



产品承认书
PRODUCT SPECIFICATIONS

客户 :
CUSTOMER

客户料号:
CUSTOMER P/N

产品名称 :
DESCRIPTION 网络变压器

产品型号:
PART NUMBER HB2001DNL

版本:
REVISION A0

日期:
ISSUE DATE 2019/10/21

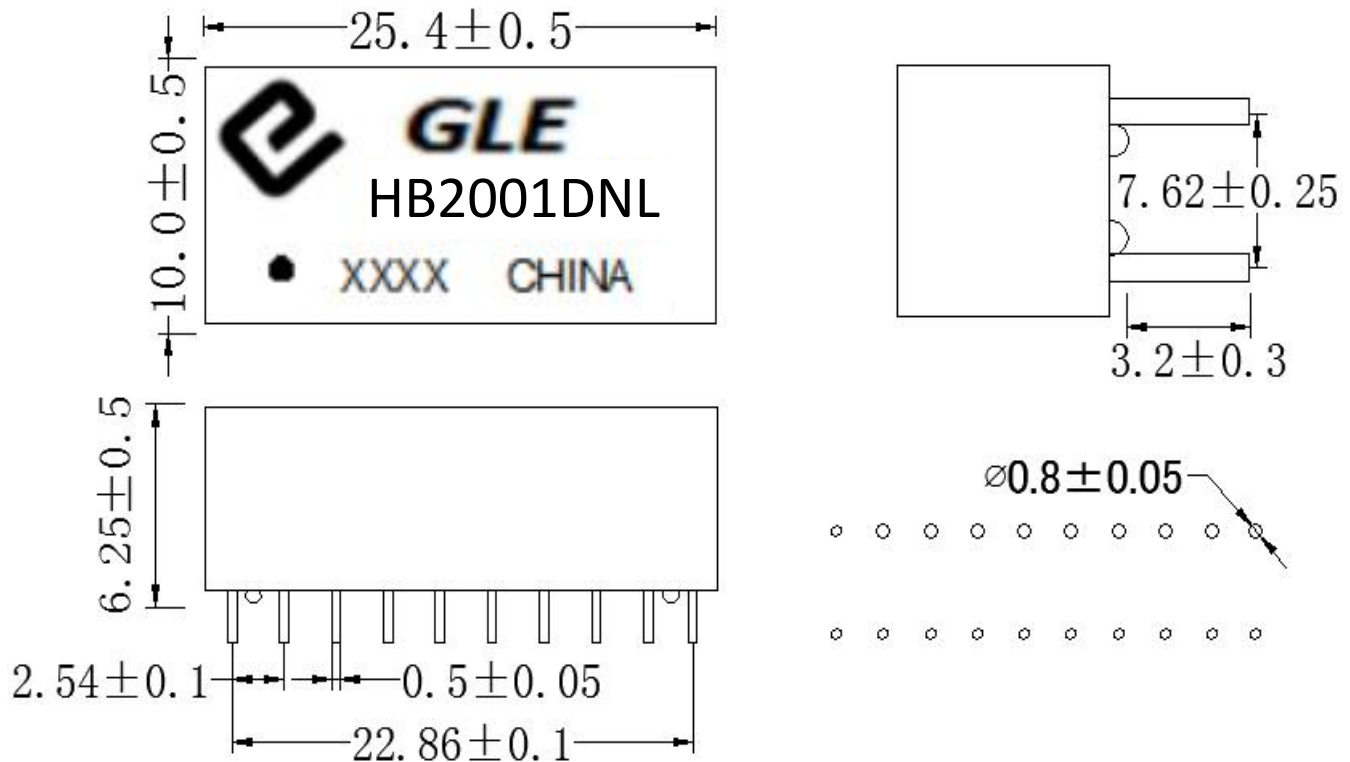
公司承认 COMPANY APPROVAL		
制作 PREPARED BY	审核 CHECKED BY	批准 APPROVED BY
刘子善	张顺钧 	张立华

客户承认 CUSTOMER APPROVAL
批准签字 APPROVED SIGNATURES



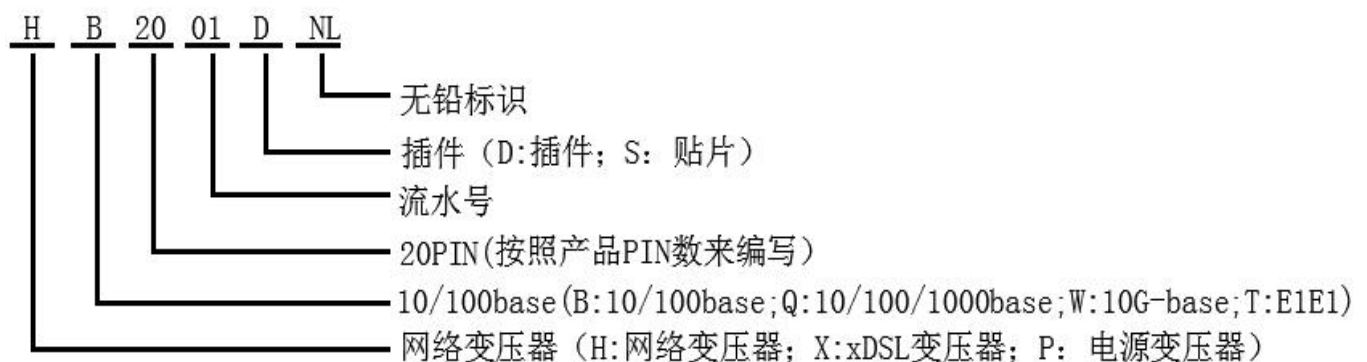
变更记录 Record of Revision		
版本 Rev.	变更说明 Description of Changes	日期 Date
0.0 A0	初版发行	2018/9/12

1. 产品外观尺寸(单位mm)

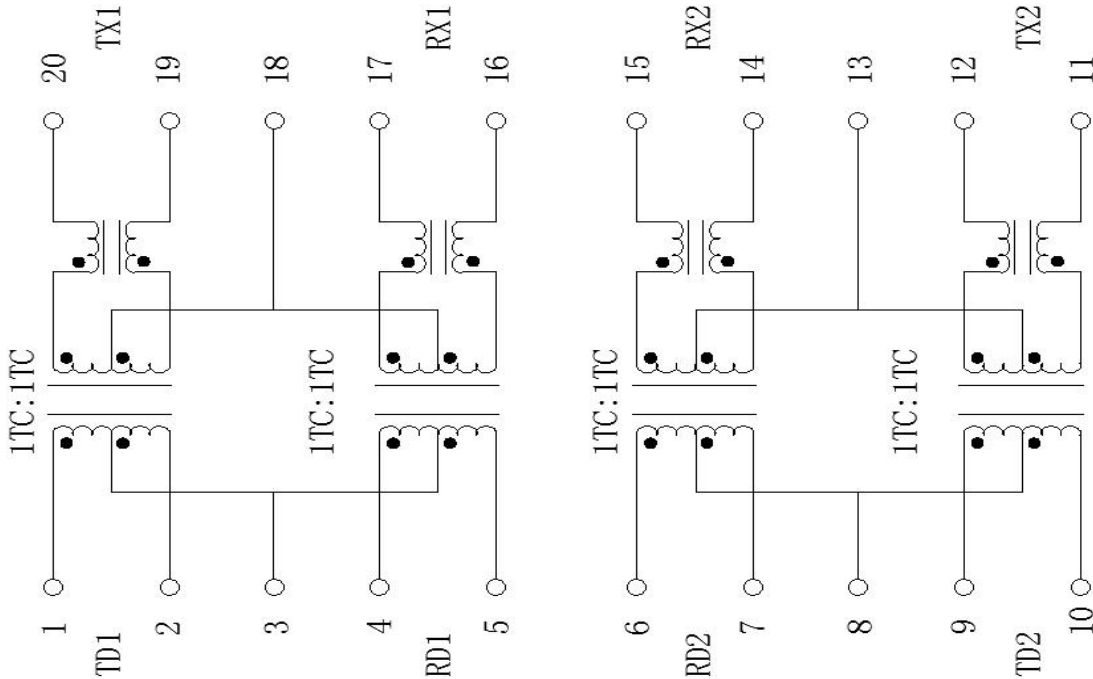


Unless otherwise specified all tolerances are: ± 0.25 in mm

产品编码定义



2. 线路图 Schematic:



3. 产品电性参数 @25°C

Electrical Specification @25°C

Inductance OCL:	350uH Min @ 100KHz	0.1V 8mA DC BIAS
Leakage Inductance:	0.50uH Max @ 100KHz	0.2V
Interwinding Capacitance:	28pF Max @ 100KHz	0.2V
DC Resistance:	0.9 Ω Max	
Turn Ratio:	1CT:1CT(TX)/1CT:1CT(RX)±5%	
Polarity:	1-20,4-17,6-15,9-12 In-Phase	
Insertion Loss:	0.5-100 MHz	-1.1dB Max
Return Loss	1-30 MHz	-16dB Min
	30.1-60MHz	-12dB Min
	60.1-80MHz	-10dB Min
Cross Talk:	1-60MHz	-42dB Min
	60-100MHz	-35dB Min
CMRR:	1-30MHz	-40dB Min
	60MHz	-35dB Min
	80-100MHz	-30dB Min
Isolation HI-POT:	1500Vrms	1mA 1S
Operating Temperature:	0°C to 70°C	
Storage Temperature:	-25°C TO +125°C	
Product Type:	Green Product	



4.SAMPLE TEST DATA

SPEC	1	2	3	4	5
L:(AT 100KHz 0.1V 8mA)					
350uH Min					
1-2	510	546	486	520	486
4-5	523	562	492	503	473
6-7	516	503	473	496	469
9-10	583	496	470	506	503
LL:(AT 100KHz 0.1V)					
0.5uH Max					
1-2(20-19 short)	0.23	0.24	0.21	0.23	0.25
4-5(17-16 short)	0.25	0.24	0.22	0.21	0.23
6-7(15-14 short)	0.24	0.23	0.20	0.26	0.22
9-10(12-11 short)	0.21	0.25	0.24	0.21	0.24
Cw/w:(AT 100KHz 0.1V)					
50PF typ					
1-2 TO 20-19	49.3	45.2	44.1	47.3	40.5
4-5 TO 17-16	49.3	45.2	44.1	47.3	40.5
6-7 TO 15-14	39.8	45.2	43.6	42.1	43.7
9-10 TO 12-11	39.8	45.2	43.6	42.1	43.7
DCR:(AT 25°C)					
1.2Ω Max					
20-19	0.74	0.69	0.70	0.62	0.73
17-16	0.73	0.67	0.65	0.61	0.68
15-14	0.70	0.66	0.64	0.69	0.70
12-11	0.68	0.62	0.63	0.67	0.65
URNS RATIO:					
(1-2):(20-19)=1CT:1CT±5%	OK	OK	OK	OK	OK
(4-5):(17-16)=1CT:1CT±5%	OK	OK	OK	OK	OK
(6-7):(15-14)=1CT:1CT±5%	OK	OK	OK	OK	OK
(9-10):(12-11)=1CT:1CT±5%	OK	OK	OK	OK	OK
MAIN TEST EQUIPMENT					
<input type="checkbox"/> CHANGCHUANG CC2670 WITHSTANDING VOLTAGE TESTER					
<input type="checkbox"/> JINKAITAI 3252 AUTOMATIC TRANSFORMER TEST SYSTEM					
<input checked="" type="checkbox"/> TONGHUI TH2818 AUTOMATIC TRANSFORMER TEST SYSTEM					
<input type="checkbox"/> RF NETWORK ANALYZERS 8712ET					



4.SAMPLE TEST DATA

SPEC	1	2	3	4	5
HI-POT:					
AT:1500VAC 1mA 1S					
1-2 TO 20-19	OK	OK	OK	OK	OK
4-5 TO 17-16	OK	OK	OK	OK	OK
6-7 TO 15-14	OK	OK	OK	OK	OK
9-10 TO 12-11	OK	OK	OK	OK	OK
Insertion Loss:					
1.1dB Max(0.5-100MHz)					
TX1(1-2):					
30MHz	0.25	0.28	0.33	0.34	0.30
40MHz	0.36	0.36	0.35	0.37	0.39
50MHz	0.49	0.48	0.46	0.49	0.44
60MHz	0.57	0.50	0.58	0.58	0.58
80MHz	0.74	0.74	0.74	0.73	0.75
100MHz	0.87	0.83	0.83	0.81	0.80
RX1(4-5):					
30MHz	0.25	0.24	0.26	0.23	0.25
40MHz	0.37	0.38	0.37	0.37	0.36
50MHz	0.41	0.49	0.48	0.49	0.41
60MHz	0.59	0.63	0.53	0.60	0.58
80MHz	0.72	0.77	0.78	0.78	0.70
100MHz	0.88	0.81	0.85	0.85	0.86
RX2(6-7):					
30MHz	0.26	0.27	0.29	0.28	0.33
40MHz	0.36	0.38	0.35	0.37	0.39
50MHz	0.41	0.42	0.43	0.49	0.45
60MHz	0.58	0.61	0.55	0.53	0.61
80MHz	0.74	0.72	0.74	0.71	0.73
100MHz	0.87	0.80	0.83	0.82	0.88
MAIN TEST EQUIPMENT					
<input checked="" type="checkbox"/> CHANGCHUANG CC2670 WITHSTANDING VOLTAGE TESTER <input type="checkbox"/> JINKAITAI 3252 AUTOMATIC TRANSFORMER TEST SYSTEM <input type="checkbox"/> TONGHUI TH2818 AUTOMATIC TRANSFORMER TEST SYSTEM <input checked="" type="checkbox"/> RF NETWORK ANALYZERS 8712ET					



4.SAMPLE TEST DATA

SPEC	1	2	3	4	5
TX2(9-10):					
30MHz	0.26	0.26	0.30	0.24	0.29
40MHz	0.34	0.31	0.35	0.34	0.38
50MHz	0.44	0.43	0.49	0.39	0.44
60MHz	0.55	0.51	0.54	0.55	0.55
80MHz	0.74	0.78	0.71	0.74	0.71
100MHz	0.83	0.84	0.86	0.85	0.83
Return Loss:					
0.5-30 MHz 18dB Min					
30.1-60 MHz 18-20log(f/30)dB Min					
60.1-80 MHz 12dB Min					
TX1(1-2):					
30MHz	23.1	23.6	26.3	24.5	27.4
40MHz	19.9	20.4	21.3	22.3	26.5
50MHz	18.4	18.9	18.9	20.4	24.3
60MHz	17.1	17.6	17.3	18.9	20.6
80MHz	13.9	14.1	13.5	13.8	14.3
RX1(4-5):					
30MHz	22.8	24.3	23.5	24.5	26.3
40MHz	19.6	21.0	21.3	22.3	21.5
50MHz	18.1	19.8	18.6	17.2	18.3
60MHz	16.9	17.3	15.7	15.6	16.3
80MHz	14.8	13.0	13.6	14.8	13.9
RX2(6-7):					
30MHz	25.3	26.8	24.2	25.7	24.6
40MHz	20.2	21.5	20.8	20.6	21.5
50MHz	18.5	17.8	16.9	17.5	17.3
60MHz	16.2	17.2	16.5	17.1	17.3
80MHz	14.0	15.9	14.3	15.3	14.2

MAIN TEST EQUIPMENT

- CHANGCHUANG CC2670 WITHSTANDING VOLTAGE TESTER
- JINKAITAI 3252 AUTOMATIC TRANSFORMER TEST SYSTEM
- TONGHUI TH2818 AUTOMATIC TRANSFORMER TEST SYSTEM
- RF NETWORK ANALYZERS 8712ET



4.SAMPLE TEST DATA

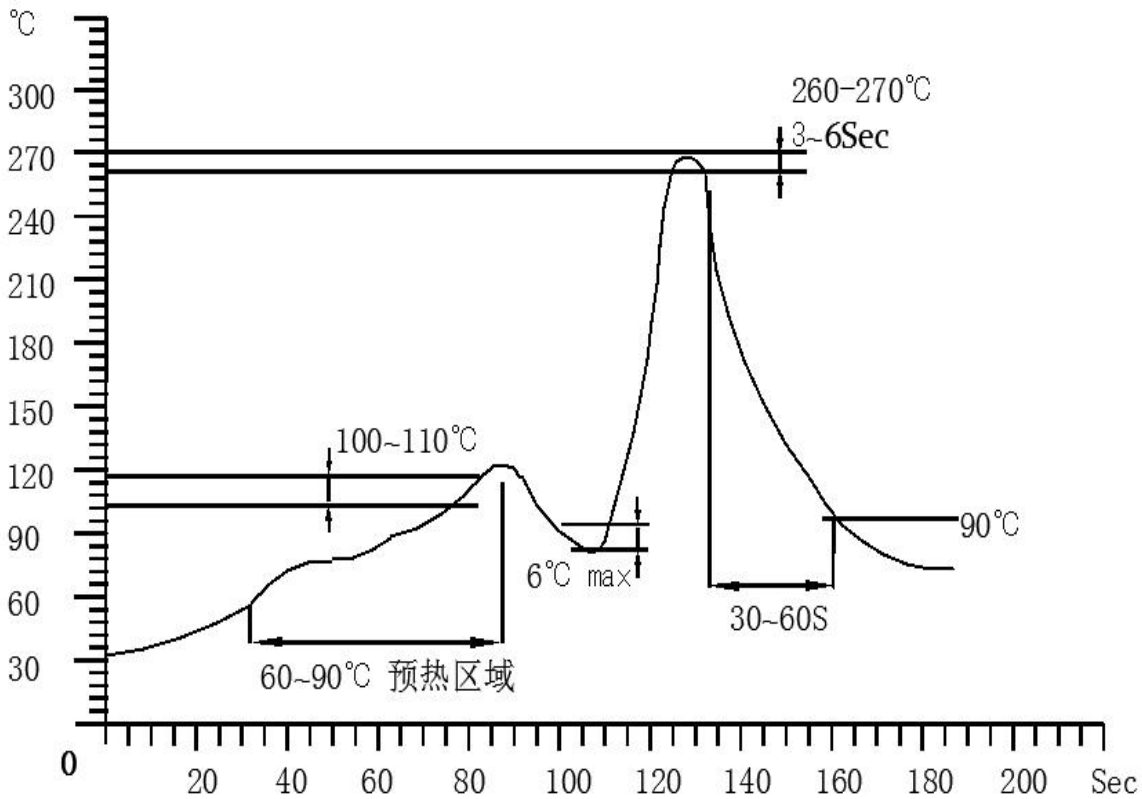
	1	2	3	4	5
SPEC					
TX2(9-10):					
30MHz	25.5	24.6	24.0	25.3	25.3
40MHz	20.3	21.6	21.4	20.4	21.6
50MHz	18.2	17.4	17.2	18.5	18.4
60MHz	16.1	15.9	15.1	15.2	15.8
80MHz	13.9	13.7	14.9	13.3	13.9
Cross Talk:					
0.5-40MHz 35dB Min					
0.1-100MHz 33-20*log(f/50)dB Min					
TX1 TO RX1:					
30MHz	45.4	48.6	49.6	51.3	47.6
60MHz	42.5	40.3	41.3	39.6	40.6
80MHz	37.1	36.4	37.2	37.3	36.0
100MHz	32.6	33.6	32.3	34.8	33.6
RX1 TO RX2:					
30MHz	48.7	49.3	45.0	44.0	41.3
60MHz	41.2	40.2	41.3	40.6	40.4
80MHz	37.3	37.3	36.2	37.3	35.2
100MHz	33.6	32.0	33.5	32.2	31.1
RX2 TO TX2					
30MHz	45.3	43.9	45.3	44.2	43.7
60MHz	41.5	41.6	40.9	38.6	39.6
80MHz	35.8	36.5	35.2	34.5	34.2
100MHz	32.9	32.8	33.1	31.7	30.3
MAIN TEST EQUIPMENT					
<input type="checkbox"/> CHANGCHUANG CC2670 WITHSTANDING VOLTAGE TESTER					
<input type="checkbox"/> JINKAITAI 3252 AUTOMATIC TRANSFORMER TEST SYSTEM					
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5. Recommended Reflow Soldering Curve:

一. Condition :

1. Available for all the through hole parts
2. Soldering Method: Wave Soldering
3. Solder: Sn-0.7Cu
4. The recommended wave soldering curve is as below:



二: Moisture Sensitive Level:

1. Level: 1
2. Floor Life: Unlimited
3. Storage Condition: $\leq 30^{\circ}\text{C}/60\% \text{ RH}$



6. Reliability:																								
NO.	Test Item	Refer To Standard	Test Condition																					
1	Resistance To Soldering Heat--Convection Reflow	IPC/JEDEC J-STD-020D	1).Peak Temperature:Refer to Specification According to Package Body Thickness And Volume 2).Preheat Temperahure and Soak Time:150~200℃,60~120 Seconds 3).Average Ramp-up Rate:3℃/Second Max																					
2	Thermal Shock	IEC68-2-14 MethodA	1).Low Temperature:-40℃ 2).High Temperature:125 3).Dwell Time:30 Minutes 4).Transition Time: Less Than 5Minutes 5).Number of Cycles:10																					
3	High Temperature	IEC68-2-2 MethodA	125℃ .96Hours																					
4	Low Temperature	IEC68-2-1 MethodA	-40℃ .96Hours																					
5	Temp er ature Humidity Cycle	IEC68-2-38	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Temp</th> <th style="text-align: left;">Humidity</th> <th style="text-align: left;">Soak time</th> </tr> </thead> <tbody> <tr> <td>25~65℃</td> <td>93+/-3%RH</td> <td>1.5 hr</td> </tr> <tr> <td>65℃</td> <td>93+/-3%RH</td> <td>4 hr</td> </tr> <tr> <td>65~25℃</td> <td>80~96%RH</td> <td>2.5 hr</td> </tr> <tr> <td>25~65℃</td> <td>93+/-3%RH</td> <td>1.5 hr</td> </tr> <tr> <td>65℃</td> <td>93+/-3%RH</td> <td>4 hr</td> </tr> <tr> <td>65~25℃</td> <td>80~96%RH</td> <td>2</td> </tr> </tbody> </table>	Temp	Humidity	Soak time	25~65℃	93+/-3%RH	1.5 hr	65℃	93+/-3%RH	4 hr	65~25℃	80~96%RH	2.5 hr	25~65℃	93+/-3%RH	1.5 hr	65℃	93+/-3%RH	4 hr	65~25℃	80~96%RH	2
Temp	Humidity	Soak time																						
25~65℃	93+/-3%RH	1.5 hr																						
65℃	93+/-3%RH	4 hr																						
65~25℃	80~96%RH	2.5 hr																						
25~65℃	93+/-3%RH	1.5 hr																						
65℃	93+/-3%RH	4 hr																						
65~25℃	80~96%RH	2																						
6	Vibration	IEC68-2-6	1).Sine Wave 2).Amplitude:0.75mm 3).Frequence:5~500~5HZ 4).Direction:X.Y.Z 5).Number of Sweep Cydes Per Direction:10 6).Duration:2Hours Each Direction																					
7	Mechanical Shock	MIL-STD-202	1).Half-Sine Wave 2).Peak Acceleration:50G 3).Duration:11mS 4).Direction:X.Y.Z-.X.-Y.-Z 5).Number of Shock Per Direction:3																					
8	Free Drop	ISO4180	1).Height:Refer to Speciflcnation According to Production weight																					
9	Solderability	JESD22-B102D	1).Precondition:150±5℃,16±0.5Hours 2).Flux Type:ROL1 3).Immersion Flux Time:5~10 Seconds 4).Solder Temperature:245±5℃ 5).Solder Immersion Time:5±0.5 Seconds 6). Solder Immersion/Emersion Speed:25.4±6.4mm/Second																					
10	Accelerated Moisture Resistance--- Unbiased Autodave	JESD22-A102-C	1).Temperature:121℃ 2).Humidity:100% 3).Vapor Pressure:29.7 Psia or 205KPa 4).Duration:96 hours																					



深圳市格莱尔电子有限公司
Shenzhen Glorious Electronic Co., Ltd.

7.主要材料清单

Material List:

No.	Item	Material	Rating	Supplier of material	UL
1	Transformer Core磁芯	Mn-Zn锰锌 Ni-Zn镍锌	/	YST(研鑫)	NA
2	Wire铜线	QPN/180聚胺脂	180℃	Elektrisola (益利素勒)	E491614
3	Case胶壳	phenolic moulding powder (电木粉)	94V-0	GLORY (格莱瑞)	E150608
4	Varnish 绝缘油	绝缘油1032	180℃	KIWEIAI (格桑)	E213437
5	Solder 焊料	SnCu锡铜	/	YIK SHING TAT (亿诚达)	NA
6	Flux 助焊剂	Water solubility 水溶性松香	/	Tongfang (同方)	NA