XXD-15 Series

ROHS

功率型热敏电阻
POWER NTC THERMISTOR

www.unsemi.com.tw

特点 Characteristic

- ◆ 抑制浪涌电流能力强
  Strong Surge Suppression Capability
- ◆ 反应速度快
  Fast Resporse
- ◆ 材料系数(B值)大，残余电阻小
  Big material constant (B value),small residual resistance
- ◆ 寿命长，可靠性高
  Long life and high reliability
- ◆ 产品系列全，工作范围宽
  Complete series,wide applications
- ◆ 新型陶瓷材料和均匀化工艺效率高，性能好
  New Ceramic Material and Homogenization Process for Volume-efficient & High- performance Design

应用领域 Application

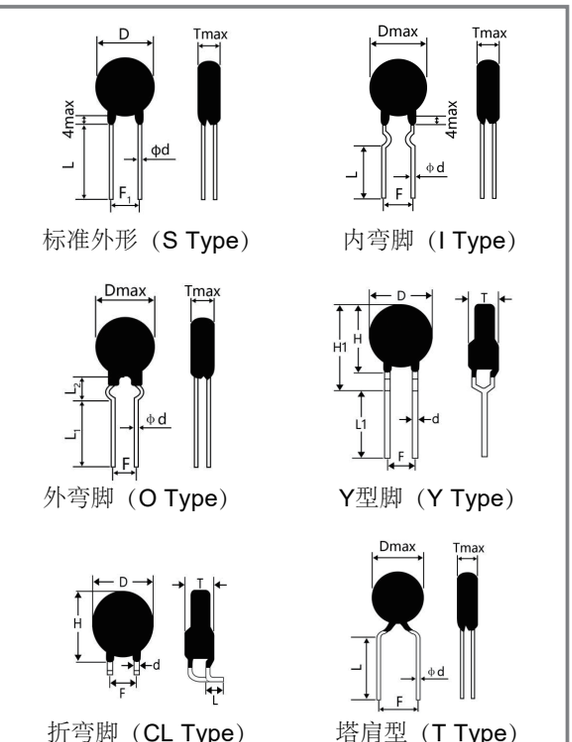
- ◆ 转换电源，开关电源，UPS电源
  Switching power-supply, switch power, UPS power
- ◆ 镇流器及各类加热器
  Electronic energy saving lamps,electronic ballast and all kinds of electric heater
- ◆ 各类显像管、显示器
  All kinds of RT display
- ◆ LED驱动电路
  LED driver circuit
- ◆ 变压器、逆变器
  Transformers and Inverters
- ◆ 软启动电机
  Soft-start motors

命名规则 Naming Convention

NTC XX D - 15 M

（1） （2） （3） （4） （5）

(1) NTC : 中性标志 Nevtral Sign
(2) 额定功率阻值 Rated Power Resistance
(3) 产品形状 Shape: D : 圆片形 Disk
(4) 产品直径 Dimension : 15 : 15mm
(5) 零功率电阻公差 Zero power resistance tolerance : M : 20%



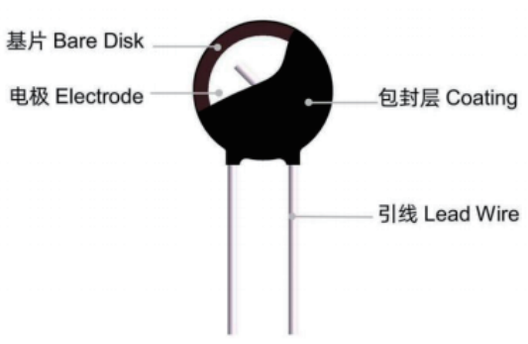
标准外形（S Type） 内弯脚（I Type）

外弯脚（O Type） Y型脚（Y Type）

折弯脚（CL Type） 塔肩型（T Type）

注：其它引线类型可定制。

结构图 Structure



酚醛树脂 **Phenolic Resin**

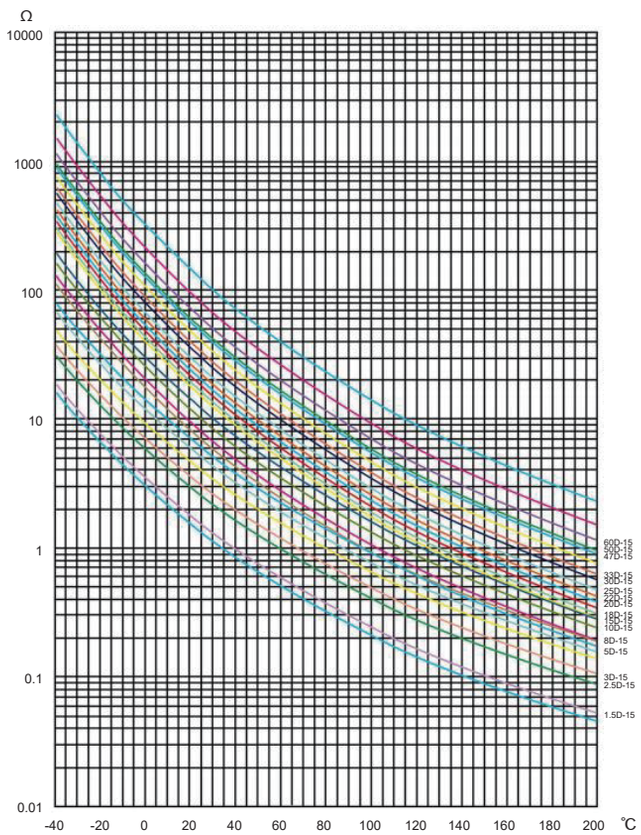
主要技术参数 Main Technical Parameters

型号 Part No.	R25 (Ω)	最大稳态电流 Max. steady State current (A)	残余电阻* Residusl Resistance (Ω)	耗散系数* Dissipation Factor (mw/°C)	热时间常数* Themal time Constant (s)	最大允许使用容量值 Max. allowable capacity value 240V/120V (μF)	B值 (K)	工作温度 Operating Temperature (°C)
1.5D-15	1.5	8.0	0.097	≥16	≤90	330/1200	2700	-40~+200
2.5D-15	2.5	7.0	0.146	≥16	≤90	330/1200	2700	-40~+200
3D-15	3.0	7.0	0.148	≥16	≤90	330/1200	2700	-40~+200
5D-15	5.0	6.0	0.133	≥16	≤90	470/1800	2800	-40~+200
8D-15	8.0	5.0	0.199	≥16	≤90	470/1800	2800	-40~+200
10D-15	10	5.0	0.218	≥16	≤90	470/1800	3000	-40~+200
15D-15	15	4.0	0.312	≥16	≤90	470/1800	3200	-40~+200
16D-15	16	4.0	0.318	≥16	≤90	470/1800	3200	-40~+200
18D-15	18	4.0	0.344	≥16	≤90	470/1800	3200	-40~+200
20D-15	20	4.0	0.353	≥16	≤90	470/1800	3200	-40~+200
22D-15	22	4.0	0.388	≥16	≤90	470/1800	3200	-40~+200
25D-15	25	3.0	0.446	≥16	≤90	330/1200	3200	-40~+200
30D-15	30	3.0	0.525	≥16	≤90	330/1200	3200	-40~+200
33D-15	33	3.0	0.582	≥16	≤90	330/1200	3200	-40~+200
47D-15	47	3.0	0.699	≥16	≤90	330/1200	3200	-40~+200
50D-15	50	3.0	0.742	≥16	≤90	330/1200	3200	-40~+200
60D-15	60	3.0	0.892	≥16	≤90	330/1200	3200	-40~+200

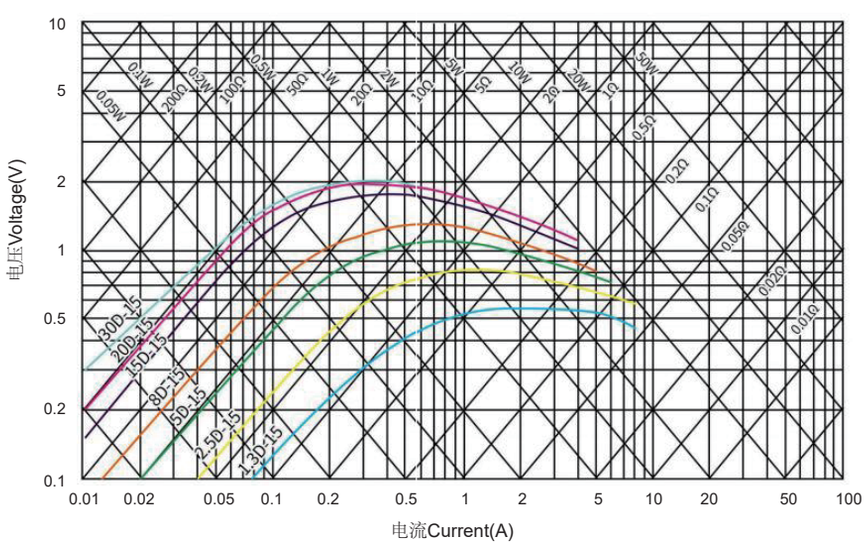
说明:*表示参考值。
Note:*Represents a reference value.

阻温特性和静态伏安特性 R-T Characteristic and Static Characteristic

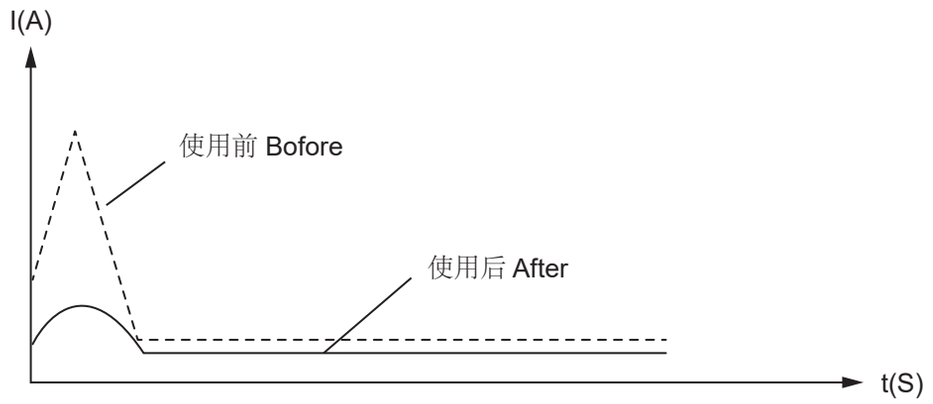
电阻-温度曲线 Resistance-Temperature Curve



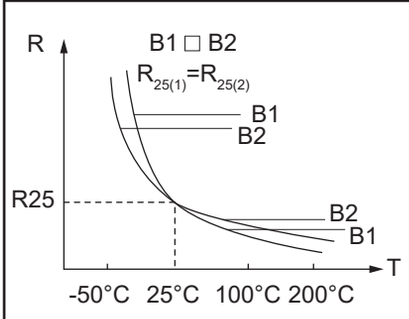
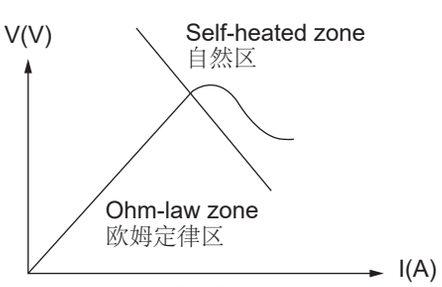
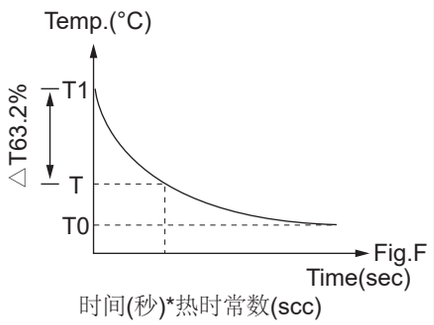
电压-电流曲线 Voltage-Current Curve



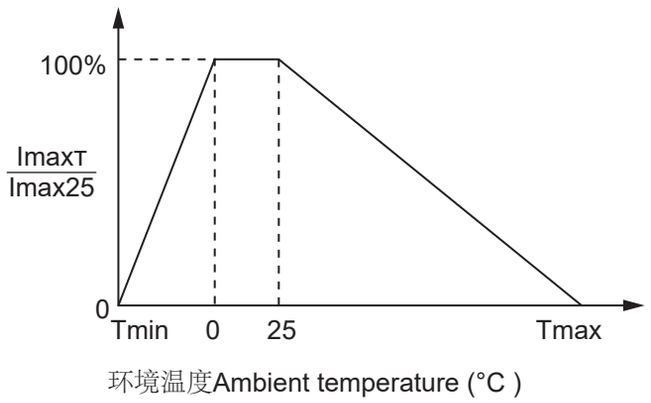
抑制浪涌电流示意图 Suppression of Inrush Current Diagram



特性 Characteristics

电阻-温度特性 Resistance-Temperature Characteristics	电压-电流特性 Voltage-Current Characteristics	温度-时间特性 Test Temperature-Time Characteristics
当功率型热敏电阻之环境温度或它本身的温度上升时，电阻值随之减小。 When the ambient temperature of the power type themistor is applied,or its temperature rises, the resistance decreases.	当功率型热敏电阻在小电流下工作时，由于功率太低，其电阻值保持固定而表现线性(符合欧姆定律V/R=I)。如果电流增加，功率型热敏电阻就会产生焦耳效应(P=V*I)而使自己发热，其电阻随即减小表现(电流增加，电压下降)的状态。 When the power themistor works at small current when the power is too low,the resistance is kept constant and behave lineary (in acordance with Ohm's law,V/R=I).If the current increases,the power type themistor will produces a Joule effect (P=V*I) and makes itself hot.The resisance then deereases (current increases,voltage decreases) State.	功率型热敏电阻与环境达成热平衡所需的时间，主要决定于材料热容量(H)及散热系数(δ)。 The power type themistor achieves heat with the environment.The time required for the equilibrium is mainly determined by the heat of the metarial.Capacity(H) and heat transfer coefcient(delta).
	 Fig.E	 时间(秒)*热时常数(scc)

最大电流降额曲线 Maximum Current Derating Curve



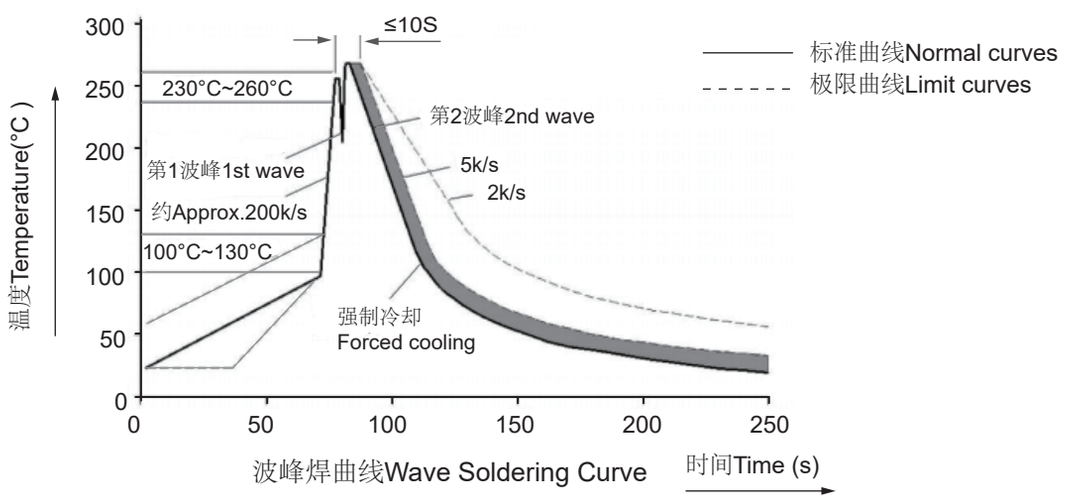
Tmax : 最高工作温度 Maximum Operating Temperature °C

Tmn : 最低工作温度 Minimum Operating Temperature °C

$T_{min}<T<0 : I_{maxT} = [1- \frac{0-T}{0-T_{min}}] \times I_{max25}$

$25<T<T_{max} : I_{maxT} = [1- \frac{T-25}{T_{max}-25}] \times I_{max25}$

波峰焊参数 Wave Soldering Parameters



波峰焊参数仅供参考。热敏电阻器实际使用时，需要进行一些相关的验证。
The wave soldering parameters are for reference only. When thermistor is for practice use, some related validation is recommended.

推荐手工焊接参数 Recommended Hand-Solder Parameters

项目 Items	条件 Condition
烙铁头部温度 Temp. of Solder Head	360℃ (max.)
焊接时间 Soldering Time	3 sec (max.)
焊接位置与涂装层距离 Distance from Thermistor	2mm (min.)

手工焊接，请注意焊接温度和焊接时间。
For hand soldering, please notice the solder tip temperature and the soldering time.

机械性能 Mechanical Performance

指标项目 Item	技术要求 Specification	测试条件/方法 Test Conditions & Methods
可焊性 Solder-ability	浸润部分上锡均匀， 上锡面积≥95% The terminals shall be uniformly tinned, and its area≥95%	将引出端沾助焊剂后，浸入到温度为240-245℃、深度为15mm 的锡槽中锡面距 NTC 本体下端6mm处，持续2-3秒。（参见 IEC68-2-20 /GB2423.28 试验Ta） Dipping the NTC terminals to a depth of 15mm in a soldering bath of 240-245℃ and to the place of 6mm far from NTC body for2-3s (See IEC68-2-20 / GB2423.28 Ta)
耐焊接热 Resistance To Soldering Heat	无可见损伤 No visible mechanical damage. ΔR/RN ≤20% (ΔR = | RN-RN' |)	根据 IEC68-2-20（GB2423 .28）试验Tb进行试验。采用焊槽法，将引出端沾助焊剂后，浸入到温度为265±5℃、深度为15mm的锡槽中,锡面距NTC本体下端6mm处，维持10±1秒。在25±2℃条件下恢复4～5h后，复测额定零功率电阻RN'。 Dipping the NTC terminals to a depth of 15mm in a soldering bath of 265±5℃ and to the place for 6mm below from NTC body for 10±1s.After recovering4~5h under 25±2℃. The rated zero power resistance value RN' shall be measured. (See IEC68-2-20 /GB2423.28 Tb)
引出端强度 Strength of lead terminal	无可见损伤 No visible mechanical damage. ΔR/RN ≤20% (ΔR = | RN-RN' |)	根据 IEC68-2-21（GB2423 .29）试验U进行试验。 试验 Ua：拉力 0N，持续10S； 试验 Ub：弯曲90°，拉力5N，持续10S； 扭转180°，拉力5N，持续10S。 在 25±2℃条件下恢复4～5h后，复测额定零功率电阻 RN' Fasten the body and apply a force gradually to each lead until 10N and then keep for 10sec, Hold body and apply a force to each lead until 90°slowly at 5N in the direction of lead axis and then keep for 10sec, and do this in the opposite direction repeat for other terminal. After recovering 4~5h under 25±2℃, the rated zero power resistance value RN' shall be measured. (See IEC68-2-21/GB2423.29 Ua / Ub)

电气性能 Electrical Performance

指标项目 Item	技术要求 Specification	测试条件/方法 Test Conditions & Methods
额定零功率电阻 Rated Zero-Power Resistance RN (Ω)	3±20%	环境温度 TA: 25℃±1℃ 测试电压: 1.5VDC 在常温TA条件下，放置1~2小时 后测得阻值RN。 Ambient temp. Range:25℃±1℃(TA). Testing voltage: 1.5VDC After placing for 1~2 hours under TA, the resistance value shall be measured.
热耗散系数δ(MW/℃) Thermal Dissipation Constant	≥9	在特定的环境温度下，热耗散系数(δ)为热敏电阻电功率消耗(ΔP)与本体温度变化量 (ΔT)的比值。 The thermal dissipation constant(δ) could be calculated by the ratio of a change in power dissipation(ΔP) of the thermistor to a change in temperature(ΔT) of the thermistor at a specified ambient temperature
热时间常数τ(S) Thermal Time Constant	≤30	热时间常数(τ)为在零功率条件下，热敏电阻的温度下降到其最初温度与最终温度之差为63.2%时所需要的时间。 The time(τ shall be measured within which the temperature change of NTC thermistor is reached at 63.2% of the ambient temperature change under zero power condition.
材料常数 Material Constant B	2700±10% B=T1T2/(T2- T1) × Ln (R1/R2)	R1 , R2 分别为 T1 , T2温度下的零功率电阻 R1 , R2 is zero-power resistance at T1 , T2 T1 = 298.15 K(25℃) T2 = 323.15 K(50℃)
最大稳态电流（A）	无可见损伤 visible mechanical damage. ΔRN / RN ≤20% (ΔR = ｜RN-RN'｜)	环境温度:25℃±2℃ 测试电流:3.0A Ambient temp. Range: 25℃±2℃ Testing Current:3.0A

可靠性试验 Reliability Test

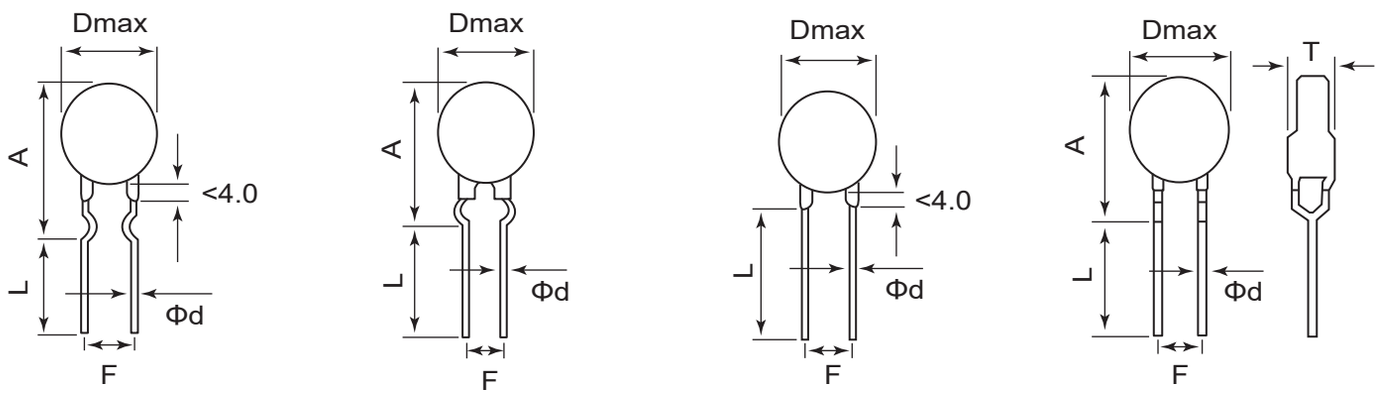
指标项目 Item	技术要求 Specification	测试条件/方法 Test Conditions & Methods
温度循环测试 Temp. Cycling Testing	无可见损伤 No visible mechanical damage. ΔRN / RN ≤20% (ΔR = | RN-RN' |)	在 Ta=-40±3℃和 Tb=200±3℃的环境温度中各存放30分钟, 循环5次.每次高低温循环都有在25±2℃的环境中过渡5分钟。样品进行温度循环测试后，取出放置室温（25±2℃），4~5小时后测量零功率电阻 RN'。 Ta:-40±3℃/ 30min→25±2℃/ 5min→Tb:200±3℃/ 30min→25±2℃/ 5min Cycles: 5times After recovering 4~5h under 25±2℃, the rated zero power resistance value RN' shall be measured.
电循环测试 Electrical Cycling Testing	无可见损伤 No visible mechanical damage. ΔRN / RN ≤20% (ΔR = | RN-RN' |)	环境温度:25℃±2℃ 循环次数: 1,000次 通/断: 1分钟 / 5分钟 测试电流:3.0A 样品置于室温（25±2℃）4~5小时后,测量其零功率电阻 RN' Ambient temp. Range:25℃±2℃. Cycles: 1,000times On / Off: 1m / 5m Test Current 3.0A After recovering 4~5h under 25±2℃, the rated zero power resistance value RN' shall be measured.
持久性测试 LoadLife (Endurance) Testing	无可见损伤 No visible mechanical damage. ΔRN / RN ≤20% (ΔR = | RN-RN' |)	环境温度:25℃±2℃ 样品通过最大工作电流 3.0A , 1,000±24 小时后，取出置于室温（25±2℃）4~5小时后,测量其零功率电阻 RN' Ambient temp. Range:25℃±2℃; 3.0A/ 1,000±24h After recovering 4~5h under 25±2℃, the rated zero power resistance value RN' shall be measured.
耐湿性测试 Humidity Testing	无可见损伤 No visible mechanical damage. ΔRN / RN ≤20% (ΔR = | RN-RN' |)	在温度 40±2℃,相对湿度 93±3%的环境中放置 1000±24小时后，取出置于室温（25±2℃）4~5小时后, 测量其零功率电阻 RN' Ambient temp. range : 40℃±2℃ R.H.:93±3% , Energized time:1000±24h After recovering 4~5h under 25±2℃, the rated zero power resistance value RN' shall be measured.

术语 Glossary

项目 Item	描述 Description
R_{25}	**标称零功率电阻值 Nominal Zero-power Resistance** 25°C标准参考温度下零功率电阻的标称值，除非另有规定。 Nominal value of zero-power resistance at the standard referencetemperature of 25°C, unless otherwise specified.
Imax25	**25°C环境温度下的最大电流 Maximum Current at Ambient Temperature of 25°C** 在25°C的环境温度下，可连续施加到热敏电阻器上的电流(直流或交流正弦波的有效值)最大值。 Maximum value of current (d.c. or r.m.s. values for Sine wave shaped a.c.) which can be continuously applied to the thermistor at an ambient temperature of 25°C.
B	**B值 B value** 用以下公式表示热灵敏指数 $B = \frac{Ta \times Tb}{Tb - Ta} \times \ln \frac{Ra}{Rb}$ Ra在温度Ta (单位为K)下测定的零功率电阻值(单位为Ω) Rb在温度Tb (单位为K)下测定的零功率电阻值(单位为Ω) Ta =298.15K, Tb=358.15K Index of thermal sensitivity expressed by the formula $B = \frac{Ta \times Tb}{Tb - Ta} \times \ln \frac{Ra}{Rb}$ Ra is the zero-power resistance (Ω) at temperature Ta (K) Rb is the zero-power resistance (Ω) at temperature Tb (K) Ta =298.15K, Tb=358.15K
δ	**耗散系数 Dissipation Factor** 使热敏电阻器的温度升高1K所需消耗的功率，通常为规定的环境温度下功耗变化与热敏电阻器阻体温度变化之比。 Power dissipation required for a thermistor to raise its temperature by 1K and which is generally the ratio of the power dissipation change to the resulting thermistor body temperature change at a specifed ambient temperature.
Ta	**环境温度变化的热时间常数 Thermal Time Constant by Ambient Temperature Change** 热敏电阻器对规定介质中环境温度63.2%的外部阶跃变化作出响应所需的时间。 Time required for a thermistor to respond to 63.2% of an external step change in ambient temperature in a defined medium.
Rmin@Imax25	**残余电阻 Residual Resistance** 当热敏电阻器上流过最大电流并达到热平衡时的直流电阻值。 Inrush Current-limiting Thermistors value of the d.c. resistance of a thermistor when its thermal stability is reached with the maximum current passing.
Cmax	**最大允许电容量 Maximum Permissible Capacitance** 在负载状态下，与一个热敏电阻器连接的电容器的最大允许电容量值。 Maximum permissible capacitance value of a capacitor which can be connected to a thermistor under loading.
Pmax	**最大功耗 Maximum Power Dissipation** 在环境温度25°C下，可以连续施加在热敏电阻器上的最大功耗值。 Maximum value of the power dissipation which can be continuously applied to the thermistor at 25°C.

产品尺寸 Product Size

单位 Unit:mm



型号 Part No.	最大直径 Maximum Diameter Dmax	最大厚度 Maximum Thickness Tmax	引线直径 Lead Diameter d(±0.05)	引线间距 Lead Spacing F(±1.0)	Amax	L	
						直引线 Straight Lead	其他线型 Other Lines
XXD-15 Series	17.0	6.0	0.75	7.5	22.0	3.0~23	3.0~20

包装信息 Packaging Information

单位 Unit:Pcs

型号 Part No.	袋 Bag	盒 Box	箱 Carton
XXD-15 Series	500	4,000	8,000

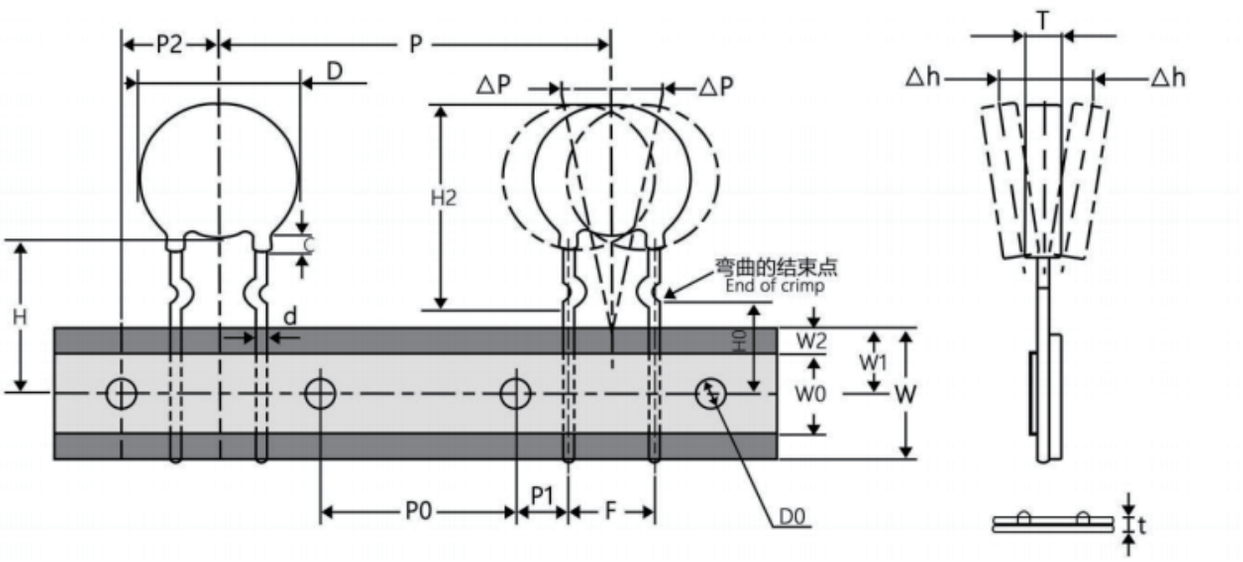
型号 Part No.	编带 Braid	盒 Box	箱 Carton
XXD-15 Series	500	500	5,000

说明：默认袋装出货方式。

Note:The default bag shipping method.

编带尺寸 Braid Size

单位 **Unit:mm**



尺寸 Dimensions	毫米 Millimeters	尺寸 Dimensions	毫米 Millimeters
P0	15.0 ± 0.3	W2	3.0 max
P	15.0	t	0.5 ± 0.05
F	7.5 ± 0.5	D	17.0 max
P1	3.75 ± 1.0	D0	4.0 ±0.3
P2	7.5 ± 1.3	d	0.75 ± 0.05
H	16.0 ± 1.0	H2	22.0 max
W	18.0 ± 1.0	T	6.0 max
W0	8.0 / 10.0	△P	0 ± 0.2
W1	9.0 ± 1.0	△h	2.0 max

優恩半導體 UNSEMI

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