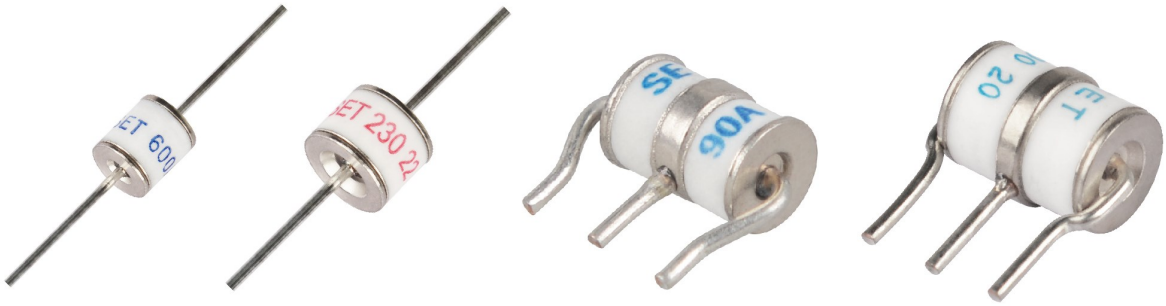
Gas Discharge Tube

DIP Type

GDT

- Fast Response
- Low Capacitance
- High Current Rating
- High Insulation Resistance
- Stable Performance Over Surface Life
- RoHS & REACH Compliant

Please refer to the datasheet of each series.



https://setsafe.com/Products/Over-Voltage-Protection/Gas-Discharge-Tube-GDT/DIP-Type.html

2024

SET safe | SET fuse

Providing a Total Solution for High Standard Safety Circuit Protection

Gas Discharge Tube（GDT）

Gas Discharge Tube (GDT) is a single-gap or multi-gap switching overvoltage protection device. Under normal circumstances, the GDT is in a high-impedance state; when suffer a surge, the GDT will change from a high-impedance state to a low-impedance state, and release the surge energy to the ground, reducing the residual voltage of the circuit, thereby protecting the equipment circuit or protect the human body from the hazards of transient overvoltage. GDT is formed by high-temperature sealing of metal electrodes, metallized ceramics, inert gas or other mixed gases.

Gas Discharge Tube (GDT) are widely used in overvoltage protection of signals, power supplies and various ports.

SETsafe | SETfuse's Gas Discharge Tube products have a voltage of 70 ~ 4500 V, a flow (@8/20 μs) 0.5 ~ 200 kA, a full range of safety certifications including: UL, cUL, TUV, and meet the RoHS, REACH requirements.

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Description, Feature, Applications, Structure Diagrams, Electrical Characteristics, Reference Curve for Spark-over Voltage, Curve for Impulse Discharge Current, Application Example, Recommended Hand-soldering Parameters, Wave Soldering Parameters, Reflow Soldering Parameters.

4.1 SDxxxx-L series 10

4.2 SFxxxx-L series 13

4.3 SExxxx-L series 16

4.4 TZxxxx-L series 19

4.5 TBxxxx-L series 22

4.6 TRxxxx-L series 25

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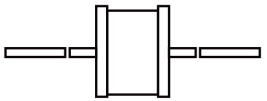
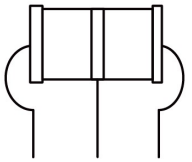
Gas Discharge Tube (GDT) Features & Model List Overview

DC Spark-over Voltage (V)	10	13	16	19	22	25	Page
4500	○	SF	SE	○	○	○	
4000	○	SF	SE	○	○	○	
3600	○	SF	SE	○	○	○	
3000	○	SF	SE	○	○	○	
2500	○	SF	SE	○	○	○	
2000	○	SF	SE	○	○	○	
1500	○	SF	SE	○	○	○	
1200	○	○	SE	○	○	○	
1000	○	SF	SE	○	○	○	
800	SD(-L)	SF	SE	○	○	○	
600	SD(-L)	SF	SE	TZ(-L)	TB	TR(-L)	
470	SD(-L)	SF	SE	TZ(-L)	TB	TR(-L)	
420	SD(-L)	SF	SE	TZ(-L)	TB	TR(-L)	
400	○	○	○	○	○	○	
350	SD(-L)	SF	SE	TZ(-L)	TB	TR(-L)	
300	○	○	○	○	○	○	
250	SD(-L)	SF	SE	○	○	○	
230	SD(-L)	SF	SE	TZ(-L)	TB	TR(-L)	
200	○	○	○	TZ(-L)	○	○	
150	SD(-L)	SF	SE	TZ(-L)	TB	TR(-L)	
90	SD(-L)	SF	SE	TZ(-L)	TB	TR(-L)	
75	SD(-L)	SF	SE	TZ(-L)	○	○	
70	SD(-L)	SF	SE	○	○	○	
Size (mm)	Φ5.0 × 5.0	Φ5.5 × 6.0	Φ8.0 × 6.0	7.6 × 5.0 × 5.0	Φ6.0 × 8.0	Φ8.0 × 10.0	
I_n (8/20 μs) (kA) Impulse Discharge Current	5	3 / 5 / 10	5 / 10 / 20	5 / 10	10	10 / 20	
Product Structure							
			DIP				

Model

+86 592-571-5838 www.SETsafe.com www.SETfuse.com E-mail : sales@SETfuse.com

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Glossary

Item	Description
V_s	**D.C.Spark-over Voltage** The voltage at which the GDT sparks over with slowly increasing d.c. voltage. — (IEC 61643-311)
V	**Impulse Spark-over Voltage** The highest Voltage which appears across the terminals of a GDT in the period between the application of an impulse of given wave-shape and the time when current begins to flow. — (ITU-T K.12)
V_a	**Arc Voltage** Voltage drop across the GDT during arc current flow. — (IEC 61643-311)
V_{gl}	**Glow Voltage** The peak value of the voltage drop across the GDT when a glow-current is flowing, It is sometimes called the glow mode voltage. — (ITU-T K.12)
8/20 μs	**8/20 Current Impulse** Current impulse with a nominal virtual front time of 8 μs and a nominal time to half-value of 20 μs. — (IEC 61643-11)
10/350 μs	**10/350 Current Impulse** Current impulse with a nominal virtual front time of 10 μs and a nominal time to half-value of 350 μs. — (IEC 61643-11)
1.2/50 μs	**1.2/50 Voltage Impulse** Voltage impulse with a nominal virtual front time of 1.2 μs and a nominal time to half-value of 50 μs. — (IEC 61643-11)
I	**Alternating Discharge Current** The r.m.s. value of an approximately sinusoidal alternating current passing through the gas discharge tube. — (ITU-T K.12)
I_n	**Nominal Discharge Current** Crest value of the current through the GDT having a current waveshape of 8/20 μs. — (IEC 61643-11)
I_{max}	**Maximum Discharge Current** Crest value of a current through the GDT having an 8/20 μs waveshape and magnitude according to the manufacturers specification. I_{max} is equal to or greater than I_n. — (IEC 61643-11)

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I_{imp}	**Impulse Discharge Current** Crest value of a discharge current through the SPD with specified charge transfer Q and specified energy W/R in the specified time. — (IEC 61643-11)
U_p	**Voltage Protection Level** Maximum voltage to be expected at the SPD terminals due to an impulse stress with defined voltage steepness and an impulse stress with a discharge current with given amplitude and waveshape. — (GB 18802.11、IEC 61643-11)
U_C	**maximum r.m.s. voltage** Which may be continuously applied to the SPD's mode of protection. — (IEC 61643-11)
I_f	**follow current** Peak current supplied by the electrical power system and flowing through the SPD after a discharge current impulse. — (IEC 61643-11)
class I	**class I tests** Tests carried out with the impulse discharge current Iimp, with an 8/20 current impulse with a crest value equal to the crest value of Iimp, and with a 1.2/50 voltage impulse. — (IEC 61643-11)
class II	**class II tests** Tests carried out with the nominal discharge current I_n, and the 1.2/50μs voltage impulse. — (IEC 61643-11)

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GDT
Gas Discharge Tube

ATTENTION

Usage

1. Do not operate GDT in power supply networks, whose maximum operation voltage exceeds the minimum spark-overvoltage of the GDT.
2. The GDT 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.
3. If the contacts of GDT are defective, current load can cause sparks and loud noises.
4. When air pressure is from 55 kPa to 106 kPa. The relative altitude shall be +5000 m to –500 m.

Replacement

The GDT is a non-repairable product. For safety sake, please use equivalent GDT for replacement.

Storage

The packaged GDT should be placed in a dry, ventilation and non-corrosive environment.

Installation Position

Do not install the GDT in a touchable position.

Mechanical Stress

Do not take violent action such as knocking when assembling, to avoid product failure.

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GDT
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Features

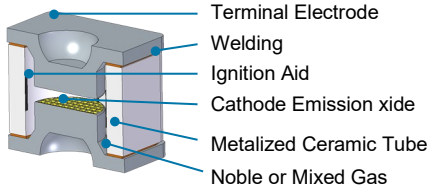
- Fast Response
- Stable Performance Over Surface Life
- High Current Rating
- Low Capacitance
- High Insulation Resistance
- RoHS & REACH Compliant

Applications

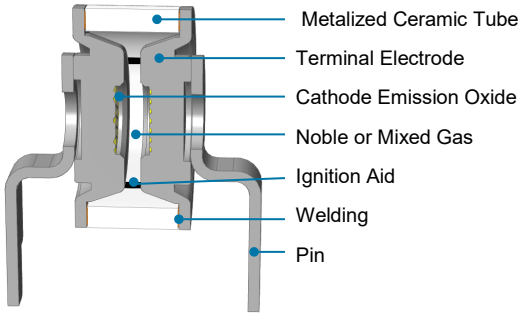
- WLAN XDSL
- CATV
- MDF
- Ethernet
- BTS (Base Station)
- Power Supply
- Antenna and RF
- Consumer Electronics
- Class Ⅰ、Class Ⅱ and SPD
- N-PE Mode Protection In AC Power

Structure

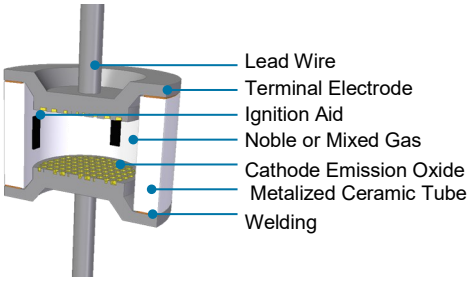
SMD Type



High Surge Type



DIP Type



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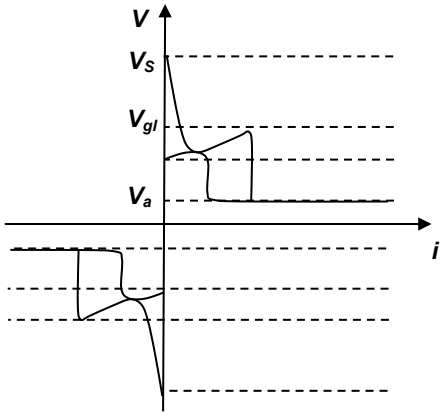
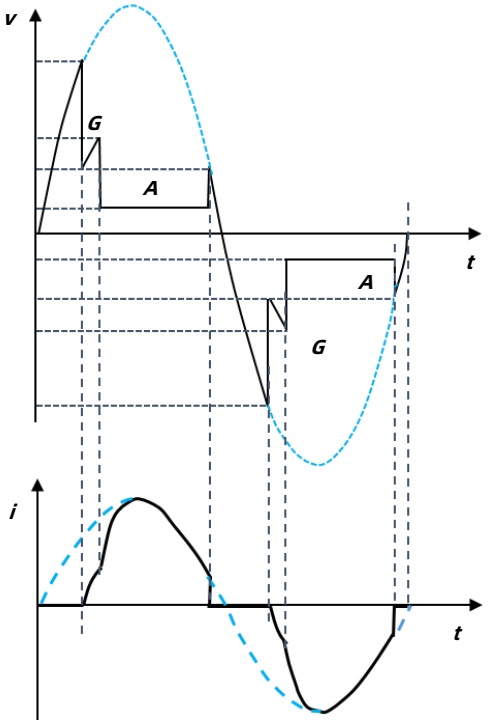
Electrical Characteristics



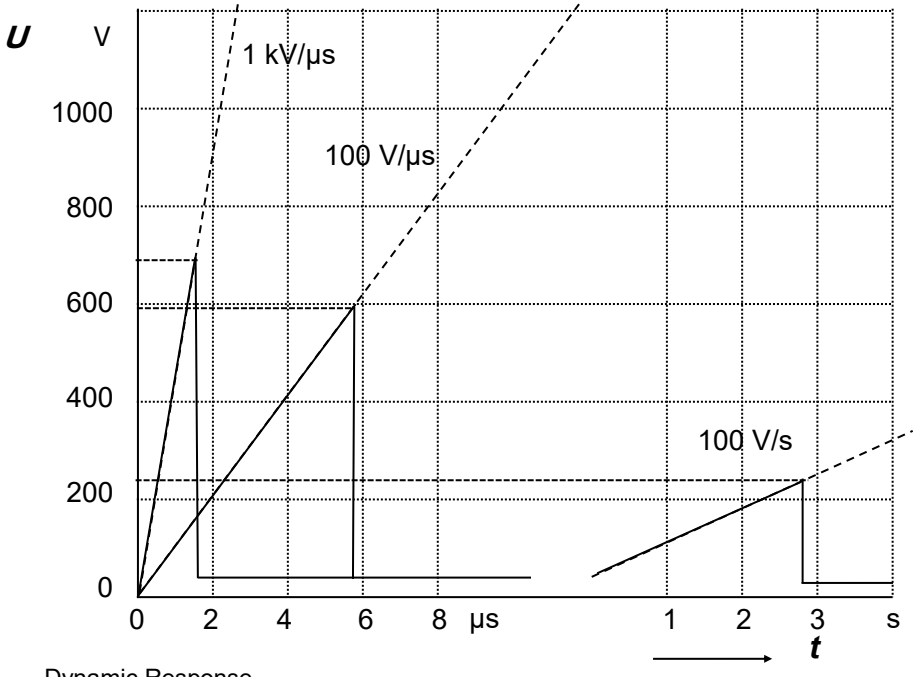
Relationship between Current and Voltage



Time Variation Patterns of Voltage and Current

V_s : Spark-over Voltage
Vgl: Glow Voltage
Va : Arc Voltage
G : Glow Mode
A : Arc Mode

Reference Curve for Spark-over Voltage (Refer to 230 VDC)



Dynamic Response
Impulse Spark-over Voltage
(100 V/μs,1 kV/μs)

Static Response
D.C. Spark-over Voltage (100 V/s)

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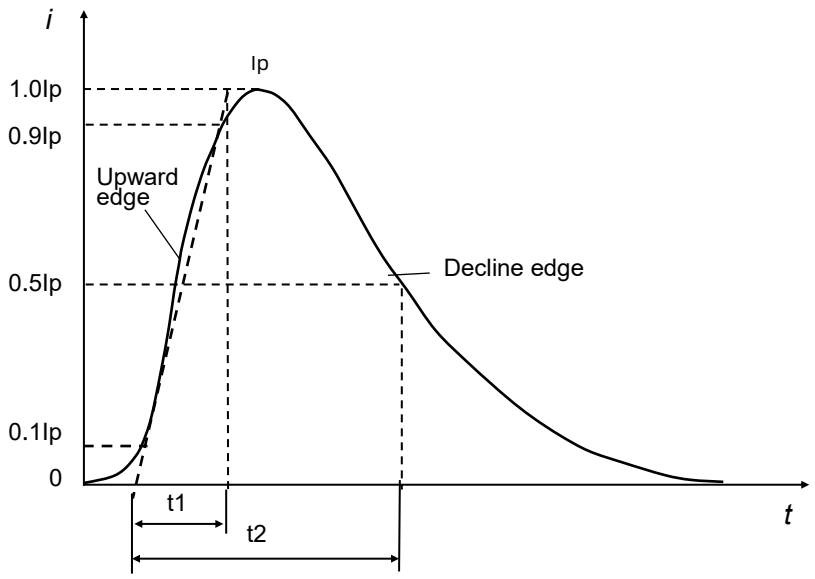
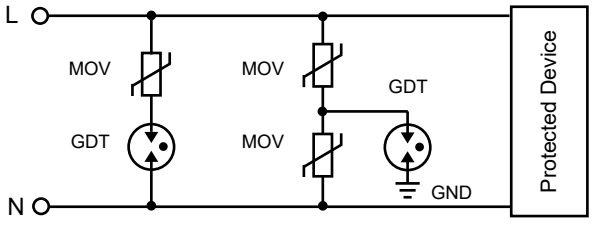
Curve for Impulse Discharge Current (For Reference Only)



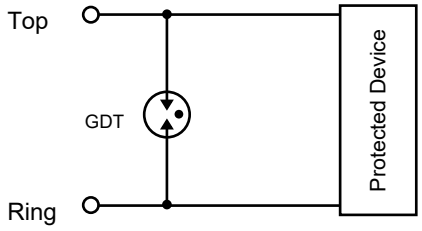
I_p: Peak current
t_1: Rise time in μs
t_2: Delay time to half value in μs

Application Example (For Reference Only)

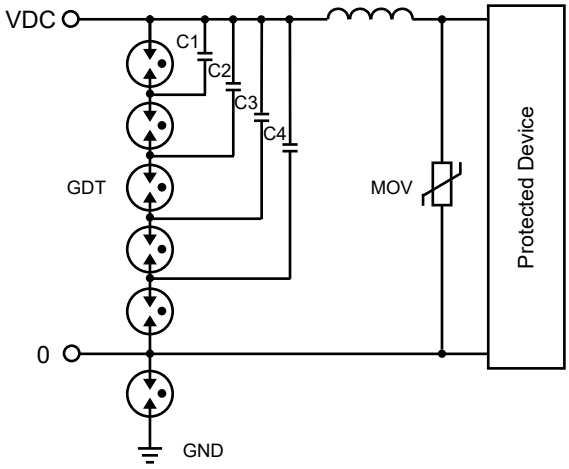
AC Power Protection



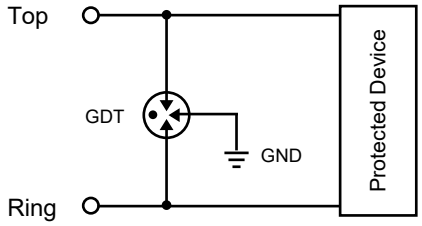
2-Electrod GDT Signal Circuit Protection



DC Power Protection



3-Electrod GDT Signal Circuit Protection



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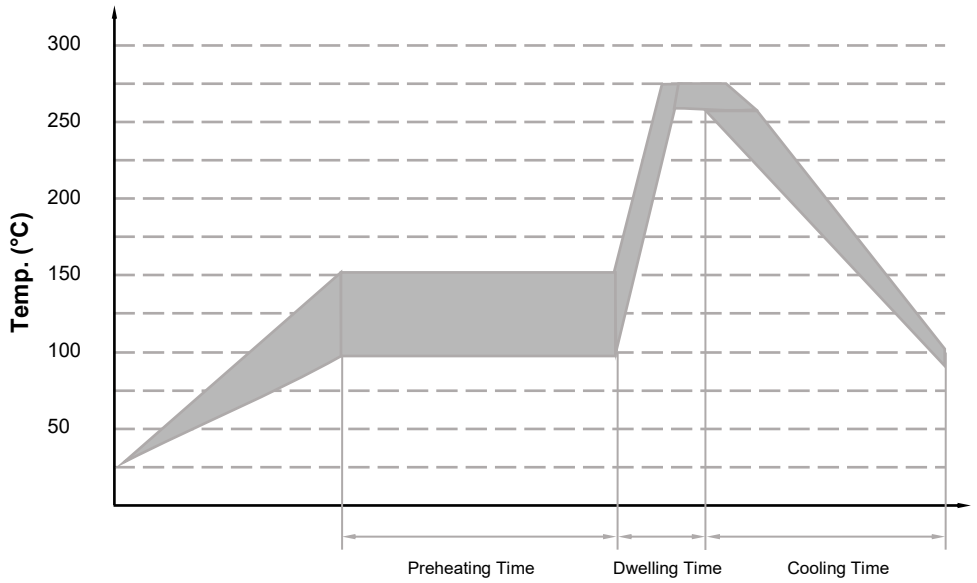
Recommended Hand-soldering Parameters (For Reference Only)

Items	Condition
Soldering Iron Temperature	350 °C (Max.)
Soldering Time	4 s (Max.)
Space between soldering point and product body	According to the guidance method

Wave Soldering Parameters (For Reference Only)



Item	Temp. (°C)	Time (s)
Preheating	90 to 150	< 150
Dwelling	255 to 280	3 to 10

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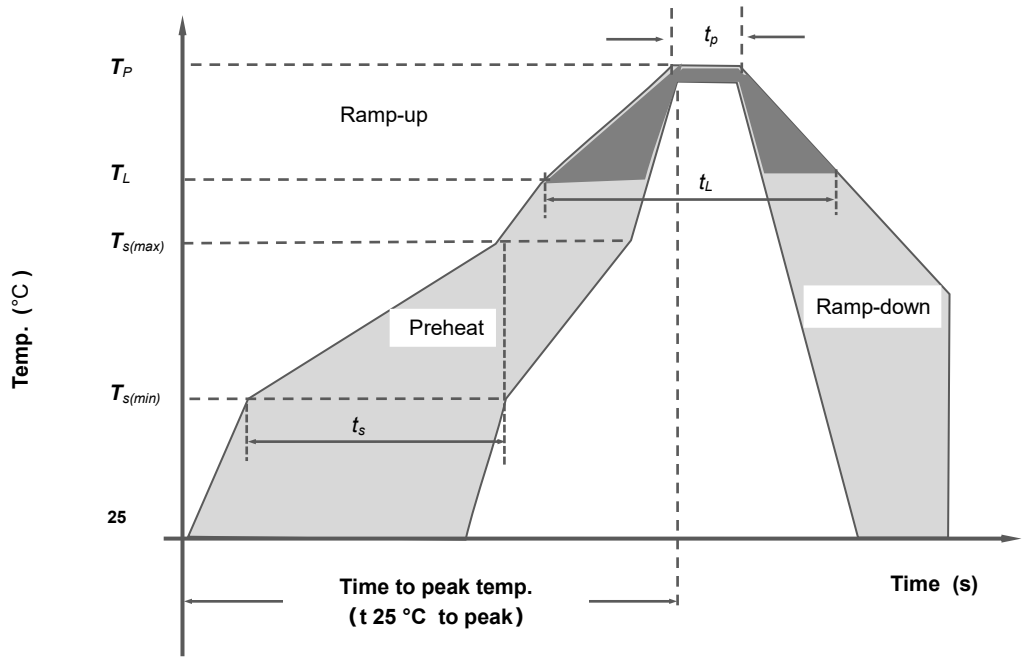
Reflow Soldering Parameters (For Reference Only)



Reflow Condition		Pb-Free Assembly
Preheat	Temp. Min $T_{s(min)}$	150 °C
	Temp. Max $T_{s(max)}$	200 °C
	Time (Min to Max) t_s	(60 to 180) s
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	Temp. (T_L) (Liquidus)	217 °C
	Temp. (t_L)	(60 to 150) s
Peak Temp. (T_P)		(255 to 260) °C
Time within 5 °C of actual peak Temp. (t_P)		(10 to 30) s
Ramp-down Rate		6 °C / second max
Time 25 °C to peak Temp. (T_P)		8 minutes max
Do not exceed		260 °C

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Description

Gas Discharge Tube (GDT) is a single-gap or multi-gap switching overvoltage protection device. Under normal circumstances, the GDT is in a high-impedance state; when suffer a surge, the GDT will change from a high-impedance state to a low-impedance state, and release the surge energy to the ground, reducing the residual voltage of the circuit, thereby protecting the equipment circuit or protect the human body from the hazards of transient overvoltage. GDT is formed by high-temperature sealing of metal electrodes, metallized ceramics, inert gas or other mixed gases.

Features

- Fast Response
- Stable Performance Over Surface Life
- High Current Rating
- Low Capacitance
- High Insulation Resistance
- RoHS & REACH Compliant

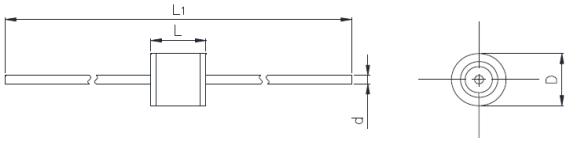
Agency Information

Agency Symbol	Standards	The File No. and certification No. obtained by SETsafe | SETfuse
	UL497B	E513446

Applications

- WLAN XDSL
- CATV
- MDF
- Ethernet
- BTS (Base Station)
- Power Supply
- Antenna and RF
- Consumer Electronics

Dimensions (mm)



L	L_1	D	d
5.0 ± 0.3	62.0 ± 3.0	Φ5 ± 0.2	Φ0.8 ± 0.05

Part Numbering System

SD 091 A - L

- L: Lead Type (L: Lead wire, Brank: Without Lead Wire)
- A: Impulse Discharge Current (T: 3 kA , A: 5 kA, M: 10 kA)
- 091: D.C. Spark-over Voltage (100 V/s) (091: 9×10^1)
- SD: Series: SD (Φ 5.0 × 5.0 mm)

Reminder:
Part numbering system in the datasheet is only for selecting correct parameter and product features. Before placing order, please contact us for specifications and use the part number and product code in the specifications to place order to ensure the part is correct. Product code is the unique indentification.

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Specifications

Model	D.C. Spark-over Voltage @100 V/s	Tolerance of V_s	Impulse Spark-over Voltage @1 kV/μs	Arc Voltage @0.5 A	Impulse Discharge Current @8/20 μs	Alternating Discharge Current @50Hz 1 s	Insulation Resistance		Capacitance 0.5 VDC @ 1MHz	Agency Approvals	
	Vs	*Vs*	*V*	*Va*	*In*	*I*	*VDC*	*IR*	*C*		
	V	V	V	V	kA	A (r.m.s.)	V	GΩ	(pF)	UL497B	TUV
SD071A - L	70	52 ~ 88	≤ 650	≈ 8	5	5	25	≥ 1	≤ 1.0	●	○
SD075A - L	75	57 ~ 93	≤ 650	≈ 8	5	5	25	≥ 1	≤ 1.0	●	○
SD091A - L	90	72 ~ 108	≤ 600	≈ 8	5	5	50	≥ 1	≤ 1.0	●	○
SD151A - L	150	120 ~ 180	≤ 600	≈ 10	5	5	50	≥ 1	≤ 1.0	●	○
SD231A - L	230	184 ~ 276	≤ 700	≈ 12	5	5	100	≥ 1	≤ 1.0	●	○
SD251A - L	250	200 ~ 300	≤ 800	≈ 12	5	5	100	≥ 1	≤ 1.0	●	○
SD351A - L	350	280 ~ 420	≤ 1000	≈ 12	5	5	100	≥ 1	≤ 1.0	●	○
SD421A - L	420	336 ~ 504	≤ 1000	≈ 15	5	5	100	≥ 1	≤ 1.0	●	○
SD471A - L	470	376 ~ 564	≤ 1200	≈ 15	5	5	100	≥ 1	≤ 1.0	●	○
SD601A - L	600	480 ~ 720	≤ 1400	≈ 15	5	5	100	≥ 1	≤ 1.0	●	○
SD801A - L	800	640 ~ 960	≤ 1600	≈ 15	5	5	100	≥ 1	≤ 1.0	●	○

Note:
1. The above parameters based on ITU - T K12 & IEC61643.311 standards.
2. "●" means GDT has gained the certification.
   "○" means GDT is no certification.

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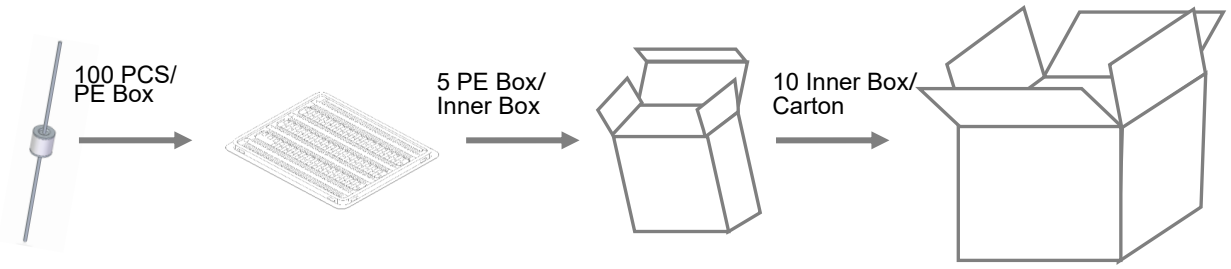
Packaging Information

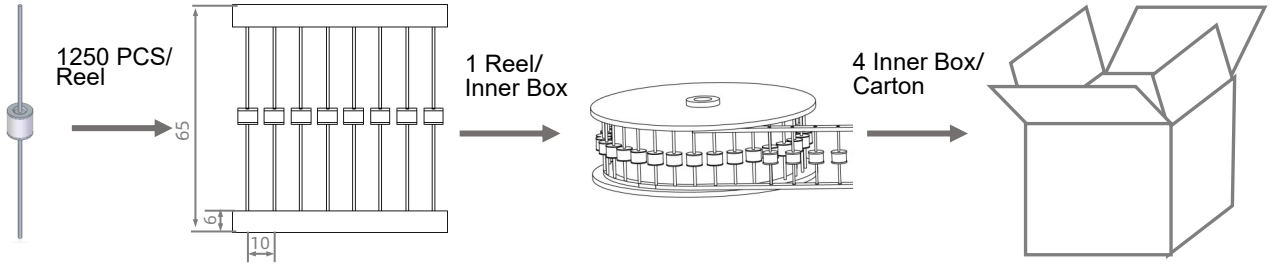
1. PE Box Package（DIP）

Item	PE Box	Inner Box	Carton
Dimensions (mm)	215 × 205 × 10.5	230 × 210 × 60	440 × 230 × 325
Quantity (PCS)	100	500	5000
Notes: Packaging dimensions and quantity are for reference only.			



2. Tape & Reel (DIP)

Item	Reel	Inner Box	Carton
Dimensions (mm)	Φ340 × 73	345 × 345 × 80	360 × 360 × 360
Quantity (PCS)	1250	1250	5000
Notes: Packaging dimensions and quantity are for reference only.			



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Agency Information

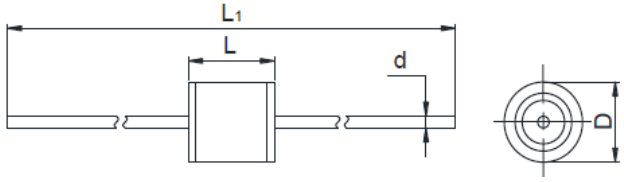
Agency Symbol	Standards	The File No. and certification No. obtained by SETsafe | SETfuse
	UL1449	E322662
	UL497B	E513446
	TUV	No.B107221003 Rev00

Applications

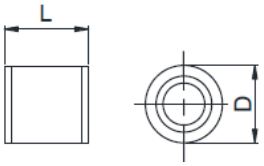
- WLAN XDSL
- CATV
- MDF
- Ethernet
- BTS (Base Station)
- Power Supply
- Antenna and RF
- Consumer Electronics

Dimensions (mm)

Leaded “L” Type Straight “Axial” Devices



Core Devices



L_1	L	D	d
62.0 ± 3.0	6.0 ± 0.5	Φ5.5 ± 0.5	0.8 ± 0.05

Part Numbering System

SF 601 A - L

- L: Lead Type (L: Lead wire, Brank: Without Lead Wire)
- A: Impulse Discharge Current (T: 3 kA , A: 5 kA, M: 10 kA)
- 601: D.C. Spark-over Voltage (100 V/s) (601: 60×10^1)
- SF: Series: SF (Φ 5.5× 6.0 mm)

Reminder:
Part numbering system in the datasheet is only for selecting correct parameter and product features. Before placing order, please contact us for specifications and use the part number and product code in the specifications to place order to ensure the part is correct. Product code is the unique indentification.

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Specifications

Model	D.C. Spark-over Voltage @100 V/s	Tolerance of V_s	Impulse Spark-over Voltage @1 kV/μs	Arc Voltage @0.5 A	Impulse Discharge Current @8/20 μs	Alternating Discharge Current @50Hz 1 s	Insulation Resistance		Capacitance 0.5 VDC @ 1MHz	Agency Approvals		
	Vs	*Vs*	*V*	*Va*	*In*	*I*	*VDC*	*IR*	*C*			
	V	V	V	V	kA	A (r.m.s.)	V	GΩ	(pF)	UL497B	UL1449	TUV
SF075A - *	75	57 ~ 93	≤ 650	≈ 8	5	5	50	≥ 1	≤ 1.0	●	N/A	●
SF091A - *	90	72 ~ 108	≤ 600	≈ 8	5	5	50	≥ 1	≤ 1.0	●	N/A	●
SF151A - *	150	120 ~ 180	≤ 600	≈ 10	5	5	50	≥ 1	≤ 1.0	●	N/A	●
SF231A - *	230	184 ~ 276	≤ 700	≈ 12	5	5	100	≥ 1	≤ 1.0	●	N/A	●
SF251A - *	250	200 ~ 300	≤ 700	≈ 12	5	5	100	≥ 1	≤ 1.0	●	N/A	●
SF351A - *	350	280 ~ 420	≤ 1000	≈ 12	5	5	100	≥ 1	≤ 1.0	●	N/A	●
SF421A - *	420	336 ~ 504	≤ 1000	≈ 15	5	5	100	≥ 1	≤ 1.0	●	N/A	●
SF471A - *	470	376 ~ 564	≤ 1200	≈ 15	5	5	100	≥ 1	≤ 1.0	●	N/A	●
SF601A - *	600	480 ~ 720	≤ 1400	≈ 15	5	5	100	≥ 1	≤ 1.0	●	N/A	●
SF801A - *	800	640 ~ 960	≤ 1600	≈ 15	5	5	100	≥ 1	≤ 1.0	●	N/A	●
SF102A - *	1000	800 ~ 1200	≤ 2000	≈ 18	5	5	100	≥ 1	≤ 1.0	N/A	○	●
SF152A - *	1500	1200 ~ 1800	≤ 2800	≈ 18	5	3	100	≥ 1	≤ 1.0	N/A	○	●
SF075M - *	75	57 ~ 93	≤ 650	≈ 8	10	5	25	≥ 1	≤ 1.0	●	N/A	●
SF091M - *	90	72 ~ 108	≤ 600	≈ 8	10	5	50	≥ 1	≤ 1.0	●	N/A	●
SF151M - *	150	120 ~ 180	≤ 600	≈ 10	10	5	50	≥ 1	≤ 1.0	●	N/A	●
SF231M - *	230	184 ~ 276	≤ 700	≈ 12	10	5	100	≥ 1	≤ 1.0	●	N/A	●
SF251M - *	250	200 ~ 300	≤ 700	≈ 12	10	5	100	≥ 1	≤ 1.0	●	N/A	●
SF351M - *	350	280 ~ 420	≤ 1000	≈ 12	10	5	100	≥ 1	≤ 1.0	●	N/A	●
SF421M - *	420	336 ~ 504	≤ 1000	≈ 15	10	5	100	≥ 1	≤ 1.0	●	N/A	●
SF471M - *	470	376 ~ 564	≤ 1200	≈ 15	10	5	100	≥ 1	≤ 1.0	●	N/A	●
SF601M - *	600	480 ~ 720	≤ 1400	≈ 15	10	5	100	≥ 1	≤ 1.0	●	N/A	●
SF801M - *	800	640 ~ 960	≤ 1600	≈ 15	10	5	100	≥ 1	≤ 1.0	●	N/A	●
SF202T - *	2000	1600 ~ 2400	≤ 4000	≈ 18	3	3	100	≥ 1	≤ 1.0	●	●	●
SF252T - *	2500	2000 ~ 3000	≤ 4000	≈ 20	3	3	100	≥ 1	≤ 1.0	N/A	●	●
SF302T - *	3000	2400 ~ 3600	≤ 4500	≈ 20	3	3	100	≥ 1	≤ 1.0	N/A	●	●
SF362T - *	3600	2880 ~ 4320	≤ 5000	≈ 20	3	3	100	≥ 1	≤ 1.0	N/A	●	●
SF402T - *	4000	3200 ~ 4800	≤ 5500	≈ 20	3	3	100	≥ 1	≤ 1.0	N/A	○	●
SF452T - *	4500	3600 ~ 5400	≤ 6000	≈ 20	3	3	100	≥ 1	≤ 1.0	N/A	○	●

Note:
1. The above parameters based on ITU - T K12 & IEC61643.311 standards.
2. "●" means GDT has gained the certification. "○" means GDT is no certification.
3. "*" Means different wire type, such as "L" means lead wire, Lead Brank mean without Lead Wire

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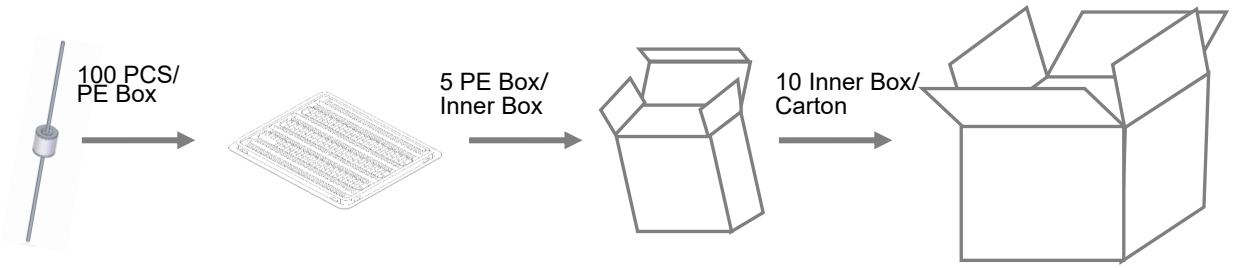
Packaging Information

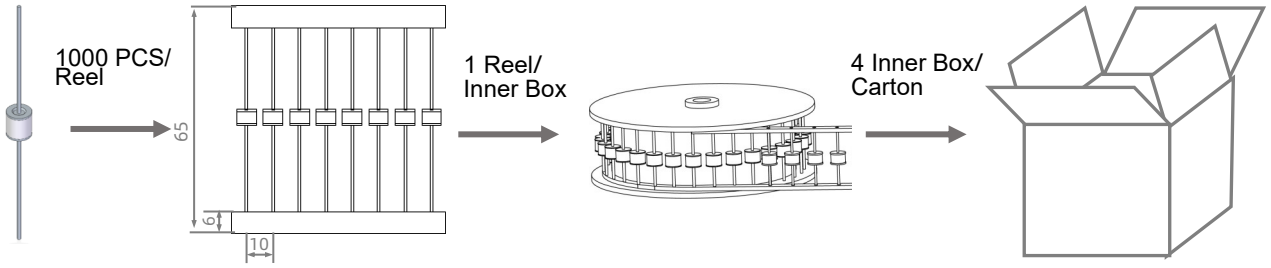
1. PE Box Package（DIP）

Item	PE Box	Inner Box	Carton
Dimensions (mm)	215 × 205 × 10.5	230 × 210 × 60	440 × 230 × 325
Quantity (PCS)	100	500	5000
Notes: Packaging dimensions and quantity are for reference only.			



2. Tape & Reel (DIP)

Item	Reel	Inner Box	Carton
Dimensions (mm)	Φ340 × 73	345 × 345 × 80	360 × 360 × 360
Quantity (PCS)	1000	1000	4000
Notes: Packaging dimensions and quantity are for reference only.			



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Description

Gas Discharge Tube (GDT) is a single-gap or multi-gap switching overvoltage protection device. Under normal circumstances, the GDT is in a high-impedance state; when suffer a surge, the GDT will change from a high-impedance state to a low-impedance state, and release the surge energy to the ground, reducing the residual voltage of the circuit, thereby protecting the equipment circuit or protect the human body from the hazards of transient overvoltage. GDT is formed by high-temperature sealing of metal electrodes, metallized ceramics, inert gas or other mixed gases.

Features

- Fast Response
- Stable Performance Over Surface Life
- High Current Rating
- Low Capacitance
- High Insulation Resistance
- RoHS & REACH Compliant

Agency Information

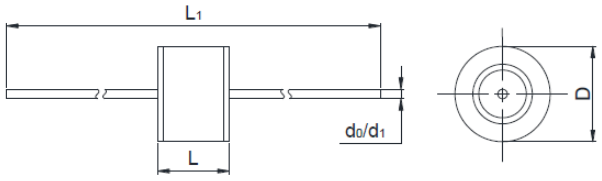
Agency Symbol	Standards	The File No. and certification No. obtained by SETsafe | SETfuse
	UL1449	E322662
	UL497B	E513446
	TUV	No.B107221003 Rev00

Applications

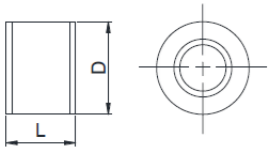
- WLAN XDSL
- CATV
- MDF
- Ethernet
- BTS (Base Station)
- Power Supply
- Antenna and RF
- Consumer Electronics

Dimensions (mm)

Leaded “L” Type Straight “Axial” Devices



Core Devices



L_1	L	D	d_0 ①	d_1 ②
62.0 ± 3.0	6.0 ± 0.5	Φ8.0 ± 0.5	0.8 ± 0.05	1.0 ± 0.05

Remarks:
① This size is for In = 10 kA and below.
② This size is specific for In = 20 kA.

Part Numbering System

SE 601 H - L

- L: Lead Type (L: Lead wire, Brank: Without Lead Wire)
- H: Impulse Discharge Current (A: 5 kA , M: 10 kA, H: 20 kA)
- 601: D.C. Spark-over Voltage (100 V/s) (601: 60×10^1)
- SE: Series: SE (Φ 8.0× 6.0 mm)

Reminder:
Part numbering system in the datasheet is only for selecting correct parameter and product features. Before placing order, please contact us for specifications and use the part number and product code in the specifications to place order to ensure the part is correct. Product code is the unique indentification.

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Specifications

Model	D.C. Spark-over Voltage @100 V/s	Tolerance of V_s	Impulse Spark-over Voltage @1 kV/μs	Arc Voltage @0.5 A	Impulse Discharge Current @8/20 μs	Alternating Discharge Current @50Hz 1 s	Insulation Resistance		Capacitance 0.5 VDC @ 1MHz	Agency Approvals		
	Vs	*Vs*	*V*	*Va*	*In*	*I*	*VDC*	*IR*	*C*			
	V	V	V	V	kA	A (r.m.s.)	V	GΩ	(pF)	UL497B	UL1449	TUV
SE075M - *	75	57~ 93	≤ 650	≈ 8	10	10	25	≥ 1	≤ 1.5	●	N/A	●
SE091M - *	90	72 ~ 108	≤ 600	≈ 8	10	10	50	≥ 1	≤ 1.5	●	N/A	●
SE151M - *	150	120 ~ 180	≤ 600	≈ 10	10	10	50	≥ 1	≤ 1.5	●	N/A	●
SE231M - *	230	184 ~ 276	≤ 700	≈ 12	10	10	100	≥ 1	≤ 1.5	●	N/A	●
SE251M - *	250	200 ~ 300	≤ 700	≈ 12	10	10	100	≥ 1	≤ 1.5	●	N/A	●
SE351M - *	350	280 ~ 420	≤ 1000	≈ 12	10	10	100	≥ 1	≤ 1.5	●	N/A	●
SE421M - *	420	336 ~ 504	≤ 1000	≈ 15	10	10	100	≥ 1	≤ 1.5	●	N/A	●
SE471M - *	470	376 ~ 564	≤ 1200	≈ 15	10	10	100	≥ 1	≤ 1.5	●	N/A	●
SE601M - *	600	480 ~ 720	≤ 1400	≈ 15	10	10	100	≥ 1	≤ 1.5	●	N/A	●
SE801M - *	800	640 ~ 960	≤ 1600	≈ 15	10	10	100	≥ 1	≤ 1.5	●	N/A	●
SE102M - *	1000	800 ~ 1200	≤ 2000	≈ 18	10	10	100	≥ 1	≤ 1.5	N/A	●	●
SE152M - *	1500	1200 ~ 1800	≤ 2800	≈ 18	10	10	100	≥ 1	≤ 1.5	N/A	●	●
SE202M - *	2000	1600 ~ 2400	≤ 4000	≈ 18	10	10	100	≥ 1	≤ 1.5	N/A	●	●
SE075H - *	75	57~ 93	≤ 650	≈ 8	20	20	25	≥ 1	≤ 1.5	●	N/A	●
SE091H - *	90	72 ~ 108	≤ 600	≈ 8	20	20	50	≥ 1	≤ 1.5	●	●	●
SE151H - *	150	120 ~ 180	≤ 600	≈ 10	20	20	50	≥ 1	≤ 1.5	●	N/A	●
SE231H - *	230	184 ~ 276	≤ 700	≈ 12	20	20	100	≥ 1	≤ 1.5	●	N/A	●
SE251H - *	250	200 ~ 300	≤ 700	≈ 12	20	20	100	≥ 1	≤ 1.5	●	N/A	●
SE351H - *	350	280 ~ 420	≤ 1000	≈ 12	20	20	100	≥ 1	≤ 1.5	●	N/A	●
SE421H - *	420	336 ~ 504	≤ 1000	≈ 12	20	20	100	≥ 1	≤ 1.5	●	N/A	●
SE471H - *	470	376 ~ 564	≤ 1200	≈ 12	20	20	100	≥ 1	≤ 1.5	●	N/A	●
SE601H - *	600	480 ~ 720	≤ 1400	≈ 15	20	20	100	≥ 1	≤ 1.5	●	●	●
SE801H - *	800	640 ~ 960	≤ 1600	≈ 15	20	20	100	≥ 1	≤ 1.5	●	●	●
SE202A - *	2000	1600 ~ 2400	≤ 4000	≈ 18	5	3	100	≥ 1	≤ 1.5	N/A	○	●
SE252A - *	2500	2000 ~ 3000	≤ 4000	≈ 20	5	3	100	≥ 1	≤ 1.5	N/A	●	●
SE302A - *	3000	2400 ~ 3600	≤ 4500	≈ 20	5	3	100	≥ 1	≤ 1.5	N/A	●	●
SE362A - *	3600	2880 ~ 4320	≤ 5000	≈ 20	5	3	100	≥ 1	≤ 1.5	N/A	●	●
SE402A - *	4000	3200 ~ 4800	≤ 5500	≈ 20	5	3	100	≥ 1	≤ 1.5	N/A	○	●
SE452A - *	4500	3600 ~ 5400	≤ 6000	≈ 20	5	3	100	≥ 1	≤ 1.5	N/A	○	●

Note:

1. The above parameters based on ITU - T K12 & IEC61643.311 standards.
2. "●" means GDT has gained the certification. "○" means GDT is no certification.
3. "*" Means different wire type, such as "L" means lead wire, Lead Brank mean without Lead Wire.

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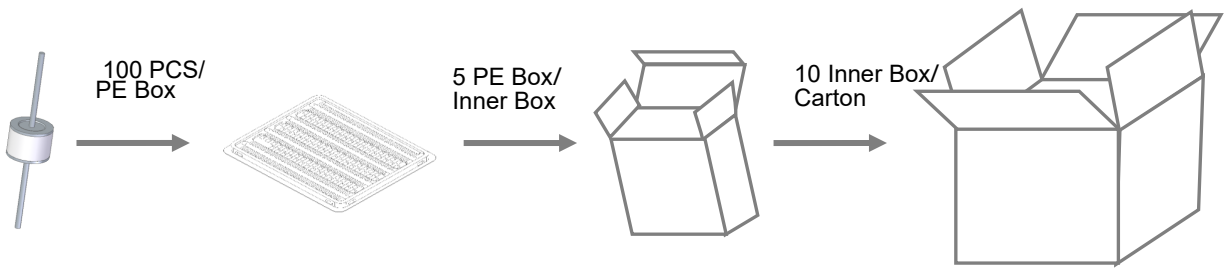
Packaging Information

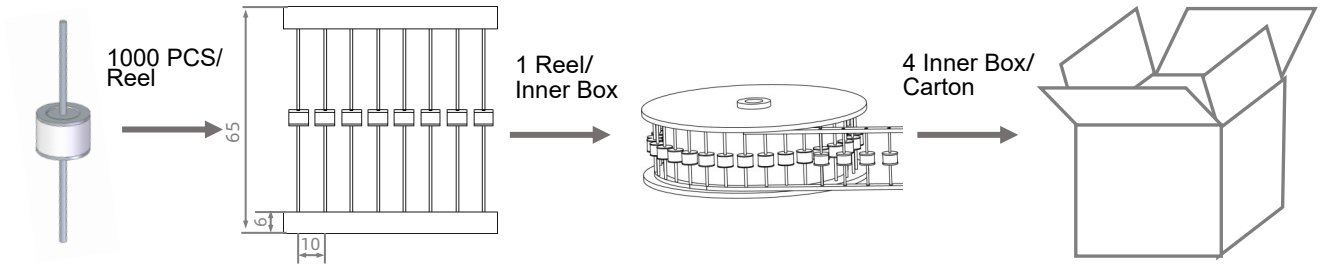
1. PE Box Package（DIP）

Item	PE Box	Inner Box	Carton
Dimensions (mm)	215 × 205 × 10.5	230 × 210 × 60	440 × 230 × 325
Quantity (PCS)	100	500	5000
Notes: Packaging dimensions and quantity are for reference only.			



2. Tape & Reel (DIP)

Item	Reel	Inner Box	Carton
Dimensions (mm)	Φ340 × 73	345 × 345 × 80	360 × 360 × 360
Quantity (PCS)	1000	1000	4000
Notes: Packaging dimensions and quantity are for reference only.			



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Description

Gas Discharge Tube (GDT) is a single-gap or multi-gap switching overvoltage protection device. Under normal circumstances, the GDT is in a high-impedance state; when suffer a surge, the GDT will change from a high-impedance state to a low-impedance state, and release the surge energy to the ground, reducing the residual voltage of the circuit, thereby protecting the equipment circuit or protect the human body from the hazards of transient overvoltage. GDT is formed by high-temperature sealing of metal electrodes, metallized ceramics, inert gas or other mixed gases.

Features

- Fast Response
- Stable Performance Over Surface Life
- High Current Rating
- Low Capacitance
- High Insulation Resistance
- RoHS & REACH Compliant

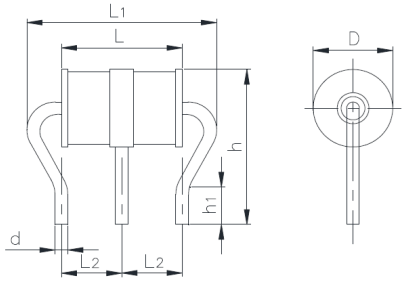
Agency Information

Agency Symbol	Standards	The File No. and certification No. obtained by SETsafe | SETfuse
	UL497B	E513446

Applications

- WLAN XDSL
- CATV
- MDF
- Ethernet
- BTS (Base Station)
- Power Supply
- Antenna and RF
- Consumer Electronics

Dimensions (mm)



L	L1	D	d
7.6 ± 0.2	12.5 max	Φ5.0 ± 0.2	0.8
L2	**h**	**h_1**	
3.8 ± 0.3	10 ± 1.5	2.2	

Part Numbering System

TZ 091 A - L

- L: Lead Type (L: Lead wire, Brank: Without Lead Wire)
- A: Impulse Discharge Current (T: 3 kA , A: 5 kA, M: 10 kA)
- 091: D.C. Spark-over Voltage (100 V/s) (091: 9×10^1)
- TZ: Series: TZ (Φ 5.0 × 7.6 mm)

Reminder:
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Specifications

Model	D.C. Spark-over Voltage @100 V/s	Tolerance of V_s	Impulse Spark-over Voltage @1 kV/μs	Arc Voltage @0.5 A	Impulse Discharge Current @8/20 μs	Alternating Discharge Current @50Hz 1 s	Insulation Resistance		Capacitance 0.5 VDC @ 1MHz	Agency Approvals	
	V_s	V_s	V	V_a	I_n	I	V_{DC}	IR	C	®	TUV
	V	V	V	V	kA	A (r.m.s.)	V	GΩ	(pF)	UL497B	TUV
TZ071A - L	70	53 ~ 87	≤ 650	≈ 8	5	5	25	≥ 1	≤ 1.0	●	○
TZ075A - L	75	57 ~ 93	≤ 650	≈ 8	5	5	25	≥ 1	≤ 1.0	●	○
TZ091A - L	90	72 ~ 108	≤ 600	≈ 8	5	5	50	≥ 1	≤ 1.0	●	○
TZ151A - L	150	120 ~ 180	≤ 600	≈ 10	5	5	50	≥ 1	≤ 1.0	●	○
TZ231A - L	230	184 ~ 276	≤ 700	≈ 12	5	5	100	≥ 1	≤ 1.0	●	○
TZ251A - L	250	200 ~ 300	≤ 700	≈ 12	5	5	100	≥ 1	≤ 1.0	●	○
TZ351A - L	350	280 ~ 420	≤ 1000	≈ 12	5	5	100	≥ 1	≤ 1.0	●	○
TZ421A - L	420	336 ~ 504	≤ 1000	≈ 15	5	5	100	≥ 1	≤ 1.0	●	○
TZ471A - L	470	376 ~ 564	≤ 1200	≈ 15	5	5	100	≥ 1	≤ 1.0	●	○
TZ601A - L	600	480 ~ 720	≤ 1400	≈ 15	5	5	100	≥ 1	≤ 1.0	●	○
TZ071M - L	70	53 ~ 88	≤ 650	≈ 8	10	10	25	≥ 1	≤ 1.0	●	○
TZ075M - L	75	57 ~ 93	≤ 650	≈ 8	10	10	25	≥ 1	≤ 1.0	●	○
TZ091M - L	90	72 ~ 108	≤ 600	≈ 8	10	10	50	≥ 1	≤ 1.0	●	○
TZ151M - L	150	120 ~ 180	≤ 600	≈ 10	10	10	50	≥ 1	≤ 1.0	●	○
TZ231M - L	230	184 ~ 276	≤ 700	≈ 12	10	10	100	≥ 1	≤ 1.0	●	○
TZ251M - L	250	200 ~ 300	≤ 700	≈ 12	10	10	100	≥ 1	≤ 1.0	●	○
TZ351M - L	350	280 ~ 420	≤ 1000	≈ 12	10	10	100	≥ 1	≤ 1.0	●	○
TZ421M - L	420	336 ~ 504	≤ 1000	≈ 15	10	10	100	≥ 1	≤ 1.0	●	○
TZ471M - L	470	376 ~ 564	≤ 1200	≈ 15	10	10	100	≥ 1	≤ 1.0	●	○
TZ601M - L	600	480 ~ 720	≤ 1400	≈ 15	10	10	100	≥ 1	≤ 1.0	●	○

Note:
1. The above parameters based on ITU - T K12 & IEC61643.311 standards.
2. "●" means GDT has gained the certification.
   "○" means GDT is no certification.

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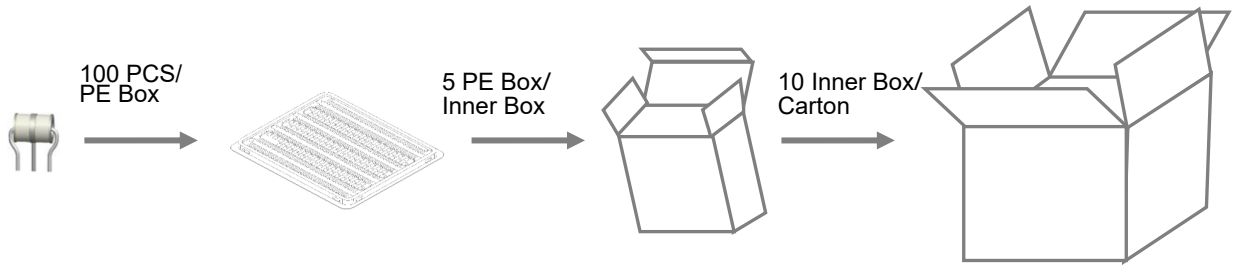
Packaging Information

PE Box Package（DIP）

Item	PE Box	Inner Box	Carton
Dimensions (mm)	215 × 205 × 10.5	230 × 210 × 60	440 × 250 × 325
Quantity (PCS)	100	500	5000
Notes: Packaging dimensions and quantity are for reference only.			



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Description

Gas Discharge Tube (GDT) is a single-gap or multi-gap switching overvoltage protection device. Under normal circumstances, the GDT is in a high-impedance state; when suffer a surge, the GDT will change from a high-impedance state to a low-impedance state, and release the surge energy to the ground, reducing the residual voltage of the circuit, thereby protecting the equipment circuit or protect the human body from the hazards of transient overvoltage. GDT is formed by high-temperature sealing of metal electrodes, metallized ceramics, inert gas or other mixed gases.

Features

- Fast Response
- Stable Performance Over Surface Life
- High Current Rating
- Low Capacitance
- High Insulation Resistance
- RoHS & REACH Compliant

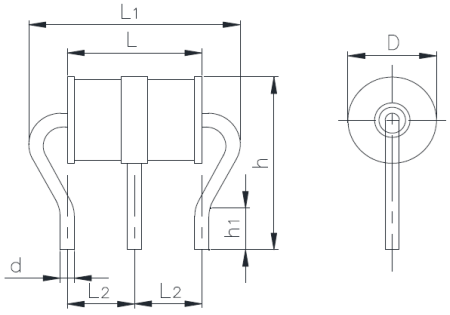
Agency Information

Agency Symbol	Standards	The File No. and certification No. obtained by SETsafe | SETfuse
	UL497B	E513446

Applications

- WLAN XDSL
- CATV
- MDF
- Ethernet
- BTS (Base Station)
- Power Supply
- Antenna and RF
- Consumer Electronics

Dimensions (mm)



D	h	L	d
Φ6.0 ± 0.2	10.0 ± 1.0	8.0 ± 0.2	Φ0.8 ± 0.1
h_1	L_1	L_2	
2.5	12.5 Max	4.4 ± 0.3	

Part Numbering System

TB 601 M - L

- L: Lead Type (L: Lead wire, Brank: Without Lead Wire)
- M: Impulse Discharge Current (A: 5 kA , M: 10 kA, H: 20 kA)
- 601: D.C. Spark-over Voltage (100 V/s) (601: 60×10^1)
- TB: Series: TB (Φ 6.0 × 8.0 mm)

Reminder:
Part numbering system in the datasheet is only for selecting correct parameter and product features. Before placing order, please contact us for specifications and use the part number and product code in the specifications to place order to ensure the part is correct. Product code is the unique indentification.

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Specifications

Model	D.C. Spark-over Voltage @100 V/s	Tolerance of V_s	Impulse Spark -over Voltage @1 kV/μs	Arc Voltage @0.5 A	Impulse Discharge Current @8/20 μs	Alternating Discharge Current @50Hz 1 s	Insulation Resistance		Capacitance 0.5 VDC @ 1MHz	Agency Approvals	
	Vs	*Vs*	*V*	*Va*	*In*	*I*	*VDC*	*IR*	*C*		
	V	V	V	V	kA	A (r.m.s.)	V	GΩ	(pF)	UL497B	TUV
TB075A - L	75	57~ 93	≤ 650	≈ 8	5	5	25	≥ 1	≤ 1.0	○	○
TB091A - L	90	72 ~ 108	≤ 600	≈ 8	5	5	50	≥ 1	≤ 1.0	○	○
TB151A - L	150	120 ~ 180	≤ 600	≈ 10	5	5	50	≥ 1	≤ 1.0	○	○
TB231A - L	230	184 ~ 276	≤ 700	≈ 12	5	5	100	≥ 1	≤ 1.0	○	○
TB251A - L	250	200 ~ 300	≤ 700	≈ 12	5	5	100	≥ 1	≤ 1.0	○	○
TB351A - L	350	280 ~ 420	≤ 1000	≈ 12	5	5	100	≥ 1	≤ 1.0	○	○
TB421A - L	420	336 ~ 504	≤ 1000	≈ 15	5	5	100	≥ 1	≤ 1.0	○	○
TB471A - L	470	376 ~ 564	≤ 1200	≈ 15	5	5	100	≥ 1	≤ 1.0	○	○
TB601A - L	600	480 ~ 720	≤ 1400	≈ 15	5	5	100	≥ 1	≤ 1.0	○	○
TB075M - L	75	57~ 93	≤ 650	≈ 8	10	5	25	≥ 1	≤ 1.0	●	○
TB091M - L	90	72 ~ 108	≤ 600	≈ 8	10	10	50	≥ 1	≤ 1.0	●	○
TB151M - L	150	120 ~ 80	≤ 600	≈ 10	10	10	50	≥ 1	≤ 1.0	●	○
TB231M - L	230	184 ~ 276	≤ 700	≈ 12	10	10	100	≥ 1	≤ 1.0	●	○
TB251M - L	250	200 ~ 300	≤ 700	≈ 12	10	10	100	≥ 1	≤ 1.0	●	○
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TB421M - L	420	336 ~ 504	≤ 1000	≈ 15	10	10	100	≥ 1	≤ 1.0	●	○
TB471M - L	470	376 ~ 564	≤ 1200	≈ 15	10	10	100	≥ 1	≤ 1.0	●	○
TB601M - L	600	480 ~ 720	≤ 1200	≈ 15	10	10	100	≥ 1	≤ 1.0	●	○

Note:
1. The above parameters based on ITU - T K12 & IEC61643.311 standards.
2. "●" means GDT has gained the certification.
   "○" means GDT is no certification.

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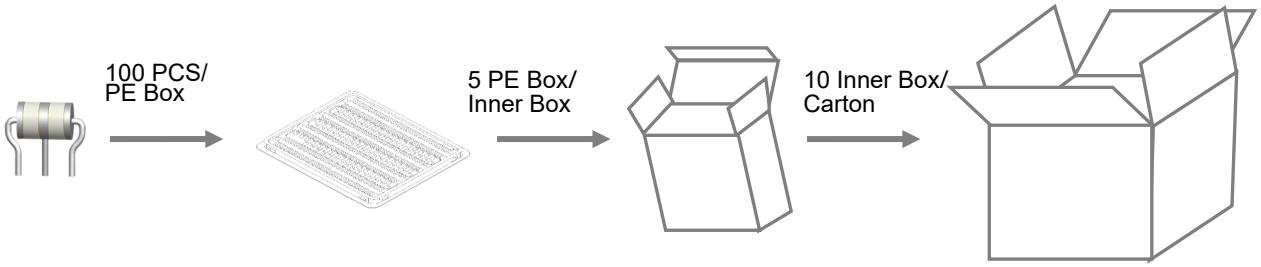
Packaging Information

PE Box Package（DIP）

Item	PE Box	Inner Box	Carton
Dimensions (mm)	215 × 205 × 10.5	230 × 210 × 60	440 × 250 × 325
Quantity (PCS)	100	500	5000
Notes: Packaging dimensions and quantity are for reference only.			



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Description

Gas Discharge Tube (GDT) is a single-gap or multi-gap switching overvoltage protection device. Under normal circumstances, the GDT is in a high-impedance state; when suffer a surge, the GDT will change from a high-impedance state to a low-impedance state, and release the surge energy to the ground, reducing the residual voltage of the circuit, thereby protecting the equipment circuit or protect the human body from the hazards of transient overvoltage. GDT is formed by high-temperature sealing of metal electrodes, metallized ceramics, inert gas or other mixed gases.

Features

- Fast Response
- Stable Performance Over Surface Life
- High Current Rating
- Low Capacitance
- High Insulation Resistance
- RoHS & REACH Compliant

Agency Information

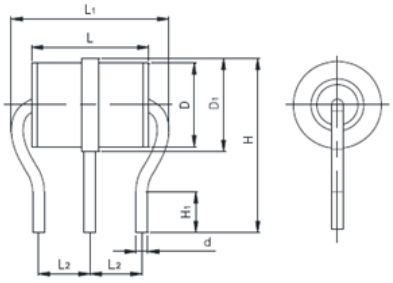
Agency Symbol	Standards	The File No. and certification No. obtained by SETsafe | SETfuse
	UL497B	E513446

Applications

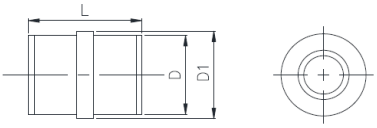
- WLAN XDSL
- CATV
- MDF
- Ethernet
- BTS (Base Station)
- Power Supply
- Antenna and RF
- Consumer Electronics

Dimensions (mm)

Leaded “L” Type Straight “Axial” Devices



Core Devices



D	H	L	d
7.2	15.0 ± 1.0	10.0 ± 0.2	1.0 ± 0.1
D_1	H_1	L_1	L_2
Φ8.0 ± 0.2	3.5	13.4 Max	4.4 ± 0.3

Part Numbering System

TR 601 M - L

- L: Lead Type (L: Lead wire, Brank: Without Lead Wire)
- M: Impulse Discharge Current (A: 5 kA , M: 10 kA, H: 20 kA)
- 601: D.C. Spark-over Voltage (100 V/s) (601: 60 × 10^1)
- TR: Series: TR (Φ 8.0 × 10.0 mm)

Reminder:
Part numbering system in the datasheet is only for selecting correct parameter and product features. Before placing order, please contact us for specifications and use the part number and product code in the specifications to place order to ensure the part is correct. Product code is the unique indentification.

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Specifications

Model	D.C. Spark-over Voltage @100 V/s	Tolerance of V_s	Impulse Spark-over Voltage @1 kV/μs	Arc Voltage @0.5 A	Impulse Discharge Current @8/20 μs	Alternating Discharge Current @50Hz 1 s	Insulation Resistance		Capacitance 0.5 VDC @ 1MHz	Agency Approvals	
	V_s	V_s	V	V_a	I_n	I	V_{DC}	IR	C	®	TUV
	V	V	V	V	kA	A (r.m.s.)	V	GΩ	(pF)	UL497B	TUV
TR075M - *	75	57~ 93	≤ 650	≈ 8	10	10	50	≥ 1	≤ 1.0	●	○
TR091M - *	90	72 ~ 108	≤ 600	≈ 8	10	10	50	≥ 1	≤ 1.0	●	○
TR151M - *	150	120 ~ 180	≤ 600	≈ 10	10	10	50	≥ 1	≤ 1.0	●	○
TR231M - *	230	184 ~ 276	≤ 700	≈ 12	10	10	100	≥ 1	≤ 1.0	●	○
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TR421M - *	420	336 ~ 504	≤ 1000	≈ 15	10	10	100	≥ 1	≤ 1.0	●	○
TR471M - *	470	376 ~ 564	≤ 1200	≈ 15	10	10	100	≥ 1	≤ 1.0	●	○
TR601M - *	600	480 ~ 720	≤ 1400	≈ 15	10	10	100	≥ 1	≤ 1.0	●	○
TR075H - *	75	57~ 93	≤ 650	≈ 8	20	10	50	≥ 1	≤ 1.0	●	○
TR091H - *	90	72 ~ 108	≤ 600	≈ 8	20	20	50	≥ 1	≤ 1.0	●	○
TR151H - *	150	120 ~ 180	≤ 600	≈ 10	20	20	50	≥ 1	≤ 1.0	●	○
TR231H - *	230	184 ~ 276	≤ 700	≈ 12	20	20	100	≥ 1	≤ 1.0	●	○
TR251H - *	250	200 ~ 300	≤ 700	≈ 12	20	10	100	≥ 1	≤ 1.0	●	○
TR351H - *	350	280 ~ 420	≤ 1000	≈ 12	20	20	100	≥ 1	≤ 1.0	●	○
TR421H - *	420	336 ~ 504	≤ 1000	≈ 15	20	20	100	≥ 1	≤ 1.0	●	○
TR471H - *	470	376 ~ 564	≤ 1200	≈ 15	20	20	100	≥ 1	≤ 1.0	●	○
TR601H - *	600	480 ~ 720	≤ 1400	≈ 15	20	20	100	≥ 1	≤ 1.0	●	○

Note:
1. The above parameters based on ITU - T K12 & IEC61643.311 standards.
2. "●" means GDT has gained the certification.
   "○" means GDT is no certification.
3. "*" Means different wire type, such as "L" means lead wire, Lead Brank mean without Lead Wire

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Packaging Information

PE Box Package（DIP）

Item	PE Box	Inner Box	Carton
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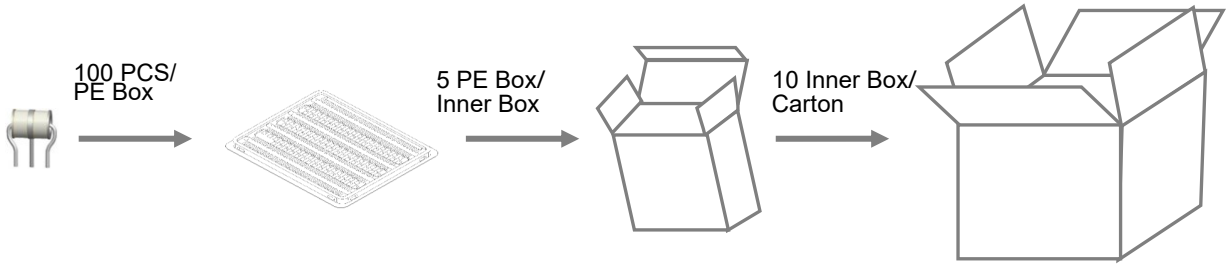

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