

MODEL : QP-320F

## OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	RIPPLE & NOISE	V1:100 mVp-p (Max) V2:150 mVp-p (Max) V3:150 mVp-p (Max) V4:150 mVp-p (Max)	I/P: 230VAC O/P:FULL LOAD Ta:25°C	V1: 85 mVp-p (Max) V2: 70 mVp-p (Max) V3: 43 mVp-p (Max) V4: 59 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1: 4.75V~ 5.5V CH2: 14.25V~ 16.5 V	I/P: 230 VAC O/P:MIN LOAD Ta:25°C	4.6 V~ 5.97 V/ CH1 13.01 V~ 17.78 V/ CH2	P
3	OUTPUT VOLTAGE TOLERANCE	V1: 3 %~ -3 % (Max) V2: 3 %~ -3 % (Max) V3: 10 %~ -6 % (Max) V4: 10 %~ -10 % (Max)	I/P: VAC / 264 VAC O/P:FULL/ MIN LOAD Ta:25°C	V1: 0.8 %~ -0.8 % V2: 0.25 %~ -0.25 % V3: 2.6 %~ -2.6 % V4: 2.7 %~ -2.7 %	P
4	LINE REGULATION	V1: 1 %~ -1 % (Max) V2: 2 %~ -2 % (Max) V3: 2 %~ -2 % (Max) V4: 3 %~ -3 % (Max)	I/P: VAC ~ 264 VAC O/P:FULL LOAD Ta:25°C	V1: 0 %~ 0 % V2: 0 %~ 0 % V3: 0.03 %~ -0.03 % V4: 0.1 %~ -0.1 %	P
5	LOAD REGULATION	V1: 2 %~ -2 % (Max) V2: 3 %~ -3 % (Max) V3: 6 %~ -6 % (Max) V4: 8 %~ -8 % (Max)	I/P: 230 VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: 0.8 %~ -0.8 % V2: 0.25 %~ -0.25 % V3: 2.6 %~ -2.6 % V4: 1.4 %~ -1.4 %	P
6	CROSS REGULATION	V1: 2 %~ -2 % (Max) V2: 3 %~ -3 % (Max) V3: 6 %~ -6 % (Max) V4: 8 %~ -8 % (Max)	I/P: 230 VAC O/P: Testing O/P 60%LOAD Other O/P 40%LOAD Change Ta:25°C	V1: 0.25 %~ -0.25 % V2: 0.04 %~ -0.04 % V3: 2 %~ -2 % V4: 2.7 %~ -2.7 %	P
7	SET UP TIME	230VAC: 800 ms (Max)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230VAC 527 ms	P
8	RISE TIME	230VAC: 50 ms (Max)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230VAC/ 26 ms	P
9	HOLD UP TIME	230VAC: 16 ms (TYP)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230VAC/ 21 ms	P
10	OVER/UNDERSHOOT TEST	< ±5%	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	TEST: <5 %	P
11	DYNAMIC LOAD	V1: 1000 mVp-p	I/P: 230 VAC O/P:FULL /Min LOAD 90%DUTY/1KHZ Ta:25°C	346 mVp-p	P

## INPUT FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	90VAC~264 VAC	I/P:TESTING O/P:FULL LOAD Ta:25°C	67 V~264V	P
			I/P: LOW-LINE-3V= 97 V HIGH-LINE+15%=300 V O/P:FULL/MIN LOAD ON: 30 Sec . OFF: 30 Sec 10MIN ( AC POWER ON/OFF NO DAMAGE )	TEST: OK	
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE OSC	I/P: 90 VAC ~ 264 VAC O/P:FULL~MIN LOAD Ta:25°C	TEST: OK	P
3	POWER FACTOR	0.95 / 230 VAC(TYP)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	PF= 0.96 / 230 VAC	P
		0.98 / 115 VAC(TYP)		PF= 0.99 / 115 VAC	
4	EFFICIENCY	83% (TYP)	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	84.6 %	P
5	INPUT CURRENT	230V/ 2.5 A (TYP)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	I = 1.7 A/ 230 VAC	P
		115V/ 5 A (TYP)		I = 3.5 A/ 115 VAC	
6	INRUSH CURRENT	230V/ 45 A (TYP)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	I = 38 A/ 230 VAC	P
		115V/ 25 A(TYP) COLD START		I = 19 A/ 115 VAC	
7	LEAKAGE CURRENT	< 2 mA / 240 VAC	I/P: 254 VAC O/P:Min LOAD Ta:25°C	L-FG: 0.7 mA N-FG: 0.7 mA	P

### PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	105 %~ 150%	I/P: 230 VAC I/P: 115 VAC O/P:TESTING Ta:25°C	128 %/ 230 VAC 128 %/ 115 VAC Foldback Current Limiting	P
2	OVER VOLTAGE PROTECTION	CH1: 5.75 V~ 6.75 V CH2: 17.25 V~ 20.25 V	I/P: 230 VAC I/P: 115 VAC O/P:MIN LOAD Ta:25°C	CH1: 6 V/ 230 VAC 6 V/ 115 VAC CH2: 18.9 V/ 230 VAC 18.9 V/ 115 VAC Shunt down Re- power ON	P
3	OVER TEMPERATURE PROTECTION	SPEC: TSW1: 95 ± 5°C O.T.P. NO DAMAGE	I/P: 230 VAC O/P:FULL LOAD	O.T.P. Active Shut down o/p volotage · recovers automatically after temperature goes down	P
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 264 VAC O/P:FULL LOAD Ta:25°C	NO DAMAGE Constant Current Limiting	P

### CONTROL FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	FAN SPEED CONTROL	-----	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	Fan Voltage= 11.58 V	P
2	POWER GOOD SIGNAL	DELAY 10ms ~ 500ms	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	123 ms/ 230VAC 123 ms/ 115VAC	P
3	POWER FAIL SIGNAL	> 1ms	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	11 ms/ 230 VAC 11 ms/ 115 VAC	P

## ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	TEMPERATURE RISE TEST	MODEL : QP-320D 1. ROOM AMBIENT BURN-IN : 12 HRS I/P: 230VAC O/P: FULL LOAD Ta= 31 °C 2. HIGH AMBIENT BURN-IN : 2 HRS I/P: 230VAC O/P: FULL LOAD Ta= 60.7 °C			P
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR ( MIN )	I/P: 230 VAC O/P: 115 % LOAD Ta:25°C	TEST : OK	P
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P: 230 VAC O/P: 100% LOAD Ta= -10 °C	TEST : OK	P
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= 50°C HUMIDITY= 95 %R.H	TEST : OK	P
5	TEMPERATURE COEFFICIENT	± 0.03 %(0-50°C)	I/P: 230 VAC O/P: FULL LOAD	± 0.01 %(0-50°C)	P
6	VIBRATION TEST	1 Carton & 1 Set (1) Waveform: Sine Wave (2) Frequency:10-500Hz (3) Sweep Time:10min/sweep cycle (4) Acceleration:2G (5) Test Time:1 hour in each axis (X.Y.Z) (6) Ta:25°C		TEST : OK	P

### SAFETY TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-O/P: 3 KVAC/min I/P-FG: 1.5 KVAC/min O/P-FG: 0.5 KVAC/min	I/P-O/P: 3.6 KVAC/min I/P-FG: 1.8 KVAC/min O/P-FG: 0.6 KVAC/min Ta:25°C	I/P-O/P: 5.92 mA I/P-FG: 4.79 mA O/P-FG: 5.33 mA NO DAMAGE	P
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: 30 GΩ I/P-FG: 30 GΩ O/P-FG: 30 GΩ NO DAMAGE	P
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta:25°C	3 mΩ	P
4	APPROVAL	TUV: Certificate NO : R50073099 UL: File NO : E183223			P

### E.M.C TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS D	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	PASS	P
2	CONDUCTION	EN55022 CLASS B	I/P: 230 VAC (50HZ) O/P:FULL/50% LOAD Ta:25°C	PASS Test by certified Lab	P
3	RADIATION	EN55022 CLASS B	I/P: 230 VAC (50HZ) O/P:FULL LOAD Ta:25°C	PASS Test by certified Lab	P
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	P
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	P
6	SURGE	IEC61000-4-5 LIGHT INDUSTRY L-N :1KV L,N-PE:2KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A	P
7	Test by certified Lab & Test Report Prepare				

### M.T.B.F & LIFE CYCLE CALCULATION

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	CAPACITOR LIFE CYCLE	SUPPOSE C 110 IS THE MOST CRITICAL COMPONENT I/P: 230VAC O/P:FULL LOAD Ta= 25 °C LIFE TIME= 474329 HRS I/P: 230VAC O/P:FULL LOAD Ta= 50 °C LIFE TIME= 106138 HRS			P
2	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE: 213.5 HRS			P

## COMPONENT STRESS TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor ( D to S) or (C to E) <b>Peak Voltage</b>	Q2 Rated 2SK2082 : 900 V 9A	I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on (2) Full Load (3)Output Short Ta:25°C	(1) 760 V (2) 760 V (3) 844 V	P
2	Diode Peak <b>Voltage</b>	D100 Rated S60SC4M : 40V 60A  D200 Rated KCH30A10 : 100V 30A  D300 Rated F20NC15 : 150V 20A  D400 Rated YG805C10 : 120V 20A	I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on (2) Full Load (3)Output Short Ta:25°C	(1) 24 V (2) 21.4 V (3) 22.4 V  (1) 68.4 V (2) 70.4 V (3) 55.2 V  (1) 86.8 V (2) 92.8 V (3) 62 V  (1) 59.6 V (2) 58.4 V (3) 37.6 V	P
3	Clamp Diode Peak <b>Voltage</b>	D4 Rated HER208 : 1KV 2A	I/P:High-Line +3V = 267 V O/P: (1)Full Load (2) Dynamic Load 90%Duty/1KHz Ta:25°C	(1) 784 V (2) 760 V	P
4	<b>Input Capacitor Voltage</b>	C5 Rated : 150u / 400V/ 105°C	I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change (4)Burn in 1hour Ta:25°C	(1) 364 V (2) 392 V (3) 386 V (4) 386 V	P
5	<b>Control IC Voltage Test</b>	U1 Rated ML4800 : 18V	I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta:25°C	(1) 14.5 V (2) 15.4 V (3) 14.8 V	P
6	P.F.C Power Transistor ( D to S) or (C to E) <b>Peak Voltage</b>	Q1 Rated IRFP460A : 500 V 20A	I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on (2) Full Load (3)Output Short Ta:25°C	(1) 444 V (2) 440 V (3) 440 V	P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2005/11/4	RD SAMPLE	PASS	VINCENT TSENG	MAX LIN
2005/12/2	PRODUCT SAMPLE W0510C53	PASS	VINCENT TSENG	MAX LIN
2005/12/26	PRODUCT SAMPLE W0512B52	PASS	VINCENT TSENG	MAX LIN

2003/12/12 A50-F023