



Test Report: NPF-200-48

200W Constant Voltage+Constant Current LED Driver

■ 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

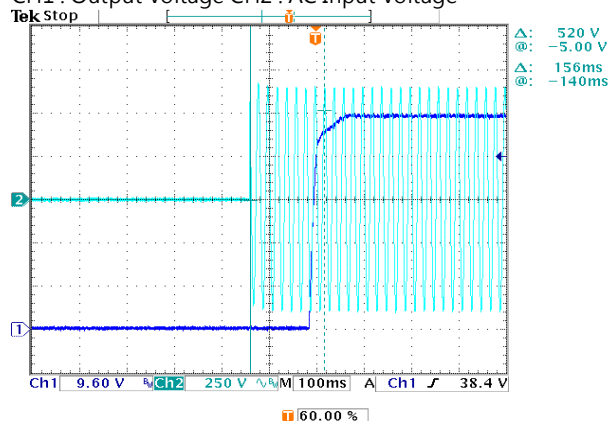
ENVIRONMENT TEST

■ DESIGN VERIFY TEST

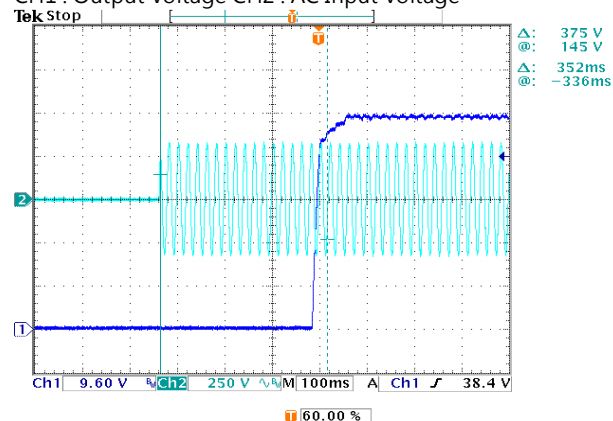
OUTPUT FUNCTION TEST

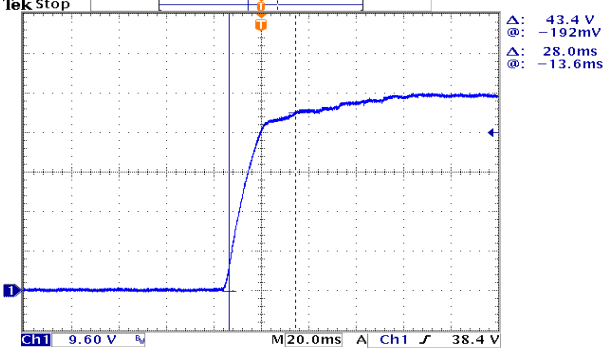
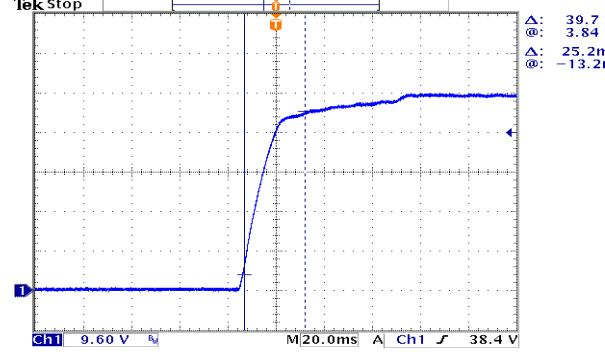
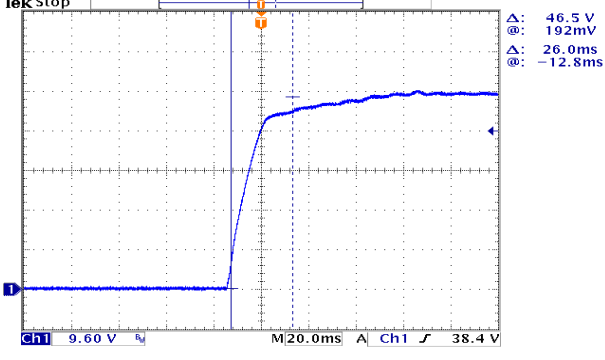
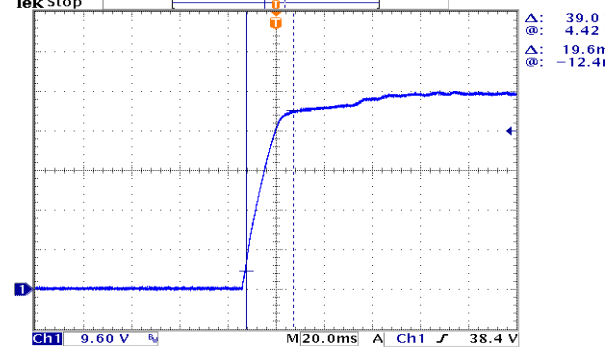
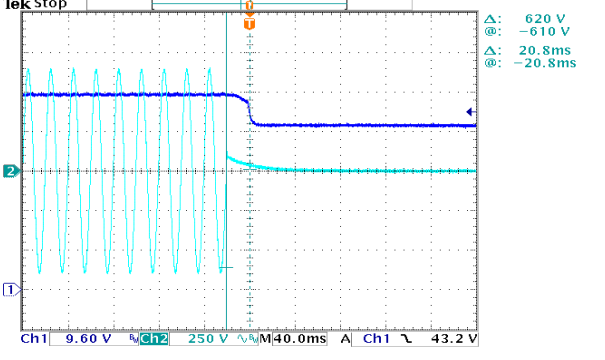
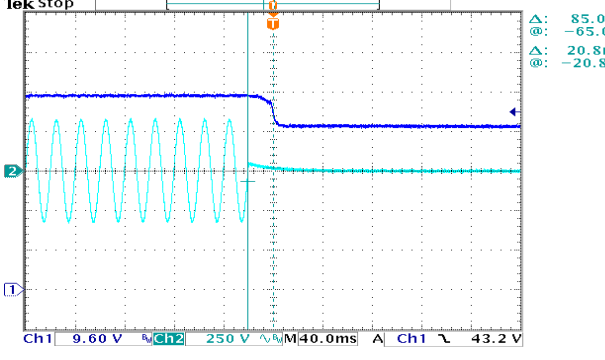
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	CURRENT TOLERANCE	±5%	I/P: 230 VAC I/P:115VAC O/P:FULL LOAD Ta:25°C LEDH MODE TEST	-0.96%~2.94%
2	CONSTANT CURRENT AND OUTPUT VOLTAGE REGION	CH1: 24V~48V	I/P: 230 VAC O/P:FULL LOAD Ta:25°C LEDH MODE TEST	19.2V~47.1V /230VAC
3	OUTPUT VOLTAGE TOLERANCE	V1: -2% ~ 2% (Max)	I/P:110 /305 VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: 0.06%~0.2%
4	LINE REGULATION	V1: -0.5% ~ 0.5% (Max)	I/P:110 /305 VAC O/P:FULL LOAD Ta:25°C	V1: -0.02%~ 0.02%
5	LOAD REGULATION	V1: -0.5% ~ 0.5% (Max)	I/P:110 /305 VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: -0.04%~0.06%
6	OVER/UNDERSHOOT TEST	< ±5%	I/P:110 /305 VAC O/P:FULL LOAD Ta:25°C	TEST: 0.8%
7	CURREN RIPPLE	V1: -5% ~ 5% (Max)	I/P:110VAC /305AC O/P:FULL/ MIN LOAD Ta:25°C	V1: 3.79%
8	SET UP TIME (Max)	230VAC/500ms 115VAC/500ms	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C LEDH MODE TEST	230VAC/156ms 115 VAC/352ms

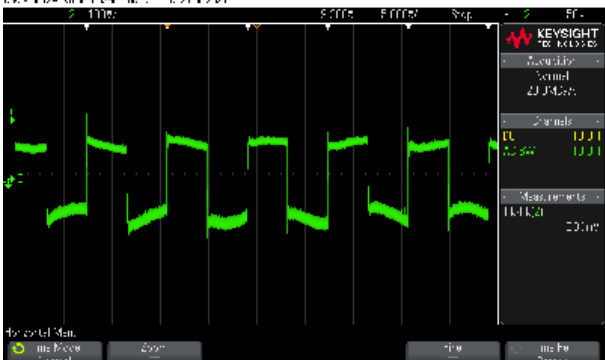
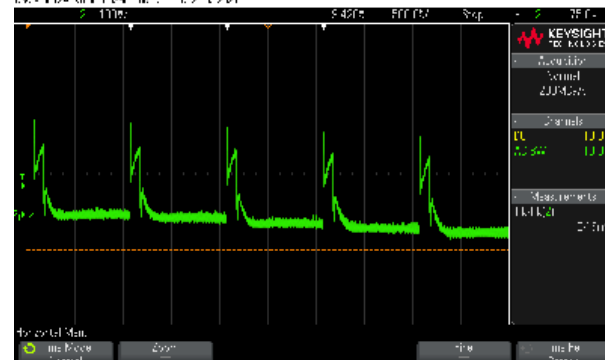
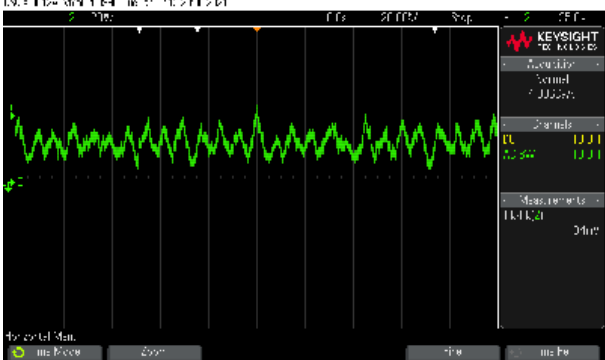
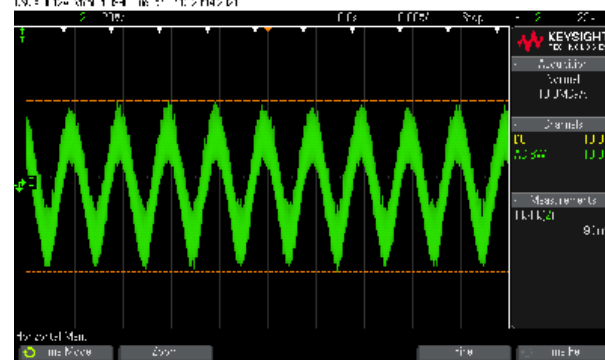
INPUT=230VAC/50HZ @ FULL LOAD
CH1 : Output Voltage CH2 : AC Input Voltage



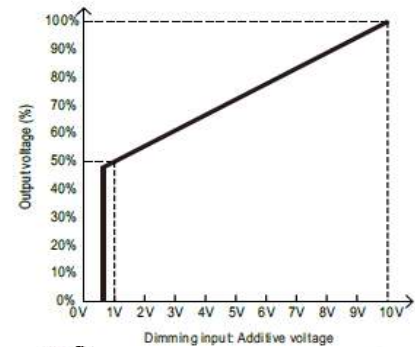
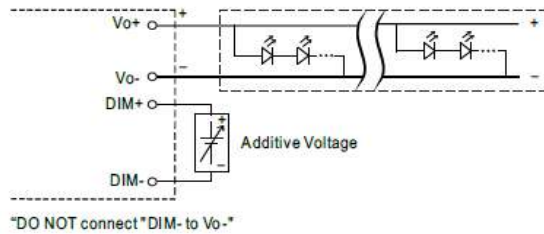
INPUT=115VAC/60HZ @ FULL LOAD
CH1 : Output Voltage CH2 : AC Input Voltage



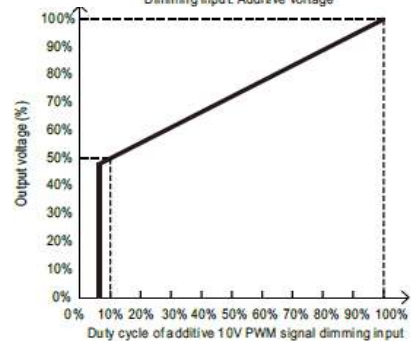
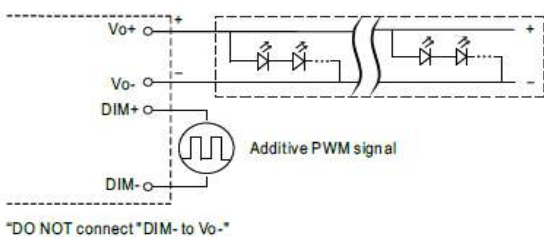
9	RISE TIME (Max)	230VAC/ 80ms for Blank type 115VAC/ 80ms for Blank type 230VAC/ 200ms for V type 115VAC/ 200ms for V type	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C LEDH MODE TEST	230VAC/ 28 ms for Blank type 115 VAC/ 25.2 ms for Blank type 230VAC/ 26 ms for V type 115 VAC/ 19.6 ms for V type
INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage for Blank type  △: 43.4 V @: -192mV △: 28.0ms @: -13.6ms INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage for Blank type  △: 39.7 V @: 3.84 V △: 25.2ms @: -13.2ms INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage for V type  △: 46.5 V @: 192mV △: 26.0ms @: -12.8ms INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage for V type  △: 39.0 V @: 4.42 V △: 19.6ms @: -12.4ms				
10	HOLD UP TIME (Max)	230VAC/10ms 115VAC/10ms	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C LEDH MODE TEST	230VAC/20.8ms 115 VAC/20.8ms
INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage  △: 620 V @: -610 V △: 20.8ms @: -20.8ms INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage  △: 85.0 V @: -65.0 V △: 20.8ms @: -20.8ms				

11	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	330mVp-p FULL /50% LOAD 50%DUTY / 120HZ 346mVp-p FULL /50% LOAD 50%DUTY / 1KHZ
FULL /50% LOAD 50%DUTY / 120HZ				
FULL /50% LOAD 50%DUTY / 1KHZ				
12	RIPPLE & NOISE (Max)	V1: 250mVp-p	I/P: 230 VAC O/P:FULL LOAD Ta:25°C CCH MODE TEST	V1: 90mVp-p
high frequency :				
low frequency :				
13	DIMMING OPERATION (forV-Type)	※ 3 in 1 dimming function to adjust output voltage level • Output constant voltage can be adjusted by applying one of the three methodologies between DIM+ and DIM-: 0 ~ 10VDC, or 10V PWM signal or resistance. • Direct connecting to LEDs is suggested. It is not suitable to be used with additional drivers. • Dimming source current from power supply: 100μA (typ.)		

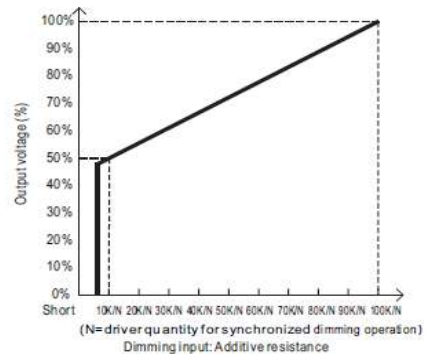
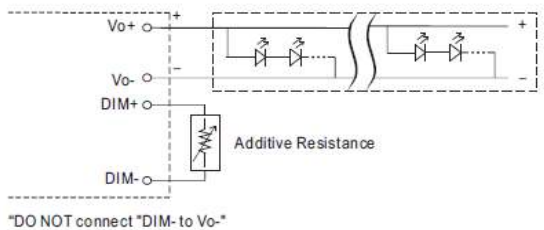
◎ Applying additive 0 ~ 10V DC



◎ Applying additive 10V PWM signal (frequency range 100Hz ~ 3KHz):



◎ Applying additive resistance:



Note : 1. Min. dimming level is about 50% of output voltage and the output voltage is not defined when $V_{out} < 50\%$
2. The output voltage could drop down to 0V when dimming input is about 0k or 0Vdc, or 10V PWM signal with 0% duty cycle.

I/P 230 VAC O/P DIMMING TEST

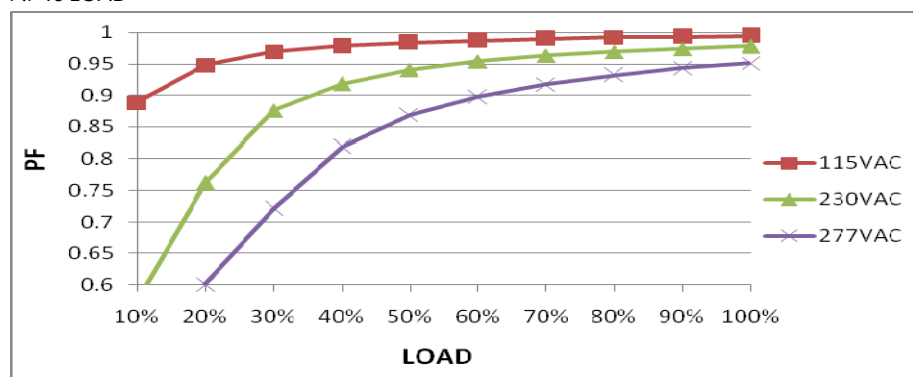
1	V	SHORT	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V	OPEN
	Output Voltage	0.00000 V	23.85	26.49	28.45	30.89	33.63	36.34	39.22	41.94	45.12	48.25	48.18
2	%	0.00%	49.69 %	55.19 %	59.27%	64.35%	70.06 %	75.71 %	81.71 %	87.38 %	94.00 %	100.52 %	100.38 %
	PWM	0V	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	OPEN
3	Output Voltage (100Hz)	0.00000 V	24.08	26.49	29.00	31.60	34.14	36.86	39.58	42.34	45.20	47.91	48.17
	%	0.00%	50.17 %	55.18 %	60.42%	65.83%	71.13 %	76.79 %	82.46 %	88.21 %	94.17 %	99.81%	100.35 %
4	R	0%	10K	20K	30K	40K	50K	60K	70K	80K	90K	100K	OPEN
	Output Voltage	0.00000 V	23.91	26.43	29.03	31.60	34.43	37.13	39.86	42.61	46.04	48.19	48.21
	%	0.00%	49.81 %	55.06 %	60.48%	65.83%	71.73 %	77.35 %	83.04 %	88.77 %	95.92 %	100.40 %	100.44 %

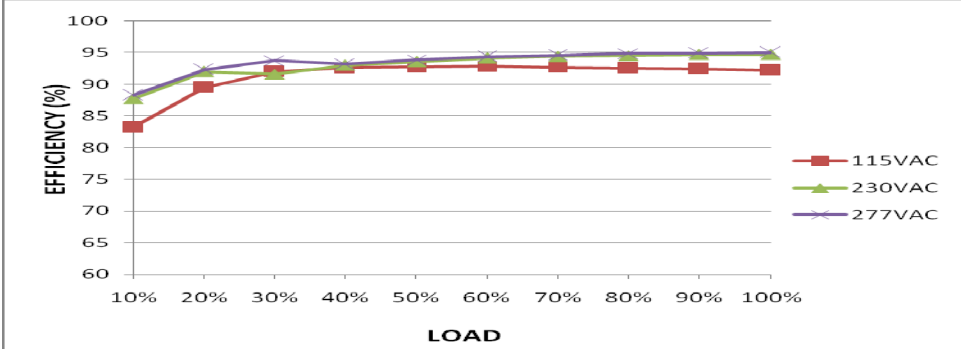
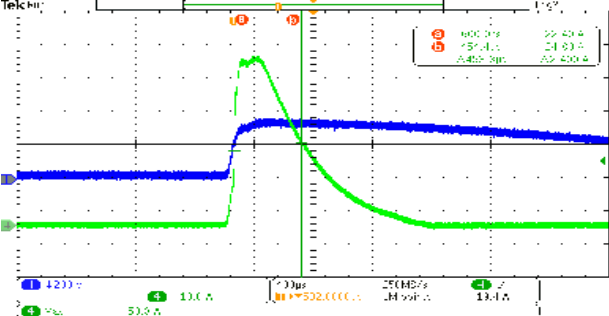
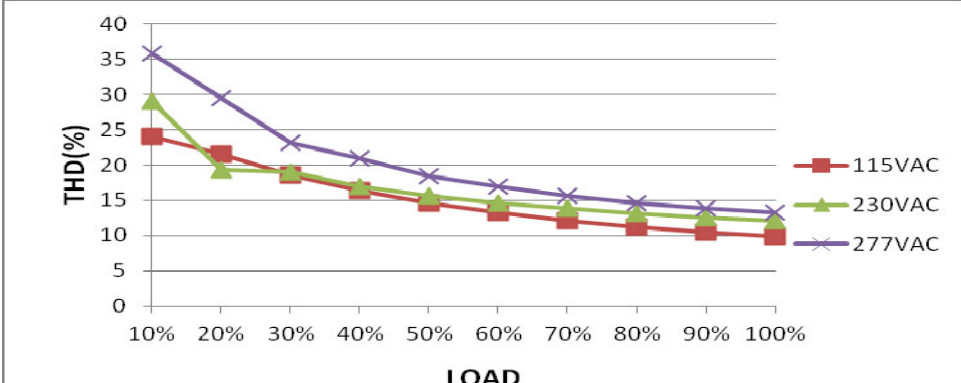
TEST RESULT OK

INPUT FUNCTION TEST

N O	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	100VAC~305 VAC 142VDC~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 (PLEASE CHECK DERATING CURVE) Ta:25°C I/P: LOW-LINE-3V=107 VAC HIGH-LINE+10V=315 VAC O/P:FULL/MIN LOAD (PLEASE CHECK DERATING CURVE) ON: 30 Sec OFF: 30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	(1) 97V~308VAC (2)242Vdc~431Vdc/FULL LOAD 142Vdc~431Vdc/50% LOAD (3) 242Vdc~431Vdc/FULL LOAD 142Vdc~431Vdc/50% LOAD TEST:OK
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P: 110 VAC ~305VAC O/P:FULL~MIN LOAD Ta:25°C	OK
3	INPUT CURRENT (TYP)	277VAC/ 0.9A 230 VAC/1.1A 115 VAC/2.2A	I/P: 277VAC/230 VAC/115 VAC O/P:FULL LOAD Ta:25°C	I=0.75A/277VAC I =0.89A/ 230VAC I =1.79A/ 115VAC
4	STANDBY POWER CONSUMPTION	<0.5W for V-type only	I/P : 230 VAC O/P : Output voltage dim to off Ta : 25°C	0.4073W
5	POWER FACTOR(TYP)	0.96/230 VAC FULL LOAD 0.97/115 VAC FULL LOAD 0.94/277 VAC FULL LOAD	I/P: 230 VAC/115VAC/277VAC O/P:FULL LOAD Ta:25°C	PF=0.978/230V/100%LOAD PF=0.994/115V/100%LOAD PF=0.951/277V/100%LOAD

P.F vs LOAD



6	EFFICIENCY (TYP)	94%	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	94.73 %
EFFICIENCY vs LOAD				
				
7	INRUSH CURRENT (TYP)	230 V/65A (twidh=550us measured at 50% Ipeak) COLD START	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	I = 50.8A/ 230VAC T50= 453.8 us
INPUT=230VAC/50HZ @ FULL LOAD CH1 : AC Input Voltage CH4 : Input current				
				
8	TOTAL HARMONIC DISTORTION	THD<20%(@load 60%/115VC,230VAC; @load 75%/277VAC)	I/P : 115/230VAC O/P : 60% LOAD Ta : 25°C I/P : 277VAC O/P : 75% LOAD Ta : 25°C	THD : 13.24%/ 60% Load/115VAC THD : 14.61% /60% Load/230VAC THD : 15.23%/75% Load/277VAC
THD vs LOAD				
				

ROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER CURRENT PROTECTION	95%~108%	I/P: 305VAC I/P: 230VAC I/P: 110VAC O/P: TESTING Ta:25°C	102.1%/ 305VAC 102.3%/ 230VAC 101.8%/100VAC PROTECTION TYPE : Hiccup mode or Constant current limiting, recovers automatically after fault condition is removed
2	OVER VOLTAGE PROTECTION	V1: 53V~65V	I/P: 305VAC I/P: 230VAC I/P: 110VAC O/P: MIN LOAD Ta:25°C	56.98V/ 305VAC 56.96V/ 230VAC 56.97V/ 90VAC PROTECTION TYPE : Shut down o/p voltage, re-power on to recover
3	OVER TEMPERATURE PROTECTION	NO DAMAGE	I/P: 305 VAC I/P: 110 VAC O/P: FULL LOAD	O.T.P. Active PROTECTION TYPE : Shut down o/p voltage, re-power on to recover
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 305VAC I/P: 110 VAC O/P: FULL LOAD Ta:25°C	NO DAMAGE PROTECTION TYPE : Hiccup mode or Constant current limiting, recovers automatically after fault condition is removed

COMPONENT STRESS TEST

N O	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor (D to S) or (C to E) Peak Voltage	Q73 Rated 11 A/ 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. (8) LEDmax (9) LEDmin	VDS: (1) 475V (2) 503V (3) 471V (4) 467V (5) 464V (6) 467V (7) 497V (8) 468V (9) 482V

			I/P:Low-Line -3V = 97V 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) LEDmax (9)LEDmin Ta:25°C	VDS: (1) 476V (2) 480V (3) 459V (4) 463V (5) 468V (6) 472V (7) 463V (8) 446V (9) 458V
2	P.F.C Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated 26A/ 600V	AC ON/OFF I/P:High-Line +3V =308 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 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. (8) LEDmax (9)LEDmin I/P:Low-Line -3V = 97V 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) LEDmax (9)LEDmin Ta:25°C	VDS: (1) 529V (2) 448V (3) 505V (4) 529V (5) 517V (6) 513V (7) 464V (8) 537V (9) 533V VDS: (1) 517V (2) 480V (3) 513V (4) 521V (5) 517V (6) 517V (7) 526V (8) 513V (9) 509V

3	P.F.C DIODE	D5 Rated 9A/600V	AC ON/OFF I/P:High-Line +3V =308 V 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) LEDmax (6)LEDmin I/P:Low-Line -3V = 97V 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) LEDmax (6)LEDmin Ta:25°C	(1) 486V (2) 422V (3) 511V (4) 510V (5) 515V (6) 508V (1) 446V (2) 488V (3) 450V (4) 446V (5) 442V (6) 451V
4	Diode Peak Voltage	Q101 Rated 33A/ 150V Q100 Rated 33A/ 150V	AC ON/OFF I/P:High-Line +3V =308 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 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. (8).NO LOAD (9) LEDmax (10)LEDmin Ta:25°C	Q101: VDS: (1) 104.9V (2) 15.7V (3) 104.9V (4) 104.1V (5) 103.3V (6) 104.9V (7) 15.7V (8) 102.5V (9) 104.1V (10) 60.7V Q100 VDS: (1) 108.9V (2) 26.1V (3) 107.3V (4) 108.1V (5) 107.3V (6) 106.5V (7) 23.7V (8) 100.9V (9) 106.5V (10) 63.9V

5	Input Capacitor Voltage	C5 Rated: 100uF / 450 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) 452V (2) 436V (3) 452V (4) 444V
6	Control IC Voltage Test	U1 Rated - 0.3V~35V U2 Rated - 0.3V to 20V U100 Rated - 0.3V~32V	AC ON/OFF I/P:High-Line +3V =308 V FOR C.V MODE TYPE O/P(1)FULL LOAD (2) Output Short (3)O.L.P (4)O.V.P. (5)NO LOAD VRmin.LOW LINE FOR C.C MODE TYPE O/P(6)LEDmax (7)LEDmin	U2: (1) 18.2V (2) 17.4V (3) 17.6V (4) 15.8V (5) 15.8V (6) 17.8V (7) 18V U1: (1) 17.6V (2) 17.7V (3) 17.4V (4) 17.2V (5) 15.8V (6) 17.4V (7) 17.4V U100: (1) 10.8V (2) 11.2V (3) 11.4V (4) 16.8V (5) 10.7V (6) 10.7V (7) 10.8V

SAFETY & EMC TEST

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 3.75KVAC/min	I/P-O/P: 4.125 KVAC/min Ta:25°C	I/P-O/P: 3.214mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100MΩ	I/P-O/P: 500 VDC Ta:25°C	I/P-O/P: 9999MΩ NO DAMAGE
3	LEAKAGE CURRENT	< 0.25mA / 277VAC	I/P: 277 VAC O/P:Min LOAD Ta:25°C	L-FG:0.037mA N-FG:0.035 mA

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS C	I/P: 230VAC/50HZ O/P:FULL LOAD Ta:25°C	PASS
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 LIGHT 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 LIGHT INDUSTRY INPUT: 1KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A
6	SURGE	IEC61000-4-5 INDUSTRY L-N :2KV	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 : NPF-200V-48 1. ROOM AMBIENT BURN-IN : 2HRS I/P : 230VAC O/P : FULL LOAD Ta=25.6 °C 2. HIGH AMBIENT BURN-IN : 2HRS I/P : 230VAC O/P : FULL LOAD Ta=50.6 °C			
		NO	Position	ROOM AMBIENT Ta=25.6 °C	HIGH AMBIENT Ta=50.6°C
		1	RTH1	70.1°C	85.4°C
		2	BD1	66.8°C	86.2°C
		3	Q1	67.2°C	87.0°C
		4	C5	64.5°C	84.2°C
		5	L2	65.4°C	85.1°C
		6	C86	66.4°C	86.4°C
		7	Q71	64.5°C	84.5°C
		8	Q73	65.0°C	85.1°C
		9	U1	64.2°C	84.0°C
		10	C36	65.0°C	85.1°C
		11	T1	71.8°C	92.1°C
		12	C106	53.8°C	75.2°C
		13	Q100	56.4°C	78.1°C
		14	Q101	61.5°C	83.5°C
		15	D5	69.4°C	89.1°C
		16	U101	62.3°C	83.5°C
		17	TC	54.3°C	73.9°C
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230 VAC O/P : 102.6 %LOAD Ta : 25°C	TEST : OK	
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 305VAC/110VAC O/P : FULL LOAD Ta= -45/-30 °C	TEST : OK	
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 45 °C NO DAMAGE	I/P : 305 VAC O/P : FULL LOAD Ta= 45 °C HUMIDITY= 95 %R.H	TEST : OK	
5	TEMPERATURE COEFFICIENT	± 0.03 %/(0°C~50°C)	I/P : 230 VAC O/P : FULL LOAD	± 0.0008 %/°C(0~50°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 : 10CYCLE 5. Input/Output condition : STATIC		

7	THERMAL SHOCK TEST	-40~45°C	1. Thermal shock Temperature : -45°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
8	VIBRATION TEST	10 ~ 500Hz, 5G 10min./1cycle, 60min. each along X, Y, Z axes	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 12min/sweep cycle (4) Acceleration : 6G (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=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) 520069HRS (2) 166867HRS (3) 277193HRS (4) 310931 HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 829.6K hrs min. Telcordia SR-332 (Bellcore) ; 247.5K 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 : 50,000 hours	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	WUWQ/HUANGMK	WENF	LINKX

2018.4.30

GP-A50-F010