



Test Report: RD-50A

50W 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

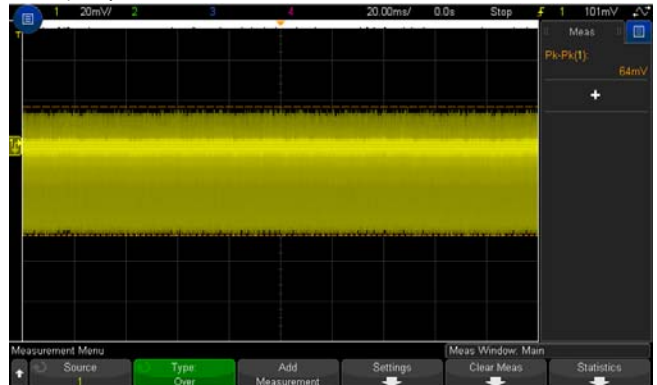
OUTPUT FUNCTION TEST

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,.50V~5.80V /230VAC 4,.50V~5.80V/115VAC
2	OUTPUT VOLTAGE(Max) TOLERANCE	V1 : -2%~2 % V2 : -7%~7%	I/P: 88VAC /264VAC O/P:FULL/ MIN. LOAD Ta:25°C	V1 : -0.06%~0.06% V2 : -0.72%~1.88%
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 : -0.05%~0.74%
4	LOAD REGULATION(Max)	V1: -0.5%~0.5% V2: -3%~3%	I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25°C	V1 : -0.06%~0.06% V2 : -0.72%~1.88%
5	OVER/UNDERSHOOT TEST	< ±10%	I/P: 230VAC O/P:FULL LOAD Ta:25°C	5.2%
6	RIPPLE & NOISE(Max)	V1: 80mVp-p V2: 120mVp-p	I/P:230VAC O/P:FULL LOAD Ta:25°C	V1: 64mVp-p V2: 69mVp-p

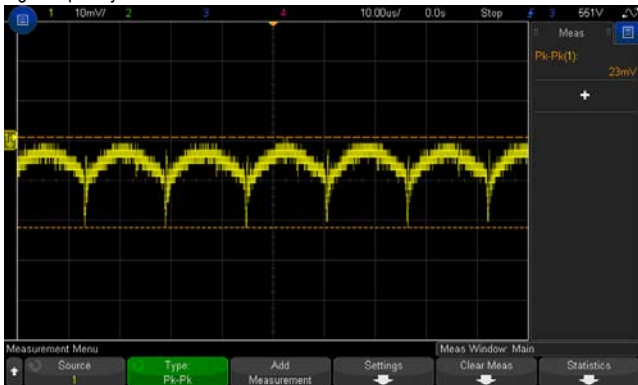
high frequency (V1) :



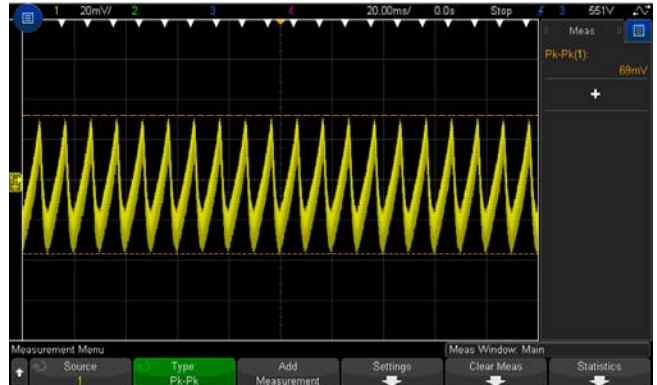
low frequency (V1) :



high frequency (V2) :

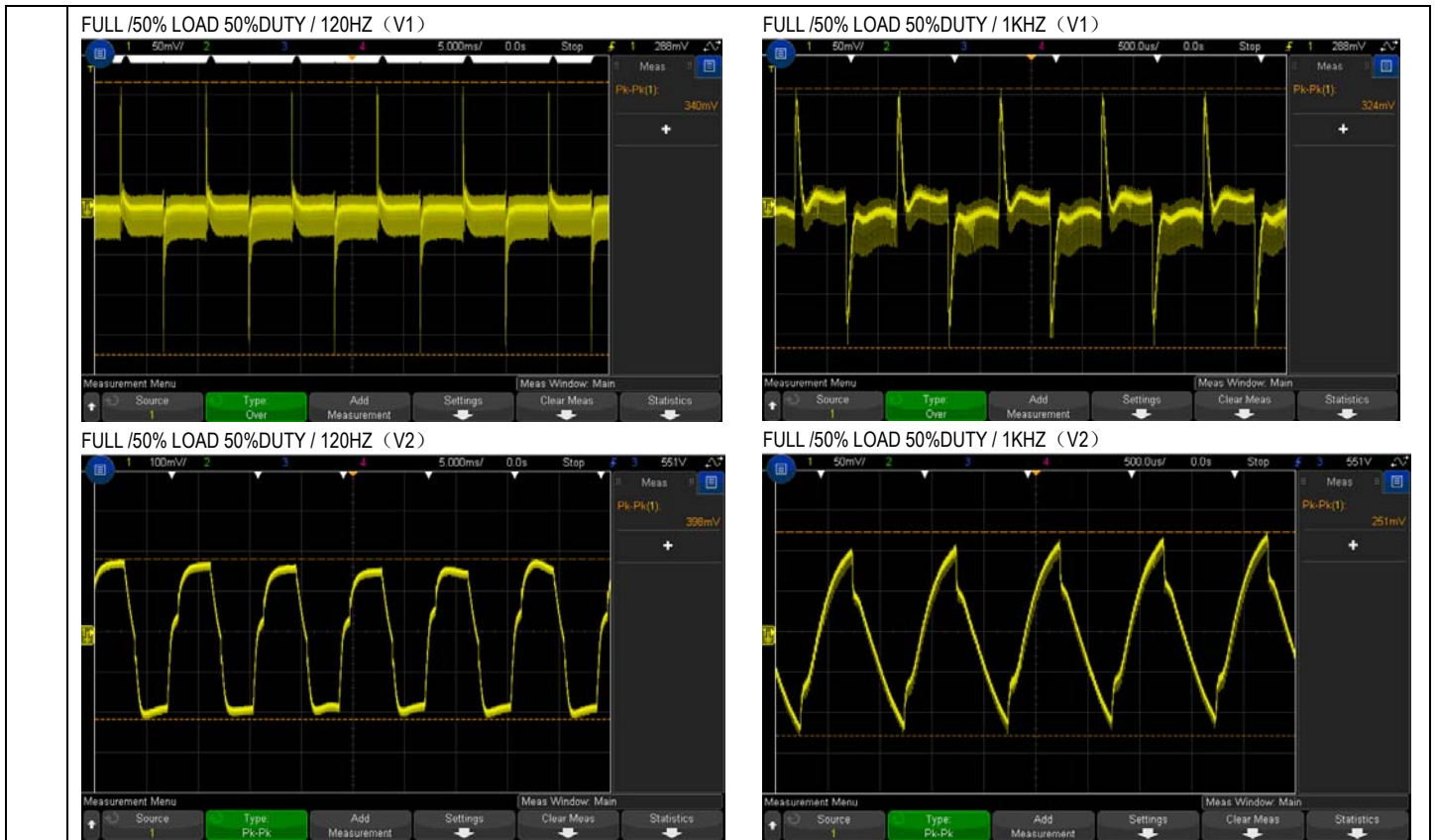


low frequency (V2) :



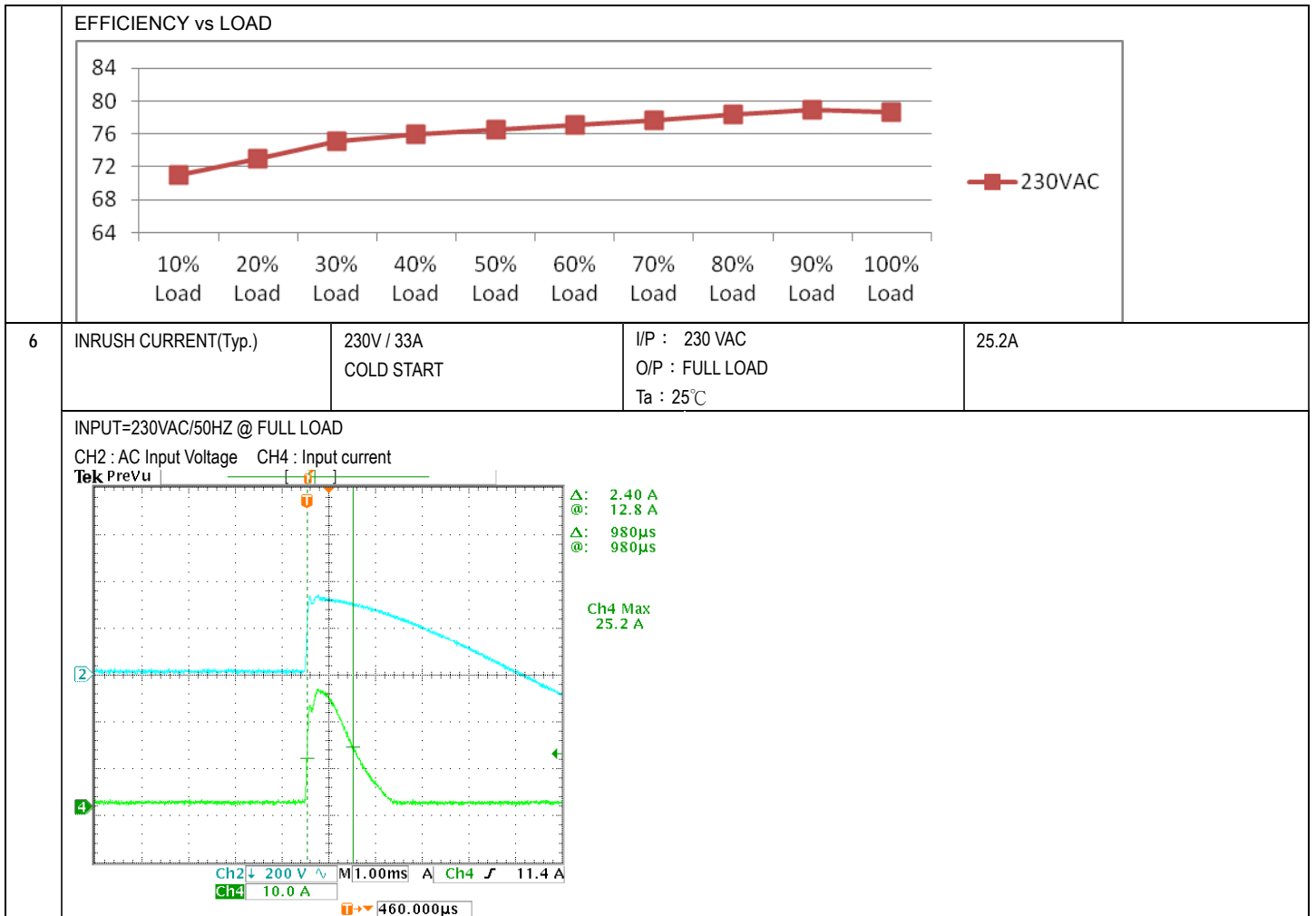
7	SET UP TIME(Max)	230VAC/500ms 115VAC/1200ms	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 168 ms 115VAC/ 115.8ms
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	<p>INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage</p>	<p>INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage</p>	
<p>8 RISE TIME (Max)</p>	<p>230VAC/20ms 115VAC/30ms</p>	<p>I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C</p>	<p>230VAC/10.22ms 115VAC/11.39ms</p>
	<p>INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage</p>		<p>INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage</p>
<p>9 HOLD UP TIME (Typ.)</p>	<p>230VAC/60ms 115VAC/10ms</p>	<p>I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C</p>	<p>230VAC/ 62.4ms 115VAC/ 10.6ms</p>
	<p>INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage</p>		<p>INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage</p>
<p>10 DYNAMIC LOAD</p>	<p>V1: 1000 mVp-p V2: 1200 mVp-p</p>	<p>I/P: 230VAC O/P: (1)FULL /50% LOAD 50%DUTY / 120HZ (2)FULL /50% LOAD 50%DUTY / 1KHZ Ta:25°C</p>	<p>(1) (2) V1: 340mVp-p 324mVp-p V2: 398mVp-p 251mVp-p</p>



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°C	78V~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°C	TEST: OK
3	INPUT CURRENT (Typ.)	230V/ 0.8A 115V/1.3A	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I =0.49A/ 230VAC I =0.91A/ 115VAC
4	LEAKAGE CURRENT	<2 mA / 240 VAC	I/P : 240 VAC O/P : Min LOAD Ta : 25°C	0.5mA
5	EFFICIENCY(Typ.)	78%	I/P:230 VAC O/P:FULL LOAD Ta:25°C	78.6%



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	136.9% / 264VAC 140.3% / 230VAC 134.7% / 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	6.22V / 264VAC 6.22V / 230VAC 6.22V / 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) 581V (2) 581V (3) 560V
2	O/P Diode	D50 Rated : 60 V D55 Rated : 45 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) 47.6V (1) 37.1V (2) 39.9V (2) 31.1V (3) 46.0V (3) 36.3V
3	Input Capacitor Voltage	C5 Rated :100 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) 383V (2) 367V (3) 367V (4) 363 V
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) 12.8V (2) 12.8V (3) 12.8V (4) 12.8V (5) 12.8V
5	Clamp Diode Peak Voltage	D1 Rated :1000 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) 552V (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:3.17mA I/P-FG:1.73mA O/P-FG:1.07mA 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	6 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	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> 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 <input type="checkbox"/> LIGHT INDUSTRY AIR: 8KV / Contact: 4KV <input checked="" type="checkbox"/> 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 <input checked="" type="checkbox"/> 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-50A 1. ROOM AMBIENT BURN-IN : 1.5 HRS I/P : 230VAC O/P : FULL LOAD Ta= 29.1 °C 2. HIGH AMBIENT BURN-IN : 1.5 HRS I/P : 230VAC O/P : FULL LOAD Ta= 45.5 °C																																																														
				<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 29.1 °C</th> <th>HIGH AMBIENT Ta=45.5 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>BD1</td><td>76.7°C</td><td>93.0°C</td></tr> <tr><td>2</td><td>C5</td><td>57.6°C</td><td>74.1°C</td></tr> <tr><td>3</td><td>Q1</td><td>100.6°C</td><td>116.6°C</td></tr> <tr><td>4</td><td>D1</td><td>99.3°C</td><td>114.8°C</td></tr> <tr><td>5</td><td>T1</td><td>95.4°C</td><td>112.8°C</td></tr> <tr><td>6</td><td>D50</td><td>84.4°C</td><td>100.5°C</td></tr> <tr><td>7</td><td>D55</td><td>94.3°C</td><td>111.1°C</td></tr> <tr><td>8</td><td>C53</td><td>77.2°C</td><td>93.0°C</td></tr> <tr><td>9</td><td>R5</td><td>107.8°C</td><td>119.8°C</td></tr> <tr><td>10</td><td>C56</td><td>77.8°C</td><td>93.8°C</td></tr> <tr><td>11</td><td>LF1</td><td>65.1°C</td><td>81.2°C</td></tr> <tr><td>12</td><td>U1</td><td>64.9°C</td><td>81.0°C</td></tr> <tr><td>13</td><td>D3</td><td>69.2°C</td><td>86.1°C</td></tr> <tr><td>14</td><td>D4</td><td>58.5°C</td><td>74.7°C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta= 29.1 °C	HIGH AMBIENT Ta=45.5 °C	1	BD1	76.7°C	93.0°C	2	C5	57.6°C	74.1°C	3	Q1	100.6°C	116.6°C	4	D1	99.3°C	114.8°C	5	T1	95.4°C	112.8°C	6	D50	84.4°C	100.5°C	7	D55	94.3°C	111.1°C	8	C53	77.2°C	93.0°C	9	R5	107.8°C	119.8°C	10	C56	77.8°C	93.8°C	11	LF1	65.1°C	81.2°C	12	U1	64.9°C	81.0°C	13	D3	69.2°C	86.1°C	14	D4	58.5°C	74.7°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°C	TEST : OK
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 264VAC/115VAC O/P : 100 % LOAD Ta= -25°C	TEST : OK
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL45°C /95 %R.H NO DAMAGE	I/P : 272 VAC O/P : FULL LOAD Ta=45 °C HUMIDITY= 95 %R.H	TEST : OK
5	TEMPERATURE COEFFICIENT	± 0.03%/°C (0~50°C)	I/P : 230 VAC O/P : FULL LOAD	± 0.0034%/°C (0~50°C)
6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -45°C~ +90°C 2. Temperature change rate : 25°C / 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°C~ +50°C 2. Temperature change rate : 25°C / 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°C		TEST : OK
9	CAPACITOR LIFE CYCLE	SUPPOSE C62 IS THE MOST CRITICAL COMPONENT (1) I/P : 230VAC O/P : FULL LOAD Ta= 25 °C LIFE TIME (2) I/P : 230VAC O/P : FULL LOAD Ta=45 °C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta=45 °C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta= 45 °C LIFE TIME		(1) 83259.9HRS (2) 21400.2HRS (3) 47334.5 HRS (4) 85591.6HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 172.6K hrs min. MIL-HDBK-217F (25°C)		
11	Ongoing Reliability Test	I/P : 230VAC O/P : FULL LOAD TA=50°C Demonstration Mean Time Between Failure : 30,000 hours		

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	LIUTT		Wangdz

2018.4.30 GP-A50-F010