



Test Report: NSP-2400-24

2400W AC/DC High Reliable Multi-Industries 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

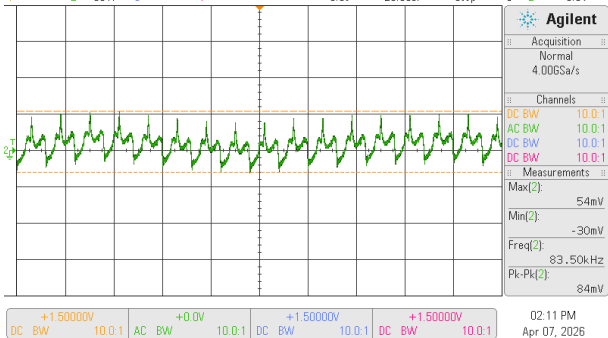
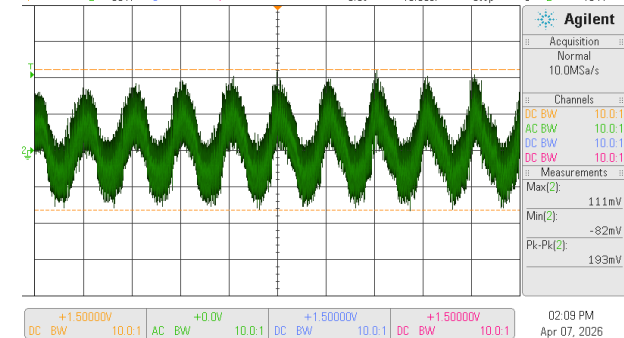
E.M.C. Test

■ RELIABILITY TEST

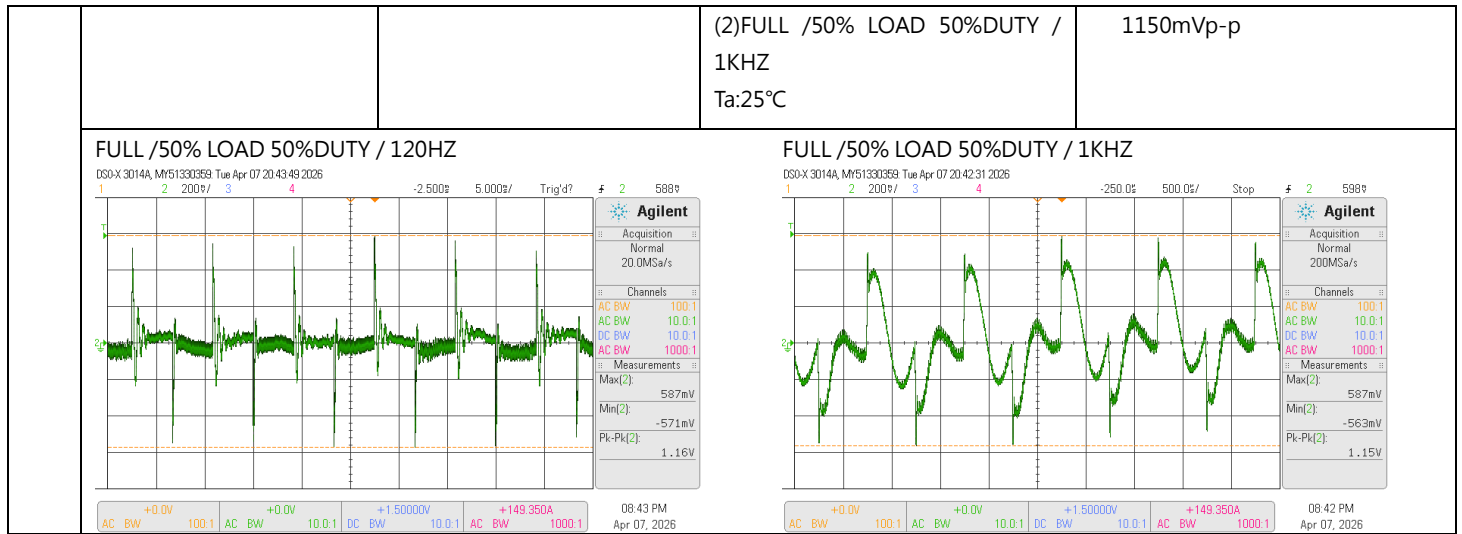
ENVIRONMENT TEST

DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 21.6V ~ 28.8V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	20.787V~29.378V/230VAC 20.787V~29.378V/115VAC
2	OUTPUT VOLTAGE TOLERANCE	V1: 1% ~ -1%	I/P : 85VAC /305VAC O/P : FULL/ MIN. LOAD Ta:25°C	V1 : 0.16% ~ -0.03%
3	LINE REGULATION	V1: 0.5% ~ -0.5%	I/P : 85VAC~ 305VAC O/P : FULL LOAD Ta:25°C	V1 : 0.03% ~ -0.01%
4	LOAD REGULATION	V1: 0.5% ~ -0.5%	I/P : 230VAC O/P : FULL ~MIN LOAD Ta:25°C	V1 : 0.2% ~ -0.18 %
5	OVER/UNDERSHOOT TEST	<± 10%	I/P : 230VAC O/P : FULL LOAD Ta:25°C	<10%
6	RIPPLE & NOISE (Max)	V1: 300mVp-p	I/P : 230VAC O/P : FULL LOAD Ta:25°C	V1 : 193mVp-p
high frequency :  low frequency : 				
7	SET UP TIME(Max)	230VAC/1800ms 115VAC/1800ms 277VAC/1800ms	I/P : 230 VAC I/P : 115 VAC I/P : 277 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 1424ms 115VAC/ 1396ms 277VAC/ 1374ms
INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage			INPUT=115VAC/60HZ @ FULL LOAD CH2 : Output Voltage CH1 : AC Input Voltage	

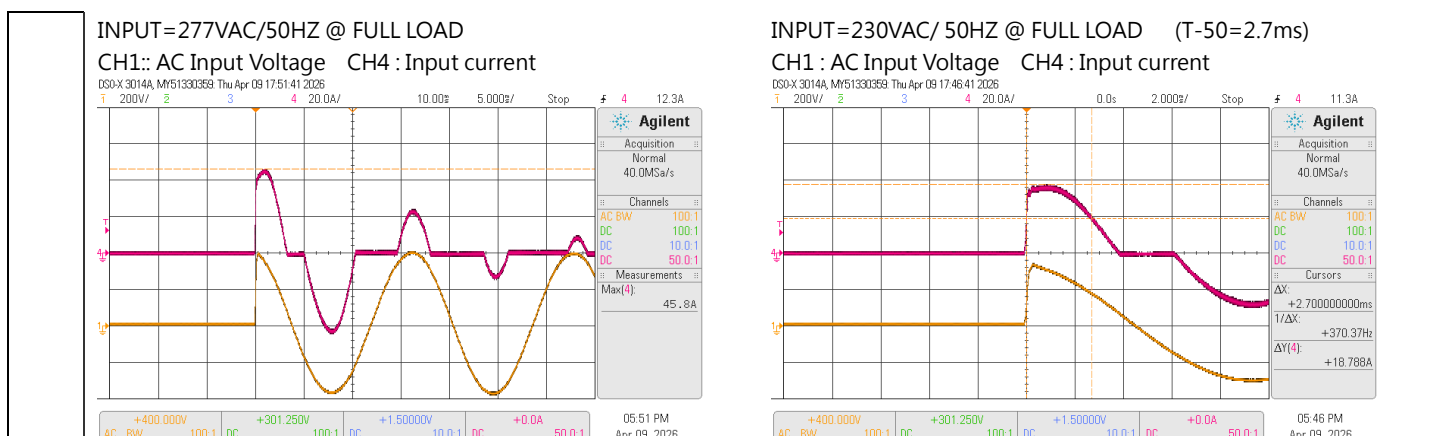
8	RISE TIME (Max) 230VAC/60ms 115VAC/60ms 277VAC/60ms	I/P : 230 VAC I/P : 115 VAC I/P : 277 VAC O/P : FULL LOAD Ta : 25°C 230VAC/ 32.2ms 115VAC/ 32.4ms 277VAC/ 32.8ms
	INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage	INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage
9	HOLD UP TIME (Typ.) 230VAC/12ms / 70% Load 230VAC/8ms / Full Load	I/P : 230 VAC O/P : 70% LOAD O/P : FULL LOAD Ta : 25°C 25.4ms / 70%Load 17.5ms / Full Load
	INPUT=230VAC/50HZ @ 70% LOAD CH2 : Output Voltage CH1 : AC Input Voltage	INPUT=230VAC/50HZ @ FULL LOAD CH2 : Output Voltage CH1 : AC Input Voltage
10	DYNAMIC LOAD V1: 2400 mVp-p	I/P: 230VAC O/P: (1)FULL /50% LOAD 50%DUTY / 120HZ 1160mVp-p



INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	85VAC~305VAC 250VDC~ 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=82 V HIGH-LINE+10V=315 V O/P:FULL/MIN LOAD (PLEASE CHECK DERATING CURVE) ON: 30 Sec OFF: 30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	(1) 82V~305V (2)241.9Vdc~431Vdc/FULL LOAD 242.1Vdc~431Vdc/50% LOAD (3) 242.3Vdc~431Vdc/FULL LOAD 242.3Vdc~431Vdc/50% LOAD TEST:PASS
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P : 85 VAC ~305 VAC O/P : FULL~MIN LOAD Ta:25°C	TEST: PASS
3	INPUT CURRENT (Typ.)	115V/ 17 A 230V/ 13 A 277V/ 11A	I/P : 115 VAC I/P : 230 VAC I/P : 277 VAC O/P : FULL LOAD Ta : 25°C	I =16.25A / 115VAC I =11.44A / 230VAC I =9.74A / 277VAC
4	LEAKAGE CURRENT	<500 uA / 277 VAC (Earth) < 100uA / 277 VAC (Touch)	I/P : 277 VAC /60Hz O/P : Min LOAD Ta : 25°C	Earth L-FG : 338 uA N-FG : 338 uA Touch +Vo : 65 uA -Vo : 65 uA
6	POWER FACTOR (Typ.)	0.98/ 115VAC 0.95/ 230VAC 0.93/ 277VAC	I/P : 115 VAC I/P : 230 VAC I/P : 277 VAC	PF=0.995 / 115VAC PF=0.978 / 230VAC PF=0.958 / 277VAC

			O/P : FULL LOAD Ta : 25°C																																													
P.F vs LOAD																																																
<table border="1"><caption>P.F vs LOAD Data</caption><thead><tr><th>LOAD (%)</th><th>115VAC PF</th><th>230VAC PF</th><th>277VAC PF</th></tr></thead><tbody><tr><td>10</td><td>0.98</td><td>0.90</td><td>0.60</td></tr><tr><td>20</td><td>0.98</td><td>0.94</td><td>0.83</td></tr><tr><td>30</td><td>0.98</td><td>0.95</td><td>0.87</td></tr><tr><td>40</td><td>0.98</td><td>0.96</td><td>0.90</td></tr><tr><td>50</td><td>0.98</td><td>0.96</td><td>0.92</td></tr><tr><td>60</td><td>0.98</td><td>0.97</td><td>0.93</td></tr><tr><td>70</td><td>0.98</td><td>0.97</td><td>0.94</td></tr><tr><td>80</td><td>0.98</td><td>0.97</td><td>0.95</td></tr><tr><td>90</td><td>0.98</td><td>0.97</td><td>0.96</td></tr><tr><td>100</td><td>0.98</td><td>0.98</td><td>0.96</td></tr></tbody></table>					LOAD (%)	115VAC PF	230VAC PF	277VAC PF	10	0.98	0.90	0.60	20	0.98	0.94	0.83	30	0.98	0.95	0.87	40	0.98	0.96	0.90	50	0.98	0.96	0.92	60	0.98	0.97	0.93	70	0.98	0.97	0.94	80	0.98	0.97	0.95	90	0.98	0.97	0.96	100	0.98	0.98	0.96
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7	EFFICIENCY(Typ.)	91%	I/P : 230 VAC O/P : 100% LOAD Ta:25°C	91.9%																																												
EFFICIENCY vs LOAD																																																
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90	88	92	92																																													
100	88	92	92																																													
8	INRUSH CURRENT(Typ.)	115V/30A 230V/60A 277V/75A COLD START	I/P : 115 VAC I/P : 230 VAC I/P : 277 VAC O/P : FULL LOAD Ta : 25°C	I =16.9A/ 115VAC I =37.8A/ 230VAC I =45.8A/ 277VAC T50=2.7ms/230V																																												
INPUT=115VAC/60HZ @ FULL LOAD CH1 : AC Input Voltage CH4 : Input current																																																
Agilent Acquisition Normal 40.0MSa/s Channels AC BW 100.1 DC 100.1 DC 10.0.1 DC 50.0.1 Measurements Max(4) 16.9A																																																
INPUT=230VAC/ 50HZ @ FULL LOAD CH1 : AC Input Voltage CH4 : Input current																																																
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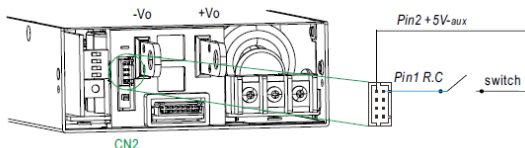


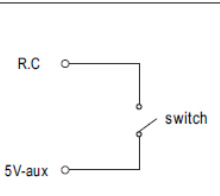
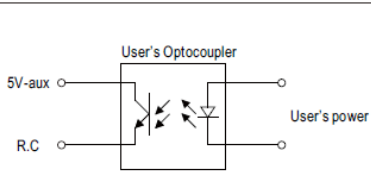
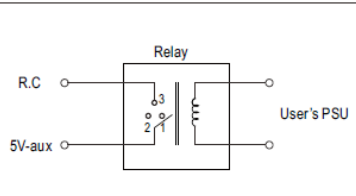
PROTECTION FUNCTION TEST

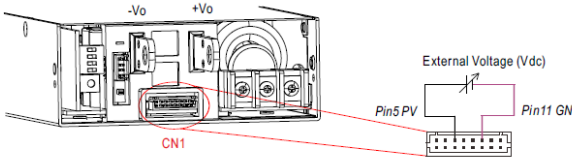
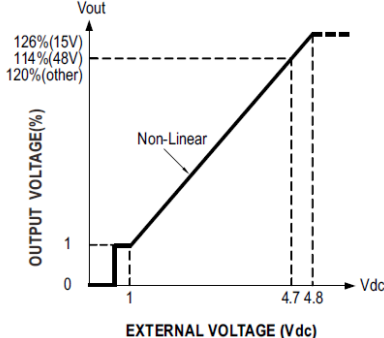
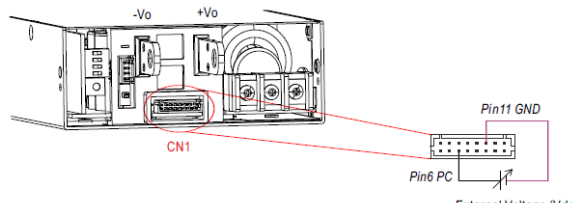
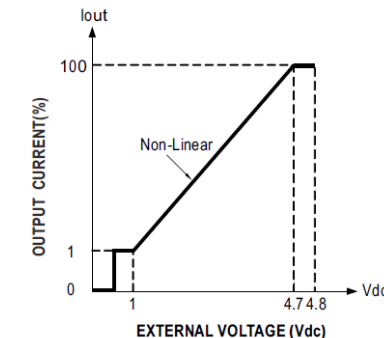
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	PEAK POWER MODE From 105% to 200% of rated output power, unit will shut down after 5 seconds of continuous operation. AC repower on to recover. (2 Sec for 12V/15V models)	I/P : 305VAC : 230VAC : 180VAC : 115VAC : 100VAC : 85VAC O/P : TESTING Ta:25°C	106.7/ 305VAC 106.7/ 230VAC 105.9/ 180VAC 73.5/ 115VAC 63.6/ 100VAC 58.6%/ 85VAC PROTECTION TYPE : From 105% to 200% of rated output power, unit will shut down after 5 seconds of continuous operation. AC repower on to recover. (2 Sec for 12V/15V models)
		PEAK POWER MODE At >200% of rated output power, constant current limiting is activated. Unit will shut down after 5 seconds of continuous operation. AC repower on to recover. (2 Sec for 12V/15V models) Note: Input$\geq$ 220VAC:Peak power = 2 X Rated Power Input < 220VAC:Peak power=1.33 X Rated Power	I/P : 305VAC : 230VAC : 220VAC : 180VAC : 115VAC : 100VAC : 85VAC O/P : Peak Load Ta:25°C	202%/ 305VAC 202%/ 230VAC 202%/ 220VAC 134%/ 180VAC 93.5%/ 115VAC 80.6%/ 100VAC 74.5%/ 85VAC PROTECTION TYPE : At >200% of rated output power, constant current limiting is activated. Unit will shut down after 5 seconds of continuous operation. AC repower on to recover. (2 Sec for 12V/15V models)
		CURRENT LIMITING MODE Constant current limiting, recovers automatically after abnormal condition is removed	I/P : 305VAC : 230VAC : 180VAC : 115VAC : 100VAC	106.6%/ 305VAC 106.6%/ 230VAC 105.6%/ 180VAC 73.5%/ 115VAC 63.5%/ 100VAC

			: 85VAC O/P : TESTING Ta:25°C	58.8% / 85VAC PROTECTION TYPE : Constant current limiting, recovers automatically after abnormal condition is removed
2	OVER VOLTAGE PROTECTION	29V ~ 37V	I/P: 305VAC I/P: 230VAC I/P: 85VAC O/P:MIN LOAD Ta:25°C	30.8V/ 305VAC 30.8V/ 230VAC 30.8V/ 85VAC PROTECTION TYPE : shut down o/p voltage, re-power on to recover
3	OVER TEMPERATURE PROTECTION	Protection type : Shut down output voltage, recovers automatically after temperature goes down	I/P: 305VAC I/P: 85VAC O/P:FULL LOAD	O.T.P. Active Protection type : Shut down output voltage, recovers automatically after temperature goes down
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 305VAC I/P: 85VAC O/P: FULL LOAD Ta:25°C	NO DAMAGE PROTECTION TYPE : Shutdown O/P voltage, re-power on to recover

CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT												
1	AUXILIARY POWER (AUX)	1. Auxiliary voltage output, 4.25~5.75Vdc, referenced to GND-aux (pin2). The maximum load current is 0.2A. This output has the built-in "Oring diodes" and is not controlled by "R.C" 2. Auxiliary voltage output, 10.2~13.8Vdc, referenced to GND-aux (pin2). The maximum load current is 0.8A. This output has the built-in "Oring diodes" and is not controlled by "R.C". I/P: 230 VAC O/P:FULL LOAD Ta:25°C Test Result : <table><tr><th>AUX</th><th>TOLERANCE</th><th>RIPPLE</th><th>TEST RESULT</th></tr><tr><td>5V / 0.2A</td><td>4.25~5.75V</td><td>150mVp-p</td><td>4.91V/35mV</td></tr><tr><td>12V / 0.8A</td><td>10.2~13.8V</td><td>450mVp-p</td><td>11.88V/32mV</td></tr></table>	AUX	TOLERANCE	RIPPLE	TEST RESULT	5V / 0.2A	4.25~5.75V	150mVp-p	4.91V/35mV	12V / 0.8A	10.2~13.8V	450mVp-p	11.88V/32mV		
AUX	TOLERANCE	RIPPLE	TEST RESULT													
5V / 0.2A	4.25~5.75V	150mVp-p	4.91V/35mV													
12V / 0.8A	10.2~13.8V	450mVp-p	11.88V/32mV													
2	REMOTE ON/OFF CONTROL	※ The power supply can be turned ON/OFF individually or along with other units by using the "Remote Control" function with external switch, photocoupler or relay. <table><tr><th>PSU Vo Status</th><th>Between +5V-aux(Pin 2) and R.C(Pin 1)</th></tr><tr><td>Power ON</td><td>Switch Short</td></tr><tr><td>Power OFF</td><td>Switch Open</td></tr></table>	PSU Vo Status	Between +5V-aux(Pin 2) and R.C(Pin 1)	Power ON	Switch Short	Power OFF	Switch Open								
PSU Vo Status	Between +5V-aux(Pin 2) and R.C(Pin 1)															
Power ON	Switch Short															
Power OFF	Switch Open															

		   R.C. by external switch. R.C. by user's optocoupler control module. R.C. by user's Relay control module. I/P: 230 VAC O/P:FULL LOAD Ta:25°C Test Result : <table><tr><td>Between ON/OFF and +5V-AUX</td><td>Power Supply Status</td></tr><tr><td>SW SHORT</td><td>ON</td></tr><tr><td>SW OPEN</td><td>OFF</td></tr></table>	Between ON/OFF and +5V-AUX	Power Supply Status	SW SHORT	ON	SW OPEN	OFF									
Between ON/OFF and +5V-AUX	Power Supply Status																
SW SHORT	ON																
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3	REMOTE SENSE	S+ / S- >0.5V Compensate voltage drop on the load wiring up to 0.5V.	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	0.5V													
4	ALARM SIGNAL	DC OK SIGNAL High (3.5 ~ 5.5V) : When the $V_{out} \leq 77\% \pm 5\%$. Low (-0.5 ~ 0.5V) : When $V_{out} \geq 80\% \pm 5\%$. The maximum sourcing current is 10mA and only for output. I/P: 230 VAC O/P:FULL LOAD Ta:25°C Test Result <table><tr><th>Spec.</th><th>Transition point</th><th>Spec.</th><th>DC OK SIGNAL</th></tr><tr><td>$V_{out} \leq 72\% \sim 82\%$</td><td>77.5%</td><td>High (3.5 ~ 5.5V)</td><td>4.92V</td></tr><tr><td>$V_{out} \geq 75\% \sim 85\%$</td><td>79.2%</td><td>Low (-0.5 ~ 0.5V)</td><td>0.0V</td></tr></table>				Spec.	Transition point	Spec.	DC OK SIGNAL	$V_{out} \leq 72\% \sim 82\%$	77.5%	High (3.5 ~ 5.5V)	4.92V	$V_{out} \geq 75\% \sim 85\%$	79.2%	Low (-0.5 ~ 0.5V)	0.0V
Spec.	Transition point	Spec.	DC OK SIGNAL														
$V_{out} \leq 72\% \sim 82\%$	77.5%	High (3.5 ~ 5.5V)	4.92V														
$V_{out} \geq 75\% \sim 85\%$	79.2%	Low (-0.5 ~ 0.5V)	0.0V														

5	OUTPUT VOLTAGE PROGRAMMABLE(PV)	(1)Default by potentiometer (SVR) (a)Have the DIP switch position-3 set as (b)Output voltage can be trimmed by SVR. (2)By Output Voltage Programming (a)Have the DIP switch position-3 set as (b)The output voltage can be trimmed to 0~120% by applying EXTERNAL VOLTAGE between PV and GND on CN1.   I/P: 230 VAC O/P:FULL LOAD Ta:25°C TEST RESULT : <table><tr><td>External voltage(DC)</td><td>0.8V</td><td>1V</td><td>4.078V</td><td>4.7V</td><td>4.8V</td></tr><tr><td>SPEC(V)</td><td>0</td><td>0~1.44</td><td>22.8~25.2</td><td>27.6~30</td><td>28.36~30.76</td></tr><tr><td>Vout</td><td>0.236</td><td>0.236</td><td>23.928</td><td>28.786</td><td>29.504</td></tr></table>	External voltage(DC)	0.8V	1V	4.078V	4.7V	4.8V	SPEC(V)	0	0~1.44	22.8~25.2	27.6~30	28.36~30.76	Vout	0.236	0.236	23.928	28.786	29.504	6	OUTPUT CURRENT PROGRAMMABLE (PC)	(1)Default Overload Protection(OLP) value (a)Have the DIP switch position-2 set as (b)Output current is set default value. (2)By Constant Current Level Programming (a)Have the DIP switch position-2 set as (b)The constant current level can be trimmed to 0~100% of the rated current by applying EXTERNAL VOLTAGE between PC and GND on CN1.   I/P: 230 VAC O/P:TESTING Ta:25°C <table><tr><td>External voltage(DC)</td><td>0.8V</td><td>1V</td><td>2.831</td><td>4.7V</td><td>4.8V</td></tr><tr><td>SPEC</td><td>0%</td><td>1%±10%</td><td>50%±10%</td><td>100%±10%</td><td>102.67%±10%</td></tr><tr><td>Iout</td><td>1.28%</td><td>1.3%</td><td>50.61%</td><td>101.51%</td><td>103.81%</td></tr></table>	External voltage(DC)	0.8V	1V	2.831	4.7V	4.8V	SPEC	0%	1%±10%	50%±10%	100%±10%	102.67%±10%	Iout	1.28%	1.3%	50.61%	101.51%	103.81%	7	FAN NOISE (Typ.)	10% load @38 dB 70% load @44dB Built-in intelligent fan speed control detect by PSU' S internal temperature	I/P : 230 VAC O/P : TESTING Ta : 25°C	10% load:37.5 dB 70% load: 46dB
External voltage(DC)	0.8V	1V	4.078V	4.7V	4.8V																																									
SPEC(V)	0	0~1.44	22.8~25.2	27.6~30	28.36~30.76																																									
Vout	0.236	0.236	23.928	28.786	29.504																																									
External voltage(DC)	0.8V	1V	2.831	4.7V	4.8V																																									
SPEC	0%	1%±10%	50%±10%	100%±10%	102.67%±10%																																									
Iout	1.28%	1.3%	50.61%	101.51%	103.81%																																									

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor (D to S) or (C to E) Peak Voltage	Q3 Rated : 650V 52 A@TC=25°C 37 A@TC=100°C VGS : -10V to 22V	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 Full Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. (8)Peak Load VGS (1)OLP (2)Output Short (3) Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4) Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (5) Dynamic Load Full Load/ Min. Load 50%Duty/120Hz (6)NO LOAD (7)Peak Load VDS: 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 Full Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. (8)Peak Load	VDS: (1) 485V/22.6A (2) 589V/42A (3) 501V/41.4A (4) 489V/30.6A (5) 481V/24.6A (6) 509V/31.4A (7) 545V/41A (8) 533V/41A VGS: (1)19.3V (2)21.3V (3)19.1V (4)18.5V (5)19.7V (6)16.9V (7)19.3V VDS: (1) 486V/22.9A (2) 537V/42A (3) 501V/41.9A (4) 489V/27.4A (5) 477V/25.8A (6) 501V/31.4A (7) 493V/37.0A (8) 509V/39.5A
2	P.F.C Transistor (D to S) or (C to E)	Q901 Rated: 650 V	I/P:High-Line +3V =308 V AC ON/OFF	VDS:

	Peak Voltage	55 A@TC=25°C 35 A@TC=100°C VGS :± 25 V	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 Full Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. (8) Peak Load VGS: (1)OLP (2)Output Short (3) Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4) Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (5) Dynamic Load Full Load/ Min. Load 50%Duty/120Hz (6)NO LOAD (7)Peak 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 Full Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. (8)Peak Load Ta:25°C	(1) 541V (2) 501V (3) 505V (4) 549V (5) 549V (6) 501V (7) 489V (8) 557V VGS: (1)12.03V (2)11.95V (3)11.79V (4)11.55V (5)11.55V (6)11.07V (7)12.03V VDS: (1) 557V (2) 533V (3) 561V (4) 561V (5) 545V (6) 545V (7) 477V (8) 577V
4	Diode Peak Voltage	Q800 Rated: 224A/ 120V VGS : ±20 V Q853 Rated: 224A/ 120V VGS : ±20 V	AC ON/OFF I/P:High-Line +3V =308 V VO: SPEC MAX 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	Q800: VO: SPEC MAX VDS: (1) 114.7V (2) 113.9V (3) 115.5V (4) 115.5V Q853: VO: SPEC MAX VDS: (1) 113.9V (2) 113.9V (3) 116.3V (4) 113.1V

			(5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load Full Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. (8)No Load (9)Peak Load <u>VO: standard</u> O/P: (1)Full Load (2)Peak Load VGS: <u>VO: standard</u> (1)OLP (2)Output Short (3) Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4) Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (5) Dynamic Load Full Load/ Min. Load 50%Duty/120Hz (6)NO LOAD (7)Peak Load Ta:25°C	(5) 114.7V (6) 117.9V (7) 117.1V (8) 116.3V (9) 113.9V <u>VO: standard</u> (1) 112.3V (2) 113.9V <u>VO: standard</u> VGS: (1)8.90V (2)9.07V (3)8.90V (4)8.82V (5)8.90V (6)4.72V (7)8.98V	(5) 113.1V (6) 115.64V (7) 117.1V (8) 117.1V (9) 113.9V <u>VO: standard</u> (1) 112.3V (2) 113.9V <u>VO: standard</u> VGS: (1)8.98V (2)9.31V (3)8.98V (4)8.98V (5)8.98V (6)6.73V (7)8.98V
5	Input Capacitor Voltage	C5 Rated: 100μ / 450V Surge voltage: 495 V	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)445V (2)448V (3)449V (4)446V	

■ SAFETY& E.M.C. TEST

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 4 K VAC/min I/P-FG : 2 K VAC/min O/P-FG: 1.5 KVAC/min	I/P-O/P: 4.4 KVAC/min I/P-FG: 2.4 KVAC/min O/P-FG: 1.8 KVAC/min Ta:25°C	I/P - O / P: 4.7 mA I / P - F G : 3.16 mA O / P - F G : 11.6 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: 500 VDC I/P - FG : 500 VDC O/P-FG: 500 VDC Ta:25°C	I/P - O / P: >30 GΩ I / P - F G : >30 GΩ O / P - F G : >30 GΩ NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	42A / 2min Ta:25°C	28mΩ

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
2	CONDUCTION	EN55032,EN55011 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab
3	RADIATION	EN55032,EN55011 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 <u>MEDICAL</u> AIR : 15KV / Contact : 8KV	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 : NSP-2400-24 1. ROOM AMBIENT BURN-IN : 1HRS I/P : 230VAC O/P : FULL LOAD Ta= 25 °C 2. HIGH AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta= 60 °C		

				NO	Position	ROOM AMBIENT Ta= 25 °C	HIGH AMBIENT Ta= 60 °C
				1	LF2	60.4°C	78.1°C
				2	BD1	95.1°C	110.0°C
				3	L1	67.9°C	81.1°C
				4	RY1	71.5°C	83.9°C
				5	Q901	83.8°C	93.9°C
				6	Q903	81.4°C	93.2°C
				7	D13	87.1°C	98.4°C
				8	C5	73.9°C	83.1°C
				9	L40	69.6°C	83.1°C
				10	Q1	89.1°C	99.0°C
				11	Q2	89.4°C	98.4°C
				12	Q3	88.6°C	98.1°C
				13	Q4	88.5°C	98.0°C
				14	D28	84.4°C	94.6°C
				15	D176	91.5°C	98.4°C
				16	Q801	78.4°C	91.9°C
				17	Q803	72.6°C	87.0°C
				18	Q852	71.6°C	87.3°C
				19	Q850	80.5°C	94.1°C
				20	T1-2	89.3°C	96.5°C
				21	T1-1	86.8°C	93.5°C
				22	T1 Core	86.3°C	89.5°C
				23	Q801	74.4°C	88.7°C
				24	A-PCB	87.3°C	98.3°C
				25	L100	90.3°C	103.7°C
				26	T170	80.0°C	93.1°C
				27	U200	101.6°C	105.3°C
				28	U850	88.1°C	97.5°C
				29	U401	37.8°C	66.5°C
				30	C182	70.7°C	84.0°C
				31	C105	42.6°C	66.9°C
				32	C104	46.9°C	69.3°C
				33	RT10	74.1°C	85.4°C
				34	CN451	68.6°C	81.7°C
				35	RT12	64.7°C	79.4°C
				28	Q712	70.5°C	87.4°C
				29	L100-PCB	93.8°C	102.3°C
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230 VAC O/P : 110%LOAD Ta : 25°C	TEST : OK			
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 305VAC/180VAC 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 60 °C/95 %R.H NO DAMAGE	I/P : 315 VAC O/P : FULL LOAD Ta= 60 °C HUMIDITY= 95 %R.H	TEST : OK
5	TEMPERATURE COEFFICIENT	± 0.03 %/°C(0~60°C)	I/P : 230 VAC O/P : FULL LOAD	± 0.002 %/°C(0~60°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	-30~60°C	1. Thermal shock Temperature : -35°C~ +65°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, 2G 10min./1cycle, 60min. each along X, Y, Z axes	(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°C	
9	CAPACITOR LIFE CYCLE	SUPPOSE C104 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= 60 °C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta= 60 °C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta= 60 °C LIFE TIME Note: 15years(131,400h) is the maximum so that the deterioration of the sealing material		(1) 131400HRS (2) 131400HRS (3) 131400HRS (4) 131400HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 566.1K hrs min. Telcordia SR-332 (Bellcore) ; 47.3K hrs min. MIL-HDBK-217F (25°C)		
11	Ongoing Reliability Test	I/P : 230VAC O/P : FULL LOAD TA=60°C Demonstration Mean Time Between Failure : 50,000 hours		

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	DANIEL GAO	SANFORD SU	ERIS WU

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