TEST REPORT: RPS-300-15-C

300W Single Output Green Medical Type

■ DESIGN VERIFY TEST

- Output Function Test
- Input Function Test
- Protection Function Test
- Component Stress Test

■ SAFETY & E.M.C. TEST

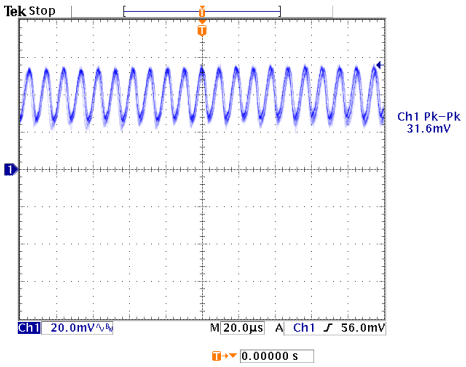
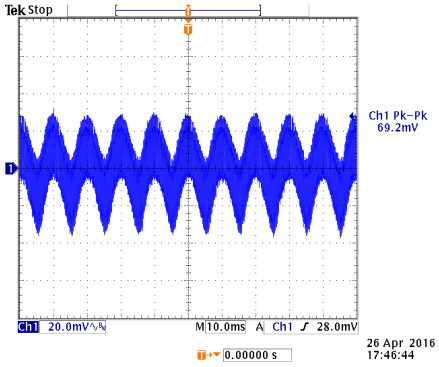
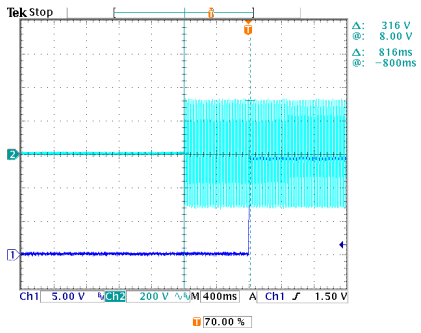
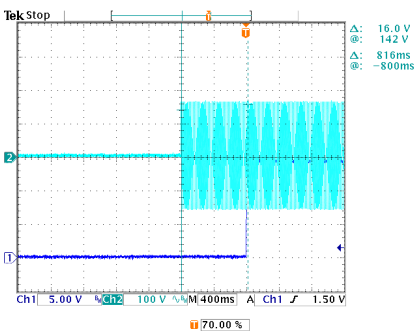
- Safety Test
- E.M.C. Test

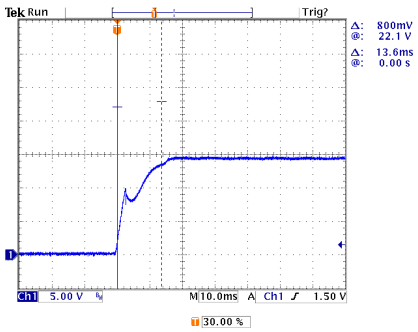
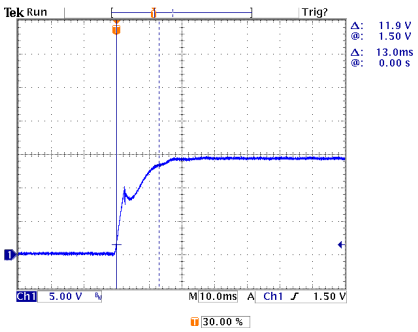
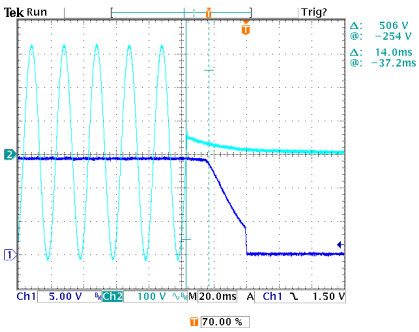
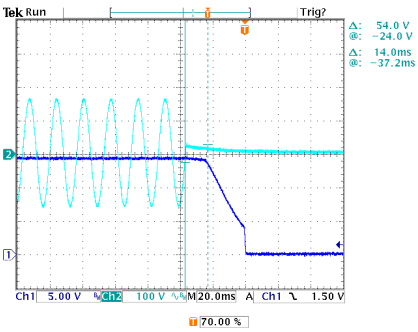
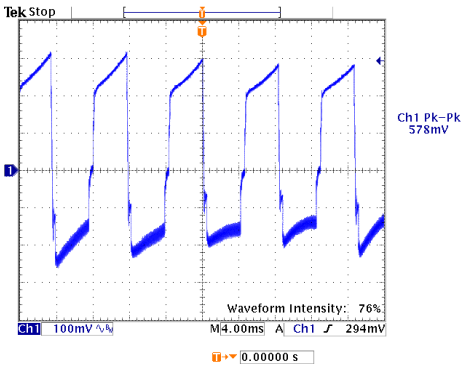
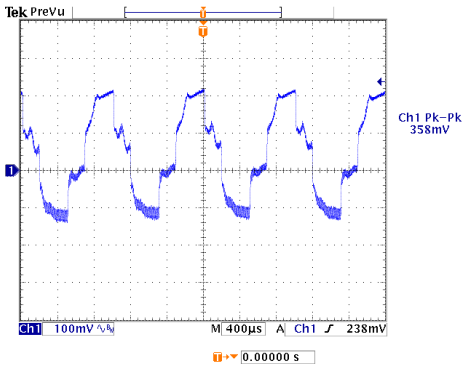
■ RELIABILITY TEST

- ENVIRONMENT TEST

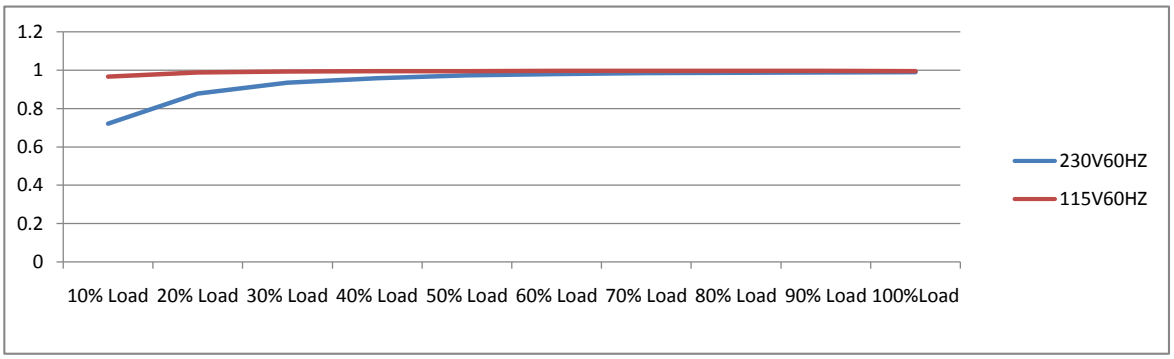
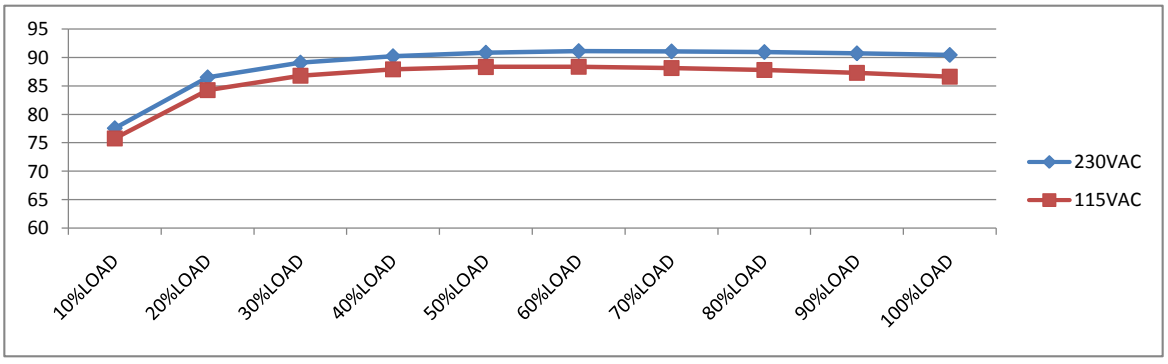
■ DESIGN VERIFY TEST

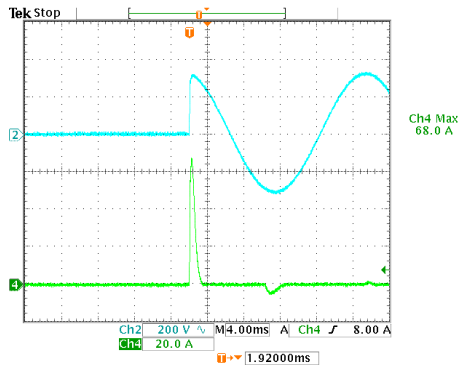
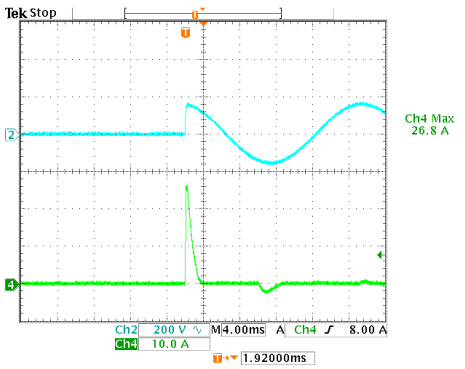
OUTPUT FUNCTION

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 14.25V ~ 15.75V	I/P : 230VAC O/P: MIN LOAD TA : 25℃	CH1: 13.86V ~ 16.36V	PASS
2	OUTPUT VOLTAGE TOLERANCE (Max)	V1 : 3.0% ~ -3.0%	I/P : 115VAC / 264VAC O/P: FULL / MINLOAD TA= 25℃	V1: 0.75% ~ -0.58%	PASS
3	LINE REGULATION (MAX.)	V1 : 0.5% ~ -0.5%	I/P : 115VAC / 264VAC O/P: FULL LOAD TA : 25℃	V1: 0.00% ~ 0.00%	PASS
4	LOAD REGULATION(MAX.)	V1 : 1.0% ~ -1.0%	I/P : 230VAC O/P: MIN LOAD ~ FULL LOAD TA : 25℃	V1: 0.75% ~ -0.58%	PASS
5	OVER/UNDERSHOOT TEST	< ±5%	I/P : 230VAC O/P: FULL LOAD TA : 25℃	TEST< 1.9 %	PASS
6	RIPPLE & NOISE(Max)	V1 : 120 mVp-p	I/P : 230VAC O/P: FULL LOAD TA : 25℃	V1 : 69.2 mVp-p	PASS
	high frequency:		low frequency:		
					
7	SET UP TIME (MAX.)	230VAC : 2500ms 115VAC : 3000ms	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA : 25℃	230VAC : 816ms 115VAC : 816ms	PASS
	INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage		INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage		
					

8	RISE TIME (MAX.)	230VAC : 30ms 115VAC : 30ms	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA : 25℃	230VAC : 13.6ms 115VAC : 13.0ms	PASS
	INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage  		INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage  		
9	HOLD UP TIME (TYP.)	230VAC : 13ms 115VAC : 13ms	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA : 25℃	230VAC : 14.0ms 115VAC : 14.0ms	PASS
	INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage  		INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage  		
10	DYNAMIC LOAD	V1 : 1500 mVp-p	I/P : 230VAC O/P: (1)Full/Min load 50%duty/120HZ (2)Full/Min load 50%duty/1KHZ TA : 25℃	(1). (2). unit:mVp-p V1: 578mv 358mv	PASS
	FULL /MIN LOAD 50%DUTY / 120HZ  		FULL /MIN% LOAD 50%DUTY / 1KHZ  		

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	90VAC ~ 264VAC	I/P : TESTING O/P : FULL LOAD Ta : 25℃	72.6VAC ~ 264VAC	PASS
			I/P : LOW-LINE = 112VAC HIGH-LINE = 300VAC O/P : FULL/MIN LOAD ON:30 Sec ; OFF:30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	TEST : OK	
2	INPUT FREQUENCY RANGE	47HZ ~ 63HZ NO DAMAGE	I/P : 115VAC ~ 264VAC O/P : FULL~MIN LOAD Ta : 25℃	TEST : OK	PASS
3	INPUT CURRENT (TYP.)	1.80A / 230VAC 3.50A / 115VAC	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA : 25℃	I= 1.4616A / 230VAC I= 3.2644A / 115VAC	PASS
4	LEAKAGE CURRENT	< 200uA Earth leakage current	I/P : 264VAC O/P: MIN LOAD TA : 25℃	L-FG 80 uA N-FG 44 uA	PASS
		< 70uA Touch leakage current	I/P : 264VAC O/P: MIN LOAD TA : 25℃	L-V-: 31 uA N-V- 31 uA	
5	NO LOAD POWER CONSUMPTION	< 0.50W	I/P : 230VAC O/P: MIN LOAD TA : 25℃	< 0.384 W	PASS
6	POWER FACTOR (TYP.)	0.93 / 230VAC 0.98 / 115VAC	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA : 25℃	PF= 0.99 / 230VAC PF= 0.9926 / 115VAC	PASS
					
7	EFFICIENCY (TYP.)	90.0%	I/P : 230VAC O/P: FULL LOAD TA : 25℃	90.474 %	PASS
					

8	INRUSH CURRENT (TYP.)	80A / 230VAC 40A / 115VAC COLD START	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA : 25℃	I= 68.0A / 230VAC I= 26.8A / 115VAC	PASS
	INPUT=230VAC/50HZ @ FULL LOAD CH2 : AC Input Voltage CH4 : Input current (1V=1A)		INPUT=115VAC/50HZ @ FULL LOAD CH2 : AC Input Voltage CH4 : Input current (1V=1A)		
					

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	105% ~ 135%	I/P: 264VAC I/P: 230VAC I/P: 115VAC O/P: TESTING TA : 25℃	12.60% 264VAC 123.60% 230VAC 123.60% 115VAC Hiccup Mode	PASS
2	OVER VOLTAGE PROTECTION	16.20V ~ 18.50V	I/P: 264VAC I/P: 230VAC I/P: 90VAC O/P: MIN LOAD TA : 25℃	17.30V 264VAC 17.30V 230VAC 17.30V 90VAC Shut down Re- power ON	PASS
3	OVER TEMPERATURE PROTECTION	Shut down Re- power ON	I/P: 264VAC I/P: 90VAC O/P: FULL LOAD	O.T.P. Active Shut down Re- power ON	PASS
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 264VAC I/P: 90VAC O/P: FULL LOAD Ta: 25℃	NO DAMAGE Hiccup Mode	PASS

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	PWM Power Transistor	Q5 Rated : 600V 19.0A	I/P : 267VAC VDS : O/P : (1)Full Load Turn on (2) Output Short (3)Fulll load continue Ta : 25℃	VIN: 267VAC VDS: (1). 430.00V (2). 460.00V (3). 418.00V	PASS
2	PWM Power Transistor	Q6 Rated : 600V 19.0A	I/P : 267VAC VDS : O/P : (1)Full Load Turn on (2) Output Short (3)Fulll load continue Ta : 25℃	VIN: 267VAC VDS: (1). 434.00V (2). 454.00V (3). 424.00V	PASS
3	O/P MOSFET	Q101 Rated : 75V 80.0A Q102 Rated : 75V 80.0A	I/P : 267VAC VDS : O/P : (1)Full Load Turn on (2) Output Short (3)Fulll load continue Ta : 25℃	Q101 Q102 VDS : VDS : (1). 41.60V 41.80V (2). 11.60V 12.80V (3). 41.40V 41.80V	PASS
4	Input Capacitor	C5 Rated : 150uf 400V	I/P : 267VAC O/P : (1)Full Load Turn on /Off (2)Min load Turn on /Off (3)Full Load /Min load Change (4)Full Load Continue Ta : 25℃	(1). 399.00V (2). 396.00V (3). 399.00V (4). 412.00V	PASS

5	Control IC	U1 Rated： 16V (max) 8.85V (min)	I/P： 267VAC O/P： (1)Full Load (2)Output Short (3)O.L.P (4)O.V.P (5)Low Line No Load Vo(min) Ta： 25℃	U1 (1). 14.20V (2). 14.20V (3). 14.20V (4). 14.20V (5). 13.90V		PASS
6	PFC Power Transistor	Q1 Rated： 600V 17.9A	I/P： 267VAC VDS： O/P： (1)Full Load Turn on (2) Output Short (3)Fulll load continue Ta： 25℃	VIN: 267VAC VDS: (1). 496.00V (2). 584.00V (3). 484.00V		PASS
7	PFC Diode	D10 Rated： 600V 8.0A	I/P： 267VAC O/P： (1)Full Load Turn on (2) Output Short (3)Dynamic Load Full/Min Load 90%Duty/5KHz (4)Dynamic Load Full/Min Load 50%Duty/120Hz Ta： 25℃	267VAC (1). 418.00V (2). 418.00V (3). 416.00V (4). 418.00V		PASS
8	Clamp Diode	D33 Rated： 1000V 1.0A	I/P： 267VAC O/P： (1)Dynamic Load Full/Min Load 90%Duty/1KHz (2)Fulll load continue Ta： 25℃	(1). 350.00V (2). 298.00V		PASS

■SAFETY & E.M.C. TEST

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-O/P： 4.000KVAC /min I/P-FG： 2.000KVAC /min O/P-FG： 1.500KVAC /min	I/P-O/P: 4.400KVAC /min I/P-FG: 2.400KVAC /min O/P-FG: 1.800KVAC /min Ta： 25℃	I/P-O/P: 1.69mA I/P-FG: 1.16mA O/P-FG: 1.43mA NO DAMAGE	PASS
2	ISOLATION RESISTANCE	I/P-O/P： 500VDC>100MΩ I/P-FG： 500VDC>100MΩ O/P-FG： 500VDC>100MΩ	I/P-O/P: 500VDC I/P-FG: 500VDC O/P-FG: 500VDC Ta： 25℃/70%RH	I/P-O/P: 9999MΩ I/P-FG: 9999MΩ O/P-FG: 9999MΩ NO DAMAGE	PASS

E.M.C. TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS A 0	I/P： 230VAC /50HZ O/P： FULL LOAD Ta： 25℃	PASS	PASS
2	CONDUCTION	EN55022 CLASS B	I/P： 230VAC /50HZ O/P： FULL LOAD / 50% LOAD Ta： 25℃	PASS Test by certified Lab	PASS
3	RADIATION	EN55022 CLASS B	I/P： 230VAC /50HZ O/P： FULL LOAD Ta： 25℃	PASS Test by certified Lab	PASS
4	E.S.D	EN61000-4-2 MEDICAL AIR：15KV / Contact：8KV	I/P： 230VAC /50HZ O/P： FULL LOAD Ta： 25℃	CRITERIA A	PASS
5	E.F.T	EN61000-4-4 MEDICAL INPUT： 2KV	I/P： 230VAC /50HZ O/P： FULL LOAD Ta： 25℃	CRITERIA A	PASS
6	SURGE	IEC61000-4-5 MEDICAL L-N:1KV;L/N-PE：2KV	I/P： 230VAC /50HZ O/P： FULL LOAD Ta： 25℃	CRITERIA A	PASS

■RELIABILITY TEST

<table>
<tr><th>NO</th><th>TEST ITEM</th><th>SPECIFICATION</th><th>TEST CONDITION</th><th>RESULT</th><th>VERDICT</th></tr>
<tr><td>1</td><td>TEMPERATURE RISE TEST</td><td>MODEL： RPS-300-12-C
1. ROOM AMBIENT BURN-IN： 1.0hrs
IP: 230VAC O/P: 100% LOAD TA= 32.5℃
2. HIGH AMBIENT BURN-IN： 1.0hrs
IP: 230VAC O/P: 100% LOAD TA= 49.9℃
<table>
<tr><th>NO.</th><th>Position</th><th>ROOM AMBIENT 32.5℃</th><th>HIGH AMBIENT Ta： 49.9℃</th></tr>
<tr><td>1</td><td>BD1</td><td>62.7℃</td><td>70.7℃</td></tr>
<tr><td>2</td><td>ZNR1</td><td>41.6℃</td><td>60.5℃</td></tr>
<tr><td>3</td><td>C1</td><td>39.0℃</td><td>58.1℃</td></tr>
<tr><td>4</td><td>LF2</td><td>40.3℃</td><td>61.1℃</td></tr>
<tr><td>5</td><td>C5</td><td>60.4℃</td><td>82.7℃</td></tr>
<tr><td>6</td><td>Q1</td><td>59.2℃</td><td>77.7℃</td></tr>
<tr><td>7</td><td>L2</td><td>71.6℃</td><td>94.4℃</td></tr>
<tr><td>8</td><td>ZNR2</td><td>59.1℃</td><td>54.9℃</td></tr>
<tr><td>9</td><td>T1</td><td>60.6℃</td><td>81.6℃</td></tr>
<tr><td>10</td><td>C200</td><td>64.0℃</td><td>80.2℃</td></tr>
<tr><td>11</td><td>C105</td><td>61.9℃</td><td>76.8℃</td></tr>
<tr><td>12</td><td>Q101</td><td>58.6℃</td><td>78.1℃</td></tr>
<tr><td>13</td><td>Q5</td><td>81.5℃</td><td>77.9℃</td></tr>
<tr><td>14</td><td>TSW1</td><td>45.9℃</td><td>62.2℃</td></tr>
<tr><td>15</td><td>TSW2</td><td>53.6℃</td><td>70.8℃</td></tr>
<tr><td>16</td><td>U1</td><td>53.4℃</td><td>74.1℃</td></tr>
<tr><td>17</td><td>U103</td><td>57.3℃</td><td>75.0℃</td></tr>
<tr><td>18</td><td>C911</td><td>69.9℃</td><td>84.1℃</td></tr>
<tr><td>19</td><td>T900</td><td>70.5℃</td><td>84.2℃</td></tr>
<tr><td>20</td><td>U903</td><td>80.8℃</td><td>97.2℃</td></tr>
<tr><td>21</td><td>C950</td><td>63.7℃</td><td>81.1℃</td></tr>
<tr><td>22</td><td>C955</td><td>52.6℃</td><td>70.8℃</td></tr>
<tr><td>23</td><td>L1</td><td>45.2℃</td><td>75.1℃</td></tr>
</table></td><td></td><td></td><td>PASS</td></tr>
<tr><td>2</td><td>OVER LOAD BURN-IN TEST</td><td>NO DAMAGE
1 HOUR (MIN)</td><td>I/P： 230VAC
O/P： 112.00% LOAD
Ta： 25℃</td><td>TEST：OK</td><td>PASS</td></tr>
<tr><td>3</td><td>LOW TEMPERATURE TURN ON TEST</td><td>NO DAMAGE
1 HOUR (MIN)</td><td>I/P： 264VAC / 115VAC
O/P： FULL LOAD
Ta： -30.0℃</td><td>TEST：OK</td><td>PASS</td></tr>
<tr><td>4</td><td>HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TEST</td><td>AFTER 12 HOURS
IN CHAMBER ON
CONTROL 50℃
NO DAMAGE</td><td>I/P： 272VAC
O/P： FULL LOAD
Ta： 50℃
HUMIDITY= 95.0% RH</td><td>TEST：OK</td><td>PASS</td></tr>
<tr><td>5</td><td>TEMPERATURE COEFFICIENT</td><td>±0.03% /(0℃~50℃)</td><td>I/P： 230VAC
O/P： FULL LOAD</td><td>±0.0130% /(0℃~50℃)</td><td>PASS</td></tr>
<tr><td>6</td><td>STORAGE TEMPERATURE TEST</td><td>1. Thermal shock Temperature： -40℃ ~ +85℃
2. Temperature change rate ：25℃ / MIN
3. Dwell time low and high temperature ： 30 MIN/EACH
4. Total test cycle：5 CYCLE
5. Input/Output condition： STATIC</td><td></td><td>TEST：OK</td><td>PASS</td></tr>
<tr><td>7</td><td>THERMAL SHOCK TEST</td><td>1. Thermal shock Temperature： -35℃ ~ +55℃
2. Temperature change rate ：25℃ / MIN
3. Dwell time low and high temperature ： 30 MIN/EACH
4. Total test cycle：10 CYCLE
5. Input/Output condition：
230VAC Full Load AC ON/OFF test turn on 58sec；turn off 2sec</td><td></td><td>TEST：OK</td><td>PASS</td></tr>
<tr><td>8</td><td>VIBRATION TEST</td><td>1 Carton & 1 Set
(1) Waveform： Sine Wave
(2) Frequency：10~500Hz
(4) Acceleration： 2G
(5) Test Time： 60 min in each axis (X.Y.Z)
(6) Ta：25℃</td><td></td><td>TEST：OK</td><td>PASS</td></tr>
<tr><td>9</td><td>CAPACITOR LIFE CYCLE</td><td>:SUPPOSE C105 IS THE MOST CRITICAL COMPONENT
(1) I/P： 230VAC O/P：FULL LOAD Ta= 25.0℃ LIFE TIME
(2) I/P： 230VAC O/P：FULL LOAD Ta= 50.0℃ LIFE TIME
(3) I/P： 230VAC O/P：75% LOAD Ta= 50.0℃ LIFE TIME
(4) I/P： 230VAC O/P：50% LOAD Ta= 50.0℃ LIFE TIME</td><td></td><td>(1). 255933.3 HRS
(2). 32876.9 HRS
(3). 74008.2 HRS
(4). 114529.8 HRS</td><td>PASS</td></tr>
<tr><td>10</td><td>MTBF</td><td>Conducted by Parts Stress Analysis Prediction
160K hrs min. MIL-HDBK-217F (25℃)</td><td></td><td></td><td>PASS</td></tr>
<tr><td>11</td><td>DMTBF /Accelerated Life test</td><td>Demonstration Mean Time Between Failure (Expected Life): Above 30000HRS</td><td></td><td>@TA 50℃</td><td>PASS</td></tr>
</table>

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	FRANK	GESG	WANGDZ

2007/3/20 A50-S014