



Test Report: RID-65A

65W Dual Output Switching Power Supply

■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Control Function Test

Component Stress Test

■ SAFETY & E.M.C. TEST

Safety Test

E.M.C. Test

■ RELIABILITY TEST

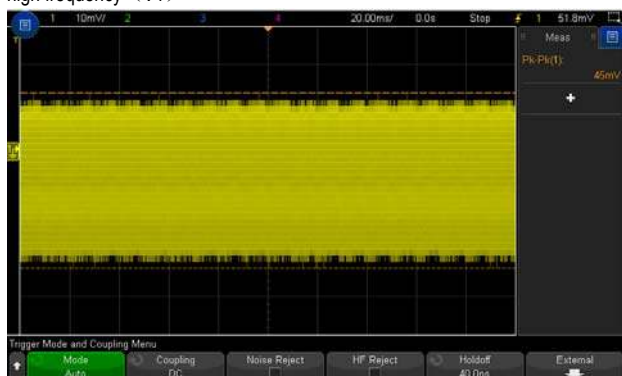
ENVIRONMENT TEST

DESIGN VERIFY TEST

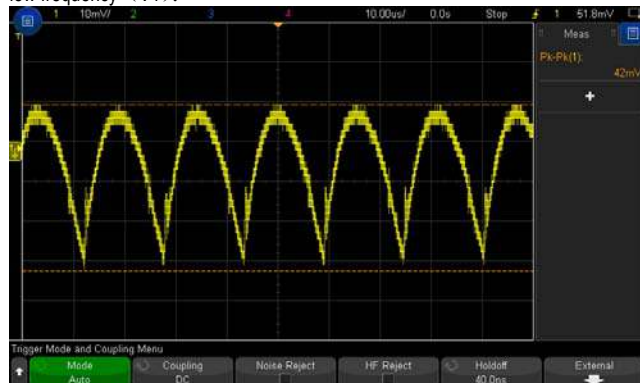
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 4.75V~ 5.5 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	4.62V~5.73V/230VAC 4.62V~5.73V /115VAC
2	OUTPUT VOLTAGE(Max) TOLERANCE	V1: -2%~2 % V2: -8%~8 %	I/P: 88VAC /264VAC O/P:FULL/ MIN. LOAD Ta:25°C	V1: -0.06%~0.06% V2: -0.05%~0.72%
3	LINE REGULATION (Max)	V1: -0.5%~ 0.5% V2: -1.5%~ 1.5%	I/P: 88VAC~ 264VAC O/P:FULL LOAD Ta:25°C	V1: -0.01%~0.01% V2: -0.03%~0.03%
4	LOAD REGULATION(Max)	V1: -0.5%~0.5% V2: -5%~5%	I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: -0.05%~0.06% V2: -0.37%~1.70%
5	OVER/UNDERSHOOT TEST	< ±10%	I/P: 230VAC O/P:FULL LOAD Ta:25°C	1.2%
6	RIPPLE & NOISE(Max)	V1: 80mVp-p V2: 120mVp-p	I/P:230VAC O/P:FULL LOAD Ta:25°C	V1: 45mVp-p V2: 24mVp-p

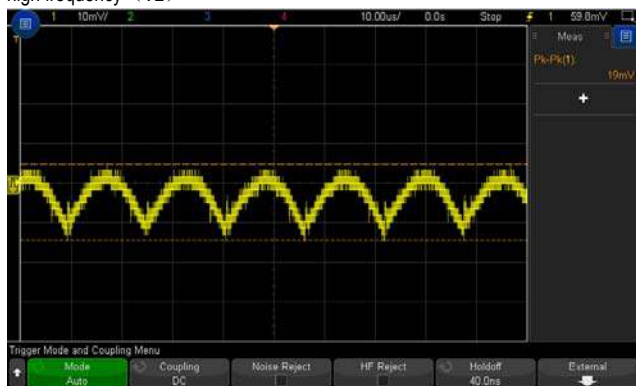
high frequency (V1) :



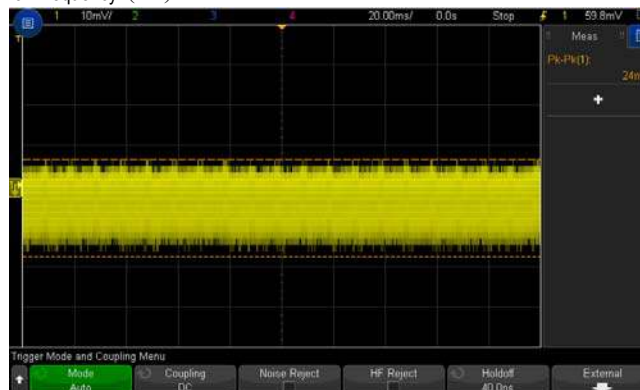
low frequency (V1):



high frequency (V2) :



low frequency (V2) :



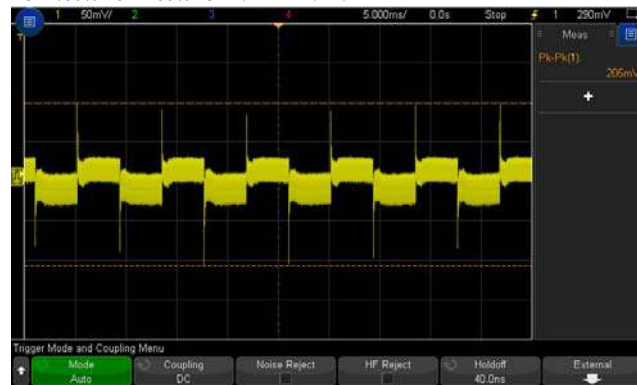
7	SET UP TIME(Max)	230VAC/500ms 115VAC/1200ms	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 138 ms 115VAC/ 182ms
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INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage				
8	RISE TIME (Max)	230VAC/20ms 115VAC/30ms	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/4.17ms 115VAC/7.68ms
INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage				
9	HOLD UP TIME (Typ.)	230VAC/50ms 115VAC/12ms	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 81.8ms 115VAC/ 16.4ms
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: 1000 mVp-p V2: 1200 mVp-p	I/P: 230VAC O/P: (1) FULL /50% LOAD 50%DUTY / 120HZ (2) FULL /50% LOAD 50%DUTY / 1KHZ Ta:25°C	(1) V1: 211mVp-p V2: 519mVp-p (2) 205mVp-p 183mVp-p

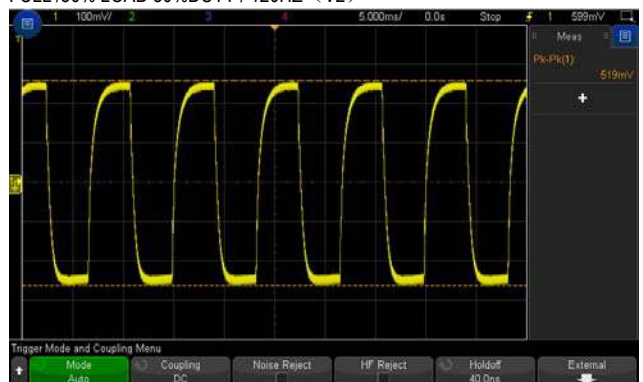
FULL /50% LOAD 50%DUTY / 120HZ (V1)



FULL /50% LOAD 50%DUTY / 1KHZ (V1)



FULL /50% LOAD 50%DUTY / 120HZ (V2)

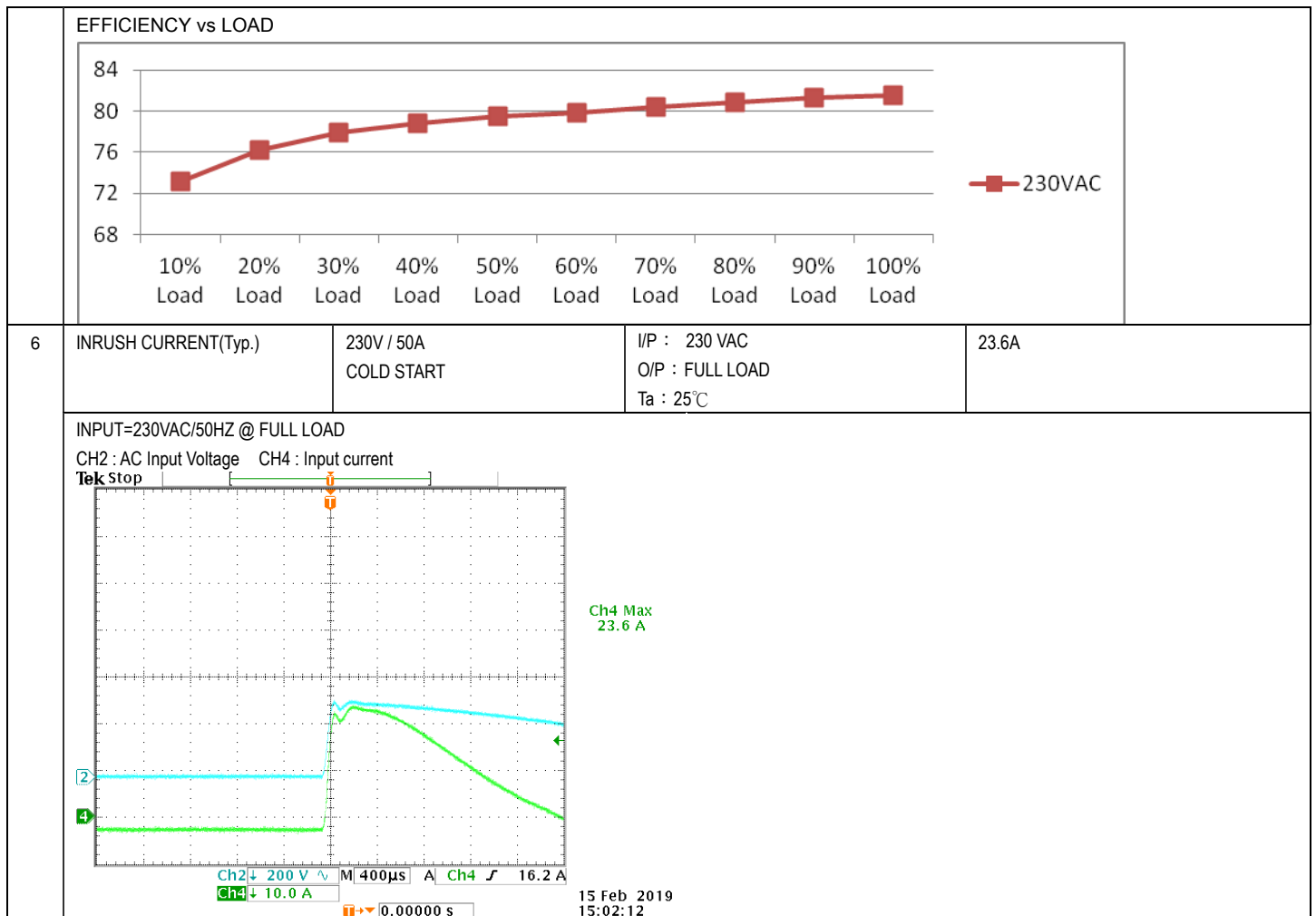


FULL /50% LOAD 50%DUTY / 1KHZ (V2)



INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	88VAC~264VAC	I/P:TESTING O/P:FULL LOAD Ta:25℃	74V~264V
			I/P: LOW-LINE-3V=85 V HIGH-LINE+15%=300 V O/P:FULL/MIN LOAD (PLEASE CHECK DERATING CURVE) ON: 30 Sec OFF: 30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	TEST: OK
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P:88 VAC ~264 VAC O/P:FULL~MIN LOAD Ta:25℃	TEST: OK
3	INPUT CURRENT (Typ.)	230V/ 1.2A 115V/ 2A	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25℃	I =0.64A/ 230VAC I =1.03A/ 115VAC
4	LEAKAGE CURRENT	<2 mA / 240 VAC	I/P : 240 VAC O/P : Min LOAD Ta : 25℃	0.3 mA
5	EFFICIENCY(Typ.)	80%	I/P:230 VAC O/P:FULL LOAD Ta:25℃	81.5%



PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	110%~150%	I/P: 264VAC I/P: 230VAC I/P: 115VAC O/P: TESTING Ta: 25°C	118.1%/ 264VAC 123.6%/ 230VAC 121.5%/115VAC PROTECTION TYPE : Hiccup mode, recovers automatically after fault condition is removed
2	OVER VOLTAGE PROTECTION	5.75V~6.75V	I/P: 264VAC I/P: 230VAC I/P: 88VAC O/P: MIN LOAD Ta: 25°C	5.94V/ 264VAC 5.94V/ 230VAC 5.94V/ 88VAC PROTECTION TYPE : Hiccup mode, recovers automatically after fault condition is removed
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 264VAC I/P: 88VAC O/P: FULL LOAD Ta: 25°C	NO DAMAGE PROTECTION TYPE : Hiccup mode, recovers automatically after fault condition is removed

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated : 600 V	AC ON/OFF I/P: High-Line +3V =267V VDS: O/P: (1) Full Load (2) Output Short (3) Full Load Continue Ta: 25°C	VDS: (1) 544V (2) 572V (3) 536V
2	O/P Diode	D50 Rated : 200 V D55 Rated : 40 V	AC ON/OFF I/P: High-Line +3V =267 V O/P: (1) Full Load (2) Output Short (3) Full Load Continue Ta: 25°C	D50 D55 (1) 36.7V (2) 34.3V (3) 36.3V
3	Input Capacitor Voltage	C5 Rated : 150 μ / 400 V	I/P: High-Line +3V =267V O/P: (1) Full Load input on/off (2) Min load input on /Off (3) Full Load /Min load Change (4) Full load continue Ta: 25°C	(1) 387V (2) 371V (3) 371V (4) 371V
4	Control IC Voltage Test	U1 Rated : 7.2V~ 16 V	AC ON/OFF I/P: High-Line +3V =267 V O/P(1) FULL LOAD (2) Output Short (3) O.L.P (4) O.V.P. (5) NO LOAD VRmin (LOW LINE) Ta: 25°C	(1) 12.7V (2) 12.7V (3) 12.7V (4) 12.7V (5) 9.4V
5	Clamp Diode Peak Voltage	D1 Rated : 600 V	AC ON/OFF I/P : High-Line +3V = 267 V O/P : (1) Dynamic Load 90%Duty/1KHz (2) Full load continue Ta : 25°C	(1) 544V (2) 540V

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 3KVAC/min I/P-FG: 2 KVAC/min O/P-FG: 0.5KVAC/min	I/P-O/P: 3.6 KVAC/min I/P- FG: 2.4 KVAC/min O/P - FG: 0.6 KVAC/min Ta: 25°C	I/P-O/P: 6.14mA I/P-FG: 8.35mA O/P-FG: 4.61mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P: 500VDC > 100M Ω I/P- FG: 500VDC > 100M Ω O/P- FG: 500VDC > 100M Ω	I/P-O/P: 600 VDC I/P- FG: 600 VDC Ta: 25°C	I/P-O/P: 9999M Ω I/P-FG: 9999M Ω O/P-FG: 9999M Ω NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 m Ω	40 A / 2min Ta: 25°C / 70%RH	5 m Ω

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS A	I/P:230VAC/50HZ O/P:FULL LOAD Ta:25°C	☒ PASS ☐ FAIL
2	CONDUCTION	EN55032 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab
3	RADIATION	EN55032 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab
4	E.S.D	EN61000-4-2 INDUSTRY AIR: 8KV / Contact: 4KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
5	E.F.T	EN61000-4-4 INDUSTRY INPUT : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
6	SURGE	IEC61000-4-5 INDUSTRY L-N : 2KV L/N-PE : 4KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
7	Test by certified Lab & Test Report Prepare Any contradictions of the test results, please refer to the latest EMC test report.			

RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																																																				
1	TEMPERATURE RISE TEST	MODEL : RD-65A 1. ROOM AMBIENT BURN-IN : 1.5 HRS I/P : 230VAC O/P : FULL LOAD Ta= 23.2 °C 2. HIGH AMBIENT BURN-IN : 1.5 HRS I/P : 230VAC O/P : FULL LOAD Ta= 45.6 °C																																																																						
		<table><tr><th>NO</th><th>Position</th><th>ROOM AMBIENT Ta= 23.2 °C</th><th>HIGH AMBIENT Ta=45.6 °C</th></tr><tr><td>1</td><td>BD1</td><td>55.0°C</td><td>78.8°C</td></tr><tr><td>2</td><td>C5</td><td>53.5°C</td><td>76.1°C</td></tr><tr><td>3</td><td>Q1</td><td>73.2°C</td><td>96.9°C</td></tr><tr><td>4</td><td>U1</td><td>73.4°C</td><td>94.9°C</td></tr><tr><td>5</td><td>D1</td><td>79.1°C</td><td>100.2°C</td></tr><tr><td>6</td><td>T1coil</td><td>99.8°C</td><td>108.9°C</td></tr><tr><td>7</td><td>T1core</td><td>84.8°C</td><td>106.8°C</td></tr><tr><td>8</td><td>D55</td><td>72.8°C</td><td>90.5°C</td></tr><tr><td>9</td><td>D50</td><td>81.0°C</td><td>103.4°C</td></tr><tr><td>10</td><td>C56</td><td>66.9°C</td><td>87.0°C</td></tr><tr><td>11</td><td>D53</td><td>71.3°C</td><td>91.1°C</td></tr><tr><td>12</td><td>D51</td><td>74.1°C</td><td>94.0°C</td></tr><tr><td>13</td><td>LF1</td><td>50.1°C</td><td>73.1°C</td></tr><tr><td>14</td><td>R56</td><td>75.9°C</td><td>96.9°C</td></tr><tr><td>15</td><td>R57</td><td>77.8°C</td><td>98.3°C</td></tr><tr><td>16</td><td>RTH1</td><td>78.6°C</td><td>95.5°C</td></tr></table>			NO	Position	ROOM AMBIENT Ta= 23.2 °C	HIGH AMBIENT Ta=45.6 °C	1	BD1	55.0°C	78.8°C	2	C5	53.5°C	76.1°C	3	Q1	73.2°C	96.9°C	4	U1	73.4°C	94.9°C	5	D1	79.1°C	100.2°C	6	T1coil	99.8°C	108.9°C	7	T1core	84.8°C	106.8°C	8	D55	72.8°C	90.5°C	9	D50	81.0°C	103.4°C	10	C56	66.9°C	87.0°C	11	D53	71.3°C	91.1°C	12	D51	74.1°C	94.0°C	13	LF1	50.1°C	73.1°C	14	R56	75.9°C	96.9°C	15	R57	77.8°C	98.3°C	16	RTH1	78.6°C	95.5°C
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230 VAC O/P : 129% LOAD Ta : 25℃	TEST : OK
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 264VAC/115VAC O/P : 100 % LOAD Ta= -25℃	TEST : OK
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL45℃ /95 %R.H NO DAMAGE	I/P : 272 VAC O/P : FULL LOAD Ta=45 ℃ HUMIDITY= 95 %R.H	TEST : OK
5	TEMPERATURE COEFFICIENT	± 0.03%/℃ (0~50℃)	I/P : 230 VAC O/P : FULL LOAD	± 0.0067%/℃ (0~50℃)
6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -45℃~ +90℃ 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 : STATIC		TEST : OK
7	THERMAL SHOCK TEST	1. Thermal shock Temperature : -30℃~ +50℃ 2. Temperature change rate : 25℃ / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 16 CYCLE 5. Input/Output condition : 15cycle:230V/ FULL LOAD AC ON 3sec/AC OFF 1sec TEST 1cycle:230V/ FULL LOAD Burn In Test		TEST : OK
8	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 10min/sweep cycle (4) Acceleration : 5G (5) Test Time : 180min in each axis (X.Y.Z) (6) Ta : 25℃		TEST : OK
9	CAPACITOR LIFE CYCLE	SUPPOSE C56 IS THE MOST CRITICAL COMPONENT (1) I/P : 230VAC O/P : FULL LOAD Ta= 25 ℃ LIFE TIME (2) I/P : 230VAC O/P : FULL LOAD Ta=45 ℃ LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta=45 ℃ LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta= 45 ℃ LIFE TIME		(1) 131104.2HRS (2) 38441.7HRS (3) 77872 HRS (4) 141212.5HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 265.9K hrs min. MIL-HDBK-217F (25℃)		
11	Ongoing Reliability Test	I/P : 230VAC O/P : FULL LOAD TA=50℃ Demonstration Mean Time Between Failure : 30,000 hours		

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	LIUTT		Wangdz

2018.4.30 GP-A50-F010