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 melf for surface mount, to axial and radial leaded 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				−40˚C～+125˚C	10kΩ	58
TS03, TC03, TH03				−40˚C～+100˚C	25Ω～100KΩ	58,62
TN05, TC05, TH05				−40˚C～+125˚C	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	±0.3%	±1%		±3%	±5%		

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

板载式热敏电阻系列 ON BOARD THERMISTOR SERIE

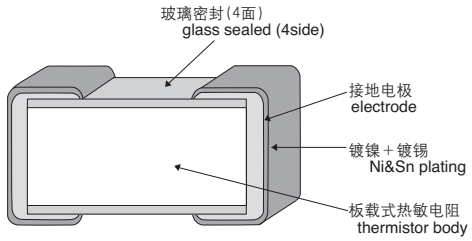
表面贴装型

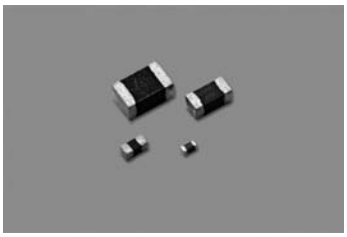
采用本公司独特的材料技术、产品设计技术及生产流程，开发生产的高精度、超小型化表面贴装型热敏电阻。
具有应对各种需求的形状和特性的品种。

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℃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 migtation resistance.)
- Strong against electrostatic discharge
- Excellent high frequency characteristics.
- Excellent solderability and heat resistance.
- High temperature(150℃)
- Lead-free
- RoHS Compliance

■产品系列 Product lineup

使用温度范围 Operating temperature range

高温类型 High temperature type

-40℃～150℃

高温高精度产品
High temperature and High precision type

TD Series P.57

R=±1%～
B=±1%

高温超高精度产品
High temperature and Super-high precision type

TZ Series P.57

R=±0.5%～
B=±0.3%

标准类型 Standard type

1005～2012 类型 1005～2012 type
-40℃～125℃

0603类型 0603type
-40℃～100℃

标准产品
Standard type

TN Series P.60～61
TC Series P.60～62
TS Series P.62

R=±5%～
B=±3%

高精度产品
High precision type

TH Series P.58～59

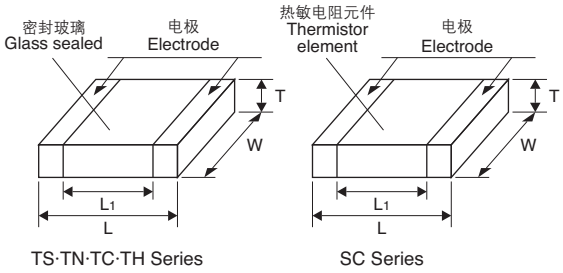
R=±1%～
B=±1%

高温化、超高精度化
Super-high presicion type

TX Series P.58

R=±0.5%～
B=±0.3%

■形状・尺寸 Dimensions



(mm)

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.

NTC热敏电阻
NTC THERMISTOR

板载式热敏电阻系列 ON BOARD THERMISTOR SERIES

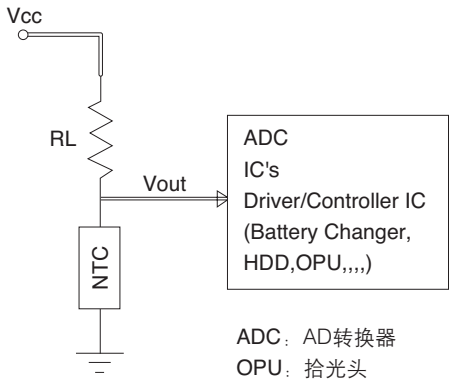
■用途

●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

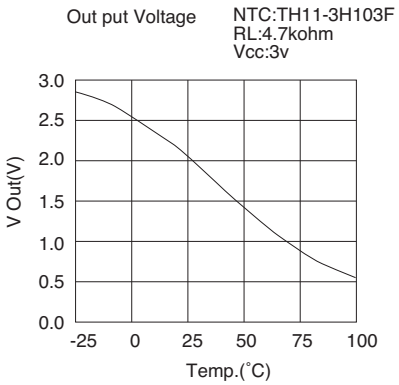
■Applications

●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



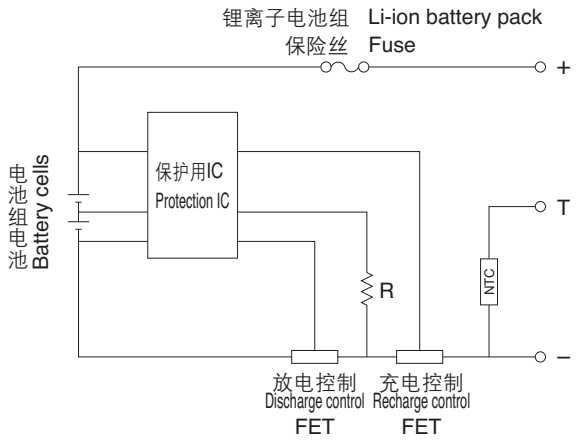
ADC：AD转换器
OPU：拾光头



■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.



Th : TH05-3H103F (10kΩ±1%, 3370K±1%)

[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.

[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.

[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。

[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 sealled body for high reliability.

■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	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	4H104**	100kΩ	4,360K	4,360K
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	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	新产品 3M104**	100kΩ	3,580K	3,620K
4H104**	100kΩ	4,360K	4,360K	新产品 3R154**	150kΩ	3,680K	3,723K
新产品 3S224**	220kΩ	3,760K	3,806K	新产品 3U334**	330kΩ	3,850K	3,904K
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.

板载式热敏电阻系列 ON BOARD THERMISTOR SERIES

[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 TX05 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.

[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 TH03 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
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

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

[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	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	3K683**	68kΩ	3,500K	3,534K
3V103**	10kΩ	3,910K	3,876K	3M104**	100kΩ	3,590K	3,628K
4C153**	15kΩ	4,110K	4,053K	4H104**	100kΩ	4,360K	4,360K
3T223**	22kΩ	3,820K	3,841K	3R154**	150kΩ	3,680K	3,723K
3K333**	33kΩ	3,480K	3,617K	3S224**	220kΩ	3,760K	3,806K
3J473**	47kΩ	3,440K	3,481K	3U334**	330kΩ	3,850K	3,904K
4B473**	47kΩ	4,050K	4,067K	3W474**	470kΩ	3,940K	3,998K
				4V105G*	1MΩ	4,900K	4,909K

※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

※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	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	3W503**	50kΩ	3,950K	4,030K
3V103**	10kΩ	3,924K	3,914K	3R803**	80kΩ	3,700K	3,743K
3W303**	30kΩ	3,950K	3,991K	3S104**	100kΩ	3,760K	3,806K
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

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

NTC热敏电阻 NTC THERMISTOR

板载式热敏电阻系列 ON BOARD THERMISTOR SERIES

[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。

[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.

■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。

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.

■特性 ■Characteristics

TN11系列 TN11 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
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.

板载式热敏电阻系列 ON BOARD THERMISTOR 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。

[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.

■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。

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.

■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.

NTC热敏电阻 NTC THERMISTOR

MITSUBISHI MATERIALS CORPORATION

板载式热敏电阻系列 ON BOARD THERMISTOR SERIES

[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。

[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

■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.

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

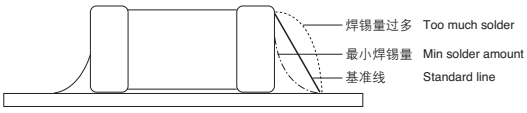
医疗、宇航、核电等设备上使用的电子部件，与用于一般民用设备的相比，常常要求更高的可靠性，因为这些设备一旦发生故障，经常会导致人身危害或引起巨大的社会损失。考虑用于此类用途时，请务必事先与本公司联系。

■保存环境

1)保存温度、湿度
　环境温度：-10～40℃
　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.

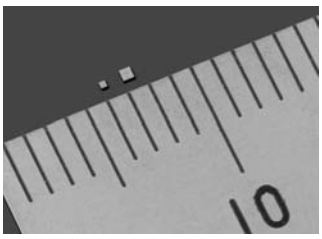
■Other caution

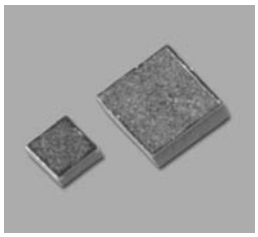
Use this product within the specified temperature range. Feel free to contact us when you have any questions regarding our products.

NTC热敏电阻 NTC THERMISTOR

板载式热敏电阻系列 ON BOARD THERMISTOR SERIES

FH05、FH10系列



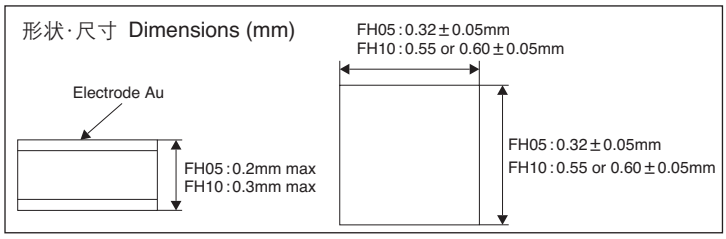


●电阻值容许偏差 ····· ±1%, ±2%, ±3% (R25)
●B值容许偏差 ····· ±1% (B25/50)
●端子电极 ····· 金
●使用温度范围 ····· –40˚C～+125˚C
●散热系数 ····· FH05:0.15mW/˚C, FH10:0.3mW/˚C
●最大功率 ····· FH05:15mW, FH10:30mW
※散热常数、最大功率是钎焊ø0.1mmCuNi线状态下的值。

■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)

FH05, FH10 Series



●Resistance tolerance ····· ±1%, ±2%, ±3%(R25)
●B value tolerance ····· ±1%(B25/50)
●Termination ····· Au
●Operating temperature range ····· –40˚C～+125˚C
●Heat disspation ····· FH05:0.15mW/˚C, FH10:0.3mW/˚C
●Maximum power dissipation ····· FH05:15mW, FH10:30mW
※Heat dissipation and Maximum power dissipation are applied to thermistor connected ø0.1mm CuNi wire by solder.

■Features

●Small precision type
●Long-life Reliability
●Excellent solderability,bondability
●Excellent stability against Au/Sn soldering process(about 300˚C)

■特性 Characteristics

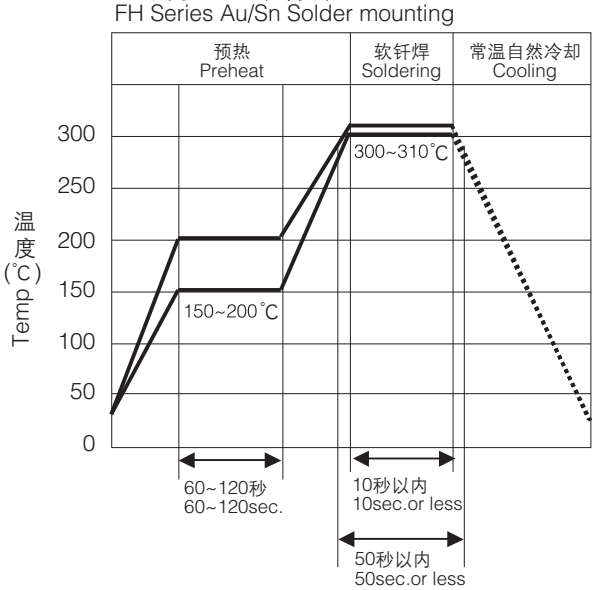
FH05、FH10系列 FH05,10 Series

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
			±1%	±2%	±3%	
FH05	FH05-6D103*C	10kΩ	○	○	○	3,930K
FH10	FH10-6E103*C	10kΩ	○	○	○	3,950K
	FH10-6Q103*C	10kΩ	○	○	○	3,410K
	FH10-3U104*C	100kΩ	○	○	○	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:N2gases(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.

板载式热敏电阻系列 ON BOARD THERMISTOR SERIES

[通用产品]
MN18系列

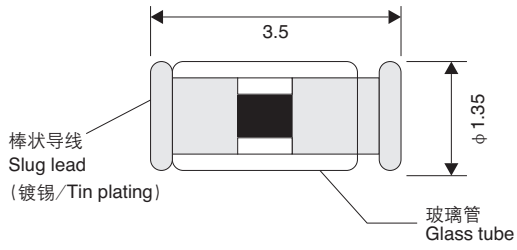
●电阻值容许偏差 ····· ±3%, ±5% (R25)
●B值容许偏差 ····· ±3% (B25/50)
●端子电极 ····· 镀锡
●使用温度范围 ····· −40˚C～+150˚C
●散热系数 ····· 2.0mW/˚C
●最大功率 ····· 250mW

■特点

●可在高温下使用。
●耐环境性能优异。

[High temp. range type]
MN18 Series

形状·尺寸 Dimensions (mm)



●Resistance tolerance ····· ±3%,±5%(R25)
●B value tolerance ····· ±3%(B25/50)
●Termination ····· Tin plating
●Operating temperature range ····· −40˚C~+150˚C
●Heat dissipation ····· 2.0mW/˚C
●Maximum power dissipation ····· 250mW

■Features

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

■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**	2kΩ	3,470K	3,507K	6E203**	20kΩ	3,965K	4,016K
3G302**	3kΩ	3,470K	3,507K	6P303**	30kΩ	3,948K	3,984K
3G502**	5kΩ	3,470K	3,507K	6H503**	50kΩ	3,770K	3,820K
3H103**	10kΩ	3,465K	3,502K	3U104**	100kΩ	3,965K	4,038K
				3U154**	150kΩ	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.

NTC热敏电阻 NTC THERMISTOR

MH18系列

●电阻值容许偏差 ····· ±1%, ±2%, ±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～+150˚C
●散热系数 ····· 2.0mW/˚C
●最大功率 ····· 250mW

■特点

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

MH18 Series

●Resistance tolerance ····· ±1%,±2%,±3%(R25)
●B value tolerance ····· ±1%(B25/50)
●Termination ····· Tin plating
●Operating temperature range ····· −40˚C~+150˚C
●Heat dissipation ····· 2.0mW/˚C
●Maximum power dissipation ····· 250mW

■Features

●High precision type.(±1%)
●Suitable for high temperature applications.
●Excellent choice for harsh environments.

■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				
		±1%	±2%	±3%		
3G202**	2kΩ	○	○	○	3,470K	3,507K
3G302**	3kΩ	○	○	○	3,470K	3,507K
3G502**	5kΩ	○	○	○	3,470K	3,507K
3H103**	10kΩ	○	○	○	3,465K	3,502K
6E203**	20kΩ	−	○	○	3,965K	4,016K
6P303**	30kΩ	○	○	○	3,948K	3,984K
6H503**	50kΩ	○	○	○	3,770K	3,820K
3U104**	100kΩ	○	○	○	3,965K	4,038K
3U154**	150kΩ	○	○	○	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.

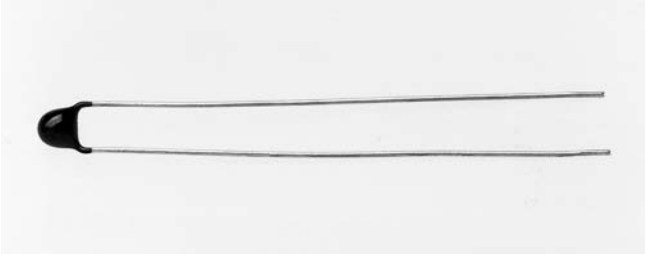
板载式热敏电阻系列 ON BOARD THERMISTOR SERIES

[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 temperrature type]** 玻璃封装产品 **Glass encapsulated** **GA, GH, GR Series**

[用途] [Applications]	[特点] [Features]	[系列] [Series]
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

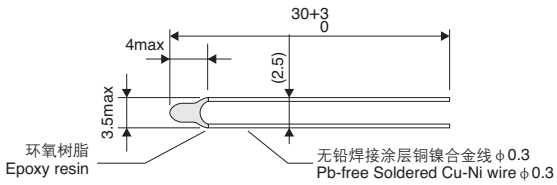
[径向引脚型]
CN25系列



●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 ····· δ=0.7mW/˚C
●最大功率 ····· P=59.5mW

[Radial leaded type]
CN25 Series

形状・尺寸 Dimensions (mm)



●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 ····· δ=0.7mW/˚C
●Maximum power dissipation ····· P=59.5mW

■特点

●小型、高精度。
●温度循环特性优异。

■Features

●Small precision type.
●Excellent thermal cycle endurance.

■特性 Characteristics

CN25系列 CN25 Series

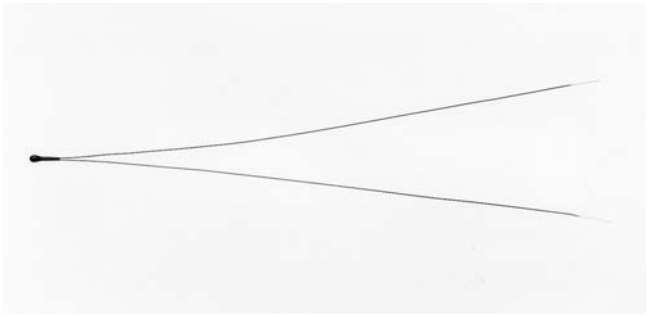
型 号 Type	电阻值 Resistance R25	B值 B Value B25/50	B值 B Value B25/85	热响应时间常数 Thermal time constant τ (sec.)	型 号 Type	电阻值 Resistance R25	B值 B Value B25/50	B值 B Value B25/85	热响应时间常数 Thermal time constant τ (sec.)
3G501**	500Ω	3,450K	3,488K	14	3H103**	10kΩ	3,450K	3,486K	12
3G102**	1kΩ	3,450K	3,488K	12	3T103**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

※关于R−T数据，请参阅本公司主页。

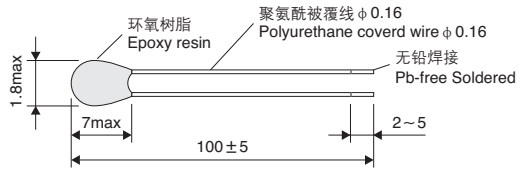
※Regarding R-T data, please refer to our Home Page.

板载式热敏电阻系列 ON BOARD THERMISTOR SERIES

RM16系列 RM16 Series



形状・尺寸 Dimensions (mm)



●电阻值容许偏差 …… ±3%, ±5% (R25)
●B值容许偏差 …… ±3% (B25/50)
●端子电极 …… 聚氨酰被覆线
●使用温度范围 …… –40˚C～+110˚C
●散热系数 …… δ=0.6mW/˚C
●热响应时间常数 …… τ=6sec.
●最大功率 …… P=51mW

●Resistance tolerance …… ±3%,±5%(R25)
●B value tolerance …… ±3%(B25/50)
●Termination …… Polyurethane covered wire
●Operating temperature range …… –40˚C～+110˚C
●Heat dissipation constant …… δ=0.6mW/˚C
●Thermal time constant …… τ=6sec.
●Maximum power dissipation …… P=51mW

■特点

●小型、高精度。
●导线长，便于安装子测定部。

■Features

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

■特性 Characteristics

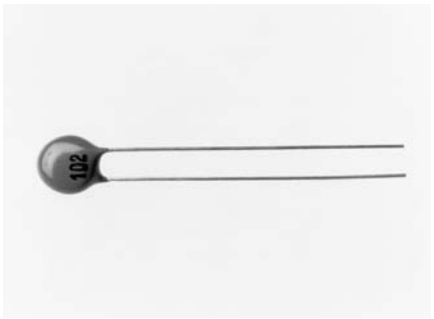
RM16系列 RM16 Series

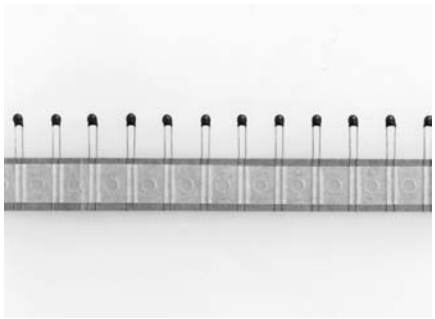
型 号 Type	电阻值 R25 Resistance	B值 B25/50 B Value	B值 B25/85 B Value	型 号 Type	电阻值 R25 Resistance	B值 B25/50 B Value	B值 B25/85 B Value
3G102**	1kΩ	3,450K	3,488K	6M303**	30kΩ	3,970K	4,084K
3G202**	2kΩ	3,450K	3,488K	3U503**	50kΩ	3,950K	4,025K
6D502**	5kΩ	3,930K	3,941K	3U803**	80kΩ	3,950K	4,025K
3H103**	10kΩ	3,450K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

※关于R–T数据，请参阅本公司主页。

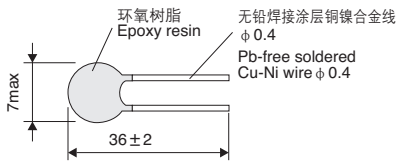
※Regarding R-T data, please refer to our Home Page.

DC30系列 DC30 Series





形状・尺寸 Dimensions (mm)



●电阻值容许偏差 …… ±5%, ±10% (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～+100˚C

●Resistance tolerance …… ±5%,±10%(R25)
●B value tolerance …… ±3%(B25/50)
●Termination …… Pb-free Soldered Cu-Ni wire
●Operating temperature range …… -40˚C~+100˚C

■特点

●适合自动插装。

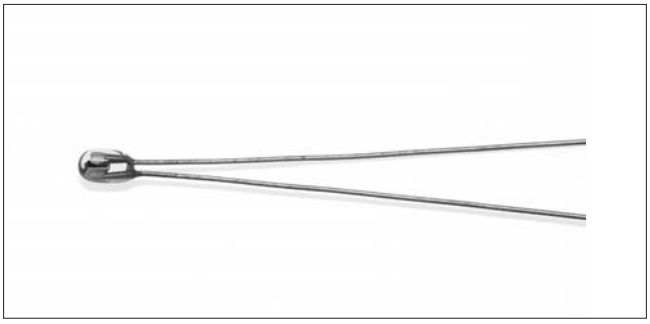
■Features

●Can be used with automatic insertion equipment.

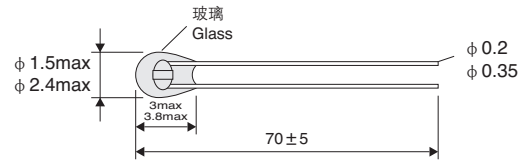
※关于DC30系列的详细情况，请进行相关咨询。

※Please contact us for the details of DC30 series.

GR15,GR25系列 GR15,GR25 Series



形状・尺寸 Dimensions (mm)



上部数据：GR15系列 Upper value : GR15 Series
下部数据：GR25系列 Lower value : 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 temperature range …… −40˚C～+300˚C(150˚C)
●Heat dissipation constant …… GR15 : δ=0.7mW/˚C
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	

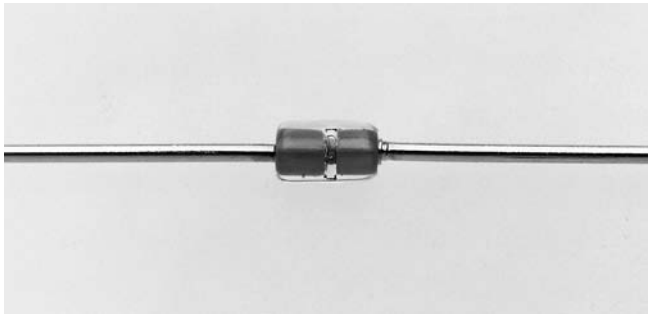
※关于R−T数据,请参阅本公司主页。

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

NTC THERMISTOR NTC热敏电阻

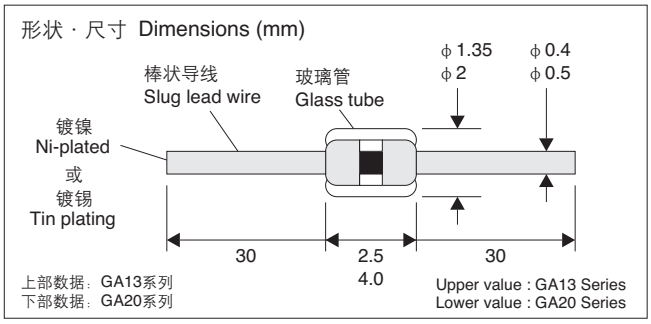
板载式热敏电阻系列 ON BOARD THERMISTOR SERIES

[轴向引脚型]
GA13、GA20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 ····· 镀镍或镀锡
●使用温度范围 ····· –40˚C～+300˚C
–40˚C～+150˚C
●散热系数 ····· GA13 : δ=1.3mW/˚C
GA20 : δ=1.8mW/˚C
●热响应时间常数 ····· GA13 : τ=14sec.,GA20 :τ=25sec.
●最大功率 ····· GA13 : P=357mW(300˚C耐热产品)
P=162mW(150˚C耐热产品)
GA20 : P=495mW(300˚C耐热产品)
P=225mW(150˚C耐热产品)

[Axial leaded type]
GA13, GA20 Series



●Resistance tolerance ····· ±3%,±5%(R25)
●B value tolerance ····· ±3%(B25/50)
●Termination ····· Ni-plating or Tin plating
●Operating ····· –40˚C～+300˚C
temperature range –40˚C～+150˚C
●Heat dissipation ····· GA13 : δ=1.3mW/˚C
constant GA20 : δ=1.8mW/˚C
●Thermal time constant ····· GA13 : τ=14sec.,GA20 : τ=25sec.
●Maximum power dissipation ····· GA13 : P=357mW(max temp.300˚C)
P=162mW(max temp.150˚C)
GA20 : P=495mW(max temp.300˚C)
P=225mW(max temp.150˚C)

■特点

●可在高温下使用。
●适合自动插装。

■Features

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

■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**	2kΩ	3,470K	3,507K
3G302**	3kΩ	3,470K	3,507K
6D502**	5kΩ	3,950K	3,961K
6P303**	30kΩ	3,948K	3,984K
3U104**	100kΩ	3,965K	4,038K

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**	2kΩ	3,470K	3,507K
3G302**	3kΩ	3,470K	3,507K
6D502**	5kΩ	3,950K	3,961K
6P203**	20kΩ	3,948K	3,984K
6P303**	30kΩ	3,948K	3,984K
3U503**	50KΩ	3,965K	4,038K
3U104**	100KΩ	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**	10kΩ	3,465K	3,502K
6E203**	20kΩ	3,965K	4,016K
6H503**	50kΩ	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**	10kΩ	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.

NTC热敏电阻 NTC THERMISTOR

板载式热敏电阻系列 ON BOARD THERMISTOR SERIES

[高精度引脚型]

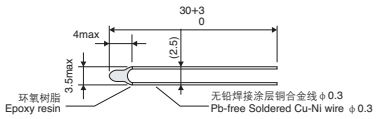
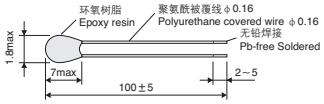
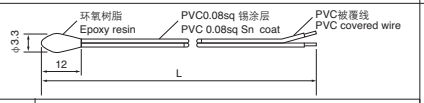
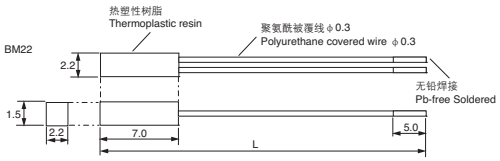
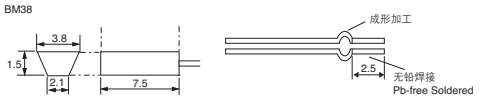
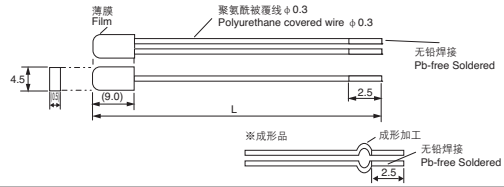
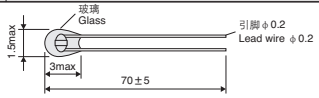
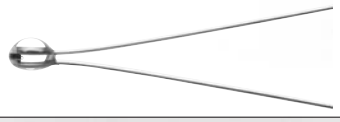
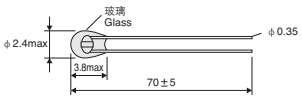
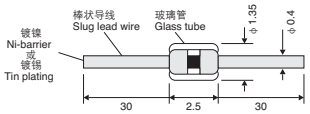
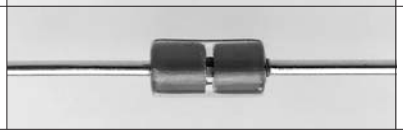
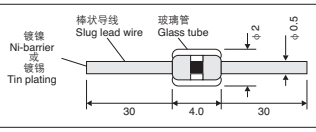
高精度系列产品，可用于高精度电路的温度补偿或温度控制、温度测量上，要求电阻值及B值的容许偏差极小的产品。

[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
径向引脚型 Radial Leaded Type	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	
	新产品 BM22			−40˚C～+100˚C
	BM38			
			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	
	新产品 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
轴向引脚型 Axial Leaded Type	GH13			−40˚C～ +300(150)˚C
	GH20			−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.

板载式热敏电阻系列 ON BOARD THERMISTOR SERIES

CH25，RH16，BN35，BM22，BM38，BF05系列

●散热系数‥CH25:δ=0.7mW/˚C,RH16:δ=0.6mW/˚C,BN35:δ=2.4mW/˚C,BM22:δ=1.2mW/˚C,BM38:δ=1.3mW/˚C,BF05:δ=1.5mW/˚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

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

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

●Heat dissipation constant‥CH25:δ=0.7mW/˚C,RH16:δ=0.6mW/˚C,BN35:δ=2.4mW/˚C,BM22:δ=1.2mW/˚C,BM38:δ=1.3mW/˚C,BF05:δ=1.5mW/˚C
●Maximum power dissipation‥CH25:P=59.5mW,RH16:P=51mW,BN35:P=132mW,BM22:P=90mW,BM38:P=97.5mW,BF05:P=112mW

※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 : 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)

GR15, GR25 Series

●Heat dissipation constant ‥‥‥ GR15 : δ=0.7mW/˚C, 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)

NTC热敏电阻 NTC THERMISTOR

300˚C耐热产品 300˚C Heat resistance

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

150˚C耐热产品 150˚C Heat resistance

系列名 Series	型 号 Type	电阻值 Resistance R25	电阻值容许偏差 Resistance tolerance ±1%	±2%	±3%	B值 B25/50 B Value	B值 B25/85 B Value
GR15	6S222**	2.186kΩ	–	○	○	3,386K±1%	3,419K
	3G302**	3kΩ	–	○	○	3,490K±1%	3,527K
	6Q542**	5.369kΩ	–	○	○	3,423K±1%	3,468K
	6Q852**	8.471kΩ	–	○	○	3,423K±1%	3,468K
	6Q113**	10.74kΩ	–	○	○	3,423K±1%	3,468K
	6M373**	36.74kΩ	○	○	○	3,985K±1%	4,099K
	6N493**	48.70kΩ	○	○	○	3,935K±1%	4,030K
GR25	3G202**	2kΩ	○	○	○	3,490K±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.

GH13, GH20系列

●散热系数 ····· GH13 ：δ=1.3mW/℃
GH20 ：δ=1.8mW/℃
●热响应时间常数 ····· GH13 ：τ=14sec.， GH20 ：τ=25sec.
●最大功率 ····· GH13 ：P=357mW (300℃耐热产品)
P=162mW (150℃耐热产品)
GH20 ：P=495mW (300℃耐热产品)
P=225mW (150℃耐热产品)

GH13, GH20 Series

●Heat dissipation constant ····· GH13 : δ=1.3mW/℃
GH20 : δ=1.8mW/℃
●Thermal time constant ···· GH13 : τ=14sec.,GH20 : τ=25sec.
●Maximum power dissipation ····· GH13 : P=357mW(max temp.300℃)
P=162mW(max temp.150℃)
GH20 : P=495mW(max temp.300℃)
P=225mW(max temp.150℃)

300℃耐热产品 300℃ Heat resistance

系列名 Series	型 号 Type	电阻值 Resistance R25	电阻值容许偏差 Resistance tolerance ±1%	±2%	±3%	B值 B25/50 B Value	B值 B25/85 B Value
GH13	3G202＊＊	2kΩ	○	○	○	3,470K±1%	3,507K
	3G302＊＊	3kΩ	○	○	○	3,470K±1%	3,507K
	6D502＊＊	5kΩ	○	○	○	3,950K±1%	3,961K
	6P303＊＊	30kΩ	○	○	○	3,948K±1%	3,984K
	3U104＊＊	100kΩ	○	○	○	3,965K±1%	4,038K
GH20	3G202＊＊	2kΩ	○	○	○	3,470K±1%	3,507K
	3G302＊＊	3kΩ	○	○	○	3,470K±1%	3,507K
	6D502＊＊	5kΩ	○	○	○	3,950K±1%	3,961K
	6P203＊＊	20kΩ	○	○	○	3,948K±1%	3,984K
	6P303＊＊	30kΩ	○	○	○	3,948K±1%	3,984K
	3U503＊＊	50kΩ	○	○	○	3,965K±1%	4,038K
	3U104＊＊	100kΩ	○	○	○	3,965K±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℃耐热产品 150℃ Heat resistance

系列名 Series	型 号 Type	电阻值 Resistance R25	电阻值容许偏差 Resistance tolerance ±1%	±2%	±3%	B值 B25/50 B Value	B值 B25/85 B Value
GH13	3H103＊＊	10kΩ	○	○	○	3,465K±1%	3,502K
	6E203＊＊	20kΩ	—	○	○	3,965K±1%	4,016K
	6H503＊＊	50kΩ	○	○	○	3,770K±1%	3,820K
GH20	3H103＊＊	10kΩ	○	○	○	3,465K±1%	3,502K

※关于R-T数据，请参阅本公司主页。

※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℃。

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

※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℃.

【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时，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(Cℓ2、NH3、SOx、NOx)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模型加工时，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 (Cℓ2, NH3, SOx, NOx)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

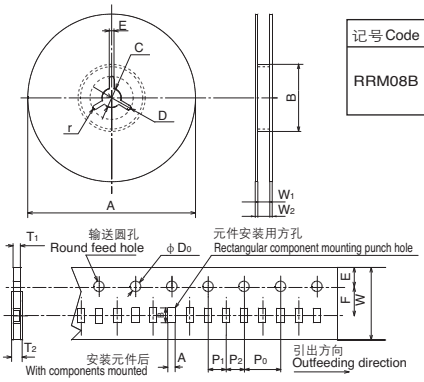
单位 : mm Unit : mm

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



记号Code	A	B	C	D	E	W1	W2	r
RRM08B	ø180 +0 −3	ø60 +1 −0	ø13.0 ±0.2	R10.5 ±0.4	2.0 ±0.5	9.0 ±0.3	11.4 ±1.0	0.5

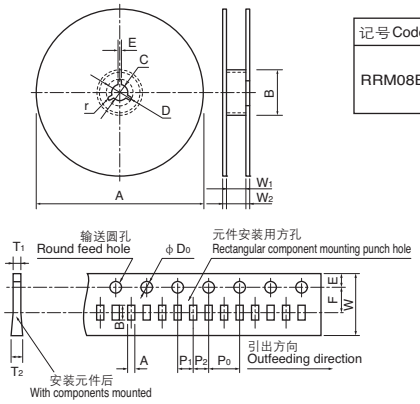
A	B	W	F	E	P1
0.37 ±0.08	0.67 ±0.08	8.0 ±0.3	3.50 ±0.05	1.75 ±0.10	2.0 ±0.1

P2	P0	D0	T1	T2	安装孔 Loading hole
2.0 ±0.1	4.0 ±0.1	ø1.5 +0.1 −0	0.4 以下 max	0.5 以下 max	方形通孔 或者 冲压凹孔 Rectangular hole or Press pocket

R

TZ05
TX05
TD05
TN05
TC05
TH05

10,000



记号Code	A	B	C	D	E	W1	W2	r
RRM08B	ø180 +0 −3	ø60 +1 −0	ø13.0 ±0.2	R10.5 ±0.4	2.0 ±0.5	9.0 ±0.3	11.4 ±1.0	0.5

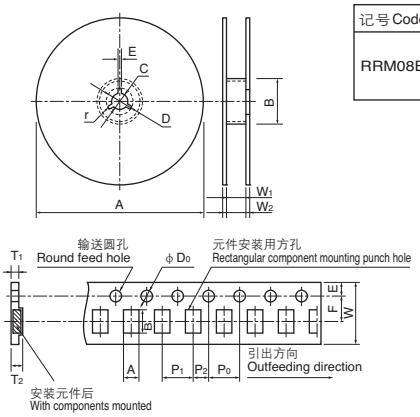
A	B	W	F	E	P1
0.62 ±0.10	1.15 ±0.10	8.0 ±0.3	3.50 ±0.05	1.75 ±0.10	2.0 ±0.1

P2	P0	D0	T1	T2	安装孔 Loading hole
2.00 ±0.05	4.0 ±0.1	ø1.5 +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



记号Code	A	B	C	D	E	W1	W2	r
RRM08B	ø180 +0 −3	ø60 +1 −0	ø13.0 ±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	P1
1.62 ±0.2 (1.0 ±0.2)	2.4 ±0.2 (1.8 ±0.2)	8.0 ±0.3	3.50 ±0.05	1.75 ±0.10	4.0 ±0.1

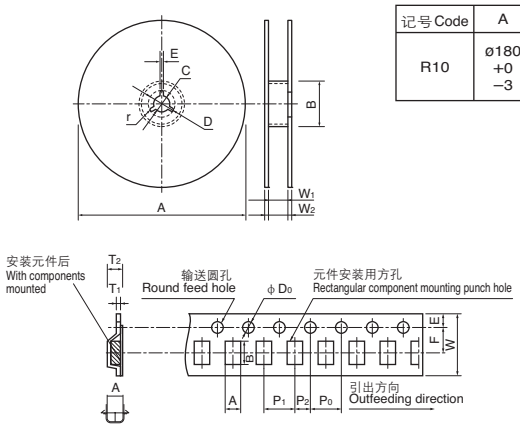
P2	P0	D0	T1	T2	安装孔 Loading hole
2.00 ±0.05	4.0 ±0.1	ø1.5 +0.1 −0	1.1 以下 max	1.4 以下 max	方形通孔 Rectangular hole

※( )内的数值是TN11、TH11、TN10、TC10的尺寸。
※Dimensions in ( ) are for TN11, TH11, TN10, TC10.

P

MN18
MH18

2,000



记号Code	A	B	C	D	E	W1	W2	r
R10	ø180 +0 −3	ø60 +1 −0	ø13.0 ±0.2	R10.5 ±0.4	2.0 ±0.5	9.0 ±0.3	11.4 ±1.0	0.5

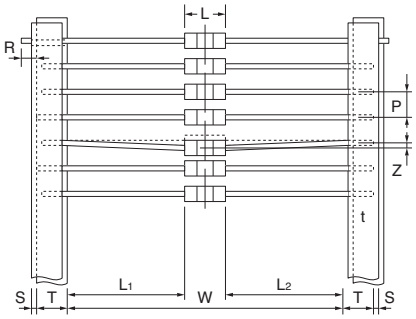
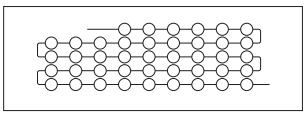
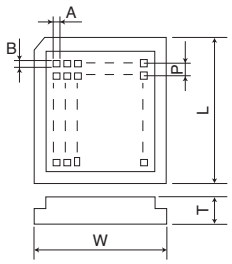
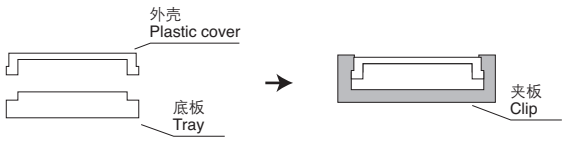
A	B	W	F	E	P1
1.7 ±0.1	4.1 ±0.1	8.0 ±0.2	3.55 ±0.1	1.5 ±0.1	4.0 ±0.1

P2	P0	D0	T1	T2	安装孔 Loading hole
2.00 ±0.05	4.0 ±0.1	ø1.5 +0.1 −0	0.5 以下 max	2.0 以下 max	方形通孔 Rectangular hole

NTC热敏电阻 NTC THERMISTOR

■包装形式 Packing form

单位 : mm Unit : mm

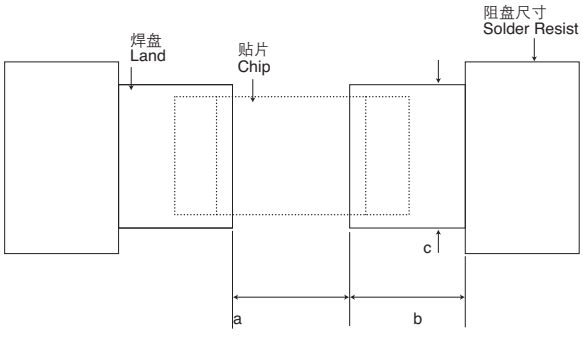
包装记号 Packing code	相应系列 Related series	包装数量 Packing Qty.	包装形式 Packing form
B	TS03, TC03, TH03, TN05, TC05, TH05, TZ05, TX05, TD05, TN10, TC10, TN11, TH11,TD11, TN20, TC20, TH20,	500	聚乙烯袋 Poly bag 
	MN18, MH18, GA13, GH13,GA20, GH20, CN25, CH25,RM16, RH16, GR15	200	
	DC30, GR25	100	
F	GA13 GH13 GA20 GH20	2,000	 产品引出方向(从侧面看) Feed direction (Side view) 
C	FH05 FH10	400	 

记号 Code	尺寸 Dimensions
L	[GA13,GH13]2.5 $^{+0.2}_{-0.4}$
	[GA20,GH20]4.0 $^{+0.2}_{-0.4}$
W	52.0 $^{+0.2}_{-1.0}$
P	5.0±0.5
L_1-L_2	1.0max.

记号 Code	尺寸 Dimensions
T	6.0±1.0
Z	1.5max.
R	不可露出带外 Not sticking out of tape
t	3.2min.
S	0.8max.

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		

■推荐焊盘布局 Recommended land Pattern



焊盘尺寸(单位 : mm) (Unit : mm)

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.

热敏传感器 THERMISTOR SENSORS

[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℃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。

■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 signficant, 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

室用空调机用

■特点

●防湿性能优异。
●小型、温度响应快。

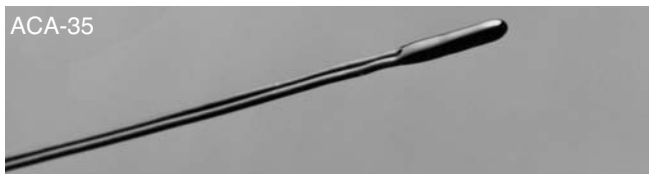
Sensor for room air conditioner

■Features

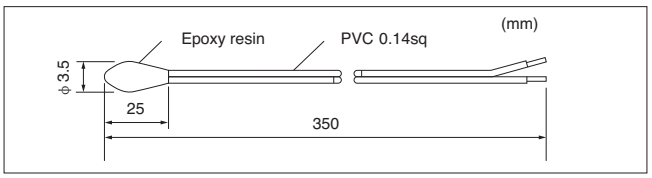
●Moisture resistant.
●Small with quick temperature response.

NTC热敏电阻
NTC THERMISTOR

ACA-35

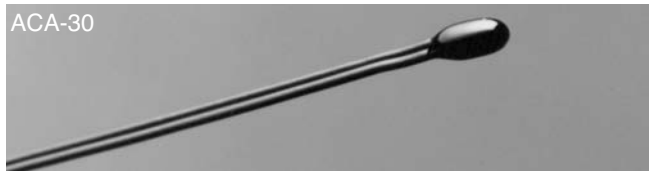


●电阻值 ····· R_{25}=15kΩ±3%(薄片)
●B值(3T) ····· $B_{25/50}$=3950K±2%
$B_{25/85}$=3989K
●使用温度范围 ····· −30˚C～+100˚C
●用途 ····· 气温用
●热响应时间常数(空气中) ····· 50sec.

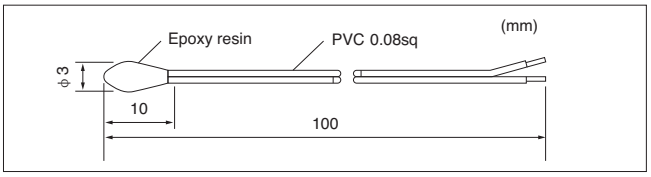


●Resistance ····· R_{25}=15kΩ±3% (Flake chip)
●B value (3T) ····· $B_{25/50}$=3950K±2%
$B_{25/85}$=3989K
●Operating temperature range ····· -30˚C~+100˚C
●Application ····· Air temperature
●Thermal time constant (in air) ····· 50sec.

ACA-30



●电阻值 ····· R_{25}=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.

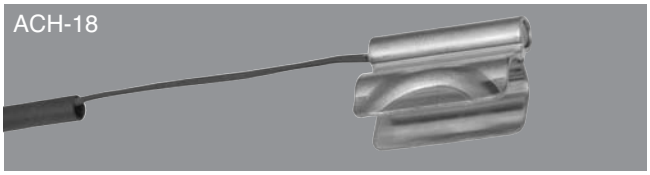


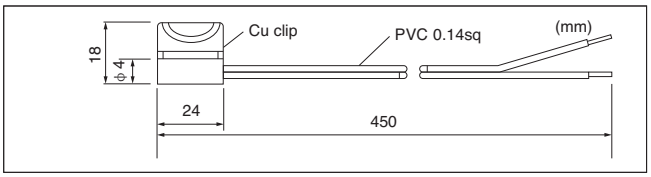
●Resistance ····· R_{25}=5kΩ±3% (Flake chip)
●B value (3T) ····· $B_{25/50}$=3950K±2%
$B_{25/85}$=3989K
●Operating temperature range ····· -30˚C~+100˚C
●Application ····· Remote control
●Thermal time constant (in air) ····· 25sec.

※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。

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

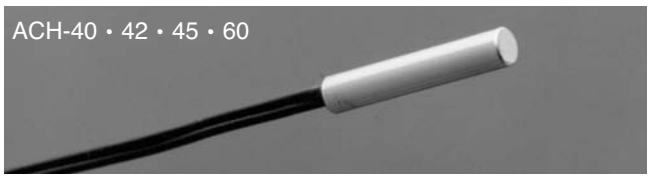
热敏传感器 THERMISTOR SENSORS

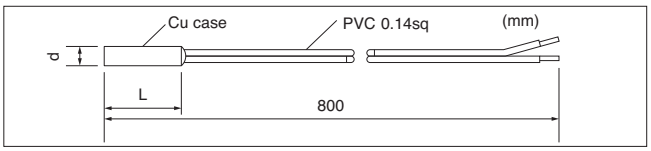




●电阻值 ····· R_{25}=15kΩ±2%(薄片)
●B值(3H) ····· $B_{25/50}$=3450K±2%
$B_{25/85}$=3486K
●使用温度范围 ····· −30˚C～+100˚C
●用途 ····· 热交换器用
●热响应时间常数(水中) ····· 5sec.

●Resistance ····· R_{25}=15kΩ±2% (Flake chip)
●B value (3H) ····· $B_{25/50}$=3450K±2%
$B_{25/85}$=3486K
●Operating temperature range ····· -30˚C~+100˚C
●Application ····· Heat exchanger
●Thermal time constant (in water) ···· 5sec.

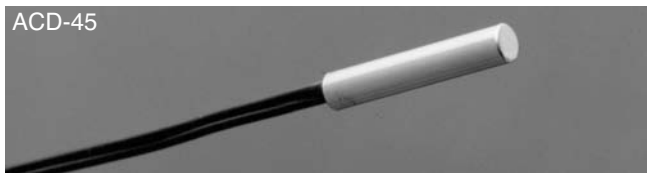


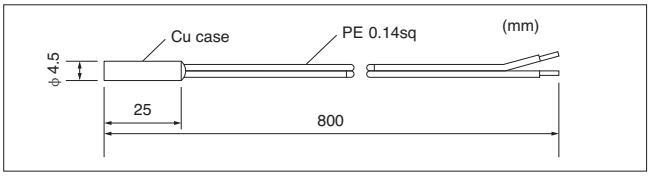


d(mm)	ø4.0	ø4.2	ø4.5	ø6.0
L(mm)	24	25	25	24

●电阻值 ····· R_{25}=10kΩ±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 ····· 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.

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





●电阻值 ····· R_{90}=5kΩ±3%(薄片)
●B值(3U) ····· $B_{25/50}$=3950K±3%
$B_{25/85}$=4025K
●使用温度范围 ····· −30˚C～+130˚C
●用途 ····· 排水管用
●热响应时间常数(水中) ····· 5sec.

●Resistance ····· R_{90}=5kΩ±3% (Flake chip)
●B value (3U) ····· $B_{25/50}$=3950K±3%
$B_{25/85}$=4025K
●Operating temperature range ····· -30˚C~+130˚C
●Application ····· Delivery pipe
●Thermal time constant (in water) ···· 5sec.

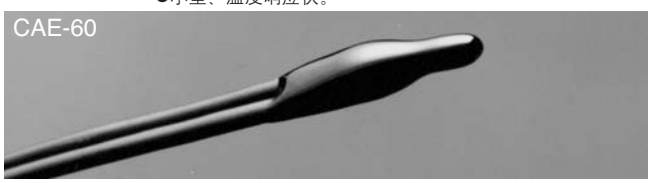
汽车空调机用 Sensor for car air conditioner

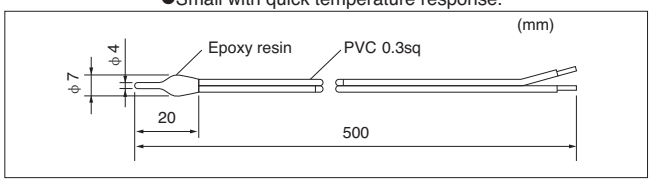
■特点

●防湿性能优异。
●小型、温度响应快。

■Features

●Moisture resistant.
●Small with quick temperature response.





●电阻值 ····· R_0=4.852kΩ±5%(薄片)
●B值(6D) ····· $B_{25/50}$=3930K±3%
$B_{25/85}$=3941K
●使用温度范围 ····· −30˚C～+100˚C
●用途 ····· 蒸发器用
●热响应时间常数(水中) ····· 4sec.

●Resistance ····· R_0=4.852kΩ±5% (Flake chip)
●B value (6D) ····· $B_{25/50}$=3930K±3%
$B_{25/85}$=3941K
●Operating temperature range ····· -30˚C~+100˚C
●Application ····· Evaporator
●Thermal time constant (in water) ···· 4sec.

洗衣干燥机用

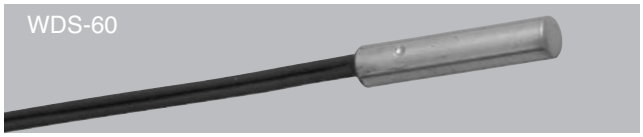
■特点

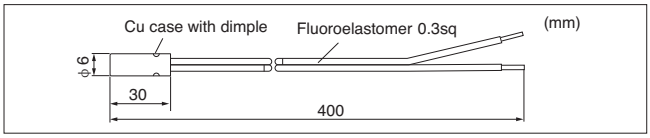
●耐热性能优异。
●防湿性能优异。

Sensor for Washing & Drying machine

■Features

●Resistance to high temperature.
●Moisture resistant.





●电阻值 ····· R_{100}=3.3kΩ±3%(GR型)
●B值(6PR) ····· $B_{25/100}$=3999K±2%
●使用温度范围 ····· −30˚C～150˚C
●热响应时间常数(水中) ····· 10sec.

●Resistance ····· R_{100}=3.3kΩ±3% (GR TYPE)
●B value (6PR) ····· $B_{25/100}$=3999K±2%
●Operating temperature range ····· -30˚C~150˚C
●Thermal time constant (in water) ··· 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。

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

NTC THERMISTOR
NTC热敏电阻

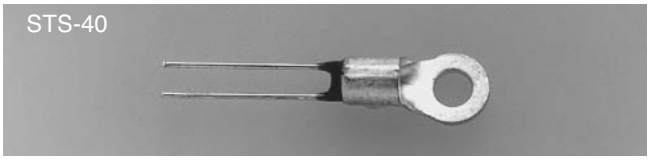
表面温度用 Sensor for measuring surface temperature

■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。

STS-40

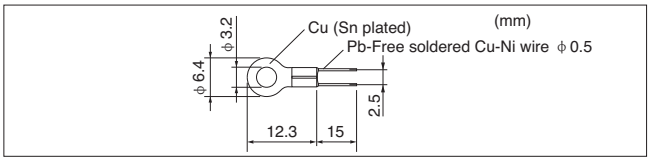


●电阻值 ····· R_{25}=10kΩ±1%(薄片)
●B值(3H) ····· $B_{25/50}$=3450k±1%
$B_{25/85}$=3486k
●使用温度范围 ····· −30˚C～＋110˚C
●热响应时间常数(铝块上) ····· 18sec.

■Features

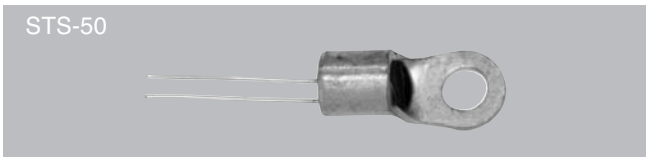
●Can be fastened with a screw.
●Metal contact surface yields fast temperature response.

※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.

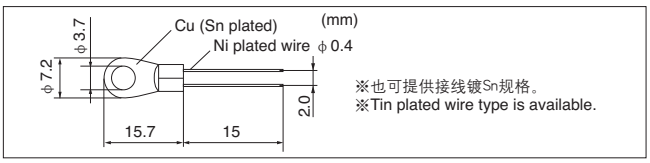


●Resistance ····· R_{25}=10kΩ±1% (Flake chip)
●B value (3H) ····· $B_{25/50}$=3450K±1%
$B_{25/85}$=3486K
●Operating temperature range ····· -30˚C~+110˚C
●Thermal time constant (on A ℓ block) ··· 18sec.

STS-50

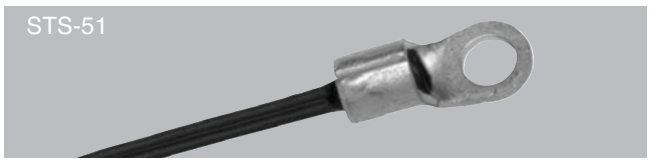


●电阻值 ····· R_{25}=10kΩ±3%(GA型)
●B值(3HG) ····· $B_{25/50}$=3465K±3%
$B_{25/85}$=3502K
●使用温度范围 ····· −40˚C～＋150˚C
●热响应时间常数(铝块上) ····· 22sec.

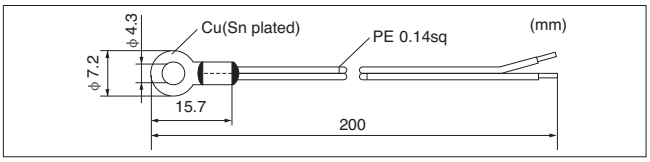


●Resistance ····· R_{25}=10kΩ±3% (GA Type)
●B value (3HG) ····· $B_{25/50}$=3465K±3%
$B_{25/85}$=3502K
●Operating temperature range ····· -40˚C~+150˚C
●Thermal time constant (on A ℓ block) .. 22sec.

STS-51



●电阻值 ····· R_{25}=10kΩ±5%(CTH)
●B值(3TV) ····· $B_{25/50}$=3820K±3%
$B_{25/85}$=3792K
●使用温度范围 ····· −40˚C～＋150˚C
●热响应时间常数(铝块上) ····· 27sec.



●Resistance ····· R_{25}=10kΩ±5% (CTH)
●B value (3TV) ····· $B_{25/50}$=3820K±3%
$B_{25/85}$=3792K
●Operating temperature range ····· -40˚C~+150˚C
●Thermal time constant (on A ℓ block) ··· 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。

IBS-25

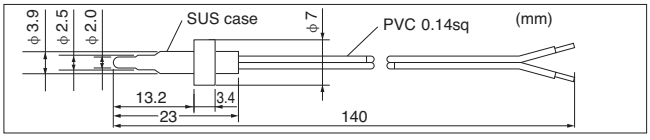
●电阻值 ····· R_{50}=3.485kΩ±2.5%(GR型)
●B值(6QR) ····· $B_{25/50}$=3423K±1%
$B_{25/85}$=3468K
●使用温度范围 ····· −30˚C～＋105˚C
●热响应时间常数(水中) ····· 0.8sec.

※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。

Sensor for instant boiler

■Features

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



●Resistance ····· R_{50}=3.485kΩ±2.5% (GR TYPE)
●B value (6QR) ····· $B_{25/50}$=3423K±1%
$B_{25/85}$=3468K
●Operating temperature range ····· -30˚C~+105˚C
●Thermal time constant (in water) ··· 0.8sec.

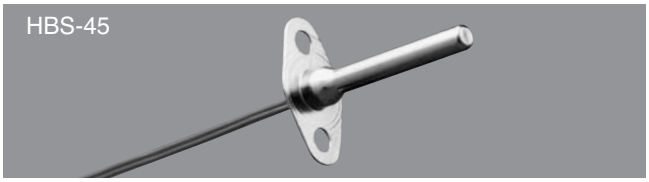
※Regarding R-T data, please refer to our Home Page.
※Please consult us regarding the operating conditions of Thermistor sensors.

NTC热敏电阻
NTC THERMISTOR

温水器用 Sensor for hot boiler

■特点

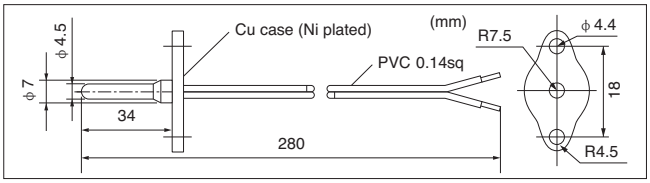
●耐湿性能优异。



●电阻值 ····· R_{25}=11kΩ±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
●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。

■Features

●Moisture resistant.

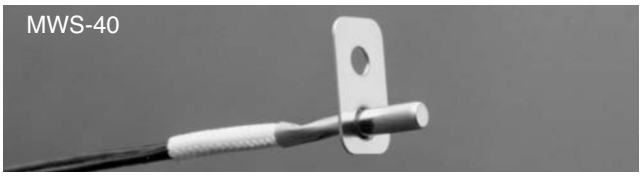


●Resistance ····· R_{25}=11kΩ±3% (Flake chip)
●B value (3T) ····· $B_{25/50}$=3950K±2%
$B_{25/85}$=3989K
●Operating temperature range ····· -30˚C~+100˚C
●Thermal time constant (in water) ··· 3sec.
※Regarding R-T data, please refer to our Home Page.
※Please consult us regarding the operating conditions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

微波炉用

■特点

●耐热性能优异。
●温度响应快。



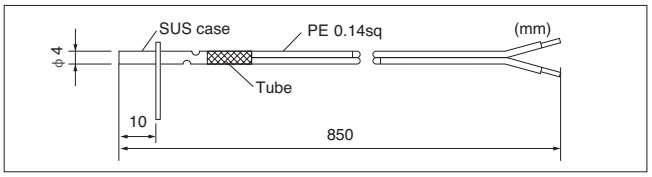
●电阻值 ····· R_{200}=1kΩ±3%(GA型)
●B值(4BG) ····· $B_{25/50}$=4100K±2%
$B_{25/85}$=4170K
●使用温度范围 ····· −30˚C～+260˚C(仅传感器部)
●热响应时间常数(水中)····· 20sec.

●电阻值 ····· R_{200}=1kΩ±3%(GA型)
●B值(4BG) ····· $B_{25/50}$=4100K±2%
$B_{25/85}$=4170K
●使用温度范围 ····· −30˚C～+260˚C(仅传感器部)
●热响应时间常数(水中)····· 20sec.

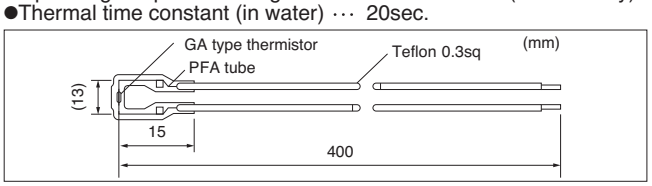
Sensor for microwave oven

■Features

●Resistant to high temperature.
●Quick temperature response.



●Resistance ····· R_{200}=1kΩ±3% (GA Type)
●B value (4BG) ····· $B_{25/50}$=4100K±2%
$B_{25/85}$=4170K
●Operating temperature range ····· -30˚C~+260˚C (Sensor only)
●Thermal time constant (in water) ··· 20sec.

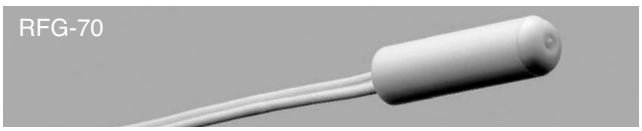


●Resistance ····· R_{200}=1kΩ±3% (GA Type)
●B value (4BG) ····· $B_{25/50}$=4100K±2%
$B_{25/85}$=4170K
●Operating temperature range ····· -30˚C~+260˚C (Sensor only)
●Thermal time constant (in water) ··· 20sec.

冰箱用

■特点

●防湿性能优异。

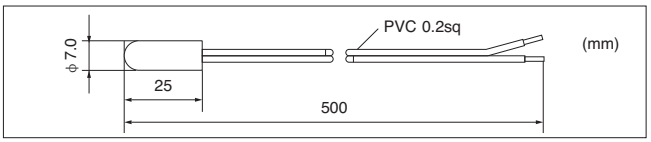


●电阻值 ····· R_0=6.35kΩ±3%(薄片)
●B值(6W)····· $B_{0/25}$=3823K±2%
$B_{-20/0}$=3738K
●使用温度范围 ····· −40˚C～+80˚C
●用途 ····· 冰箱用(冷冻、除霜、冷藏用)
●热响应时间常数(水中)····· 25sec.

Sensor for refrigerator

■Features

●Moisture resistant.

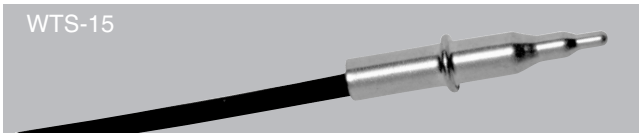


●Resistance ····· R_0=6.35kΩ±3% (Flake chip)
●B value (6W) ····· $B_{0/25}$=3823K±2%
$B_{-20/0}$=3738K
●Operating temperature range ····· -40˚C~+80˚C
●Application ····· Refrigerator (freezer, defrosting, cold storage)
●Thermal time constant (in water) ··· 25sec.

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。

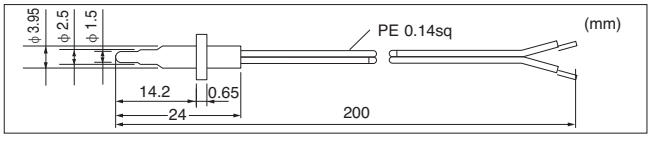


●电阻值 ····· R_{37}=29.46kΩ±3%(GR型)
●B值(6PR)····· $B_{25/50}$=3948K±1.5%
$B_{25/85}$=3984K
●使用温度范围 ····· −30˚C～105˚C
●热响应时间常数(水中)····· 0.5sec.
※关于R−T数据，请参阅本公司主页。
※有关热敏温度传感器的使用环境条件，请于本公司协商。

Sensor for Bidet

■Features

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



●Resistance ····· R_{37}=29.46kΩ±3% (GR TYPE)
●B value (6PR) ····· $B_{25/50}$=3948K±1.5%
$B_{25/85}$=3984K
●Operating temperature range ····· -30˚C~105˚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。

式1(eq1) $R=R_0 \exp\{B(1/T-1/T_0)\}$

R ：温度T(K)时的电阻值
R_0：温度T_0(K)时的电阻值
B ：B值
※T(K)= t(℃)+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/℃。
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。

式2(eq2) $B_T=CT^2+DT+E$

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(T_0，R_0)(T_1，R_1)(T_2，R_2)(T_3，R_3)，通过式3～6计算。
首先由式样3根据T_0和T_1,T_2,T_3的电阻值求出B_1,B_2,B_3,然后代入以下各式样。

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

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

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

式6(eq6) $E=B_1-DT_1-CT_1 \cdot T_1$

●电阻值计算例
试根据电阻－温度特性表，求25℃时的电阻值为5(kΩ)，B值偏差为50(K)的热敏电阻在10℃～30℃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　T_1＝10＋273.15　T_2＝20＋273.15　T_3＝30＋273.15

②代入$B_T=CT^2+DT+E+50$，求B_T。

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

NTC Thermistor basic properties

Negative temperature coeffcient(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)
R_0 : resistance at absolute temperature T_0(K)
B : B value
※T(K)= t(℃)+273.15

The B value for the thermistor characteristics is not fixed, but can vary by as much as 5K/℃ 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 (T_0, R_0). (T_1, R_1). (T_2, R_2) and (T_3, R_3).
With equation 3, B_1, B_2 and B_3, can be determined from the resistance values for To and T_1, T_2, T_3 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.

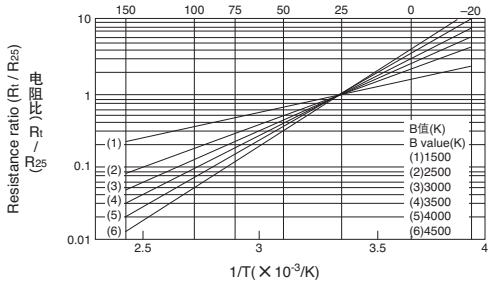
②$B_T=CT^2+TD+E+50$; substitute the value into equation and solve for B_T

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

热敏电阻 THERMISTOR

●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℃(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。

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

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

这里α前的负号(－)，表示当温度上升时零负载电阻降低。

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℃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。

■Heat dissipation constant (JIS-C2570-1)

The dissipation constant (δ) indicates the power necessary for increasing the temperature of the thermistor element by 1℃ 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.

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

※$(P = I^2 \cdot R = I \cdot V)$

产品目录记载值为下列测定条件下的典型值。

①25℃静止空气中。
②轴向引脚、径向引脚型在出厂状态下测定。

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

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

■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℃为额定环境温度、由下式计算出的值。

(式)额定功率=散热系数×(最高使用温度－25)

■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℃ as the ambient temperature.
(formula) Rated power=heat dissipation constant×(maximum operating temperature-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℃时，容许运行功率可由下式计算。
容许运行功率=t×散热系数

■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 ℃ is the permissible temperature rise, can be calculated using the following formula.

Permissible operating power= t×heat dissipation constant

■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。

■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.

$$T=(T_1-T_2)\exp(-t/\tau)+T_2 \cdots\cdots (3.1)$$
$$=(T_2-T_1)\{1-\exp(-t/\tau)\}+T_1 \cdots\cdots (3.2)$$

常数τ称热响应时间常数。
上式中，若令t=τ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。

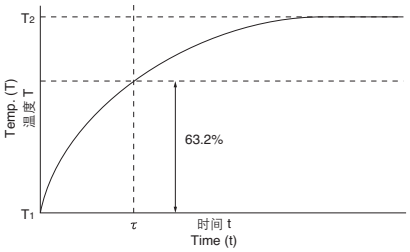
⑬配线时应确保导线端部(含连接器)不会渗入“水”、“蒸气”、“电解质”等，否则会造成接触不良。
⑭请勿在超出设定范围的腐蚀性气体的环境($C\ell_2$、NH_3、SOx、NOx)以及会接触到电解质、盐水、酸、碱、有机溶剂的场所中使用。

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= τ, 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 temperatrue 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:
①Part is moved from a 50˚C envirconment to a still air 25˚C environment until the temperature of the thermistor reaches 34.2˚C.
②Axial and radial leaded parts are measured in their shipping form.

Please note, the thermal dissipation constant and thermal time constant will vary acccrding 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.

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).
⑨When the case type sensor is used under high humidity environment, make sure to design so that the protected case tip must be exposedto 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.
⑩Do not add excessive vibrating shocking pressure.
⑪Avoid from excessive pulling and bending of the lead wire.
⑫Do not impress excessive voltage in the insulated part and between the electrode. This might cause to occur the insulated malfunction.
⑬Consider wiring, due to contact failure might occur if the terminal of the lead wire (including the connector) is immersed into [water] [steam] [electrolyte] etc.
⑭Do not use in corrosiveness gas atmosphere ($C\ell_2$, NH_3, SOx, NOx) 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.
⑮Due 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.