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ISO 9001 DNV UKAS QUALITY MANAGEMENT No.1182-2004-AQ-RGC-UKAS

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WWAB7.3-13

SPECIFICATION FOR APPROVAL

Spec. No.: WWSMF52-20 Issued Date:Jul. 23th, 05

CUSTOMER: MILLIARD DEVICES LIMITED

Part Name: Bead Type NTC Thermistor

Application: For Temperature Sensing

Customer Part No.:

Weilin / Zhonghao Part No. : WMF52-103J3950GEB

FOR CUSTOMER APPROVAL

We have approved the attached specification.

Representative : _____ Date: _____

Title : _____

Division : _____

Customer : _____

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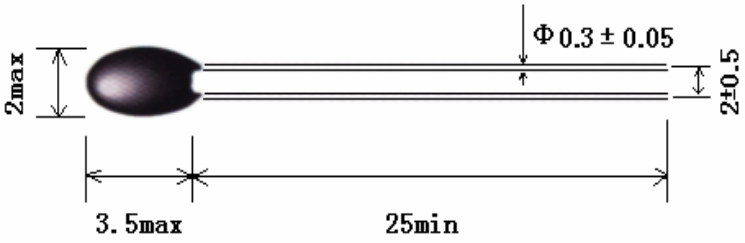
1. APPEARANCE 外观

1-1. Dimensions (mm)尺寸



1-2. Marking 标志

■ No marking 无标志

1-3.Coating 包封

□ No coating 无包封

■ Coating 包封

Material 包封材料

□PF resin 酚醛树脂
□Silicon 硅树脂
■Epoxy 环氧树脂
□Others 其他

Color 颜色

□Green 绿色
□Red 红色
□Tan 黄色
■Black 黑色
□Blue 兰色

1-4. Leads 引线

■Tin – plated copper wire 镀锡铜引线

□Tin-plated steel wire 镀锡钢线

■ Straight 直形 □ Axis-formed 轴弯

□ In-Forming 内弯 □ No Lead 无引线

2. MECHANICAL CHARACTERISTICS 机械性能

Item 指标项目	Specification 技术要求	Test Conditions & Methods 测试条件/方法
2-1. Solder-ability 可焊性	The terminals shall be uniformly tinned, and its area≥95% 浸润部分上锡均匀，上锡面积≥95%	Dipping theNTC terminals to a depth of 15mm in a soldering bath of 250±10℃ and to the place of 6mm far from NTC body for 3±0.5s (See IEC68-2-20 /GB2423.28 Ta) 将引出端沾助焊剂后，浸入到温度为 250℃±10℃、深度为 15mm 的锡槽中锡面距 NTC 本体下端 6mm 处，持续 3±0.5 秒。（参见 IEC68-2-20 /GB2423.28 试验 Ta）
2-2. Resistance To Soldering Heat 耐焊接热	No visible mechanical damage. 无可见损伤 $\Delta R/R_N$ ≤2% ($\Delta R = \lvert R_N - R_N' \rvert$)	Dipping the NTC terminals to a depth of 15mm in a soldering bath of 250±10℃ and to the place for 6mm below from NTC body for 3±0.5s.After recovering4-5h under 25±2℃. The rated zero power resistance value R_N' shall be measured. (See IEC68-2-20 /GB2423.28 Tb) 根据 IEC68-2-20（GB2423 .28）试验 Tb 进行试验。 采用焊槽法，将引出端沾助焊剂后，浸入到温度为 250℃±10℃、深度为 15mm 的锡槽中,锡面距 NTC 本体下端 6mm 处，维持 3±0.5 秒. 在 25±2℃条件下恢复 4－5h 后，复测额定零功率电阻 R_N'.

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2-3. Strength of lead terminal 引出端强度	No break out 无损坏 Δ R/RN ≤2% (Δ R = | RN-RN' |)	Fasten the body and apply a force gradually to each lead until 10N and then keep for 10sec, Hold body and apply a force to each lead until 90° slowly at 5N in the direction of lead axis and then keep for 10sec, and do this in the opposite direction repeat for other terminal. After recovering 4~5h under 25±2℃, the rated zero power resistance value RN' shall be measured. (See IEC68-2-21/GB2423.29 Ua / Ub) 根据 IEC68-2-21（GB2423 .29）试验 U 进行试验。 试验 Ua：拉力 10N，持续 10 S； 试验 Ub：弯曲 90°，拉力 5N，持续 10 S； 扭转 180°，拉力 5N，持续 10 S。 在 25±2℃条件下恢复 4～5 h 后，复测额定零功率电阻 RN'

3.ELECTRICAL CHARACTERISTICS 电气性能

3-1.Test Conditions & Method 测试条件/方法

Items 指标项目	Spec. 技术要求	Test Conditions & Methods 测试条件/方法
3-1-1.Rated Zero-Power Resistance 额定零功率电阻 R_N (KΩ)	10±5%	Ambient temp. range 环境温度 ：25℃±0.5℃ Test the resistance of NTC (testing voltage is ≤1.5V_{DC}) after place it into25℃±0.5℃ immobile medium (silicon oil for example) for more than 30 minutes with constant temperature(precision for controlling temperature=±0.5℃) 将 NTC 置于 25℃±0.5℃的静止介质(例如硅油)中恒温(控温精度为±0.5℃)30 分钟后,测量其阻值。测试电压≤1.5V_{DC}。
3-1-2.Thermal Dissipation Constant 热耗散系数 (mW/°C)	≥2.0	The thermal dissipation constant(δ) could be calculated by the ratio of a change in power dissipation(ΔP) of the thermistor to a change in temperature(ΔT) of the thermistor at a specified ambient temperature 在特定的环境温度下，热耗散系数(δ)为热敏电阻电功率消耗(ΔP)与本体温度变化量 (ΔT)的比值.
3-1-3.Thermal Time Constant 热时间常数 τ (s)	≤7	The time(τ) shall be measured within which the temperature change of NTC thermistor is reached at 63.2% of the ambient temperature change under zero power condition 热时间常数(τ)为在零功率条件下，热敏电阻的温度下降到其最初温度与最终温度之差为 63.2% 时所需要的时间
3-1-4.Material Constant 材料常数 B (°K)	3950±2%(25℃/50℃) $B=T_1T_2/(T_2-T_1)\times L_n(R_1/R_2)$	R_1 , R_2 is zero-power resistance at T_1 , T_2 R_1 , R_2 分别为 T_1 , T_2 温度下的零功率电阻 T_1 = 298.15°K(25°C) T_2 = 323.15°K(50°C)

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3-1-5.Insulated Resistance 绝缘电阻(MΩ)	≥500 No visible mechanical damage. 无可见损伤	Testing voltage 测试电压: 500VDC Energized time 持续时间:60S

4. Reliability Test 可靠性试验

Items 指标项目	Spec. 技术要求	Test Conditions & Methods 测试条件/方法
*4-1. Temp. Cycling Testing 温度循环测试	No visible mechanical damage. 无可见损伤 $\Delta R_N / R_N \leq 2\%$ ($\Delta R = \lvert R_N - R_N' \rvert$)	Ta:-25±3℃/ 30min→25±3℃/ 5min→Tb:100℃±3℃/ 30min→25±3℃/ 5min Cycles: 5times After recovering 4~5 h under 25±2℃, the rated zero power resistance value R_N' shall be measured. 在 Ta=- 25±3℃和 Tb=100±3℃的环境温度中各存放 30 分钟, 循环 5 次.每次高低温循环都有在 25±3℃的环境中过渡 5 分钟。 样品进行温度循环测试后，取出放置室温（25±2℃）4~5 小时后测量零功率电阻 R_N'.
*4-2. Humidity Testing 耐湿性测试		Ambient temp. range : 40℃±2℃ R.H.:93±3%， Energized time:1000 h±12 h After recovering 4~5 h under 25±2℃, the rated zero power resistance value R_N' shall be measured. 在温度 40±2℃,相对湿度 93±3%的环境中放置 1000 小时±12 小时后，取出置于室温（25±2℃）4~5 小时后, 测量其零功率电阻 R_N'.
*4-3. Low temperatureTesting 耐低温测试		Ambient temp. range : -50℃±3℃ Energized time: 1000h±12 h After recovering 4~5 h under 25±2℃, the rated zero power resistance value R_N' shall be measured. 在温度-50℃±3℃的环境中放置 1000 小时±12 小时后取出置于室温（25±2℃）4~5 小时后,测量其零功率电阻 R_N'.
*4-4. High temperatureTesting 耐高温测试		Ambient temp. range : 100℃±2℃ Energized time: 1000h±12 h After recovering 4~5 h under 25±2℃, the rated zero power resistance value R_N' shall be measured. 在温度 100℃±2℃的环境中放置 1000 小时±12 小时后取出置于室温（25±2℃）4~5 小时后, 测量其零功率电阻 R_N'.

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5. INSPECTION 检验方法

5-1. Lot Inspection 批量检验

Sampling with IEC410 / DIN ISO 2859-1 (GB/T2828.1-2003) ; Testing with SPEC.NO.: WWSMF52-20.
抽样方法按 IEC410/ DIN ISO 2859-1 (GB/T2828.1-2003); 试验方法按 SPEC.NO.: WWSMF52-20.

Item 指标项目	IL	AQL	Item 指标项目	IL	AQL
Appearance 外观	Ⅱ	0.65	Rated Zero-Power Resistance 额定零功率电阻 R_N	Ⅱ	0.65
Soldering-ability 可焊性	S-2	2.5	Strength of lead terminal 引出端强度	S-2	2.5

5-2. Periodic Inspection 周期性试验

See the items with *参见*条目

6. NUMBERING SYSTEM AND PACKING 产品标号及包装

6-1. PART NUMBERING 产品编号

WMF52	－	103	J	3950	G	E	B
①		②		③		④	⑤

① Series WMF52： WEILIN-ZHONGHAO NTC For Temperature Sensing
WMF52 系列: 伟林－中昊用于温度探测的负温度系数热敏电阻

② Rated zero power resistance&Tol. 额定零功率电阻及允差：
103-10kΩ 225- 2,200kΩ
(J- ±5% F-±1% G - ±2% H - ±3% K- ±10%)

③ B Value& Tol. B 值及允差：
3,950-3,950°K 4,050-4,050°K
(G - ±2% F-±1% H - ±3% J- ±5% K- ±10%)

④ Coating Material 包装材料：E-Epoxy 环氧树脂 S-Silicone 硅树脂

⑤ Packing Type 包装类型：B -Bulk 散装 A-Ammo 条带 R -Reel 盘带

6-2.Lot Numbering 批号编号方法

0	1	01
①	②	③

① Year of ex-factory 出库年度 0: 2000 (1: 2001, …, 9: 2009)

② Month of ex-factory 出库月度 1: January (2: Feb,…, 9: Sep, O: Oct, N: Nov, D: Dec).

③ Serial number of ex-factory in current month: 01～99: No. 01～99, J0: No.100, J1～J9: No.101～109, K0:No.110,
当月出库序号 K1～K9: No.111～119, S0: No.190, S1～S9: No.191～199, T0: No.200, …

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6-3. Packing Type 包装方式

■ Bulk 散装

□Ammo 条带

□ Reel 盘带

7. Operating Temperature Range 工作温度范围:

-40 ~ + 100℃

8. STORAGE CONDITIONS 存贮环境条件：

8-1.Temperature 温度: -10℃～+40℃

8-2. Humidity 湿度: ≤70%RH

8-3. Term 期限: ≤6 months (First-in/ First-out 先进先出)

8-4. Place 地点:

Do not exposing the components to the following conditions, otherwise, it may result in deterioration of characteristics.

不要暴露在下列环境条件下，否则将导致性能衰退或参数飘移：

1) Corrosive gas or deoxidizing gas. 腐蚀性或易氧化气体

2) Flammable and explosive gases. 易燃易爆气体

3) Oil, water and chemical liquid. 油、水和化学溶液

4) Under the sunlight. 太阳光下

8-5. Handling after seal open: After unpacking of the minimum package, reseal it promptly or store it inside a sealed container with a drying agent.

尽量保证开口最小化，立即重新封好，并贮存在密封、带有干燥剂的容器中。

9. WARNING 注意、警告 ⚠

Do not apply the components under the following conditions, otherwise, it may result in deterioration of characteristics, destruction of components or in the worst case, to catching fire.

请不要在下列条件下使用本元件，否则将可能导致产品性能衰退或产品损毁，甚至引发火灾：

1) Exceeding I_{max}. 超过最大工作电流

2) Exceeding rated temperature range. 超过许可工作温度范围

3) Inferior thermal dissipation (Due to badly inferior thermal dissipation, some part of the components body will become overheated and then be damaged.)

散热不良（由于散热不良，本元件可能因部分过热而导致破坏）