

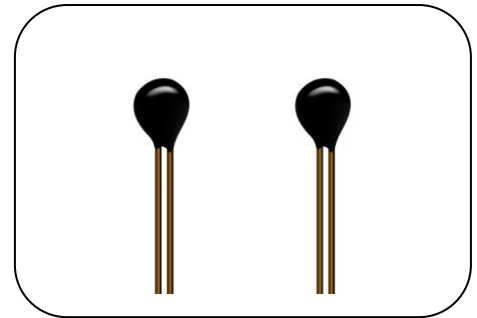
# NTC Thermistor : TTS Series



## Epoxy Bead Type for Temperature Sensing/Compensation

### ■ Features

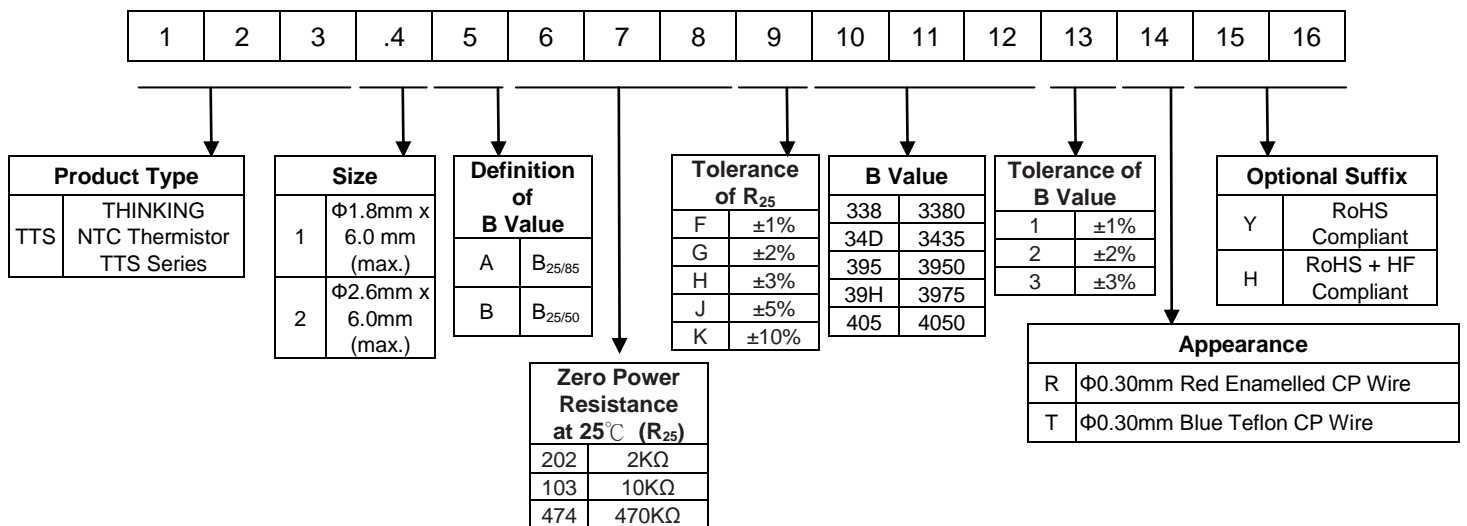
1. RoHS compliant
2. Halogen-Free (HF) series are available
3. Body size:  $\Phi 1.8\text{mm}$ ,  $\Phi 2.6\text{mm}$
4. Radial lead resin coated
5. Long leads for easy sensor placement
6. Operating temperature range:  $-40^{\circ}\text{C} \sim +100^{\circ}\text{C}$
7. Wide resistance range
8. Agency recognition: UL / cUL / TUV



### ■ Recommended Applications

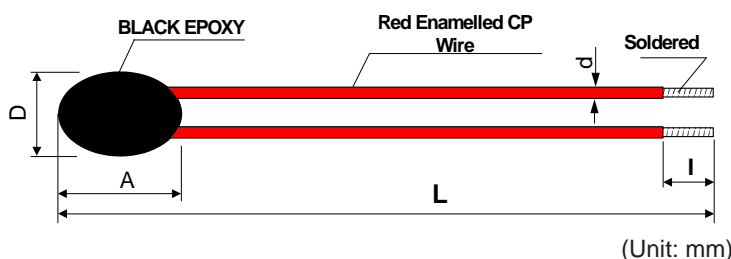
1. Home appliances
2. Computers
3. Battery packs
4. Thermometers

### ■ Part Number Code



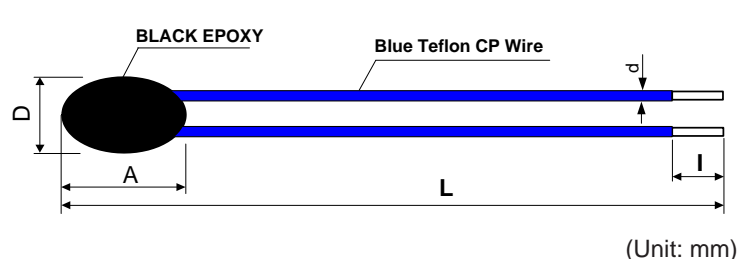
### ■ Structure and Dimensions

#### R Type



Series	Dmax.	Amax.	d	L	I
TTS1	1.8	6.0	$0.30 \pm 0.02$	$70 \pm 5$	$2 \pm 0.5$
TTS2	2.6	6.0			

#### T Type



Series	Dmax.	Amax.	d	L	I
TTS1	1.8	6.0	$0.30 \pm 0.02$	$70 \pm 5$	$2 \pm 0.5$

Note: D: 1.5mm is available upon request.

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## Electrical Characteristics

Part No.	Zero Power Resistance at 25°C	Tolerance of R <sub>25</sub>	B Value	Tolerance of B value	Max. Power Dissipation at 25°C	Dissipation Factor	Thermal Time Constant	Operating Temperature Range	Safety Approvals			
	R <sub>25</sub> (KΩ)	(±%)	(K)	(±%)	P <sub>max</sub> (mW)	δ(mW/°C)	τ (Sec.)	T <sub>L</sub> ~T <sub>U</sub> (°C)	UL cUL	TUV		
TTS1(2)A202□34D*	2	1,2,3,5	25/85	3435	2, 3	45	≧ 1	≧ 10	-40 ~ +100	√	√	
TTS1(2)A502□347*	5			3470						√	√	
TTS1(2)A502□395*	5			3950						√	√	
TTS1(2)A103□34D*	10			3435						1, 2, 3	√	√
TTS1(2)A103□395*	10			3950							√	√
TTS1(2)A103□39H*	10			3975							√	√
TTS1(2)A113□39H*	11			3975	√						√	
TTS1(2)A223□374*	22			3740	√						√	
TTS1(2)A503□395*	50			3950	√						√	
TTS1(2)A503□409*	50			4090	√						√	
TTS1(2)A104□400*	100			4000	√						√	
TTS1(2)A104□419*	100			4190	2, 3					√	√	
TTS1(2)A104□436*	100			4360						√	√	
TTS1(2)A474□457*	470			4570						√	√	
TTS1(2)B202□338*	2		3380	√						√		
TTS1(2)B502□342*	5		3420	2, 3	√					√		
TTS1(2)B502□390*	5		3900		√					√		
TTS1(2)B103□338*	10		3380	25/50	1, 2, 3					√	√	
TTS1(2)B103□391*	10		3910							√	√	
TTS1(2)B103□39D*	10		3935							√	√	
TTS1(2)B113□39D*	11		3935							√	√	
TTS1(2)B223□370*	22		3700							√	√	
TTS1(2)B503□392*	50		3920							√	√	
TTS1(2)B503□402*	50		4020							√	√	
TTS1(2)B104□39D*	100		3935							√	√	
TTS1(2)B104□412*	100		4120							2, 3	√	√

Note 1: □ = Tolerance of R<sub>25</sub>  
 \* = Tolerance of B value

Note 2: UL/cUL File No: E138827  
 TUV File No:R 50236283

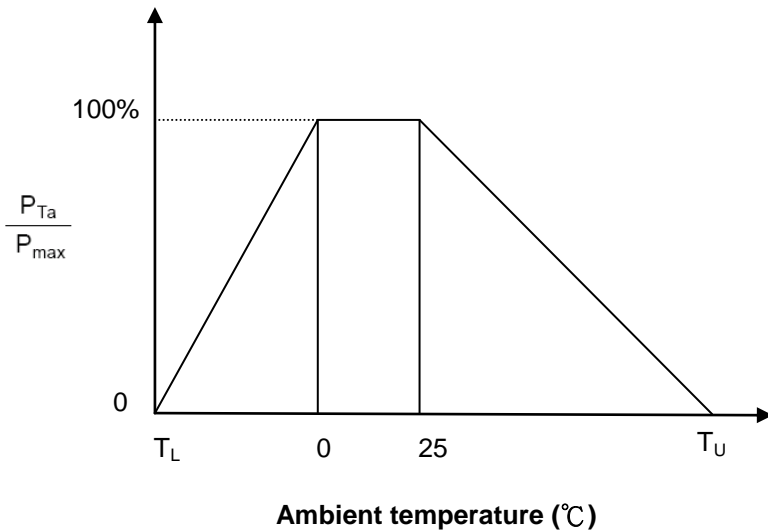
Note 3: Special specifications are available upon request.

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## Max. Power Dissipation Derating Curve



$T_U$  : Maximum operating temperature (°C)

$T_L$  : Minimum operating temperature (°C)

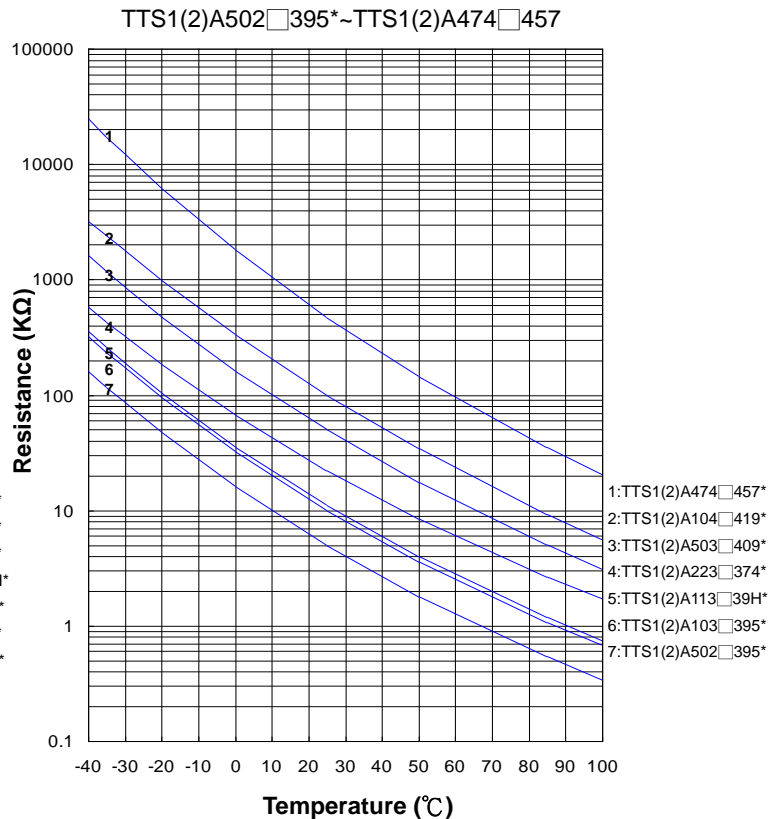
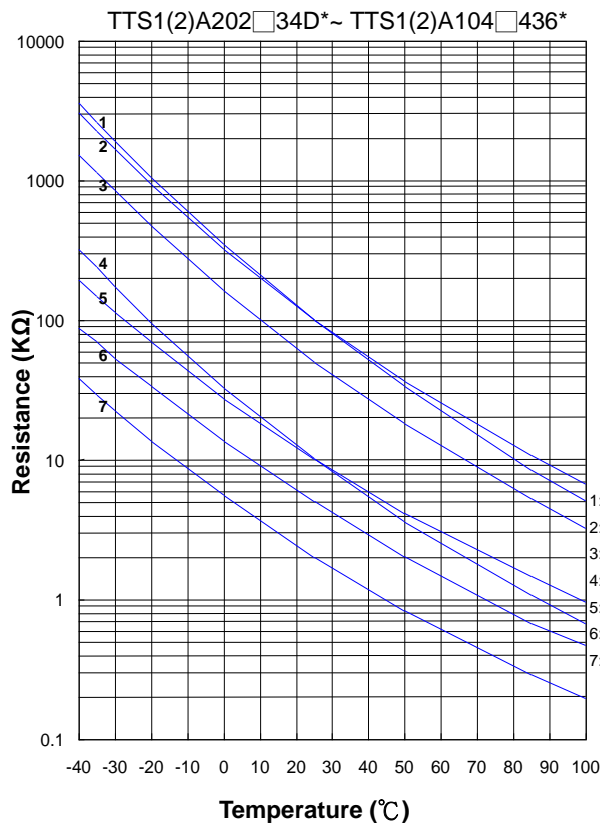
For example:

Ambient temperature( $T_a$ ) = 55°C

Maximum operating temperature( $T_U$ ) = 100°C

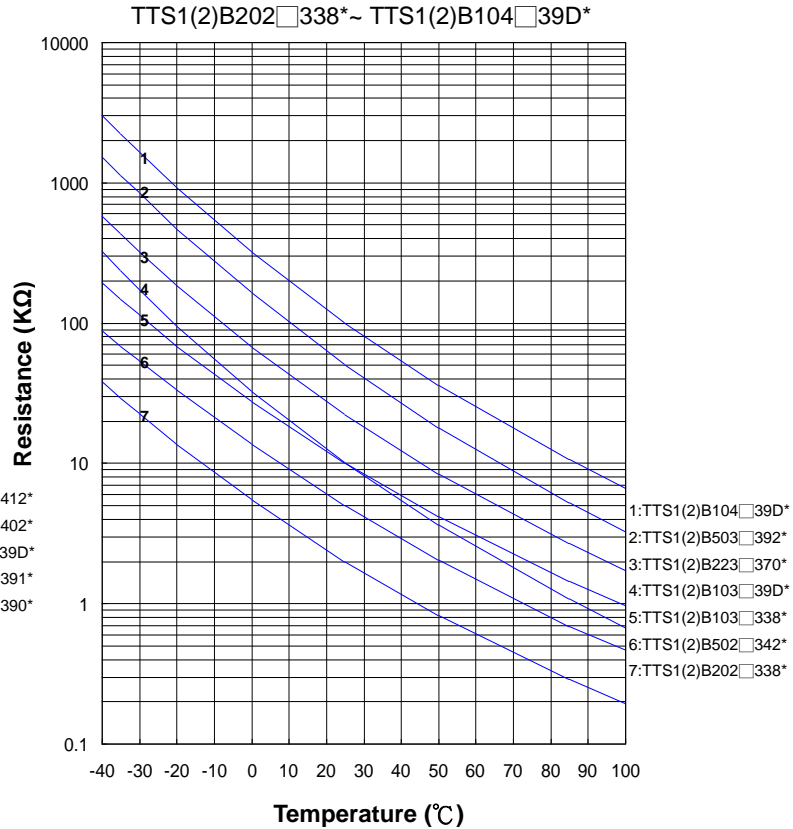
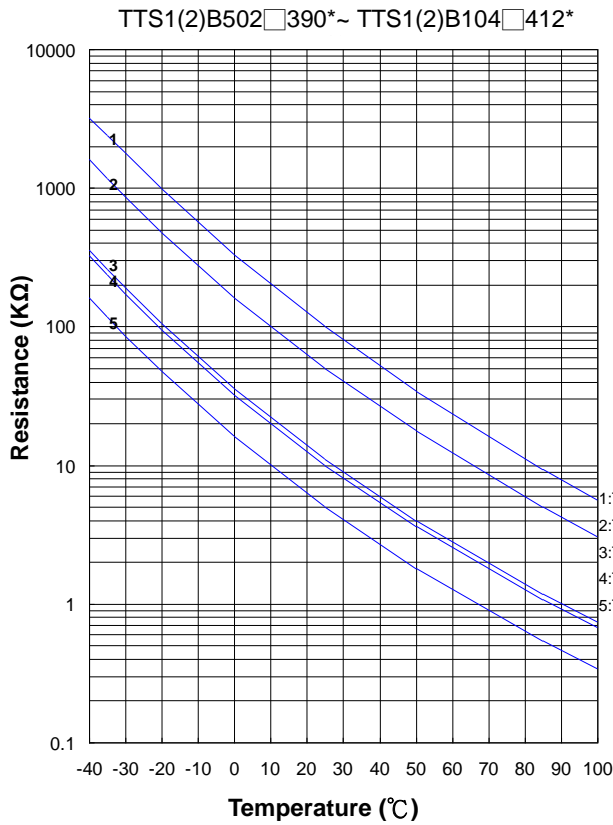
$$P_{Ta} = (T_U - T_a) / (T_U - 25) \times P_{max} = 60\% P_{max}$$

## R-T Characteristic Curves



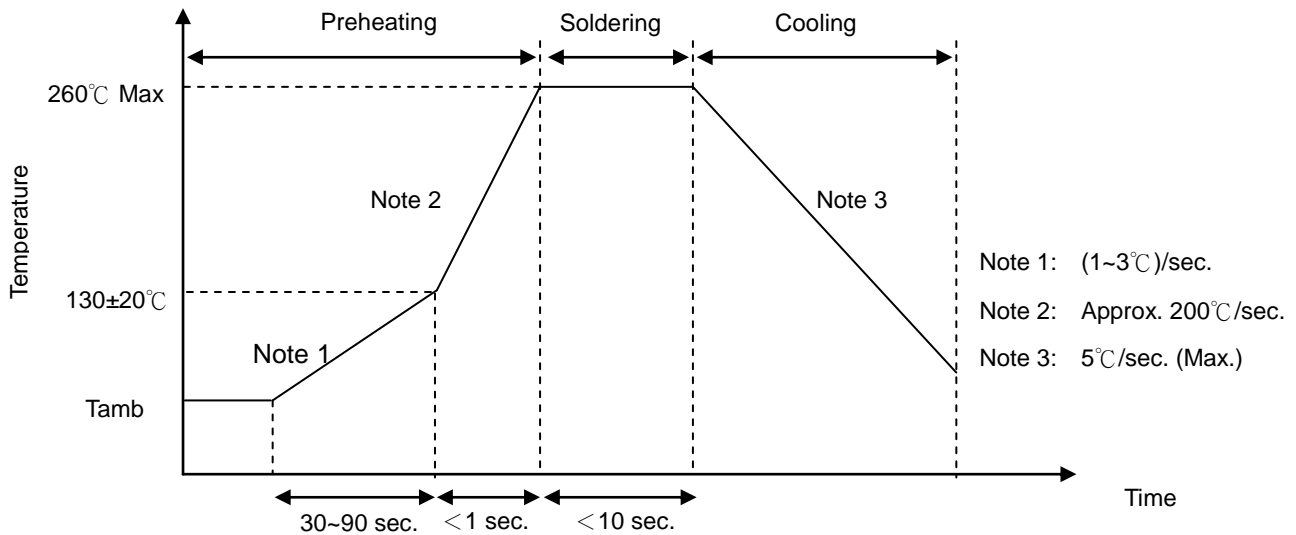
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## ■ Soldering Recommendation

### ● Wave Soldering Profile



### ● Recommended Reworking Conditions With Soldering Iron

Item	Conditions
Temperature of Soldering Iron-tip	360°C (max.)
Soldering Time	3 sec. (max.)
Distance from Thermistor	10 mm (min.)

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### ■ Reliability

Item	Standard	Test conditions / Methods	Specifications															
Tensile Strength of Terminations	IEC 60068-2-21	<p>Gradually apply the specified force and keep the unit fixed for 10±1 sec.</p> <table border="1"> <thead> <tr> <th>Terminal diameter (mm)</th> <th>Force (Kg)</th> </tr> </thead> <tbody> <tr> <td><math>d \leq 0.25</math></td> <td>0.10</td> </tr> <tr> <td><math>0.25 &lt; d \leq 0.3</math></td> <td>0.25</td> </tr> <tr> <td><math>0.3 &lt; d \leq 0.5</math></td> <td>0.5</td> </tr> </tbody> </table>	Terminal diameter (mm)	Force (Kg)	$d \leq 0.25$	0.10	$0.25 < d \leq 0.3$	0.25	$0.3 < d \leq 0.5$	0.5	No visible damage							
Terminal diameter (mm)	Force (Kg)																	
$d \leq 0.25$	0.10																	
$0.25 < d \leq 0.3$	0.25																	
$0.3 < d \leq 0.5$	0.5																	
Bending Strength of Terminations	IEC 60068-2-21	<p>Hold specimen and apply the force specified below to each lead. Bend the specimen to 90°, and then return to the original position. Repeat the procedure in the opposite direction.</p> <table border="1"> <thead> <tr> <th>Terminal diameter (mm)</th> <th>Force (Kg)</th> </tr> </thead> <tbody> <tr> <td><math>d \leq 0.25</math></td> <td>0.05</td> </tr> <tr> <td><math>0.25 &lt; d \leq 0.3</math></td> <td>0.125</td> </tr> <tr> <td><math>0.3 &lt; d \leq 0.5</math></td> <td>0.25</td> </tr> </tbody> </table>	Terminal diameter (mm)	Force (Kg)	$d \leq 0.25$	0.05	$0.25 < d \leq 0.3$	0.125	$0.3 < d \leq 0.5$	0.25	No visible damage							
Terminal diameter (mm)	Force (Kg)																	
$d \leq 0.25$	0.05																	
$0.25 < d \leq 0.3$	0.125																	
$0.3 < d \leq 0.5$	0.25																	
Solderability	IEC 60068-2-20	245 ± 3°C, 3 ± 0.3 sec.	At least 95% of terminal electrode is covered by new solder															
Resistance to Soldering Heat	IEC 60068-2-20	260 ± 3°C, 10 ± 1 sec.	No visible damage   $\Delta R_{25}/R_{25}$   ≤ 3 %															
High Temperature Storage	IEC 60068-2-2	100 ± 5°C, 1000 ± 24 hrs	No visible damage   $\Delta R_{25}/R_{25}$   ≤ 5 %															
Damp Heat, Steady State	IEC 60068-2-78	40 ± 2°C, 90~95% RH, 1000 ± 24 hrs	No visible damage   $\Delta R_{25}/R_{25}$   ≤ 3 %															
Rapid Change of Temperature	IEC 60068-2-14	<p>The conditions shown below shall be repeated 5 cycles.</p> <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Period (minutes)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-40 ± 5</td> <td>30 ± 3</td> </tr> <tr> <td>2</td> <td>Room temperature</td> <td>5 ± 3</td> </tr> <tr> <td>3</td> <td>100 ± 5</td> <td>30 ± 3</td> </tr> <tr> <td>4</td> <td>Room temperature</td> <td>5 ± 3</td> </tr> </tbody> </table>	Step	Temperature (°C)	Period (minutes)	1	-40 ± 5	30 ± 3	2	Room temperature	5 ± 3	3	100 ± 5	30 ± 3	4	Room temperature	5 ± 3	No visible damage   $\Delta R_{25}/R_{25}$   ≤ 3 %
Step	Temperature (°C)	Period (minutes)																
1	-40 ± 5	30 ± 3																
2	Room temperature	5 ± 3																
3	100 ± 5	30 ± 3																
4	Room temperature	5 ± 3																
Max. Power Dissipation	IEC 60539-1 4.26.3	25 ± 5°C, Pmax., 1000 ± 24 hrs	No visible damage   $\Delta R_{25}/R_{25}$   ≤ 5 %															

### ■ Packaging

- Bulk Packing: 500 pcs/bag

### ■ Warehouse Storage Conditions of Products

- Storage Conditions :
  1. Storage Temperature: -10°C ~ +40°C
  2. Relative Humidity: ≤ 75%RH
  3. Keep away from corrosive atmosphere and sunlight.
- Period of Storage : 1 year