

# Quality Engineering Test Report

**SERIES: PS-65 60W WATTS SIGLE OUTPUT SWITCHING POWER SUPPLY OPEN FRAME TYPE**

|                |                            |                             |
|----------------|----------------------------|-----------------------------|
| <b>SAMPLE:</b> | A.PS-65-5      5V / 12A    | D. PS-65-24      24V / 3A   |
|                | B.PS-65-12      12V / 5.2A | E. PS-65-48      48V / 1.5A |
|                | C.PS-65-15      15V / 4.2A |                             |

| NO | TEST ITEM                | TEST CONDITION / SPECIFICATION  | RESULT  | VERDICT |
|----|--------------------------|---|---|---------|
| 1  | AC INPUT VOLTAGE RANGE   | I/P:TESTING      SPEC:90~264VAC<br>O/P:FULL LOAD  | A:65.85VAC~267VAC   | P       |
| 2  | LINE REGULATION          | I/P:85~264VAC      SPEC: A: ±1%<br>O/P:FULL LOAD      B: ±1%<br>C: ±1%<br>D: ±1%<br>E: ±1%  | A: $\frac{-0.12\%}{\%}$ ~ 0% %<br>B: 0% % ~ 0% %<br>C: 0% % ~ 0% %<br>D: 0% % ~ 0% %<br>E: 0% % ~ $\frac{0.01\%}{\%}$ | P       |
| 3  | LOAD REGULATION          | I/P:230VAC      SPEC: A: ±3%<br>O/P:      B: ±2%<br>MIN. TO FULL LOAD      C: ±2%<br>D: ±2%<br>E: ±2%                                 | A: -0.24% ~ +0.36%<br>B: -0.05% ~ +0.05%<br>C: 0% % ~ 0.04%<br>D: -0.02% ~ 0% %<br>E: $\frac{-0.01\%}{\%}$ ~ +0.01%   | P       |
| 4  | OUTPUT VOLTAGE TOLERANCE | I/P:85~264VAC      SPEC: A: ±3%<br>O/P:      B: ±2%<br>MIN. TO FULL LOAD      C: ±2%<br>D: ±2%<br>E: ±2%                              | A: -0.5% ~ +0.24%<br>B: 0% ~ +0.1%<br>C: 0% ~ +0.04%<br>D: -0.02% ~ +0.02%<br>E: 0% ~ +0.03%                          | P       |
| 5  | RIPPLE & NOISE           | I/P:230VAC      SPEC: A:100mV<br>O/P: FULL LOAD      B:100mV<br>C:100mV<br>D:100mV<br>E:100mV   | A: <u>66mV</u><br>B: <u>77mV</u><br>C: <u>21mV</u><br>D: <u>28mV</u><br>E: <u>43mV</u>                                | P       |
| 6  | AC INPUT CURRENT         | I/P:230VAC      SPEC: 0.9A<br>O/P:FULL LOAD   | A: <u>0.7A</u>  | P       |
| 7  | MAX. INRUSH CURRENT      | I/P:230VAC      SPEC: 40A<br>O/P:FULL LOAD  | A: <u>32.39A</u>  | P       |
| 8  | O/P VOLTAGE ADJ.RANGE    | I/P:230VAC      SPEC:-5%~+10%<br>O/P:MIN. LOAD      A:4.75V~5.5V<br>B:11.4V~13.2V<br>C:14.25V~16.5V<br>D:22.8V~26.4V<br>E:45.6V~52.8V | A:4.28V~6.18V<br>B:9.33V~13.73V<br>C:12.62V~18.85V<br>D:17.23V~27.6V<br>E:38.8V~53.6V                                 | P       |
| 9  | SET UP TIME              | I/P:230VAC      SPEC:800ms<br>O/P:FULL LOAD   | A: <u>552.86mS</u>  | P       |
| 10 | HOLD UP TIME             | I/P:230VAC      SPEC:20mS<br>O/P:FULL LOAD  | A: <u>93.66mS</u>   | P       |

| NO | TEST ITEM                      | TEST CONDITION / SPECIFICATION   | RESULT   | VERDICT |
|----|--------------------------------|--|--|---------|
| 11 | EFFICIENCY                     | I/P:230VAC<br>O/P: FULL LOAD<br>SPEC: A:76%<br>B:79%<br>C:79%<br>D:80%<br>E:80%  | A: <u>76.5%</u><br>B: <u>80.24%</u><br>C: <u>81.83%</u><br>D: <u>83.25%</u><br>E: <u>83.95%</u>            | P       |
| 12 | OVER LOAD PROTECTION           | I/P:230VAC<br>O/P: TESTING<br>SPEC:<br>A: 73~105W<br>B: 73~105W<br>C: 73~105W<br>D: 73~105W<br>E: 73~105W  | A: <u>78.84W</u><br>B: <u>83.56W</u><br>C: <u>78.74W</u><br>D: <u>93.44W</u><br>E: <u>97.67W</u>           | P       |
| 13 | OVER VOLTAGE PROTECTION        | I/P:230VAC<br>O/P:TESTING<br>SPEC:115%~135%<br>A : 5.5V~6.75V<br>B : 13.2V~16.2V<br>C : 16.5V~20.25V<br>D : 26.4V~32.4V<br>E : 52.8V~64.8V   | A: <u>6.20V</u><br>B: <u>14.08V</u><br>C: <u>19.03V</u><br>D: <u>28.3V</u><br>E: <u>53.7V</u>              | P       |
| 14 | GROUND LEAKAGE CURRENT         | I/P:240VAC<br>SPEC:<br>L-FG--<0.5mA<br>N-FG--<0.5mA  | B: L-FG: <u>0.4 mA</u><br>N-FG: <u>0.4mA</u>   | P       |
| 15 | INSULATION RESISTANCE          | SPEC: O/P-FG 500VDC/50MOhms MIN.<br>I/P-O/P 500VDC/50MOhms MIN.<br>I/P-FG 500VDC/50MOhms MIN.  | A: O/P-FG > <u>50MOhms</u><br>I/P-O/P > <u>50MOhms</u><br>I/P-FG > <u>50MOhms</u>                          | P       |
| 16 | DIELECTRIC / WITHSTAND VOLTAGE | SPEC: I/P- O/P: 3000VAC/ 1 sec (10mA CUT-OFF)<br>I/P - FG: 1500VAC/ 1 sec (10mA CUT-OFF)<br>O/P - FG : 500VAC/1sec (10mA CUT-OFF)  | A: I/P-O/P : <u>3.38mA</u><br>I/P-FG : <u>3.52mA</u><br>O/P- FG : <u>1.93mA</u>                            | P       |
| 17 | BURN-IN TEST                   | I/P: 230VAC O/P:FULL LOAD<br>TA:25.4°C BURN-IN DURATION : 1.33 hrs   | A: NON BREAK   | P       |
| 18 | ENVIRONMENT TEST               | 1.LOW TEMPERATURE TEST<br>I/P:80 VAC O/P:FULL LOAD<br>AMBIENT TEMPERATURE:-8.5°C<br>2.HIGH AMBIENT TEMPERATURE FULL LOAD TEST<br>I/P:230VAC O/P:FULL LOAD<br>AMBIENT TEMPERATURE:45.1°C<br>3.ACCELERATED LIFE TEST<br>I/P:267VAC O/P:FULL LOAD<br>POWER ON :3 min POWER OFF :5 sec<br>AMBIENT TEMPERATURE:85°C<br>AMBIENT HUMIDITY:95% | AFTER <u>2</u> hrs<br>POWER ON <u>OK</u><br>AFTER <u>14</u> hrs<br>NON BREAK<br>AFTER 3.5 hrs<br>NON BREAK | P       |

| NO       | TEST ITEM   | TEST CONDITION / SPECIFICATION  | RESULT   | VERDICT  |      |       |     |              |        |        |    |                 |        |        |    |                       |        |        |    |           |        |        |    |                      |        |        |     |                      |        |        |    |                       |        |      |    |             |        |        |     |             |      |        |  |            |
|----------|---|---|----------|----------|------|-------|-----|--------------|--------|--------|----|-----------------|--------|--------|----|-----------------------|--------|--------|----|-----------|--------|--------|----|----------------------|--------|--------|-----|----------------------|--------|--------|----|-----------------------|--------|------|----|-------------|--------|--------|-----|-------------|------|--------|--|------------|
| 19       | TEMPERATURE RISE TEST<br>Trise OF PARTS                           | I/P :230VAC                      AFTER 1.33 hrs BURN-IN<br>O/P :FULL LOAD                TA:25.4°C<br><table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>POSITION</th> <th>P/N</th> <th>TEMP</th> <th>Trise</th> </tr> </thead> <tbody> <tr> <td>BD1</td> <td>BRIDGE DIODE</td> <td>55.1°C</td> <td>29.7°C</td> </tr> <tr> <td>Q1</td> <td>MAIN TRANSISTOR</td> <td>78.3°C</td> <td>52.9°C</td> </tr> <tr> <td>T1</td> <td>MAIN TRANSFORMER COIL</td> <td>68.1°C</td> <td>42.7°C</td> </tr> <tr> <td>D4</td> <td>O/P DIODE</td> <td>94.1°C</td> <td>68.7°C</td> </tr> <tr> <td>C5</td> <td>I/P FILTER CAPACITOR</td> <td>45.8°C</td> <td>20.4°C</td> </tr> <tr> <td>C22</td> <td>O/P FILTER CAPACITOR</td> <td>74.1°C</td> <td>48.7°C</td> </tr> <tr> <td>T1</td> <td>MAIN TRANSFORMER CORE</td> <td>75.4°C</td> <td>50°C</td> </tr> <tr> <td>D1</td> <td>CLAMP DIODE</td> <td>92.8°C</td> <td>57.4°C</td> </tr> <tr> <td>LF1</td> <td>LINE FILTER</td> <td>49°C</td> <td>23.6°C</td> </tr> </tbody> </table> | POSITION | P/N      | TEMP | Trise | BD1 | BRIDGE DIODE | 55.1°C | 29.7°C | Q1 | MAIN TRANSISTOR | 78.3°C | 52.9°C | T1 | MAIN TRANSFORMER COIL | 68.1°C | 42.7°C | D4 | O/P DIODE | 94.1°C | 68.7°C | C5 | I/P FILTER CAPACITOR | 45.8°C | 20.4°C | C22 | O/P FILTER CAPACITOR | 74.1°C | 48.7°C | T1 | MAIN TRANSFORMER CORE | 75.4°C | 50°C | D1 | CLAMP DIODE | 92.8°C | 57.4°C | LF1 | LINE FILTER | 49°C | 23.6°C |  | *<br>NOTE1 |
| POSITION | P/N   | TEMP  | Trise    |          |      |       |     |              |        |        |    |                 |        |        |    |                       |        |        |    |           |        |        |    |                      |        |        |     |                      |        |        |    |                       |        |      |    |             |        |        |     |             |      |        |  |            |
| BD1      | BRIDGE DIODE  | 55.1°C  | 29.7°C   |          |      |       |     |              |        |        |    |                 |        |        |    |                       |        |        |    |           |        |        |    |                      |        |        |     |                      |        |        |    |                       |        |      |    |             |        |        |     |             |      |        |  |            |
| Q1       | MAIN TRANSISTOR   | 78.3°C  | 52.9°C   |          |      |       |     |              |        |        |    |                 |        |        |    |                       |        |        |    |           |        |        |    |                      |        |        |     |                      |        |        |    |                       |        |      |    |             |        |        |     |             |      |        |  |            |
| T1       | MAIN TRANSFORMER COIL   | 68.1°C  | 42.7°C   |          |      |       |     |              |        |        |    |                 |        |        |    |                       |        |        |    |           |        |        |    |                      |        |        |     |                      |        |        |    |                       |        |      |    |             |        |        |     |             |      |        |  |            |
| D4       | O/P DIODE   | 94.1°C  | 68.7°C   |          |      |       |     |              |        |        |    |                 |        |        |    |                       |        |        |    |           |        |        |    |                      |        |        |     |                      |        |        |    |                       |        |      |    |             |        |        |     |             |      |        |  |            |
| C5       | I/P FILTER CAPACITOR  | 45.8°C  | 20.4°C   |          |      |       |     |              |        |        |    |                 |        |        |    |                       |        |        |    |           |        |        |    |                      |        |        |     |                      |        |        |    |                       |        |      |    |             |        |        |     |             |      |        |  |            |
| C22      | O/P FILTER CAPACITOR  | 74.1°C  | 48.7°C   |          |      |       |     |              |        |        |    |                 |        |        |    |                       |        |        |    |           |        |        |    |                      |        |        |     |                      |        |        |    |                       |        |      |    |             |        |        |     |             |      |        |  |            |
| T1       | MAIN TRANSFORMER CORE   | 75.4°C  | 50°C     |          |      |       |     |              |        |        |    |                 |        |        |    |                       |        |        |    |           |        |        |    |                      |        |        |     |                      |        |        |    |                       |        |      |    |             |        |        |     |             |      |        |  |            |
| D1       | CLAMP DIODE   | 92.8°C  | 57.4°C   |          |      |       |     |              |        |        |    |                 |        |        |    |                       |        |        |    |           |        |        |    |                      |        |        |     |                      |        |        |    |                       |        |      |    |             |        |        |     |             |      |        |  |            |
| LF1      | LINE FILTER   | 49°C  | 23.6°C   |          |      |       |     |              |        |        |    |                 |        |        |    |                       |        |        |    |           |        |        |    |                      |        |        |     |                      |        |        |    |                       |        |      |    |             |        |        |     |             |      |        |  |            |
| 20       | LIFE CYCLE  | SUPPOSE C22 IS THE MOST CRITICAL COMPONENT<br>I/P:230VAC O/P:FULL LOAD Ta:25°C Tc22:73.7°C Life: 23966 hrs<br>I/P:230VAC O/P:FULL LOAD Ta:40°C Tc22:81.9°C Life: 13575 hrs  |          | P        |      |       |     |              |        |        |    |                 |        |        |    |                       |        |        |    |           |        |        |    |                      |        |        |     |                      |        |        |    |                       |        |      |    |             |        |        |     |             |      |        |  |            |
| 21       | CRITICAL COMPONENT RECORD<br>( FOR QC INSPECTION REFERENCE ONLY ) | FUSE :4A/250VAC GFE.<br>BRIDGE DIODE :LT KB408G.<br>LINE FILTER :LS TF-484.<br>TRANSFOMER :LS TF-461<br>POWER SWITCHER :K2545<br>OUTPUT DIODE :D83-004.<br>OUTPUT CAPACITOR :ELNA 1200uF/16V , 105°C, RJH<br>INPUT CAPACITOR :HITACHI 150uF/400V,85°C<br>P.C.B :PS-65,CEM-1 2 OZSS 127mm x 76.2mm   |          |          |      |       |     |              |        |        |    |                 |        |        |    |                       |        |        |    |           |        |        |    |                      |        |        |     |                      |        |        |    |                       |        |      |    |             |        |        |     |             |      |        |  |            |
| DATE     | SAMPLE  | TEST RESULT   | TEST     | APPROVAL |      |       |     |              |        |        |    |                 |        |        |    |                       |        |        |    |           |        |        |    |                      |        |        |     |                      |        |        |    |                       |        |      |    |             |        |        |     |             |      |        |  |            |
| 971220   | PS-65   | NOTE1:WORKING TEMPERATURE>=40°C, OUTPUT SHOULD DERATING   | H.C.LIOU | Max Lin  |      |       |     |              |        |        |    |                 |        |        |    |                       |        |        |    |           |        |        |    |                      |        |        |     |                      |        |        |    |                       |        |      |    |             |        |        |     |             |      |        |  |            |