



MODEL: MPQ-120C

OUTPUT FUNCTION TEST

| NO | TEST ITEM                   | SPECICATION   | TEST CONDITION   | RESULT   | VERDICT |
|----|-----------------------------|---|--|--|---------|
| 1  | RIPPLE & NOISE              | V1: 80 mVp-p (Max)<br>V2: 150 mVp-p (Max)<br>V3: 80 mVp-p (Max)<br>V4: 80 mVp-p (Max)                   | I/P: 230VAC<br>O/P:FULL LOAD<br>Ta:25°C  | V1: 10 mVp-p (Max)<br>V2: 17 mVp-p (Max)<br>V3: 14 mVp-p (Max)<br>V4: 25 mVp-p (Max)   | P       |
| 2  | OUTPUT VOLTAGE ADJUST RANGE | CH1: 4.75 V- 5.5 V  | I/P: 230 VAC<br>I/P: 115 VAC<br>O/P:MIN LOAD<br>Ta:25°C                            | 4.15 V- 5.79 V/ 230 VAC<br>4.15 V- 5.79 V/ 115 VAC                                     | P       |
| 3  | OUTPUT VOLTAGE TOLERANCE    | V1: 2 % - -2 % (Max)<br>V2: 6 % - -7 % (Max)<br>V3: 5 % - -5 % (Max)<br>V4: 5 % - -5 % (Max)            | I/P: 115 VAC / 264 VAC<br>O/P:FULL/ MIN LOAD<br>Ta:25°C                            | V1: 0.2 % - -0.2 %<br>V2: 3.1 % - -3.1 %<br>V3: 0.3 % - -0.3 %<br>V4: 0.05 % - -0.05 % | P       |
| 4  | LINE REGULATION             | V1: 0.5 % - -0.5 % (Max)<br>V2: 2 % - -2 % (Max)<br>V3: 0.5 % - -0.5 % (Max)<br>V4: 0.5 % - 0.5 % (Max) | I/P: 115 VAC ~ 264 VAC<br>O/P:FULL LOAD<br>Ta:25°C                                 | V1: 0 % - 0 %<br>V2: 1.2 % - -0.1 %<br>V3: 0 % - 0 %<br>V4: 0 % - 0 %                  | P       |
| 5  | LOAD REGULATION             | V1: 0.5 % - -0.5 % (Max)<br>V2: 3.5 % - -3.5 % (Max)<br>V3: 1 % - -1 % (Max)<br>V4: 1 % - -1 % (Max)    | I/P: 230 VAC<br>O/P:FULL -MIN LOAD<br>Ta:25°C                                      | V1: 0.15 % - -0.15 %<br>V2: 1 % - -1 %<br>V3: 0.3 % - -0.3 %<br>V4: 0 % - 0 %          | P       |
| 6  | CROSS REGULATION            | V1: 0.5 % - -0.5 % (Max)<br>V2: 3.5 % - -3.5 % (Max)<br>V3: 1 % - -1 % (Max)<br>V4: 1 % - -1 % (Max)    | I/P: 230 VAC<br>O/P: Testing O/P 60%LOAD<br>Other O/P 40%LOAD<br>Change<br>Ta:25°C | V1: 0 % - 0 %<br>V2: 2.5 % - -2.5 %<br>V3: 0.15 % - -0.15 %<br>V4: 0.05 % - -0.05 %    | P       |
| 7  | SET UP TIME                 | 230VAC: 500 ms (Max)<br>115 VAC: 1200 ms (Max)  | I/P: 230 VAC<br>I/P: 115 VAC<br>O/P:FULL LOAD<br>Ta:25°C                           | 230VAC/ 229 ms<br>115VAC/ 529 ms   | P       |
| 8  | RISE TIME                   | 230VAC: 20 ms (Max)<br>115VAC: 50 ms (Max)  | I/P: 230 VAC<br>I/P: 115 VAC<br>O/P:FULL LOAD<br>Ta:25°C                           | 230VAC/ 11 ms<br>115VAC/ 21 ms   | P       |
| 9  | HOLD UP TIME                | 230VAC: 80 ms (TYP)<br>115VAC: 14 ms (TYP)  | I/P: 230 VAC<br>I/P: 115 VAC<br>O/P:FULL LOAD<br>Ta:25°C                           | 230VAC/ 89 ms<br>115VAC/ 17 ms   | P       |
| 10 | OVER/UNDERSHOOT TEST        | < ±5%   | I/P: 230 VAC<br>O/P:FULL LOAD<br>Ta:25°C   | TEST: <5 %   | P       |
| 11 | DYNAMIC LOAD                | V1: 1000 mVp-p  | I/P: 230 VAC<br>O/P:FULL /Min LOAD<br>90%DUTY/1KHZ<br>Ta:25°C                      | 196 mVp-p  | P       |

INPUT FUNCTION TEST

| NO | TEST ITEM             | SPECICATION                                      | TEST CONDITION   | RESULT                                   | VERDICT |
|----|-----------------------|--|--|--|---------|
| 1  | INPUT VOLTAGE RANGE   | 90VAC~264 VAC                                    | I/P:TESTING<br>O/P:FULL LOAD<br>Ta:25°C  | 70 V~264V                                | P       |
|    |                       |  | I/P:<br>LOW-LINE-3V= 87 V<br>HIGH-LINE+15%=300 V<br>O/P:FULL/MIN LOAD<br>ON: 30 Sec . OFF: 30 Sec 10MIN<br>( AC POWER ON/OFF NO DAMAGE ) | TEST: OK                                 |         |
| 2  | INPUT FREQUENCY RANGE | 47HZ ~440 HZ<br>NO DAMAGE OSC                    | I/P: 90 VAC ~ 264 VAC<br>O/P:FULL-MIN LOAD<br>Ta:25°C  | TEST: OK                                 | P       |
| 3  | EFFICIENCY            | 71 % (TYP)                                       | I/P: 230 VAC<br>O/P:FULL LOAD<br>Ta:25°C   | 71.6 %                                   | P       |
| 4  | INPUT CURRENT         | 230V/ 1.7 A(TYP)<br>115V/ 2.9 A(TYP)             | I/P: 230 VAC<br>I/P: 115 VAC<br>O/P:FULL LOAD<br>Ta:25°C   | I = 1.4 A/ 230 VAC<br>I = 2.4 A/ 115 VAC | P       |
| 5  | INRUSH CURRENT        | 230V/ 45 A(TYP)<br>115V/ 22 A(TYP)<br>COLD START | I/P: 230 VAC<br>I/P: 115 VAC<br>O/P:FULL LOAD<br>Ta:25°C   | I = 38 A/ 230 VAC<br>I = 18 A/ 115 VAC   | P       |
| 6  | LEAKAGE CURRENT       | < 180 uA / 264 VAC                               | I/P: 264 VAC<br>O/P:Min LOAD<br>Ta:25°C  | L-FG: 129 uA<br>N-FG: 129 uA             | P       |

PROTECTION FUNCTION TEST

| NO | TEST ITEM               | SPECICATION                            | TEST CONDITION  | RESULT  | VERDICT |
|----|-------------------------|--|---|---|---------|
| 1  | OVER LOAD PROTECTION    | 110 %- 150 %                           | I/P: 230 VAC<br>I/P: 115 VAC<br>O/P:TESTING<br>Ta:25°C  | 144 %/ 230 VAC<br>144 %/ 115 VAC<br>Hiccup Mode               | P       |
| 2  | OVER VOLTAGE PROTECTION | CH1: 5.75 V~ 6.75 V                    | I/P: 230 VAC<br>I/P: 115 VAC<br>O/P:MIN LOAD<br>Ta:25°C | 6.24 V/ 230 VAC<br>6.24 V/ 115 VAC<br>Shunt down Re- power ON | P       |
| 3  | SHORT PROTECTION        | SHORT EVERY OUTPUT<br>1 HOUR NO DAMAGE | I/P: 264 VAC<br>O/P:FULL LOAD<br>Ta:25°C                | NO DAMAGE<br>Hiccup Mode                                      | P       |

ENVIRONMENT TEST

| NO | TEST ITEM   | SPECIFICATION  | TEST CONDITION   | RESULT           | VERDICT |
|----|---|--|--|------------------|---------|
| 1  | TEMPERATURE RISE TEST   | MODEL : MPQ-120B<br>1. ROOM AMBIENT BURN-IN : 1HRS<br>I/P: 230VAC O/P: FULL LOAD Ta= 28.7 °C<br>2. HIGH AMBIENT BURN-IN : 2.5 HRS<br>I/P: 230VAC O/P: FULL LOAD Ta= 55.4 °C                            |  |                  | P       |
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| 2  | OVER LOAD BURN-IN TEST  | NO DAMAGE<br>1 HOUR ( MIN )  | I/P: 230 VAC<br>O/P: 134 % LOAD<br>Ta:25°C                       | TEST : OK        | P       |
| 3  | LOW TEMPERATURE<br>TURN ON TEST                                   | TURN ON AFTER 2 HOUR   | I/P: 230 VAC<br>O/P: 100 % LOAD<br>Ta= -20 °C                    | TEST : OK        | P       |
| 4  | HIGH HUMIDITY<br>HIGH TEMPERATURE<br>HIGH VOLTAGE<br>TURN ON TEST | AFTER 12 HOURS<br>IN CHAMBER ON<br>CONTROL 500 °C<br>NO DAMAGE   | I/P: 272 VAC<br>O/P: FULL LOAD<br>Ta= 50 °C<br>HUMIDITY= 95 %R.H | TEST : OK        | P       |
| 5  | TEMPERATURE<br>COEFFICIENT  | ± 0.04 %(0-50°C)   | I/P: 230 VAC<br>O/P: FULL LOAD                                   | ± 0.02 %(0-50°C) | P       |
| 6  | VIBRATION TEST  | 1 Carton & 1 Set Operating<br>(1) Waveform: Sine Wave<br>(2) Frequency:10-500Hz<br>(3) Sweep Time:10min/sweep cycle<br>(4) Acceleration:2G<br>(5) Test Time:1 hour in each axis (X.Y.Z)<br>(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<br>I/P-FG: 1.5 KVAC/min<br>O/P-FG: 0.5 KVAC/min | I/P-O/P: 4.2 KVAC/min<br>I/P-FG: 1.8 KVAC/min<br>O/P-FG: 0.6 KVAC/min<br>Ta:25°C | I/P-O/P: 3.62 mA<br>I/P-FG: 1.64 mA<br>O/P-FG: 0.77 mA<br>NO DAMAGE | P       |
| 2  | ISOLATION RESISTANCE | I/P-O/P:500VDC>100MΩ<br>I/P-FG: 500VDC>100MΩ<br>O/P-FG:500VDC>100MΩ | I/P-O/P: 500 VDC<br>I/P-FG: 500 VDC<br>O/P-FG: 500 VDC<br>Ta:25°C                | I/P-O/P: 15 GΩ<br>I/P-FG: 8 GΩ<br>O/P-FG: 13 GΩ<br>NO DAMAGE        | P       |
| 3  | GROUNDING CONTINUITY | FG(PE) TO CHASSIS<br>OR TRACE < 100 mΩ                              | 40 A / 2min<br>Ta:25°C   | 4 mΩ  | P       |
| 4  | APPROVAL             | TUV: Certificate NO : TA50053140<br>UL: File NO : E227340           |  |   | P       |

**E.M.C TEST**

| NO | TEST ITEM                                   | SPECICATION  | TEST CONDITION                                      | RESULT                        | VERDICT |
|----|---|--|---|-------------------------------|---------|
| 1  | HARMONIC                                    | EN61000-3-2<br>CLASS A                             | I/P: 230 VAC/50HZ<br>O/P:FULL LOAD<br>Ta:25°C       | PASS                          | P       |
| 2  | CONDUCTION                                  | EN55022<br>CLASS B                                 | I/P: 230 VAC (50HZ)<br>O/P:FULL/50% LOAD<br>Ta:25°C | PASS<br>Test by certified Lab | P       |
| 3  | RADIATION                                   | EN55022<br>CLASS B                                 | I/P: 230 VAC (50HZ)<br>O/P:FULL LOAD<br>Ta:25°C     | PASS<br>Test by certified Lab | P       |
| 4  | E.S.D                                       | EN61000-4-2<br>INDUSTRY<br>AIR:8KV / Contact:4KV   | I/P: 230 VAC/50HZ<br>O/P:FULL LOAD<br>Ta:25°C       | CRITERIA A                    | P       |
| 5  | E.F.T                                       | EN61000-4-4<br>INDUSTRY<br>INPUT: 2KV              | I/P: 230 VAC/50HZ<br>O/P:FULL LOAD<br>Ta:25°C       | CRITERIA A                    | P       |
| 6  | SURGE                                       | IEC61000-4-5<br>INDUSTRY<br>L-N :2KV<br>L,N-PE:4KV | I/P: 230 VAC/50HZ<br>O/P:FULL LOAD<br>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<br>LIFE CYCLE | SUPPOSE C 61 IS THE MOST CRITICAL COMPONENT<br>I/P: 230VAC O/P:FULL LOAD Ta= 25 °C LIFE TIME= 547701 HRS<br>I/P: 230VAC O/P:FULL LOAD Ta= 50 °C LIFE TIME= 83127 HRS |                |        | P       |
| 2  | MTBF                    | MIL-HDBK-217F NOTICES2 PARTS COUNT<br>TOTAL FAILURE RATE: 262.1K HRS   |                |        | P       |



## COMPONENT STRESS TEST

| NO | TEST ITEM  | SPECIFICATION   | TEST CONDITION   | RESULT  | VERDICT |
|----|--|---|--|---|---------|
| 1  | Power Transistor<br>(D to S) or (C to E) <b>Peak Voltage</b> | Q1 Rated<br>2SK2082 : 900 V 9 A   | I/P:High-Line +3V = 267 V<br>O/P: (1)Full Load Turn on<br>(2) Full Load<br>(3)Output Short<br>Ta:25°C                                | (1) 490 V<br>(2) 630 V<br>(3) 676 V   | P       |
| 2  | Diode Peak <b>Voltage</b>                                    | D60 Rated<br>SBL3040PT : 40 V 30 A<br><br>D50 Rated<br>BYQ28X-200 : 200 V 10 A<br><br>D72 Rated<br>HER302 : 100V 3 A<br><br>D80 Rated<br>HER303 : 200 V 3 A | I/P:High-Line +3V = 267 V<br>O/P: (1)Full Load Turn on<br>(2) Full Load<br>(3)Output Short<br>Ta:25°C                                | (1) 26.5 V<br>(2) 33 V<br>(3) 26.1 V<br><br>(1) 48.4 V<br>(2) 58 V<br>(3) 49.8 V<br><br>(1) 41.2 V<br>(2) 52.2 V<br>(3) 42 V<br><br>(1) 134 V<br>(2) 133 V<br>(3) 144 V | P       |
| 3  | Clamp Diode Peak <b>Voltage</b>                              | D1 Rated<br>HER208 : 1KV 2 A  | I/P:High-Line +3V = 267 V<br>O/P: (1)Full Load<br>(2) Dynamic Load<br>90%Duty/1KHz<br>Ta:25°C  | (1) 620 V<br>(2) 654 V  | P       |
| 4  | Input Capacitor <b>Voltage</b>                               | C 5 Rated<br>: 150u / 400V/ 105°C   | I/P:High-Line +3V = 267 V<br>O/P: (1)Full Load Turn on /Off<br>(2) Min load Turn on /Off<br>(3)Full Load /Min load Change<br>Ta:25°C | (1) 384 V<br>(2) 384 V<br>(3) 384 V   | P       |
| 5  | Control IC <b>Voltage Test</b>                               | U1 Rated<br>TL3842 : 30 V   | I/P:High-Line +3V = 267 V<br>O/P: (1)Full Load Turn on /Off<br>(2) Min load Turn on /Off<br>(3)Full Load /Min load Change<br>Ta:25°C | (1) 16.8 V<br>(2) 16.8 V<br>(3) 16 V  | P       |

| DATE       | SAMPLE                     | TEST RESULT | TESTER        | APPROVAL |
|------------|----------------------------|-------------|---------------|----------|
| 2004/8/16  | RD SAMPLE                  | PASS        | VINCENT TSENG | MAX LIN  |
| 2004/11/22 | PRODUCT SAMPLE<br>W0409B19 | PASS        | VINCENT TSENG | MAX LIN  |

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