

# NTC thermistors: HNC series



For temperature sensing/ compensation:  $\Phi 5\text{mm}$  disk type

## ■ Characteristics

1. Comply with RoHS, HF and REACH requirements
2. Body size:  $\Phi 5\text{mm}$
3. Radial lead epoxy package
4. Working temperature range:  $-40\text{ }^\circ\text{C} \sim +125\text{ }^\circ\text{C}$
5. Wide resistance range:  $5\Omega \sim 470\text{K}\Omega$
6. High cost performance



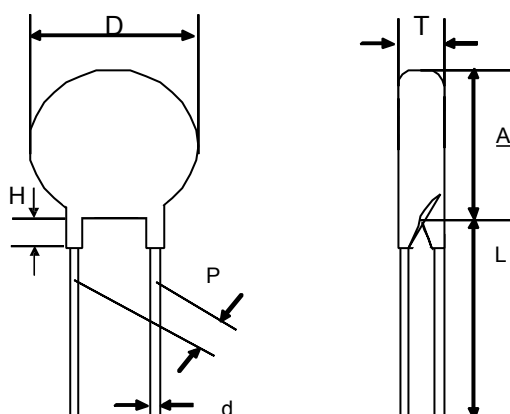
## ■ Application

1. Household appliances, Audiovisual products
2. Automotive electronics, communication equipment
3. Industrial equipment
4. Computer and peripheral products
5. Power supply, inverter, UPS
6. Transformer, adapter and charger

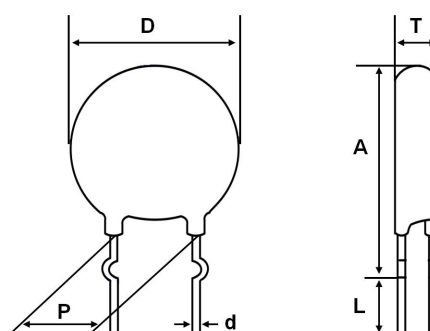
## ■ Coding

H	N	C	1	0	3	J	S	C	3	0				
1	2	3	4	5	6	10	11	13	14	15	16	17	18	19
Product types			25°C zero power resistance			R <sub>25</sub> Tolerance		Lead style		Packing		Cutting lead length		Special control
SEMISAM thermistor HNC series			R <sub>25</sub> <100			J	±5%	S	Straight lead	C	Cutting leads	30	3.0mm	
	005		5Ω			K	±10%	O	Out lead	AB	Taping 12.7mm and Box	35	3.5mm	
	050		50Ω			M	±20%			DB	Taping 15.0mm and Box			
			R <sub>25</sub> ≥100Ω							R	Taping and Reel			
	101		100Ω							Blank	Bulk			
	103		10000Ω											
	474		470000Ω											

S style(Straight lead)



O style(Out lead)



(Unit: mm)

Styl	D max.	P	d	Hmax.	Amax.	L min.	Tmax.
S	6.5	2.5±0.5	0.5±0.02	3	6.5	3.0	5
O	6.5	3.5±0.5	0.5±0.02	—	11.0	3.0	5

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## ■ Electrical characteristics

Type	Zero power resistance @25°C	R <sub>25</sub> tolerance	B Value (25/50)	Max. power @25°C	Dissipation factor	Thermal time constant	Working temperature
	R <sub>25</sub> (Ω)	(±%)	(K)	P <sub>max</sub> (mW)	δ(mW/°C)	τ(Sec.)	T <sub>L</sub> ~T <sub>U</sub> (°C)
HNC005□	5	10,15	2450	450	Approx. 4.5	Approx. 20	-40~+125
HNC010□	10		2750				
HNC015□	15		2800				
HNC020□	20		2800				
HNC025□	25		2900				
HNC033□	33		2900				
HNC045□	45		3000				
HNC050□	50		3050				
HNC085□	85		3100				
HNC101□	100		3200				
HNC151□	150		3250				
HNC201□	200		3400				
HNC301□	300		3600				
HNC331□	330		3600				
HNC471□	470		3600				
HNC501□	500		3650				
HNC681□	680		3700				
HNC102□	1000		3800				
HNC152□	1500		3900				
HNC202□	2000		3950				
HNC252□	2500		4000				
HNC302□	3000		4000				
HNC332□	3300		4000				
HNC472□	4700		4050				
HNC502□	5000		4050				
HNC602□	6000		4050				
HNC682□	6800	4050					
HNC802□	8000	4050					
HNC103□	10000	5,10,15	4050	450	Approx. 4.5	Approx. 20	-40~+125
HNC123□	12000		4050				
HNC153□	15000		4200				
HNC203□	20000		4250				
HNC303□	30000		4250				
HNC473□	47000		4300				
HNC503□	50000		4300				
HNC104□	100000		4400				
HNC154□	150000		4500				
HNC204□	200000		4600				
HNC224□	220000		4650				
HNC334□	330000		4700				
HNC474□	470000		4750				

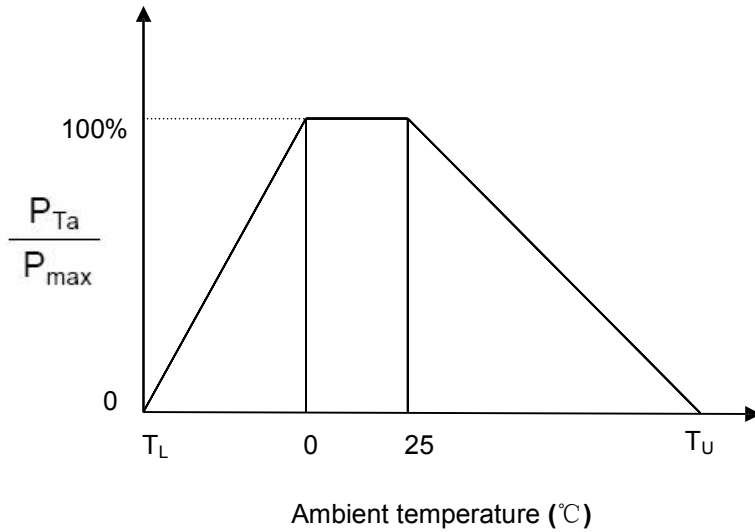
Remark: □=R<sub>25</sub> tolerance

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## Maximum power derating curve



$T_U$ : Upper limit of working temperature ( $^{\circ}\text{C}$ )

$T_L$ : Lower limit of working temperature ( $^{\circ}\text{C}$ )

For example:

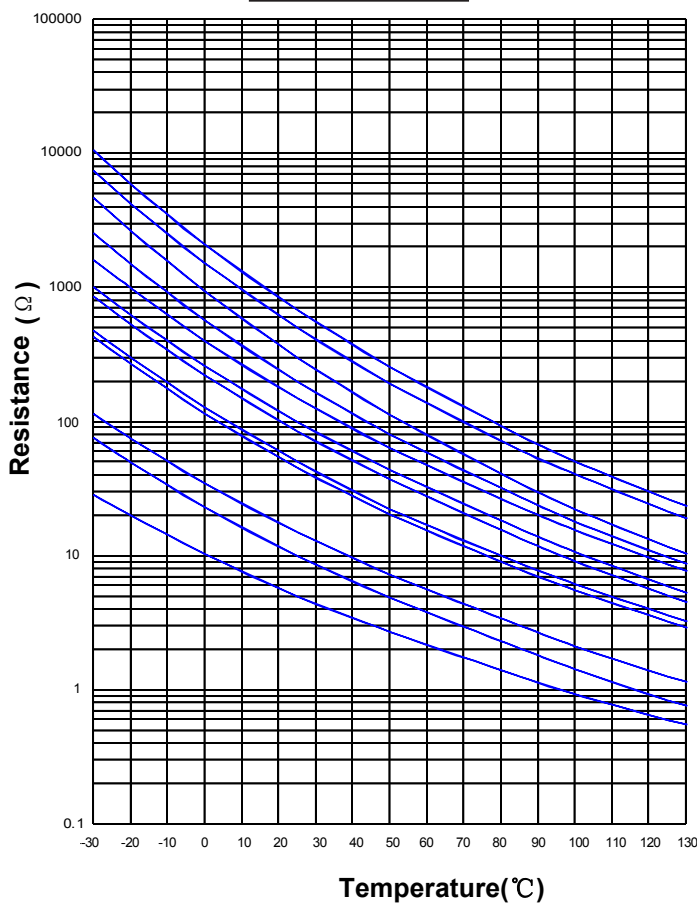
Ambient temperature ( $T_a$ )=  $55^{\circ}\text{C}$

Upper limit of working temperature ( $T_u$ )= $125^{\circ}\text{C}$

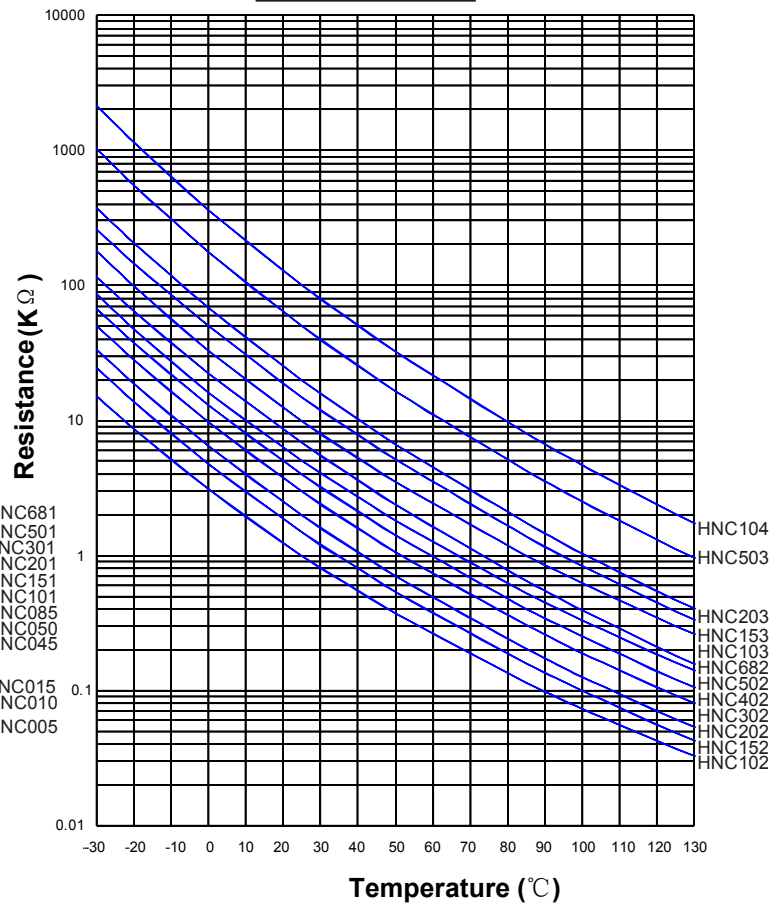
$$P_{Ta} = (T_u - T_a) / (T_u - 25) \times P_{max} = 70\% P_{max}$$

## RT curve (typical)

**HNC005~HNC681**



**HNC102~HNC104**





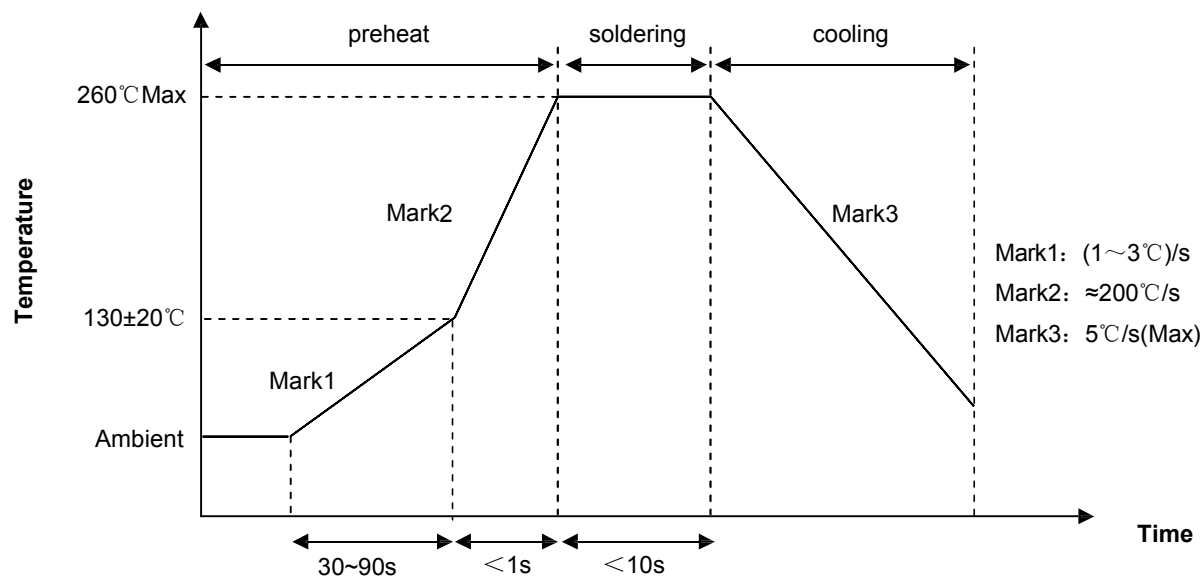
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## ■ Recommended soldering conditions

Wave soldering curve



Note: PCB surface should be at least 6 cm distance from the thermistor body to prevent parts damage

## Iron soldering conditions

Item	Conditions
Temperature	360°C(max.)
Soldering time	3 sec.(max.)
Distance between soldering position and coating	2mm(min.)

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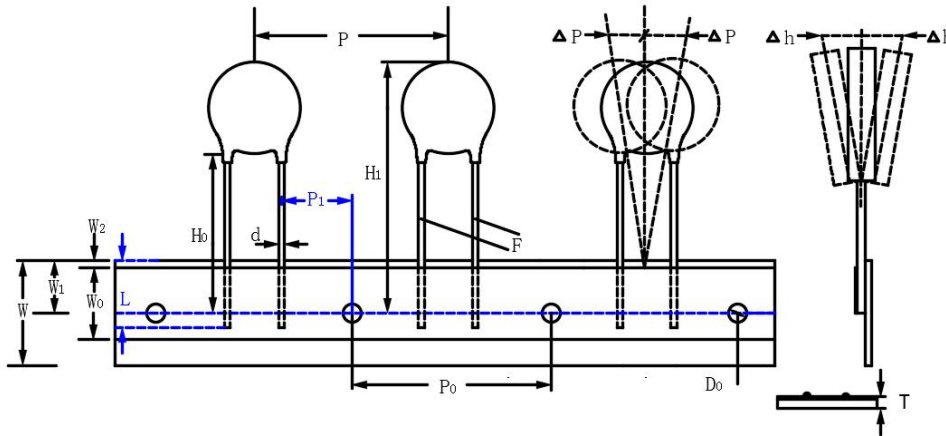
## ■ Reliability

Test Item	Standard	Test condition/method	Requirement															
Tensile strength of terminals	IEC60068-2-21	Gradually applying the force specified and duration $10 \pm 1\text{s}$  <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">Wire diameter (mm)</td> <td style="text-align: center;">Pulling Force (Kg)</td> </tr> <tr> <td style="text-align: center;">-----</td> <td style="text-align: center;">-----</td> </tr> <tr> <td style="text-align: center;"><math>0.3 &lt; d \leq 0.5</math></td> <td style="text-align: center;">0.5</td> </tr> </table>	Wire diameter (mm)	Pulling Force (Kg)	-----	-----	$0.3 < d \leq 0.5$	0.5	No visible damage									
Wire diameter (mm)	Pulling Force (Kg)																	
-----	-----																	
$0.3 < d \leq 0.5$	0.5																	
Bending of terminals	IEC60068-2-21	Add the specified weight to one lead of the sample, bend it $90^\circ$ in one direction, and then returned to its original position. Then bend $90^\circ$ in the opposite direction in the same way.  <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">Wire diameter (mm)</td> <td style="text-align: center;">Bending force (Kg)</td> </tr> <tr> <td style="text-align: center;">-----</td> <td style="text-align: center;">-----</td> </tr> <tr> <td style="text-align: center;"><math>0.3 &lt; d \leq 0.5</math></td> <td style="text-align: center;">0.25</td> </tr> </table>	Wire diameter (mm)	Bending force (Kg)	-----	-----	$0.3 < d \leq 0.5$	0.25	No visible damage									
Wire diameter (mm)	Bending force (Kg)																	
-----	-----																	
$0.3 < d \leq 0.5$	0.25																	
Solderability	IEC60068-2-20	$245 \pm 3^\circ\text{C}$ , $3 \pm 0.3\text{s}$	Tin area $\geq 95\%$															
Solder resistance	IEC60068-2-20	$260 \pm 3^\circ\text{C}$ , $10 \pm 1\text{s}$	No visible damage   $\Delta R_{25}/R_{25}$   $\leq 3\%$															
High temperature storage	IEC600068-2-2	$125 \pm 5^\circ\text{C}$ , $1000 \pm 24\text{h}$	No visible damage   $\Delta R_{25}/R_{25}$   $\leq 5\%$															
Steady state damp heat	IEC60068-2-78	$40 \pm 2^\circ\text{C}$ , 90~95%RH, $1000 \pm 24\text{h}$	No visible damage   $\Delta R_{25}/R_{25}$   $\leq 3\%$															
Thermal shock	IEC60068-2-14	Temperature changes rapidly acc. conditions as below table, 5 cycles  <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Step</th> <th>Temperature (<math>^\circ\text{C}</math>)</th> <th>Cycle (min.)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;"><math>-40 \pm 5</math></td> <td style="text-align: center;"><math>30 \pm 3</math></td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">Room temp.</td> <td style="text-align: center;"><math>5 \pm 3</math></td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;"><math>125 \pm 5</math></td> <td style="text-align: center;"><math>30 \pm 3</math></td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;">Room temp.</td> <td style="text-align: center;"><math>5 \pm 3</math></td> </tr> </tbody> </table>	Step	Temperature ( $^\circ\text{C}$ )	Cycle (min.)	1	$-40 \pm 5$	$30 \pm 3$	2	Room temp.	$5 \pm 3$	3	$125 \pm 5$	$30 \pm 3$	4	Room temp.	$5 \pm 3$	No visible damage   $\Delta R_{25}/R_{25}$   $\leq 3\%$
Step	Temperature ( $^\circ\text{C}$ )	Cycle (min.)																
1	$-40 \pm 5$	$30 \pm 3$																
2	Room temp.	$5 \pm 3$																
3	$125 \pm 5$	$30 \pm 3$																
4	Room temp.	$5 \pm 3$																
Max. power	IEC60539-1 4.26.3	$25 \pm 5^\circ\text{C}$ , Pmax., $1000 \pm 24\text{h}$	No visible damage   $\Delta R_{25}/R_{25}$   $\leq 5\%$															
Insulation resistance	MIL-STD-202F -Method302	$1000\text{V}_{\text{DC}}$ , 1min.	$\geq 500\text{M}\Omega$															

### ■ Packing

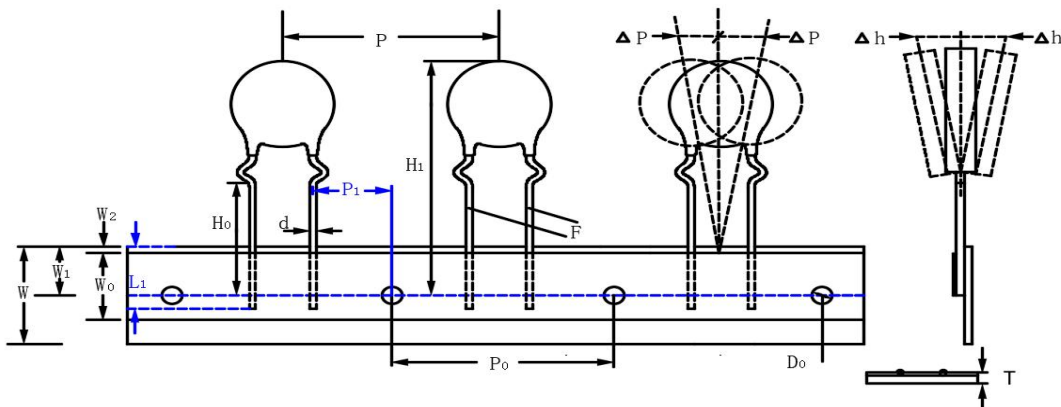
#### Taping packaging

#### S style (straight leads)



Taping Dimension	$P_0$	F	P	$P_1$	$H_0$	$H_1$	d	$W_0$	$W_1$	$W_2$	W	$\Delta P$	$\Delta h$	L	$D_0$	T
	$\pm 0.3$	$\pm 0.5$	$\pm 1$	$\pm 0.7$	$\pm 1.0$	Max.	$\pm 0.05$	$\pm 1$	$+0.75$ $-0.5$	Max.	$+1$ $-0.5$	Max.	Max.	Min.	$\pm 0.2$	$\pm 0.3$
$P_0: 12.7$	12.7	2.5	12.7	5.10	20.0	28	0.5	8	9	3	18	1	2	9	4	0.5
$P_0: 15.0$	15.0	2.5	15.0	6.25	20.0	28	0.5	8	9	3	18	1	2	9	4	0.5

#### O style (Outer lead)



Taping Dimension	$P_0$	F	P	$P_1$	$H_0$	$H_1$	d	$W_0$	$W_1$	$W_2$	W	$\Delta P$	$\Delta h$	$L_1$	$D_0$	T
	$\pm 0.3$	$\pm 0.5$	$\pm 1$	$\pm 0.7$	$\pm 1.0$	Max.	$\pm 0.05$	$\pm 1$	$+0.75$ $-0.5$	Max.	$+1$ $-0.5$	Max.	Max.	Min.	$\pm 0.2$	$\pm 0.3$
$P_0: 12.7$	12.7	3.5	12.7	4.6	17.5	30	0.5	8	9	3	18	1	2	9	4	0.5
$P_0: 15.0$	15.0	3.5	15.0	5.75	17.5	30	0.5	8	9	3	18	1	2	9	4	0.5

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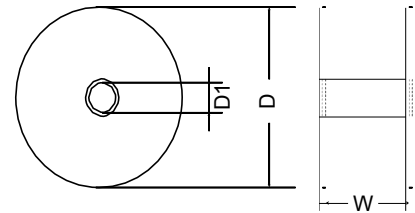
## ■ Packing quantity

### Bulk packing

Series	Straight lead (pcs/bag)	Cutting lead (pcs/bag)
HNC	500	1000

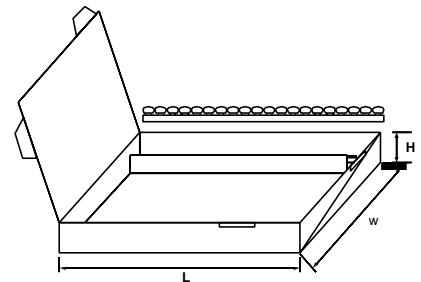
### Reel packing

Series	D (mm)	D1 (mm)	W (mm)	Quantity (pcs/reel)
HNC	340 $\pm$ 10	31 $\pm$ 1	46 $\pm$ 1	2,500



### Box packing

Series	Quantity (pcs/box)
HNC	2,000



L	W	H
348mm	275mm	60mm

## ■ Warehouse storage conditions

Storage conditions:

1. Storage temperature:  $-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$
2. Relative humidity:  $\leq 75\% \text{RH}$
3. Do not store products in an environment with corrosive gas or direct sunlight

Storage period: 1 year



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For temperature sensing/ compensation:  $\Phi$ 5mm disk type



## ■Revision record

Revision date	Edition	Revised content
2022.4.8	2.0	1、 Coding principle: the foot shape code deletes the inner bending foot and increases the outer bending foot.
		2、 For the product size, Dmax is changed from 6.0mm to 6.5mm, the outer curved foot Amax is changed from 10mm to 11mm, and the straight foot lmin is changed from 25mm to 3mm.
		3、 In the tape drawing, the inner bent foot is deleted and the outer bent foot is added.