

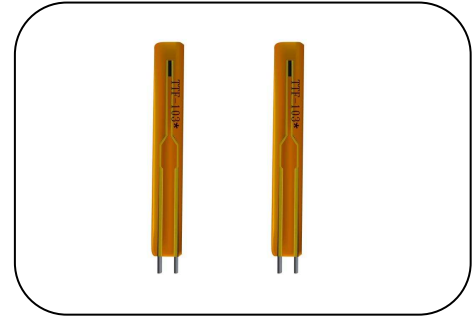
NTC Thermistor : TTF Series



Insulation Film Type for Temperature Sensing/Compensation

■ Features

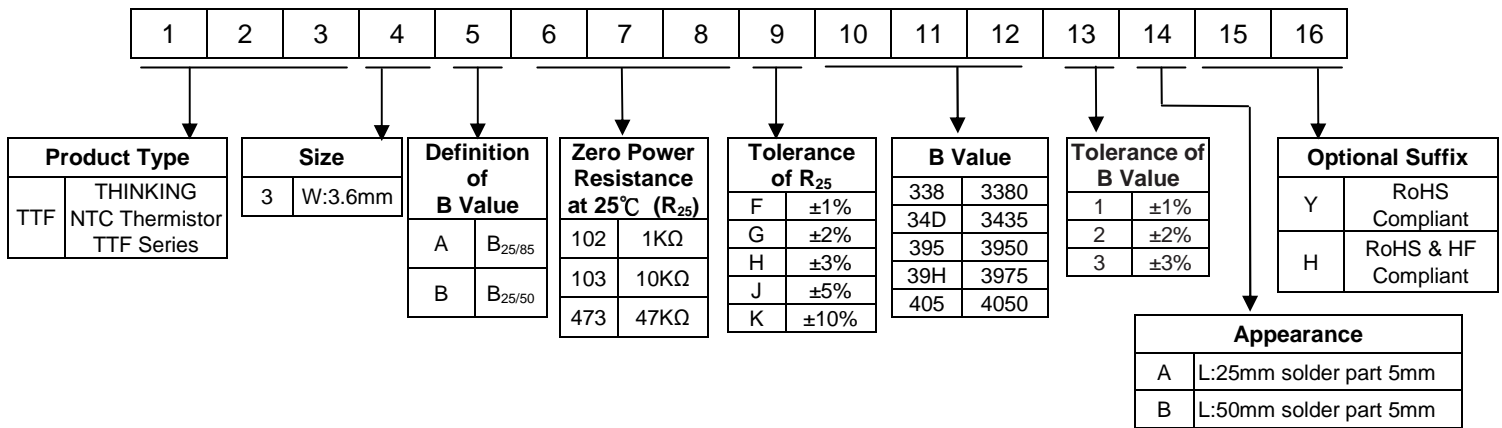
1. RoHS compliant
2. Halogen-Free (HF) series are available
3. Radial led insulation film coated
4. Operating temperature range: $-40^{\circ}\text{C} \sim +100^{\circ}\text{C}$
5. Agency recognition: UL / cUL



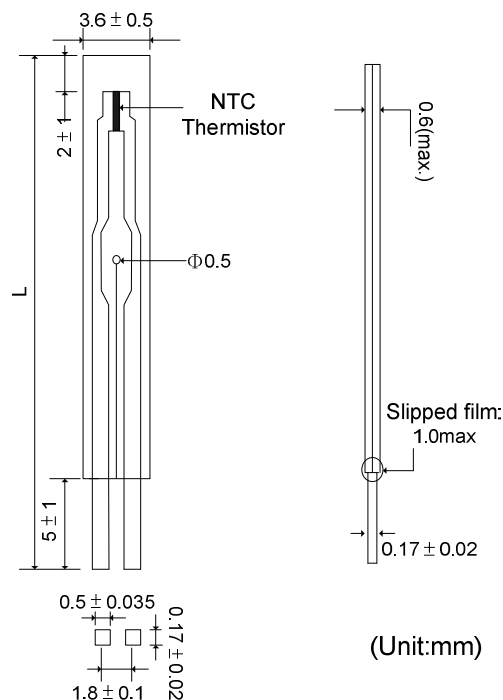
■ Recommended Applications

1. Home appliances
2. Computers
3. Battery packs

■ Part Number Code



■ Structure and Dimensions



NTC Thermistor : TTF Series



Insulation Film Type for Temperature Sensing/Compensation

Electrical Characteristics

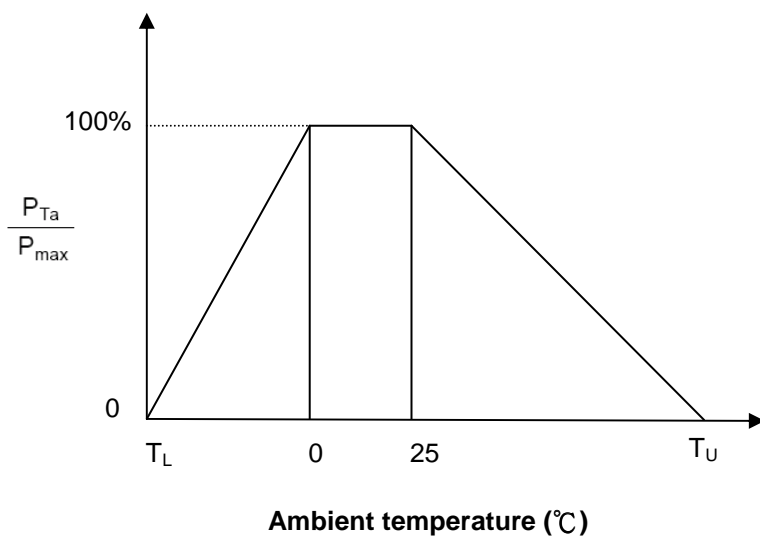
Part No.	Zero Power Resistance at 25°C	Tolerance of R ₂₅	B Value	Tolerance of B value	Max. Power Dissipation at 25°C	Dissipation Factor	Thermal Time Constant	Operating Temperature Range	Safety Approvals	
	R ₂₅ (KΩ)	(±%)	(K)	(±%)	P _{max} (mW)	δ(mW/°C)	τ (Sec.)	T _L ~T _U (°C)	UL	cUL
TTF3A502□34D*	5	1, 2, 3, 5	25/85	3435	3.5	Approx. 0.7	Approx. 5	-40 ~ +100	√	√
TTF3A103□34D*	10			3435					√	√
TTF3A203□34D*	20			3435					√	√
TTF3A223□34D*	22			3435					√	√
TTF3A303□39H*	30			3975					√	√
TTF3A104□34D*	100			3435					√	√

Note 1: □ = Tolerance of R₂₅
 * = Tolerance of B value

Note 2: UL/cUL File No: E138827

Note 3: Special specifications are available upon request.

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

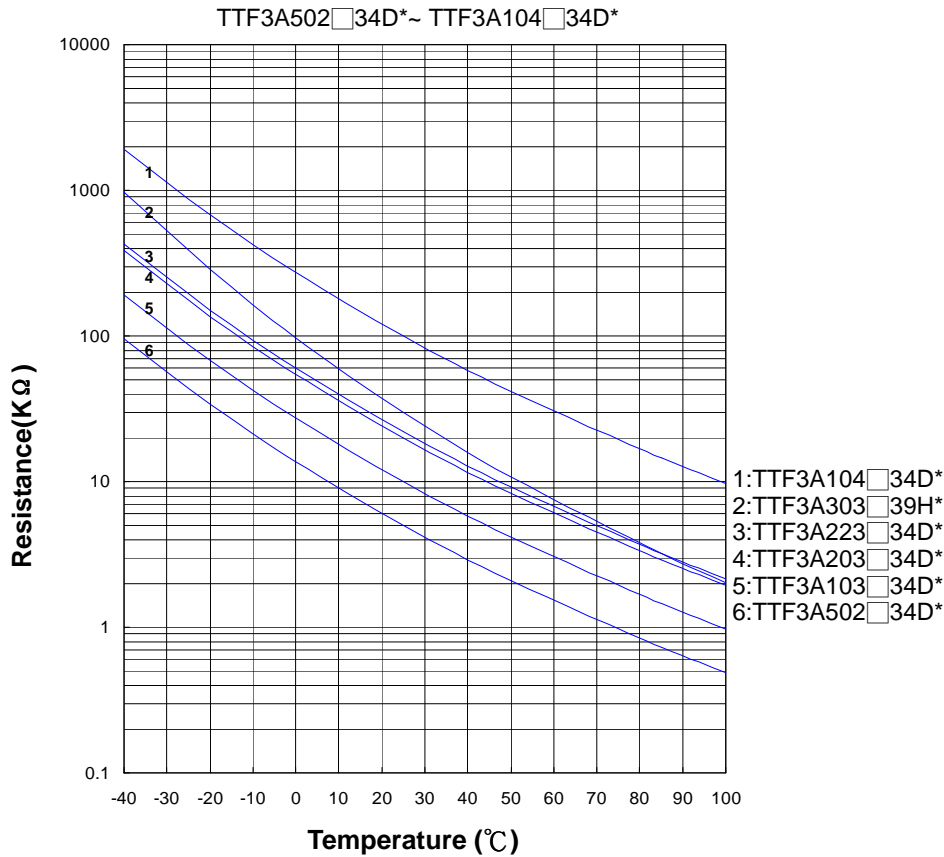
$P_{Ta} = (T_U - T_a) / (T_U - 25) \times P_{max} = 60\% P_{max}$

NTC Thermistor : TTF Series



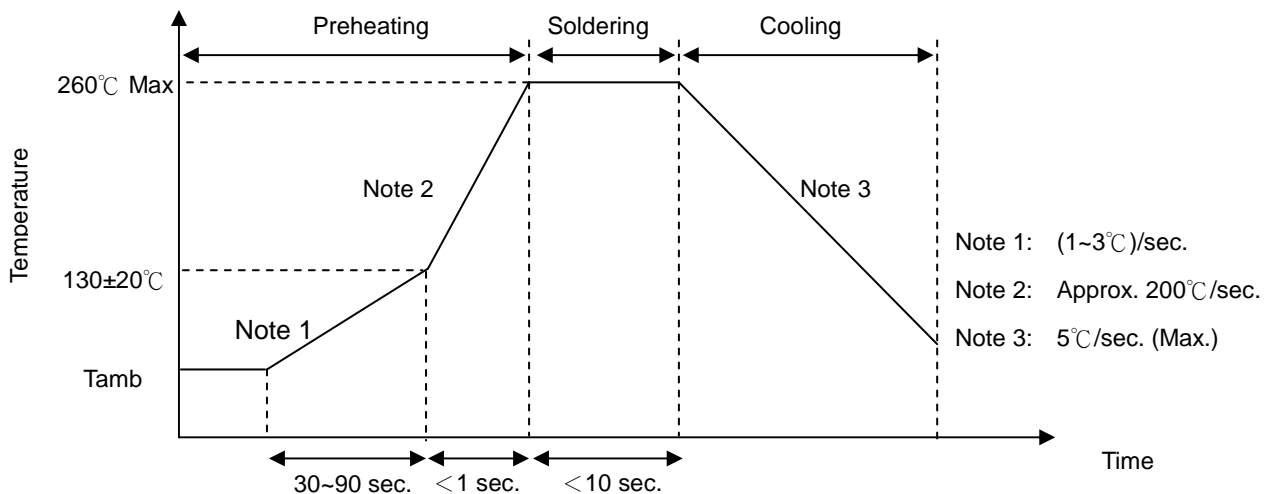
Insulation Film Type for Temperature Sensing/Compensation

■ R-T Characteristic Curves



■ 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 Coating	Do not touch film bottom

NTC Thermistor : TTF Series



Insulation Film Type for Temperature Sensing/Compensation

■ Reliability

Item	Standard	Test conditions / Methods	Specifications															
Tensile Strength of Terminals	IEC 60068-2-21	<p>Gradually apply the specified force and keep the unit fixed for 10±1 sec.</p> <table border="0"> <tr> <td style="text-align: center;">Terminal cross-sectional area (mm²)</td> <td style="text-align: center;">Force (Kg)</td> </tr> <tr> <td style="text-align: center;">0.05<S≤0.1</td> <td style="text-align: center;">0.25</td> </tr> </table>	Terminal cross-sectional area (mm ²)	Force (Kg)	0.05<S≤0.1	0.25	No visible damage											
Terminal cross-sectional area (mm ²)	Force (Kg)																	
0.05<S≤0.1	0.25																	
Bending Strength of Terminals	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="0"> <tr> <td style="text-align: center;">Terminal cross-sectional area (mm²)</td> <td style="text-align: center;">Force (Kg)</td> </tr> <tr> <td style="text-align: center;">0.05<S≤0.1</td> <td style="text-align: center;">0.125</td> </tr> </table>	Terminal cross-sectional area (mm ²)	Force (Kg)	0.05<S≤0.1	0.125	No visible damage											
Terminal cross-sectional area (mm ²)	Force (Kg)																	
0.05<S≤0.1	0.125																	
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 ΔR ₂₅ /R ₂₅ ≤ 3 %															
High Temperature Storage	IEC 60068-2-2	100 ± 5°C, 1000 ± 24 hrs	No visible damage ΔR ₂₅ /R ₂₅ ≤ 5 %															
Damp Heat, Steady State	IEC 60068-2-78	40 ± 2°C, 90~95% RH, 1000 ± 24 hrs	No visible damage ΔR 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 ΔR 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	25 ± 5°C, Pmax. , 1000 ± 24 hrs	No visible damage ΔR 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