



Test Report: LRS-1200-48

1200W Low Profile Economical Enclosed Type 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

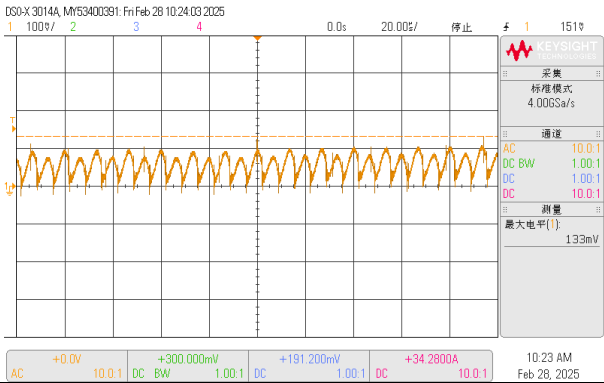
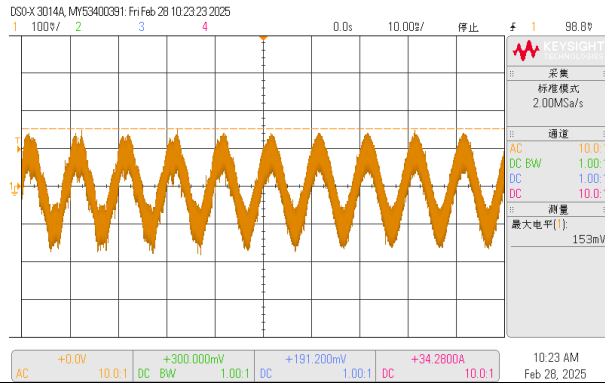
E.M.C. Test

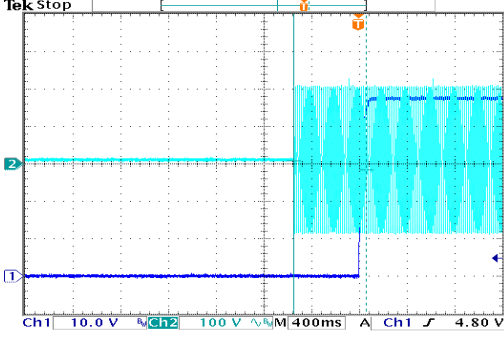
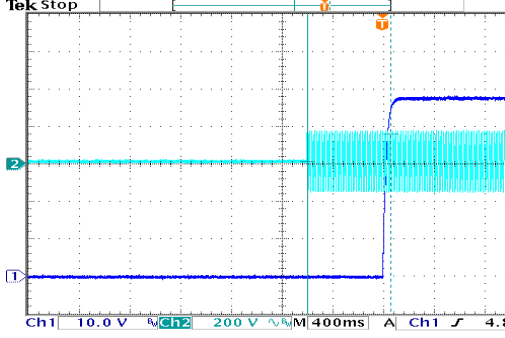
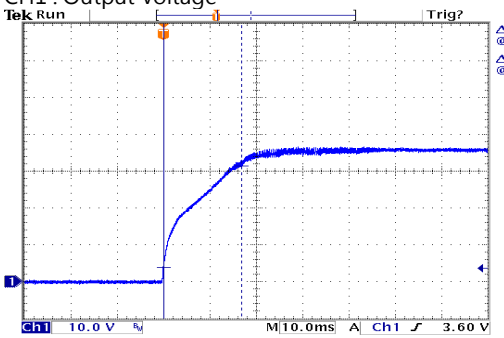
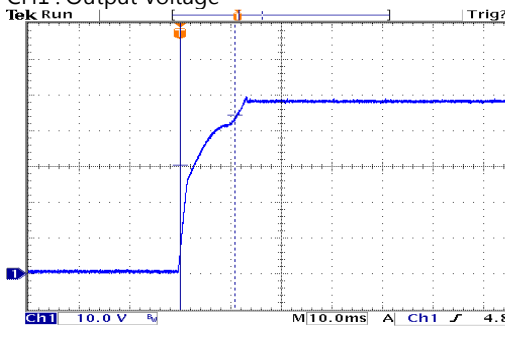
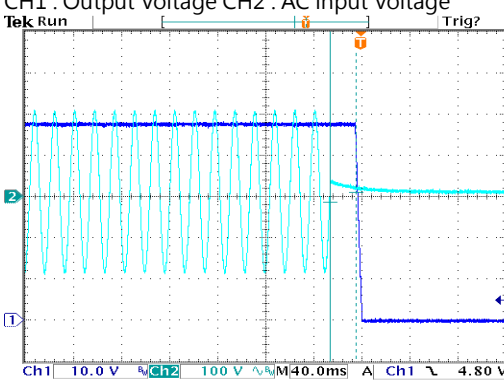
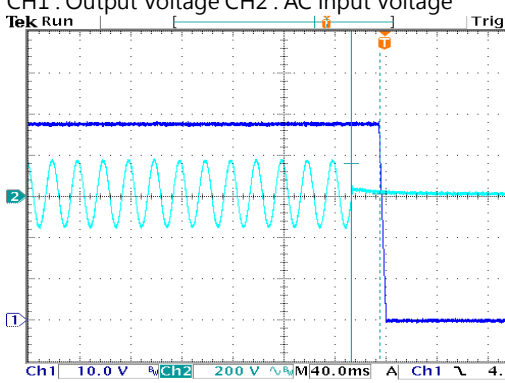
■ RELIABILITY TEST

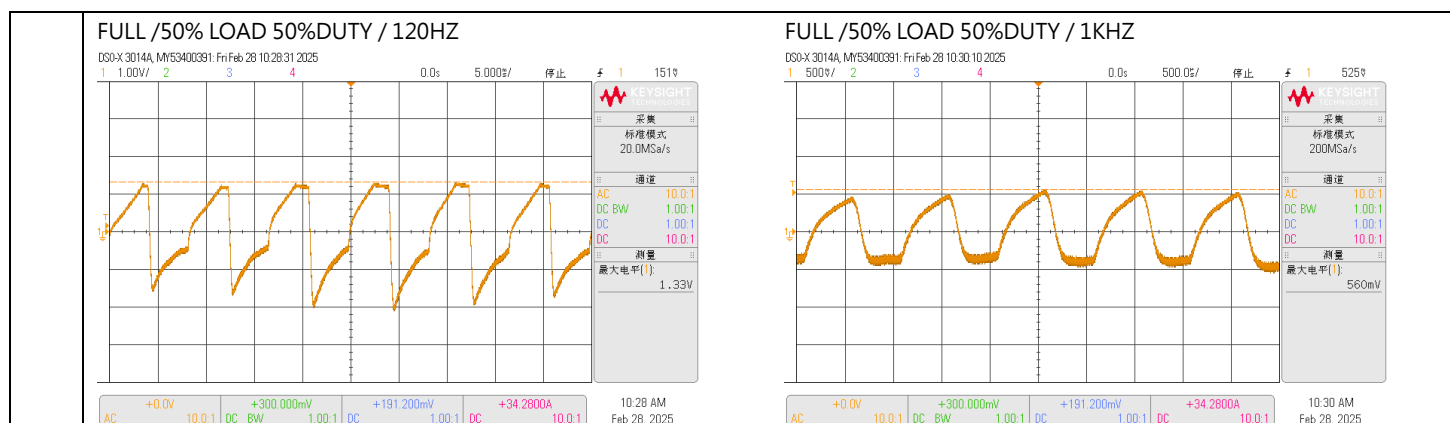
ENVIRONMENT TEST

DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

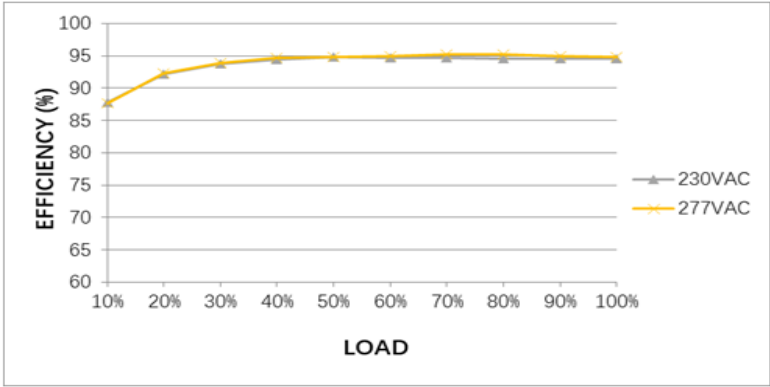
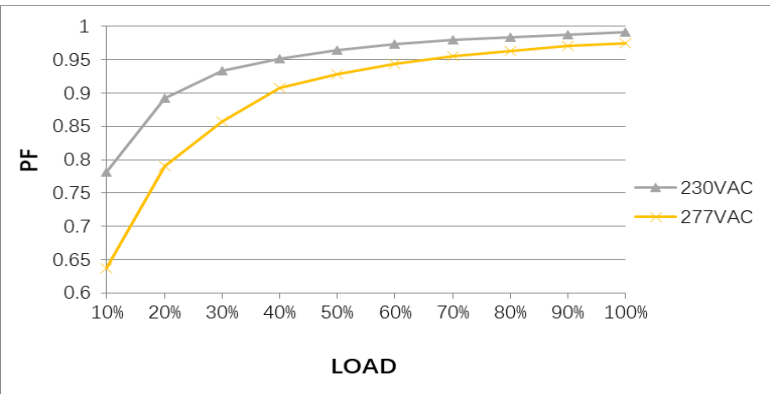
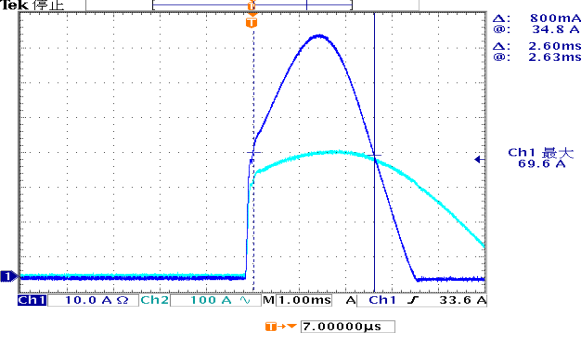
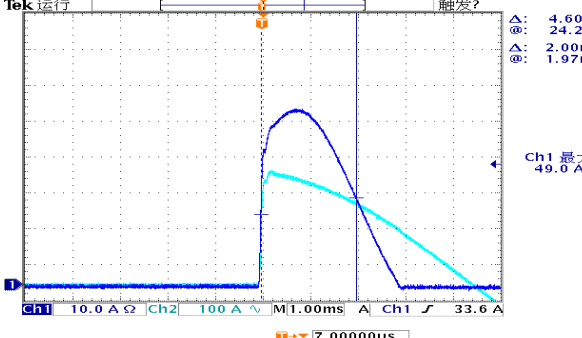
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 48V~56V	I/P : 230 VAC O/P : MIN LOAD Ta : 25°C	45.99V~57.06V/230VAC
2	OUTPUT VOLTAGE TOLERANCE	V1: 1.0%~ -1.0%	I/P: 180VAC /305VAC O/P:FULL/ MIN. LOAD Ta:25°C	V1: 0.08%~0.29%
3	LINE REGULATION	V1: 0.5%~- 0.5%	I/P: 180VAC~ 305VAC O/P:FULL LOAD Ta:25°C	V1:-0.18%~ 0.15%
4	LOAD REGULATION	V1: 0.5%~- 0.5%	I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: 0.15%~ 0.12%
5	OVER/UNDERSHOOT TEST	< ± 5%	I/P: 230VAC O/P:FULL LOAD Ta:25°C	3.44%
6	RIPPLE & NOISE (Max)	V1:360mVp-p	I/P: 230 VAC O/P: MIN LOAD—FULL LOAD Ta:25°C	V1: 153mVp-p / 100% load
high frequency :  low frequency : 				
7	SET UP TIME(Max)	277VAC/1500ms 230VAC/1500ms	I/P : 277VAC I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	277VAC/ 608ms 230VAC/ 656ms
INPUT=277VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage			INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage	

				
8	RISE TIME (Max)	277VAC/70ms 230VAC/70ms	I/P : 277VAC I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	277VAC/ 16.8ms 230VAC/10.8 ms
	INPUT=277VAC/60HZ @ FULL LOAD CH1 : Output Voltage		INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage	
				
9	HOLD UP TIME (Typ.)	277VAC/10ms 230VAC/10ms	I/P : 277VAC I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	277VAC/ 21.6ms 230VAC/ 22.4ms
	INPUT=277VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage		INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage	
				
10	DYNAMIC LOAD	V1: 4800mVp-p	I/P: 230VAC O/P: (1)FULL /50% LOAD 50%DUTY / 120HZ (2)FULL /50% LOAD 50%DUTY / 1KHZ Ta:25°C	1330mVp-p 560mVp-p



INPUT FUNCTION TEST

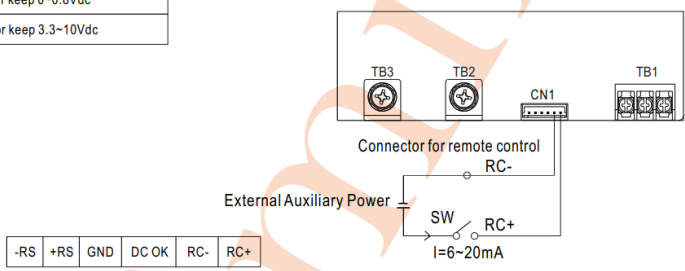
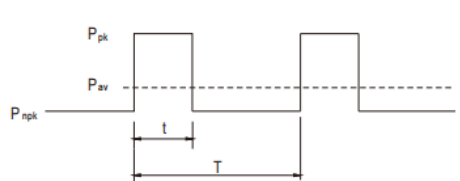
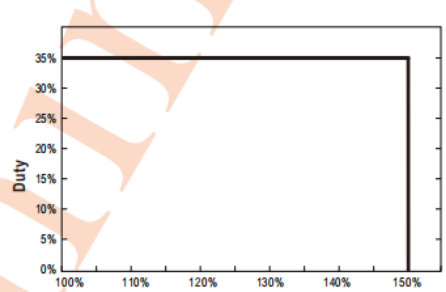
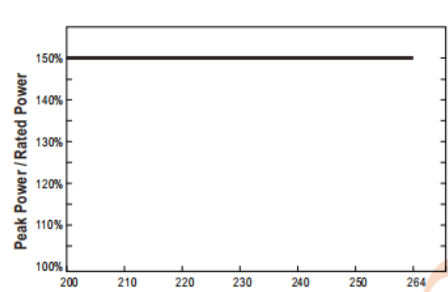
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	180VAC~305VAC 255VDC~ 431VDC	(1) I/P:TESTING O/P:FULL LOAD (2) I/P:DC TESTING(L:+ N:-) O/P: FULL / 50% LOAD (3) I/P:DC TESTING(L:- N:+) O/P: FULL / 50% LOAD Ta:25°C I/P: LOW-LINE-3V=177 V HIGH-LINE+10V=315V O/P:FULL/MIN LOAD (PLEASE CHECK DERATING CURVE) ON: 30 Sec OFF: 30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	(1) 177 V~308V (2) 255Vdc~431Vdc/FULL LOAD 255Vdc~431Vdc/50% LOAD (3) 255Vdc~431Vdc/FULL LOAD 255Vdc~431Vdc/50% LOAD TEST:OK
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P:180 VAC ~305 VAC O/P:FULL~MIN LOAD Ta:25°C	TEST: OK
3	INPUT CURRENT (Typ.)	277V/5A 230V/7A	I/P : 277VAC I/P : 230VAC O/P : FULL LOAD Ta : 25°C	I =4.71A/ 277VAC I =5.6A/ 230VAC
4	LEAKAGE CURRENT	< 2mA / 277VAC < 7.07mA (Peak)/ 277 VAC < 2mA / 240 VAC < 7.07mA (Peak)/ 240 VAC	I/P : 277 VAC I/P : 240 VAC O/P : Min LOAD Ta : 25°C	277VAC: L-FG : 0.363 mA N-FG : 0.354mA L-FG : 0.707mA(Peak) N-FG : 0.694mA(Peak) 240VAC: L-FG : 0.212 mA N-FG : 0.205 mA L-FG : 0.385mA(Peak) N-FG : 0.400 mA(Peak)

5	EFFICIENCY(Typ.)	94%	I/P:230 VAC O/P:FULL LOAD Ta:25°C	94.58%
	EFFICIENCY vs LOAD 			
6	POWER FACTOR(TYP)	0.95/230 VAC 0.93/277 VAC	I/P: 230 VAC/277VAC O/P:FULL LOAD Ta:25°C	PF= 0.991/230V PF= 0.975/277V
	P.F vs LOAD 			
7	INRUSH CURRENT(Typ.)	277V/75A 230V/60A COLD START	I/P : 277VAC I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	I =69.6A/ 277VAC T50=2600us/277V I =49A/ 230VAC T50=2000us/230V
	INPUT=277VAC/50HZ @ FULL LOAD CH2 : AC Input Voltage CH1 : Input current  INPUT=230VAC/50HZ @ FULL LOAD CH2 : AC Input Voltage CH1 : Input current 			

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	Protection type : 1、Output power >105% rated for more than 5 seconds then shut down o/p voltage, re-power on to recover 2、Constant current limiting for output power >150% rated for more than 5 seconds and then shut down o/p voltage, re-power on to recover	I/P: 305VAC I/P: 230VAC I/P: 180VAC O/P:TESTING Ta:25°C	107.3%/ 305VAC 107.2%/ 230VAC 107.3%/180VAC Protection type : 1、Output power >105% rated for more than 5 seconds then shut down o/p voltage, re-power on to recover 2、Constant current limiting for output power >150% rated for more than 5 seconds and then shut down o/p voltage, re-power on to recover
2	OVER VOLTAGE PROTECTION	57V~67V	I/P: 305VAC I/P: 230VAC I/P: 180VAC O/P:MIN LOAD Ta:25°C	67.6V/ 305VAC 67.6V/ 230VAC 67.6V/ 180VAC Protection type : Shut down o/p voltage, re-power on to recover
3	OVER TEMPERATURE PROTECTION	NO DAMAGE	I/P: 305VAC I/P: 180VAC O/P:FULL LOAD	O.T.P. Active Protection type : Shut down o/p voltage, re-power on to recover

CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT												
1	REMOTE CONTROL	2. Remote Control The PSU can be turned ON/OFF by using the "Remote Control" function with external switch and auxiliary power. <table><tr><td>PSU Vo status</td><td>Between RC-(pin5) and RC+(pin6)</td></tr><tr><td>Power ON</td><td>SW open or keep 0~0.8Vdc</td></tr><tr><td>Power OFF</td><td>SW short or keep 3.3~10Vdc</td></tr></table>  I/P: 230 VAC O/P:FULL LOAD Ta:25°C Test Result : <table><tr><td>Between ON/OFF</td><td>Power Output Status</td></tr><tr><td>SW OFF (0~0.8V)</td><td>ON</td></tr><tr><td>SW ON (3.3~10V)</td><td>OFF</td></tr></table>	PSU Vo status	Between RC-(pin5) and RC+(pin6)	Power ON	SW open or keep 0~0.8Vdc	Power OFF	SW short or keep 3.3~10Vdc	Between ON/OFF	Power Output Status	SW OFF (0~0.8V)	ON	SW ON (3.3~10V)	OFF		
PSU Vo status	Between RC-(pin5) and RC+(pin6)															
Power ON	SW open or keep 0~0.8Vdc															
Power OFF	SW short or keep 3.3~10Vdc															
Between ON/OFF	Power Output Status															
SW OFF (0~0.8V)	ON															
SW ON (3.3~10V)	OFF															
2	PEAK POWER	4. Peak Power $P_{av} = \frac{P_{pk} \times t + P_{npg} \times (T-t)}{T} \leq P_{rated}$$Duty = \frac{t}{T} \times 100\% \leq 35\%$$t \leq 5 \text{ sec}$   P_{av}: Average output power (W) P_{pk}: Peak output power (W) P_{npg}: Non-peak output power (W) P_{rated}: Rated output power (W) t: Peak power width(sec) T: Period(sec) I/P: 200/305 VAC O/P:PEAK LOAD (1Hour NO DAMAGE) Ta:25°C Test Result: OK														

3	REMOTE SENSE	S+ / S- Compensate voltage drop on the load wiring up to 0.3V.	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	> 0.3 V
4	DC_OK Signal	1. PSU ON 3.3V~5.6V 2. PSU OFF 0V~1V	I/P:230VAC O/P:FULL LOAD Ta:25°C	TEST : OK
5	FAN NOISE(Typ.)	Built-in intelligent fan speed control detect by PSU'S internal temperature		
		10% load with Ta=25°C	45dB	
		70% load with Ta=25°C	53dB	
		I/P:230VAC O/P:10%Load/70%Load Ta:25°C TEST : 44.76dB/10%load 47.24dB/70%load		

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor (D to S) or (C to E) Peak Voltage	Q 4 Rated 41A/600V	AC ON/OFF I/P:High-Line +3V =308V VDS: O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. I/P:Low-Line -3V = 177V O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. Ta:25°C	VDS: (1) 526V (2) 534V (3) 526V (4) 522V (5) 526V (6) 522V (7) 534V VDS: (1) 538V (2) 566V (3) 530V (4) 534V (5) 526V (6) 538V (7) 482V

2	P.F.C Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated 41A/600V	I/P:High-Line +3V =308 V AC ON/OFF O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. I/P:Low-Line -3V =177V AC ON/OFF O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. Ta:25°C	VDS: (1) 522V (2) 486V (3) 522V (4) 526V (5) 522V (6) 526V (7) 478V VDS: (1) 522V (2) 530V (3) 526V (4) 522V (5) 526V (6) 526V (7) 482V
3	P.F.C DIODE	D3 Rated 10A/650V	I/P:High-Line +3V =308 V AC ON/OFF O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (4)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz I/P:Low-Line -3V = 177V AC ON/OFF O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (4)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz Ta:25°C	(1) 444V (2) 452V (3) 448V (4) 448V (1) 452V (2) 460V (3) 460V (4) 452V

4	Diode Peak Voltage	Q100 Rated 88A/ 150 V Q104 Rated 88A/ 150 V	AC ON/OFF I/P:High-Line +3V =308V O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. (8).NO LOAD Ta:25°C	Q100: VDS: (1) 138.1V (2) 136.5V (3) 140V (4) 139.2V (5) 139.2V (6) 135.2V (7) 131.2V (8) 126.4V Q104: VDS: (1) 141.3V (2) 135.7V (3) 139.7V (4) 141.3V (5) 134.9V (6) 138.1V (7) 136.5V (8) 126.4V
5	Input Capacitor Voltage	C5 Rated: 330u/450V Surge voltage:500V	I/P:High-Line +3V =308V 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)444V (2)452V (3)464V (4) 448V
6	Control IC Voltage Test	PWM IC U2 Rated 8.9 V~ 15.5 V PFC IC U1 Rated -0.3V~ 26V O/P IC U102 Rated 3V~ 32V AUX IC U300 Rated 0V~50V	AC ON/OFF I/P:High-Line +3V =308 V O/P(1)Full Load (2) Output Short (3)O.L.P (4)O.V.P. (5)No Load VR min (Low Line) Ta:25°C	U2 (1) 13.6V (2) 13.52V (3) 13.60V (4) 13.36V (5) 13.36V U1 (1)13.6V (2)13.52V (3)13.60V (4)13.36V (5)13.36V

				U102 (1) 10.83V (2) 10.79V (3) 10.79V (4) 10.71V (5)10.71V U300 (1)13.6V (2)13.52V (3)13.60V (4)13.36V (5)13.36V
7	TOP SWITCHING STAND BY POWER	U300 Rated 1A/730V	AC ON/OFF I/P:High-Line +3V =308V O/P: (1)Full Load (2)Remote On/Off I/P:Low-Line -3V =177 V O/P: (1)Full Load (2)Remote On/Off Ta:25°C	(1) 518V (2) 542V (1) 518V (2) 546V

■ SAFETY& E.M.C. TEST

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 4.2 K VAC/min I/P-FG : 2.1 K VAC/min O/P-FG: 1.25 KVAC/min	I/P-O/P: 4.62 KVAC/min I/P-FG: 2.52 KVAC/min O/P-FG: 1.5 KVAC/min Ta:25°C	I/P - O/P: mA I / P - F G : mA O / P - F G : m A NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P: 500 VDC>100MΩ I / P - F G : 500 VDC>100MΩ O/P-FG: 500 VDC >100MΩ	I/P-O/P: 500 VDC I / P - F G : 500 VDC O/P-FG: 500 VDC Ta:25°C	I/P - O/P: MΩ I / P - F G : MΩ O / P - F G : MΩ NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25°C	13mΩ

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2	I/P:230VAC/50HZ O/P:FULL LOAD Ta:25°C	PASS
2	CONDUCTION	EN55032 CLASS A	I/P : 230 VAC (50HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab
3	RADIATION	EN55032 CLASS A	I/P : 230 VAC (50HZ) O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab
4	E.S.D	EN61000-4-2 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 : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
6	SURGE	EN61000-6-2 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 : LRS-1200-48 1. ROOM AMBIENT BURN-IN : 2HRS I/P : 230VAC O/P : FULL LOAD Ta= 30.9°C 2. HIGH AMBIENT BURN-IN : 2HRS I/P : 230VAC O/P : FULL LOAD Ta= 51.8°C																																																																																																																																		
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230 VAC O/P : 111.6 % LOAD Ta : 25°C	TEST : OK
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 305VAC/200VAC O/P : 100 % LOAD Ta= -35 °C	TEST : OK
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50 °C/95 %R.H NO DAMAGE	I/P : 315 VAC O/P : FULL LOAD Ta= 50 °C HUMIDITY= 95 %R.H	TEST : OK
5	TEMPERATURE COEFFICIENT	±0.03 %/°C(0~30°C)	I/P : 230 VAC O/P : FULL LOAD	± 0.014 %/°C(0~30°C)
6	STORAGE TEMPERATURE TEST	-40~85°C	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	
7	THERMAL SHOCK TEST	-30~50°C	1. Thermal shock Temperature : -35°C~ +55°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	
8	VIBRATION TEST	10 ~ 500Hz, 3G 10min./1cycle, 60min. each along X, Y, Z axes	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 10min/sweep cycle (4) Acceleration : 4G (5) Test Time : 180min in each axis (X.Y.Z) (6) Ta : 25°C	
9	CAPACITOR LIFE CYCLE	SUPPOSE C106 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=50 °C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta=50 °C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta=50 °C LIFE TIME	(1) 1245604HRS (2) 229544HRS (3) 337782HRS (4) 426485HRS	
10	MTBF	Conducted by Parts Stress Analysis Prediction 924.6K hrs min. Telcordia SR-332 (Bellcore) ; 93.2K 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	WUWQIN/ZHOUBIAO	WENF	WUWQ

2020.10.1 TAG-QA-009