0402F series

SMD chip fuse

特征/General Information



- **特点/Main Characteristics**

  贴片保险丝/SMD fuse，快断/Fast Acting，0402

- **材料/Materials**

  本体/Body：陶瓷/Ceramic

  端子/Termination：银镀镍锡/ Silver over-plated with nickel and Tin

- **环保标准/Environment Standard**

  无铅/Lead-free，无卤/Halogen-free，RoHS

- **工作温度/Operating temperature**

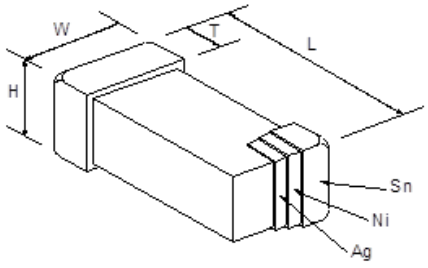
  -55℃ to +125℃ (需降额/with de-rating)

- **产品认证/Certificates**

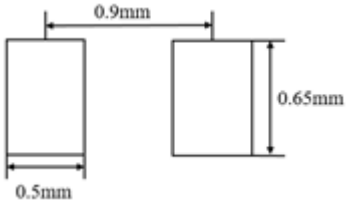
  UL

产品尺寸与推荐焊盘/Dimensions and Recommended Land Pattern(mm)

产品尺寸/Dimensions	推荐焊盘/ Recommended Land Pattern



L	W	H	T
1.00±0.05	0.50±0.05	0.50max	0.10min



动作时间特性/Clear-Time Characteristics

% of current rating	Clear-time at 25 ℃
100%	4 hours min.
250%	5 seconds max.
400%	0.05 seconds max.

● 命名规则/ Part Numbering

0402 WCF @A#V&

(1) (2) (3)

(1) 尺寸代码/Size code：标准 EIA 芯片尺寸/Standard EIA Chip Size

(2) 公司代码/Company code：维安贴片保险丝/Wayon Chip Fuse

(3) “@”代表电流安培值，050-500 可表示 0.50 安~5 安；“#”代表电压值，对应 024/032；后续的“&”为空位或“-XX”代表客户代码或封装型号代码。/ “@” represents ampere maybe 050-500 means 0.50A-5A. “#” represents voltage 024/032. Maybe followed by “&” is empty or “-XX” denoting customer code or package code.

● 电气特性/Electrical Characteristics

产品代码 Part number	额定电流 Current Rating	额定电压 Voltage Rating	分断能力 Interrupting Rating	冷态电阻 Nominal Cold DCR	标称 I^2t Nominal I^2t	UL
	A	VDC	A	mΩ	(A^2s)	
0402WCF050A032V	0.5	32/24	35	380	0.004	-
0402WCF050A024V						
0402WCF075A032V	0.75			210	0.014	√
0402WCF075A024V						
0402WCF100A032V	1.0			120	0.05	√
0402WCF100A024V						
0402WCF150A032V	1.5			49	0.07	√
0402WCF150A024V						
0402WCF200A032V	2.0			28	0.225	√
0402WCF200A024V						
0402WCF300A032V	3.0			18	0.49	√
0402WCF300A024V						
0402WCF400A032V	4.0			12	0.91	√
0402WCF400A024V						
0402WCF500A032V	5.0			8	1.2	√
0402WCF500A024V						

Notice:

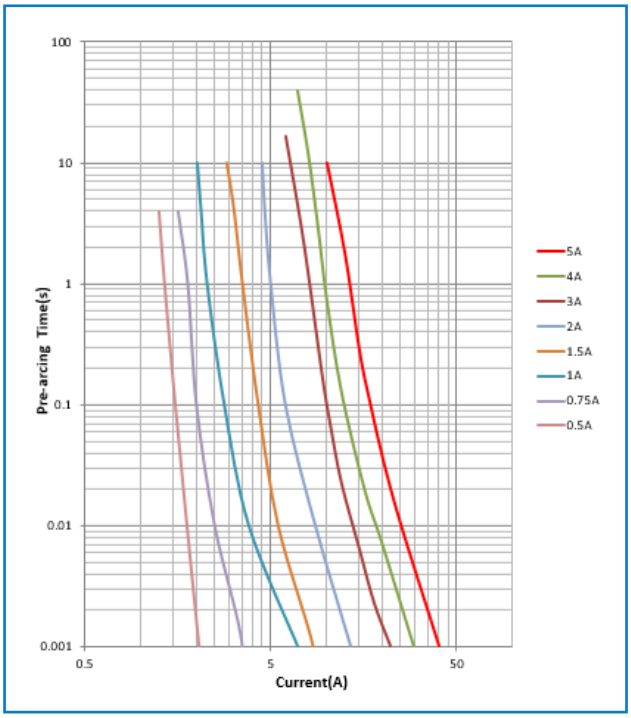
1. 在≤10%额定电流和 25℃环境下测量。

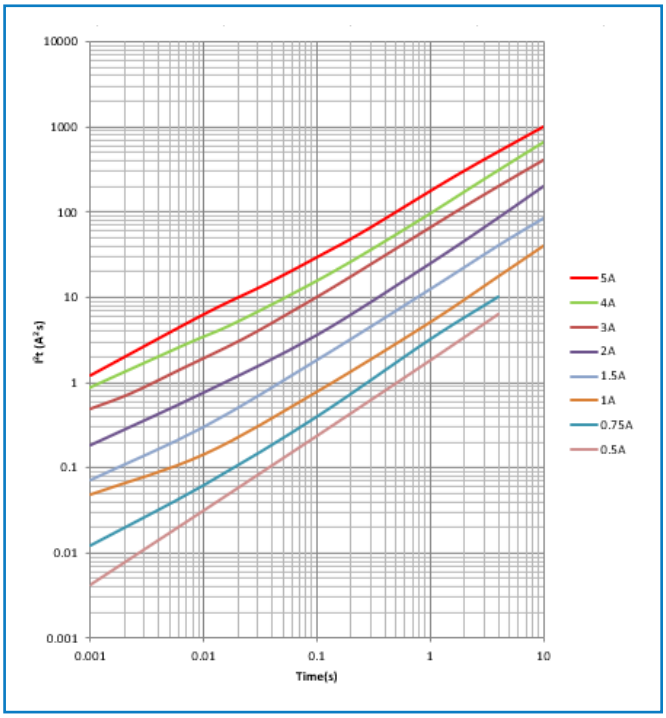
Measured at ≤ 10% rated current and 25℃ ambient.

2. 标称 I^2t 为 0.001 秒时的熔断 I^2t 值。

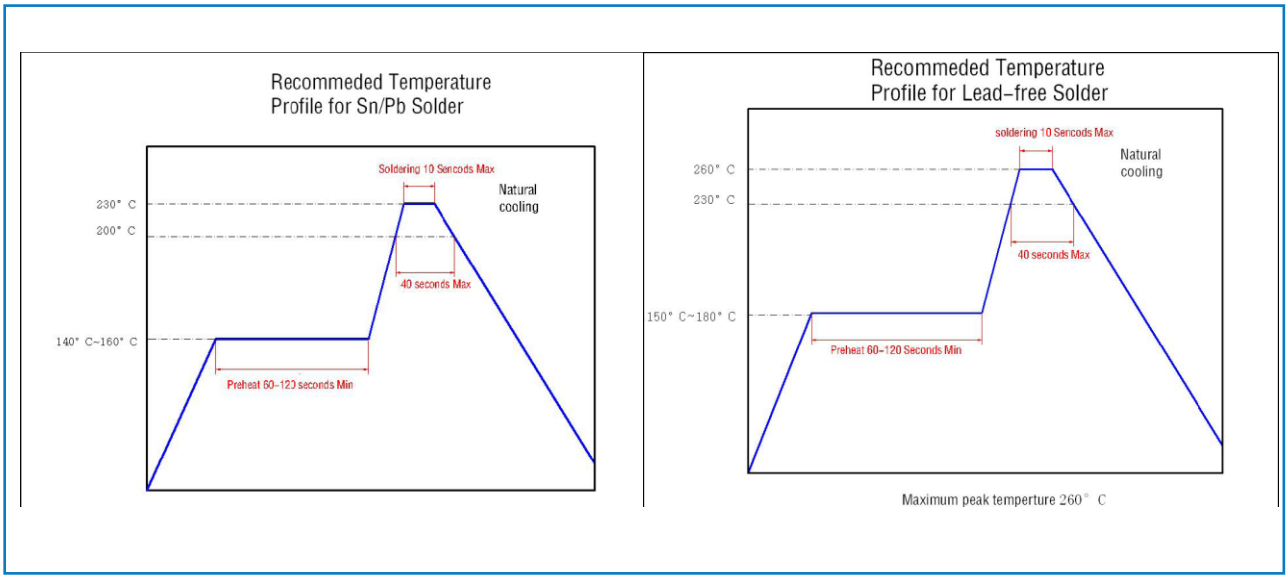
Melting I^2t at 0.001 second pre-arcing time.

● 动作时间曲线/Average Clear-Time Curves





● 回流焊条件/Solder Reflow Recommendations



● 焊接推荐条件/Recommended conditions for soldering

1.预热：150℃，最低 60 秒/ Preheating:150℃,60s(min)。烙铁头适宜最高温度/最长焊接时间：280℃/10s 或 350℃/3s。/Appropriate temperature (max) of soldering iron tip/soldering time (max): 280℃/10s or 350℃/3s. 烙铁头最高温度/最长焊接时间：350℃/9s 或 400℃/8s。/ Maximum temperature of soldering iron tip/soldering time：350℃/9s or 400℃/8s.

2.强烈建议使用烙铁头可同时熔化两个端子焊锡的热风拆焊台，请勿使烙铁头直接接触芯片端子。/Using hot air rework station with tip that can melt the solder on both terminations of the same time is strongly recommended, don't directly contact the chip termination with the tip of soldering iron.

● 可靠性测试/Reliability Tests:

No.	测试/Test	要求/Requirement	测试条件/Test condition	测试参考 Test reference
1	耐焊接热性能 Resistance to Solder Heat	直流电阻（DCR）变化量≤±10%; 无机械损伤 DCR change ≤±10% No mechanical damage	260℃下浸泡 1 次，60 s One dip at 260℃ for 60 sec	MIL-STD-202 Method 210
2	可焊性 Solderability	最小覆盖面积≥95% Minimum95%coverage	235℃下浸泡 1 次，5 s One dip at 235℃ for 5sec	MIL-STD-202 Method 208
3	机械冲击 Mechanical Shock	直流电阻（DCR）变化量≤±10%; 无机械损伤 DCR change ≤±10% No mechanical damage	加速度 1500G，脉冲宽度 0.5 毫秒，半正弦波冲击 1500 G, 0.5 ms, half-sine shocks	MIL-STD-202 Method 213
4	机械振动 Mechanical vibration	直流电阻（DCR）变化量≤±10% 无机械损伤 DCR change ≤±10% No mechanical damage	振幅 0.4 英寸（双振幅）或加速度 30G，频率 5-3000Hz 0.4" D.A. or 30 G between 5-3000 Hz	MIL-STD-202 Method 204
5	盐雾测试 Salt spray	直流电阻（DCR）变化量≤±10% 无机械损伤 DCR change ≤±10% No mechanical damage	暴露 48 小时 48 hours exposure	MIL-STD-202 Method 101
6	热冲击 Thermal shock	直流电阻（DCR）变化量≤±10%; 无机械损伤 DCR change ≤±10% No mechanical damage	在-65℃和+125℃之间循环 100 次 100 cycles between -65 ℃ and +125℃	MIL-STD-202 Method 107

7	耐湿性 Moisture resistance	直流电阻（DCR）变化量≤±15%； 无机械损伤 DCR change ≤±15% No mechanical damage	10 次循环 10 cycles	MIL-STD-202 Method 106
8	端子强度 Terminal strength	直流电阻（DCR）变化量≤±10% 无机械损伤 DCR change ≤±10% No mechanical damage	1206 封装：悬挂 1.5kg 重物，时长 30 秒；0603 封装：悬挂 0.5kg 重物，时长 30 秒 30 sec. hanging for 1206 (1.5kg) and 0603 (0.5KG)	Refer to WAYON Standard
9	寿命测试 Life	测试期间无电路开路现象； 电压降变化量≤初始值的 ±20% No electrical "opens" during testing voltage drop change shall be less than±20% of initial value	施加 80% 额定电流，环境温度 25℃至 28℃，持续 2000 小时 80% Rated current ambient temperature +25℃ to +28 ℃,2000 hours	Refer to WAYON Standard
10	弯曲测试 Bending	测试期间无电路开路现象 No electrical "opens" during testing	弯曲 2 毫米，时长超过 5 秒 2mm bending, more than 5 seconds	Refer to WAYON Standard

● 电气规格/Electrical Specifications

分断后特性/Clear-Time Characteristics:

与简式规格书中规定的内容一致。/Same as specified on the Short Form Data Sheet.

分断后绝缘电阻/Insulation Resistance after Opening:

施加额定电压分断时，绝缘电阻最小值为 20,000 欧姆。Fuse在低压条件下分断，可能导致分断后的绝缘电阻值降低。/20,000 ohms minimum when cleared with rated voltage applied. Fuse clearing under low voltage conditions may result in lower after clearing insulation resistance values. (注：在正常故障条件下（低压或额定电压条件），WAYON贴片Fuse的分断后绝缘电阻值足以满足电路保护需求。/Note: Under normal fault conditions (low or rated voltage conditions), WAYON chip fuses provide sufficient after clearing insulation resistance values for circuit protection.)

载流能力/Current Carrying Capacity:

依据 MIL-PRF-23419 标准评估，在环境温度为 + 25℃的条件下，能承受 100% 额定电流，且持续时间不低于 4 小时。/100% Rated current at +25℃ ambient for 4 hours minimum when evaluated per MIL-PRF-23419.

分断能力/Interrupt Ratings:

与简式规格书中规定的内容一致。/Same as specified on the Short Form Data Sheet.

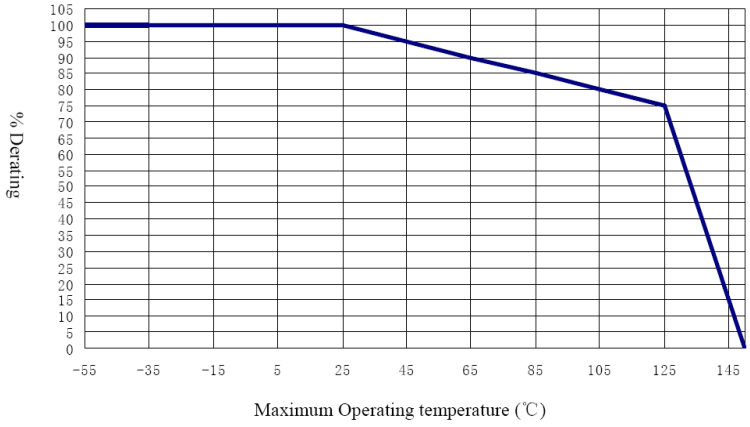
保险丝选型与温度降额指南/Fuse Selection and Temperature De-rating Guideline:

环境温度会影响熔断器的载流能力。当熔断器在高于 25℃的温度下工作时，需进行 “降额”（de-rated）使用。/The ambient temperature affects the current carrying capacity of fuses. When a fuse is operating at a temperature higher than 25℃, the fuse shall be "de-rated".

从产品目录中选型时,可遵循以下规则:目录fuse额定电流 = 标称工作电流/0.75/最高工作温度下的降额百分比。/To select a fuse from the catalog, the following rule may be followed: Catalog Fuse Current Rating = Nominal Operating Current / 0.75 / % De-rating at the maximum operating temperature.

示例：在 100℃温度下，降额百分比为 90%，标称工作电流为4A，则从产品目录中选取的fuse额定电流应为：/Example: At 100℃, % De-rating is 90%. The nominal operating current is 4A. The current rating for fuse selected from the catalog shall be:

4 / 0.75 / 90% =5.9A or 6A



● 包装与储存/Packaging and Storage

储存/Storage

环境最高温度不得超过 40℃。超过 40℃的储存温度可能导致包装材料变形。建议的储存最高相对湿度为 70%。高温高湿环境会加速端子上镀层的氧化，降低元器件的可焊性。应使用含干燥剂的密封塑料袋储存，以减少端子氧化，且仅在使用前打开密封袋。产品不得储存在含有硫或氯的有害气体环境中。

The maximum ambient temperature shall not exceed 40℃. Storage temperatures higher than 40℃ could result in the deformation of packaging materials. The maximum relative humidity recommended for storage is 70%. High humidity with high temperature can accelerate the oxidation of the solder plating on the termination and reduce the solderability of the components. Sealed plastic bags with desiccant shall be used to reduce the oxidation of the termination and shall only be opened prior to use. The products shall not be stored in areas where harmful gases containing sulfur or chlorine are present.

包装/Packaging

维安（WAYON）贴片保险丝采用卷带包装，适用于自动贴片机；特殊应用场景下也提供散装包装。卷带包装和散装包装的产品均采用含干燥剂的塑料袋密封。卷带尺寸可为 7 英寸或 13 英寸，根据客户的喜好而定。

WAYON's chip fuse are provided on tape-and-reel for use in pick-and-place machines or in bulk for special applications. Both tape-and-reel and bulk products are sealed in plastic bags with desiccant. The reel size can be 7 inches or 13 inches, depending on customers' preference.

包装数据/Packaging Data

每卷数量/Quantity per reel　　10,000pcs

● 注意事项与警告/Cautions and warnings

1、操作处理/Handling

- 贴片保险丝严禁掉落。在保险丝操作处理过程中，不得造成芯片破损。/CHIP FUSE must not be dropped. Chip-offs must not be caused during handling of FUSEs.
- 严禁用徒手接触元器件，建议佩戴手套操作。/Components must not be touched with bare hands. Gloves are recommended.
- 操作处理期间，应避免保险丝表面受到污染。/Avoid contamination of fuse surface during handling.

2、焊接/Soldering

- 应使用树脂型助焊剂或非活性助焊剂。/Use resin-type flux or non-activated flux.
- 预热不充分可能导致陶瓷开裂。/Insufficient preheating may cause ceramic cracks.
- 不建议通过浸入溶剂的方式进行快速冷却。/Rapid cooling by dipping in solvent is not recommended.
- 建议彻底清除助焊剂。/Complete removal of flux is recommended.

3、安装/Mounting

- 在安装前、安装过程中及安装后，均不得刮伤电极。
  Electrode must not be scratched before/during/after the mounting process.
- 用于与保险丝组装的触点和外壳，在安装前必须保持清洁。
  Contacts and housings used for assembly with fuses have to be clean before mounting.
- 工作过程中，保险丝表面温度可能会非常高。需确保相邻元器件与保险丝保持足够距离，以保证保险丝能正常散热。
  During operation, the fuse's surface temperature can be very high (ICL). Ensure that adjacent components are placed at a sufficient distance from the fuse to allow for proper cooling of the fuses.
- 需确保相邻材料的设计工作温度与保险丝表面温度相匹配，且周围部件及材料必须能够承受该温度。
  Ensure that adjacent materials are designed for operation at temperatures comparable to the surface temperature of the fuse. Be sure that surrounding parts and materials can withstand this temperature.
- 加工过程中，应避免保险丝表面受到污染。
  Avoid contamination of fuse surface during processing.

4、使用/Operation

- 保险丝仅可在规定的工作温度范围内使用。
  Use fuses only within the specified operating temperature range.
- 环境条件不得对保险丝造成损害，保险丝仅可在正常大气环境下使用。
  Environmental conditions must not harm the fuses. Use fuses only in normal atmospheric conditions.
- 应防止贴片保险丝接触任何液体和溶剂。必须确保没有水分进入贴片保险丝内部（例如，通过插头端子进入）。若用于测量（如检测规定的电阻 - 温度特性），不得将元器件浸入水中，而应使用适宜的液体（如氟化液 ）。
  Contact of chip fuses with any liquids and solvents should be prevented. It must be ensured that no water enters the chip fuse (e.g. through plug terminals). For measurement purposes (checking the specified resistance vs. temperature), the component must not be immersed in water but in suitable liquids.
- 应避免结露和凝露现象。
  Avoid dewing and condensation.

Contact Information

No.1001, Shiwan(7) Road, Pudong District, Shanghai, P.R.China.201207
Tel: 86-21-50310888 Fax: 86-21-50757680 Email: market@way-on.com
WAYON website: http://www.way-on.com
For additional information, please contact your local Sales Representative.
WAYON® is registered trademark of Wayon Corporation.

Product Specification Statement

1.The product specification aims to provide users with a reference regarding various product parameters, performance, and usage. It presents certain aspects of the product's performance in graphical form and is intended solely for users to select product and make product comparisons, enabling users to better understand and evaluate the characteristics and advantages of the product. It does not constitute any commitment, warranty, or guarantee.

2.The product parameters described in the product specification are numerical values, characteristics, and functions obtained through actual testing or theoretical calculations of the product in an independent or ideal state. Due to the complexity of product applications and variations in test conditions and equipment, there may be slight fluctuations in parameter test values. WAYON shall not guarantee that the actual performance of the product when installed in the customer's system or equipment will be entirely consistent with the product specification, especially concerning dynamic parameters. It is recommended that users consult with professionals for product selection and system design. Users should also thoroughly validate and assess whether the actual parameters and performance when installed in their respective systems or equipment meet their requirements or expectations. Additionally, users should exercise caution in verifying product compatibility issues, and WAYON assumes no responsibility for the application of the product.

3.WAYON strives to provide accurate and up-to-date information to the best of our ability. However, due to technical, human, or other reasons, WAYON cannot guarantee that the information provided in the product specification is entirely accurate and error-free. WAYON shall not be held responsible for any losses or damages resulting from the use or reliance on any information in these product specifications. WAYON reserves the right to revise or update the product specification and the products at any time without prior notice, and the user's continued use of the product specification is considered an acceptance of these revisions and updates. Prior to purchasing and using the product, users should verify the above information with WAYON to ensure that the product specification is the most current, effective, and complete. If users are particularly concerned about product parameters, please consult WAYON in detail or request relevant product test reports. Any data not explicitly mentioned in the product specification shall be subject to separate agreement.

4.Users are advised to pay attention to the parameter limit values specified in the product specification and maintain a certain margin in design or application to ensure that the product does not exceed the parameter limit values defined in the product specification. This precaution should be taken to avoid exceeding one or more of the limit values, which may result in permanent irreversible damage to the product, ultimately affecting the quality and reliability of the system or equipment.

5.The design of the product is intended to meet civilian needs and is not guaranteed for use in harsh environments or precision equipment. It is not recommended for use in systems or equipment such as medical devices, aircraft, nuclear power, and similar systems, where failures in these systems or equipment could reasonably be expected to result in personal injury. WAYON shall assume no responsibility for any consequences resulting from such usage.

6.Users should also comply with relevant laws, regulations, policies, and standards when using the product specification. Users are responsible for the risks and liabilities arising from the use of the product specification and must ensure that it is not used for illegal purposes. Additionally, users should respect the intellectual property rights related to the product specification and refrain from infringing upon any third-party legal rights. WAYON shall assume no responsibility for any disputes or controversies arising from the above-mentioned issues in any form.