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## 规格书

SPECIFICATION  
FOR  
APPROVAL

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产品名称 Product Name	气体放电管 Gas Discharge Tube (GDT)
产品型号 Model No.	SF091M-SMD
产品编码 Product Code	110000000xxxx
产品描述 Product Description	SMD, 方电极圆瓷管, 管体 6×6×6 mm, 卷盘料带装。 SMD, Tube Body 6×6×6 mm, Tape & Reel.
冲击放电电流 Impulse Discharge Current	10 kA (8/20 μs)
认证 Agency Approval	UL、TUV
制造商 Manufacturer	厦门赛尔特电子股份有限公司 Xiamen SET Electronics Co.,Ltd.
产地 Country of Origin	中国 China

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## 客户批准 CUSTOMER APPROVAL

客户名称 Customer Name					
客户料号 Customer P/N					
结论 Conclusion	<input type="checkbox"/> 合格 (承认) Qualified <input type="checkbox"/> 不合格 Unqualified 不合格原因: Root Cause:				
生效日期 Effective Date	年 YY 月 MM 日 DD				
Name:	Date:	Name:	Date:	Name:	Date:
经办 Prepared By	审核 Reviewed By	核准 Approved By			

1、如果本规格获得你们的批准, 请签名并拷贝一份副本给赛尔特。

IF YOU APPROVE THIS SPECIFICATION, PLEASE SIGN AND RETURN ONE COPY TO SETsafe | SETfuse.

2、给赛尔特下订单时, 请在订单中列出上述表格中的: 产品型号、产品编码对应的内容。

PLEASE WRITE THE RELATED PRODUCT MODEL, PRODUCT CODE SHOWN IN THE ABOVE SPECIFICATION INTO THE PURCHASING ORDER(PO) THAT YOU PROVIDE TO SETsafe | SETfuse.

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## 1 适用范围 Applicable Scope

本承认书适用于型号为 SF091M-SMD 的气体放电管。

The specification is applicable for GDT, and the product mode is SF091M-SMD.

## 2 术语 Glossary

### 2.1 气体放电管 Gas Discharge Tube

密封于放电介质中（不处于大气压力下的空气中）的一个间隙或几个间隙，用于保护设备或人身或两者同时免受瞬时大电压的危害。

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.

### 2.2 直流击穿电压 D.C.Spark-over Voltage

施加缓慢升高的直流电压时，从高阻抗状态转变为导通状态时刻的电压。

The voltage at which the gas discharge tube sparks over with slowly increasing d.c. voltage.

### 2.3 标称直流击穿电压 Normal D.C.Spark-over Voltage

由制造商规定的，用来表明气体放电管（型号标记）并且指出它在被保护设备的使用条件下的应用范围。直流击穿电压的容差极限值也是对标称直流击穿电压而言的。

The voltage specified by the manufacturer to designate the gas discharge tube (type designation) and to indicate its application with respect to the service conditions of the installation to be protected. Tolerance limits of the d.c. spark-over voltage are also referred to the nominal d.c. spark-over voltage.

### 2.4 冲击击穿电压 Impulse Spark-over Voltage

从施加给定波形的冲击起直至开始有电流流通的这段时间内，气体放电管两端子上出现的最高电压。

The highest voltage which appears across the terminals of a gas discharge tube in the period between the applications of an impulse of given wave-shape and the time when current begins to flow.

### 2.5 交流放电电流 Alternating Discharge Current

流经气体放电管的近似正弦交流电流的有效值。

The r.m.s. value of an approximately sinusoidal alternating current passing through the gas discharge tube.

### 2.6 标称交流放电电流 Nominal Discharge Current

在规定时间内，气体放电管允许流过频率为 15 Hz~62 Hz 之间的交流放电电流的设计值。

For currents with a frequency of 15 Hz to 62 Hz, the alternating discharge current which the gas discharge tube is designed to carry for a defined time.

- 2.7** 冲击放电电流 Impulse Discharge Current  
流经气体放电管冲击电流的峰值。  
The peak value of the impulse current passing through the gas discharge tube.
- 2.8** 标称冲击放电电流 Normal Impulse Discharge Current  
气体放电管额定的具有规定的电流—时间波形的冲击电流峰值。  
The peak value of the impulse current with a defined wave-shape with respect to time for which the gas discharge tube is rated.
- 2.9** 弧光电压 Arc Voltage  
在阻抗最低状态或弧光模式下测得的跨越放电管的电压。  
The voltage measured across the tube while in lowest impedance state or arc mode.
- 2.10** 过保持电压 Holdover Voltage  
在规定的电路条件下，气体放电管经过一次冲击放电后，可望清除并恢复至高阻抗时放电管两端最大的直流电压。  
The maximum d.c. voltage across the terminals of a gas discharge tube under which it may be expected to clear and to return to the high impedance state after the passage of a surge, under specified circuit conditions.
- 2.11** 辉光电压 Glow Voltage  
辉光电流流经期间，跨越 GDT 的电压降的峰值。它有时也被称为辉光模式电压。  
The peak value of the voltage drop across the GDT when a glow-current is flowing. It is sometimes called the glow mode voltage.
- 2.12** 续流遮断时间 Current turn-off time  
在导通一段时间后，气体放电管自身恢复到非导通状态所需的时间。  
The time required for the gas discharge tube to return itself to a non-conducting state following a period of conduction.
- 2.13** 电容 Capacitance  
气体放电管的每个端子对其余各端子间的电容。  
Capacitance of each terminal of the gas discharge tube against the remaining terminals.
- 2.14** 绝缘电阻 Insulation resistance  
气体放电管的每个端子对其余各端子间的电阻。  
Resistance of each terminal of the gas discharge tube against the remaining terminals.

### 3 结构符号 Structure and Symbol

#### 3.1 结构和符号 Structure and Symbol

产品结构：在有电极和金属化陶瓷组成腔体内充入一定比例惰性混合气体，经过高温焊接形成的密闭器件，后期根据客户需要在两端电极焊接引线或不同连接。

Product structure: the vacuum component is filled with the fit Noble or mixed gas between the metal electrode and the metallized ceramic and welding them together by the high temperature and whether subjoin the wire and connection shape according to customer's requirement.



Tin-plated

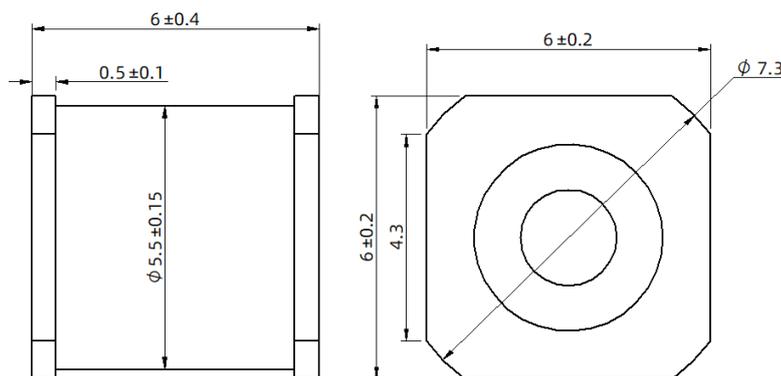


#### 3.2 主要原材料明细 Main Material List

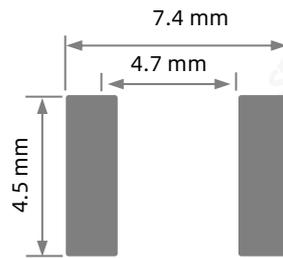
编号 No.	零件名 Part Name	材质 Materials
1	端电极 Terminal electrode	铜 Cu
2	金属化瓷管 Metal Ceramic Tube	95瓷 Al <sub>2</sub> O <sub>3</sub> 95%
3	焊料 Welding	银铜合金 AgCu28
4	惰性及混合气体 Noble or mixed gas	氖氩及相应的混合气体 Ne、Ar or mixed gas

#### 3.3 尺寸 Dimensions (mm)

未注明公差按 GB1804-f 级 (Not specified tolerances according to GB1804-f level)



### 3.4 焊盘推荐尺寸 Recommendation Pad Size



## 4 特性和应用 Features and Application

### 特性 Features

- 快速的响应 Fast response
- 性能稳定 Stable performance Over life
- 高电流 High current rating
- 低电容 Low capacitance
- 高绝缘性 High insulation resistance

### 主要应用 Application

- 电源 Power & SPD
- 线路保护 Data line/Card
- 消费电子 Consumer electronic

## 5 安规认证 Agency Approval

认证标志 Agency	标准 Standards	认证号 File No.	类别 Category
	UL 497B	E513446	QVGQ2
	IEC61643-311:2013	No.B107221003 Rev00	N/A

## 6 环保 Environment

环保 Environment	指令号 Order No.	指令 Order
RoHS	2015/863/EU	满足 RoHS 指令 Meet the RoHS
REACH	1907/2006/EC	满足 REACH 法规 Meet the REACH

气体放电管不含任何放射性物质。

Gas discharge tubes shall not contain radioactive material.

## 7 技术参数 Specifications

技术条款 Technical Item	参数值 Specifications	单位 Unit
<b>直流击穿电压 (100 V/s) ①②</b>		
D.C. Spark-over Voltage (100 V/s)	90	V
Min.~Max.	72~108	V
<b>冲击击穿电压 Impulse Spark-over Voltage</b>		
For 99% of Measured Value at 1 kV/us	$\leq 600$	V
Typical Values of Distribution	$\leq 550$	V
<b>耐电流能力 Life Test Current</b>		
Operation 10 times 50 Hz 1 s③	5	A
Operation 10 times ( $\pm 5$ times) at 8/20 $\mu$ s ③	10	kA
Operation 1 times at 8/20 $\mu$ s④	15	kA
<b>绝缘电阻 (50 VDC) Insulation Resistance at 50 VDC</b>	$\geq 1.0$	G $\Omega$
<b>电容 (1 MHz) Capacitance at 1 MHz</b>	$\leq 1.0$	pf
<b>弧光电压 (1 A) Arc Voltage at 1 A</b>	$\approx 8$	V
<b>工作温度 Operating Temperature</b>	-40 ~ +125	$^{\circ}$ C
<b>重量 Weight</b>	$\approx 0.87$	g
<b>标记 Marking Blue Positive</b>	<b>SET 90M YY</b> SET Logo 90 D.C. Spark-over Voltage M Impulse Discharge Current YY Year of Production	

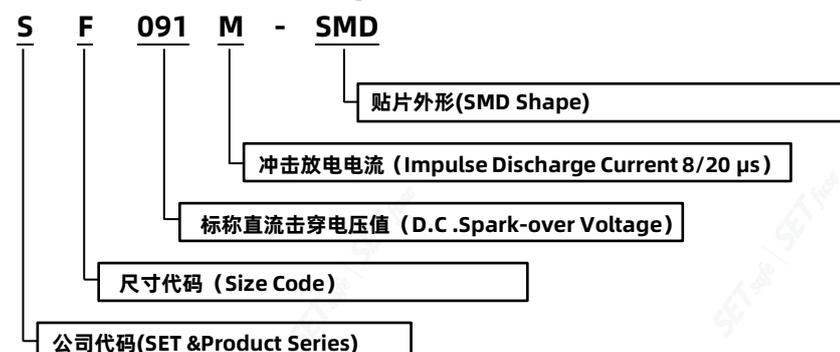
\*① At delivery AQL 0.65 level GB/T2828.1-2003 or DIN ISO 2859.

\*② In ionized mode.

\*③ Terms and current waveforms in accordance with ITU-T Rec. K.12 and IEC61643-311 or GB9043.

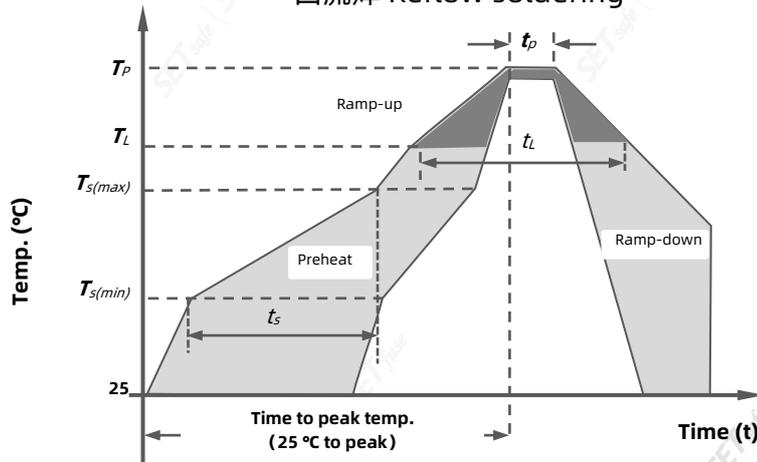
\*④ D.C.Spark-over voltage may exceed  $\pm 25\%$  after discharge, but will continue to protect without venting.

## 8 型号命名规则 (Ordering Code and Rules)



## 9 推荐焊接条件 Soldering Conditions

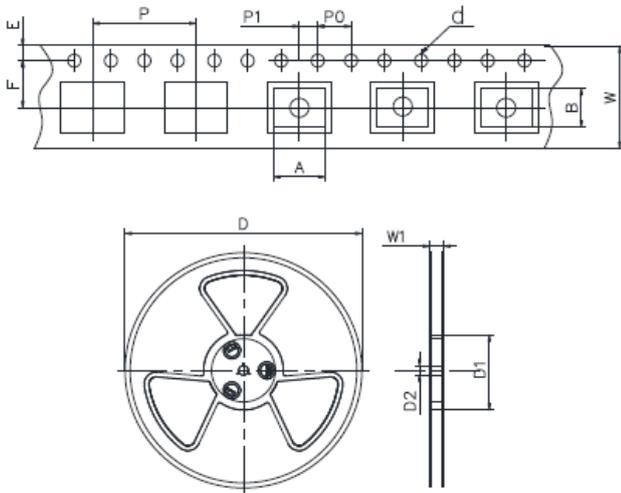
### 回流焊 Reflow soldering



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 second
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 seconds
Peak Temp.( $t_p$ )		255 to 260 °C
Time within 5 °C of actual peak Temp.( $T_p$ )		10 seconds
Ramp-down Rate		6 °C/second max
Time 25 °C to peak Temp.( $T_p$ )		8 minutes Max
Do not exceed		260 °C

\* This curve for reference only

### 10 编带尺寸 Taping and Size



REF	Dimension(mm)
A	6.5±0.1
B	6.5±0.1
d	Φ1.5±0.1
P	12.0±0.1
P0	4.0±0.1
P1	2.0±0.1
E	1.75±0.1
F	7.5±0.1
W	16.0±0.3
W1	20.5±2.0
D	Φ330.0
D1	Φ50 min
D2	Φ13±0.15

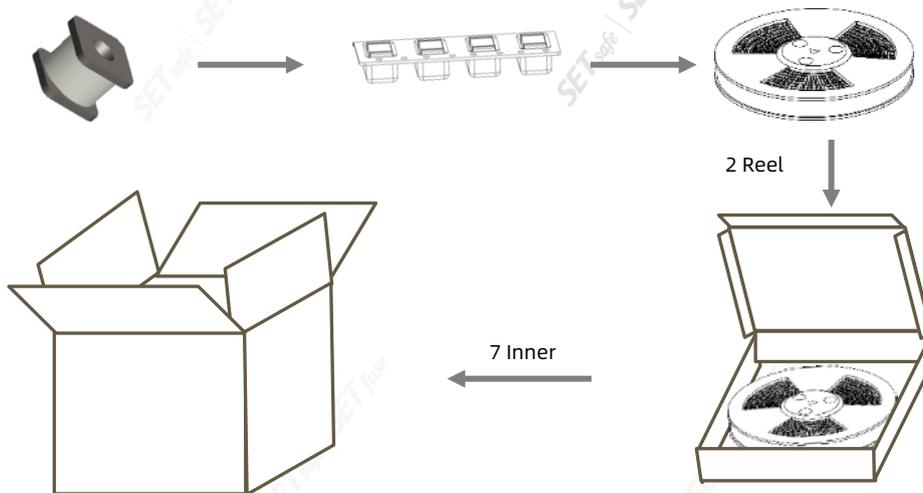
### 11 包装及数量 Box Package and Quantity

项目 Item	每卷 Reel	内箱 Inner	外箱 Carton
尺寸 Dimensions (mm)	Φ330×20.5	340×340×40	360×360×360
数量 Quantity (PCS)	700	1400	9800

备注：包装尺寸及数量仅供参考

Remark: The dimensions and quantity of packaging is for reference only

包装示意图 Packaging Drawing



## 12 注意事项 Warning

- 在电源线路中最大运行电压超过气体放电管的最小开启电压，不能使用气体放电管。

Do not operate gas discharge tube in power supply networks, whose maximum operation voltage exceeds the minimum spark-overvoltage of the gas discharge tube.

- 气体放电管在长时间电流压力下会变热（起火），这种过载将使连接器失效或器件损坏。

Gas discharge tube 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.

- 如果气体放电管的接触有缺陷，超载的电流能引产生火花和大的噪音。

If the contacts of the surge arresters are defective, current load can cause sparks and loud noises.

- 气体放电管必须小心轻放，不得跌落。

Gas discharge tube must be handled with care and must not be dropped.

- 损坏的放电管不能继续使用。

Do not continue to use damaged gas discharge tube.

## 13 储存条件 Store Conditions

要包装好的放电管应置于干燥、通风和无腐蚀的环境中。

The packaged gas discharge tube should be placed in a dry, ventilation and non-corrosion environment.

## 14 规格书之有效性 Validity

### 14.1 有关修订之协议 Agreement of Revision

本承认书的内容若有不充分或有必要修订时，得由两公司协议后再行修订。

If the content of these specifications is inadequate or need revising, it will be revised after both parties' agreement.

### 14.2 有效性 Validity

本承认书提出后，于贵公司承认期间，可暂时使用，若经过 1 个月后贵公司无异议或无签回承认时，则视同有效文件运用，如有变更另行通知。

The specifications can be used temporarily during the period of approval. If you have no any objection or not return one hardcopy to us within one month, these specifications will be operated as a valid document. If any change, we will inform you.

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