

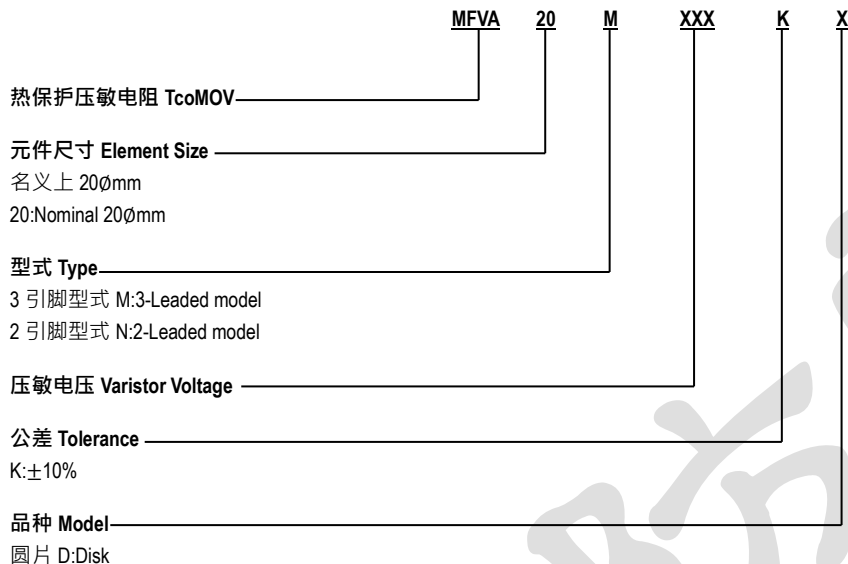
1 适用范围 Scope

本规格书适用于型号为 MFVA 系列的热保护型压敏电阻。
 The specification is applicable for MFVA Series varistors with thermal protection.

2 术语 Glossary

参考标准 Reference Standards
 UL1449 4th ed (2014), GB/T 18801.1-2011
 IEC 61643-11:2011, IEC 61051-1:2007, IEC 61051-2:1991

3 型号说明 Part Number System



4 安全标准认证 Safety Standards Approval

标准号 Standard No.	UL 1449 4th ed.	CSA C22.2 (cUL)	CE EN 61643-11 EN61000-6-3 EN61000-6-1	TUV EN 61643-11 2012
认证号 File No.	E315429	E315429	MTE/DAL/ D12050521	J 50421337
180K~390K			Approved	
470K	Approved	Approved	Approved	
560K~680K			Approved	
820K~101K	Approved	Approved	Approved	
121K~181K			Approved	
201K~221K	Approved	Approved	Approved	
241K			Approved	
271K	Approved	Approved	Approved	
301K			Approved	
331K	Approved	Approved	Approved	
361K~391K			Approved	
431K~511K	Approved	Approved	Approved	Approved
561K~681K	Approved	Approved	Approved	
751K			Approved	
781K~821K	Approved	Approved	Approved	
911K			Approved	
102K	Approved	Approved	Approved	
112K			Approved	
122K	Approved	Approved	Approved	

5. 技术参数 Specifications

技术术语 Glossary of Terms	技术参数 Specifications	参照标准 Reference Standards
工作温度 Operation Temp. Range	-40°C~+85°C	IEC 61051
存储温度 Storage Temp. Range	-40°C~+125°C	IEC 61051
压敏电压 Varistor Voltage (Vn)	* V	IEC 61051
最大连续工作电压 Maximum Continuous Operating Voltage (MCOV)	AC: * V/DC: * V	IEC 61051
标称放电电流 Nominal Discharge Current (In)	* kA (8/20μs)	UL1449
最大放电电流 Maximum Discharge Current (Imax)	* kA (8/20μs)	UL1449
介电耐压(引脚与外壳间) Dielectric Voltage (Between Leads and Enclosure)	≥2500V, 1 minute	IEC 61051

注意：安装时若是弯折引脚可能导致内部结构损坏,产品将失去质量保证。若有弯折引脚需求可客制化

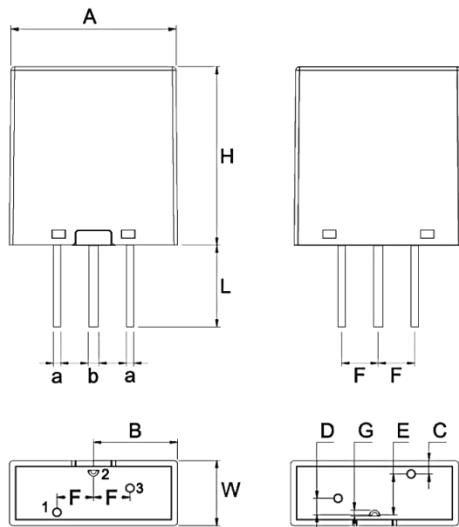
Caution: Bending of bottom leads during installation may cause internal damage and will void manufacturer's product warranty. Bending of bottom leads requirements could be customized.

型号 Part Number	最大连续工作电压 Maximum Continuous Operating Voltage (MCOV)		压敏电压 Varistor Voltage (Vn)	钳位电压 Clamping Voltage Max.		标称放电电流 Nominal Discharge Current (In)	最大放电电流 Maximum Discharge Current (I max)
	ACrms (V)	DC (V)	(V)	V _P (V)	I _P (A)	In*15 times (kA)	I Max*2 times (kA)
180K	11	14	16~21.5	36	20	1	2.5
220K	14	18	20~26	43			
270K	17	22	24~31	53			
330K	20	26	30~36	65			
390K	25	31	35~43	77			
470K	30	38	42~52	93			
560K	35	45	50~62	110			
680K	40	56	61~75	135			
820K	50	65	74~90	135			
101K	60	85	90~110	165			
121K	75	100	108~132	200	100	5	10
151K	95	125	135~165	250			
181K	115	150	162~198	300			
201K	130	170	185~225	340			
221K	140	180	198~242	360			
241K	150	200	216~264	395			
271K	175	225	247~303	455			
301K	190	250	270~330	505			
331K	210	275	297~363	545			
361K	230	300	324~396	595			
391K	250	320	351~429	650			
431K	275	350	387~473	710			
471K	300	385	423~517	775			
511K	320	415	459~561	845			
561K	350	460	504~616	920			
621K	385	505	558~682	1025			
681K	420	560	612~748	1120			
751K	460	615	675~825	1240			
781K	485	640	702~858	1290			
821K	510	670	738~902	1355			
911K	550	745	819~1001	1500			
102K	625	825	900~1100	1650			
112K	680	895	990~1210	1815			
122K	750	990	1080~1320	1980			

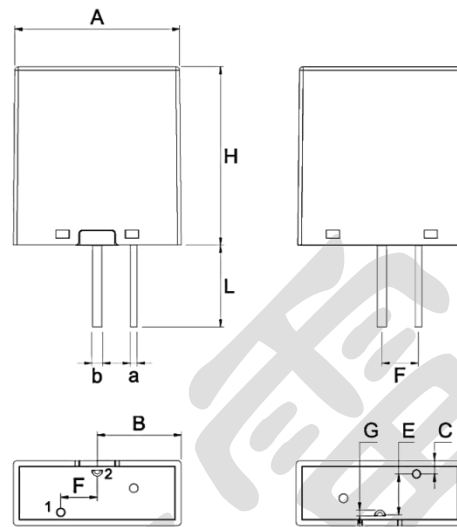
6. 结构尺寸 Structure and Dimension

6.1 尺寸 Dimensions (mm)

MFVA M Series



MFVA N Series



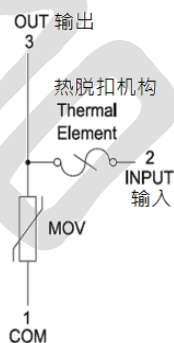
C	D	F	G	L	a	b
2.0±0.1	2.24±0.10	5.0±0.5	0.8±0.1	10.0±1.0	1.0±0.1	1.2±0.1

	A	B	E	H	W
180K~221K	21.2±0.5	10.6±1.0	4.15±0.10	22.5±0.5	7.4±0.5
241K~621K	23.0±0.5	11.5±1.0	5.5±0.1	24.2±0.5	9.0±0.5
681K~122K	23.0±0.5	11.5±1.0	9.5±0.1	24.2±0.5	12.8±0.5

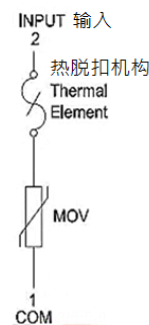
Unit : mm 单位 : mm

6.2 电路图 Circuit Diagrams

M Type M型式



N Type N型式



7 检验 Inspection
7.1 大气条件 Atmospheric Conditions

温度 Temperature : 15 °C - 35 °C
 相对湿度 Relative Humidity : 45%-75%
 大气压力 Air pressure: 86 kPa to 106 kPa

7.2 常规检验项目 Routine Inspection Items

序号 No.	项目 Items	试验要求 Test Requirement	参考标准 Reference Standards	抽样频率和 接受标准 AQL
1	外观 Appearance	壳体无穿孔,飞边;引脚镀层良好,无氧化发黑等情况。 The case without perforation, flash; the pin coating is good and no oxidative blackening.	ISO 2768-1 GB/T 1804	G-II AQL=1.0
2	尺寸 Dimension	用游标卡尺测量引脚外露长度,尺寸范围参照 4.1。 Use vernier caliper to measure the Pin out length, size range reference 4.1.	ISO 2768-1 GB/T 1804	S-2 AQL=0.65
3	压敏电压 Varistor Voltage	将压敏电阻连接到一个可调电压源,调节电压以保持在 10 ms 和 500 ms 之间施加的 1 mA DC 电流测量变阻器两端的电压。 Varistors be connected to a variable voltage source adjusted to maintain a current of 1 mA DC applied between 10 ms and 500 ms and the voltage across the varistor measured.	IEC 61051	G-II AQL=0.25
4	介电耐压 Dielectric Voltage	在引脚和外壳间施加工频电压≥2500 V, 1 分钟。 Subject the voltage no less than 2500V, last for 1 minute between leads and enclosure.	IEC 61051	S-2 AQL=1.0
5	标称放电电流试验 Nominal Discharge Current Test	参见第 7 章节《检验》第 7.3 条 Reference 7.3 of the chapter 5 《Inspection》	UL 1449	3 PCS/Lot AC=0
6	最大放电电流试验 Maximum Discharge Current Test	参见第 7 章节《检验》第 7.4 条 Reference 7.3 of the chapter 5 《Inspection》	UL1449	3 PCS/Lot AC=0

7.3 标称放电电流 Operating Duty Test

电涌保护器施加 15 次 8/20us 电流电涌。在施加此电涌电流波时,样品不加交流电。施加 15 次电涌时应分成 3 个序次,每个序次 5 次电涌。在每次施加电涌后的 1 秒钟之内必须施加 MCOV 60 ±15 秒。每个序次 5 次电涌施加后,样品应停留 30 ±5 分钟。第 15 次电涌施加后,应重新施加 MCOV 至少 15 分钟。每次施加电涌时测量限制电压(MLV),计算 15 次数值的平均值(10V 位数四舍五入)。

The samples shall be subjected to fifteen 8/20us current surges. During the application of these surges the samples are unenergized. Surges shall be applied in three groups of five surges. Within 1 second after the application of each surge, the specified MCOV shall be applied for 60 seconds ±5 seconds. After each group of 5 surges, the samples shall rest for 30 minutes±5 minutes. After the 15th surge, the MCOV shall be re-applied for at least 15 minutes. Measure Measured Limiting Voltage (MLV) during each surge and compute the average of the 15 values to obtain the MLV rating (rounding to the nearest 10 V).

判定标准:产品在测试中与测试后不能有可见可闻的损坏,且每只样品的每个 MLV 值在平均 MLV 的 ±10% 以内。

Pass Criteria: During and following the surge test, there shall not have visible or smelt (or both) damage, and each Measured Limiting Voltage (MLV) per sample was within +/-10% of the Average MLV of the 15 MLVs for that specific sample.

7.4 最大放电电流试验 Maximum Discharge Current Test

未测试过的电涌保护器应施加 1 次或 2 次 8/20us 电流电涌。在施加此电涌电流波时,样品不加交流电。在每次施加电涌后的 1 秒钟之内必须施加 MCOV 60 ±15 秒。第 1 次电涌施加后,样品应停留 5 分钟再施加第 2 次电涌。最后一次电涌施加后,应重新施加 MCOV 至少 15 分钟。

Previously untested sample shall be subjected to one or two 8/20us current surges. During the application of these surges the samples are unenergized. Within 1 second after the application of each surge, the specified MCOV shall be applied for 60 seconds ±5 seconds. After first surge, the sample shall rest for 5 minutes. After the last surge, the MCOV shall be re-applied for at least 15 minutes.

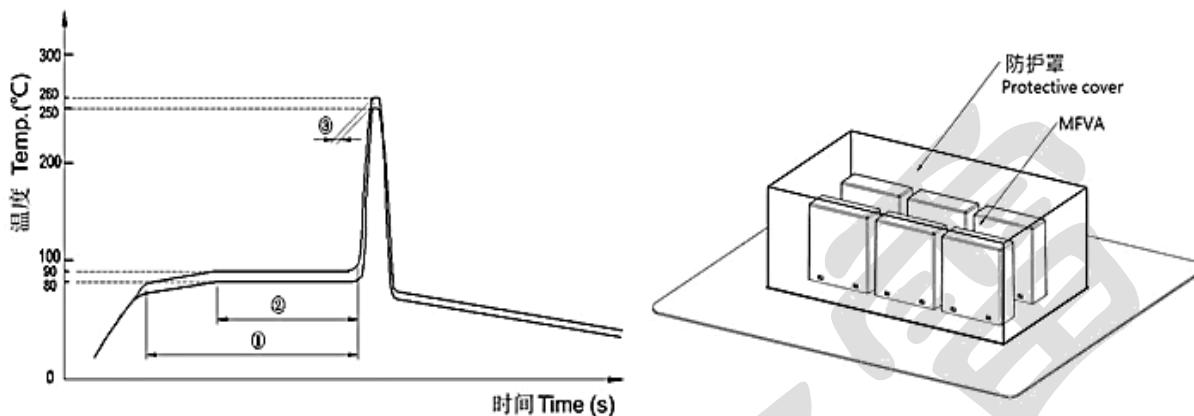
判定标准:产品在测试中与测试后不能有可见可闻的损坏,且测试前后 MOV 压敏电压的变化率 <10%。

Pass Criteria: During and following the surge test, there shall not have visible or smelt (or both) damage, and the variation rate of the varistor voltage shall be less than 10%

8 推荐焊接条件 Soldering Conditions

8.1 本产品可满足波峰焊,注意产品引脚超出 PCB 焊盘长度不要大于 3 mm,预热温度控制于 90 °C 以内,波峰温度小于 260°C,过锡时间≤4s,进行焊接时建议 :增加防护罩减少产品吸热 -产品过波峰后加降温设施使温度快速降至室温 -推荐按下面焊接曲线图设置 :

The product is available for wave soldering, the length of exposed pins should be less than 3 mm and do keep the preheat temperature below 90°C. soldering temperature should be less than 260°C, tinning time should be less than 4s, During wave soldering, a protective cover can be applied to protect the product from the heat, or after wave soldering cooling equipment is recommended to rapidly reduce the product to room temperature. Recommend as following graph.



8.2 如采用烙铁焊接,请注意烙铁温度与焊接时间,推荐焊接条件为 :

If you use iron to weld, please pay attention to the iron temperature and soldering time :

项目 Item	条件 Condition
烙铁头温度 Iron Temperature	350 °C (Max.)
焊接时间 Soldering Time	4 s (Max.)
焊锡点位置离产品底部 Space Between Soldering Point and the Bottom of Product	2 mm (Min.)

9 注意事项 Important Note

9.1 该产品为内置低熔点合金型脱扣装置的压敏电阻,当使用波峰焊或手工焊接工艺时,生产前应该做充分前期工艺验证,预防内部低温合金受热冲击损伤。

The MOV contains a low melting point alloy type thermal-link inside. When waving soldering or hand soldering applied, the earlier stage process verification should be carried to avoid the thermal-link damaged by thermal shock.

9.2 装配时不要用丙酮等溶剂清洗本产品,以免破坏本产品的封装层。

When assembly, please don't use acetone and other solvents to clean products, so as not to destroy enclosure.

9.3 装配时应避免出现如敲击等作业方式,避免造成本产品出现机械损伤。

When assembly, please avoid knocking and such practices, so as not to make mechanical damage on products.

9.4 安装时若是弯折引脚可能导致内部结构损坏,产品将失去质量保证。若有弯折引脚需求可客制化

Bending of bottom leads during installation may cause internal damage and will void manufacturer's product warranty. Bending of bottom leads requirements could be customized.

9.5 产品应用系统中出现的暂态过电压应小于 UT,否则需进行其他设计以避免暂态过电压下的失效。

The temporary overvoltage value in product application system should be less than UT, if not some other designs are needed to avoid failure which caused by the temporary overvoltage.



10 标示及包装 Marks and Package

10.1 本体标示 Product Body Marking

例如 ex: 产品型号 Product Model: MFVA20M471K



10.2 包装 Packaging

塑料泡壳 Plastic Tray (350×250×12mm) 49 PCS/盘 Tray	301K~122K 外箱 Outside Box (350×260×150mm) 686 PCS/ 箱 Carton	180K~271K 外箱 Outside Box (350×260×150mm) 735 PCS/ 箱 Carton
		

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