

MODEL : GS90A19-P1M

### OUTPUT FUNCTION TEST

| NO | TEST ITEM                | SPECIFICATION                                   | TEST CONDITION  | RESULT                           | VERDICT |
|----|--------------------------|---|---|----------------------------------|---------|
| 1  | RIPPLE & NOISE           | V1:150 mVp-p (Max)                              | I/P: 230VAC<br>O/P:FULL LOAD<br>Ta:25°C                       | V1: 80 mVp-p (Max)               | P       |
| 2  | OUTPUT VOLTAGE TOLERANCE | V1:4%- -4% (Max)                                | I/P: 100 VAC / 264 VAC<br>O/P:FULL/ MIN LOAD<br>Ta:25°C       | V1: 1 %- -1 %                    | P       |
| 3  | LINE REGULATION          | V1: 1 %- -1 % (Max)                             | I/P: 100 VAC ~ 264 VAC<br>O/P:FULL LOAD<br>Ta:25°C            | V1: 0 %- 0 %                     | P       |
| 4  | LOAD REGULATION          | V1: 4 %- -4% (Max)                              | I/P: 230 VAC<br>O/P:FULL -MIN LOAD<br>Ta:25°C                 | V1: 1 %- -1 %                    | P       |
| 5  | SET UP TIME              | 230VAC: 1000 ms (Max)<br>115 VAC: 1000 ms (Max) | I/P: 230 VAC<br>I/P: 115 VAC<br>O/P:FULL LOAD<br>Ta:25°C      | 230VAC/ 482 ms<br>115VAC/ 704 ms | P       |
| 6  | RISE TIME                | 230VAC: 20 ms (Max)<br>115VAC: 20 ms (Max)      | I/P: 230 VAC<br>I/P: 115 VAC<br>O/P:FULL LOAD<br>Ta:25°C      | 230VAC/ 6 ms<br>115VAC/ 7 ms     | P       |
| 7  | HOLD UP TIME             | 230VAC: 20 ms (TYP)<br>115VAC: 20 ms (TYP)      | I/P: 230 VAC<br>I/P: 115 VAC<br>O/P:FULL LOAD<br>Ta:25°C      | 230VAC/ 76 ms<br>115VAC/ 30 ms   | P       |
| 8  | OVER/UNDERSHOOT TEST     | < ±5%   | I/P: 230 VAC<br>O/P:FULL LOAD<br>Ta:25°C                      | TEST: <5 %                       | P       |
| 9  | DYNAMIC LOAD             | V1: 1900 mVp-p                                  | I/P: 230 VAC<br>O/P:FULL /Min LOAD<br>90%DUTY/1KHZ<br>Ta:25°C | 641 mVp-p                        | P       |

### INPUT FUNCTION TEST

| NO | TEST ITEM             | SPECIFICATION                              | TEST CONDITION   | RESULT                                     | VERDICT |
|----|-----------------------|--|--|--|---------|
| 1  | INPUT VOLTAGE RANGE   | 90VAC~264 VAC                              | I/P:TESTING<br>O/P:FULL LOAD<br>Ta:25°C  | 66 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 ~63 HZ<br>NO DAMAGE OSC               | I/P: 100 VAC ~ 264 VAC<br>O/P:FULL-MIN LOAD<br>Ta:25°C   | TEST: OK                                   | P       |
| 3  | POWER FACTOR          | 0.91 / 230 VAC(TYP)<br>0.95 / 115 VAC(TYP) | I/P: 230 VAC<br>I/P: 115 VAC<br>O/P:FULL LOAD<br>Ta:25°C   | PF= 0.924 / 230VAC<br>PF= 0.985 / 115VAC   | P       |
| 4  | EFFICIENCY            | 89 % (TYP)                                 | I/P: 230 VAC<br>O/P:FULL LOAD<br>Ta:25°C   | 90.1 %                                     | P       |
| 5  | INPUT CURRENT         | 230V/ 1 A (TYP)<br>115V/ 2 A (TYP)         | I/P: 230 VAC<br>I/P: 115 VAC<br>O/P:FULL LOAD<br>Ta:25°C   | I = 0.46 A/ 230 VAC<br>I = 0.88 A/ 115 VAC | P       |
| 6  | INRUSH CURRENT        | 230V/ 70 A (TYP)<br><br>COLD START         | I/P: 230 VAC<br>O/P:FULL LOAD<br>Ta:25°C   | I = 61 A/ 230 VAC                          | P       |
| 7  | LEAKAGE CURRENT       | < 1 mA / 240 VAC                           | I/P: 264 VAC<br>O/P:Min LOAD<br>Ta:25°C  | L-FG: 0.28 mA<br>N-FG: 0.28 mA             | P       |
| 8  | NO LOAD CONSUMPTION   | < 0.5 W/240VAC                             | I/P: 240 VAC<br>O/P:NO LOAD<br>Ta:25°C   | 0.4 W                                      | P       |

### PROTECTION FUNCTION TEST

| NO | TEST ITEM                   | SPECIFICATION                            | 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  | 130 %/ 230 VAC<br>125 %/ 115 VAC<br>Hiccup Mode                 | P       |
| 2  | OVER VOLTAGE PROTECTION     | CH1:19.95 V- 25.65 V                     | I/P: 230 VAC<br>I/P: 115 VAC<br>O/P:MIN LOAD<br>Ta:25°C | 23.34 V/ 230 VAC<br>23.41 V/ 115 VAC<br>Shunt down Re- power ON | P       |
| 3  | OVER TEMPERATURE PROTECTION | SPEC:<br>RTH30>100°C O.T.P.<br>NO DAMAGE | I/P: 230 VAC<br>O/P:FULL LOAD                           | O.T.P. Active<br>Shunt down Re-power ON                         | P       |
| 4  | 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       |



### SAFETY TEST

| NO | TEST ITEM            | SPECIFICATION   | TEST CONDITION   | RESULT  | VERDICT |
|----|----------------------|---|--|---|---------|
| 1  | WITHSTAND VOLTAGE    | I/P-O/P: 3 KVAC/min<br>I/P-FG: 1.5 KVAC/min<br>O/P-FG: 0.5 KVAC/min | I/P-O/P: 3.6 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: 2.7 mA<br>I/P-FG: 2.01 mA<br>O/P-FG: 0.504 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 / 70%RH        | I/P-O/P: 23.6 GΩ<br>I/P-FG: 1.74 GΩ<br>O/P-FG: 30 GΩ<br>NO DAMAGE   | P       |
| 3  | APPROVAL             | TUV: Certificate NO : S50132045<br>UL: File NO : E183223            |  |   | P       |

### E.M.C TEST

| NO | TEST ITEM                                   | SPECIFICATION  | TEST CONDITION  | RESULT                        | VERDICT |
|----|---|--|---|-------------------------------|---------|
| 1  | HARMONIC                                    | EN61000-3-2<br>CLASS A<br>CLASS D                        | I/P: 220VAC/230VAC/240VAC/<br>50HZ<br>O/P:100%/75%/50%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>LIGHT 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>LIGHT INDUSTRY<br>INPUT: 1KV              | I/P: 230 VAC/50HZ<br>O/P:FULL LOAD<br>Ta:25°C                         | CRITERIA A                    | P       |
| 6  | SURGE                                       | IEC61000-4-5<br>LIGHT INDUSTRY<br>L-N :1KV<br>L,N-PE:2KV | 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                   | SPECIFICATION  | TEST CONDITION | RESULT | VERDICT |
|----|-----------------------------|--|----------------|--------|---------|
| 1  | CAPACITOR<br>LIFE CYCLE     | GS90A24-P1M : SUPPOSE C102 IS THE MOST CRITICAL COMPONENT<br>I/P: 230VAC O/P:FULL LOAD Ta=25 °C LIFE TIME=156362 HRS<br>I/P: 230VAC O/P:FULL LOAD Ta=40 °C LIFE TIME=53762 HRS |                |        | P       |
| 2  | MTBF                        | MIL-HDBK-217F NOTICES2 PARTS COUNT<br>TOTAL FAILURE RATE: 348.7K HRS   |                |        | P       |
| 3  | DMTBF/Accelerated Life Test | Demonstration Mean Time Between Failure : Above 20,000 hours @ TA 40°C   |                |        | P       |

COMPONENT STRESS TEST

| NO | TEST ITEM  | SPECIFICATION                     | TEST CONDITION   | RESULT                                    | VERDICT |
|----|--|-----------------------------------|--|---|---------|
| 1  | Power Transistor<br>( D to S) or (C to E) Peak Voltage | Q 32Rated<br>SPA07N60C3 7.3A/600V | I/P:High-Line +3V = 267 V<br>O/P: (1)Full Load Turn on<br>(2) Output Short<br>Ta:25°C  | (1) 580 V<br>(2) 504 V                    | P       |
| 2  | Diode Peak Voltage                                     | Q 101 Rated<br>STP80NF12 80A/120V | I/P:High-Line +3V = 267 V<br>O/P: (1)Full Load Turn on<br>(2)Output Short<br>Ta:25°C   | (1) 103 V<br>(2) 81 V                     | P       |
| 3  | Clamp Diode Peak Voltage                               | D 30 Rated<br>GP20K : 800 V 2 A   | I/P:High-Line +3V = 267 V<br>O/P: (1) Dynamic Load<br>90%Duty/1KHz<br>Ta:25°C  | (1) 536 V                                 | P       |
| 4  | Input Capacitor Voltage                                | C 5 Rated<br>120u/400V 105°C KMG  | 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) 396 V<br>(2) 394 V<br>(3) 396 V       | P       |
| 5  | Control IC Voltage Test                                | U 2Rated<br>TEA1751T : 38 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) 24.52 V<br>(2) 17.54 V<br>(3) 24.52 V | P       |

| DATE      | SAMPLE                     | TEST RESULT | TESTER     | APPROVAL      |
|-----------|----------------------------|-------------|------------|---------------|
| 2008/5/16 | RD SAMPLE                  | PASS        | SANFORD SU | VINCENT TSENG |
| 2008/8/7  | PRODUCT SAMPLE<br>W0806B60 | PASS        | SANFORD SU | VINCENT TSENG |
| 2008/9/16 | PRODUCT SAMPLE<br>W0808C62 | PASS        | SANFORD SU | VINCENT TSENG |

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