

MODEL: MPQ-200C

### OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	RIPPLE & NOISE	V1: 80 mVp-p (Max) V2: 150 mVp-p (Max) V3: 80 mVp-p (Max) V3: 80 mVp-p (Max)	I/P: 230VAC O/P:FULL LOAD Ta:25°C	V1: 26 mVp-p (Max) V2: 55 mVp-p (Max) V3: 16 mVp-p (Max) V4: 27 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1: 4.75 V- 5.5 V	I/P: 230 VAC I/P: 115 VAC O/P:MIN LOAD Ta:25°C	4.5 V- 5.62 V/ 230 VAC 4.5 V- 5.62 V/ 115 VAC	P
3	OUTPUT VOLTAGE TOLERANCE	V1: 2 % - -2 % (Max) V2: 6 % - -6 % (Max) V3: 5 % - -5 % (Max) V4: 5 % - -5 % (Max)	I/P: 115 VAC / 264 VAC O/P:FULL/ MIN LOAD Ta:25°C	V1: 0.12 % - -0.12 % V2: 3.2 % - -3.2 % V3: 0.4 % - -0.4 % V4: 0.1 % - -0.1 %	P
4	LINE REGULATION	V1: 0.5 % - -0.5 % (Max) V2: 1 % - -1 % (Max) V3: 0.5 % - -0.5 % (Max) V4: 0.5 % - -0.5 % (Max)	I/P: 115 VAC ~ 264 VAC O/P:FULL LOAD Ta:25°C	V1: 0 % - 0 % V2: 0 % - 0 % V3: 0 % - 0 % V4: 0.04 % - -0.04 %	P
5	LOAD REGULATION	V1: 1 % - -1 % (Max) V2: 5 % - -5 % (Max) V3: 1 % - -1 % (Max) V4: 1 % - -1 % (Max)	I/P: 230 VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: 0.12 % - -0.12 % V2: 2.2 % - -2.2 % V3: 0.4 % - -0.4 % V4: 0.04 % - -0.04 %	P
6	CROSS REGULATION	V1: 1 % - -1 % (Max) V2: 5 % - -5 % (Max) V3: 1 % - -1 % (Max) V4: 1 % - -1 % (Max)	I/P: 230 VAC O/P: Testing O/P 60%LOAD Other O/P 40%LOAD Change Ta:25°C	V1: 0.12 % - -0.12 % V2: 3.2 % - -3.2 % V3: 0 % - 0 % V4: 0.04 % - -0.04 %	P
7	SET UP TIME	230VAC: 1000 ms (Max) 115 VAC: 3000 ms (Max)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230VAC/ 616 ms 115VAC/ 1836 ms	P
8	RISE TIME	230VAC: 20 ms (Max) 115VAC: 20 ms (Max)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230VAC/ 16 ms 115VAC/ 14 ms	P
9	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/ 18.3 ms 115VAC/ 18.5 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	85 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	69 V-264V	P
			I/P: LOW-LINE-3V= 87 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 ~440HZ 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) 0.98/1150 VAC(TYP)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	PF= 0.97 /230 VAC. PF= 0.99 /115 VAC	P
4	EFFICIENCY	77% (TYP)	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	78.8 %	P
5	INPUT CURRENT	230V/ 1.6 A (TYP) 115V/ 3.5 A (TYP)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	I = 1.14 A/ 230 VAC I = 2.27 A/ 115 VAC	P
6	INRUSH CURRENT	230V/ 40 A(TYP) 115V/ 25 A(TYP) COLD START	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	I = 31 A/ 230 VAC I = 20 A/ 115 VAC	P
7	LEAKAGE CURRENT a. For earth leakage current b. For patient leakage current	a. <180 uA / 264 VAC b. <100 uA / 264 VAC	I/P: 264 VAC O/P:Min LOAD Ta:25°C	a. 67.5 uA b. 58 uA	P

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	120 %- 160 %	I/P: 230 VAC I/P: 115 VAC O/P: TESTING Ta:25°C	137 %/ 230 VAC 137 %/ 115 VAC Hiccup Mode	P
2	OVER VOLTAGE PROTECTION	CH1: 5.75 V- 6.75 V	I/P: 230 VAC I/P: 115 VAC O/P: MIN LOAD Ta:25°C	5.97 V/ 230 VAC 5.97 V/ 115 VAC Shunt down Re- power ON	P
3	OVER TEMPERATURE ROTECTION	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 voltage , 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 Hiccup Mode	P

CONTROL FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	REMOTE CONTROL	Rc+ / Rc- 0V- 0.8V POWER ON 4V- 10V POWER OFF	I/P: 230 VAC O/P: FULL LOAD Ta:25°C	0V ~ 2.5 V POWER ON 2.6 V ~ 10 V POWER OFF	P
2	POWER GOOD SIGNAL	DELAY 10ms ~ 500ms	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD Ta:25°C	293 ms/ 230 VAC 293 ms/ 115 VAC	P
3	POWER FAIL SIGNAL	> 1ms	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD Ta:25°C	4 ms/ 230 VAC 4 ms/ 115 VAC	P
4	REMOTE SENSE	>0.25V	I/P: 230 VAC O/P: FULL LOAD Ta:25°C	>0.25V	P

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	TEMPERATURE RISE TEST	MODEL : MPQ-200B WITH FAN 1. ROOM AMBIENT BURN-IN : 2HRS I/P: 230VAC O/P: FULL LOAD Ta= 28.8 °C 2. HIGH AMBIENT BURN-IN : 2HRS I/P: 230VAC O/P: FULL LOAD Ta= 50.7 °C			P
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR ( MIN )	I/P: 230 VAC O/P: V1@20A V2@9A V3@2.4A V4@2.4A Ta:25°C	TEST : OK	P
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P: 230 VAC O/P: 80 % LOAD Ta= -20 °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	± 0.04 % (0~50°C)	I/P: 230 VAC O/P: FULL LOAD	± 0.02 % (0~50°C)	P
6	VIBRATION TEST	1 Carton & 1 Set Operating (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: 4 KVAC/min I/P-FG: 1.5 KVAC/min O/P-FG: 1.5 KVAC/min	I/P-O/P: 4.2 KVAC/min I/P-FG: 1.8 KVAC/min O/P-FG: 1.8 KVAC/min Ta:25°C	I/P-O/P: 1.98 mA I/P-FG: 0.83 mA O/P-FG: 0.13 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: 24 GΩ I/P-FG: 27 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	18 mΩ	p
4	APPROVAL	TUV: Certificate NO : TA50069957 UL: File NO : E227340			P

**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: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 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 INDUSTRY INPUT: 2KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A	P
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	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 C110 IS THE MOST CRITICAL COMPONENT I/P: 230VAC O/P:FULL LOAD Ta= 25 °C LIFE TIME= 437900 HRS I/P: 230VAC O/P:FULL LOAD Ta= 50 °C LIFE TIME= 72238 HRS			P
2	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE: 262.1K 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>	Q20 Rated IRFP450 : 500 V 14A	I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on (2) Full Load (3)Output Short Ta:25°C	(1) 384 V (2) 392 V (3) 388 V	P
2	Diode Peak <b>Voltage</b>	D100 Rated SBL3040PT : 40 V 30 A  D200 Rated S20LC20U : 200 V 20 A  D300 Rated SF10SC6 : 60 V 10 A  D300 Rated FMX-12SL : 200 V 10 A	I/P:High-Line +3V = 267 V O/P: (1) Full Load Turn on (2) Full Load (3)Output Short Ta:25°C	(1) 21.6 V (2) 18.5 V (3) 21.9 V  (1) 59.6 V (2) 51.4 V (3) 61.2 V  (1) 38.8 V (2) 34.6 V (3) 53 V  (1) 91.2 V (2) 62 V (3) 94.8 V	P
3	<b>Input Capacitor Voltage</b>	C 5 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) 386 V (2) 390 V (3) 392 V (4) 388 V	P
4	<b>Control IC Voltage Test</b>	U1 Rated ML4800 : 18 V	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) 14.9 V (2) 14.7 V (3) 14.8 V	P
5	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) 392 V (2) 406 V (3) 386 V	P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2005/5/17	RD SAMPLE	PASS	VINCENT TSENG	MAX LIN
2005/9/3	PRODUCT SAMPLE W0507B20	PASS	VINCENT TSENG	MAX LIN

2003/12/12 A50-F023