Test Report: NSP-750-27

750W AC/DC High Reliable Multi-Industries Encolsed 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

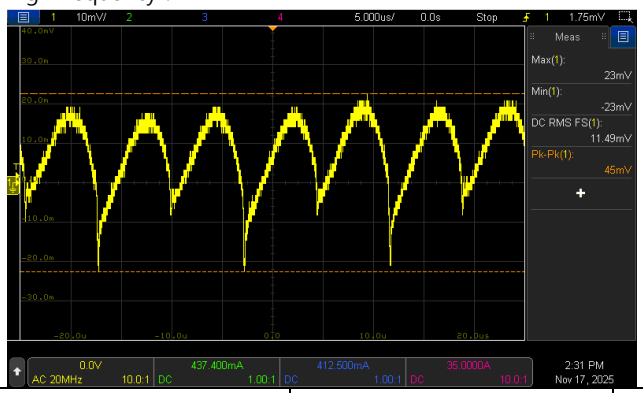
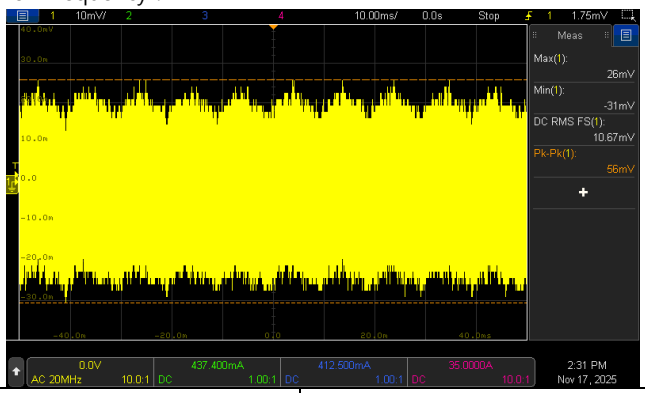
Safety Test
E.M.C. Test

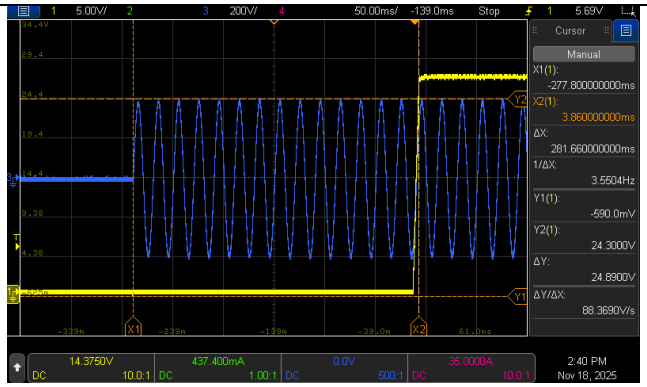
■ RELIABILITY TEST

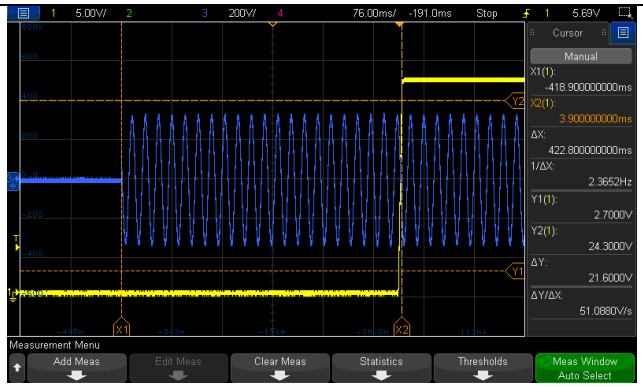
ENVIRONMENT TEST

■ DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

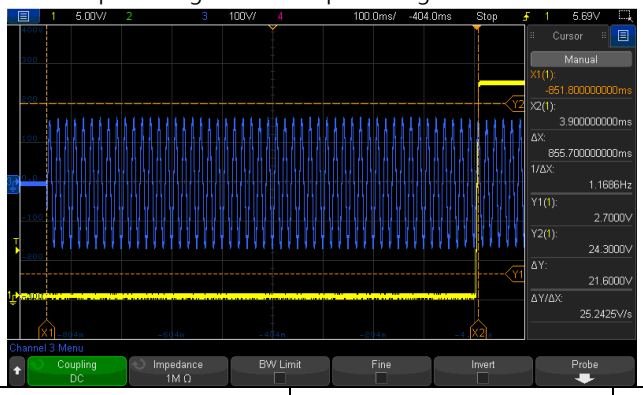
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 26V~32V	I/P： 277 VAC I/P： 230 VAC I/P： 115 VAC O/P：MIN LOAD Ta：25℃	25.54V~32.98V/277VAC 25.54V~32.98V/230VAC 25.54V~32.98V/115VAC
2	OUTPUT VOLTAGE TOLERANCE	V1: -1% ~ +1%	I/P: 85VAC~305VAC O/P:FULL~MIN. LOAD Ta:25℃	V1: -0.1333% ~ 0.1667%
3	LINE REGULATION	V1: -0.5% ~ +0.5%	I/P: 85VAC~ 305VAC O/P:FULL LOAD Ta:25℃	V1: -0.0037% ~ 0.0074%
4	LOAD REGULATION	V1: -0.5% ~ +0.5%	I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25℃	V1: -0.0185% ~ 0.0111%
5	OVER/UNDERSHOOT TEST	<± 5%	I/P: 230VAC O/P:FULL LOAD / NO LOAD Ta:25℃	4.61%
6	RIPPLE & NOISE (Max)	V1: 240mVp-p	I/P:230VAC O/P:FULL LOAD Ta:25℃	45mVp-p / high frequency 56mVp-p / low frequency
	high frequency :  low frequency : 			
7	SET UP TIME(Max)	277VAC/900ms 230VAC/1000ms 115VAC/1500ms	I/P： 277 VAC I/P： 230 VAC I/P： 115 VAC O/P：FULL LOAD Ta：25℃	277VAC/281.66ms 230VAC/422.8ms 115VAC/855.7ms
	INPUT=277VAC/50HZ @ FULL LOAD CH1: Output Voltage CH3: AC Input Voltage		INPUT=230VAC/50HZ @ FULL LOAD CH1: Output Voltage CH3: AC Input Voltage	





INPUT=115VAC/60HZ @ FULL LOAD

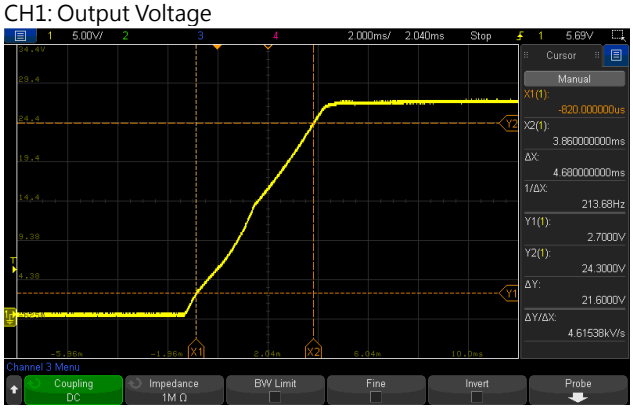
CH1: Output Voltage CH3: AC Input Voltage



8	RISE TIME (Max)	277VAC/80ms 230VAC/80ms 115VAC/80ms	I/P： 277 VAC I/P： 230 VAC I/P： 115 VAC O/P：FULL LOAD Ta：25℃	277VAC/4.68ms 230VAC/4.68ms 115VAC/4.7ms

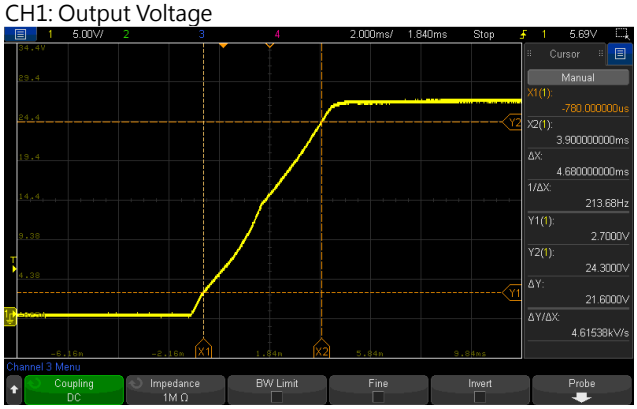
INPUT=277VAC/50HZ @ FULL LOAD

CH1: Output Voltage



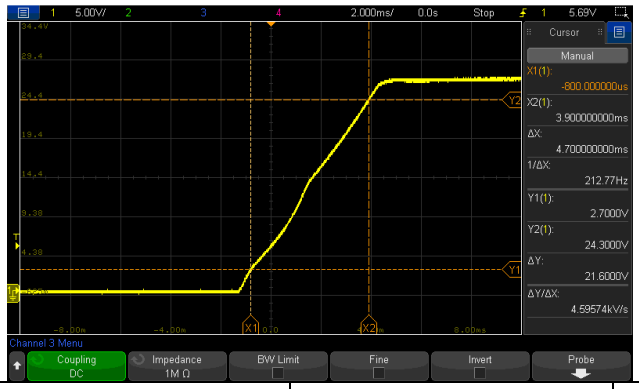
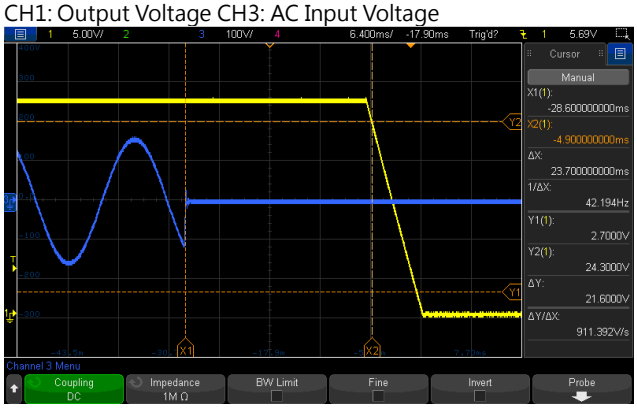
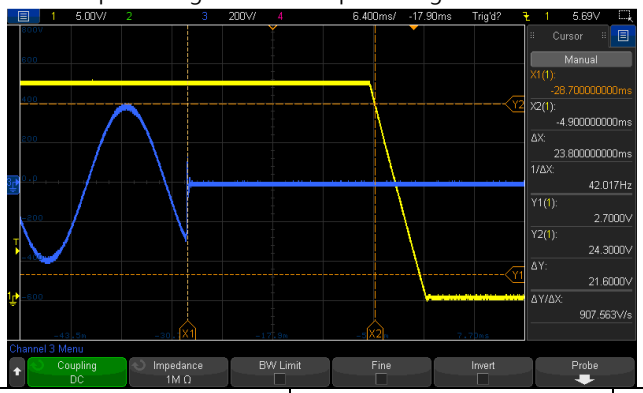
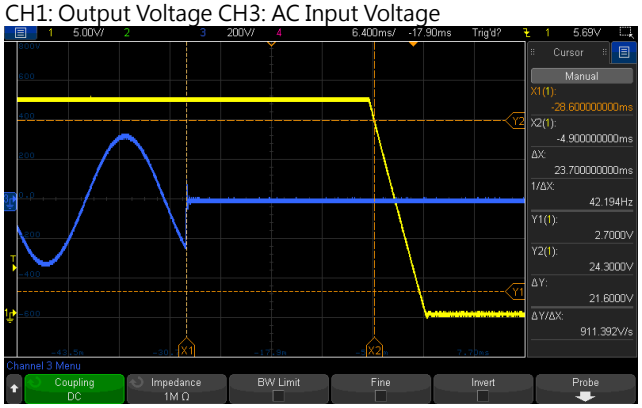
INPUT=230VAC/50HZ @ FULL LOAD

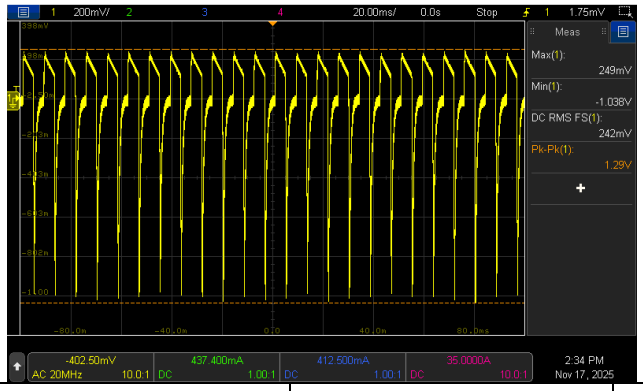
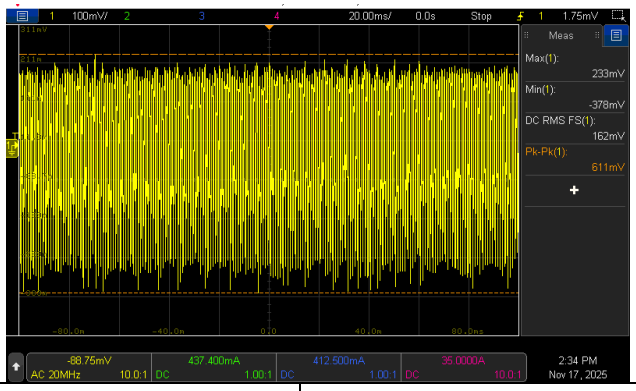
CH1: Output Voltage



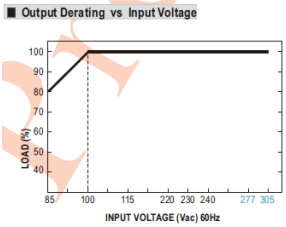
INPUT=115VAC/60HZ @ FULL LOAD

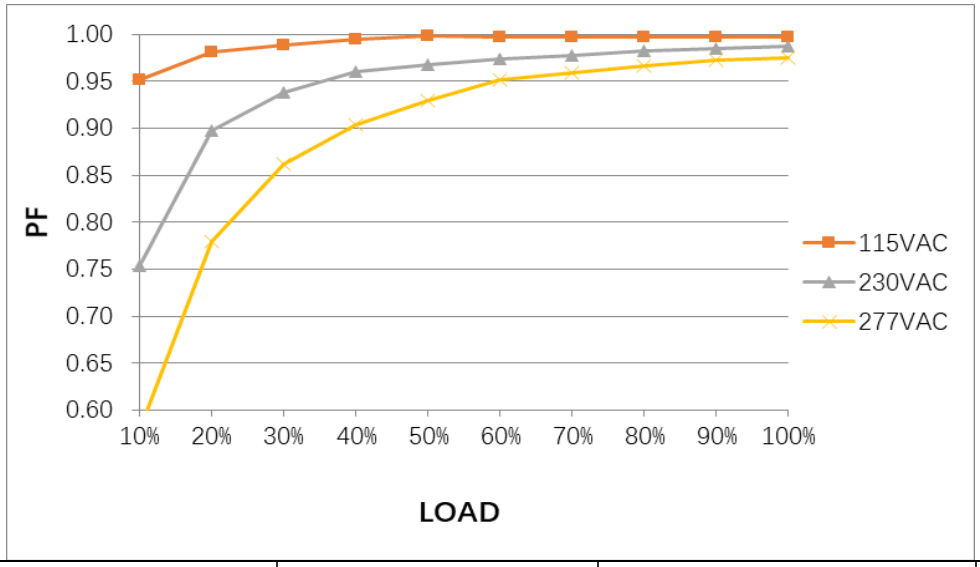
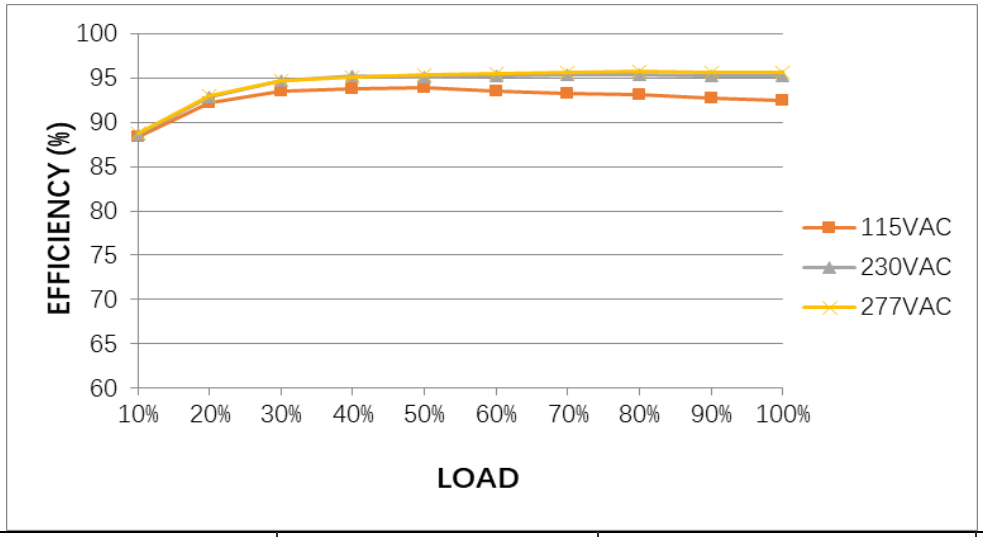
CH1: Output Voltage

				
9	HOLD UP TIME (Typ.)	277VAC/16ms 230VAC/16ms 115VAC/16ms	I/P： 277 VAC I/P： 230 VAC I/P： 115 VAC O/P：FULL LOAD Ta：25℃	277VAC/23.8ms 230VAC/23.7ms 115VAC/23.7ms
	INPUT=277VAC/50HZ @ FULL LOAD CH1: Output Voltage CH3: AC Input Voltage  INPUT=115VAC/60HZ @ FULL LOAD CH1: Output Voltage CH23: AC Input Voltage 		INPUT=230VAC/50HZ @ FULL LOAD CH1: Output Voltage CH3: AC Input Voltage 	
10	DYNAMIC LOAD	V1: 2700mVp-p	I/P: 230VAC O/P: (1) FULL/ MIN LOAD 50%DUTY / 120HZ (2) FULL/ MIN LOAD 50%DUTY / 1KHZ Ta:25℃	1290mVp-p 611mVp-p

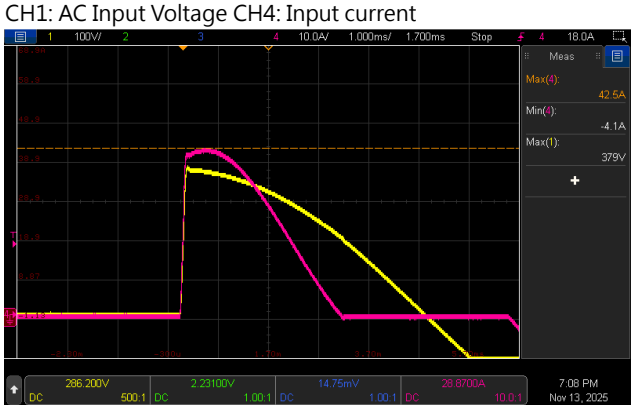
	FULL / MIN LOAD 50%DUTY / 120HZ 		FULL / MIN LOAD 50%DUTY / 1KHZ 	
11	TRANSIENT RECOVERY TIME	V1: 2700mVp-p <500us	I/P: 230VAC O/P:40% LOAD CHANGE 50%DUTY/120HZ 1.25A/us	237mVp-p

INPUT FUNCTION TEST

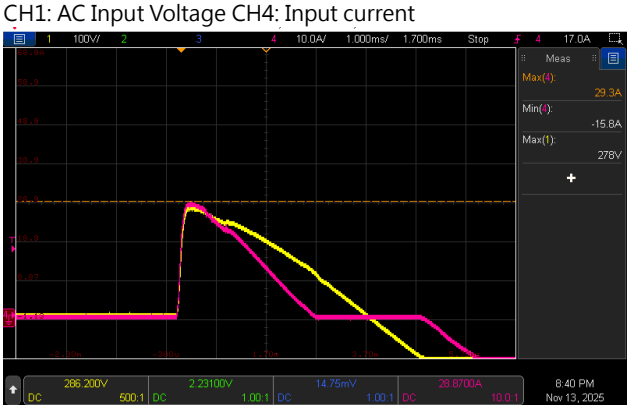
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	85VAC~305VAC 120VDC~ 431VDC 	(1) I/P: TESTING O/P: FULL / 80% LOAD (2) I/P: DC TESTING (L: + N: -) O/P: FULL / 80% LOAD (3) I/P: DC TESTING (L: - N: +) O/P: FULL / 80% LOAD Ta:25℃	(1) 80.3V~305V/ FULL LOAD 80.3V~305V/ 80% LOAD (2) 109Vdc~431Vdc/FULL LOAD 109Vdc~431Vdc/80% LOAD (3) 109Vdc~431Vdc/FULL LOAD 109Vdc~431Vdc/80% LOAD
			I/P: 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)	TEST：OK
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P: 85VAC~ 305VAC O/P:FULL~MIN LOAD Ta:25℃	TEST：OK
3	INPUT CURRENT (Typ.)	277V/ 3.2 A 230V/ 3.9 A 115V/ 8.2 A	I/P： 277 VAC I/P： 230 VAC I/P： 115 VAC O/P：FULL LOAD Ta：25℃	I =2.91A/ 277VAC I =3.48A/ 230VAC I =7.14A/ 115VAC
4	LEAKAGE CURRENT	Earth leakage current < 350uA (rms)@277Vac ; touch current<100uA(rms) @ 277Vac ;	I/P： 277 VAC/60HZ O/P：Min LOAD Ta：25℃	For Earth：218uA For touch： 28uA
5	NO LOAD CONSUMPTION	Remote Power OFF: 0.75W/115Vac 0.75W/230Vac 1W/277Vac	I/P：115VAC I/P：230VAC I/P：277VAC O/P：NO LOAD	TEST： Remote Power OFF / Remote Power ON

		Remote Power ON: 5W/115Vac 5W/230Vac 5W/277Vac	Ta：25℃	115VAC 0.27W 3.85W 230VAC 0.44W 3.49W 277VAC 0.57W 3.24W
6	POWER FACTOR (Typ.)	0.90/ 277VAC 0.93/ 230VAC 0.98/115VAC	I/P： 277 VAC I/P： 230 VAC I/P： 115 VAC O/P：FULL LOAD Ta：25℃	PF=0.9785/277VAC PF=0.9875/230VAC PF=0.9975/115VAC
	P.F vs LOAD 			
7	EFFICIENCY(Typ.)	94%	I/P:230 VAC O/P:FULL LOAD Ta:25℃	95.73%
	EFFICIENCY vs LOAD 			
8	INRUSH CURRENT(Typ.)	277V/50A 230V/40A 115V/20A COLD START	I/P： 277 VAC I/P： 230 VAC I/P： 115 VAC O/P：FULL LOAD Ta：25℃	I =42.5A/ 277VAC I =29.3A/ 230VAC I =15.6A/ 115VAC T50= 1540us/230V

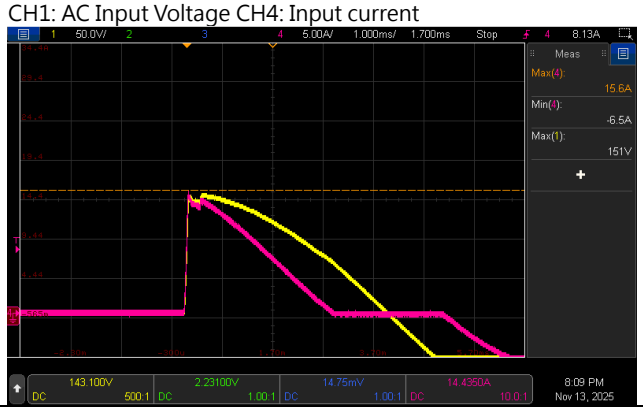
INPUT=277VAC/50HZ @ FULL LOAD
CH1: AC Input Voltage CH4: Input current



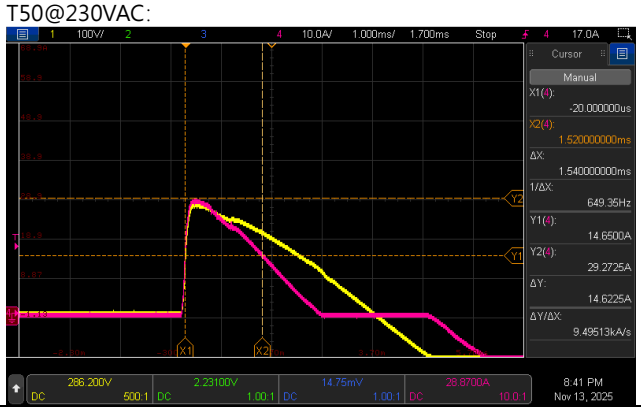
INPUT=230VAC/50HZ @ FULL LOAD
CH1: AC Input Voltage CH4: Input current



INPUT=115VAC/ 60HZ @ FULL LOAD
CH1: AC Input Voltage CH4: Input current



T50@230VAC:



PROTECTION FUNCTION TEST

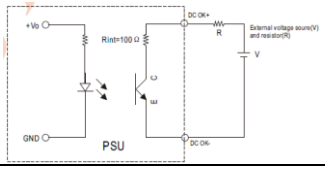
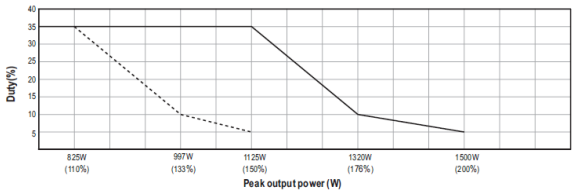
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	Protection type: Normally works within 105 ~ 200% rated output power for more than 5 seconds and then constant current limiting without shutdown(Vout>30%), recovers automatically after fault condition is removed, or shut down o/p voltage when Vout<30%, AC re-power on to recover. Protection type: >200% rated power, constant current limiting (Vout>30%)with auto-recovery after fault condition is removed, or shut down o/p voltage when Vout<30%,AC re-power on to recover.	I/P: 305VAC I/P: 230VAC I/P: 180VAC I/P: 100VAC O/P:TESTING Ta:25℃	TEST： 116.55%/305VAC 116.55%/230VAC 116.19%/100VAC Protection type: Normally works within 105 ~ 200% rated output power for more than 5 seconds and then constant current limiting without shutdown (Vout>30%), recovers automatically after fault condition is removed, or shut down o/p voltage when Vout<30%, AC re-power on to recover. 219.4 %/305VAC 219.4 %/180VAC 203.6 %/100VAC Protection type:

				>200% rated power, constant current limiting (Vout>30%)with auto-recovery after fault condition is removed, or shut down o/p voltage when Vout<30%,AC re-power on to recover.
2	OVER VOLTAGE PROTECTION	33V~ 42V Protection type: Shut down o/p voltage, AC re-power on to recover	I/P: 305VAC I/P: 85VAC O/P:MIN LOAD Ta:25℃	37.43V/ 305VAC 37.43V/ 85VAC PROTECTION TYPE： Shut down o/p voltage, AC re-power on to recover
3	OVER TEMPERATURE PROTECTION	Protection type: Shut down o/p voltage, recovers automatically after temperature goes down	I/P: 305VAC I/P: 85VAC O/P:FULL LOAD	TEST： OK O.T.P. Active Protection type : Shut down o/p voltage, recovers automatically after temperature goes down
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE Protection type: Constant current limiting for more than 5 seconds (Vout<30%) and then shut down o/p voltage, AC re-power on to recover or Hiccup mode, recovery automatically after fault condition is removed. Depends on the user's wire impedance.	I/P: 305VAC I/P: 85VAC O/P:FULL LOAD	NO DAMAGE Protection type: Constant current limiting for more than 5 seconds (Vout<30%) and then shut down o/p voltage, AC re-power on to recover or Hiccup mode, recovery automatically after fault condition is removed. Depends on the user's wire impedance.

CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	AUXILIARY POWER (AUX)	1. 5Vaux @ 0.2A, Tolerance -15% ~ +15% at main output 20% rated current; 2. 12Vaux @ 0.8A, Tolerance -15% ~ +15% at main output 20% rated current. I/P: 230 VAC O/P:FULL LOAD Ta:25℃ Test Result：		

AUX	TOLERANCE
5V / 0.2A	-0.46% ~ 0%
12V / 0.8A	-0.21% ~ 0%

2	REMOTE CONTROL	POWER ON: short between RC+(pin11)&5V-AUX(pin13) on CN1; POWER OFF: open between RC+(pin11)&5V-AUX(pin13) on CN1	I/P:230VAC O/P:FULL LOAD Ta:25℃	TEST: OK
3	REMOTE SENSE	Compensate voltage drop on the load wiring up to 0.3V.	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	TEST: OK
4	DC OK SIGNAL	15Vdc/10mA resistive load 	I/P:230VAC O/P:FULL LOAD Ta:25℃	TEST: OK
5	FAN CONTROL	(1)Fan ON/OFF control: RTH3≥ 50℃±10℃ FAN ON RTH3≤ 40℃±10℃ FAN OFF	I/P:230VAC O/P:TESTING	TEST: (1) OK (2) 44.7 dB Ta:25℃
6	PEAK Power	I/P: 100/305VAC O/P:  --- --- --- 100VAC ———200VAC		TEST: OK

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	
1	PWM Transistor (D to S) or (C to E) Peak Voltage	Q2/Q3 : Rated: 600V/40A	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	Q2 VDS: (1) 495V (2) 495V (3) 499V (4) 499V (5) 495V (6) 495V (7) 483V (8) 499V	Q3 VDS: (1) 489V (2) 489V (3) 492V (4) 492V (5) 489V (6) 492V (7) 473V (8) 492V

			(7)0%→400% Load. (8) Peak Load Ta:25℃	
2	P.F.C Transistor (D to S) or (C to E) Peak Voltage	Q1 : Rated: 650V/46A	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. (8) Peak Load Ta:25℃	Q1 VDS: (1) 569V (2) 569V (3) 569V (4) 569V (5) 566V (6) 569V (7) 569V (8) 566V
3	P.F.C DIODE	D5 : Rated: 60A/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 (5) Peak Load Ta:25℃	(1) 475V (2) 475V (3) 470V (4) 470V (5) 474V
4	Diode Peak Voltage	Q100 / Q104 : Rated: 100V/136A	AC ON/OFF I/P: High-Line +3V =308 V VO=Vomax 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 (9) Peak Load VO=Vnormal O/P: (1) Full Load Ta:25℃	Q100: VO=Vomax VDS: (1) 72.5V (2) 72.5V (3) 72.9V (4) 72.9V (5) 72.9V (6) 73.4V (7) 71.1V (8) 74.3V (9) 76.3V VO=Vnormal (1) 67.4V Q104: VO=Vomax VDS: (1) 73.1V (2) 73.1V (3) 73.6V (4) 73.6V (5) 73.6V (6) 74.1V (7) 71.2V (8) 72.7V (9) 75.1V VO=Vnormal (1) 67.4V

5	Input Capacitor Voltage	C5 : Rated: 100u/450V	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 (5) Peak Load on/off (6) Peak Load continue Ta:25℃	(1) 450V (2) 450V (3) 441V (4) 438V (5) 450V (6) 441V

■ 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: 1.5 KVAC/min	I/P-O/P: 4.62 KVAC/min I/P-FG: 2.52 KVAC/min O/P-FG: 1.8 KVAC/min Ta:25℃	I/P-O/P: 1.89 mA I/P-FG: 2.77 mA O/P-FG: 1.23 m A NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P: 500 VDC>100MΩ I/P-FG: 500 VDC>100MΩ O/P-FG: 500 VDC >100MΩ	I/P-O/P: 600 VDC I/P-FG: 600 VDC O/P-FG: 600 VDC Ta:25℃	I/P-O/P: 50 GΩ I/P-FG: 33 GΩ O/P-FG: 50 GΩ NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25℃	9mΩ

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	BS EN/EN61000-3-2 （IEC61000-3-2） ■ CLASS A	I/P:230VAC/50HZ O/P:FULL LOAD Ta:25℃	■ PASS
2	CONDUCTION	BS EN/EN55032(CISPR32), CNS 15936 CLASS B BS EN/EN55011（CISPR11） CLASS B	I/P：230 VAC (50HZ) O/P：FULL/50% LOAD Ta：25℃	PASS Test by certified Lab
3	RADIATION	BS EN/EN55032(CISPR32), CNS 15936 CLASS B BS EN/EN55011（CISPR11） CLASS B	I/P：230 VAC (50HZ) O/P：FULL LOAD Ta：25℃	PASS Test by certified Lab
4	E.S.D	BS EN/EN61000-4-2 AIR：15KV / Contact：8KV	I/P：230 VAC/50HZ O/P：FULL LOAD Ta：25℃	CRITERIA A

5	E.F.T	BS EN/EN61000-4-4 INPUT： 2KV	I/P：230 VAC/50HZ O/P：FULL LOAD Ta：25℃	CRITERIA A
6	SURGE	BS EN/EN 61000-4-5 L-N ：2KV L,N-PE：4KV	I/P： 230 VAC/50HZ O/P：FULL LOAD Ta：25℃	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： NSP-750-24 1. ROOM AMBIENT BURN-IN： 2HRS I/P： 230VAC O/P： FULL LOAD Ta=26.8℃ 2. HIGH AMBIENT BURN-IN： 2HRS I/P： 230VAC O/P： FULL LOAD Ta= 60.1℃		

NO	Position	ROOM AMBIENT Ta=26.8℃	HIGH AMBIENT Ta=60.1℃
1	ZNR1	31.0℃	64.8℃
2	LF1	35.3℃	69.6℃
3	LF2	36.1℃	70.3℃
4	C2	33.2℃	67.1℃
5	BD1	55.4℃	88.0℃
6	C16	38.4℃	72.2℃
7	RTH1	36.1℃	69.5℃
8	RY1	39.4℃	72.6℃
9	RTH4	45.5℃	79.0℃
10	L1	50.5℃	84.0℃
11	Q1	45.9℃	79.6℃
12	D5	44.4℃	78.2℃
13	C5	35.4℃	69.0℃
14	ZNR1	31.0℃	64.8℃
15	LF1	35.3℃	69.6℃
16	LF2	36.1℃	70.3℃

NO	Position	ROOM AMBIENT Ta=26.8℃	HIGH AMBIENT Ta=60.1℃
17	C2	33.2℃	67.1℃
18	BD1	55.4℃	88.0℃
19	C16	38.4℃	72.2℃
20	RTH1	36.1℃	69.5℃
21	RY1	39.4℃	72.6℃
22	RTH4	45.5℃	79.0℃
23	L1	50.5℃	84.0℃
24	Q1	45.9℃	79.6℃
25	D5	44.4℃	78.2℃
26	C5	35.4℃	69.0℃
27	D6	41.7℃	75.6℃
28	U1	47.3℃	82.0℃
29	C7	43.4℃	77.7℃
30	Q3	46.7℃	81.9℃
31	Q2	49.2℃	84.4℃
32	Q4	53.5℃	88.2℃
33	C42	43.2℃	76.6℃
34	T1core	56.4℃	87.0℃
35	T1coil	93.4℃	98.0℃
36	C108	43.5℃	79.0℃
37	U9	49.1℃	82.7℃
38	U2	47.2℃	81.7℃
39	R7	47.9℃	81.5℃
40	C92	48.0℃	82.3℃
41	U5	48.1℃	81.8℃
42	U101	53.5℃	87.6℃
43	Q100	54.2℃	88.8℃
44	Q104	56.2℃	91.1℃
45	J101	47.6℃	80.7℃
46	D13	40.2℃	73.9℃
47	U104	35.9℃	69.1℃
48	RTH5	54.9℃	89.1℃
49	C107	45.5℃	80.7℃
50	C110	43.2℃	76.5℃
51	C135	38.5℃	70.7℃
52	U100	45.4℃	80.9℃
53	U7	41.4℃	75.2℃
54	RTH3	39.0℃	73.3℃
55	T2	40.4℃	74.4℃
56	C158	33.1℃	67.1℃
57	C201	39.3℃	74.1℃
58	U111	39.6℃	73.7℃
59	Q5	41.9℃	75.9℃
60	U100	42.3℃	76.2℃

2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P： 230 VAC O/P： 114%LOAD Ta：25℃	TEST：OK
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P： 305VAC/100VAC O/P： 80%/100%LOAD Ta= -45℃/-35℃	TEST：OK
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 60℃/95 %R.H NO DAMAGE	I/P： 315VAC O/P：FULL LOAD Ta= 60℃ HUMIDITY= 95 %R.H	TEST：OK
5	TEMPERATURE COEFFICIENT	± 0.05%/℃(0~60℃)	I/P： 230 VAC O/P：FULL LOAD	± 0.005%/℃(0~60℃)
6	STORAGE TEMPERATURE TEST	-40~85℃	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	
7	THERMAL SHOCK TEST	-30~60℃	1. Thermal shock Temperature： -35℃~ +65℃ 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	
8	VIBRATION TEST	10 ~ 500Hz, 2G 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：3G (5) Test Time：180min in each axis (X.Y.Z) (6) Ta：25℃	
9	CAPACITOR LIFE CYCLE	SUPPOSE C107 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= 60℃ LIFE TIME (3) I/P： 230VAC O/P：75% LOAD Ta= 60℃ LIFE TIME (4) I/P： 230VAC O/P：50% LOAD Ta= 60℃ LIFE TIME		(1) 937548HRS (2) 72642HRS (3) 125350HRS (4) 189547HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 1047.1K hrs min. Telcordia SR-332 (Bellcore) ; 137.4K hrs min. MIL-HDBK-217F (25℃)		
11	Ongoing Reliability Test	I/P：230VAC O/P：FULL LOAD TA=50℃ Demonstration Mean Time Between Failure : 50,000 hours		

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	Yuwei	Liutt	Wangzd

2020.10.1 TAG-QA-009