



Test Report: NDR-240-48

240W Single Output Industrial DIN RAIL

■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Component Stress Test

■ SAFETY & E.M.C. TEST

Safety Test

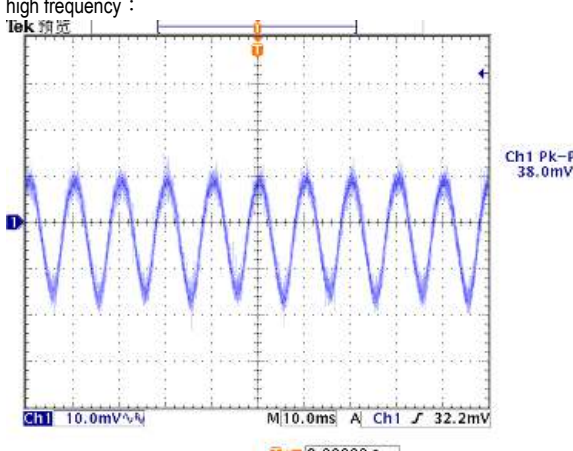
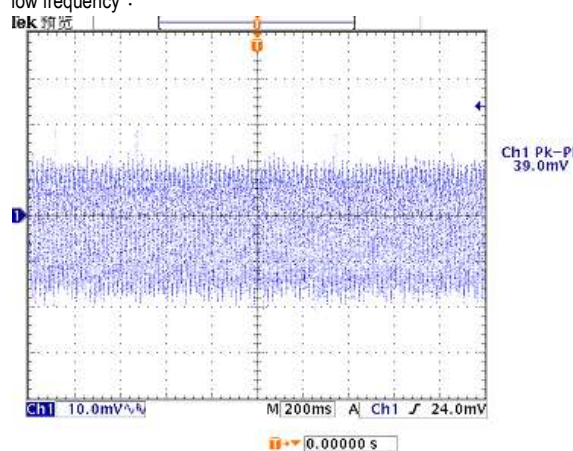
E.M.C. Test

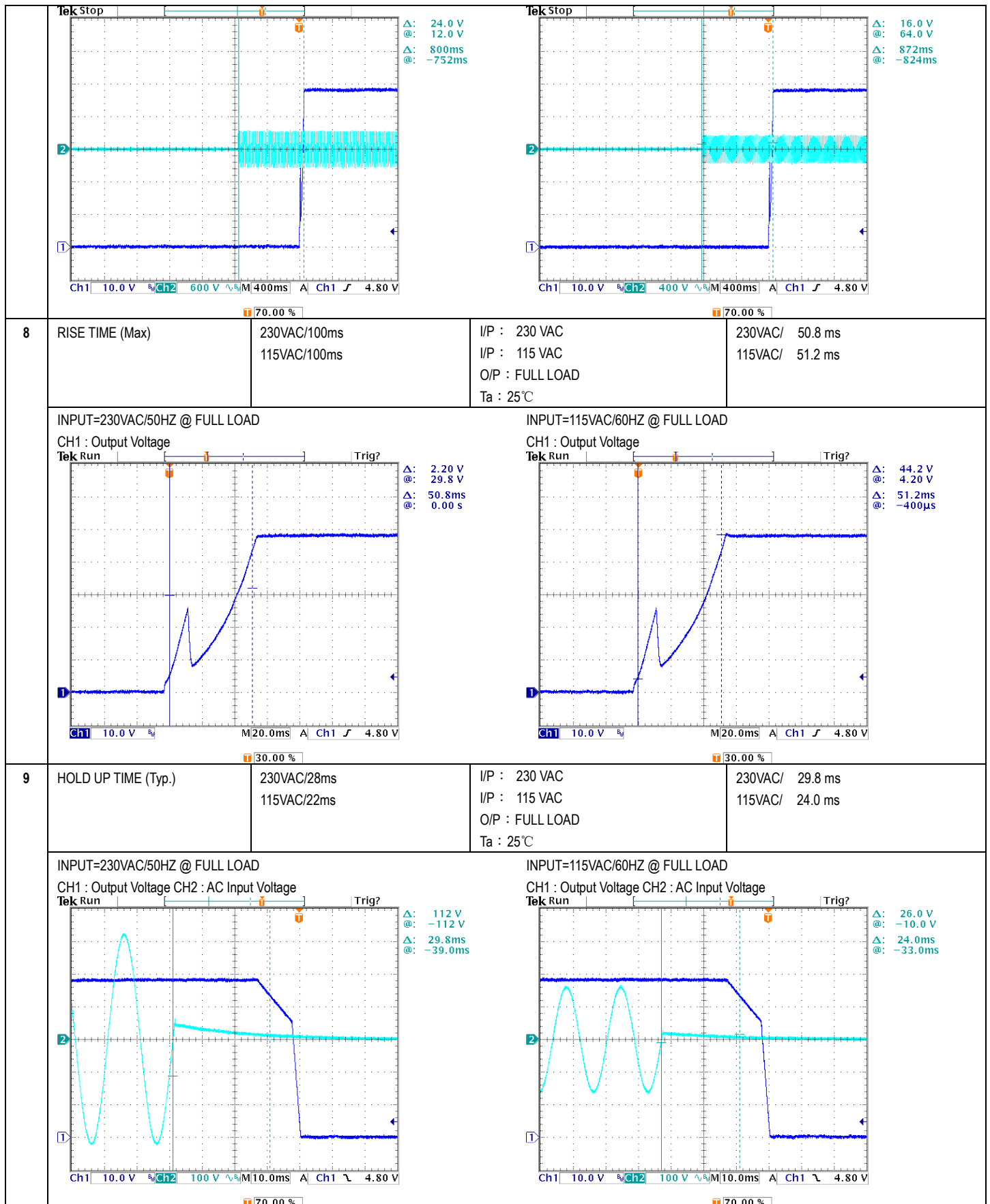
■ RELIABILITY TEST

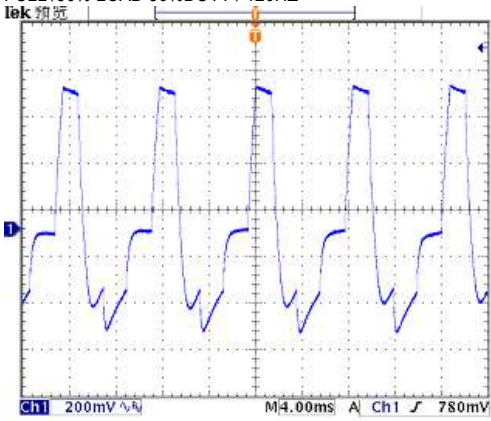
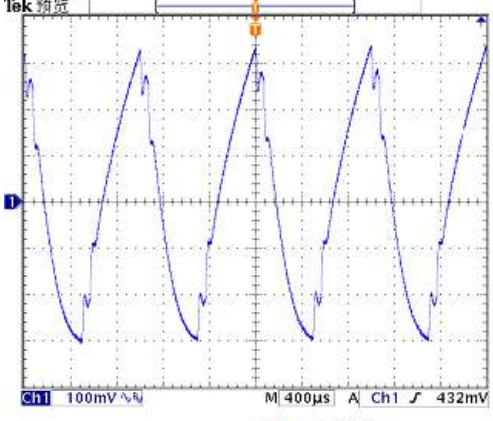
ENVIRONMENT TEST

DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

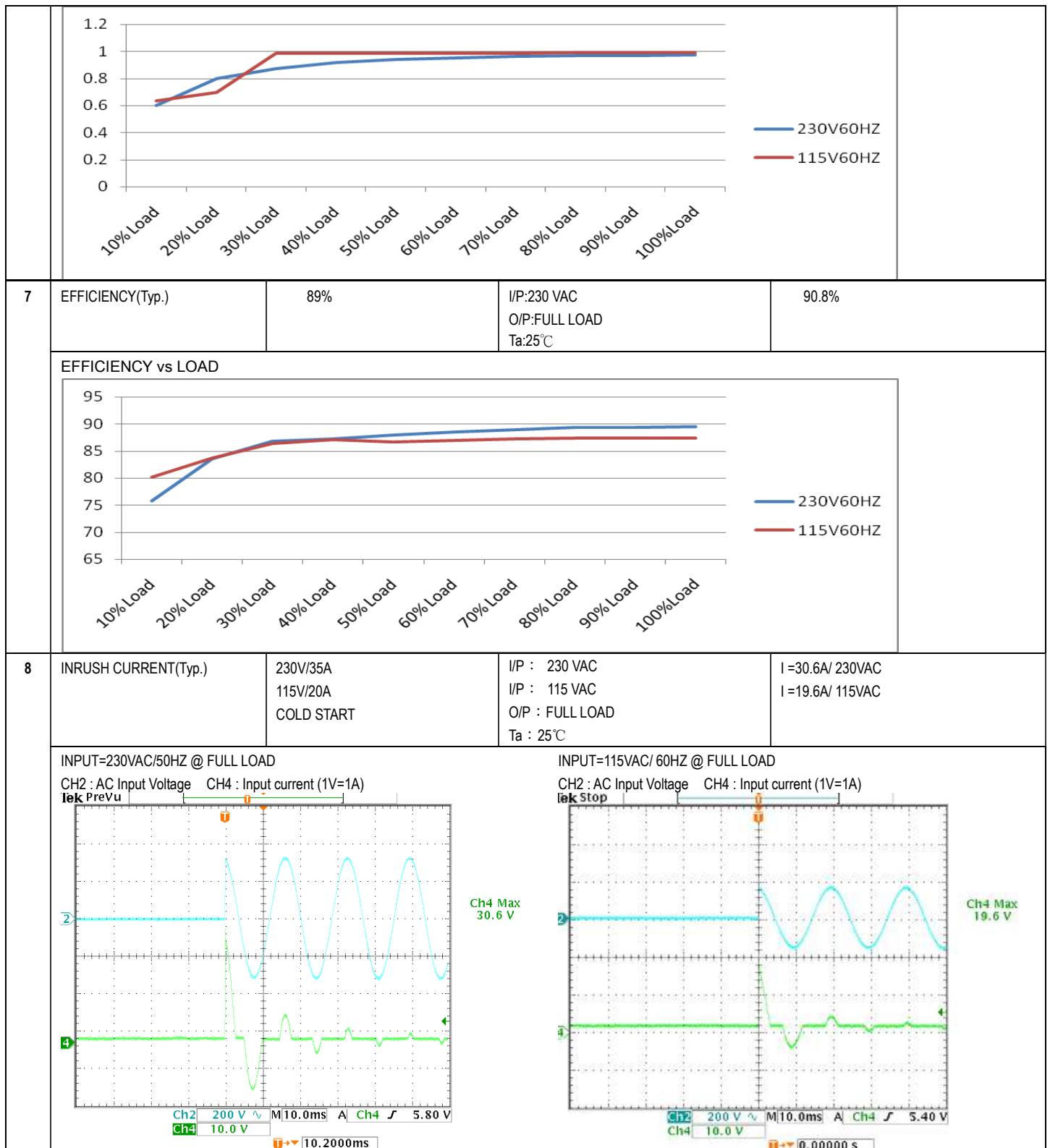
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 48V~ 55V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25℃	46.625V~57.687V/230VAC 46.613V~57.685V/115VAC
2	OUTPUT VOLTAGE(Max) TOLERANCE	V1: -1%~ -1%	I/P: 100VAC /264VAC O/P:FULL/ MIN. LOAD Ta:25℃	V1: 0%~ 0%
3	LINE REGULATION (Max)	V1: -0.5%~ -0.5%	I/P: 100VAC~ 264VAC O/P:FULL LOAD Ta:25℃	V1: 0%~ 0%
4	LOAD REGULATION(Max)	V1: -1%~ -1%	I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25℃	V1: 0%~ 0%
5	OVER/UNDERSHOOT TEST	< ±5%	I/P: 230VAC O/P:FULL LOAD Ta:25℃	< ±5%
6	RIPPLE & NOISE(Max)	V1: 150mVp-p	I/P:230VAC O/P:FULL LOAD Ta:25℃	V1: 39.0mVp-p
high frequency :  Ch1 Pk-Pk 38.0mV low frequency :  Ch1 Pk-Pk 39.0mV				
7	SET UP TIME(Max)	230VAC/1500ms 115VAC/3000ms	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25℃	230VAC/ 800ms 115VAC/ 872ms
INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage			INPUT=115VAC/60HZ @ 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	1070mVp-p 646mVp-p
FULL /50% LOAD 50%DUTY / 120HZ  Ch1 Pk-Pk 1.07 V FULL /50% LOAD 50%DUTY / 1KHZ  Ch1 Pk-Pk 646mV				
11	TRANSIENT RECOVERY TIME	V1: 4800mVp-p <500us	I/P: 230VAC O/P:40% LOAD CHANGE 50%DUTY/120HZ 1.25A/us	434mVp-p 0us

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	90VAC~264VAC	I/P:TESTING O/P:FULL LOAD Ta:25°C	84.7V~264V
			I/P: LOW-LINE-3V=87 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:100 VAC ~264 VAC O/P:FULL~MIN LOAD Ta:25°C	TEST: OK
3	INPUT CURRENT (Typ.)	230V/ 1.3A 115V/ 2.5A	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I=1.18A/ 230VAC I=2.46A/ 115VAC
4	LEAKAGE CURRENT	<1 mA / 240 VAC	I/P : 240 VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.8mA N-FG : 0.8mA
6	POWER FACTOR (Typ.)	0.95/ 230VAC 0.98/115VAC	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	PF=0.975/230VAC PF=0.993/115VAC
	P.F vs LOAD			



PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	105%~ 130 %	I/P: 264VAC I/P: 230VAC I/P: 100VAC O/P:TESTING Ta:25℃	116.8%/ 264VAC 116.8%/ 230VAC 116.5%/100VAC PROTECTION TYPE : constant current limiting, recovers automatically after fault condition is removed
2	OVER VOLTAGE PROTECTION	56V~65V	I/P: 264VAC I/P: 230VAC I/P: 90VAC O/P:MIN LOAD Ta:25℃	62.8V/ 264VAC 62.5V/ 230VAC 62.7V/ 90VAC PROTECTION TYPE : shut down o/p voltage,re-power on to recover
3	OVER TEMPERATURE PROTECTION	Protection type : :shut down o/p voltage,recovers automaticallyafter temperature goes down	I/P: 264VAC I/P: 90VAC O/P:FULL LOAD	O.T.P. Active Protection type :shut down o/p voltage,recovers automaticallyafter temperature goes down
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 264VAC I/P: 90VAC O/P: FULL LOAD Ta:25℃	NO DAMAGE PROTECTION TYPE : constant current limiting, recovers automatically after fault condition is removed

COMPONENT STRESS TEST

[illegible]

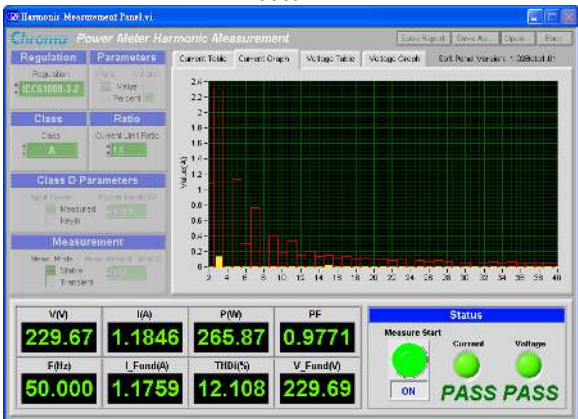
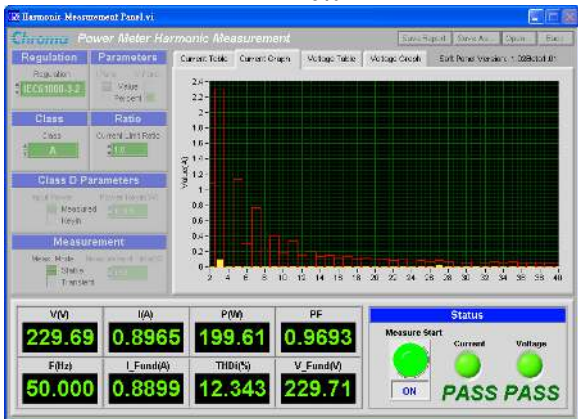
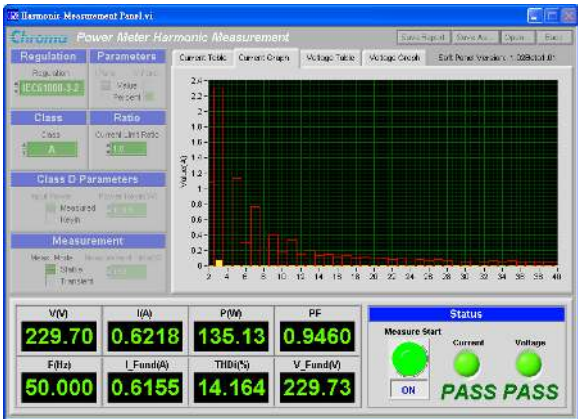
			(2)Output Short (3) Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4) Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (5) Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (6)NO LOAD Ta:25°C	(6)12.5V
2	P.F.C Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated : 20 A/ 600 V VGS ± 30V	I/P:High-Line +3V =267 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)0%→400% 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 100% Load/ Min. Load 50%Duty/120Hz (6)NO LOAD I/P:Low-Line -3V = 97V 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)0%→400% 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 100% Load/ Min. Load 50%Duty/120Hz (6)NO LOAD Ta:25°C	VDS: (1) 428V (2) 404V (3) 430V (4) 415V (5) 436V VGS: (1)13.6V (2)13.4V (3)13.5V (4)13.5V (5)13.2V (6)10.2V VDS: (1) 436 V (2) 440V (3) 464V (4) 451V (5) 441V VGS: (1)13.4V (2)13.2V (3)13.4V (4)13.7V (5)13.1V (6)12.5V
3	P.F.C DIODE	D10 Rated : 8A/ 600V	I/P:High-Line +3V =267 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/	(1) 394V (2) 398V (3) 395V (4) 398V

			Min. Load 50%Duty/120Hz I/P:Low-Line -3V = 97V 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) 362V (2) 374V (3) 374V (4) 372V
4	Diode Peak Voltage	D101 Rated : 10A/ 200V D102 Rated : 20A/ 300 V	I/P:High-Line +3V =267 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)0%→400% Load. Ta:25°C	Q101: VDS: (1)170V (2)165V (3)177V (4)170V (5)165V Q104: VDS: (1)264V (2)284V (3)264V (4)262V (5)284V
5	Input Capacitor Voltage	C5 Rated: : 180 μ / 400 V 105 °C	I/P:High-Line +3V =267 V O/P: (1)Full Load input on/off (2) Min load input on /Off (3)Full Load /Min load Change Ta:25°C	(1)386V (2)382V (3)402V
6	Control IC Voltage Test	PWM IC U1 Rated : 27 V 12V(MIN.)	I/P:High-Line +3V =267 V AC ON/OFF O/P(1)FULL LOAD (2) Output Short (3)O.L.P (4)O.V.P. (5)NO LOAD VR 下限.LOW LINE Ta:25°C	(1) 15.6V (2) 15.6V (3) 15.6V (4) 15.6V (5) 14.3V
7	Clamp Diode Peak Voltage	D22 Rated : 1KV / 1 A	I/P : High-Line +3V = 267 V AC ON/OFF O/P : (1) Dynamic Load 90%Duty/1KHz (2)Full load continue Ta : 25°C	(1)772 (2)768

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 3KVAC/min I/P-FG: 2KVAC/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:1.5mA I/P-FG:1.3mA O/P-FG:0.5m A NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100MΩ I/P-FG: 500VDC>100MΩ O/P-FG:500VDC>100MΩ	I/P-O/P: 500 VDC I/P-FG: 500 VDC O/P-FG: 500 VDC Ta:25°C	I/P-O/P:>9999 MΩ I/P-FG: >9999MΩ O/P-FG: >9999MΩ NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25°C	3.8 mΩ

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
100%  75%  50% 				
2	CONDUCTION	EN55022 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab
3	RADIATION	EN55022 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 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 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			

RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	
1	TEMPERATURE RISE TEST	MODEL : NDR-240-48			
		1. ROOM AMBIENT BURN-IN : 1 HRS I/P : 230VAC O/P : FULL LOAD Ta= 19.5 °C			
		2. HIGH AMBIENT BURN-IN : 1 HRS I/P : 230VAC O/P : FULL LOAD Ta= 46.3 °C			
		NO	Position	ROOM AMBIENT Ta= 19.5 °C	HIGH AMBIENT Ta= 46.3 °C
		1	LF1	32.5°C	58.7°C
		2	LF2	41.1°C	67.7°C
		3	BD1	51.3°C	77.2°C
		4	LF3	47.4°C	74.3°C
		5	C5	39.1°C	64.5°C
		6	U1	45.2°C	71.7°C
		7	C105	48.4°C	75.6°C
		8	L100	56.2°C	84.9°C
		9	T1	62.7°C	90.7°C
		10	D102	68.6°C	94.9°C
		11	D101	71.3°C	97.8°C
		12	Q2	68.6°C	95.5°C
		13	Q1	58.0°C	84.9°C
		14	TSW1	46.2°C	72.9°C
		15	U200	55.4°C	82.2°C
		16	C68	40.4°C	66.9°C
17	L4	39.2°C	65.0°C		
18	D22	60.2°C	87.6°C		
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230 VAC O/P : 117 % LOAD Ta : 25°C	TEST : OK	
		TURN ON AFTER 2 HOUR	I/P : 264VAC/100VAC O/P : 100 % LOAD Ta= -25 °C	TEST : OK	
3	LOW TEMPERATURE TURN ON TEST				

4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50 °C NO DAMAGE	I/P : 272 VAC O/P : FULL LOAD Ta= 52.7 °C HUMIDITY= 95 %R.H	TEST : OK
5	TEMPERATURE COEFFICIENT	± 0.03 %/°C (0~50°C)	I/P : 230 VAC O/P : FULL LOAD	± 0.00232 %/°C (0~50°C)
6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -40°C~ +85°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 5 CYCLE 5. Input/Output condition : STATIC		OK
7	THERMAL SHOCK TEST	1. Thermal shock Temperature : -20°C~ +70°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 : 230VAC/Full Load AC ON/OFF TEST turn on 58sec ; turn off 2sec		OK
8	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 12min/sweep cycle (4) Acceleration : 2G (5) Test Time : 60min in each axis (X.Y.Z) (6) Ta : 25°C		TEST : OK
9	CAPACITOR LIFE CYCLE	SUPPOSE C105 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) 293520HRS (2) 50478HRS (3) 62120HRS (4) 89059HRS
10	MTBF	MIL-HDBK-217F TOTAL FAILURE RATE : 230.2 KHRS		
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure (Expected Life): Above 50,000 hours @ TA 50°C		

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	FRANK	GESG	WANGDZ

2007/3/20 A50-S014