



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 HB1601SNL

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



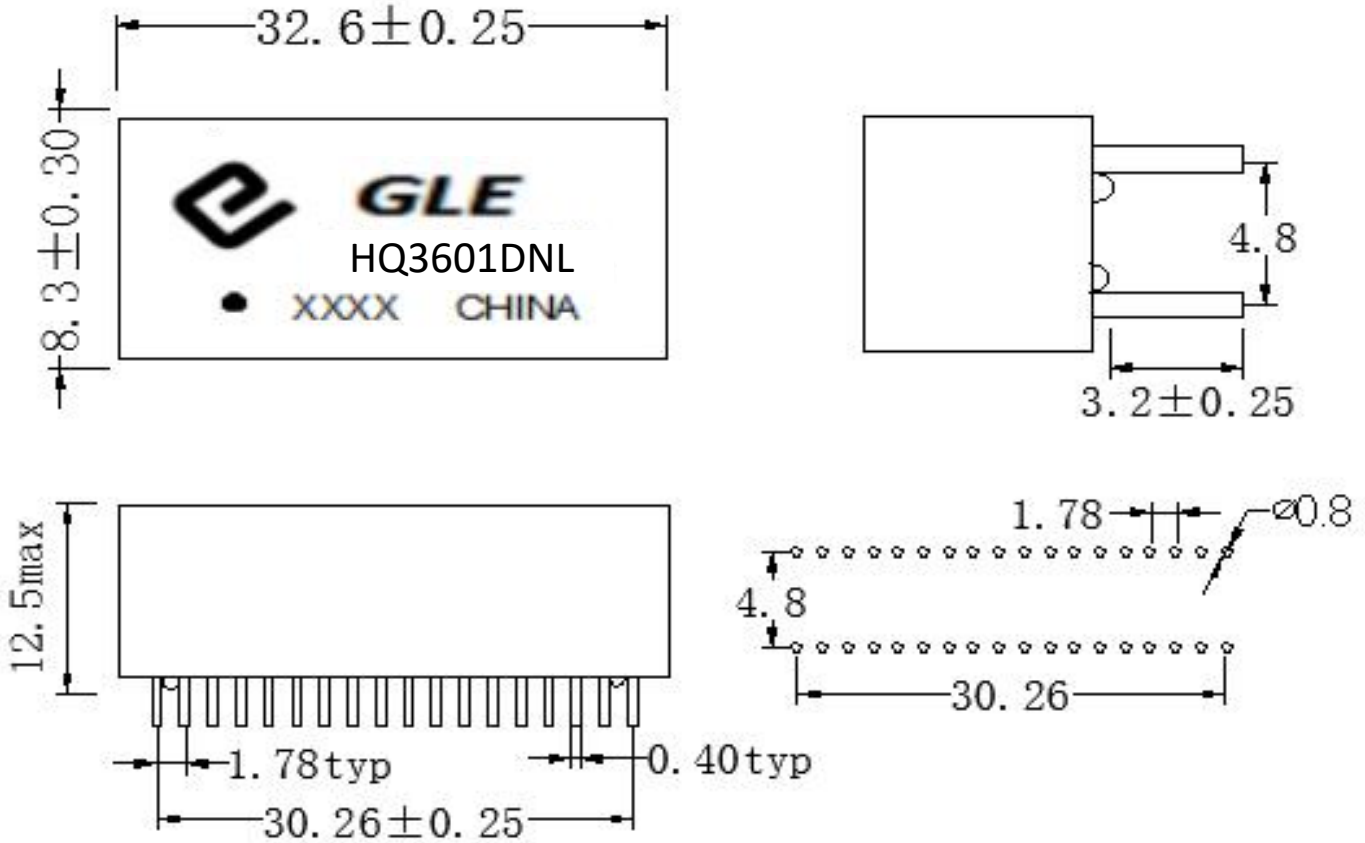
深圳市格莱尔电子有限公司
Shenzhen Glorious Electronic Co., Ltd.

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	2015/7/6

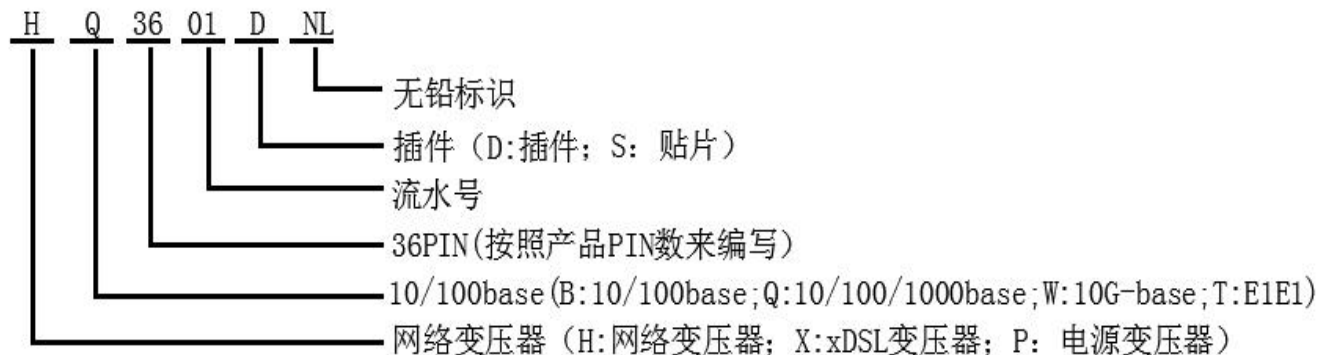


1. 产品外观尺寸(单位mm)

Mechanical:



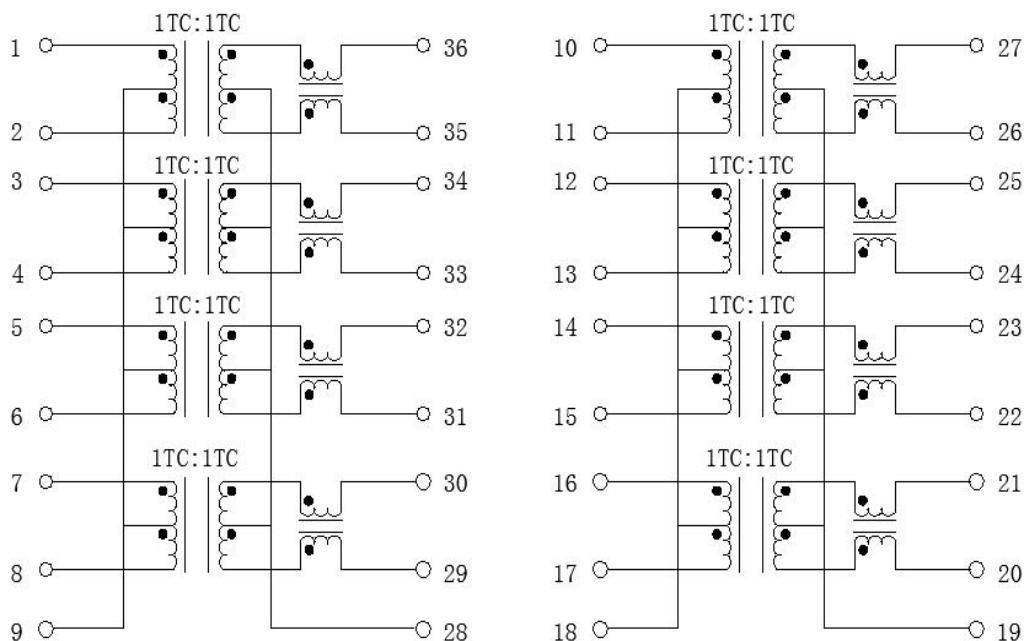
产品编码定义:





2. 线路图

Schematic:



3. 产品电性参数@25°C

Electrical Specification @25°C

Inductance OCL:	350uH Min @ 100KHz	0.2V 8mA DC BIAS
Leakage Inductance:	0.50uH Max @ 100KHz	0.2V
Interwinding Capacitance:	25pF Typ @ 100KHz	0.2V
DC Resistance:	1.2 Ω	Max
Turn Ratio:	1CT:1CT±5%	
Polarity:	1-36,2-35,3-34,4-33,5-32,6-31,7-30,8-30 In-Phase	
Insertion Loss :	0.5-100MHz	1.1dB Max
Return Loss :	0.5-40MHz	18dB Min
	40.1-100MHz	12-20log(f/80)dB Min
Cross Talk:	0.5-40MHz	35dB Min
	40.1-100MHz	33-20log(f/50)dB Min
CMRR:	0.5-100MHz	30dB Min
Isolation HI-POT:	1500VAC	1mA 1S
Operating Temperature:	0°C to 70°C	
Storage Temperature:	-25°C TO +125°C	
Product tape :	Green Product	



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4.SAMPLE TEST DATA

SPEC	1	2	3	4	5
L:(AT 100KHz 0.2V 8mA)					
350uH Min					
1-2	755	745	778	761	700
3-4	658	736	701	714	761
5-6	750	636	721	446	770
7-8	755	744	789	467	767
10-11	751	722	669	718	722
12-13	717	752	742	758	673
14-15	707	733	775	680	762
16-17	821	761	661	717	702
LL:(AT 100KHz 0.2V)					
0.5uH Max					
1-2(36-35 short)	0.21	0.23	0.23	0.22	0.21
3-4(34-33 short)	0.27	0.21	0.24	0.23	0.22
5-6(32-31 short)	0.27	0.24	0.22	0.24	0.26
7-8(30-29 short)	0.24	0.20	0.24	0.20	0.24
10-11(27-26 short)	0.23	0.19	0.23	0.18	0.21
12-13(25-24 short)	0.26	0.23	0.24	0.21	0.23
14-15(23-22short)	0.21	0.24	0.22	0.24	0.25
16-17(21-20 short)	0.23	0.21	0.23	0.22	0.22
Cw/w:(AT 100KHz 0.2V)					
25PF Typ					
1-2 TO 36-25	26.0	20.0	21.0	19.0	18.0
3-4 TO 34-33	20.0	20.0	19.0	24.0	25.0
5-6 TO 32-31	17.0	18.0	16.0	26.0	26.0
7-8 TO 30-29	19.0	18.0	26.0	20.0	19.0
10-11 TO 27-26	20.0	19.0	18.0	19.0	19.0
12-13 TO 25-24	24.0	20.0	23.0	21.0	22.0
14-15 TO 23-22	19.0	18.0	22.0	26.0	18.0
16-17 TO 21-20	17.0	17.0	19.0	20.0	20.0
MAIN TEST EQUIPMENT					
<input type="checkbox"/> CHANGCHUANG CC2670 WITHSTANDING VOLTAGE TESTER					
<input type="checkbox"/> JINKAITAI 3250 AUTOMATIC TRANSFORMER TEST SYSTEM					
<input checked="" type="checkbox"/> TONGHUI TH-2818XB AUTOMATIC TRANSFORMER TEST SYSTEM					
<input type="checkbox"/> RF NETWORK ANALYZERS 8712ET					



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4.SAMPLE TEST DATA

SPEC	1	2	3	4	5
DCR:(AT 25°C)					
1.2Ω Max					
36-35	0.77	0.82	0.83	0.75	0.82
34-33	0.78	0.80	0.83	0.82	0.80
32-31	0.79	0.86	0.80	0.81	0.80
30-29	0.81	0.80	0.82	0.79	0.83
27-26	0.80	0.83	0.81	0.74	0.79
25-24	0.77	0.80	0.79	0.76	0.81
23-22	0.78	0.78	0.79	0.82	0.78
21-20	0.80	0.74	0.80	0.80	0.81
URNS RATIO:					
(1-2):(36-35)=1CT:1CT±5%	OK	OK	OK	OK	OK
(3-4):(34-33)=1CT:1CT±5%	OK	OK	OK	OK	OK
(5-6):(32-31)=1CT:1CT±5%	OK	OK	OK	OK	OK
(7-8):(30-29)=1CT:1CT±5%	OK	OK	OK	OK	OK
(10-11):(27-26)=1CT:1CT±5%	OK	OK	OK	OK	OK
(12-13):(25-24)=1CT:1CT±5%	OK	OK	OK	OK	OK
(14-15):(23-22)=1CT:1CT±5%	OK	OK	OK	OK	OK
(16-17):(21-20)=1CT:1CT±5%	OK	OK	OK	OK	OK
HI-POT:					
AT:1500VAC 1mA 1S					
1-2 TO 36-25	OK	OK	OK	OK	OK
3-4 TO 34-33	OK	OK	OK	OK	OK
5-6 TO 32-31	OK	OK	OK	OK	OK
7-8 TO 30-29	OK	OK	OK	OK	OK
10-11 TO 27-26	OK	OK	OK	OK	OK
12-13 TO 25-24	OK	OK	OK	OK	OK
14-15 TO 23-22	OK	OK	OK	OK	OK
16-17 TO 21-20	OK	OK	OK	OK	OK
MAIN TEST EQUIPMENT					
<input checked="" type="checkbox"/> CHANGCHUANG CC2670 WITHSTANDING VOLTAGE TESTER					
<input type="checkbox"/> JINKAITAI 3250 AUTOMATIC TRANSFORMER TEST SYSTEM					
<input checked="" type="checkbox"/> TONGHUI TH-2818XB AUTOMATIC TRANSFORMER TEST SYSTEM					
<input type="checkbox"/> RF NETWORK ANALYZERS 8712ET					



4.SAMPLE TEST DATA

SPEC	1	2	3	4	5
Insertion Loss:					
0.5-100MHz 1.1dB Max					
TX1(1-2):					
30MHz	0.29	0.31	0.33	0.30	0.34
40MHz	0.49	0.47	0.46	0.45	0.48
50MHz	0.63	0.60	0.61	0.60	0.63
60MHz	0.71	0.71	0.73	0.70	0.73
80MHz	0.78	0.79	0.79	0.78	0.78
100MHz	0.82	0.81	0.82	0.81	0.80
TX2(3-4):					
30MHz	0.34	0.35	0.31	0.29	0.30
40MHz	0.46	0.48	0.47	0.41	0.49
50MHz	0.61	0.61	0.60	0.61	0.63
60MHz	0.73	0.70	0.71	0.73	0.71
80MHz	0.79	0.78	0.79	0.78	0.78
100MHz	0.82	0.81	0.83	0.80	0.84
TX3(5-6):					
30MHz	0.31	0.31	0.33	0.29	0.29
40MHz	0.47	0.47	0.48	0.49	0.45
50MHz	0.61	0.60	0.61	0.63	0.60
60MHz	0.73	0.71	0.73	0.71	0.69
80MHz	0.79	0.79	0.78	0.78	0.76
100MHz	0.80	0.81	0.81	0.82	0.84
TX4(7-8):					
30MHz	0.33	0.27	0.30	0.31	0.29
40MHz	0.47	0.49	0.45	0.46	0.48
50MHz	0.60	0.63	0.60	0.61	0.61
60MHz	0.71	0.71	0.70	0.73	0.73
80MHz	0.79	0.78	0.78	0.79	0.76
100MHz	0.81	0.82	0.81	0.82	0.83
MAIN TEST EQUIPMENT					
<input type="checkbox"/> CHANGCHUANG CC2670 WITHSTANDING VOLTAGE TESTER					
<input type="checkbox"/> JINKAITAI 3250 AUTOMATIC TRANSFORMER TEST SYSTEM					
<input type="checkbox"/> TONGHUI TH-2818XB AUTOMATIC TRANSFORMER TEST SYSTEM					
<input checked="" type="checkbox"/> RF NETWORK ANALYZERS 8712ET					



4.SAMPLE TEST DATA

SPEC	1	2	3	4	5
TX5(10-11):					
30MHz	0.31	0.33	0.32	0.29	0.29
40MHz	0.47	0.46	0.47	0.41	0.48
50MHz	0.61	0.61	0.60	0.61	0.63
60MHz	0.70	0.73	0.73	0.73	0.71
80MHz	0.76	0.77	0.79	0.78	0.78
100MHz	0.81	0.82	0.83	0.80	0.81
TX6(12-13):					
30MHz	0.32	0.31	0.32	0.29	0.31
40MHz	0.48	0.47	0.46	0.49	0.42
50MHz	0.61	0.60	0.61	0.63	0.61
60MHz	0.70	0.72	0.73	0.71	0.73
80MHz	0.78	0.79	0.79	0.78	0.78
100MHz	0.81	0.80	0.82	0.84	0.82
TX7(14-15):					
30MHz	0.34	0.33	0.30	0.34	0.30
40MHz	0.45	0.42	0.47	0.47	0.44
50MHz	0.61	0.61	0.60	0.61	0.63
60MHz	0.73	0.72	0.71	0.70	0.71
80MHz	0.79	0.78	0.79	0.81	0.78
100MHz	0.82	0.80	0.80	0.81	0.85
TX8(16-17):					
30MHz	0.35	0.31	0.34	0.28	0.29
40MHz	0.46	0.47	0.48	0.41	0.49
50MHz	0.61	0.60	0.59	0.61	0.63
60MHz	0.73	0.71	0.70	0.71	0.71
80MHz	0.79	0.79	0.78	0.78	0.79
100MHz	0.83	0.83	0.81	0.80	0.81
Return Loss:					
0.5-40MHz 18dB Min					
0.1-100MHz 12-20log(f/80)dB Min					
MAIN TEST EQUIPMENT					
<input type="checkbox"/> CHANGCHUANG CC2670 WITHSTANDING VOLTAGE TESTER					
<input type="checkbox"/> JINKAITAI 3250 AUTOMATIC TRANSFORMER TEST SYSTEM					
<input type="checkbox"/> TONGHUI TH-2818XB AUTOMATIC TRANSFORMER TEST SYSTEM					
<input checked="" type="checkbox"/> RF NETWORK ANALYZERS 8712ET					



4.SAMPLE TEST DATA

SPEC	1	2	3	4	5
TX1(1-2):					
30MHz	26.6	26.3	27.3	25.3	25.7
40MHz	24.3	25.2	23.2	22.2	22.5
50MHz	23.5	21.4	22.3	21.3	20.5
60MHz	18.3	18.5	18.6	18.2	18.2
80MHz	17.6	16.5	17.6	17.5	16.4
100MHz	14.3	14.5	14.6	14.1	14.1
TX2(3-4):					
30MHz	25.5	26.9	25.1	26.3	25.6
40MHz	23.3	23.3	23.2	23.2	22.5
50MHz	21.3	23.5	21.2	22.3	20.5
60MHz	18.2	18.3	18.5	18.6	18.2
80MHz	16.6	16.6	16.5	16.6	16.3
100MHz	14.4	14.5	14.6	14.3	14.8
TX3(5-6):					
30MHz	26.4	25.3	25.5	25.6	25.9
40MHz	23.3	25.2	23.2	22.6	23.5
50MHz	23.5	21.2	22.3	21.6	21.5
60MHz	18.1	18.5	18.6	18.3	18.5
80MHz	17.6	16.5	17.6	17.5	16.3
100MHz	14.8	14.7	14.6	15.3	14.9
TX4(7-8):					
30MHz	25.1	22.7	24.2	26.9	23.6
40MHz	23.1	21.7	23.6	24.0	22.9
50MHz	21.3	21.1	22.4	21.5	22.6
60MHz	18.5	18.6	18.2	18.7	18.6
80MHz	16.2	16.5	16.6	16.3	17.1
100MHz	17.3	16.4	15.9	15.4	14.4
MAIN TEST EQUIPMENT					
<input type="checkbox"/> CHANGCHUANG CC2670 WITHSTANDING VOLTAGE TESTER					
<input type="checkbox"/> JINKAITAI 3250 AUTOMATIC TRANSFORMER TEST SYSTEM					
<input type="checkbox"/> TONGHUI TH-2818XB AUTOMATIC TRANSFORMER TEST SYSTEM					
<input checked="" type="checkbox"/> RF NETWORK ANALYZERS 8712ET					



4.SAMPLE TEST DATA

SPEC	1	2	3	4	5
TX5(10-11):					
30MHz	25.5	26.5	26.7	26.9	25.4
40MHz	23.3	23.2	22.5	24.3	23.2
50MHz	21.3	22.3	20.5	23.5	21.2
60MHz	18.2	18.6	18.2	18.3	18.5
80MHz	16.9	16.7	16.3	16.6	16.5
100MHz	13.3	14.5	14.5	14.9	14.1
TX6(12-13):					
30MHz	25.6	26.4	25.6	25.5	25.5
40MHz	25.2	24.5	22.6	23.5	23.2
50MHz	21.3	23.4	21.6	21.5	22.3
60MHz	18.5	18.3	18.3	18.5	18.6
80MHz	16.5	17.6	17.5	16.3	17.6
100MHz	14.9	13.9	15.4	14.8	13.7
TX7(14-15):					
30MHz	25.3	26.9	26.3	25.6	27.3
40MHz	22.6	23.3	25.2	23.5	23.2
50MHz	21.3	21.5	21.2	20.5	22.3
60MHz	18.3	18.3	18.5	18.2	18.6
80MHz	17.5	17.6	16.5	16.3	17.6
100MHz	15.5	14.5	14.7	14.5	14.2
TX8(16-17):					
30MHz	25.8	26.9	26.5	26.6	25.3
40MHz	23.3	23.3	23.2	22.5	23.2
50MHz	21.3	22.5	22.3	20.5	21.1
60MHz	18.2	18.7	18.6	18.2	18.5
80MHz	16.6	16.6	16.6	16.3	16.5
100MHz	14.4	14.5	14.5	14.5	14.6
Cross Talk:					
0.5-40MHz	35dB Min				
0.1-100MHz	33-20log(f/50)dB Min				
TX1 TO TX2:					
30MHz	43.3	42.2	42.5	38.8	41.2
60MHz	34.6	36.6	35.3	35.7	36.3
80MHz	33.2	31.3	32.3	32.1	33.5
100MHz	30.8	31.2	30.2	31.9	31.5
MAIN TEST EQUIPMENT					
<input type="checkbox"/> CHANGCHUANG CC2670 WITHSTANDING VOLTAGE TESTER					
<input type="checkbox"/> JINKAITAI 3250 AUTOMATIC TRANSFORMER TEST SYSTEM					
<input type="checkbox"/> TONGHUI TH-2818XB AUTOMATIC TRANSFORMER TEST SYSTEM					
<input checked="" type="checkbox"/> RF NETWORK ANALYZERS 8712ET					

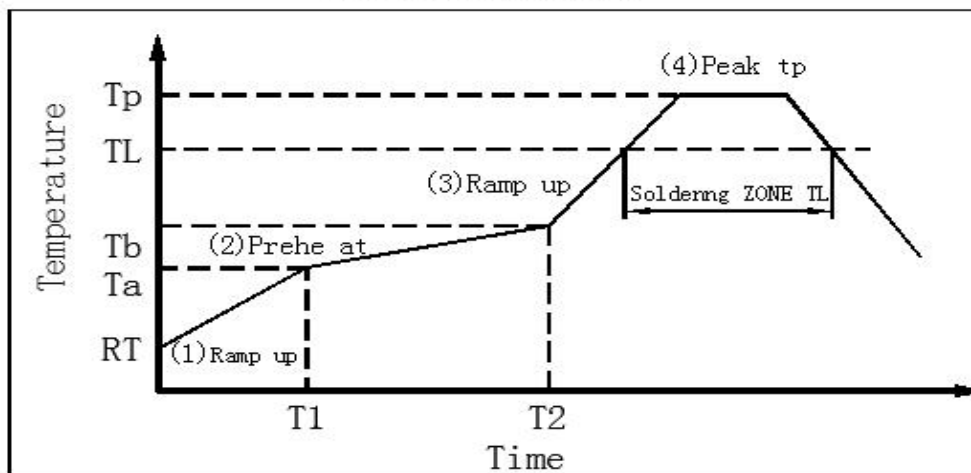


4.SAMPLE TEST DATA

SPEC	1	2	3	4	5
TX2 TO TX3:					
30MHz	41.7	44.5	43.3	42.3	42.3
60MHz	37.6	36.3	36.6	37.6	38.5
80MHz	34.3	33.2	34.2	33.5	34.2
100MHz	32.5	30.9	30.3	30.1	31.2
TX3 TO TX4:					
30MHz	42.3	42.2	43.3	43.3	44.3
60MHz	34.2	36.5	35.6	35.4	34.0
80MHz	32.3	32.3	32.2	33.6	33.9
100MHz	31.5	30.9	31.3	31.2	31.2
TX4 TO TX5:					
30MHz	42.9	43.0	41.3	43.9	44.3
60MHz	35.4	36.2	36.6	34.3	35.2
80MHz	32.1	33.4	32.2	32.6	33.4
100MHz	31.8	30.2	31.0	30.1	31.2
TX5 TO TX6:					
30MHz	41.3	40.3	40.3	42.1	42.3
60MHz	36.4	37.3	36.9	38.6	38.6
80MHz	33.2	32.2	34.1	33.8	33.3
100MHz	30.2	30.8	31.3	30.7	31.6
TX6 TO TX7:					
30MHz	41.6	41.5	43.3	42.6	40.3
60MHz	35.8	36.4	37.3	36.6	35.0
80MHz	32.0	33.3	32.6	33.2	32.3
100MHz	31.0	30.2	30.9	30.1	30.7
TX7 TO TX8:					
30MHz	43.4	41.3	40.6	43.8	42.8
60MHz	35.9	35.6	35.3	36.3	36.0
80MHz	33.2	32.5	32.3	32.4	33.3
100MHz	31.4	29.6	30.5	30.3	31.5
MAIN TEST EQUIPMENT					
<input type="checkbox"/> CHANGCHUANG CC2670 WITHSTANDING VOLTAGE TESTER					
<input type="checkbox"/> JINKAITAI 3250 AUTOMATIC TRANSFORMER TEST SYSTEM					
<input type="checkbox"/> TONGHUI TH-2818XB AUTOMATIC TRANSFORMER TEST SYSTEM					
<input checked="" type="checkbox"/> RF NETWORK ANALYZERS 8712ET					

5. Recommended Reflow Soldering Curve:

IR reflow graph



IR reflow profile

Form-1(Reference JEDEC J-STD-020C Table 5-2)

IR reflow profile		Sn-Pb	PB-ferr
step#	Profile Feature	Condition/Dur ation	Condition/Dur ation
step1	Ramp-up rate	1.5~3°C/sec	1.5~3°C/sec
step2	Preheat:100~150°C (Ta-Tb)	t1-t2:60~120 sec	t1-t2:60~180 sec
step3	Ramp-up rate (TLtoTb)	1.5~3°C/sec	1.5~3°C/sec
	Temp er maintained above183°C (TL)	TL:60-150°C/sec	TL:80-150°C/sec
step4	Peak temper ature (Tp)	230+5/-10°C	260+0/-5°C
	Time within5°C of actual peak te mperature	30±10 sec	30±10 sec
step5	Ramp-down rate	6°C/sec. Max	6°C/sec. Max
Note1	Subject zhe samples to 3 cycles of zhe above defind reflow conditions		Subject zhe samples to 3 cycles of zhe above defind reflow conditions
Note2	Time 25°C to peak temperature:6minutes max		Time 25°C to peak temperature:8minutes max
Note3			The time between reflows shall be 5 minutes minimum

SnPb Eutectic Process-"Package Peak Reflow Temperature"

Form-2(Reference JEDEC J-STD-020C Table 4-1)

产品厚度	产品体积<350mm ³	产品体积≥350mm ³
<2.5mm	240+0/-5°C	225+0/-5°C
≥2.5mm	225+0/-5°C	225+0/-5°C

Pb-free Process-"Package Peak Reflow Temperature"

Form-2(Reference JEDEC J-STD-020C Table 4-1)

产品厚度	产品体积<350mm ³	产品体积350mm ³ -2000mm ³	产品体积>2000mm ³
<1.6mm	260+0/-5°C	260+0/-5°C	260+0/-5°C
1.6mm-2.5mm	260+0/-5°C	250+0/-5°C	245+0/-5°C
>2.5mm	250+0/-5°C	245+0/-5°C	245+0/-5°C



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

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 Speciflcation 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 3.05*1.78*2.06-4700(13Ts)竖放		(鸿强)	NA
2	Wire铜线	0.09mm-QPN180℃		SUNTEK (松田)	E234867
3	Case胶壳	PF2A5-151J(b) UL 94V-0 CP线		(裕达)	E150608
4	Varnish 绝缘油	无卤凡立水 JX1150Y3-2 HF 180℃		(乾坤)	E213437
5	Solder 焊料	SnCu锡铜	/	(亿诚达)	NA
6	Flux 助焊剂	Water solubility 水溶性松香	/	Tongfang (同方)	NA

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