

板载式热敏电阻产品介绍

板载式热敏电阻产品有表面贴装用的晶片型与圆板型,以及主板贴装用的轴向引脚型与径向引脚型产品,可适合各种安装。

Introduction of on-board thermistors

The on board thermistors are available in several different packages, from chip and melt for surface mount, to axial and radial led for through the hole mounting.

板载式热敏电阻的种类 On-board thermistors

| 系列名 Series | 形状 Type | 端子电极 Termination | 使用温度范围 Operating temperature range | 电阻值范围 Resistance range | 页码 Page | | |
|-------------------|----------------------------|--|---------------------------------------|---------------------------|----------------|-------------|-------|
| 新产品 TZ05 | 贴片式热敏电阻 SMD chip | 镀锡 Tin plating | -40°C ~ +150°C | 10kΩ | 57 | | |
| 新产品 TD05, TD11 | | | | 10kΩ ~ 100kΩ | 57 | | |
| 新产品 TX05 | | | | 10kΩ | 58 | | |
| TS03, TC03, TH03 | | | -40°C ~ +100°C | | -40°C ~ +125°C | 25Ω ~ 100kΩ | 58,62 |
| TN05, TC05, TH05 | | | | | | 30Ω ~ 2MΩ | 58,61 |
| TN11, TH11 | | | | | | 2kΩ ~ 1MΩ | 59,60 |
| TN10, TC10 | | | | | | 30Ω ~ 150kΩ | 61 |
| TN20, TC20, TH20 | | | 40Ω ~ 2MΩ | 59,60 | | | |
| MN18, MH18 | | | 圆板型热敏电阻 MELF | 镀锡 Tin plating | -40°C ~ +150°C | 2kΩ ~ 150kΩ | 65 |
| FH05, FH10 | | | 薄片式热敏电阻 Flake chip | 金电极 Au Electrode | -40°C ~ +125°C | 10kΩ, 100kΩ | 64 |
| CN25, CH25 | 径向引脚型热敏电阻 Radial leaded | 无铅焊接涂层铜镍合金线 Pb-free soldered Cu-Ni wire | -40°C ~ +110°C | 500Ω ~ 500kΩ | 66,71 | | |
| RM16, RH16 | | 聚氨酯被覆线 Polyurethane covered wire | | 1kΩ ~ 100kΩ | 67,71 | | |
| BN35 | | PVC被覆线 PVC covered wire | -20°C ~ 80°C | 10kΩ ~ 2.2MΩ | 71 | | |
| 新产品 BM22, BM38 | | 聚氨酯被覆线 Polyurethane covered wire | -40°C ~ +100°C | 10kΩ | 71 | | |
| 新产品 BF05 | | 10kΩ | | 71 | | | |
| GR15, GR25 | | 杜美丝 Dumet wire | -40°C ~ +300°C (+150°C) | 2kΩ ~ 10MΩ | 68,71 | | |
| DC30 | | 无铅焊接涂层铜镍合金线 Pb-free soldered Cu-Ni wire | -40°C ~ +100°C | 300Ω ~ 200kΩ | 67 | | |
| GA13, GH13 | | 轴向引脚型热敏电阻 Axial leaded | 镀镍或镀锡 Ni-plating or Tin plating | -40°C ~ +300°C (+150°C) | 2kΩ ~ 100kΩ | 69,72 | |
| GA20, GH20 | 2kΩ ~ 100kΩ | | | | 69,72 | | |

型号构成 Part number system

| | | | | | |
|---------------|---|-----------------|--------------------------|--------------------------------------|---------------------------|
| TN05 | — | 3T | 103 | J | B |
| 系列名 Series | | 标称B值 B Value | 标称电阻值 Resistance ① | 电阻值容许偏差 Resistance tolerance ② | 包装形式 Packing form ③ |

①表示25°C时的电阻值,前2位为电阻值的有效数字,第3位为有效数字后的零的个数。单位为Ω。
Resistance value at 25°C is expressed in ohms. First two digits are significant and the last digit is the numbers of zeros following.

②电阻值容许偏差
Resistance tolerance.

③包装形式
Packing form

| 标记 Code | D | F | G | H | J | K | L |
|---------------------------------|---|-----|-----|-----|-----|------|------|
| 电阻值容许偏差 Resistance tolerance | ±0.5% | ±1% | ±2% | ±3% | ±5% | ±10% | ±15% |
| B值容许偏差 B Value tolerance | $\begin{matrix} \text{===== } \pm 1\% \text{ =====} \\ = \pm 0.3\% = & & \text{===== } \pm 3\% \text{ =====} \\ & & \text{===== } \pm 5\% \text{ =====} \end{matrix}$ | | | | | | |

| 记号 Code | 包装形式 Packing form | 包装数量 Packing Qty. | 相应品种 Related series |
|------------|------------------------|----------------------|--|
| B | 散装 Bulk | 500 | TS03, TC03, TH03, TN05, TC05, TH05, TN10, TC10, TN11, TH11 TZ05, TX05, TD05, TD11, TN20, TC20, TH20 |
| | | 200 | MN18, MH18, GA13, GH13, GA20, GH20 CN25, CH25, RM16, RH16, GR15 |
| | | 100 | DC30, GR25 |
| C | 塑料盘装 Plastic tray | 400 | FH05, FH10 |
| T | 纸带装 Paper taping | 4,000 | TD11, TN11, TH11, TN10, TC10, TN20, TC20, TH20 |
| P | 塑料带装 Plastic taping | 2,000 | MN18, MH18 |
| F | 扁平包装 Flat pack | 2,000 | GA13, GH13, GA20, GH20, DC30 |
| R | 纸带装 Paper taping | 10,000 | TZ05, TX05, TD05, TN05, TC05, TH05 |
| D | | 15,000 | TS03, TC03, TH03 |

NTC THERMISTOR
热敏电阻

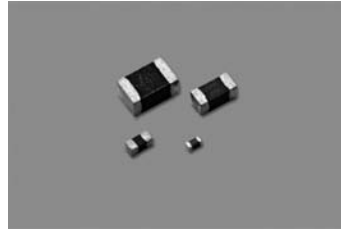
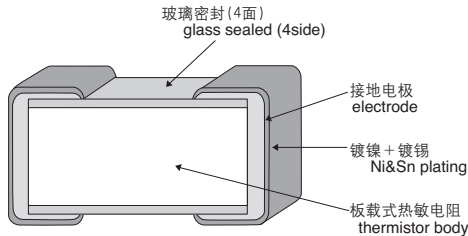
表面贴装型

采用本公司独特的材料技术、产品设计技术及生产流程, 开发生产的高精度、超小型化表面贴装型热敏电阻。
具有应对各种需求的形状和特性的品种。

SMD Type

Using our company's unique materials, product design, and manufacturing technologies, we have been able to produce smaller and increasingly precise surface mount thermistors.
This has enabled us to create a full line of parts to meet various characteristic and size requirements.

■ 结构及外观 Structure and appearance



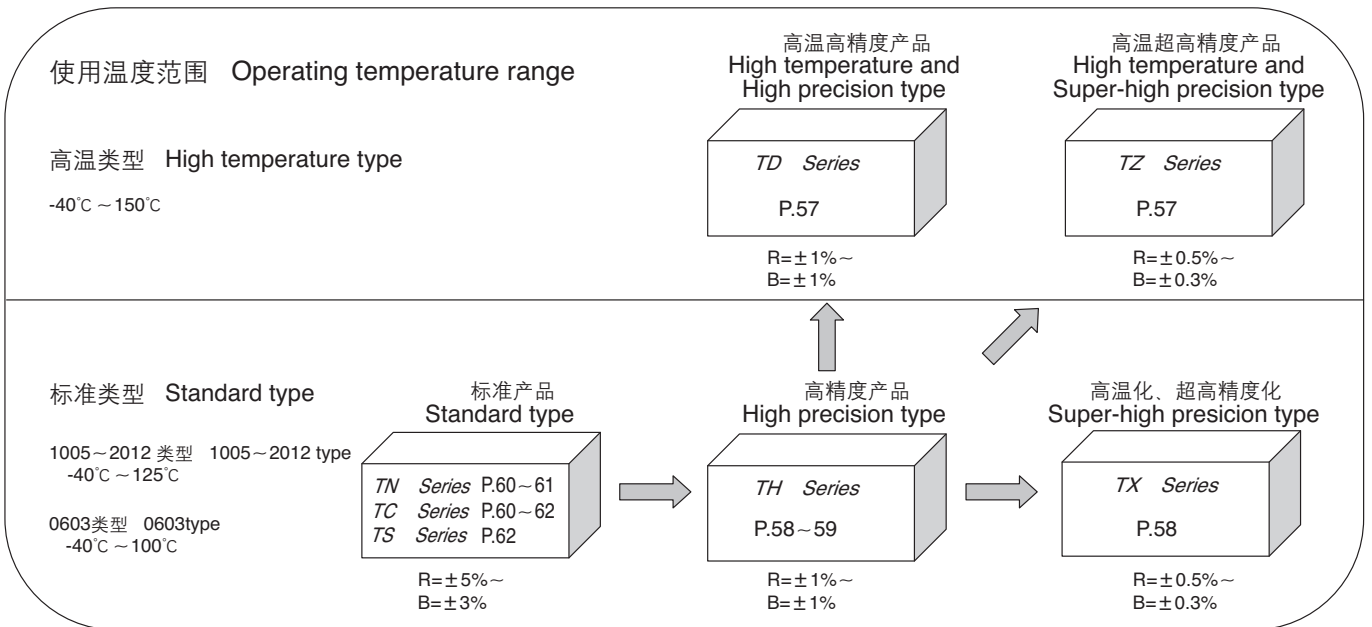
■ 特点

- 通过独自的原材料, 实现超高精度的温度测量
- 通过独自的4面玻璃密封做法, 实现较高的可靠性 (机械应力强、耐环境性、耐变换电阻性能优异)
- 优异的静电放电耐压性能
- 优异的高频率特性
- 优异的焊接性能、耐热性能
- 可用于150°C高温
- 完全不含铅(Pb)产品
- RoHS指定产品

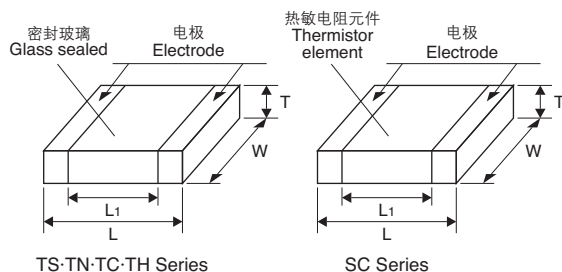
■ Features

- Provides ultra-accurate temperature measurement of its own raw materials
- High reliability by unique four-sided glass coating. (Excellent mechanical strength, environmental resistance and migration resistance.)
- Strong against electrostatic discharge
- Excellent high frequency characteristics.
- Excellent solderability and heat resistance.
- High temperature(150°C)
- Lead-free
- RoHS Compliance

■ 产品系列 Product lineup



■ 形状·尺寸 Dimensions



| 系列 Series | L | W | T | L ₁ |
|------------------------|-----------|--|--|----------------|
| TS03·TC03·TH03 | 0.60±0.04 | 0.30±0.04 | 0.30±0.04 | 0.10min. |
| TZ·TX·TD05 TN·TC·TH | 1.00±0.15 | 0.50 ^{+0.05} _{-0.10} | 0.50 ^{+0.05} _{-0.10} | 0.20min. |
| TN·TC | 1.60±0.15 | 0.80±0.15 | 0.95max. | 0.30min. |
| TD11·TN·TH11 | 1.60±0.15 | 0.80±0.15 | 0.70max. | 0.30min. |
| TN·TC·TH20 | 2.00±0.20 | 1.25±0.20 | 1.25max. | 0.40min. |

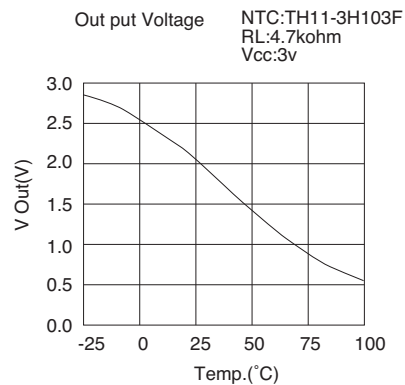
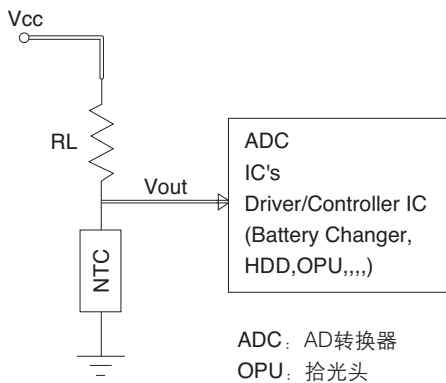
■用途

- 硬盘驱动器的温度补偿电路
- CD、DVD刻录用光学头
- PC主板的温度监视
- DC冷却风扇的转速控制
- 手机功率放大器增益的温度补偿
- 液晶驱动电压的控制(对比度补偿)
- 电池组的温度控制、温度保护
- 光通信用LD模块的温度控制
- MOS-FET的过热保护
- DVC/DSC的温度补偿
- 温度补偿型晶体振荡器(TCXO)的温度补偿
- 打印机的温度探测 控制电路用
- 车载音响的温度补偿及过热探测

■Applications

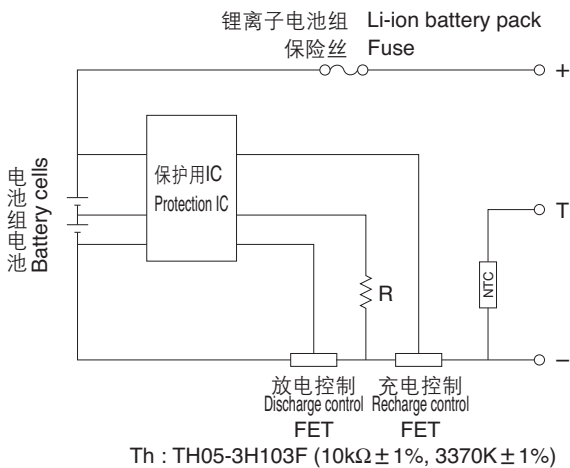
- Temperature compensated circuit in HDD
- Optical pickup for CD/DVD writing,
- CPU periphery temperature monitoring circuits,
- Temperature detection for DC power supply
- Gain Stabilization for mobile phone
- Temperature compensation of display contrast in LCD
- Temperature detection of battery cells
- Optical communication related equipment Laser transmission circuit temperature compensation
- Temperature detection for MOS-FET
- DVC/DSC devices; Auto-focus circuits, plunger peripheral circuits, battery pack temperature control circuits
- Temperature Compensation of Crystal Oscillators (TCXO)
- Temperature compensation for ink-viscosity (Inkjet Printer)
- Temperature compensation and detection for Car-audio equipment

■温度检测回路 Temperature detection circuit



■典型用途 Typical Applications

- 电池组
在用于移动电子设备等的电池组(二次电池)上,使用高精度型的片状热敏电阻作为电路保护元件。
- Battery pack
Chip thermistor with high precision is used for the protection circuit inside the battery pack for mobile electronic devices.



[高温超高精度产品]

TZ05系列

- 形状·尺寸 1.0×0.5×0.55max (mm)
(参见形状·尺寸表)
- 电阻值容许偏差 ±0.5%, ±1% (R25)
- B值容许偏差 ±0.3% (R25/R50)
- 端子电极 镀锡
- 使用温度范围 -40°C~+150°C
- 散热系数 2.4mW/°C
- 最大功率 300mW

■特点

- 实现超高精度的电阻值±0.5%容许偏差、B定数0.3%容许偏差。
- 可用于-40°C~+150°C高温范围内。
- 元件表面玻璃密封，可靠性高。
- 优异的静电放电耐压性能。

■特性 Characteristics

TZ05系列 TZ05 Series

| 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value |
|------------|-----------------------|----------------------|----------------------|
| 3H103** | 10kΩ | 3,380K | 3,423K |

※上表以外的特殊规格请垂询。
※Please consult us for availability of non-standard items.

[高温超高精度产品]

TD05系列

- 形状·尺寸 1.0×0.5×0.55max (mm)
(参见形状·尺寸表)
- 电阻值容许偏差 ±1%, ±2%, ±3% (R25)
- B值容许偏差 ±1%, ±2% (R25/50)
- 端子电极 镀锡
- 使用温度范围 -40°C~+150°C
- 散热系数 2.4mW/°C
- 最大功率 300mW

TD11系列

- 形状·尺寸 1.6×0.8×0.70max (mm)
(参见形状·尺寸表)
- 电阻值容许偏差 ±1%, ±2%, ±3% (R25)
- B值容许偏差 ±1%, ±2% (R25/50)
- 端子电极 镀锡
- 使用温度范围 -40°C~+150°C
- 散热系数 3.0mW/°C
- 最大功率 375mW

■特点

- 可用于-40°C~+150°C高温范围内。
- 实现高精度电阻值、B常数±1%容许偏差。
- 优异的静电放电耐压性能。
- 最适用于发动机控制电路、DC/DC变频器。
- 元件表面玻璃密封，可靠性高。

■特性 Characteristics

TD05系列 TD05 Series

| 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value |
|------------|-----------------------|----------------------|----------------------|
| 3H103** | 10kΩ | 3,370K | 3,413K |
| 3L104** | 100kΩ | 3,540K | 3,587K |

TD11系列 TD11 Series

| 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value |
|-------------|-----------------------|----------------------|----------------------|
| 3H103** | 10kΩ | 3,370K | 3,423K |
| 4H104** | 100kΩ | 4,360K | 4,360K |
| 新产品 3S224** | 220kΩ | 3,760K | 3,806K |
| 新产品 3W474** | 470kΩ | 3,940K | 3,998K |

※上表以外的特殊规格请垂询。
※Please consult us for availability of non-standard items.

[High temperature, super-high precision type]

TZ05 Series

- Dimensions 1.0×0.5×0.55max(mm)
- Resistance tolerance ±0.5%, ±1% (R25)
- B value tolerance ±0.3% (R25/R50)
- Termination Tin plating
- Operating temperature range -40°C~+150°C
- Heat dissipation 2.4mW/°C
- Maximum power dissipation 300mW

■Features

- High precision type.(±0.3%)
- Suitable for wide operating temperature rang.(-40°C~+150°C)
- Glass sealed body for high reliability
- Strong against electrostatic discharge.

[High Temperature, high precision type]

TD05 Series

- Dimensions 1.0×0.5×0.55max(mm)
- Resistance tolerance ±1%, ±2%, ±3% (R25)
- B value tolerance ±1%, ±2% (R25/50)
- Termination Tin plating
- Operating temperature range -40°C~+150°C
- Heat dissipation 2.4mW/°C
- Maximum power dissipation 300mW

TD11 Series

- Dimensions 1.6×0.8×0.70max(mm)
- Resistance tolerance ±1%, ±2%, ±3% (R25)
- B value tolerance ±1%, ±2% (R25/50)
- Termination Tin plating
- Operating temperature range -40°C~+150°C
- Heat dissipation 3.0mW/°C
- Maximum power dissipation 375mW

■Features

- Suitable for wide operating temperature rang.(-40°C~+150°C)
- High precision type.(±1%)
- Strong against electrostatic discharge.
- Suitable for engine control circuit and DC/DC converter.
- Glass sealed body for high reliability.

[超高精度产品]

TX05系列

- 形状·尺寸 1.0×0.5×0.55max (mm)
(参见形状·尺寸表)
- 电阻值容许偏差 ±0.5%, ±1%(R25)
- B值容许偏差 ±0.3% (R25/R50)
- 端子电极 镀锡
- 使用温度范围 -40°C~+125°C
- 散热系数 2.4mW/°C
- 最大功率 240mW

■特点

- 实现超高精度的电阻值±0.5%容许偏差, B定数0.3%容许偏差。
- 元件表面全部玻璃密封, 可靠性高。
- 静电放电耐压性能优异。

■特性 Characteristics

| TX05系列 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value |
|----------------------|-----------------------|----------------------|----------------------|
| 3H103** | 10kΩ | 3,380K | 3,423K |

※上表以外的特殊规格请垂询。
※Please consult us for availability of non-standard items.

[超高精度产品]

TH03系列

- 形状·尺寸 0.6×0.3×0.34max (mm)
(参见形状·尺寸表)
- 电阻值容许偏差 ±3%(R25)
- B值容许偏差 ±1% (B25/50)
- 端子电极 镀锡
- 使用温度范围 -40°C~+100°C
- 散热系数 1.5mW/°C
- 最大功率 110mW

■特性 Characteristics

| TH03系列 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value |
|----------------------|-----------------------|----------------------|----------------------|
| 3H103** | 10kΩ | 3,370K | 3,413K |
| 4B104** | 100kΩ | 4,030K | 4,073K |

TH05系列

- 形状·尺寸 1.0×0.5×0.55max (mm)
(参见形状·尺寸表)
- 电阻值容许偏差 ±1%, ±2%, ±3% (R25)
- B值容许偏差 ±1%, ±2% (B25/50)
- 端子电极 镀锡
- 使用温度范围 -40°C~+125°C
- 散热系数 2.4mW/°C
- 最大功率 240mW

■特点

- 超小型。
- 电阻值精度高, B值的容许偏差为±1%。
- 静电放电耐压性能优异。
- 最适用于锂离子、镍氢等电池组。
- 元件表面全部玻璃密封, 可靠性高。

■特性

| TH05系列 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value | 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value |
|----------------------|-----------------------|----------------------|----------------------|------------|-----------------------|----------------------|----------------------|
| 3H103** | 10kΩ | 3,370K | 3,413K | 3L104** | 100kΩ | 3,540K | 3,578K |
| 3T103** | 10kΩ | 3,820K | 3,792K | 4F104** | 100kΩ | 4,250K | 4,254K |
| 3I473** | 47kΩ | 3,400K | 3,490K | 3M154** | 150kΩ | 3,620K | 3,668K |
| 4B473** | 47kΩ | 4,050K | 4,057K | 4K474H* | 470kΩ | 4,500K | 4,541K |

※关于R-T数据, 请参阅本公司主页。

[Super-high precision type]

TX05 Series

- Dimensions 1.0×0.5×0.55max (mm)
- Resistance tolerance ±0.5%, ±1%(R25)
- B value tolerance ±0.3%(R25/R50)
- Termination Tin plating
- Operating temperature range -40°C~+125°C
- Heat dissipation 2.4mW/°C
- Maximum power dissipation 240mW

■Features

- High precision type.(±0.3%)
- Glass sealed body for high reliability
- Strong against electrostatic discharge.

[High precision type]

TH03 Series

- Dimensions 0.6×0.3×0.34max (mm)
- Resistance tolerance ±3%(R25)
- B value tolerance ±1%(B25/50)
- Termination Tin plating
- Operating temperature range -40°C~+100°C
- Heat dissipation 1.5mW/°C
- Maximum power dissipation 110mW

TH05 Series

- Dimensions 1.0×0.5×0.55max (mm)
- Resistance tolerance ±1%, ±2%, ±3%(R25)
- B value tolerance ±1%, ±2%(B25/50)
- Termination Tin plating
- Operating temperature range -40°C~+125°C
- Heat dissipation 2.4mW/°C
- Maximum power dissipation 240mW

■Features

- Ultra small size.
- High precision type.(±1%)
- Strong against electrostatic discharge.
- Suitable for battery pack application.(Li-ion, Ni-MH etc)
- Glass sealed body for high reliability.

■Characteristics

TH05 Series

[高精度产品]

TH11系列

- 形状·尺寸 1.6×0.8×0.70max (mm)
(参见形状·尺寸表)
- 电阻值容许偏差 ±1%, ±2%, ±3% (R25)
- B值容许偏差 ±1%, ±2% (B25/50)
- 端子电极 镀锡
- 使用温度范围 -40°C~+125°C
- 散热系数 3.0mW/°C
- 最大功率 300mW

■特点

- 电阻值精度高, B值的容许偏差为±1%。
- 静电放电耐压性能优异。
- 最适用于锂离子、镍氢等电池组。
- 元件表面全部玻璃密封, 可靠性高。

■特性

TH11系列

| 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value |
|------------|-----------------------|----------------------|----------------------|
| 3H103** | 10kΩ | 3,370K | 3,423K |
| 3V103** | 10kΩ | 3,910K | 3,876K |
| 4C153** | 15kΩ | 4,110K | 4,053K |
| 3T223** | 22kΩ | 3,820K | 3,841K |
| 3K333** | 33kΩ | 3,480K | 3,617K |
| 3J473** | 47kΩ | 3,440K | 3,481K |
| 4B473** | 47kΩ | 4,050K | 4,067K |

※关于R-T数据, 请参阅本公司主页。

[High precision type]

TH11 Series

- Dimensions 1.6×0.8×0.70max (mm)
- Resistance tolerance ±1%, ±2%, ±3%(R25)
- B value tolerance ±1%, ±2%(B25/50)
- Termination Tin plating
- Operating temperature range -40°C~+125°C
- Heat dissipation 3.0mW/°C
- Maximum power dissipation 300mW

■Features

- High precision type.(±1%)
- Strong against electrostatic discharge.
- Suitable for battery pack application.(Li-ion, Ni-MH etc)
- Glass sealed body for high reliability.

■Characteristics

TH11 Series

| 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value |
|------------|-----------------------|----------------------|----------------------|
| 3K683** | 68kΩ | 3,500K | 3,534K |
| 3M104** | 100kΩ | 3,590K | 3,628K |
| 4H104** | 100kΩ | 4,360K | 4,360K |
| 3R154** | 150kΩ | 3,680K | 3,723K |
| 3S224** | 220kΩ | 3,760K | 3,806K |
| 3U334** | 330kΩ | 3,850K | 3,904K |
| 3W474** | 470kΩ | 3,940K | 3,998K |
| 4V105G* | 1MΩ | 4,900K | 4,909K |

※Regarding R-T data, please refer to our Home Page.

TH20系列

- 形状·尺寸 2.0×1.25×1.25max (mm)
(参见形状·尺寸表)
- 电阻值容许偏差 ±1%, ±2%, ±3% (R25)
- B值容许偏差 ±1%, ±2% (B25/50)
- 端子电极 镀锡
- 使用温度范围 -40°C~+125°C
- 散热系数 5.0mW/°C
- 最大功率 500mW

■特点

- 电阻值精度高, B值的容许偏差为±1%。
- 静电放电耐压性能优异。
- 最适用于锂离子、镍氢等电池组。
- 元件表面全部玻璃密封, 可靠性高。

■特性

TH20系列

| 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value |
|------------|-----------------------|----------------------|----------------------|
| 3H103** | 10kΩ | 3,370K | 3,489K |
| 3V103** | 10kΩ | 3,924K | 3,914K |
| 3W303** | 30kΩ | 3,950K | 3,991K |
| 3M503** | 50kΩ | 3,590K | 3,628K |

※关于R-T数据, 请参阅本公司主页。

TH20 Series

- Dimensions 2.0×1.25×1.25max (mm)
- Resistance tolerance ±1%, ±2%, ±3%(R25)
- B value tolerance ±1%, ±2%(B25/50)
- Termination Tin plating
- Operating temperature range -40°C~+125°C
- Heat dissipation 5.0mW/°C
- Maximum power dissipation 500mW

■Features

- High precision type.(±1%)
- Strong against electrostatic discharge.
- Suitable for battery pack application.(Li-ion, Ni-MH etc)
- Glass sealed body for high reliability.

■Characteristics

TH20 Series

| 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value |
|------------|-----------------------|----------------------|----------------------|
| 3W503** | 50kΩ | 3,950K | 4,030K |
| 3R803** | 80kΩ | 3,700K | 3,743K |
| 3S104** | 100kΩ | 3,760K | 3,806K |

※Regarding R-T data, please refer to our Home Page.

[通用产品]

TN · TC20系列

- 形状 · 尺寸 2.0×1.25×1.25max (mm)
(参见形状 · 尺寸表)
- 电阻值容许偏差 ±5%, ±10% (R25)
- B值容许偏差 ±3%, ±5% (B25/50)
- 端子电极 镀锡
- 使用温度范围 -40°C~+125°C
- 散热系数 5.0mW/°C
- 最大功率 500mW

■特点

- 低容量, 适用于TCXO。
- 可对应高B值(TC20系列)。
- 元件表面玻璃密封, 可靠性高。
- 产品系列齐全, 可适应各种用途需要。

■特性 Characteristics

TN20系列 TN20 Series

| 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value | 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value |
|------------|-----------------------|----------------------|----------------------|------------|-----------------------|----------------------|----------------------|
| 2N680** | 68Ω | 2,650K | 2,673K | 3H103** | 10kΩ | 3,370K | 3,489K |
| 2S101** | 100Ω | 2,750K | 2,758K | 3V103** | 10kΩ | 3,924K | 3,914K |
| 2T151** | 150Ω | 2,800K | 2,813K | 3N153** | 15kΩ | 3,650K | 3,695K |
| 2V221** | 220Ω | 2,900K | 2,917K | 3S223** | 22kΩ | 3,750K | 3,786K |
| 3A331** | 330Ω | 3,000K | 3,019K | 3W303** | 30kΩ | 3,950K | 3,991K |
| 3C471** | 470Ω | 3,100K | 3,120K | 3T333** | 33kΩ | 3,800K | 3,839K |
| 3E681** | 680Ω | 3,200K | 3,218K | 3U473** | 47kΩ | 3,850K | 3,894K |
| 3E102** | 1kΩ | 3,200K | 3,221K | 3W503** | 50kΩ | 3,950K | 4,030K |
| 3I152** | 1.5kΩ | 3,400K | 3,403K | 3N683** | 68kΩ | 3,650K | 3,690K |
| 3K202** | 2kΩ | 3,500K | 3,469K | 3R803** | 80kΩ | 3,700K | 3,743K |
| 3S332** | 3.3kΩ | 3,750K | 3,731K | 4C104** | 100kΩ | 4,100K | 4,141K |
| 3W472** | 4.7kΩ | 3,950K | 3,909K | 4D154** | 150kΩ | 4,150K | 4,195K |
| 4C682** | 6.8kΩ | 4,100K | 4,044K | 5A205** | 2MΩ | 5,000K | 5,043K |

※关于R-T数据, 请参阅本公司主页。 ※Regarding R-T data, please refer to our Home Page.

TC20系列 TC20 Series

| 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value | 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value |
|------------|-----------------------|----------------------|----------------------|------------|-----------------------|----------------------|----------------------|
| 2S400** | 40Ω | 2,750K | 2,758K | 4C302** | 3.0kΩ | 4,100K | 4,044K |

※关于R-T数据, 请参阅本公司主页。 ※Regarding R-T data, please refer to our Home Page.

TN11系列

- 形状 · 尺寸 1.6×0.8×0.70max (mm)
(参见形状 · 尺寸表)
- 电阻值容许偏差 ±5%, ±10% (R25)
- B值容许偏差 ±3% (B25/50)
- 端子电极 镀锡
- 使用温度范围 -40°C~+125°C
- 散热系数 3.0mW/°C
- 最大功率 300mW

■特点

- 小型、薄型。
- 低容量, 适用于TCXO。
- 元件表面玻璃密封, 可靠性高。
- 产品系列齐全, 可适应各种用途需要。

■特性

TN11系列

| 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value | 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value |
|------------|-----------------------|----------------------|----------------------|------------|-----------------------|----------------------|----------------------|
| 3I202** | 2kΩ | 3,400K | 3,399K | 3K683** | 68kΩ | 3,500K | 3,534K |
| 3H103** | 10kΩ | 3,370K | 3,423K | 3M104** | 100kΩ | 3,590K | 3,628K |
| 3V103** | 10kΩ | 3,910K | 3,876K | 4H104** | 100kΩ | 4,360K | 4,360K |
| 4C153** | 15kΩ | 4,110K | 4,053K | 3R154** | 150kΩ | 3,680K | 3,723K |
| 3T223** | 22kΩ | 3,820K | 3,841K | 3S224** | 220kΩ | 3,760K | 3,806K |
| 3K333** | 33kΩ | 3,480K | 3,617K | 3U334** | 330kΩ | 3,850K | 3,904K |
| 3J473** | 47kΩ | 3,440K | 3,481K | 3W474** | 470kΩ | 3,940K | 3,998K |
| 4B473** | 47kΩ | 4,050K | 4,067K | | | | |

※关于R-T数据, 请参阅本公司主页。 ※Regarding R-T data, please refer to our Home Page.

[Standard type]

TN-TC20 Series

- Dimensions 2.0×1.25×1.25max (mm)
- Resistance tolerance ±5%, ±10%(R25)
- B value tolerance ±3%, ±5%(B25/50)
- Termination Tin plating
- Operating temperature range -40°C~+125°C
- Heat dissipation 5.0mW/°C
- Maximum power dissipation 500mW

■Features

- Suitable for TCXO applications because of the low capacitance.
- High B value available.(TC20 Series)
- Glass sealed body for high reliability.
- Full lineup for various applications.

■Characteristics

TN11 Series

TN11 Series

- Dimensions 1.6×0.8×0.70max (mm)
- Resistance tolerance ±5%, ±10%(R25)
- B value tolerance ±3% (B25/50)
- Termination Tin plating
- Operating temperature range -40°C~+125°C
- Heat dissipation 3.0mW/°C
- Maximum power dissipation 300mW

■Features

- Small and thin size.
- Suitable for TCXO applications because of the low capacitance.
- Glass sealed body for high reliability.
- Full lineup for various applications.

■Characteristics

TN11 Series

[通用产品]

TN·TC10系列

- 形状·尺寸 1.6×0.8×0.95max (mm)
(参见形状·尺寸表)
- 电阻值容许偏差 ±5%, ±10% (R25)
- B值容许偏差 ±3%, ±5% (B25/50)
- 端子电极 镀锡
- 使用温度范围 -40°C~+125°C
- 散热系数 3.0mW/°C
- 最大功率 300mW

■特点

- 低容量, 适用于TCXO。
- 可对应高B值(TC10系列)。
- 元件表面玻璃密封, 可靠性高。
- 产品系列齐全, 可适应各种用途需要。

■特性 Characteristics

TN10系列 TN10 Series

| 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value | 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value |
|------------|-----------------------|----------------------|----------------------|------------|-----------------------|----------------------|----------------------|
| 2D300** | 30Ω | 2,150K | 2,155K | 3K222** | 2.2kΩ | 3,500K | 3,499K |
| 2H680** | 68Ω | 2,350K | 2,380K | 3N332** | 3.3kΩ | 3,650K | 3,633K |
| 2R101** | 100Ω | 2,700K | 2,724K | 3S472** | 4.7kΩ | 3,750K | 3,750K |
| 2S121** | 120Ω | 2,750K | 2,769K | 3V682** | 6.8kΩ | 3,900K | 3,868K |
| 2T151** | 150Ω | 2,800K | 2,813K | 4C103** | 10kΩ | 4,100K | 4,048K |
| 2V221** | 220Ω | 2,900K | 2,901K | 3U153** | 15kΩ | 3,850K | 3,870K |
| 3A331** | 330Ω | 3,000K | 3,025K | 3K223** | 22kΩ | 3,500K | 3,643K |
| 3C471** | 470Ω | 3,100K | 3,125K | 3J333** | 33kΩ | 3,450K | 3,494K |
| 3D681** | 680Ω | 3,150K | 3,181K | 3K473** | 47kΩ | 3,500K | 3,537K |
| 3F102** | 1kΩ | 3,250K | 3,260K | 3M683** | 68kΩ | 3,600K | 3,645K |
| 3I152** | 1.5kΩ | 3,400K | 3,399K | 3R104** | 100kΩ | 3,700K | 3,743K |
| | | | | 3S154** | 150kΩ | 3,750K | 3,797K |

※关于R-T数据, 请参阅本公司主页。

※Regarding R-T data, please refer to our Home Page.

TC10系列 TC10 Series

| 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value | 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value |
|------------|-----------------------|----------------------|----------------------|------------|-----------------------|----------------------|----------------------|
| 2R820** | 82Ω | 2,700K | 2,724K | 3K182** | 1.8kΩ | 3,500K | 3,499K |
| 2S101** | 100Ω | 2,750K | 2,769K | 4C202** | 2kΩ | 4,100K | 4,048K |
| 2V181** | 180Ω | 2,900K | 2,901K | 4C302** | 3kΩ | 4,100K | 4,048K |

※关于R-T数据, 请参阅本公司主页。

※Regarding R-T data, please refer to our Home Page.

TN·TC05系列

- 形状·尺寸 1.0×0.5×0.55max (mm)
(参见形状·尺寸表)
- 电阻值容许偏差 ±5%, ±10% (R25)
- B值容许偏差 ±3% (B25/50)
- 端子电极 镀锡
- 使用温度范围 -40°C~+125°C
- 散热系数 2.4mW/°C
- 最大功率 240mW

■特点

- 超小型。
- 低容量, 适用于TCXO。
- 可对应高B值(TC05系列)。
- 元件表面玻璃密封, 可靠性高。
- 产品系列齐全, 可适应各种用途需要。

■特性 Characteristics

TN05系列 TN05 Series

| 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value | 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value |
|------------|-----------------------|----------------------|----------------------|------------|-----------------------|----------------------|----------------------|
| 3C102** | 1.0kΩ | 3,110K | 3,124K | 3V223** | 22kΩ | 3,900K | 3,898K |
| 3E152** | 1.5kΩ | 3,200K | 3,214K | 3N333** | 33kΩ | 3,650K | 3,725K |
| 3G222** | 2.2kΩ | 3,290K | 3,298K | 4B473** | 47kΩ | 4,050K | 4,057K |
| 3H302** | 3.0kΩ | 3,370K | 3,375K | 3I473** | 47kΩ | 3,400K | 3,490K |
| 3I332** | 3.3kΩ | 3,420K | 3,425K | 3J683** | 68kΩ | 3,450K | 3,492K |
| 3L472** | 4.7kΩ | 3,530K | 3,528K | 3K803** | 80kΩ | 3,500K | 3,543K |
| 3N682** | 6.8kΩ | 3,670K | 3,657K | 3L104** | 100kΩ | 3,540K | 3,578K |
| 3H103** | 10kΩ | 3,370K | 3,413K | 3M154** | 150kΩ | 3,620K | 3,668K |
| 3T103** | 10kΩ | 3,820K | 3,792K | 4W205** | 2MΩ | 4,950K | 4,984K |
| 4B153** | 15kΩ | 4,030K | 3,985K | | | | |

※关于R-T数据, 请参阅本公司主页。

※Regarding R-T data, please refer to our Home Page.

TC05系列 TC05 Series

| 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value | 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value |
|------------|-----------------------|----------------------|----------------------|------------|-----------------------|----------------------|----------------------|
| 2S300** | 30Ω | 2,750K | 2,769K | 2S151** | 150Ω | 2,750K | 2,769K |
| 2S400** | 40Ω | 2,750K | 2,769K | 4C202** | 2.0kΩ | 4,100K | 4,048K |
| 2S680** | 68Ω | 2,750K | 2,769K | 4C272** | 2.7kΩ | 4,100K | 4,048K |
| 2S820** | 82Ω | 2,750K | 2,769K | 4C302** | 3.0kΩ | 4,100K | 4,048K |
| 2S101** | 100Ω | 2,750K | 2,769K | 4C332** | 3.3kΩ | 4,100K | 4,048K |
| 2S121** | 120Ω | 2,750K | 2,769K | 4K224** | 220kΩ | 4,500K | 4,541K |

※关于R-T数据, 请参阅本公司主页。

※Regarding R-T data, please refer to our Home Page.

[Standard type]

TN·TC10 Series

- Dimensions 1.6×0.8×0.95max (mm)
- Resistance tolerance ±5%, ±10%(R25)
- B value tolerance ±3%, ±5%(B25/50)
- Termination Tin plating
- Operating temperature range -40°C~+125°C
- Heat dissipation 3.0mW/°C
- Maximum power dissipation 300mW

■Features

- Suitable for TCXO applications because of the low capacitance.
- High B value available.(TC10 Series)
- Glass sealed body for high reliability.
- Full lineup for various applications.

TN·TC05 Series

- Dimensions 1.0×0.5×0.55max (mm)
- Resistance tolerance ±5%, ±10%(R25)
- B value tolerance ±3% (B25/50)
- Termination Tin plating
- Operating temperature range -40°C~+125°C
- Heat dissipation 2.4mW/°C
- Maximum power dissipation 240mW

■Features

- Ultra small size.
- Suitable for TCXO applications because of the low capacitance.
- High B value available.(TC05 Series)
- Glass sealed body for high reliability.
- Full lineup for various applications.

[通用产品]

TS·TC03系列

- 形状·尺寸 0.6×0.3×0.34max (mm)
(参见形状·尺寸表)
- 电阻值容许偏差 ±5%, ±10% (R25)
- B值容许偏差 ±3% (B25/50)
- 端子电极 镀锡
- 使用温度范围 -40°C~+100°C
- 散热系数 1.5mW/°C
- 最大功率 110mW

■特点

- 尺寸为0.6×0.3mm的超小型。
- 可对应高B值。
- 元件表面玻璃密封，可靠性高。

■特性 Characteristics

TC03系列 TC03 Series

| 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | 值 B25/85 B Value | 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value |
|------------|-----------------------|----------------------|---------------------|------------|-----------------------|----------------------|----------------------|
| 3H103J | 10kΩ | 3,370K | 3,413K | 4B104** | 100kΩ | 4,030K | 4,073K |

TS03系列 TS03 Series

| 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | 值 B25/85 B Value | 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value |
|------------|-----------------------|----------------------|---------------------|------------|-----------------------|----------------------|----------------------|
| 2S250** | 25Ω | 2,750K | 2,754K | 4K202** | 2.0kΩ | 4,500K | 4,481K |
| 2S300** | 30Ω | 2,750K | 2,754K | 4K302** | 3.0kΩ | 4,500K | 4,481K |

※关于R-T数据，请参阅本公司主页。
※上表以外的特殊规格请垂询。

※Regarding R-T data, please refer to our Home Page.
※Please consult us for availability of non-standard items.

[Standard type]

TS·TC03 Series

- Dimensions 0.6×0.3×0.34max(mm)
- Resistance tolerance ±5%, ±10%(R25)
- B value tolerance ±3%(B25/50)
- Termination Tin plating
- Operating temperature range -40°C~+100°C
- Heat dissipation 1.5mW/°C
- Maximum power dissipation 110mW

■Features

- Ultra small size(0.6×0.3mm)
- Corresponding to the high B value
- Glass sealed body for high reliability

使用注意事项

■使用电压

若使用的电压过高，则因传感器自身发热，不仅无法正确检测出周围的温度，而且可能会引起异常高温，损坏传感器。因此，对于异常电压，请采取保护电路等安全措施。

■使用环境

请勿在下列环境中使用，否则将导致特性劣化，严重时甚至会造成故障(或人身伤害事故)。

- 1) 直接接触水的场所、因湿度大可能会导致结露的场所
- 2) 有腐蚀性、还原性气体(硫化氢、亚硫酸、氯气、氨气等)的环境
- 3) 有挥发性、可燃性气体的环境
- 4) 多尘的场所
- 5) 减压或加压后的空气中
- 6) 暴露于盐水、油、药液、有机溶剂的场所
- 7) 振动或冲击过大的场所
- 8) 其他与上述环境相当的场所

请务必在成品上附加适当的故障保护功能，确保在产品出现异常或不良状况时，可防止二次灾害的发生。

■安全预防

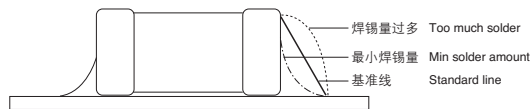
医疗、宇航、核电等设备上使用的电子部件，与用于一般民用设备的相比，常常要求更高的可靠性，因为这些设备一旦发生故障，经常会导致人身伤害或引起巨大的社会损失。考虑用于此类用途时，请务必事先与本公司联系。

■保存环境

- 1) 保存温度、湿度
环境温度：-10~40°C
相对湿度：70%RH以下(不可结露)
- 2) 保存期限
购入后12个月以内
- 3) 开封后的处理
请在打开最小包装后密封保存或置于有干燥剂的密封容器内保存。
- 4) 保存场所
请保存在无阳光直射及特殊气体(硫磺和氯气等)的场所。

■安装条件

- 1) 设计时确保焊盘的大小左右均等。
- 2) 焊剂请使用低活性(卤化物含有率在0.2wt%以下)的产品。
- 3) 焊接后进行超音波清洗时，输出过大会引起主板共振，由此可能会造成主板破裂或端子电极粘着力下降。故此，推荐按以下条件进行清洗。
频率：40kHz以下
输出：20W/L以下
清洗时间：5分钟以内
- 4) 焊锡量越多，本产品所受的机械应力就越大，过大时可能会造成破裂。请调整焊锡量，使焊缝上端的厚度为贴片厚度的1/2~2/3。



- 5) 若在传感器焊接于主板上后的工序或处理中主板发生弯曲，传感器可能会发生破裂。因此在设计零部件配置时，应尽量避免施加会使主板产生挠曲的过大应力。
- 6) 进行主板分割时，由于传感器受到机械应力的作用，故请采取适当的传感器配置和分割方法。

■其他注意事项

请务必在规定的温度范围内使用，否则可能会导致材质及特性劣化。若对本产品规格有任何不明之处，请与本公司联系。

Caution in Chip Thermistor usage

■Operating Power

Thermistors shall not be operated in excess of the specified Maximum permissible electrical power" in the specifications. Unless the thermistors are operated under the specified Maximum permissible electrical power, it may cause burnout and damage due to thermal run away. Fully check safety and reliability in your circuit.

■Operating Conditions

Do not use the thermistors under the following conditions because all these factors deteriorate the thermistor characteristics or cause failures and burnout.

- 1) Wet or humid locations
- 2) Corrosive or deoxidizing gas (Hydrogen sulfide, Sulfurous acid, Chloride and ammonia, etc.)
- 3) Volatile or flammable gas
- 4) Dusty conditions
- 5) Under high pressure or low pressure
- 6) locations with salt water, oils, chemical liquids or organic solvents
- 7) Strong vibrations or mechanical impact
- 8) Other places similar to the hazardous conditions mentioned above

Be sure to provide an appropriate fail-safe function on your product to prevent secondary damages that may be caused by the failure of our product.

■Safety precaution

Our products shall be used for general purpose applications required for consumer type electronics equipment. Strongly recommend to consult us before use of our product, if you think about use of our products on the following special applications with high level of safety. •Medical equipment, •Aircraft equipment, Aerospace equipment, •Atomic power equipment, etc.

■Storage conditions

- 1) Storage temperature and humidity
Temperature : -10 to + 40 degree C
Humidity : less than 70%RH(not dewing condition)
- 2) Storage term
Use our product within 12 months after delivery.
- 3) Handling after unpacking
After unpacking, reseal products or store them in a sealed package with a dry agent.
- 4) Storage place
Do not store our products in direct sunlight or in corrosive gas(sulfuric acid or chlorine gas, etc.)

■Soldering and mounting notice

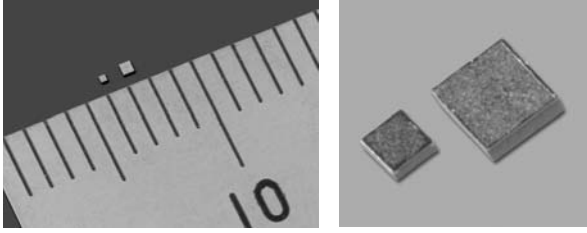
- 1) Use recommended dimensions of lands and the dimensions shall be symmetrical.
- 2) Use rosin-based flux. Do not use strong acid flux with halide content over 0.2wt%.
- 3) Do not use ultrasonic cleaning with too much output to avoid deteriorating the strength of the terminal electrodes or cracking in the solder and/or ceramic bodies of the products. The followings are recommended conditions for ultrasonic cleaning.
Frequency : less than 40 kHz
Output : less than 20 W/L
Cleaning time : less than 5 min
- 4) Too much soldering may cause mechanical stress resulting in cracking. The amount of solder shall be controlled according to the standard height of fillet shown below.

- 5) Choose a mounting position that minimizes the stress imposed on the chip during bending of the board.
- 6) Since dividing or breaking of the PC boards may cause mechanical stress in the thermistors on the PC boards, it shall be done carefully by using a jig to prevent the product from mechanical damage.

■Other caution

Use this product within the specified temperature range. Feel free to contact us when you have any questions regarding our products.

FH05、FH10系列



- 电阻值容许偏差 $\pm 1\%$, $\pm 2\%$, $\pm 3\%$ (R25)
 - B值容许偏差 $\pm 1\%$ (B25/50)
 - 端子电极 金
 - 使用温度范围 $-40^{\circ}\text{C} \sim +125^{\circ}\text{C}$
 - 散热系数 FH05: $0.15\text{mW}/^{\circ}\text{C}$, FH10: $0.3\text{mW}/^{\circ}\text{C}$
 - 最大功率 FH05: 15mW , FH10: 30mW
- ※散热常数、最大功率是钎焊 $\phi 0.1\text{mm}$ CuNi线状态下的值。

■特点

- 小型、高精度。
- 可靠性持久。
- 可焊性与粘合性优异。
- 金锡焊接贴装时的稳定性优异。(约 300°C)

■特性 Characteristics

FH05、FH10系列 FH05,10 Series

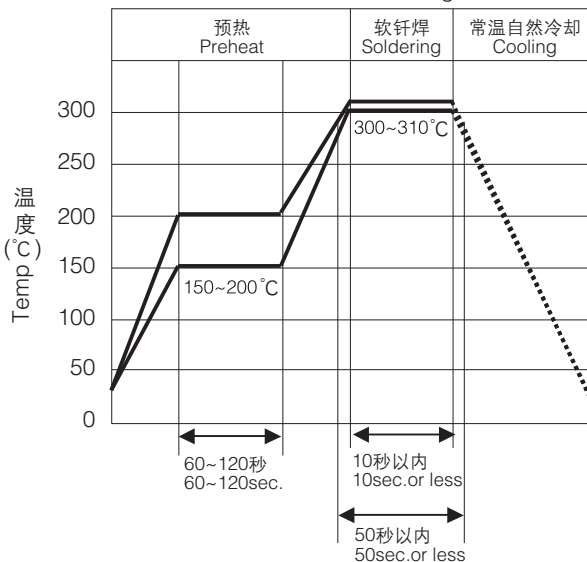
| 系列 Series | 型号 Type | 电阻值 Resistance R25 | 电阻值容许偏差 Resistance Tolerance | | | B值 B25/50 B Value |
|-----------|--------------|--------------------|------------------------------|-----------|-----------|-------------------|
| | | | $\pm 1\%$ | $\pm 2\%$ | $\pm 3\%$ | |
| FH05 | FH05-6D103*C | 10k Ω | ○ | ○ | ○ | 3,930K |
| FH10 | FH10-6E103*C | 10k Ω | ○ | ○ | ○ | 3,950K |
| | FH10-6Q103*C | 10k Ω | ○ | ○ | ○ | 3,410K |
| | FH10-3U104*C | 100k Ω | ○ | ○ | ○ | 3,950K |

※关于R-T数据, 请参阅本公司主页。

※Regarding R-T data, please refer to our Home Page.

■推荐的钎焊条件 Recommended Soldering Profile

FH系列Au/Sn钎焊安装
FH Series Au/Sn Solder mounting



钎焊: Au/Sn(80/20)预制 Solder: Au/Sn(80/20) preform
环境: N2(O2:50ppm以内) Atmosphere: N2 gases(O2:50ppm or less)

- 1) 保持时间为元件表面温度达到以上温度后的时间。
 - 2) 超过 280°C 的温度时, 必须在50秒以内。
 - 3) 钎焊后应慢冷却, 不可快速冷却。
- 1) Time shown in the above figures is measured from the point when chip surface reaches temperature.
 - 2) Please keep exposure to temperature exceeding 280°C to under 50seconds.
 - 3) After soldering, do not force cool, allow the parts to cool gradually.

[通用产品]
MN18系列



- 电阻值容许偏差 $\pm 3\%$, $\pm 5\%$ (R25)
- B值容许偏差 $\pm 3\%$ (B25/50)
- 端子电极 镀锡
- 使用温度范围 $-40^{\circ}\text{C}\sim+150^{\circ}\text{C}$
- 散热系数 $2.0\text{mW}/^{\circ}\text{C}$
- 最大功率 250mW

■特点

- 可在高温下使用。
- 耐环境性能优异。

■特性 Characteristics

MN18系列 MN18 Series

| 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value | 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value |
|------------|-----------------------|----------------------|----------------------|------------|-----------------------|----------------------|----------------------|
| 3G202** | 2k Ω | 3,470K | 3,507K | 6E203** | 20k Ω | 3,965K | 4,016K |
| 3G302** | 3k Ω | 3,470K | 3,507K | 6P303** | 30k Ω | 3,948K | 3,984K |
| 3G502** | 5k Ω | 3,470K | 3,507K | 6H503** | 50k Ω | 3,770K | 3,820K |
| 3H103** | 10k Ω | 3,465K | 3,502K | 3U104** | 100k Ω | 3,965K | 4,038K |
| | | | | 3U154** | 150k Ω | 3,965K | 4,038K |

※关于R-T数据, 请参阅本公司主页。

※Regarding R-T data, please refer to our Home Page.

MH18系列

- 电阻值容许偏差 $\pm 1\%$, $\pm 2\%$, $\pm 3\%$ (R25)
- B值容许偏差 $\pm 1\%$ (B25/50)
- 端子电极 镀锡
- 使用温度范围 $-40^{\circ}\text{C}\sim+150^{\circ}\text{C}$
- 散热系数 $2.0\text{mW}/^{\circ}\text{C}$
- 最大功率 250mW

■特点

- 电阻值精度高, B值的容许偏差为 $\pm 1\%$ 。
- 可在高温下使用。
- 耐环境性能优异。

■特性 Characteristics

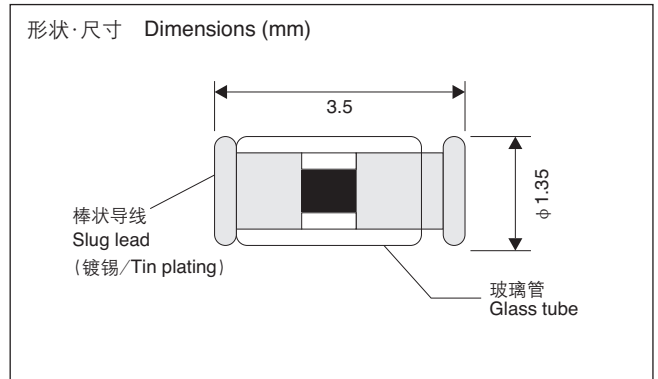
MH18系列 MH18 Series

| 型号 Type | 电阻值 Resistance | | | | B值 B25/50 B Value | B值 B25/85 B Value |
|------------|----------------|-------------------------------|-----------|-----------|----------------------|----------------------|
| | R25 | 电阻值 容许偏差 Resistance tolerance | | | | |
| | | $\pm 1\%$ | $\pm 2\%$ | $\pm 3\%$ | | |
| 3G202** | 2k Ω | ○ | ○ | ○ | 3,470K | 3,507K |
| 3G302** | 3k Ω | ○ | ○ | ○ | 3,470K | 3,507K |
| 3G502** | 5k Ω | ○ | ○ | ○ | 3,470K | 3,507K |
| 3H103** | 10k Ω | ○ | ○ | ○ | 3,465K | 3,502K |
| 6E203** | 20k Ω | — | ○ | ○ | 3,965K | 4,016K |
| 6P303** | 30k Ω | ○ | ○ | ○ | 3,948K | 3,984K |
| 6H503** | 50k Ω | ○ | ○ | ○ | 3,770K | 3,820K |
| 3U104** | 100k Ω | ○ | ○ | ○ | 3,965K | 4,038K |
| 3U154** | 150k Ω | ○ | ○ | ○ | 3,965K | 4,038K |

※关于R-T数据, 请参阅本公司主页。

※Regarding R-T data, please refer to our Home Page.

[High temp. range type]
MN18 Series



- Resistance tolerance $\pm 3\%$, $\pm 5\%$ (R25)
- B value tolerance $\pm 3\%$ (B25/50)
- Termination Tin plating
- Operating temperature range $-40^{\circ}\text{C}\sim+150^{\circ}\text{C}$
- Heat dissipation $2.0\text{mW}/^{\circ}\text{C}$
- Maximum power dissipation 250mW

■Features

- Suitable for high temperature applications.
- Excellent choice for harsh environments.

[引脚类型] [Leaded type]

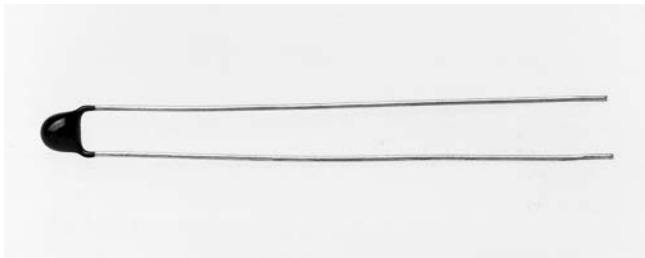
| | | |
|--|---|--|
| 树脂涂层产品 Resin coated CN, CH, BN, BM, BF, DC Series | [高灵敏度型] [High sensitivity type] 树脂涂层产品 Resin coated RM, RH Series | [耐高温型] [High temperature type] 玻璃封装产品 Glass encapsulated GA, GH, GR Series |
|--|---|--|

[用途] [Applications] [特点] [Features]

| | | |
|-------------------------------|---|---|
| 电池组 Battery pack | 小型、高精度。 可对应不同导线长度的产品。 Small and Precise. Available with different lead lengths. | CN, CH, BN, BM, BF, DC系列 CN, CH, BN, BM, BF, DC Series |
| 电子体温计 Clinical thermometer | 小型、高精度、高灵敏度。 导线长，便于测定部安装。 Small, precise and sensitive. Long leads for easy placement. | RM, RH系列 RM, RH Series |
| 车辆 Automobile | 可在高温下使用。 Suitable for high temperature application. | GA, GH, GR系列 GA, GH, GR Series |

[径向引脚型]

CN25系列



- 电阻值容许偏差 ±3%, ±5% (R25)
- B值容许偏差 ±3% (B25/50)
- 端子电极 无铅焊接涂层铜镍合金线
- 使用温度范围 -40°C ~ +110°C
- 散热系数 $\delta=0.7\text{mW}/^\circ\text{C}$
- 最大功率 $P=59.5\text{mW}$

■特点

- 小型、高精度。
- 温度循环特性优异。

■特性 Characteristics

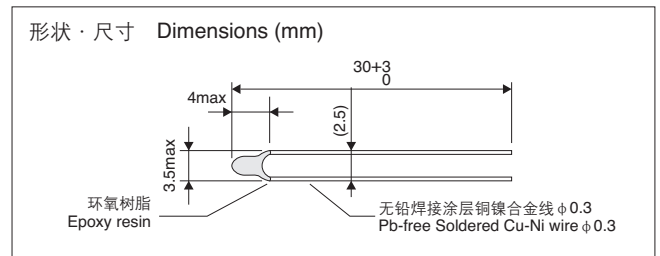
CN25系列 CN25 Series

| 型号 Type | 电阻值 Resistance R25 | B值 B Value B25/50 | B值 B Value B25/85 | 热响应时间常数 Thermal time constant τ (sec.) | 型号 Type | 电阻值 Resistance R25 | B值 B Value B25/50 | B值 B Value B25/85 | 热响应时间常数 Thermal time constant τ (sec.) |
|------------|--------------------------|-------------------------|-------------------------|---|------------|--------------------------|-------------------------|-------------------------|---|
| 3G501** | 500 Ω | 3,450K | 3,488K | 14 | 3H103** | 10k Ω | 3,450K | 3,486K | 12 |
| 3G102** | 1k Ω | 3,450K | 3,488K | 12 | 3T103** | | 3,950K | 3,989K | 14 |
| 6D102** | | 3,930K | 3,941K | 14 | 3T203** | 20k Ω | 3,950K | 3,989K | 12 |
| 3G202** | 2k Ω | 3,450K | 3,488K | 14 | 3U303** | 30k Ω | 3,950K | 4,025K | 14 |
| 6D202** | | 3,930K | 3,941K | 12 | 3U503** | 50k Ω | 3,950K | 4,025K | 14 |
| 3G302** | 3k Ω | 3,450K | 3,488K | 12 | 3U104** | 100k Ω | 3,950K | 4,025K | 12 |
| 6D302** | | 3,930K | 3,941K | 14 | 4L204** | 200k Ω | 4,550K | 4,629K | 14 |
| 3H502** | 5k Ω | 3,450K | 3,486K | 14 | 4L304** | 300k Ω | 4,550K | 4,629K | 14 |
| 6E502** | | 3,950K | 4,001K | 12 | 4L504** | 500k Ω | 4,550K | 4,629K | 12 |

※关于R-T数据, 请参阅本公司主页。

[Radial leaded type]

CN25 Series

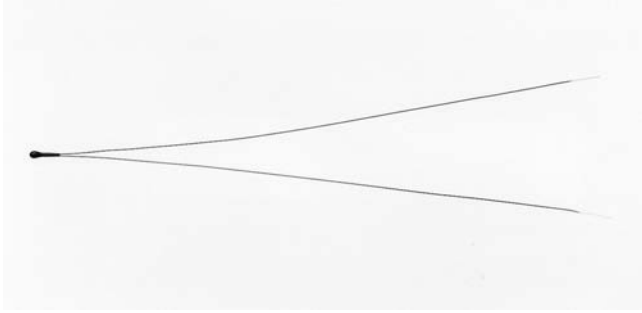


- Resistance tolerance ±3%, ±5% (R25)
- B value tolerance ±3% (B25/50)
- Termination Pb-free Soldered Cu-Ni wire
- Operating temperature range -40°C ~ +110°C
- Heat dissipation constant $\delta=0.7\text{mW}/^\circ\text{C}$
- Maximum power dissipation $P=59.5\text{mW}$

■Features

- Small precision type.
- Excellent thermal cycle endurance.

RM16系列 RM16 Series



- 电阻值容许偏差 $\pm 3\%, \pm 5\%$ (R25)
- B值容许偏差 $\pm 3\%$ (B25/50)
- 端子电极 聚氨酯被覆线
- 使用温度范围 $-40^{\circ}\text{C} \sim +110^{\circ}\text{C}$
- 散热系数 $\delta=0.6\text{mW}/^{\circ}\text{C}$
- 热响应时间常数 $\tau=6\text{sec.}$
- 最大功率 $P=51\text{mW}$

■特点

- 小型、高精度。
- 导线长，便于安装于测定部。

■特性 Characteristics

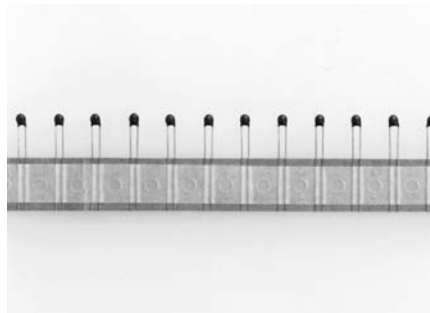
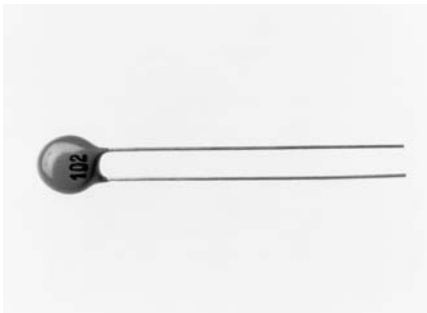
RM16系列 RM16 Series

| 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value | 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value |
|------------|-----------------------|----------------------|----------------------|------------|-----------------------|----------------------|----------------------|
| 3G102** | 1k Ω | 3,450K | 3,488K | 6M303** | 30k Ω | 3,970K | 4,084K |
| 3G202** | 2k Ω | 3,450K | 3,488K | 3U503** | 50k Ω | 3,950K | 4,025K |
| 6D502** | 5k Ω | 3,930K | 3,941K | 3U803** | 80k Ω | 3,950K | 4,025K |
| 3H103** | 10k Ω | 3,450K | 3,486K | 3U104** | 100k Ω | 3,950K | 4,025K |
| 6E103** | | 3,950K | 4,001K | 4A104** | 100k Ω | 4,020K | 4,099K |
| 6M203** | 20k Ω | 3,970K | 4,084K | | | | |

※关于R-T数据，请参阅本公司主页。

※Regarding R-T data, please refer to our Home Page.

DC30系列 DC30 Series



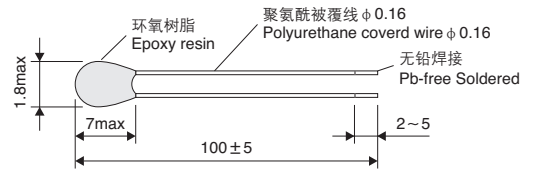
- 电阻值容许偏差 $\pm 5\%, \pm 10\%$ (R25)
- B值容许偏差 $\pm 3\%$ (B25/50)
- 端子电极 无铅焊接涂层铜镍合金线
- 使用温度范围 $-40^{\circ}\text{C} \sim +100^{\circ}\text{C}$

■特点

- 适合自动插装。

※关于DC30系列的详细情况，请进行相关咨询。

形状·尺寸 Dimensions (mm)

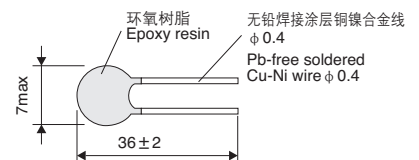


- Resistance tolerance $\pm 3\%, \pm 5\%$ (R25)
- B value tolerance $\pm 3\%$ (B25/50)
- Termination Polyurethane covered wire
- Operating temperature range $-40^{\circ}\text{C} \sim +110^{\circ}\text{C}$
- Heat dissipation constant $\delta=0.6\text{mW}/^{\circ}\text{C}$
- Thermal time constant $\tau=6\text{sec.}$
- Maximum power dissipation $P=51\text{mW}$

■Features

- Small precision type.
- Long leads for easy sensor placement.

形状·尺寸 Dimensions (mm)



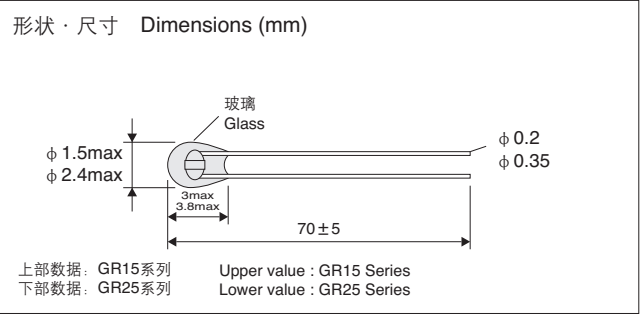
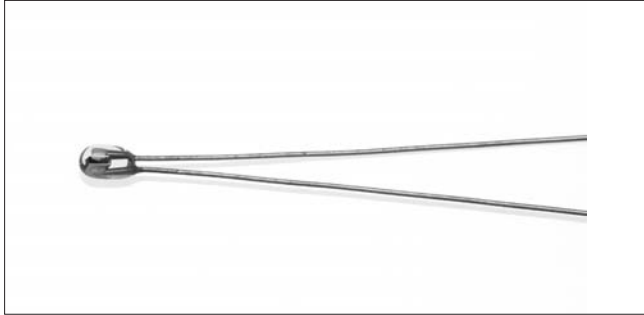
- Resistance tolerance $\pm 5\%, \pm 10\%$ (R25)
- B value tolerance $\pm 3\%$ (B25/50)
- Termination Pb-free Soldered Cu-Ni wire
- Operating temperature range $-40^{\circ}\text{C} \sim +100^{\circ}\text{C}$

■Features

- Can be used with automatic insertion equipment.

※Please contact us for the details of DC30 series.

GR15,GR25系列 GR15,GR25 Series



- 电阻值容许偏差.....±3%, ±5% (R25)
- B值容许偏差..... ±3% (B25/50)
- 端子电极..... 杜美丝
- 使用温度范围.....-40°C~+300°C(150°C)
- 散热系数..... GR15: δ=0.7mW/°C
GR25: δ=1.0mW/°C
- 热响应时间常数..... GR15: τ=6sec.
GR25: τ=16sec.
- 最大功率..... GR15: P=87mW(150°C耐热产品)
P=192mW(300°C耐热产品)
GR25: P=125mW(150°C耐热产品)

- Resistance tolerance ±3%, ±5%(R25)
- B value tolerance ±3%(B25/50)
- Termination Dumet wire
- Operating -40°C~+300°C(150°C)
temperature range
- Heat dissipation GR15: δ=0.7mW/°C
constant
GR25: δ=1.0mW/°C
- Thermal time constant GR15: τ=6sec.
GR25: τ=16sec.
- Maximum power dissipation GR15: P=87mW(max temp.150°C)
P=192mW(max temp.300°C)
GR25: P=125mW(max temp.150°C)

■特点

- 小型、高精度。
- 可在高温下使用。

■Features

- Small precision type.
- Suitable for high temperature applications.

■特性 Characteristics

300°C耐热产品 GR15系列 300°C Heat resistance GR15 Series

| 型号 Type | 电阻值 R25 Resistance | 电阻值 R100 Resistance | 电阻值 R200 Resistance | B值 B25/50 B Value | B值 B25/85 B Value | B值 B0/100 B Value | B值 B100/200 B Value |
|------------|-----------------------|------------------------|------------------------|----------------------|----------------------|----------------------|------------------------|
| 7A103** | 10kΩ | 0.5309kΩ | 0.04963kΩ | 4,397K | 4,369K | 4,375K | 4,184K |
| 6P493** | 49.12kΩ | 3.315kΩ | 0.3097kΩ | 3,948K | 3,984K | 3,961K | 4,185K |
| 7C993** | 98.63kΩ | 6.264kΩ | 0.5660kΩ | 4,036K | 4,074K | 4,052K | 4,245K |
| 7B104** | 100kΩ | 3.813kΩ | 0.2490kΩ | 4,828K | 4,843K | 4,818K | 4,818K |
| 7D234** | 231.4kΩ | 12.98kΩ | 1.017kΩ | 4,207K | 4,254K | 4,221K | 4,496K |
| 5D105** | 1MΩ | 29.93kΩ | 1.444kΩ | 5,121K | 5,184K | 5,134K | 5,352K |
| 7E145** | 1.388MΩ | 63.87kΩ | 4.021kΩ | 4,460K | 4,537K | 4,488K | 4,882K |
| 5E106** | 10MΩ | 242.1kΩ | 8.871kΩ | 5,393K | 5,486K | 5,425K | 5,838K |

150°C耐热产品 GR15系列 150°C Heat resistance GR15 Series

| 型号 Type | 电阻值 R25 Resistance | 电阻值 R100 Resistance | | B值 B25/50 B Value | B值 B25/85 B Value | B值 B0/100 B Value | |
|------------|-----------------------|------------------------|--|----------------------|----------------------|----------------------|--|
| 6S222** | 2.186kΩ | 0.2166kΩ | | 3,386K | 3,419K | 3,390K | |
| 3G302** | 3kΩ | 0.2757kΩ | | 3,490K | 3,527K | 3,499K | |
| 6Q542** | 5.369kΩ | 0.5103kΩ | | 3,423K | 3,468K | 3,450K | |
| 6Q852** | 8.471kΩ | 0.8051kΩ | | 3,423K | 3,468K | 3,450K | |
| 6Q113** | 10.74kΩ | 1.021kΩ | | 3,423K | 3,468K | 3,450K | |
| 6M373** | 36.74kΩ | 2.262kΩ | | 3,985K | 4,099K | 4,015K | |
| 6N493** | 48.70kΩ | 3.125kΩ | | 3,935K | 4,030K | 3,988K | |

150°C耐热产品 GR25系列 150°C Heat resistance GR25 Series

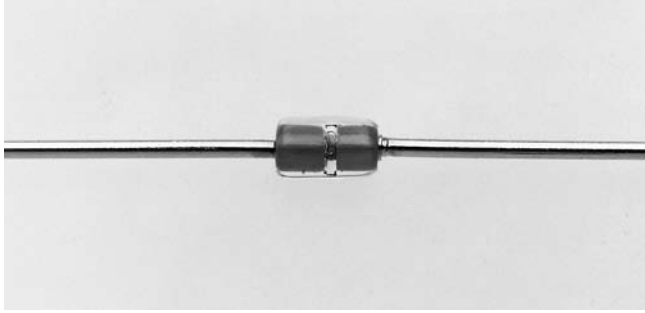
| 型号 Type | 电阻值 R25 Resistance | 电阻值 R100 Resistance | | B值 B25/50 B Value | B值 B25/85 B Value | B值 B0/100 B Value | |
|------------|-----------------------|------------------------|--|----------------------|----------------------|----------------------|--|
| 3G202** | 2kΩ | 0.1838kΩ | | 3,490K | 3,527K | 3,499K | |

※关于R-T数据,请参阅本公司主页。

※Regarding R-T data, please refer to our Home Page.

[轴向引脚型]

GA13、GA20系列



- 电阻值容许偏差 $\pm 3\%$, $\pm 5\%$ (R25)
- B值容许偏差 $\pm 3\%$ (B25/50)
- 端子电极 镀镍或镀锡
- 使用温度范围 $-40^{\circ}\text{C} \sim +300^{\circ}\text{C}$
 $-40^{\circ}\text{C} \sim +150^{\circ}\text{C}$
- 散热系数 GA13 : $\delta=1.3\text{mW}/^{\circ}\text{C}$
GA20 : $\delta=1.8\text{mW}/^{\circ}\text{C}$
- 热响应时间常数 GA13 : $\tau=14\text{sec.}$, GA20 : $\tau=25\text{sec.}$
- 最大功率 GA13 : $P=357\text{mW}$ (300°C 耐热产品)
 $P=162\text{mW}$ (150°C 耐热产品)
GA20 : $P=495\text{mW}$ (300°C 耐热产品)
 $P=225\text{mW}$ (150°C 耐热产品)

■特点

- 可在高温下使用。
- 适合自动插装。

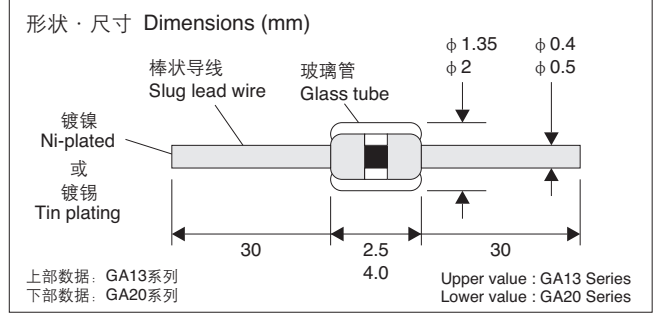
■特性 Characteristics

300°C耐热产品 300°C Heat resistance
GA13系列 GA13 Series

| 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value |
|------------|-----------------------|----------------------|----------------------|
| 3G202** | 2k Ω | 3,470K | 3,507K |
| 3G302** | 3k Ω | 3,470K | 3,507K |
| 6D502** | 5k Ω | 3,950K | 3,961K |
| 6P303** | 30k Ω | 3,948K | 3,984K |
| 3U104** | 100k Ω | 3,965K | 4,038K |

[Axial leaded type]

GA13, GA20 Series



- Resistance tolerance $\pm 3\%$, $\pm 5\%$ (R25)
- B value tolerance $\pm 3\%$ (B25/50)
- Termination Ni-plating or Tin plating
- Operating $-40^{\circ}\text{C} \sim +300^{\circ}\text{C}$
temperature range $-40^{\circ}\text{C} \sim +150^{\circ}\text{C}$
- Heat dissipation GA13 : $\delta=1.3\text{mW}/^{\circ}\text{C}$
constant GA20 : $\delta=1.8\text{mW}/^{\circ}\text{C}$
- Thermal time constant GA13 : $\tau=14\text{sec.}$, GA20 : $\tau=25\text{sec.}$
- Maximum power dissipation GA13 : $P=357\text{mW}$ (max temp. 300°C)
 $P=162\text{mW}$ (max temp. 150°C)
GA20 : $P=495\text{mW}$ (max temp. 300°C)
 $P=225\text{mW}$ (max temp. 150°C)

■Features

- Suitable for high temperature applications.
- Can be used with automatic insertion equipment.

NTC热敏电阻

GA20系列 GA20 Series

| 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value |
|------------|-----------------------|----------------------|----------------------|
| 3G202** | 2k Ω | 3,470K | 3,507K |
| 3G302** | 3k Ω | 3,470K | 3,507K |
| 6D502** | 5k Ω | 3,950K | 3,961K |
| 6P203** | 20k Ω | 3,948K | 3,984K |
| 6P303** | 30k Ω | 3,948K | 3,984K |
| 3U503** | 50K Ω | 3,965K | 4,038K |
| 3U104** | 100K Ω | 3,965K | 4,038K |

150°C耐热产品 150°C Heat resistance
GA13系列 GA13 Series

| 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value |
|------------|-----------------------|----------------------|----------------------|
| 3H103** | 10k Ω | 3,465K | 3,502K |
| 6E203** | 20k Ω | 3,965K | 4,016K |
| 6H503** | 50k Ω | 3,770K | 3,820K |

GA20系列 GA20 Series

| 型号 Type | 电阻值 R25 Resistance | B值 B25/50 B Value | B值 B25/85 B Value |
|------------|-----------------------|----------------------|----------------------|
| 3H103** | 10k Ω | 3,465K | 3,502K |

※关于镀镍产品与镀锡产品的型号表示法
希望订购镀锡产品时, 请将“-”(连字符)改为“Z”即可。
(例如)镀镍产品: GA13-3H103**
镀锡产品: GA13Z3H103**
对于镀锡产品, 无论上述耐热产品如何分类, 容许温度全都为150°C。
※关于R-T数据, 请参阅本公司主页。

※For nickel or Tin plating
Place a "Z" in place of the "-" (hyphen) when ordering Tin plated parts.
(example) Nickel plated part : GA13-3H103**
Tin plated part : GA13Z3H103**
Please note Tin plated parts have a maximum heat resistances of 150°C.
※Regarding R-T data, please refer to our Home Page.

[高精度引脚型]

高精度系列产品，可用于高精度电路的温度补偿或温度控制、温度测量上，要求电阻值及B值的容许偏差极小的产品。

[High precision leaded type]

The high precision has very tight resistance and B value tolerances to allow very accurate temperature control or compensation.

形状 Type

尺寸 Dimensions (mm)

| 系列名 Series | 形状 Construction | 使用温度范围 Operating Temp.range |
|---------------------------|-----------------|-------------------------------|
| CH25 | | -40°C ~ +110°C |
| RH16 | | -40°C ~ +110°C |
| BN35 | | -20°C ~ +80°C |
| | | L=25mm BN35-*****-25 |
| | | L=50mm BN35-*****-50 |
| | | L=75mm BN35-*****-75 |
| | | L=100mm BN35-*****-100 |
| | | L=125mm BN35-*****-125 |
| L=150mm BN35-*****-150 | | |
| BM22 BM38 | | -40°C ~ +100°C |
| | | L=25mm BM22(38)-*****-250 |
| | | L=50mm BM22(38)-*****-050 |
| | | L=75mm BM22(38)-*****-075 |
| | | L=100mm BM22(38)-*****-100 |
| | | L=125mm BM22(38)-*****-125 |
| BF05 | | -40°C ~ +100°C |
| | | L=27mm BF05-*****-250 |
| | | L=52mm BF05-*****-050 |
| | | L=77mm BF05-*****-075 |
| | | L=102mm BF05-*****-100 |
| | | L=127mm BF05-*****-125 |
| GR15 | | -40°C ~ +300(150)°C |
| GR25 | | -40°C ~ +150°C |
| GH13 GH20 | | -40°C ~ +300(150)°C |
| | | -40°C ~ +300(150)°C |

※有关CH25,RH16,BN35系列是低卤素规格 (氯、溴分别在900ppm以内，卤素total1500ppm以内) 的产品，请与本公司协商。

※BM22,BM38,BF05系列是低卤素规格产品。

※For CH25, RH16, BN35 series, they are low - halogen products (Specification: Cl, Br each 900ppm or less., halogen total 1,500ppm or less.). Please approach us for details.

※For BM22, BM38,BF05 series, low - halogen is also applied.

CH25, RH16, BN35, BM22, BM38, BF05系列

CH25, RH16, BN35, BM22, BM38, BF05 Series

- 散热系数 · CH25: $\delta=0.7\text{mW}/^\circ\text{C}$, RH16: $\delta=0.6\text{mW}/^\circ\text{C}$, BN35: $\delta=2.4\text{mW}/^\circ\text{C}$, BM22: $\delta=1.2\text{mW}/^\circ\text{C}$, BM38: $\delta=1.3\text{mW}/^\circ\text{C}$, BF05: $\delta=1.5\text{mW}/^\circ\text{C}$
- 最大功率 · CH25: P=59.5mW, RH16: P=51mW, BN35: P=132mW, BM22: P=90mW, BM38: P=97.5mW, BF05: P=112mW

- Heat dissipation constant · CH25: $\delta=0.7\text{mW}/^\circ\text{C}$, RH16: $\delta=0.6\text{mW}/^\circ\text{C}$, BN35: $\delta=2.4\text{mW}/^\circ\text{C}$, BM22: $\delta=1.2\text{mW}/^\circ\text{C}$, BM38: $\delta=1.3\text{mW}/^\circ\text{C}$, BF05: $\delta=1.5\text{mW}/^\circ\text{C}$
- Maximum power dissipation · CH25: P=59.5mW, RH16: P=51mW, BN35: P=132mW, BM22: P=90mW, BM38: P=97.5mW, BF05: P=112mW

| 系列名 Series | 型号 Type | 电阻值 Resistance | | | | B值 B25/50 B Value | B值 B25/85 B Value | 热时间常数 Thermal time constant τ (sec.) | |
|---------------|------------|----------------|------------------------------|-----------|-----------|----------------------|----------------------|--|----|
| | | R25 | 电阻值容许偏差 Resistance tolerance | | | | | | |
| | | | $\pm 1\%$ | $\pm 2\%$ | $\pm 3\%$ | | | | |
| CH25 | 3G501** | 500 Ω | ○ | ○ | ○ | 3,450K $\pm 1\%$ | 3,488K | 14 | |
| | 3G102** | 1k Ω | ○ | ○ | ○ | 3,450K $\pm 1\%$ | 3,488K | 12 | |
| | 6D102** | | ○ | ○ | ○ | 3,930K $\pm 1\%$ | 3,941K | 14 | |
| | 3G202** | 2k Ω | ○ | ○ | ○ | 3,450K $\pm 1\%$ | 3,488K | 14 | |
| | 6D202** | | ○ | ○ | ○ | 3,930K $\pm 1\%$ | 3,941K | 12 | |
| | 3G302** | 3k Ω | ○ | ○ | ○ | 3,450K $\pm 1\%$ | 3,488K | 12 | |
| | 6D302** | | ○ | ○ | ○ | 3,930K $\pm 1\%$ | 3,941K | 14 | |
| | 3H502** | 5k Ω | ○ | ○ | ○ | 3,450K $\pm 1\%$ | 3,486K | 14 | |
| | 6E502** | | — | ○ | ○ | 3,950K $\pm 1\%$ | 4,001K | 12 | |
| | 3H103** | 10k Ω | ○ | ○ | ○ | 3,450K $\pm 1\%$ | 3,486K | 12 | |
| | 3T103** | | ○ | ○ | ○ | 3,950K $\pm 1\%$ | 3,989K | 14 | |
| | 3T203** | 20k Ω | ○ | ○ | ○ | 3,950K $\pm 1\%$ | 3,989K | 12 | |
| | 3U303** | 30k Ω | ○ | ○ | ○ | 3,950K $\pm 1\%$ | 4,025K | 14 | |
| | 3U503** | 50k Ω | ○ | ○ | ○ | 3,950K $\pm 1\%$ | 4,025K | 14 | |
| | 3U104** | 100k Ω | ○ | ○ | ○ | 3,950K $\pm 1\%$ | 4,025K | 12 | |
| | 4L204** | 200k Ω | — | ○ | ○ | 4,550K $\pm 1\%$ | 4,629K | 14 | |
| | 4L304** | 300k Ω | — | ○ | ○ | 4,550K $\pm 1\%$ | 4,629K | 14 | |
| | 4L504** | 500k Ω | — | ○ | ○ | 4,550K $\pm 1\%$ | 4,629K | 12 | |
| RH16 | 3G202** | 2k Ω | ○ | ○ | ○ | 3,450K $\pm 1\%$ | 3,488K | 6 | |
| | 6D502** | 5k Ω | ○ | ○ | ○ | 3,930K $\pm 1\%$ | 3,941K | 6 | |
| | 3H103** | 10k Ω | ○ | ○ | ○ | 3,450K $\pm 1\%$ | 3,486K | 6 | |
| | 6E103** | | ○ | ○ | ○ | 3,950K $\pm 1\%$ | 4,001K | 6 | |
| | 6M203** | 20k Ω | ○ | ○ | ○ | 3,970K $\pm 1\%$ | 4,084K | 6 | |
| | 6M303** | 30k Ω | ○ | ○ | ○ | 3,970K $\pm 1\%$ | 4,084K | 6 | |
| | 3U503** | 50k Ω | ○ | ○ | ○ | 3,950K $\pm 1\%$ | 4,025K | 6 | |
| | 3U803** | 80k Ω | ○ | ○ | ○ | 3,950K $\pm 1\%$ | 4,025K | 6 | |
| | 3U104** | 100k Ω | ○ | ○ | ○ | 3,950K $\pm 1\%$ | 4,025K | 6 | |
| | 4A104** | 100k Ω | — | ○ | ○ | 4,020K $\pm 1\%$ | 4,099K | 6 | |
| BN35 | 3H103** | 10k Ω | ○ | ○ | ○ | 3,450K $\pm 1\%$ | 3,486K | 40 | |
| | 3T103** | 10k Ω | ○ | ○ | ○ | 3,950K $\pm 1\%$ | 3,989K | 40 | |
| | 3U104** | 100k Ω | ○ | ○ | ○ | 3,950K $\pm 1\%$ | 4,024K | 40 | |
| | 5B225** | 2.2M Ω | — | — | ○ | 5,200K $\pm 1\%$ | 5,290K | 40 | |
| 新产品 | BM22 | 3H103** | 10k Ω | ○ | ○ | ○ | 3,450K $\pm 1\%$ | 3,486K | 18 |
| BM38 | 3H103** | 10k Ω | ○ | ○ | ○ | 3,450K $\pm 1\%$ | 3,486K | 21 | |
| | 3I103** | 10k Ω | ○ | ○ | ○ | 3,392K $\pm 1\%$ | 3,416K | 21 | |
| | 3J103** | 10k Ω | ○ | ○ | ○ | 3,450K $\pm 1\%$ | 3,469K | 21 | |
| 新产品 | BF05 | 3I103** | 10k Ω | ○ | ○ | ○ | 3,392K $\pm 1\%$ | 3,416K | 12 |
| 3J103** | | 10k Ω | ○ | ○ | ○ | 3,450K $\pm 1\%$ | 3,469K | 12 | |

※BN35系列中也有通过UL1434标准的产品。
※关于R-T数据,请参阅本公司主页。

※It is available in a UL1434 approved type for BN35 series.
※Regarding R-T data, please refer to our Home Page.

GR15、GR25系列

- 散热系数 · GR15: $\delta=0.7\text{mW}/^\circ\text{C}$, GR25: $\delta=1.0\text{mW}/^\circ\text{C}$
- 热响应时间常数 · GR15: $\tau=6\text{sec}$, GR25: $\tau=16\text{sec}$.
- 最大功率 · GR15: P=87mW (150 $^\circ\text{C}$ 耐热产品)
P=192mW (300 $^\circ\text{C}$ 耐热产品)
GR25: P=125mW (150 $^\circ\text{C}$ 耐热产品)

GR15, GR25 Series

- Heat dissipation constant · GR15: $\delta=0.7\text{mW}/^\circ\text{C}$, GR25: $\delta=1.0\text{mW}/^\circ\text{C}$
- Thermal time constant · GR15: $\tau=6\text{sec}$, GR25: $\tau=16\text{sec}$.
- Maximum power dissipation · GR15: P=87mW(max temp.150 $^\circ\text{C}$)
P=192mW(max temp.300 $^\circ\text{C}$)
GR25: P=125mW(max temp.150 $^\circ\text{C}$)

300 $^\circ\text{C}$ 耐热产品 300 $^\circ\text{C}$ Heat resistance

| 系列名 Series | 型号 Type | R25 | 电阻值 Resistance | | | B值 B25/50 B Value | B值 B25/85 B Value |
|---------------|------------|-----------------|------------------------------|-----------|-----------|----------------------|----------------------|
| | | | 电阻值容许偏差 Resistance tolerance | | | | |
| | | | $\pm 1\%$ | $\pm 2\%$ | $\pm 3\%$ | | |
| GR15 | 7A103** | 10k Ω | ○ | ○ | ○ | 4,397K $\pm 1\%$ | 4,369K |
| | 6P493** | 49.12k Ω | ○ | ○ | ○ | 3,948K $\pm 1\%$ | 3,984K |
| | 7C993** | 98.63k Ω | ○ | ○ | ○ | 4,036K $\pm 1\%$ | 4,074K |
| | 7B104** | 100k Ω | ○ | ○ | ○ | 4,828K $\pm 1\%$ | 4,843K |
| | 7D234** | 231.4k Ω | ○ | ○ | ○ | 4,207K $\pm 1\%$ | 4,254K |
| | 5D105** | 1M Ω | ○ | ○ | ○ | 5,121K $\pm 1\%$ | 5,184K |
| | 7E145** | 1.388M Ω | ○ | ○ | ○ | 4,460K $\pm 1\%$ | 4,537K |
| | 5E106** | 10M Ω | ○ | ○ | ○ | 5,393K $\pm 1\%$ | 5,486K |

150 $^\circ\text{C}$ 耐热产品 150 $^\circ\text{C}$ Heat resistance

| 系列名 Series | 型号 Type | R25 | 电阻值 Resistance | | | B值 B25/50 B Value | B值 B25/85 B Value |
|---------------|------------|-----------------|------------------------------|-----------|-----------|----------------------|----------------------|
| | | | 电阻值容许偏差 Resistance tolerance | | | | |
| | | | $\pm 1\%$ | $\pm 2\%$ | $\pm 3\%$ | | |
| GR15 | 6S222** | 2.186k Ω | — | ○ | ○ | 3,386K $\pm 1\%$ | 3,419K |
| | 3G302** | 3k Ω | — | ○ | ○ | 3,490K $\pm 1\%$ | 3,527K |
| | 6Q542** | 5.369k Ω | — | ○ | ○ | 3,423K $\pm 1\%$ | 3,468K |
| | 6Q852** | 8.471k Ω | — | ○ | ○ | 3,423K $\pm 1\%$ | 3,468K |
| | 6Q113** | 10.74k Ω | — | ○ | ○ | 3,423K $\pm 1\%$ | 3,468K |
| | 6M373** | 36.74k Ω | ○ | ○ | ○ | 3,985K $\pm 1\%$ | 4,099K |
| | 6N493** | 48.70k Ω | ○ | ○ | ○ | 3,935K $\pm 1\%$ | 4,030K |
| GR25 | 3G202** | 2k Ω | ○ | ○ | ○ | 3,490K $\pm 1\%$ | 3,527K |

※关于R-T数据,请参阅本公司主页。

※Regarding R-T data, please refer to our Home Page.

NTC 热敏电阻

GH13, GH20系列

- 散热系数 GH13 : $\delta=1.3\text{mW}/^\circ\text{C}$
GH20 : $\delta=1.8\text{mW}/^\circ\text{C}$
- 热响应时间常数 GH13 : $\tau=14\text{sec.}$, GH20 : $\tau=25\text{sec.}$
- 最大功率 GH13 : $P=357\text{mW}$ (300°C耐热产品)
 $P=162\text{mW}$ (150°C耐热产品)
GH20 : $P=495\text{mW}$ (300°C耐热产品)
 $P=225\text{mW}$ (150°C耐热产品)

GH13, GH20 Series

- Heat dissipation GH13 : $\delta=1.3\text{mW}/^\circ\text{C}$
constant GH20 : $\delta=1.8\text{mW}/^\circ\text{C}$
- Thermal time constant GH13 : $\tau=14\text{sec.}$, GH20 : $\tau=25\text{sec.}$
- Maximum power dissipation GH13 : $P=357\text{mW}$ (max temp.300°C)
 $P=162\text{mW}$ (max temp.150°C)
GH20 : $P=495\text{mW}$ (max temp.300°C)
 $P=225\text{mW}$ (max temp.150°C)

300°C耐热产品 300°C Heat resistance

| 系列名 Series | 型号 Type | 电阻值 Resistance | | | | B值 B25/50 B Value | B值 B25/85 B Value |
|---------------|------------|----------------|------------------------------|-----------|-----------|----------------------|----------------------|
| | | R25 | 电阻值容许偏差 Resistance tolerance | | | | |
| | | | $\pm 1\%$ | $\pm 2\%$ | $\pm 3\%$ | | |
| GH13 | 3G202* * | 2k Ω | ○ | ○ | ○ | 3,470K $\pm 1\%$ | 3,507K |
| | 3G302* * | 3k Ω | ○ | ○ | ○ | 3,470K $\pm 1\%$ | 3,507K |
| | 6D502* * | 5k Ω | ○ | ○ | ○ | 3,950K $\pm 1\%$ | 3,961K |
| | 6P303* * | 30k Ω | ○ | ○ | ○ | 3,948K $\pm 1\%$ | 3,984K |
| | 3U104* * | 100k Ω | ○ | ○ | ○ | 3,965K $\pm 1\%$ | 4,038K |
| GH20 | 3G202* * | 2k Ω | ○ | ○ | ○ | 3,470K $\pm 1\%$ | 3,507K |
| | 3G302* * | 3k Ω | ○ | ○ | ○ | 3,470K $\pm 1\%$ | 3,507K |
| | 6D502* * | 5k Ω | ○ | ○ | ○ | 3,950K $\pm 1\%$ | 3,961K |
| | 6P203* * | 20k Ω | ○ | ○ | ○ | 3,948K $\pm 1\%$ | 3,984K |
| | 6P303* * | 30k Ω | ○ | ○ | ○ | 3,948K $\pm 1\%$ | 3,984K |
| | 3U503* * | 50k Ω | ○ | ○ | ○ | 3,965K $\pm 1\%$ | 4,038K |
| | 3U104* * | 100k Ω | ○ | ○ | ○ | 3,965K $\pm 1\%$ | 4,038K |

※关于R-T数据, 请参阅本公司主页。

※Regarding R-T data, please refer to our Home Page.

150°C耐热产品 150°C Heat resistance

| 系列名 Series | 型号 Type | 电阻值 Resistance | | | | B值 B25/50 B Value | B值 B25/85 B Value |
|---------------|------------|----------------|------------------------------|-----------|-----------|----------------------|----------------------|
| | | R25 | 电阻值容许偏差 Resistance tolerance | | | | |
| | | | $\pm 1\%$ | $\pm 2\%$ | $\pm 3\%$ | | |
| GH13 | 3H103* * | 10k Ω | ○ | ○ | ○ | 3,465K $\pm 1\%$ | 3,502K |
| | 6E203* * | 20k Ω | — | ○ | ○ | 3,965K $\pm 1\%$ | 4,016K |
| | 6H503* * | 50k Ω | ○ | ○ | ○ | 3,770K $\pm 1\%$ | 3,820K |
| GH20 | 3H103* * | 10k Ω | ○ | ○ | ○ | 3,465K $\pm 1\%$ | 3,502K |

※关于R-T数据, 请参阅本公司主页。

※Regarding R-T data, please refer to our Home Page.

※关于镀镍产品与镀锡产品的型号表示法
希望订购镀锡产品时, 请将“-”(连字符)改为“Z”即可。
(例如) 镀镍产品: GA13-3H103**
镀锡产品: GA13Z3H103**
对于镀锡产品, 无论上述耐热产品如何分类, 容许温度全都为150°C。

※For nickel or Tin plating
Place a "Z" in place of the "-" (hyphen) when ordering Tin plated parts.
(example) Nickel plated part : GA13-3H103**
Tin plated part : GA13Z3H103**
Please note Tin plated parts have a maximum heat resistances of 150°C.

【温度传感器使用注意事项】

请严格遵守以下事项, 否则可能会造成温度传感器损坏、使用设备损伤或引起误动作。

- ①传感器是按不同用途分别进行设计的。若要用于规定以外的用途时, 请就使用环境条件与本公司联系洽谈。
- ②设计设备时, 请进行传感器贴装评估试验, 确认无异常后再使用。
- ③请勿在过高的功率下使用传感器。
- ④由于自身发热导致电阻值下降时, 可能会引起温度检测精度降低、设备功能故障, 故使用时请参考散热系数, 注意传感器的外加功率及电压。
- ⑤请勿在使用温度范围以外使用。
- ⑥请勿施加超出使用温度范围上下限的急剧温度变化。
- ⑦将传感器作为装置的主控制元件单独使用时, 为防止事故发生, 请务必采取设置“安全电路”、“同时使用具有同等功能的传感器”等周全的安全措施。
- ⑧在有噪音的环境中使用, 请采取设置保护电路及屏蔽传感器(包括导线)的措施。
- ⑨请勿施加过度的振动、冲击及压力。
- ⑩请勿过度拉伸及弯曲导线。
- ⑪请勿在绝缘部和电极间施加过大的电压。否则, 可能会产生绝缘不良现象。
- ⑫请勿在超出设定范围的腐蚀性气体的环境(CO₂、NH₃、SO_x、NO_x)以及会接触到电解质、盐水、酸、碱、有机溶剂的场所中使用。
- ⑬使用传感器进行树脂成型加工时, 可能会因组成构件的应力导致传感器破坏, 故应对此加以充分确认。

使用时若有其他不明之处, 请垂询本公司销售人员。

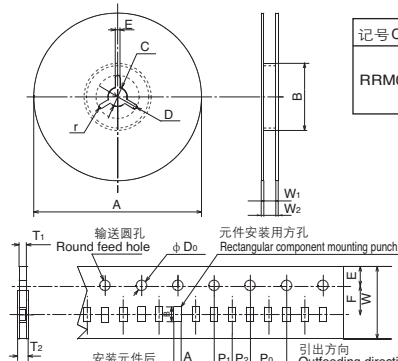
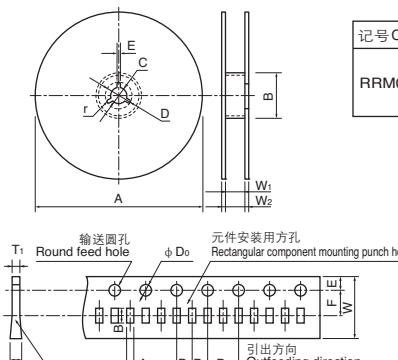
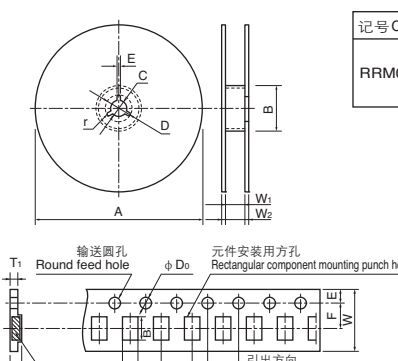
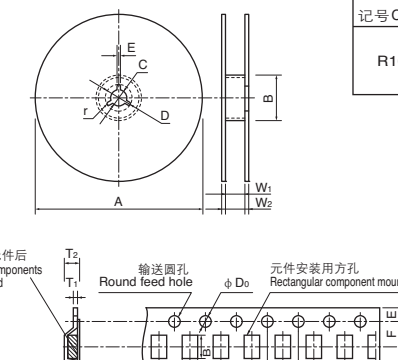
[Caution in On Board Thermistor Sensor usage]

Due to the possibilities of destruction of the sensor, damage or miss use of equipment, please strictly follow below matter.

- ①The sensor is designed for individual usage. When it is going to be used beyond the specified condition, please speak to your daily contact person for our products.
- ②Whenever designing the equipment, make sure to check sensor operation and if there is no lack of quality.
- ③Do not use the sensor exceeding rated electric power.
- ④Due to possibility of causing the decrease of the value of resistance with self heat and malfunction of the equipment or the precision decrease of the inspection temperature, carefully refer to the dissipation constant usage of electric power and voltage.
- ⑤Do not use the sensor beyond operating temperature range.
- ⑥Avoid from exceeding radical temperature change, which is beyond operating temperature range.
- ⑦In case of independently use of the sensor as a main control of the device, make sure to design and devise through safety measures for [safe circuit] and [parallel use with same function sensor] etc, to prevent from accident.
- ⑧Under the environment which receives the influence of electric noise, make sure to take countermeasure by installing a protection circuit and seal the sensor (including the lead wire).
- ⑨Do not add excessive vibrating shocking pressure.
- ⑩Avoid from excessive pulling and bending of the lead wire.
- ⑪Do not impress excessive voltage in the insulated part and between the electrode. This might cause to occur the insulated malfunction.
- ⑫Do not use in corrosiveness gas atmosphere (CO₂, NH₃, SO_x, NO_x) beyond the designated condition.
Do not use at the place where the sensor touches the electrolytic, brine, acid, alkaline and organic solvent beyond the designated condition.
- ⑬When you do processing (such as resin molding) by using thermistor sensor, please be reminded that sensor might be destroyed by the material or mismatch of it. If there is any others unclear point, please inquire to our company sales in-charge.

包装形式 Packing form


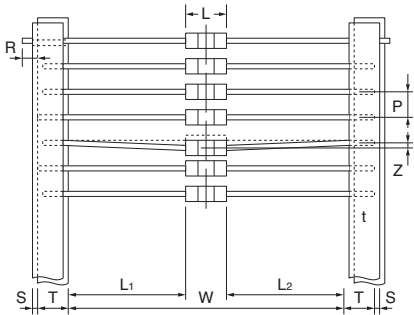
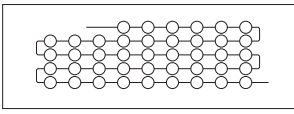
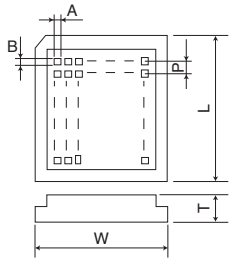
单位: mm Unit: mm

| 包装记号 Packing code | 相应系列 Related series | 包装数量 Packing Qty. | 包装形式 Packing form | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------|--|----------------------|---|------------------|--|----------------|----------------|-----|---|----------------|----------------|---|--------|------------------|-----------------|---------------|---------------|-------------|-------------|--------------|-----|---|---|---|---|---|----------------|---------------|---------------|-------------|---------------|---------------|-------------|----------------|----------------|----------------|----------------|----------------|------------------|---------------|-------------|--------------------|------------------|------------------|--|
| D | TS03 TC03 TH03 | 15,000 |  <table border="1" style="margin-top: 10px;"> <tr> <th>记号 Code</th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>W₁</th> <th>W₂</th> <th>r</th> </tr> <tr> <td>RRM08B</td> <td>∅180 +0 -3</td> <td>∅60 +1 -0</td> <td>∅13.0 ±0.2</td> <td>R10.5 ±0.4</td> <td>2.0 ±0.5</td> <td>9.0 ±0.3</td> <td>11.4 ±1.0</td> <td>0.5</td> </tr> </table> <table border="1" style="margin-top: 10px;"> <tr> <th>A</th> <th>B</th> <th>W</th> <th>F</th> <th>E</th> <th>P₁</th> </tr> <tr> <td>0.37 ±0.08</td> <td>0.67 ±0.08</td> <td>8.0 ±0.3</td> <td>3.50 ±0.05</td> <td>1.75 ±0.10</td> <td>2.0 ±0.1</td> </tr> </table> <table border="1" style="margin-top: 10px;"> <tr> <th>P₂</th> <th>P₀</th> <th>D₀</th> <th>T₁</th> <th>T₂</th> <th>安装孔 Loading hole</th> </tr> <tr> <td>2.0 ±0.1</td> <td>4.0 ±0.1</td> <td>∅1.5 +0.1 -0</td> <td>0.4 以下 max</td> <td>0.5 以下 max</td> <td>方形通孔 Rectangular hole 或者 冲压凹孔 Press pocket</td> </tr> </table> | 记号 Code | A | B | C | D | E | W ₁ | W ₂ | r | RRM08B | ∅180 +0 -3 | ∅60 +1 -0 | ∅13.0 ±0.2 | R10.5 ±0.4 | 2.0 ±0.5 | 9.0 ±0.3 | 11.4 ±1.0 | 0.5 | A | B | W | F | E | P ₁ | 0.37 ±0.08 | 0.67 ±0.08 | 8.0 ±0.3 | 3.50 ±0.05 | 1.75 ±0.10 | 2.0 ±0.1 | P ₂ | P ₀ | D ₀ | T ₁ | T ₂ | 安装孔 Loading hole | 2.0 ±0.1 | 4.0 ±0.1 | ∅1.5 +0.1 -0 | 0.4 以下 max | 0.5 以下 max | 方形通孔 Rectangular hole 或者 冲压凹孔 Press pocket |
| 记号 Code | A | B | C | D | E | W ₁ | W ₂ | r | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RRM08B | ∅180 +0 -3 | ∅60 +1 -0 | ∅13.0 ±0.2 | R10.5 ±0.4 | 2.0 ±0.5 | 9.0 ±0.3 | 11.4 ±1.0 | 0.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A | B | W | F | E | P ₁ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.37 ±0.08 | 0.67 ±0.08 | 8.0 ±0.3 | 3.50 ±0.05 | 1.75 ±0.10 | 2.0 ±0.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P ₂ | P ₀ | D ₀ | T ₁ | T ₂ | 安装孔 Loading hole | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.0 ±0.1 | 4.0 ±0.1 | ∅1.5 +0.1 -0 | 0.4 以下 max | 0.5 以下 max | 方形通孔 Rectangular hole 或者 冲压凹孔 Press pocket | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| R | TZ05 TX05 TD05 TN05 TC05 TH05 | 10,000 |  <table border="1" style="margin-top: 10px;"> <tr> <th>记号 Code</th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>W₁</th> <th>W₂</th> <th>r</th> </tr> <tr> <td>RRM08B</td> <td>∅180 +0 -3</td> <td>∅60 +1 -0</td> <td>∅13.0 ±0.2</td> <td>R10.5 ±0.4</td> <td>2.0 ±0.5</td> <td>9.0 ±0.3</td> <td>11.4 ±1.0</td> <td>0.5</td> </tr> </table> <table border="1" style="margin-top: 10px;"> <tr> <th>A</th> <th>B</th> <th>W</th> <th>F</th> <th>E</th> <th>P₁</th> </tr> <tr> <td>0.62 ±0.10</td> <td>1.15 ±0.10</td> <td>8.0 ±0.3</td> <td>3.50 ±0.05</td> <td>1.75 ±0.10</td> <td>2.0 ±0.1</td> </tr> </table> <table border="1" style="margin-top: 10px;"> <tr> <th>P₂</th> <th>P₀</th> <th>D₀</th> <th>T₁</th> <th>T₂</th> <th>安装孔 Loading hole</th> </tr> <tr> <td>2.00 ±0.05</td> <td>4.0 ±0.1</td> <td>∅1.5 +0.1 -0</td> <td>0.8 以下 max</td> <td>0.9 以下 max</td> <td>方形通孔 Rectangular hole</td> </tr> </table> | 记号 Code | A | B | C | D | E | W ₁ | W ₂ | r | RRM08B | ∅180 +0 -3 | ∅60 +1 -0 | ∅13.0 ±0.2 | R10.5 ±0.4 | 2.0 ±0.5 | 9.0 ±0.3 | 11.4 ±1.0 | 0.5 | A | B | W | F | E | P ₁ | 0.62 ±0.10 | 1.15 ±0.10 | 8.0 ±0.3 | 3.50 ±0.05 | 1.75 ±0.10 | 2.0 ±0.1 | P ₂ | P ₀ | D ₀ | T ₁ | T ₂ | 安装孔 Loading hole | 2.00 ±0.05 | 4.0 ±0.1 | ∅1.5 +0.1 -0 | 0.8 以下 max | 0.9 以下 max | 方形通孔 Rectangular hole |
| 记号 Code | A | B | C | D | E | W ₁ | W ₂ | r | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RRM08B | ∅180 +0 -3 | ∅60 +1 -0 | ∅13.0 ±0.2 | R10.5 ±0.4 | 2.0 ±0.5 | 9.0 ±0.3 | 11.4 ±1.0 | 0.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A | B | W | F | E | P ₁ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.62 ±0.10 | 1.15 ±0.10 | 8.0 ±0.3 | 3.50 ±0.05 | 1.75 ±0.10 | 2.0 ±0.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P ₂ | P ₀ | D ₀ | T ₁ | T ₂ | 安装孔 Loading hole | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.00 ±0.05 | 4.0 ±0.1 | ∅1.5 +0.1 -0 | 0.8 以下 max | 0.9 以下 max | 方形通孔 Rectangular hole | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| T | TD11 TN11 TH11 TN10 TC10 TN20 TC20 TH20 | 4,000 |  <table border="1" style="margin-top: 10px;"> <tr> <th>记号 Code</th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>W₁</th> <th>W₂</th> <th>r</th> </tr> <tr> <td>RRM08B</td> <td>∅180 +0 -3</td> <td>∅60 +1 -0</td> <td>∅13.0 ±0.2</td> <td>R10.5 ±0.4</td> <td>2.0 ±0.5</td> <td>9.0 ±0.3</td> <td>11.4 ±1.0</td> <td>0.5</td> </tr> </table> <table border="1" style="margin-top: 10px;"> <tr> <th>A</th> <th>B</th> <th>W</th> <th>F</th> <th>E</th> <th>P₁</th> </tr> <tr> <td>1.62 ±0.2</td> <td>2.4 ±0.2</td> <td>8.0 ±0.3</td> <td>3.50 ±0.05</td> <td>1.75 ±0.10</td> <td>4.0 ±0.1</td> </tr> </table> <table border="1" style="margin-top: 10px;"> <tr> <th>P₂</th> <th>P₀</th> <th>D₀</th> <th>T₁</th> <th>T₂</th> <th>安装孔 Loading hole</th> </tr> <tr> <td>2.00 ±0.05</td> <td>4.0 ±0.1</td> <td>∅1.5 +0.1 -0</td> <td>1.1 以下 max</td> <td>1.4 以下 max</td> <td>方形通孔 Rectangular hole</td> </tr> </table> <p style="font-size: small; margin-top: 5px;">※()内的数值是TN11, TH11, TN10, TC10的尺寸。 ※Dimensions in () are for TN11, TH11, TN10, TC10.</p> | 记号 Code | A | B | C | D | E | W ₁ | W ₂ | r | RRM08B | ∅180 +0 -3 | ∅60 +1 -0 | ∅13.0 ±0.2 | R10.5 ±0.4 | 2.0 ±0.5 | 9.0 ±0.3 | 11.4 ±1.0 | 0.5 | A | B | W | F | E | P ₁ | 1.62 ±0.2 | 2.4 ±0.2 | 8.0 ±0.3 | 3.50 ±0.05 | 1.75 ±0.10 | 4.0 ±0.1 | P ₂ | P ₀ | D ₀ | T ₁ | T ₂ | 安装孔 Loading hole | 2.00 ±0.05 | 4.0 ±0.1 | ∅1.5 +0.1 -0 | 1.1 以下 max | 1.4 以下 max | 方形通孔 Rectangular hole |
| 记号 Code | A | B | C | D | E | W ₁ | W ₂ | r | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RRM08B | ∅180 +0 -3 | ∅60 +1 -0 | ∅13.0 ±0.2 | R10.5 ±0.4 | 2.0 ±0.5 | 9.0 ±0.3 | 11.4 ±1.0 | 0.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A | B | W | F | E | P ₁ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.62 ±0.2 | 2.4 ±0.2 | 8.0 ±0.3 | 3.50 ±0.05 | 1.75 ±0.10 | 4.0 ±0.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P ₂ | P ₀ | D ₀ | T ₁ | T ₂ | 安装孔 Loading hole | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.00 ±0.05 | 4.0 ±0.1 | ∅1.5 +0.1 -0 | 1.1 以下 max | 1.4 以下 max | 方形通孔 Rectangular hole | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P | MN18 MH18 | 2,000 |  <table border="1" style="margin-top: 10px;"> <tr> <th>记号 Code</th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>W₁</th> <th>W₂</th> <th>r</th> </tr> <tr> <td>R10</td> <td>∅180 +0 -3</td> <td>∅60 +1 -0</td> <td>∅13.0 ±0.2</td> <td>R10.5 ±0.4</td> <td>2.0 ±0.5</td> <td>9.0 ±0.3</td> <td>11.4 ±1.0</td> <td>0.5</td> </tr> </table> <table border="1" style="margin-top: 10px;"> <tr> <th>A</th> <th>B</th> <th>W</th> <th>F</th> <th>E</th> <th>P₁</th> </tr> <tr> <td>1.7 ±0.1</td> <td>4.1 ±0.1</td> <td>8.0 ±0.2</td> <td>3.55 ±0.1</td> <td>1.5 ±0.1</td> <td>4.0 ±0.1</td> </tr> </table> <table border="1" style="margin-top: 10px;"> <tr> <th>P₂</th> <th>P₀</th> <th>D₀</th> <th>T₁</th> <th>T₂</th> <th>安装孔 Loading hole</th> </tr> <tr> <td>2.00 ±0.05</td> <td>4.0 ±0.1</td> <td>∅1.5 +0.1 -0</td> <td>0.5 以下 max</td> <td>2.0 以下 max</td> <td>方形通孔 Rectangular hole</td> </tr> </table> | 记号 Code | A | B | C | D | E | W ₁ | W ₂ | r | R10 | ∅180 +0 -3 | ∅60 +1 -0 | ∅13.0 ±0.2 | R10.5 ±0.4 | 2.0 ±0.5 | 9.0 ±0.3 | 11.4 ±1.0 | 0.5 | A | B | W | F | E | P ₁ | 1.7 ±0.1 | 4.1 ±0.1 | 8.0 ±0.2 | 3.55 ±0.1 | 1.5 ±0.1 | 4.0 ±0.1 | P ₂ | P ₀ | D ₀ | T ₁ | T ₂ | 安装孔 Loading hole | 2.00 ±0.05 | 4.0 ±0.1 | ∅1.5 +0.1 -0 | 0.5 以下 max | 2.0 以下 max | 方形通孔 Rectangular hole |
| 记号 Code | A | B | C | D | E | W ₁ | W ₂ | r | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| R10 | ∅180 +0 -3 | ∅60 +1 -0 | ∅13.0 ±0.2 | R10.5 ±0.4 | 2.0 ±0.5 | 9.0 ±0.3 | 11.4 ±1.0 | 0.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A | B | W | F | E | P ₁ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.7 ±0.1 | 4.1 ±0.1 | 8.0 ±0.2 | 3.55 ±0.1 | 1.5 ±0.1 | 4.0 ±0.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P ₂ | P ₀ | D ₀ | T ₁ | T ₂ | 安装孔 Loading hole | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.00 ±0.05 | 4.0 ±0.1 | ∅1.5 +0.1 -0 | 0.5 以下 max | 2.0 以下 max | 方形通孔 Rectangular hole | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

NTC热敏电阻

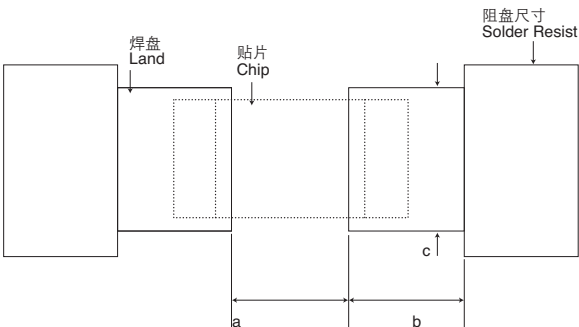
包装形式 Packing form

单位 : mm Unit : mm

| 包装记号 Packing code | 相应系列 Related series | 包装数量 Packing Qty. | 包装形式 Packing form | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------|---|-----------------------|---|---------|---------------|-----------------------|----------------------------------|------|--|-------------|------------|--|------|---------------------|------|--------------------------------------|---|------------------------------------|---|---------|---|---------|-------|---------|---|---------|
| B | TS03, TC03, TH03, TN05, TC05, TH05, TZ05, TX05, TD05, TN10, TC10, TN11, TH11, TD11, TN20, TC20, TH20, | 500 | 聚乙烯袋 Poly bag  | | | | | | | | | | | | | | | | | | | | | | | |
| | MN18, MH18, GA13, GH13, GA20, GH20, CN25, CH25, RM16, RH16, GR15 | 200 | | | | | | | | | | | | | | | | | | | | | | | | |
| | DC30, GR25 | 100 | | | | | | | | | | | | | | | | | | | | | | | | |
| F | GA13 GH13 GA20 GH20 | 2,000 |  <p>产品引出方向(从侧面看) Feed direction (Side view)</p>  <table border="1"> <thead> <tr> <th>记号 Code</th> <th>尺寸 Dimensions</th> <th>记号 Code</th> <th>尺寸 Dimensions</th> </tr> </thead> <tbody> <tr> <td rowspan="2">L</td> <td>[GA13, GH13] 2.5^{+0.2}_{-0.4}</td> <td>T</td> <td>6.0±1.0</td> </tr> <tr> <td>[GA20, GH20] 4.0^{+0.2}_{-0.4}</td> <td>Z</td> <td>1.5max.</td> </tr> <tr> <td>W</td> <td>52.0^{+0.2}_{-1.0}</td> <td>R</td> <td>不可露出带外 Not sticking out of tape</td> </tr> <tr> <td>P</td> <td>5.0±0.5</td> <td>t</td> <td>3.2min.</td> </tr> <tr> <td>L1-L2</td> <td>1.0max.</td> <td>S</td> <td>0.8max.</td> </tr> </tbody> </table> | 记号 Code | 尺寸 Dimensions | 记号 Code | 尺寸 Dimensions | L | [GA13, GH13] 2.5 ^{+0.2} _{-0.4} | T | 6.0±1.0 | [GA20, GH20] 4.0 ^{+0.2} _{-0.4} | Z | 1.5max. | W | 52.0 ^{+0.2} _{-1.0} | R | 不可露出带外 Not sticking out of tape | P | 5.0±0.5 | t | 3.2min. | L1-L2 | 1.0max. | S | 0.8max. |
| 记号 Code | 尺寸 Dimensions | 记号 Code | 尺寸 Dimensions | | | | | | | | | | | | | | | | | | | | | | | |
| L | [GA13, GH13] 2.5 ^{+0.2} _{-0.4} | T | 6.0±1.0 | | | | | | | | | | | | | | | | | | | | | | | |
| | [GA20, GH20] 4.0 ^{+0.2} _{-0.4} | Z | 1.5max. | | | | | | | | | | | | | | | | | | | | | | | |
| W | 52.0 ^{+0.2} _{-1.0} | R | 不可露出带外 Not sticking out of tape | | | | | | | | | | | | | | | | | | | | | | | |
| P | 5.0±0.5 | t | 3.2min. | | | | | | | | | | | | | | | | | | | | | | | |
| L1-L2 | 1.0max. | S | 0.8max. | | | | | | | | | | | | | | | | | | | | | | | |
| C | FH05 FH10 | 400 |  <p>外壳 Plastic cover</p> <p>底板 Tray</p> <p>夹板 Clip</p> <table border="1"> <thead> <tr> <th>记号 Code</th> <th>尺寸 Dimensions</th> <th>凹空深度 depth of pockets</th> <th>凹孔数(个) quantity of pockets(pcs.)</th> </tr> </thead> <tbody> <tr> <td>A, B</td> <td>[FH05] 0.38 [FH10] 0.66</td> <td>[FH05] 0.23</td> <td rowspan="4">400(20×20)</td> </tr> <tr> <td>P</td> <td>2.16</td> <td rowspan="3">[FH10] 0.30 or 0.38</td> </tr> <tr> <td>L, W</td> <td>50.8</td> </tr> <tr> <td>T</td> <td>3.96</td> </tr> </tbody> </table> | 记号 Code | 尺寸 Dimensions | 凹空深度 depth of pockets | 凹孔数(个) quantity of pockets(pcs.) | A, B | [FH05] 0.38 [FH10] 0.66 | [FH05] 0.23 | 400(20×20) | P | 2.16 | [FH10] 0.30 or 0.38 | L, W | 50.8 | T | 3.96 | | | | | | | | |
| 记号 Code | 尺寸 Dimensions | 凹空深度 depth of pockets | 凹孔数(个) quantity of pockets(pcs.) | | | | | | | | | | | | | | | | | | | | | | | |
| A, B | [FH05] 0.38 [FH10] 0.66 | [FH05] 0.23 | 400(20×20) | | | | | | | | | | | | | | | | | | | | | | | |
| P | 2.16 | [FH10] 0.30 or 0.38 | | | | | | | | | | | | | | | | | | | | | | | | |
| L, W | 50.8 | | | | | | | | | | | | | | | | | | | | | | | | | |
| T | 3.96 | | | | | | | | | | | | | | | | | | | | | | | | | |

NTC THERMISTOR
热敏电阻

推荐焊盘布局 Recommended land Pattern



| 型号 Type | T*20 | T*10, T*11 | T*05 | T*03 |
|---------|----------|------------|---------|---------|
| 尺寸 Size | 2.0×1.25 | 1.6×0.8 | 1.0×0.5 | 0.6×0.3 |
| a | 1.00 | 0.70 | 0.30 | 0.25 |
| b | 0.90 | 0.75 | 0.60 | 0.25 |
| c | 1.40 | 0.85 | 0.60 | 0.30 |

焊接条件请参见第92页

Please refer to page 92 for soldering conditions.

[用途] [Applications]

[系列] [Series]

| | | | | |
|-------------------------------------|--|---------------------------|------------------|-------------------|
| 室用空调机 Room air conditioner | 室内温度、室外温度、排风口、热交换器用 Room temp., External air, Outlet air, Heat exchanger | AC系列 AC Series | | |
| 车用空调机 Car air conditioner | 室内温度、室外温度、排风口、热交换器用、蒸发器用 Room temp., External air, Outlet air, Heat exchanger, Evaporator | CA系列 CA Series | | |
| 洗衣、干燥机用 Washing & Drying machine | 干燥温度 Drying temp. | WD系列 WD Series | | |
| 表面温度 Surface temperature | 表面温度检测用 Surface temperature | ST系列 ST Series | | |
| 热水器、温水器 Hot & instant boiler | 温水用、冷水用 Hot water, Cool water | IB, HB系列 IB, HB Series | | |
| 微波炉 Microwave oven | 炉内温度检测用 Oven temp. | MW系列 MW Series | | |
| 冰箱 Refrigerator | 冷藏室温度 Cold Strage | 冷冻室温度 Freezer Temp | 除霜 Defrosting | RF系列 RF Series |
| 温水冲洗马桶 Toilet | 马桶座圈用、冲洗水用、温风用 Toilet seat, Washing water, Drying air | WT系列 WT Series | | |

※关于WT系列的详情，请垂询。
※关于其他方面的用途，也请垂询。

※Please contact us for detail of WT series, and other applications.

■型号构成

DTN — C 503 F 3U
① — ② ③ ④ ⑤

- ①表示热敏电阻的记号 ②热敏电阻元件类型记号
- ③标称电阻值...表示25°C时的电阻值
前2位表示电阻值的有效数字，第3位表示有效数字后“0”的个数。单位为Ω。
- ④电阻值容许偏差记号±(%)

| 记号 | F | G | H | J | K | X |
|---------|------|------|------|------|-------|--------|
| 电阻值容许偏差 | ±1.0 | ±2.0 | ±3.0 | ±5.0 | ±10.0 | 特殊容许偏差 |

⑤B值记号。

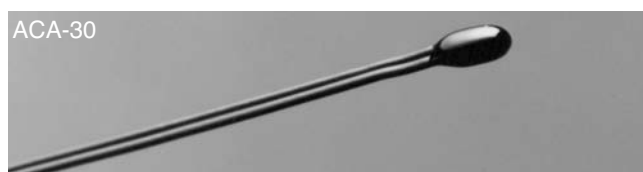
室用空调机用

■特点

- 防湿性能优异。
- 小型、温度响应快。



- 电阻值 R₂₅=15kΩ±3%(薄片)
- B值(3T) B_{25/50}=3950K±2%
B_{25/85}=3989K
- 使用温度范围 -30°C~+100°C
- 用途 气温用
- 热响应时间常数(空气中) 50sec.



- 电阻值 R₂₅=5kΩ±3%(薄片)
- B值(3T) B_{25/50}=3950K±2%
B_{25/85}=3989K
- 使用温度范围 -30°C~+100°C
- 用途 遥控用
- 热响应时间常数(空气中) 25sec.

※关于R-T数据，请参阅本公司主页。
※有关热敏温度传感器的使用环境条件，请于本公司协商。

■Part number system

DTN — C 503 F 3U
① — ② ③ ④ ⑤

- ①Thermistor ②Thermistor element
- ③Expressed resistance in Ω (at 25°C). The first two digits are significant, and the third is the number of zeros.
- ④Resistance tolerance ±(%)

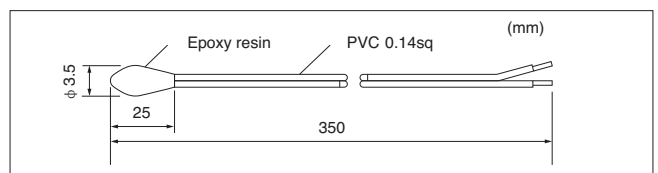
| Symbol | F | G | H | J | K | X |
|----------------------|------|------|------|------|-------|-------------------|
| Resistance tolerance | ±1.0 | ±2.0 | ±3.0 | ±5.0 | ±10.0 | Special Tolerance |

⑤B value

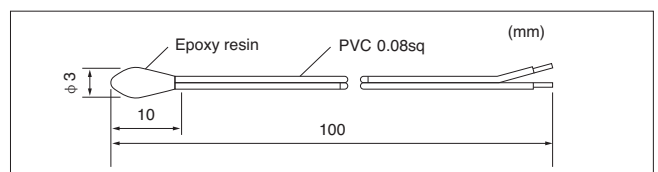
Sensor for room air conditioner

■Features

- Moisture resistant.
- Small with quick temperature response.



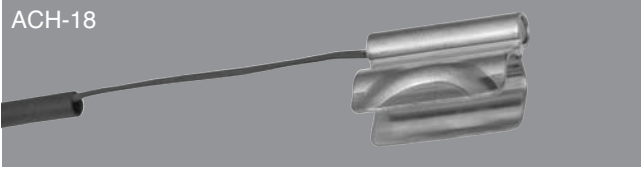
- Resistance R₂₅=15kΩ±3% (Flake chip)
- B value (3T) B_{25/50}=3950K±2%
B_{25/85}=3989K
- Operating temperature range -30°C~+100°C
- Application Air temperature
- Thermal time constant (in air) 50sec.



- Resistance R₂₅=5kΩ±3% (Flake chip)
- B value (3T) B_{25/50}=3950K±2%
B_{25/85}=3989K
- Operating temperature range -30°C~+100°C
- Application Remote control
- Thermal time constant (in air) 25sec.

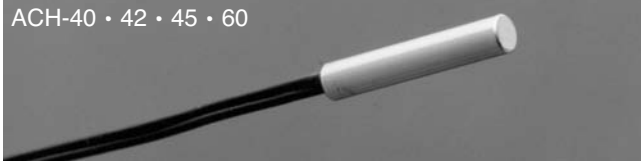
※Regarding R-T data, please refer to our Home Page.
※Please consult us regarding the operating conditions of Thermistor sensors.

ACH-18



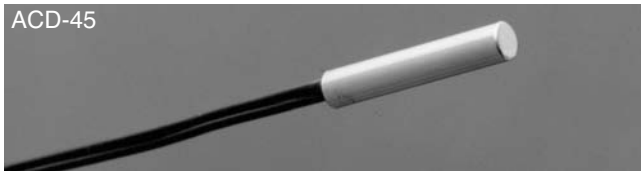
- 电阻值..... $R_{25}=15k\Omega \pm 2\%$ (薄片)
- B值 (3H) $B_{25/50}=3450K \pm 2\%$
 $B_{25/85}=3486K$
- 使用温度范围 $-30^{\circ}C \sim +100^{\circ}C$
- 用途..... 热交换器用
- 热响应时间常数 (水中) 5sec.

ACH-40 · 42 · 45 · 60



- 电阻值..... $R_{25}=10k\Omega \pm 3\%$ (薄片)
- B值 (3T) $B_{25/50}=3950K \pm 2\%$
 $B_{25/85}=3989K$
- 使用温度范围 $-30^{\circ}C \sim +100^{\circ}C$
- 用途..... 热交换器用
- 热响应时间常数 (水中) ACH-40,42 : 4.5sec.
ACH-45 : 5sec.
ACH-60 : 10sec.

ACH-45

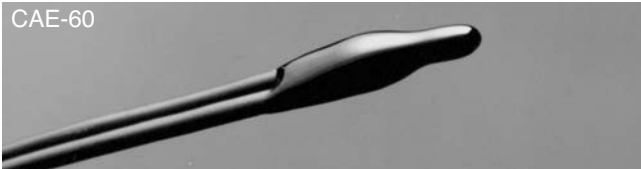


- 电阻值..... $R_{90}=5k\Omega \pm 3\%$ (薄片)
- B值 (3U) $B_{25/50}=3950K \pm 3\%$
 $B_{25/85}=4025K$
- 使用温度范围 $-30^{\circ}C \sim +130^{\circ}C$
- 用途..... 排水管用
- 热响应时间常数 (水中) 5sec.

汽车空调机用 Sensor for car air conditioner

- 特点
- 防湿性能优异。
 - 小型、温度响应快。

CAE-60

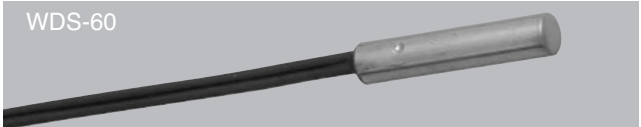


- 电阻值..... $R_0=4.852k\Omega \pm 5\%$ (薄片)
- B值 (6D) $B_{25/50}=3930K \pm 3\%$
 $B_{25/85}=3941K$
- 使用温度范围 $-30^{\circ}C \sim +100^{\circ}C$
- 用途..... 蒸发器用
- 热响应时间常数 (水中) 4sec.

洗衣干燥机用

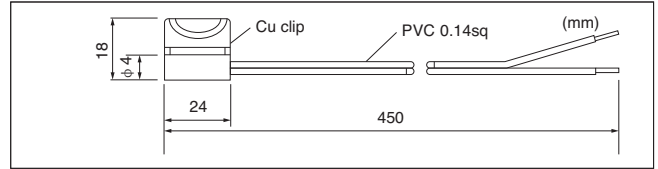
- 特点
- 耐热性能优异。
 - 防湿性能优异。

WDS-60

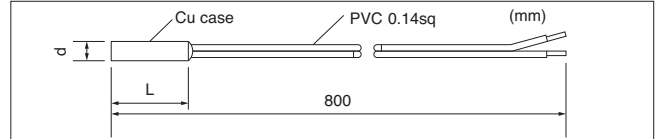


- 电阻值..... $R_{100}=3.3k\Omega \pm 3\%$ (GR型)
- B值 (6PR) $B_{25/100}=3999K \pm 2\%$
- 使用温度范围 $-30^{\circ}C \sim 150^{\circ}C$
- 热响应时间常数 (水中) 10sec.

※关于R-T数据, 请参阅本公司主页。
※有关热敏温度传感器的使用环境条件, 请于本公司协商。

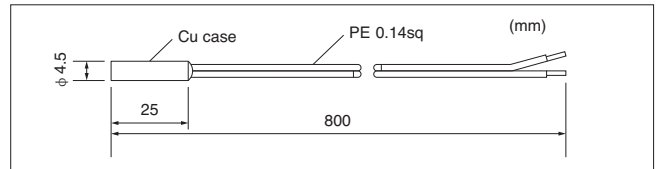


- Resistance $R_{25}=15k\Omega \pm 2\%$ (Flake chip)
- B value (3H) $B_{25/50}=3450K \pm 2\%$
 $B_{25/85}=3486K$
- Operating temperature range $-30^{\circ}C \sim +100^{\circ}C$
- Application Heat exchanger
- Thermal time constant (in water) 5sec.



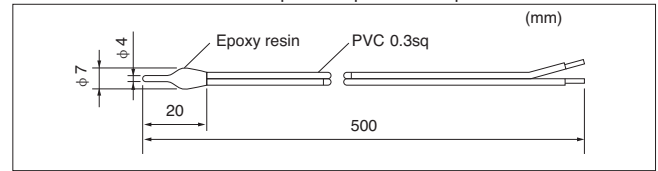
| | | | | |
|-------|------|------|------|------|
| d(mm) | ø4.0 | ø4.2 | ø4.5 | ø6.0 |
| L(mm) | 24 | 25 | 25 | 24 |

- Resistance $R_{25}=10k\Omega \pm 3\%$ (Flake chip)
- B value (3T) $B_{25/50}=3950K \pm 2\%$
 $B_{25/85}=3989K$
- Operating temperature range $-30^{\circ}C \sim +100^{\circ}C$
- Application Heat exchanger
- Thermal time constant (in water) ACH-40,42 : 4.5sec.
ACH-45 : 5sec.
ACH-60 : 10sec.



- Resistance $R_{90}=5k\Omega \pm 3\%$ (Flake chip)
- B value (3U) $B_{25/50}=3950K \pm 3\%$
 $B_{25/85}=4025K$
- Operating temperature range $-30^{\circ}C \sim +130^{\circ}C$
- Application Delivery pipe
- Thermal time constant (in water) 5sec.

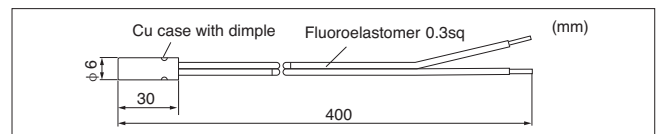
- Features
- Moisture resistant.
 - Small with quick temperature response.



- Resistance $R_0=4.852k\Omega \pm 5\%$ (Flake chip)
- B value (6D) $B_{25/50}=3930K \pm 3\%$
 $B_{25/85}=3941K$
- Operating temperature range $-30^{\circ}C \sim +100^{\circ}C$
- Application Evaporator
- Thermal time constant (in water) 4sec.

Sensor for Washing & Drying machine

- Features
- Resistance to high temperature.
 - Moisture resistant.



- Resistance $R_{100}=3.3k\Omega \pm 3\%$ (GR TYPE)
- B value (6PR) $B_{25/100}=3999K \pm 2\%$
- Operating temperature range $-30^{\circ}C \sim 150^{\circ}C$
- Thermal time constant (in water) ... 10sec.

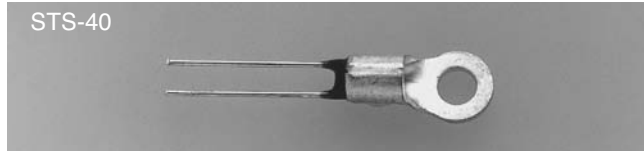
※Regarding R-T data, please refer to our Home Page.
※Please consult us regarding the operating conditions of Thermistor sensors.

表面温度用 Sensor for measuring surface temperature

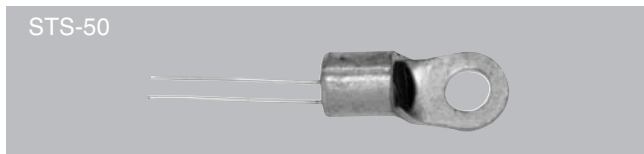
■特点

- 安装时可采用螺栓固定。
- 采用金属吸热面，温度响应快。

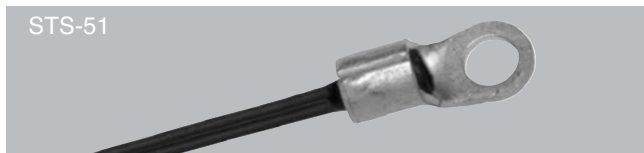
※STS系列的热时间常数是按照以下方法测定，所以测定值受氧化铝的热容量的影响。
 首先用螺钉凝固氧化铝 (120L × 120W × 20Tmm)，然后将除温度传感器的部分浸入25度的水中。之后再将氧化铝移之50度的水中。



- 电阻值 $R_{25}=10k\Omega \pm 1\%$ (薄片)
- B值 (3H) $B_{25/50}=3450K \pm 1\%$
 $B_{25/85}=3486K$
- 使用温度范围 $-30^{\circ}C \sim +110^{\circ}C$
- 热响应时间常数 (铝块上) 18sec.



- 电阻值 $R_{25}=10k\Omega \pm 3\%$ (GA型)
- B值 (3HG) $B_{25/50}=3465K \pm 3\%$
 $B_{25/85}=3502K$
- 使用温度范围 $-40^{\circ}C \sim +150^{\circ}C$
- 热响应时间常数 (铝块上) 22sec.



- 电阻值 $R_{25}=10k\Omega \pm 5\%$ (CTH)
- B值 (3TV) $B_{25/50}=3820K \pm 3\%$
 $B_{25/85}=3792K$
- 使用温度范围 $-40^{\circ}C \sim +150^{\circ}C$
- 热响应时间常数 (铝块上) 27sec.

热水器用

■特点

- 耐热冲击性能优异。
- 温度响应快。
- 不锈钢外壳，耐腐蚀性能优异。



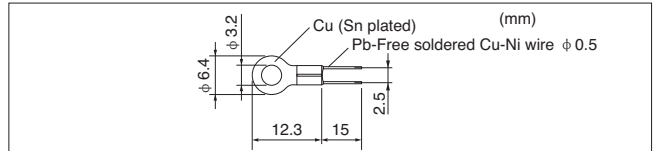
- 电阻值 $R_{50}=3.485k\Omega \pm 2.5\%$ (GR型)
- B值 (6QR) $B_{25/50}=3423K \pm 1\%$
 $B_{25/85}=3468K$
- 使用温度范围 $-30^{\circ}C \sim +105^{\circ}C$
- 热响应时间常数 (水中) 0.8sec.

※关于R-T数据，请参阅本公司主页。
 ※有关热敏温度传感器的使用环境条件，请于本公司协商。

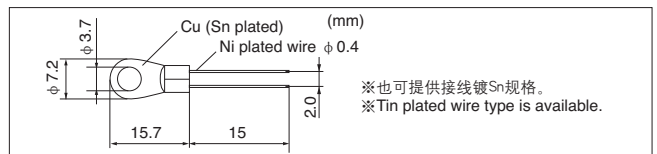
■Features

- Can be fastened with a screw.
- Metal contact surface yields fast temperature response.

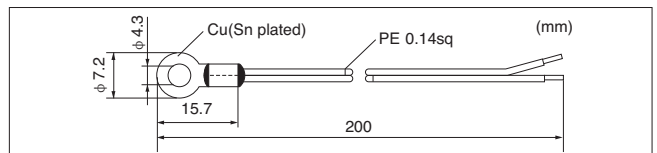
※Thermal time constant of STS series is measured by following method. The date contains the influence of the heat capacity of the aluminum block.
 ※The sensor is screwed up on aluminum block(120L × 120W × 20Tmm), the block except sensor attached surface is put into 25°C water. From this state when block is moved into 50°C water.



- Resistance $R_{25}=10k\Omega \pm 1\%$ (Flake chip)
- B value (3H) $B_{25/50}=3450K \pm 1\%$
 $B_{25/85}=3486K$
- Operating temperature range $-30^{\circ}C \sim +110^{\circ}C$
- Thermal time constant (on A ℓ block) ... 18sec.



- Resistance $R_{25}=10k\Omega \pm 3\%$ (GA Type)
- B value (3HG) $B_{25/50}=3465K \pm 3\%$
 $B_{25/85}=3502K$
- Operating temperature range $-40^{\circ}C \sim +150^{\circ}C$
- Thermal time constant (on A ℓ block) .. 22sec.

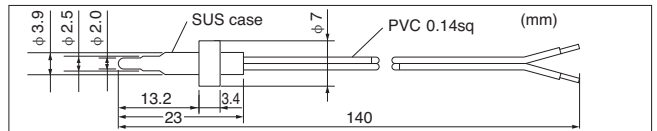


- Resistance $R_{25}=10k\Omega \pm 5\%$ (CTH)
- B value (3TV) $B_{25/50}=3820K \pm 3\%$
 $B_{25/85}=3792K$
- Operating temperature range $-40^{\circ}C \sim +150^{\circ}C$
- Thermal time constant (on A ℓ block) ... 27sec.

Sensor for instant boiler

■Features

- Resistant to heat shock.
- Quick temperature response.
- Stainless steel case makes resistant to corrosion.



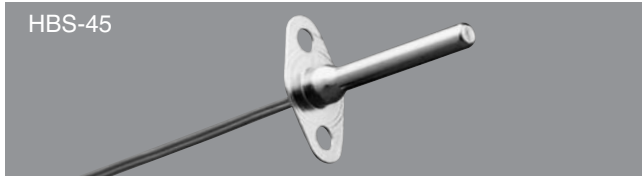
- Resistance $R_{50}=3.485k\Omega \pm 2.5\%$ (GR TYPE)
- B value (6QR) $B_{25/50}=3423K \pm 1\%$
 $B_{25/85}=3468K$
- Operating temperature range $-30^{\circ}C \sim +105^{\circ}C$
- Thermal time constant (in water) ... 0.8sec.

※Regarding R-T data, please refer to our Home Page.
 ※Please consult us regarding the operating conditions of Thermistor sensors.

热水器用 Sensor for hot boiler

■特点

- 耐湿性能优异。



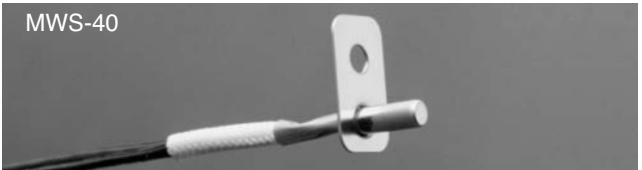
HBS-45

- 电阻值 $R_{25}=11k\Omega \pm 3\%$ (薄片)
 - B值 (3T) $B_{25/50}=3950K \pm 2\%$
 $B_{25/85}=3989K$
 - 使用温度范围 $-30^{\circ}C \sim +100^{\circ}C$
 - 热响应时间常数 (水中) 3sec.
- ※关于R-T数据, 请参阅本公司主页。
※有关热敏温度传感器的使用环境条件, 请于本公司协商。

微波炉用

■特点

- 耐热性能优异。
- 温度响应快。



MWS-40

- 电阻值 $R_{200}=1k\Omega \pm 3\%$ (GA型)
- B值 (4BG) $B_{25/50}=4100K \pm 2\%$
 $B_{25/85}=4170K$
- 使用温度范围 $-30^{\circ}C \sim +260^{\circ}C$ (仅传感器部)
- 热响应时间常数 (水中) 20sec.



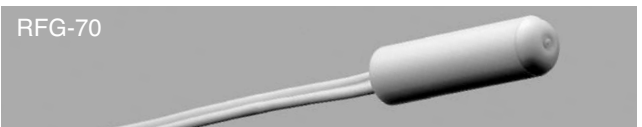
MWS-13

- 电阻值 $R_{200}=1k\Omega \pm 3\%$ (GA型)
- B值 (4BG) $B_{25/50}=4100K \pm 2\%$
 $B_{25/85}=4170K$
- 使用温度范围 $-30^{\circ}C \sim +260^{\circ}C$ (仅传感器部)
- 热响应时间常数 (水中) 20sec.

冰箱用

■特点

- 防湿性能优异。



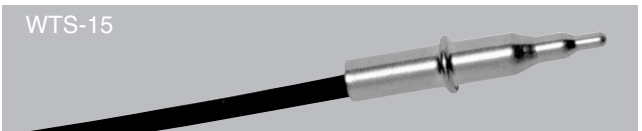
RFG-70

- 电阻值 $R_0=6.35k\Omega \pm 3\%$ (薄片)
- B值 (6W) $B_{0/25}=3823K \pm 2\%$
 $B_{-20/0}=3738K$
- 使用温度范围 $-40^{\circ}C \sim +80^{\circ}C$
- 用途 冰箱用 (冷冻、除霜、冷藏用)
- 热响应时间常数 (水中) 25sec.

冲洗马桶用

■特点

- 热灵敏性极高。
- 不锈钢外壳, 耐腐蚀性能优异。

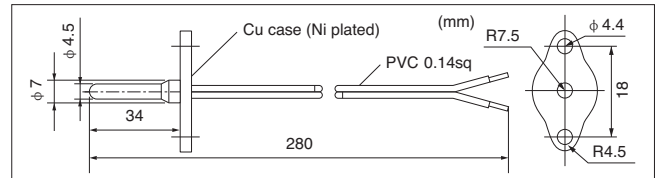


WTS-15

- 电阻值 $R_{37}=29.46k\Omega \pm 3\%$ (GR型)
 - B值 (6PR) $B_{25/50}=3948K \pm 1.5\%$
 $B_{25/85}=3984K$
 - 使用温度范围 $30^{\circ}C \sim 105^{\circ}C$
 - 热响应时间常数 (水中) 0.5sec.
- ※关于R-T数据, 请参阅本公司主页。
※有关热敏温度传感器的使用环境条件, 请于本公司协商。

■Features

- Moisture resistant.

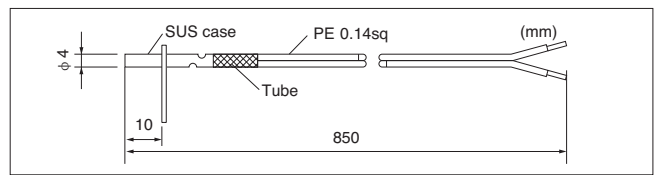


- Resistance $R_{25}=11k\Omega \pm 3\%$ (Flake chip)
 - B value (3T) $B_{25/50}=3950K \pm 2\%$
 $B_{25/85}=3989K$
 - Operating temperature range $-30^{\circ}C \sim +100^{\circ}C$
 - Thermal time constant (in water) ... 3sec.
- ※Regarding R-T data, please refer to our Home Page.
※Please consult us regarding the operating conditions of NTC Thermistor sensors.

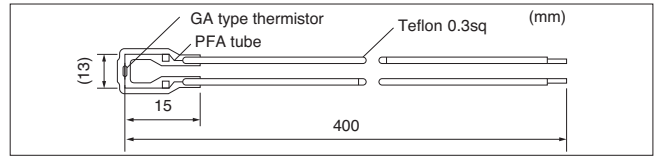
Sensor for microwave oven

■Features

- Resistant to high temperature.
- Quick temperature response.



- Resistance $R_{200}=1k\Omega \pm 3\%$ (GA Type)
- B value (4BG) $B_{25/50}=4100K \pm 2\%$
 $B_{25/85}=4170K$
- Operating temperature range $-30^{\circ}C \sim +260^{\circ}C$ (Sensor only)
- Thermal time constant (in water) ... 20sec.

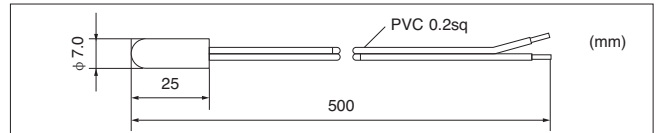


- Resistance $R_{200}=1k\Omega \pm 3\%$ (GA Type)
- B value (4BG) $B_{25/50}=4100K \pm 2\%$
 $B_{25/85}=4170K$
- Operating temperature range $-30^{\circ}C \sim +260^{\circ}C$ (Sensor only)
- Thermal time constant (in water) ... 20sec.

Sensor for refrigerator

■Features

- Moisture resistant.

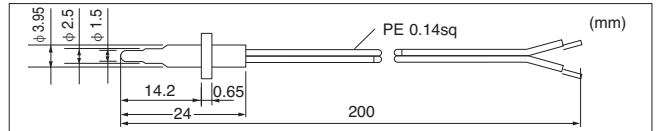


- Resistance $R_0=6.35k\Omega \pm 3\%$ (Flake chip)
- B value (6W) $B_{0/25}=3823K \pm 2\%$
 $B_{-20/0}=3738K$
- Operating temperature range $-40^{\circ}C \sim +80^{\circ}C$
- Application Refrigerator (freezer, defrosting, cold storage)
- Thermal time constant (in water) ... 25sec.

Sensor for Bidet

■Features

- Ultra quick temperature response.
- Stainless steel case makes resistant to corrosion.



- Resistance $R_{37}=29.46k\Omega \pm 3\%$ (GR TYPE)
 - B value (6PR) $B_{25/50}=3948K \pm 1.5\%$
 $B_{25/85}=3984K$
 - Operating temperature range $-30^{\circ}C \sim 105^{\circ}C$
 - Thermal time constant (in water) ... 0.5sec.
- ※Regarding R-T data, please refer to our Home Page.
※Please consult us regarding the operating conditions of Thermistor sensors.

NTC热敏电阻的基本特性

NTC热敏电阻是指具有负温度系数的热敏电阻。本产品是使用单一高纯度材料、具有接近理论密度结构的高性能陶瓷。因此，在实现小型化的同时，还具有电阻值、温度特性波动小、对各种温度变化响应快，可进行高灵敏度、高精度的检测。本公司提供各种形状、特性的小型、高可靠性产品，可满足广大客户的应用需求。

■电阻－温度特性

热敏电阻的电阻－温度特性可近似地用式1表示。

$$\text{式1(eq1)} \quad R=R_0 \exp \{B(1/T-1/T_0)\}$$

R : 温度T(K)时的电阻值
 R₀ : 温度T₀(K)时的电阻值
 B : B值
 ※T(K)= t(°C)+273.15

但实际上，热敏电阻的B值并非是恒定的，其变化大小因材料构成而异，最大甚至可达5K/°C。因此在较大的温度范围内应用式1时，将与实测值之间存在一定误差。

此处，若将式1中的B值用式2所示的作为温度的函数计算时，则可降低与实测值之间的误差，可认为近似相等。

$$\text{式2(eq2)} \quad B_T=CT^2+DT+E$$

上式中，C、D、E为常数。另外，因生产条件不同造成的B值的波动会引起常数E发生变化，但常数C、D不变。因此，在算入B值的波动量时，只需考虑常数E即可。

- 常数C、D、E的计算
 常数C、D、E可由4点的(温度、电阻值)数据(T₀, R₀)(T₁, R₁)(T₂, R₂)(T₃, R₃)，通过式3~6计算。
 首先由式3根据T₀和T₁, T₂, T₃的电阻值求出B₁, B₂, B₃，然后代入以下各式样。

$$\text{式3(eq3)} \quad B_n = \frac{\ln(R_n/R_0)}{\frac{1}{T_n} - \frac{1}{T_0}}$$

$$\text{式4(eq4)} \quad C = \frac{(B_1-B_2)(T_2-T_3)-(B_2-B_3)(T_1-T_2)}{(T_1-T_2)(T_2-T_3)(T_1-T_3)}$$

$$\text{式5(eq5)} \quad D = \frac{B_1-B_2-C(T_1+T_2)(T_1-T_2)}{(T_1-T_2)}$$

$$\text{式6(eq6)} \quad E=B_1-DT_1-CT_1 \cdot T_1$$

- 电阻值计算例
 试根据电阻－温度特性表，求25°C时的电阻值为5(kΩ)，B值偏差为50(K)的热敏电阻在10°C~30°C的电阻值。

- 步骤
 ①根据电阻－温度特性表，求常数C、D、E。

$$T_0=25+273.15 \quad T_1=10+273.15 \quad T_2=20+273.15 \quad T_3=30+273.15$$

②代入B_T=CT²+DT+E+50，求B_T。

③将数值代入R=5exp {B_T(1/T-1/298.15)}，求R。
 ※T : 10+273.15~30+273.15

NTC Thermistor basic properties

Negative temperature coefficient(NTC)thermistors are manufactured from high purity and uniform materials to achieve a construction of near-perfect theoretical density. This ensures small size, tight resistance and B-value tolerances, and fast response to temperature variations, making a highly sensitive and precision component. Thermistor is available in a wide range of types to meet your demands for small size and high reliability.

■Resistance - temperature characteristic

The resistance and temperature characteristics of a thermistor can be approximated by equation 1.

R : resistance at absolute temperature T(K)
 R₀ : resistance at absolute temperature T₀(K)
 B : B value
 ※T(K)= t(°C)+273.15

The B value for the thermistor characteristics is not fixed, but can vary by as much as 5K/°C according to the material composition. Therefore equation 1 may yield different results from actual values if applied over a wide temperature range.

By taking the B value in equation 1 as a function of temperature, as shown in equation 2, the difference with the actual value can be minimized.

C, D, and E are constants. The B value distribution caused by manufacturing conditions will change the constant E, but will have no effect on constants C or D. This means, when taking into account the distribution of B value, it is enough to do it with the constant E only.

- Calculation for constants C, D and E
 Using equations 3~6, constants C, D and E can be determined through four temperature and resistance value data points (T₀, R₀), (T₁, R₁), (T₂, R₂) and (T₃, R₃).
 With equation 3, B₁, B₂ and B₃, can be determined from the resistance values for T₀ and T₁, T₂, T₃ and then substituted into the equations below.

- Example
 Using a resistance-temperature characteristic chart, the resistance value over the range of 10°C~30°C is sought for a thermistor with a resistance of 5kΩ and a B value deflection of 50K at 25°C.

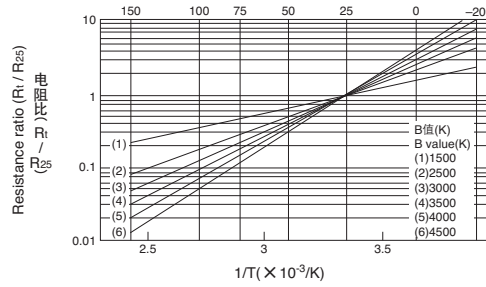
- Process
 ①Determine the constants C, D and E from the resistance-temperature chart.

②B_T=CT²+TD+E+50 ; substitute the value into equation and solve for B_T

③R= 5exp {B_T(1/T-1/298.15)} ; substitute the values into equation and solve for R
 ※T : 10+273.15~30+273.15

●电阻-温度特性图如图1所示

●Results of plotting the resistance-temperature characteristics are shown figure 1



电阻-温度特性 (图-1)
RESISTANCE-TEMPERATURE CHARACTERISTIC (Fig. 1)

■ 电阻温度系数

所谓电阻温度系数 (α)，是指在任意温度下温度变化1°C(K)时的零负载电阻变化率。

将式1微分，可得知电阻温度系数 (α) 与B值的关系。

$$\alpha = \frac{1}{R} \cdot \frac{dR}{dT} \times 100 = -\frac{B}{T^2} \times 100 (\%/^{\circ}\text{C})$$

这里 α 前的负号 (-)，表示当温度上升时零负载电阻降低。

■ Resistance temperature coefficient

The resistance-temperature coefficient (α) is defined as the rate of change of the zero-power resistance associated with a temperature variation of 1°C at any given temperature.

The relationship between the resistance-temperature coefficient (α) and the B value can be obtained by differentiating equation 1 above.

A negative value signifies that the rated zero-power resistance decreases

■ 散热系数 (JIS-C2570-1)

散热系数 (δ) 是指在热平衡状态下，热敏电阻元件通过自身发热使其温度上升1°C时所需的功率。

在热平衡状态下，热敏电阻的温度 T_1 、环境温度 T_2 及消耗功率 P 之间关系如下式所示。

$$\delta = \frac{P}{T_1 - T_2} \quad (\text{mW}/^{\circ}\text{C})$$

$$\ast (P = I^2 \cdot R = I \cdot V)$$

产品目录记载值为下列测定条件下的典型值。

- ① 25°C 静止空气中。
- ② 轴向引脚、径向引脚型在出厂状态下测定。

■ 最大功率 (JIS-C2570-1)

在额定环境温度下，可连续负载运行的功率最大值。个别产品规格书上可能记载为以往的名称“额定功率”。

产品目录记载值是以25°C为额定环境温度、由下式计算出的值。

$$(\text{式}) \text{ 额定功率} = \text{散热系数} \times (\text{最高使用温度} - 25)$$

■ 容许运行功率

这是使用热敏电阻进行温度检测或温度补偿时，自身发热产生的温度上升容许值所对应功率。(JIS中未定义。)容许温度上升 $t^{\circ}\text{C}$ 时，容许运行功率可由下式计算。

$$\text{容许运行功率} = t \times \text{散热系数}$$

■ 根据环境温度变化的热时间常数 (JIS-C2570-1)

指在零负载状态下，当热敏电阻的环境温度发生急剧变化时，热敏电阻元件产生最初温度与最终温度两者温度差的63.2%的温度变化所需的时间。

热敏电阻的环境温度从 T_1 变为 T_2 时，经过时间 t 与热敏电阻的温度 T 之间存在以下关系。

■ Heat dissipation constant (JIS-C2570-1)

The dissipation constant (δ) indicates the power necessary for increasing the temperature of the thermistor element by 1°C through self-heating in a heat equilibrium.

Applying a voltage to a thermistor will cause an electric current to flow, leading to a temperature rise in the thermistor. This "intrinsic heating" process is subject to the following relationship among the thermistor temperature T_1 , ambient temperature T_2 , and consumed power P .

Measuring conditions for all parts in this catalog are as follows:

- ① Room temp is 25°C
- ② Axial and radial leaded parts were measured in their shipping condition.

■ Maximum power dissipation (JIS-C2570-1)

The power rating is the maximum power for a continuous load at the rated temperature. In the detail specification, it is likely to write by "Power rating" that is a past name.

For parts in this catalog, the value is calculated from the following formula using 25°C as the ambient temperature.

$$(\text{formula}) \text{ Rated power} = \text{heat dissipation constant} \times (\text{maximum operating temperature} - 25^{\circ}\text{C})$$

■ Permissible operating power

Definition : The power to reach the maximum operating temperature through self heating when using a thermistor for temperature compensation or as a temperature sensor. (No JIS definition exists.) The permissible operating power, when $t^{\circ}\text{C}$ is the permissible temperature rise, can be calculated using the following formula.

$$\text{Permissible operating power} = t \times \text{heat dissipation constant}$$

■ Thermal time constant (JIS-C2570-1)

A constant expressed as the time for the temperature at the electrodes of a thermistor, with no load applied, to change to 63.2% of the difference between their initial and final temperatures, during a sudden change in the surrounding temperature.

When the surrounding temperature of the thermistor changes from T_1 to T_2 , the relation between the elapsed time t and the thermistors temperature T can then be expressed by the following equation, by ambient temperature change.

$$T = (T_1 - T_2) \exp(-t / \tau) + T_2 \dots\dots (3.1)$$

$$= (T_2 - T_1) \{1 - \exp(-t / \tau)\} + T_1 \dots\dots (3.2)$$

常数 τ 称热响应时间常数。

上式中，若令 $t = \tau$ 时，则 $(T - T_1) / (T_2 - T_1) = 0.632$ 。

换言之，如上面的定义所述，热敏电阻产生初始温度差63.2%的温度变化所需的时间即为热响应时间常数。

经过时间与热敏电阻温度变化率的关系如下表所示。

| t | $\frac{T - T_1}{T_2 - T_1}$ |
|---------|-----------------------------|
| τ | 63.2% |
| 2τ | 86.5% |
| 3τ | 95.0% |
| 4τ | 98.2% |
| 5τ | 99.4% |

表-1 热响应时间常数 Table-1 Thermal Time Constant

产品目录记录值为下列测定条件下的典型值。

- ① 静止空气中环境温度从50°C至25°C变化时，热敏电阻的温度变化至34.2°C所需时间。
- ② 轴向引脚、径向引脚型在出厂状态下测定。

另外应注意，散热系数、热响应时间常数随环境温度、组装条件而变化。

■ 热敏传感器使用注意事项

请严格遵守以下事项，否则可能会造成热敏传感器损坏、使用设备损伤或引起误动作。

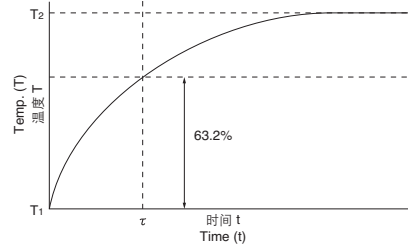
- ① 热敏传感器是按不同用途分别进行设计的。若要用于规定以外的用途时，请就使用环境条件与本公司联系洽谈。
 - ② 设计设备时，请进行热敏传感器贴装评估试验，确认无异异常后再使用。
 - ③ 请勿在过高的功率下使用热敏传感器。
 - ④ 由于自身发热导致电阻值下降时，可能会引起温度检测精度降低、设备功能故障，故使用时请参考散热系数，注意热敏传感器的外加功率及电压。
 - ⑤ 请勿在使用温度范围以外使用。
 - ⑥ 请勿施加超出使用温度范围限制的急剧温度变化。
 - ⑦ 将热敏传感器作为装置的主控制元件单独使用时，为防止事故发生，请务必采取设置“安全电路”、“同时使用具有同等功能的热敏传感器”等周全的安全措施。
 - ⑧ 在有噪音的环境中使用时，请采取设置保护电路及屏蔽热敏传感器(包括导线)的措施。
 - ⑨ 在高湿环境下使用护套型热敏传感器时，应采取仅护套头部暴露于环境(水中、湿气中)、而护套开口部不会直接接触到水及蒸气的设计。如果出现结露时，为了不使这个部位积露水，注意开口部向下等安装方法。
 - ⑩ 请勿施加过度的振动、冲击及压力。
 - ⑪ 请勿过度拉伸及弯曲导线。
 - ⑫ 请勿在绝缘部和电极间施加过大的电压。否则，可能会产生绝缘不良现象。
 - ⑬ 配线时应确保导线端子(含连接器)不会渗入“水”、“蒸气”、“电解质”等，否则会造成接触不良。
 - ⑭ 请勿在超出设定范围的腐蚀性气体的环境(Cl_2 、 NH_3 、 SO_x 、 NO_x)以及会接触到电解质、盐水、酸、碱、有机溶剂的场所中使用。
 - ⑮ 金属腐蚀可能会造成设备功能故障，故在选择材质时，应确保金属护套型及螺钉紧固型热敏传感器与安装的金属件之间不会产生接触电位差。
- 使用时若有其他不明之处，请垂询本公司销售人员。

The constant τ is called the heat dissipation constant.

If $t = \tau$, the equation becomes : $(T - T_1) / (T_2 - T_1) = 0.632$

In other words, the above definition states that the thermal time constant is the time it takes for the temperature of the thermistor to change by 63.2% of its initial temperature difference.

The rate of change of the thermistor temperature versus time is shown in table 1.



Measuring conditions for parts in this catalog are as follows:

- ① Part is moved from a 50°C environment to a still air 25°C environment until the temperature of the thermistor reaches 34.2°C.
- ② Axial and radial leaded parts are measured in their shipping form.

Please note, the thermal dissipation constant and thermal time constant will vary according to environment and mounting conditions

■ Caution in Thermistor Sensor usage

Due to the possibilities of destruction of the sensor, damage or miss use of equipment, please strictly follow below matter.

- ① The sensor is designed for individual usage. When it is going to be used beyond the specified condition, please speak to your daily contact person for our products.
- ② Whenever designing the equipment, make sure to check sensor operation and if there is no lack of quality.
- ③ Do not use the sensor exceeding rated electric power.
- ④ Due to possibility of causing the decrease of the value of resistance with self heat and malfunction of the equipment or the precision decrease of the inspection temperature, carefully refer to the dissipation constant usage of electric power and voltage.
- ⑤ Do not use the sensor beyond operating temperature range.
- ⑥ Avoid from exceeding radical temperature change, which is beyond operating temperature range.
- ⑦ In case of independently use of the sensor as a main control of the device, make sure to design and devise through safety measures for [safe circuit] and [parallel use with same function sensor] etc, to prevent from accident.
- ⑧ Under the environment which receives the influence of electric noise, make sure to take countermeasure by installing a protection circuit and seal the sensor (including the lead wire).
- ⑨ When the case type sensor is used under high humidity environment, make sure to design so that the protected case tip must be exposed to environment (in water, moisture) condition, and to the [utmost] open part of the case must be prevented from not touching water and steam directly.
Please note how such as making the opening downward to install it so as not to stay in this part when you generate the be dewy water.
- ⑩ Do not add excessive vibrating shocking pressure.
- ⑪ Avoid from excessive pulling and bending of the lead wire.
- ⑫ Do not impress excessive voltage in the insulated part and between the electrode. This might cause to occur the insulated malfunction.
- ⑬ Consider wiring, due to contact failure might occur if the terminal of the lead wire (including the connector) is immersed into [water] [steam] [electrolyte] etc.
- ⑭ Do not use in corrosiveness gas atmosphere (Cl_2 , NH_3 , SO_x , NO_x) beyond the designated condition.
Do not use at the place where the sensor touches the electrolytic, brine, acid, alkaline and organic solvent beyond the designated condition.
- ⑮ Due to possibility of the equipment becoming malfunction depending upon metal corrosion, consider not to cause potential difference with the contact metal for the case and screw equipped type sensor.
If there is any others unclear point, please inquire to our company sales in-charge.