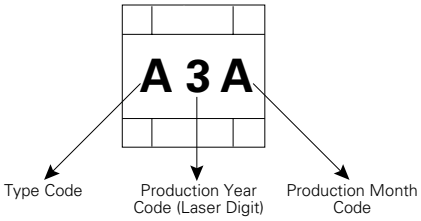
Dimensions in millimeters





Recommended Soldering Pad Layout

Product Marking



Type Code	
A	SH75
B	SH90
S	SH145
D	SH230
R	SH250
E	SH300
G	SH350
I	SH400
P	SH470
V	SH600

Month Code	
A	January
B	February
C	March
D	April
E	May
F	June
G	July
H	August
I	September
J	October
K	November
L	December

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SH Series
Gas Discharge Tubes

Part Numbering System and Ordering Information

SH XX

Series
Square GDT

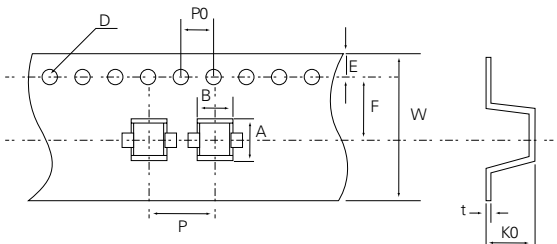
Breakdown Voltage
75 = 75V
90 = 90V
145 = 145V
230 = 230V
250 = 250V
300 = 300V
350 = 350V
400 = 400V
470 = 470V
600 = 600V

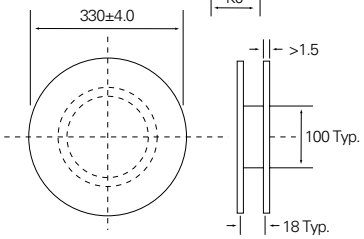
Taping and Reel Specifications

Taping

Unit = mm

Item	Spec	Item	Spec
P	12.0±0.1	D	Ø1.55±0.05
P0	4.0±0.1	W	16.0±0.3
A	5.4±0.1	K0	5.4±0.1
B	4.6±0.1	t	0.5±0.05





Packaging Quantity:
900 pcs per reel (13")
1 reel per inner box
10 inner boxes per carton
9,000 pcs per full carton

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