

MODEL : USP-150-36

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	RIPPLE & NOISE	V1:250 mVp-p (Max )	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	V1: 40 mVp-p (Max )	PASS
2	OUTPUT VOLTAGE ADJUST RANGE	CH1: 32.4 V~ 39.6 V	I/P: 230 VAC I/P:115VAC O/P:MIN LOAD Ta:25°C	29.869V~40.461V/230VAC 29.871V~40.460V/115VAC	PASS
3	OUTPUT VOLTAGE TOLERANCE	V1: -2 %~ +2 % (Max)	I/P: 90 VAC / 295 VAC O/P:FULL/ NO LOAD Ta:25°C	V1: -0.069 %~ 0.346 %	PASS
4	LINE REGULATION	V1: -0.5 %~ +0.5 % (Max)	I/P: 100 VAC ~ 295 VAC O/P:FULL LOAD Ta:25°C	V1: 0 %~ 0 %	PASS
5	LOAD REGULATION	V1: -1 %~ +1 % (Max)	I/P: 230 VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: -0.017 %~ 0 %	PASS
6	SET UP TIME	230VAC/ 2000 ms (Max) 115VAC/ 3000 ms (Max)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230 VAC/ 865.937 ms 115 VAC/ 1787.458 ms	PASS
7	RISE TIME	230VAC/ 100 ms (Max) 115 VAC/ 100 ms (Max)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230 VAC/ 8.985 ms 115 VAC/ 9.016 ms	PASS
8	HOLD UP TIME	230VAC/ 16 ms (Typ) 115VAC/ 16 ms (Typ)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230VAC/ 25.494 ms 115VAC/ 25.436 ms	PASS
9	OVER/UNDERSHOOT TEST	< ± 5 %	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	TEST: ±2.762 %	PASS
10	DYNAMIC LOAD	V1: 3600 mVp-p	I/P : 230 VAC (1)O/P : FULL /Min LOAD 90%DUTY/ 1KHZ (2)O/P : FULL /Min LOAD 90%DUTY/ 3KHZ (3)O/P : FULL /Min LOAD 90%DUTY/ 5KHZ (4)O/P : FULL /Min LOAD 50%DUTY/ 120HZ Ta : 25°C	(1) 206 mVp-p (2) 200 mVp-p (3) 197 mVp-p (4) 1730 mVp-p	PASS
11	BURN-IN TEST	(1)HI-LINE (a)0%~100% (b)100%~0% (2)LOW-LINE (a)0%~100% (b)100%~0% (3)NORNAL-LINE (a)0%~100% (b)100%~0% (4)NO/FULL LOAD SWITCH	I/P:HI/LOW/NORNAL-LINE 63Hz/47Hz O/P:(1) (a)0%~100% (b)100%~0% (2) (a)0%~100% (b)100%~0% (3) (a)0%~100% (b)100%~0% (4) NO/FULL LOAD SWITCH Ta : 25°C	(1) a.OK b.OK (2) a.OK b.OK (3) a.OK b.OK (4)OK	PASS

INPUT FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	90VAC~ 295VAC	I/P:TESTING O/P:FULL LOAD Ta:25°C	80 V~ 295 V	PASS
			(1)I/P: LOW-LINE-3V= 87 V HIGH-LINE+10V= 305 V O/P:FULL/MIN LOAD ON: 30 Sec . OFF: 30 Sec 10MIN (2) I/P:230VAC ON: 0.5 Sec . OFF: 0.5 Sec 20MIN ( AC POWER ON/OFF NO DAMAGE )	TEST: (1)OK (2)OK	
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE OSC	I/P: 90VAC ~ 295 VAC O/P:FULL-MIN LOAD Ta:25°C	TEST: OK	PASS
3	POWER FACTOR	0.96/ 230 VAC(Typ) 0.98/ 115 VAC(Typ)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	PF= 0.974 / 230VAC PF= 0.997 / 115VAC	PASS
4	EFFICIENCY	93% (Typ)	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	93.72 %	PASS
5	INPUT CURRENT	230 V/ 1 A (Typ) 115 V/ 2 A (Typ)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	I = 0.736 A/ 230VAC I = 1.467 A/ 115VAC	PASS
6	INRUSH CURRENT	230 V/ 65 A (Typ)  COLD START	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	I = 44.515 A/ 230VAC	PASS
7	LEAKAGE CURRENT	< 2 mA / 240VAC EN 60950-1	I/P:295 VAC O/P:NO LOAD Ta:25°C	L-FG: 0.272 mA N-FG: 0.271 mA	PASS

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	110%~ 160% RATED OUTPUT POWER	I/P: 100 VAC I/P: 230 VAC I/P: 295 VAC O/P:TESTING Ta:25°C	145.6 %/ 100 VAC 145.3 %/ 230VAC 145.1 %/ 295 VAC Hiccup Mode	PASS
2	OVER VOLTAGE PROTECTION	CH1: 41.4V~ 48.6V	I/P: 90 VAC I/P: 230 VAC I/P: 295 VAC O/P:MIN LOAD Ta:25°C	44.6 V/ 90 VAC 44.6 V/ 230VAC 44.6 V/ 295 VAC Shut down o/p voltage with auto-recovery or re-power on to recovery	PASS
3	OVER TEMPERATURE PROTECTION	SPEC: RTH2 100 °C ± 5 °C O.T.P. NO DAMAGE	I/P: 230 VAC O/P:FULL LOAD	96.8 °C / 230 VAC O.T.P. Active Shut down o/p voltage. recovers automatically after temperature goes down	PASS
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 295 VAC O/P: FULL LOAD Ta:25°C	NO DAMAGE  Hiccup Mode	PASS

SAFETY TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-FG: 1.5 KVAC/min I/P-O/P: 3.0 KVAC/min O/P-FG: 0.5 KVAC/min EN 60950-1	I/P-FG: 1.8 KVAC/min I/P-O/P: 3.6 KVAC/min O/P-FG: 0.6 KVAC/min Ta:25°C	I/P-FG: 2.459 mA I/P-O/P: 3.200 mA O/P-FG: 3.693 mA NO DAMAGE	PASS
2	ISOLATION RESISTANCE	I/P-FG: 500VDC>100MΩ I/P-O/P:500VDC>100MΩ O/P-FG:500VDC>100MΩ	I/P-FG: 500 VDC I/P-O/P: 500 VDC O/P-FG: 500 VDC Ta:25°C	I/P-FG: >9999 MΩ I/P-O/P: >9999 MΩ O/P-FG: >9999 MΩ NO DAMAGE	PASS
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ EN 60950-1	40 A / 2 min Ta:25°C	9 mΩ	PASS

E.M.C TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS A	I/P: 230 VAC/50HZ O/P:100% LOAD Ta:25°C	PASS	PASS
2	CONDUCTION	EN55022 CLASS B	I/P:230 VAC (50HZ) O/P:FULL LOAD Ta:25°C	PASS Test by certified Lab	PASS
3	RADIATION	EN55022 CLASS B	I/P: 230 VAC (50HZ) O/P:FULL LOAD Ta:25°C	PASS Test by certified Lab	PASS
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	PASS
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	PASS
6	SURGE	EN61000-4-5 INDUSTRY L-N :2KV L,N-PE:4KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A	PASS
7	Test by certified Lab & Test Report Prepare				

ENVIRONMENT TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR ( MIN )	I/P: 230 VAC O/P: 145 % LOAD Ta:25°C	TEST : OK	PASS
2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P: 295 VAC/100 VAC O/P: 100% LOAD Ta= -30°C	TEST : OK	PASS
3	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 55 °C NO DAMAGE	I/P: 298 VAC O/P:FULL LOAD Ta= 55 °C HUMIDITY= 95 %R.H	TEST : OK	PASS

4	TEMPERATURE COEFFICIENT	± 0.03 %(0~60℃)	I/P: 230 VAC O/P:FULL LOAD	±0.008%(0~60℃)	PASS		
5	STORAGE TEMPERATURE TEST	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 : 5 CYCLE 5. Input/Output condition : STATIC		TEST : OK	PASS		
6	THERMAL SHOCK TEST	1. Thermal shock Temperature : -30℃~ + 55℃ 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 : 230VAC/Full Load		TEST : OK	PASS		
7	VIBRATION TEST	1 Carton & 1 Set (1) Waveform: Sine Wave (2) Frequency:10~500Hz (3) Sweep Time:12min/sweep cycle (4) Acceleration:2G (加1.5G TEST 及加测 RANDOM TEST) (5) Test Time:1 hour in each axis (X.Y.Z) (6) Ta:25℃		TEST : OK	PASS		
8	CAPACITOR LIFE CYCLE	SUPPOSE C 102 IS THE MOST CRITICAL COMPONENT (1) I/P: 230 VAC O/P:FULL LOAD Ta= 25 ℃ LIFE TIME= 690030 HRS (2) I/P: 230 VAC O/P:FULL LOAD Ta= 55 ℃ LIFE TIME= 94341 HRS			PASS		
9	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE: 216.3K HRS			PASS		
10	TEMPERATURE RISE TEST	MODEL : USP-150-24 1. ROOM AMBIENT BURN-IN : 2 HRS I/P: 230 VAC O/P: 100% LOAD Ta= 33.5 ℃ 2. HIGH AMBIENT BURN-IN : 2 HRS I/P: 230 VAC O/P: 100% LOAD Ta= 54.1 ℃			PASS		
		NO	Position	P/N		ROOM AMBIENT Ta= 33.5 ℃	HIGH AMBIENT Ta= 54.1 ℃
		1	LF2	TR-652		52.1℃	72.5℃
		2	BD1	GBU408		56.2℃	75.2℃
		3	RTH2	NTC 220KΩ		63.7℃	82.9℃
		4	L1	TR-654		56.8℃	76.0℃
		5	L2	TF-6294		66.7℃	85.6℃
		6	D2	8E2TH06FP		69.2℃	87.9℃
		7	Q5	STF13NM50N		63.6℃	83.2℃
		8	Q1	STF22NM60N		56.7℃	75.4℃
		9	T1	TF-6290		83.6℃	102.5℃
		10	Q101	IRFB3607PBF		61.1℃	81.0℃
		11	U1	NCP1608B		60.2℃	79.9℃
		12	U900	L6599AD		63.1℃	82.3℃
		13	C33	223/1KV		61.3℃	79.9℃
		14	C5	100uF/450V KXG		60.3℃	78.8℃
		15	C38	100uF/25V YXM		60.8℃	79.9℃
		16	C16	100uF/50V KY		61.2℃	80.4℃
		17	C201	47uF/50V YXM		61.1℃	80.4℃
		18	C61	10uF/50V YXM		62.1℃	81.5℃
		19	C102	1000uF/35V ZLH		54.1℃	73.3℃
		20	C105	390uF/35V ZLH	50.1℃	69.4℃	

COMPONENT STRESS TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor ( D to S) or (C to E) Peak Voltage	Q5 Rated STF13NM50N : 500 V 12 A	I/P:High-Line +3V = 298 V O/P: (1)Full Load input on/off (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (4)Dynamic Load 50% Load/ Min. Load 50%Duty/120Hz  I/P:Low-Line -3V = 87 V O/P: (1)Full Load input on/off (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (4)Dynamic Load 50% Load/ Min. Load 50%Duty/120Hz Ta:25°C	(1) 474 V (2) 452 V (3) 454 V (4) 452 V  (1) 472 V (2) 452 V (3) 456 V (4) 448 V	PASS
2	Diode Peak Voltage	Q101 Rated IRF3415: 150 V 43 A	I/P:High-Line +3V =298 V O/P: (1)Full Load input on/off (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (4)Dynamic Load 50% Load/ Min. Load 50%Duty/120Hz  I/P:Low-Line -3V =87 V O/P: (1)Full Load input on/off (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (4)Dynamic Load 50% Load/ Min. Load 50%Duty/120Hz Ta:25°C	(1) 94.0 V (2) 43.0 V (3) 83.0 V (4) 80.5 V  (1) 94.5 V (2) 43.2 V (3) 82.7 V (4) 80.0 V	PASS
3	Input Capacitor Voltage	C 5 Rated NCC : 100u / 450 V 105°C / KXG Series	I/P:High-Line +3V = 298 V O/P: (1)Full Load input on/off (2) Min load input on /Off (3)Burn-IN 1 Hour Ta:25°C	(1) 478 V (2) 466 V (3) 440 V	PASS
4	Control IC Voltage Test	U 1 Rated NCP1608B: 20 V U 900 Rated L6599AD: 16 V	I/P:High-Line +3V =298 V 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	U1 U900 (1) 19.0 V (1) 13.4 V (2) 18.9 V (2) 13.1 V (3) 18.9 V (3) 13.0 V (4) 18.9 V (4) 13.1 V (5) 17.6 V (5) 13.1 V	PASS

5	P.F.C Transistor ( D to S) or (C to E) Peak Voltage	Q 1 Rated STF22NM60N: 600 V 16 A	<p>I/P:High-Line +3V = 298 V  O/P: (1)Full Load input on/off  (2)Output Short  (3)Dynamic Load Full Load/  Min. Load 90%Duty/3KHz  (4)Dynamic Load 50% Load/  Min. Load 50%Duty/120Hz</p> <p>I/P:Low-Line -3V = 87 V  O/P: (1)Full Load input on/off  (2)Output Short  (3)Dynamic Load Full Load/  Min. Load 90%Duty/3KHz  (4)Dynamic Load 50% Load/  Min. Load 50%Duty/120Hz</p> <p>Ta:25°C</p>	<p>(1) 480V  (2) 456V  (3) 458V  (4) 454V</p> <p>(1) 490V  (2) 456V  (3) 467V  (4) 456V</p>	PASS
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DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2010/4/23	RD SAMPLE	PASS	SKY	HOWAY
2011/1/14	PRODUCT SAMPLE	PASS	SKY	HOWAY