

NTC Thermistor: TTS Type



Bead Type for Temperature Sensing/Compensation

■ Features

1. RoHS compliant
2. Body size ϕ 1.6mm~ ϕ 2.5mm
3. Radial lead resin coated
4. Long leads for easy sensor placement
5. -40 ~ +100°C operating temperature range
6. Wide resistance range
7. Agency recognition: UL /cUL



■ Recommended Applications

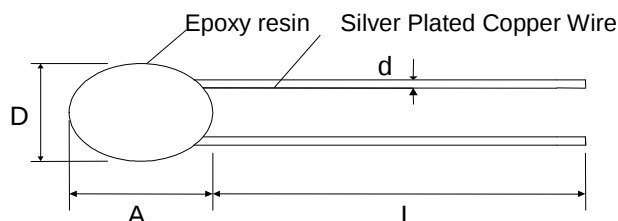
1. Home appliances (air conditioner, refrigerator, electric fan, electric cooker, washing machine, microwave oven, drinking machine, CTV, radio.)
2. Thermometer

■ Part Number Code

1		2		3		.4		5		6		7		8		9		10		11		12		13		14		15		16	
Product Type				Size				Zero Power Resistance at 25°C (R₂₅)				Tolerance of R₂₅				B Value First Two Digits				B Value Last Two Digits				Tolerance of B Value				Optional Suffix			
TTS		Thinking NTC thermistor TTS type		1		φ 1.6mmx 3 mm (max)		102		1K Ω		F		±1%		30		30		0		00		1		±1%		Y		RoHS compliant	
				2		φ 2.5mmx 4mm (max)		103		10K Ω		G		±2%		31		31		A		05		2		±2%					
								473		47K Ω		H		±3%		32		32		1		10		3		±3%					
												J		±5%		:		:		B		15									
												K		±10%		:		:		2		20									
																40		40		H		75									
																41		41		8		80									
																:		:		J		85									
																				9		90									
																				K		95									
Definition of B Value																															
A				B _{25/85}																											
B				B _{25/50}																											
Appearance																															
C				φ 0.25mm Silver plated Copper wire																											
D				φ 0.3 mm Silver plated Copper wire																											
E				φ 0.23mm enameled Copper wire																											
F				φ 0.3mm enameled Copper wire																											
M				φ 0.23mm enameled manganin wire																											
P				φ 0.5mm enameled manganin wire																											
N				φ 0.23mm enameled constantan wire																											

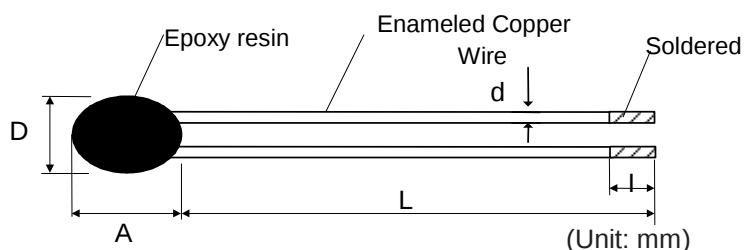
■ Structure and Dimensions

C Type



Part No.	Dmax.	Amax.	d	L
TTS1	1.6	3.0	0.25±0.02	40±2
TTS2	2.5	4.0		

E Type



Part No.	Dmax.	Amax.	d	L	l
TTS1	1.6	3.0	0.23±0.02	80±4	4±1
TTS2	2.5	4.0			

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■ Electrical Characteristics

Part No.	Zero power Resistance at 25°C	Tolerance of R ₂₅	B Value		Tolerance of B value	Max. Power Rating 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
TTS#B502□327*	5	1、2、3、 5、10	25/50	3270	1、2、3	45	≥1	≤10	-40 ~ +100	√	√
TTS#B502□347*	5		25/50	3470						√	√
TTS#B502□365*	5		25/50	3650						√	√
TTS#B502□395*	5		25/50	3950						√	√
TTS#B103□338*	10		25/50	3380						√	√
TTS#B103□347*	10		25/50	3470						√	√
TTS#B103□395*	10		25/50	3950						√	√
TTS#A103□34D	10		25/85	3435						√	√
TTS#A103□39H	10		25/85	3975						√	√
TTS#B203□395*	20		25/50	3950						√	√
TTS#A203□34D*	20		25/85	3435						√	√
TTS#A303□395*	30		25/85	3950						√	√
TTS#B473□395*	47		25/50	3950						√	√
TTS#B503□395*	50		25/50	3950						√	√
TTS#A503□34D*	50		25/85	3435						√	√
TTS#A833□40B*	83		25/85	4015						√	√
TTS#A104□34D*	100		25/85	3435						√	√
TTS#B104□410*	100		25/50	4100						√	√
TTS#A104□425*	100		25/85	4250						√	√
TTS#B474□439*	470		25/50	4390						√	√
TTS#A504□427*	500		25/85	4270						√	√
TTS#B504□430*	500		25/50	4300						√	√

Note 1: # = Body Size, □ = Tolerance of R₂₅, * = Tolerance of B value

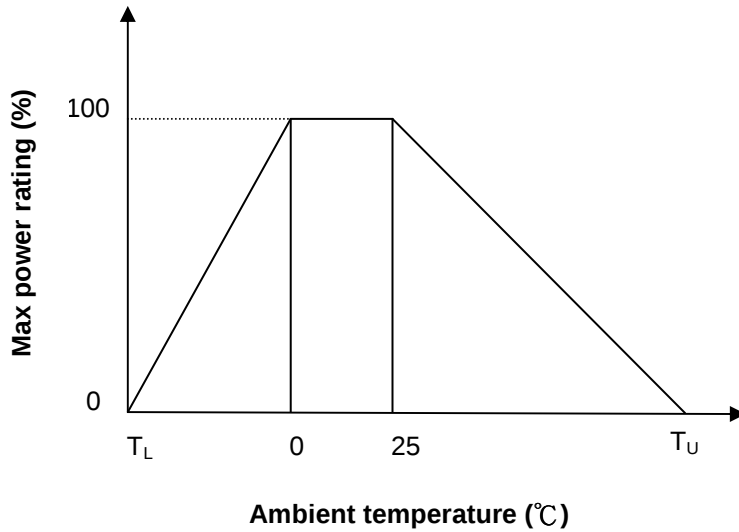
Note 2: UL/cUL File No E138827

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■ Power Derating Curve



T_U : Maximum operating temperature (°C)

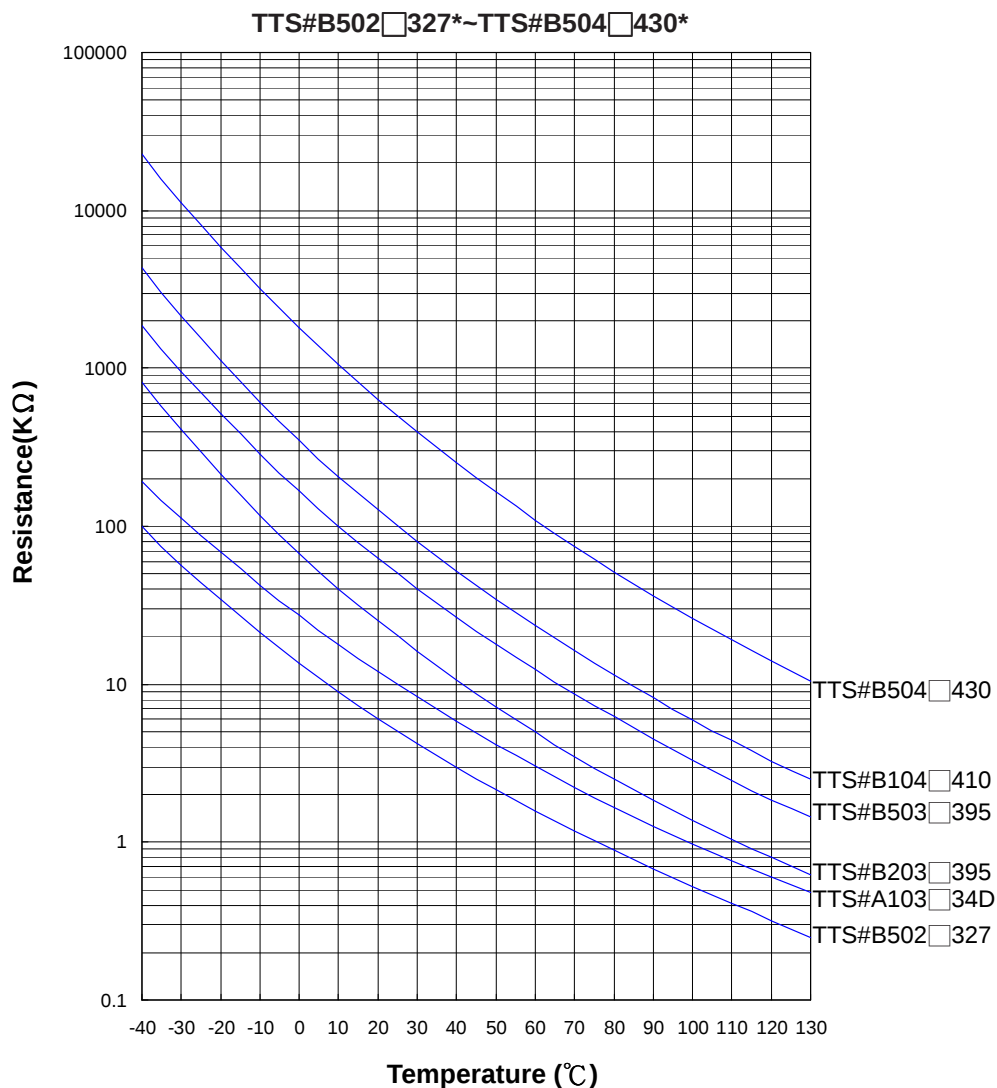
T_L : Minimum operating temperature (°C)

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 (representative)



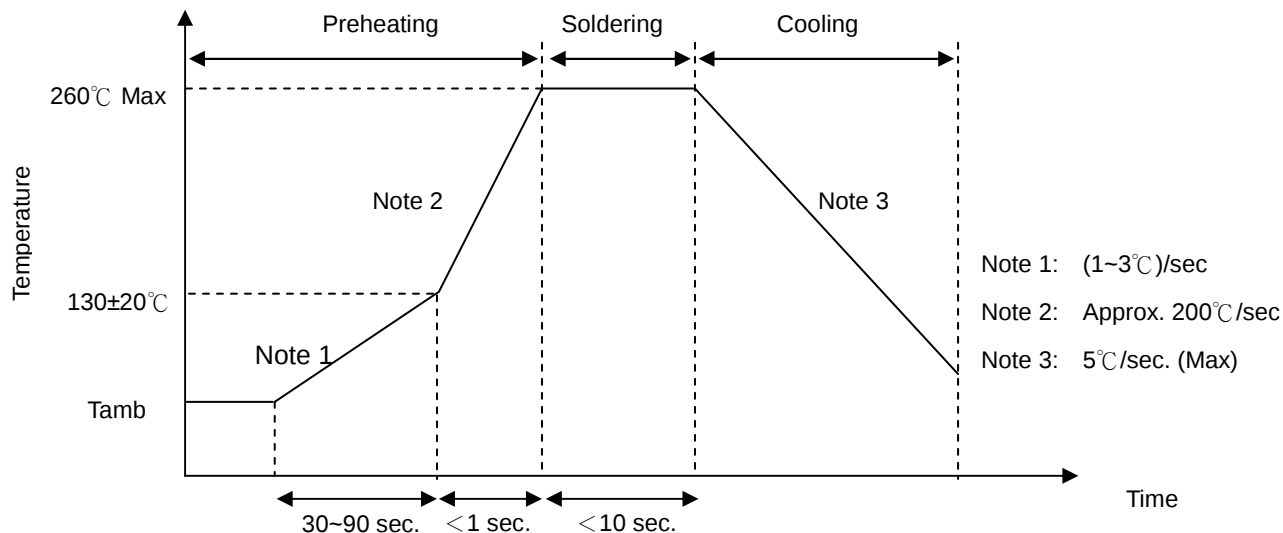
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■ Soldering Recommendation

● 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	2 mm (min.)

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■ Reliability

Item	Standard	Test conditions / Methods		Specifications															
Tensile Strength of Terminations	IEC 60068-2-21	Gradually applying the force specified and keeping the unit fixed for 10±1 sec <table><tr><td>Terminal diameter (mm)</td><td>Force (Kg)</td></tr><tr><td>$d \leq 0.25$</td><td>0.10</td></tr><tr><td>$0.25 < d \leq 0.3$</td><td>0.25</td></tr><tr><td>$0.3 < d \leq 0.5$</td><td>0.5</td></tr></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	Hold specimen and apply the force specified below to each lead. Bend the specimen to 90°, then return to the original position. Repeat the procedure in the opposite direction. <table><tr><td>Terminal diameter (mm)</td><td>Force (Kg)</td></tr><tr><td>$d \leq 0.25$</td><td>0.05</td></tr><tr><td>$0.25 < d \leq 0.3$</td><td>0.125</td></tr><tr><td>$0.3 < d \leq 0.5$</td><td>0.25</td></tr></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	235 ± 5°C , 2 ± 0.5 sec		At least 95% of terminal electrode is covered by new solder															
Resistance to Soldering Heat	IEC 60068-2-20	260 ± 5°C , 10 ± 1 sec		No visible damage ΔR ₂₅ /R ₂₅ ≤ 3 %															
High Temperature Storage	IEC60068-2-3	100 ± 5°C , 1000 ± 24 hrs		No visible damage ΔR ₂₅ /R ₂₅ ≤ 5 %															
Damp Heat, Steady State	IEC60068-2-3	40 ± 2°C , 90~95% RH , 1000 ± 24 hrs		No visible damage ΔR ₂₅ /R ₂₅ ≤ 3 %															
Rapid Change of Temperature	IEC60068-2-14	The conditions shown below shall be repeated 5 cycles <table><tr><td>Step</td><td>Temperature (°C)</td><td>Period (minutes)</td></tr><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></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																	
Life Test	IEC 60539-1	25 ± 5°C, Pmax. X 1000 ± 24 hrs		No visible damage ΔR ₂₅ /R ₂₅ ≤ 5 %															

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Packaging

- Bulk Packing: 500 pcs/ bag

■ Storage Conditions of Products

- Storage Conditions :
 - 1.Storage Temperature : $-10^{\circ}\text{C}\sim+40^{\circ}\text{C}$
 - 2.Relative Humidity : $\leq 75\%RH$
 3. Keep away from corrosive atmosphere and sunlight.
- Period of Storage : 1 year