



### 150W Quad Output with PFC Function

## QP-150 series



#### ■ Features :

- Universal AC input / Full range
- Built-in active PFC function, PF>0.95
- Protections: Short circuit / Over load / Over voltage
- Forced air cooling by built-in DC fan
- CH4: Polarity is selectable
- Fixed switching frequency at 100KHz
- 3 years warranty



#### SPECIFICATION

| MODEL                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | QP-150-3A                                                                                                               |                          |                             |                                 | QP-150-3B        |          |                   |          | QP-150-3C        |          |                   |          |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|--------------------------|-----------------------------|---------------------------------|------------------|----------|-------------------|----------|------------------|----------|-------------------|----------|
| OUTPUT                   | OUTPUT NUMBER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CH1                                                                                                                     | CH2                      | CH3                         | CH4                             | CH1              | CH2      | CH3               | CH4      | CH1              | CH2      | CH3               | CH4      |
|                          | DC VOLTAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 5V                                                                                                                      | 3.3V                     | 12V                         | -5V                             | 5V               | 3.3V     | 12V               | -12V     | 5V               | 3.3V     | 15V               | -15V     |
|                          | RATED CURRENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 10A                                                                                                                     | 10A                      | 5A                          | 0.6A                            | 10A              | 10A      | 5A                | 0.6A     | 10A              | 10A      | 4A                | 0.6A     |
|                          | CURRENT RANGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 3 ~ 15A                                                                                                                 | 0 ~ 15A                  | 0.4 ~ 5A                    | 0 ~ 1A                          | 3 ~ 15A          | 0 ~ 15A  | 0.4 ~ 5A          | 0 ~ 1A   | 3 ~ 15A          | 0 ~ 15A  | 0.4 ~ 5A          | 0 ~ 1A   |
|                          | RATED POWER (max.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 146W                                                                                                                    |                          |                             |                                 | 150.2W           |          |                   |          | 152W             |          |                   |          |
|                          | RIPPLE & NOISE (max.) Note.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 100mVp-p                                                                                                                | 100mVp-p                 | 150mVp-p                    | 150mVp-p                        | 100mVp-p         | 100mVp-p | 150mVp-p          | 150mVp-p | 100mVp-p         | 100mVp-p | 150mVp-p          | 150mVp-p |
|                          | VOLTAGE ADJ. RANGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | CH1: 4.75 ~ 5.5V                                                                                                        |                          | CH2: 3.14 ~ 3.63V           |                                 | CH1: 4.75 ~ 5.5V |          | CH2: 3.14 ~ 3.63V |          | CH1: 4.75 ~ 5.5V |          | CH2: 3.14 ~ 3.63V |          |
|                          | VOLTAGE TOLERANCE Note.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 3.0%                                                                                                                    | 3.0%                     | 6.0%                        | 5.0%                            | 3.0%             | 3.0%     | 6.0%              | 5.0%     | 3.0%             | 3.0%     | +8,-6%            | 5.0%     |
|                          | LINE REGULATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1.0%                                                                                                                    | 1.0%                     | 2.0%                        | 1.0%                            | 1.0%             | 1.0%     | 2.0%              | 1.0%     | 1.0%             | 1.0%     | 2.0%              | 1.0%     |
|                          | LOAD REGULATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2.0%                                                                                                                    | 2.0%                     | 6.0%                        | 2.0%                            | 2.0%             | 2.0%     | 6.0%              | 2.0%     | 2.0%             | 2.0%     | 6.0%              | 2.0%     |
| SETUP, RISE TIME         | 800ms, 50ms/230VAC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                         |                          |                             | 800ms, 50ms/115VAC at full load |                  |          |                   |          |                  |          |                   |          |
| HOLD UP TIME (Typ.)      | 24ms/230VAC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                         | 24ms/115VAC at full load |                             |                                 |                  |          |                   |          |                  |          |                   |          |
| INPUT                    | VOLTAGE RANGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 90 ~ 264VAC                                                                                                             |                          | 127 ~ 370VDC                |                                 |                  |          |                   |          |                  |          |                   |          |
|                          | FREQUENCY RANGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 47 ~ 63Hz                                                                                                               |                          |                             |                                 |                  |          |                   |          |                  |          |                   |          |
|                          | POWER FACTOR (Typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | PF>0.95/230VAC                                                                                                          |                          | PF>0.98/115VAC at full load |                                 |                  |          |                   |          |                  |          |                   |          |
|                          | EFFICIENCY (Typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 73%                                                                                                                     |                          |                             |                                 |                  | 75%      |                   |          |                  |          | 74%               |          |
|                          | AC CURRENT (Typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2.5A/115VAC                                                                                                             |                          | 1.2A/230VAC                 |                                 |                  |          |                   |          |                  |          |                   |          |
|                          | INRUSH CURRENT (Typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | COLD START ≤ 40A/230V                                                                                                   |                          |                             |                                 |                  |          |                   |          |                  |          |                   |          |
| LEAKAGE CURRENT          | <3.5mA / 240VAC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                         |                          |                             |                                 |                  |          |                   |          |                  |          |                   |          |
| PROTECTION               | OVERLOAD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 105 ~ 150% rated output power<br>Protection type : Hiccup mode, recovers automatically after fault condition is removed |                          |                             |                                 |                  |          |                   |          |                  |          |                   |          |
|                          | OVER VOLTAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | CH1:5.75 ~ 6.75V      CH2:3.8 ~ 4.4V<br>Protection type : Shut down o/p voltage, re-power on to recover                 |                          |                             |                                 |                  |          |                   |          |                  |          |                   |          |
|                          | OVER TEMPERATURE(OPTION)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 95℃   5℃ (TSW1)<br>Protection type : Shut down o/p voltage, recovers automatically after temperature goes down          |                          |                             |                                 |                  |          |                   |          |                  |          |                   |          |
| ENVIRONMENT              | WORKING TEMP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | -10 ~ +60℃ (Refer to output load derating curve)                                                                        |                          |                             |                                 |                  |          |                   |          |                  |          |                   |          |
|                          | WORKING HUMIDITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 20 ~ 90% RH non-condensing                                                                                              |                          |                             |                                 |                  |          |                   |          |                  |          |                   |          |
|                          | STORAGE TEMP., HUMIDITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -20 ~ +85℃, 10 ~ 95% RH                                                                                                 |                          |                             |                                 |                  |          |                   |          |                  |          |                   |          |
|                          | TEMP. COEFFICIENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0.03%/℃ (0~50℃)                                                                                                         |                          |                             |                                 |                  |          |                   |          |                  |          |                   |          |
|                          | VIBRATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 10 ~ 500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes                                                            |                          |                             |                                 |                  |          |                   |          |                  |          |                   |          |
| SAFETY & EMC<br>(Note 4) | SAFETY STANDARDS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | UL60950-1, TUV EN60950-1 approved                                                                                       |                          |                             |                                 |                  |          |                   |          |                  |          |                   |          |
|                          | WITHSTAND VOLTAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | I/P-O/P:3KVAC   I/P-FG:1.5KVAC   O/P-FG:0.5KVAC                                                                         |                          |                             |                                 |                  |          |                   |          |                  |          |                   |          |
|                          | ISOLATION RESISTANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | I/P-O/P, I/P-FG, O/P-FG:100M Ohms/500VDC                                                                                |                          |                             |                                 |                  |          |                   |          |                  |          |                   |          |
|                          | EMI CONDUCTION & RADIATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Compliance to EN55022 (CISPR22) Class B                                                                                 |                          |                             |                                 |                  |          |                   |          |                  |          |                   |          |
|                          | HARMONIC CURRENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Compliance to EN61000-3-2,-3                                                                                            |                          |                             |                                 |                  |          |                   |          |                  |          |                   |          |
| OTHERS                   | EMS IMMUNITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Compliance to EN61000-4-2,3,4,5,6,8,11; ENV50204, EN55024, light industry level, criteria A                             |                          |                             |                                 |                  |          |                   |          |                  |          |                   |          |
|                          | MTBF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 141.5K hrs min.    MIL-HDBK-217F (25℃)                                                                                  |                          |                             |                                 |                  |          |                   |          |                  |          |                   |          |
|                          | DIMENSION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 199*99*50mm (L*W*H)                                                                                                     |                          |                             |                                 |                  |          |                   |          |                  |          |                   |          |
| NOTE                     | PACKING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.93Kg; 20pcs/19.6Kg/1.28CUFT                                                                                           |                          |                             |                                 |                  |          |                   |          |                  |          |                   |          |
|                          | 1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25℃ of ambient temperature.<br>2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor.<br>3. Tolerance : includes set up tolerance, line regulation and load regulation.<br>4. The power supply is considered a component which will be installed into a final equipment. The final equipment must be re-confirmed that it still meets EMC directives. |                                                                                                                         |                          |                             |                                 |                  |          |                   |          |                  |          |                   |          |



#### ■ Features :

- Universal AC input / Full range
- Built-in active PFC function, PF>0.95
- Protections: Short circuit / Overload / Over voltage
- Forced air cooling by built-in DC fan
- CH4: Polarity is selectable
- Fixed switching frequency at 100KHz
- 3 years warranty



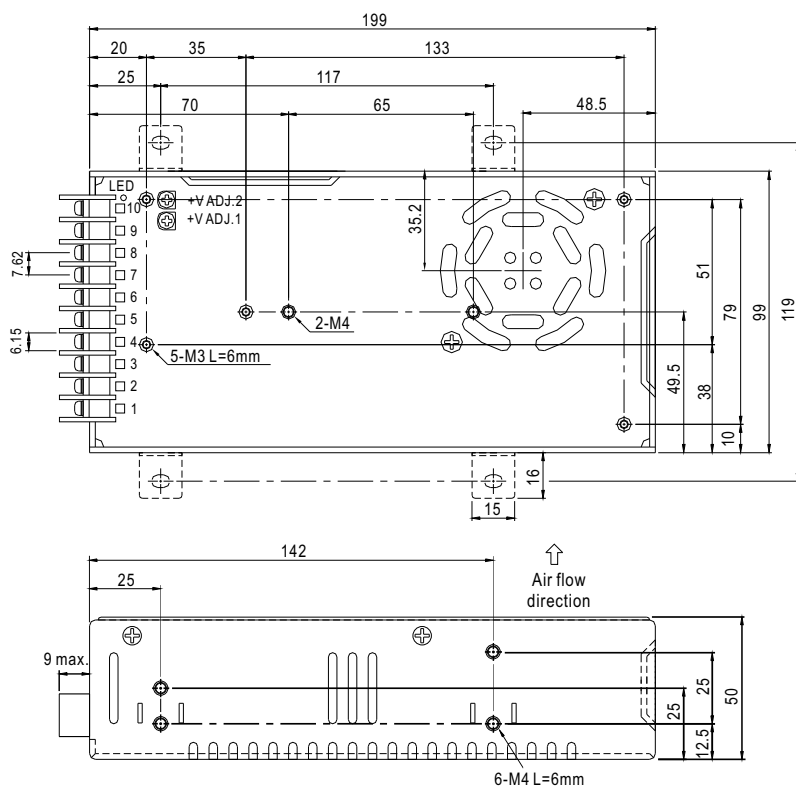
#### SPECIFICATION

| MODEL                    |                              | QP-150-3D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |                             |          | QP-150D                         |          |                   |          | QP-150F          |          |                    |          |
|--------------------------|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------------------------|----------|---------------------------------|----------|-------------------|----------|------------------|----------|--------------------|----------|
| OUTPUT                   | OUTPUT NUMBER                | CH1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CH2      | CH3                         | CH4      | CH1                             | CH2      | CH3               | CH4      | CH1              | CH2      | CH3                | CH4      |
|                          | DC VOLTAGE                   | 5V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 3.3V     | 24V                         | -12V     | 5V                              | 12V      | 24V               | -12V     | 5V               | 15V      | 24V                | -15V     |
|                          | RATED CURRENT                | 10A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 10A      | 2.5A                        | 0.6A     | 10A                             | 4A       | 2A                | 0.6A     | 10A              | 3A       | 2A                 | 0.6A     |
|                          | CURRENT RANGE                | 3 ~ 15A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0 ~ 15A  | 0.3 ~ 3A                    | 0 ~ 1A   | 3 ~ 15A                         | 0 ~ 5A   | 0.4 ~ 3A          | 0 ~ 1A   | 3 ~ 15A          | 0 ~ 5A   | 0.4 ~ 3A           | 0 ~ 1A   |
|                          | RATED POWER (max.)           | 150.2W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |          |                             |          | 150.2W                          |          |                   |          | 152W             |          |                    |          |
|                          | RIPPLE & NOISE (max.) Note.2 | 100mVp-p                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 100mVp-p | 150mVp-p                    | 150mVp-p | 120mVp-p                        | 150mVp-p | 200mVp-p          | 150mVp-p | 120mVp-p         | 150mVp-p | 200mVp-p           | 150mVp-p |
|                          | VOLTAGE ADJ. RANGE           | CH1: 4.75 ~ 5.5V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          | CH2: 3.14 ~ 3.63V           |          | CH1: 4.75 ~ 5.5V                |          | CH2: 11.4 ~ 13.2V |          | CH1: 4.75 ~ 5.5V |          | CH2: 14.3 ~ 16.5V  |          |
|                          | VOLTAGE TOLERANCE Note.3     | 3.0%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 3.0%     | 6.0%                        | 5.0%     | 3.0%                            | 3.0%     | 6.0%              | 5.0%     | 3.0%             | 3.0%     | 6.0%               | 5.0%     |
|                          | LINE REGULATION              | 1.0%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1.0%     | 2.0%                        | 1.0%     | 1.0%                            | 1.0%     | 2.0%              | 1.0%     | 1.0%             | 1.0%     | 2.0%               | 1.0%     |
|                          | LOAD REGULATION              | 2.0%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2.0%     | 6.0%                        | 2.0%     | 2.0%                            | 2.0%     | 6.0%              | 2.0%     | 2.0%             | 2.0%     | 6.0%               | 2.0%     |
| INPUT                    | SETUP, RISE TIME             | 800ms, 50ms/230VAC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |          |                             |          | 800ms, 50ms/115VAC at full load |          |                   |          |                  |          |                    |          |
|                          | HOLD UP TIME (Typ.)          | 24ms/230VAC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          | 24ms/115VAC at full load    |          |                                 |          |                   |          |                  |          |                    |          |
|                          | VOLTAGE RANGE                | 90 ~ 264VAC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          | 127 ~ 370VDC                |          |                                 |          |                   |          |                  |          |                    |          |
|                          | FREQUENCY RANGE              | 47 ~ 63Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |                             |          |                                 |          |                   |          |                  |          |                    |          |
|                          | POWER FACTOR (Typ.)          | PF>0.95/230VAC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |          | PF>0.98/115VAC at full load |          |                                 |          |                   |          |                  |          |                    |          |
|                          | EFFICIENCY (Typ.)            | 76%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |          |                             |          | 78%                             |          |                   |          | 78%              |          |                    |          |
|                          | AC CURRENT (Typ.)            | 2.5A/115VAC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          | 1.2A/230VAC                 |          |                                 |          |                   |          |                  |          |                    |          |
| PROTECTION               | INRUSH CURRENT (Typ.)        | COLD START ≤40A/230V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |                             |          |                                 |          |                   |          |                  |          |                    |          |
|                          | LEAKAGE CURRENT              | <3.5mA / 240VAC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |                             |          |                                 |          |                   |          |                  |          |                    |          |
|                          | OVERLOAD                     | 105 ~ 150% rated output power<br>Protection type : Hiccup mode, recovers automatically after fault condition is removed                                                                                                                                                                                                                                                                                                                                                                                                        |          |                             |          |                                 |          |                   |          |                  |          |                    |          |
|                          | OVER VOLTAGE                 | CH1:5.75 ~ 6.75V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          | CH2:3.8 ~ 4.4V              |          | CH1:5.75 ~ 6.75V                |          | CH2:13.8 ~ 16.2V  |          | CH1:5.75 ~ 6.75V |          | CH2:17.25 ~ 20.25V |          |
| ENVIRONMENT              | OVER TEMPERATURE(OPTION)     | 95℃ 5℃ (TSW1)<br>Protection type : Shut down o/p voltage, recovers automatically after temperature goes down                                                                                                                                                                                                                                                                                                                                                                                                                   |          |                             |          |                                 |          |                   |          |                  |          |                    |          |
|                          | WORKING TEMP.                | -10 ~ +60℃ (Refer to output load derating curve)                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          |                             |          |                                 |          |                   |          |                  |          |                    |          |
|                          | WORKING HUMIDITY             | 20 ~ 90% RH non-condensing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |          |                             |          |                                 |          |                   |          |                  |          |                    |          |
|                          | STORAGE TEMP., HUMIDITY      | -20 ~ +85℃, 10 ~ 95% RH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |          |                             |          |                                 |          |                   |          |                  |          |                    |          |
|                          | TEMP. COEFFICIENT            | 0.03%/℃ (0~50℃)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |                             |          |                                 |          |                   |          |                  |          |                    |          |
| SAFETY & EMC<br>(Note 4) | VIBRATION                    | 10 ~ 500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |          |                             |          |                                 |          |                   |          |                  |          |                    |          |
|                          | SAFETY STANDARDS             | UL60950-1, TUV EN60950-1 approved                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |                             |          |                                 |          |                   |          |                  |          |                    |          |
|                          | WITHSTAND VOLTAGE            | I/P-O/P:3KVAC I/P-FG:1.5KVAC O/P-FG:0.5KVAC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |                             |          |                                 |          |                   |          |                  |          |                    |          |
|                          | ISOLATION RESISTANCE         | I/P-O/P, I/P-FG, O/P-FG:100M Ohms/500VDC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |                             |          |                                 |          |                   |          |                  |          |                    |          |
|                          | EMI CONDUCTION & RADIATION   | Compliance to EN55022 (CISPR22) Class B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |          |                             |          |                                 |          |                   |          |                  |          |                    |          |
| OTHERS                   | HARMONIC CURRENT             | Compliance to EN61000-3-2,-3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |          |                             |          |                                 |          |                   |          |                  |          |                    |          |
|                          | EMS IMMUNITY                 | Compliance to EN61000-4-2,3,4,5,6,8,11; ENV50204, EN55024, light industry level, criteria A                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |                             |          |                                 |          |                   |          |                  |          |                    |          |
|                          | MTBF                         | 141.5K hrs min. MIL-HDBK-217F (25℃)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |          |                             |          |                                 |          |                   |          |                  |          |                    |          |
| NOTE                     | DIMENSION                    | 199*99*50mm (L*W*H)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |          |                             |          |                                 |          |                   |          |                  |          |                    |          |
|                          | PACKING                      | 0.93Kg; 20pcs/19.6Kg/1.28CUFT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |          |                             |          |                                 |          |                   |          |                  |          |                    |          |
|                          |                              | 1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25℃ of ambient temperature.<br>2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor.<br>3. Tolerance : includes set up tolerance, line regulation and load regulation.<br>4. The power supply is considered a component which will be installed into a final equipment. The final equipment must be re-confirmed that it still meets EMC directives. |          |                             |          |                                 |          |                   |          |                  |          |                    |          |

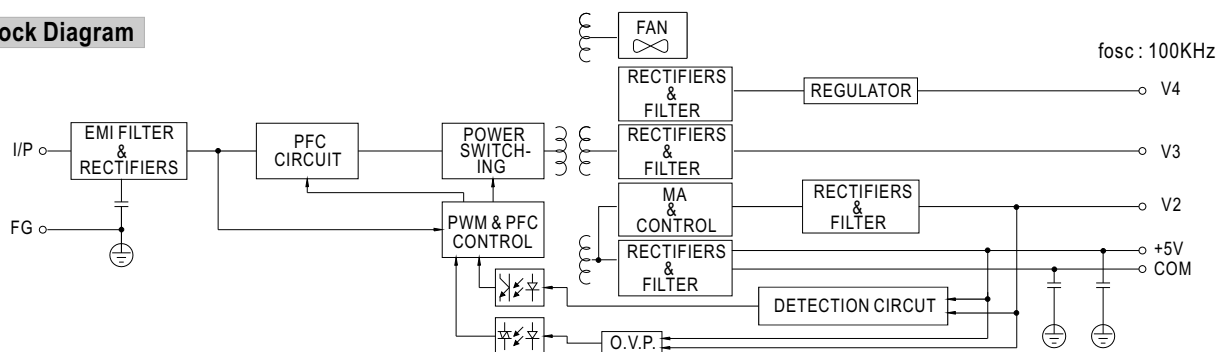
### 150W Quad Output with PFC Function

## ■ Mechanical Specification

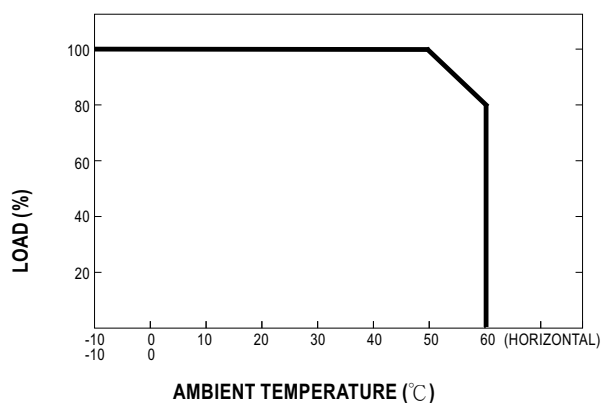
Case No. 916B Unit:mm



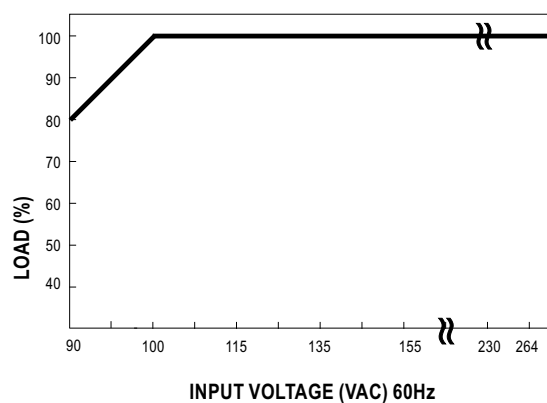
### ■ Block Diagram



### Derating Curve



### ■ Output Derating VS Input Voltage





#### ■ Features :

- Universal AC input / Full range
- Built-in active PFC function, PF>0.95
- Protections: Short circuit / Overload / Over voltage
- Forced air cooling by built-in DC fan
- Fixed switching frequency at 100KHz
- 3 years warranty



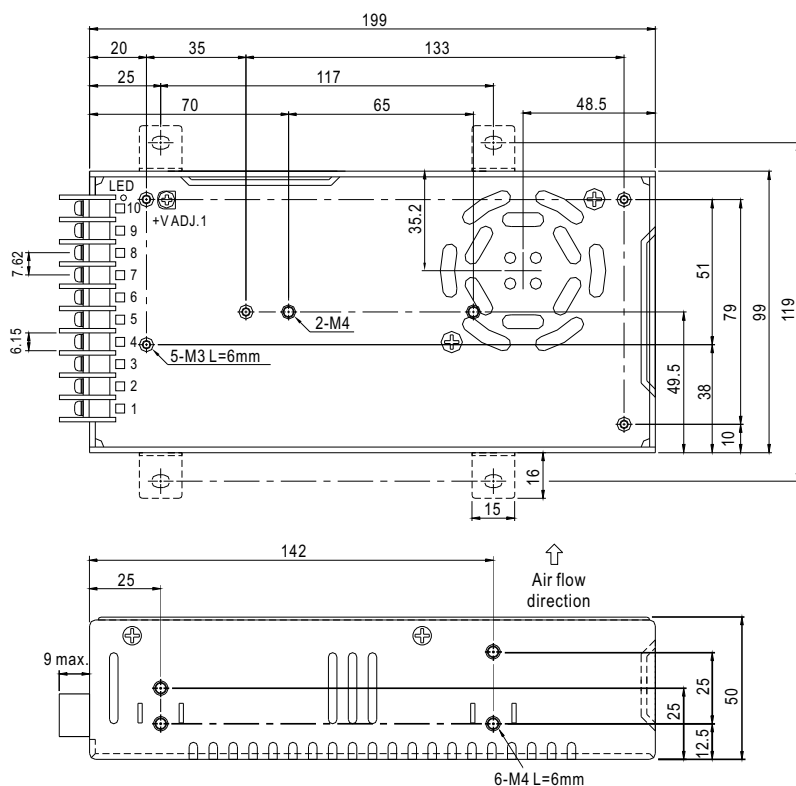
#### SPECIFICATION

| MODEL                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | QP-150B                                                                                                                 |                                                  |          |          | QP-150C         |          |          |          |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|----------|----------|-----------------|----------|----------|----------|
| OUTPUT                   | OUTPUT NUMBER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CH1                                                                                                                     | CH2                                              | CH3      | CH4      | CH1             | CH2      | CH3      | CH4      |
|                          | DC VOLTAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 5V                                                                                                                      | 12V                                              | -12V     | -5V      | 5V              | 15V      | -15V     | -5V      |
|                          | RATED CURRENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 15A                                                                                                                     | 4A                                               | 2A       | 0.6A     | 15A             | 3A       | 2A       | 0.6A     |
|                          | CURRENT RANGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 3 ~ 15A                                                                                                                 | 0.4 ~ 5A                                         | 0.3 ~ 2A | 0 ~ 1A   | 3 ~ 15A         | 0.4 ~ 4A | 0.3 ~ 2A | 0 ~ 1A   |
|                          | RATED POWER (max.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 150W                                                                                                                    |                                                  |          |          | 153W            |          |          |          |
|                          | RIPPLE & NOISE (max.) Note.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 100mVp-p                                                                                                                | 150mVp-p                                         | 150mVp-p | 100mVp-p | 100mVp-p        | 150mVp-p | 150mVp-p | 100mVp-p |
|                          | VOLTAGE ADJ. RANGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | CH1:4.75 ~ 5.5V                                                                                                         |                                                  |          |          | CH1:4.75 ~ 5.5V |          |          |          |
|                          | VOLTAGE TOLERANCE Note.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 3.0%                                                                                                                    | 6.0%                                             | +10,-6%  | 5.0%     | 3.0%            | +6,-10%  | 8.0%     | 5.0%     |
|                          | LINE REGULATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1.0%                                                                                                                    | 2.0%                                             | 2.0%     | 1.0%     | 1.0%            | 2.0%     | 2.0%     | 1.0%     |
|                          | LOAD REGULATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2.0%                                                                                                                    | 6.0%                                             | 6.0%     | 2.0%     | 2.0%            | 6.0%     | 6.0%     | 2.0%     |
| SETUP, RISE TIME         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1000ms, 50ms at full load                                                                                               |                                                  |          |          |                 |          |          |          |
| HOLD UP TIME (Typ.)      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 24ms at full load                                                                                                       |                                                  |          |          |                 |          |          |          |
| INPUT                    | VOLTAGE RANGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 90 ~ 264VAC      127 ~ 370VDC                                                                                           |                                                  |          |          |                 |          |          |          |
|                          | FREQUENCY RANGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 47 ~ 63Hz                                                                                                               |                                                  |          |          |                 |          |          |          |
|                          | POWER FACTOR (Typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | PF>0.95/230VAC      PF>0.98/115VAC at full load                                                                         |                                                  |          |          |                 |          |          |          |
|                          | EFFICIENCY (Typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 76%                                                                                                                     |                                                  |          |          |                 | 77%      |          |          |
|                          | AC CURRENT (Typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2.5A/115VAC      1.2A/230VAC                                                                                            |                                                  |          |          |                 |          |          |          |
|                          | INRUSH CURRENT (Typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | COLD START ≤40A                                                                                                         |                                                  |          |          |                 |          |          |          |
|                          | LEAKAGE CURRENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <3.5mA / 240VAC                                                                                                         |                                                  |          |          |                 |          |          |          |
| PROTECTION               | OVERLOAD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 105 ~ 135% rated output power<br>Protection type : Hiccup mode, recovers automatically after fault condition is removed |                                                  |          |          |                 |          |          |          |
|                          | OVER VOLTAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | CH1:5.75 ~ 6.75V<br>Protection type : Shut down o/p voltage, re-power on to recover                                     |                                                  |          |          |                 |          |          |          |
|                          | OVER TEMPERATURE(OPTION)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 95℃ -5℃ (TSW1)<br>Protection type : Shut down o/p voltage, recovers automatically after temperature goes down           |                                                  |          |          |                 |          |          |          |
|                          | ENVIRONMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | WORKING TEMP.                                                                                                           | -10 ~ +60℃ (Refer to output load derating curve) |          |          |                 |          |          |          |
| WORKING HUMIDITY         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 20 ~ 90% RH non-condensing                                                                                              |                                                  |          |          |                 |          |          |          |
| STORAGE TEMP., HUMIDITY  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | -20 ~ +85℃, 10 ~ 95% RH                                                                                                 |                                                  |          |          |                 |          |          |          |
| TEMP. COEFFICIENT        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0.03%/℃ (0~50℃)                                                                                                         |                                                  |          |          |                 |          |          |          |
| VIBRATION                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 10 ~ 500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes                                                            |                                                  |          |          |                 |          |          |          |
| SAFETY & EMC<br>(Note 4) | SAFETY STANDARDS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | UL60950-1, TUV EN60950-1 approved                                                                                       |                                                  |          |          |                 |          |          |          |
|                          | WITHSTAND VOLTAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | I/P-O/P:3KVAC   I/P-FG:1.5KVAC   O/P-FG:0.5KVAC                                                                         |                                                  |          |          |                 |          |          |          |
|                          | ISOLATION RESISTANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | I/P-O/P, I/P-FG, O/P-FG:100M Ohms/500VDC                                                                                |                                                  |          |          |                 |          |          |          |
|                          | EMI CONDUCTION & RADIATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Compliance to EN55022 (CISPR22) Class B                                                                                 |                                                  |          |          |                 |          |          |          |
|                          | HARMONIC CURRENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Compliance to EN61000-3-2,-3                                                                                            |                                                  |          |          |                 |          |          |          |
|                          | EMS IMMUNITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Compliance to EN61000-4-2,3,4,5,6,8,11; ENV50204, EN55024, light industry level, criteria A                             |                                                  |          |          |                 |          |          |          |
| OTHERS                   | MTBF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 141.5K hrs min.      MIL-HDBK-217F (25℃)                                                                                |                                                  |          |          |                 |          |          |          |
|                          | DIMENSION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 199*99*50mm (L*W*H)                                                                                                     |                                                  |          |          |                 |          |          |          |
|                          | PACKING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1.1Kg; 20pcs/22Kg/1.28CUFT                                                                                              |                                                  |          |          |                 |          |          |          |
| NOTE                     | 1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25℃ of ambient temperature.<br>2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor.<br>3. Tolerance : includes set up tolerance, line regulation and load regulation.<br>4. The power supply is considered a component which will be installed into a final equipment. The final equipment must be re-confirmed that it still meets EMC directives. |                                                                                                                         |                                                  |          |          |                 |          |          |          |

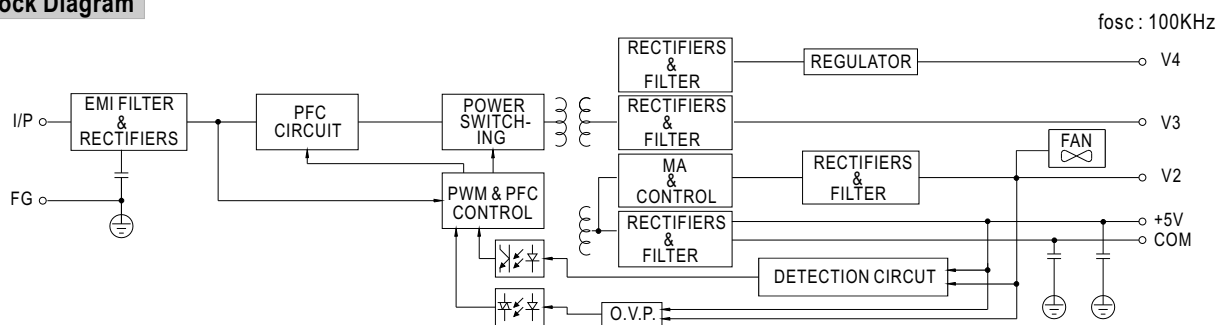
### 150W Quad Output with PFC Function

## ■ Mechanical Specification

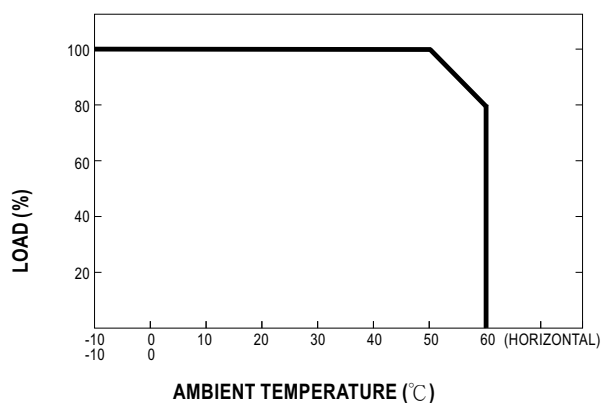
Case No. 916B    Unit:mm



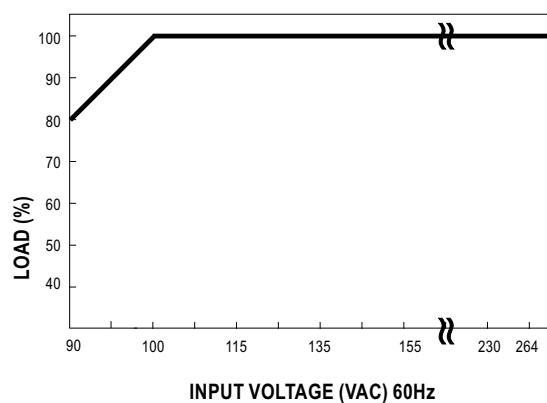
### ■ Block Diagram



### Derating Curve



### ■ Output Derating VS Input Voltage



# Quality Engineering Test Report

SERIES: QP-150 150W AC-DC QUAD OUTPUT SWITCHING POWER SUPPLY

|         |               |                                                                             |             |                                                                         |
|---------|---------------|-----------------------------------------------------------------------------|-------------|-------------------------------------------------------------------------|
| SAMPLE: | A : QP-150-3A | V1: 5 V / 10 A<br>V2: 3.3 V / 10 A<br>V3: 12 V / 5 A<br>V4: -5 V / 0.6 A    | E : QP-150D | V1: 5 V / 10 A<br>V2: 12 V / 4 A<br>V3: 24 V / 2 A<br>V4: -12 V / 0.6 A |
| SAMPLE: | B : QP-150-3B | V1: 5 V / 10 A<br>V2: 3.3 V / 10 A<br>V3: 12 V / 5 A<br>V4: -12 V / 0.6 A   | F : QP-150F | V1: 5 V / 10 A<br>V2: 15 V / 3 A<br>V3: 24 V / 2 A<br>V4: -15 V / 0.6 A |
| SAMPLE: | C : QP-150-3C | V1: 5 V / 10 A<br>V2: 3.3 V / 10 A<br>V3: 15 V / 4 A<br>V4: -15 V / 0.6 A   | G : QP-150B | V1: 5 V / 15 A<br>V2: 12 V / 4 A<br>V3: -12 V / 2 A<br>V4: -5 V / 0.6 A |
| SAMPLE: | D : QP-150-3D | V1: 5 V / 10 A<br>V2: 3.3 V / 10 A<br>V3: 24 V / 2.5 A<br>V4: -12 V / 0.6 A | H : QP-150C | V1: 5 V / 15 A<br>V2: 15 V / 3 A<br>V3: -15 V / 2 A<br>V4: -5 V / 0.6 A |

| NO | TEST ITEM              | TEST CONDITION / SPECIFICATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | RESULT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | VERDICT |
|----|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 1  | AC INPUT VOLTAGE RANGE | I/P:TESTING SPEC:90~264VAC<br>O/P:FULL LOAD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | B:63.137VAC~267VAC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | P       |
| 2  | LINE REGULATION        | I/P:100~264VAC SPEC:<br>O/P:FULL LOAD<br>A: V1: $\pm 1\%$<br>V2: $\pm 1\%$<br>V3: $\pm 2\%$<br>V4: $\pm 1\%$<br>B: V1: $\pm 1\%$<br>: V2: $\pm 1\%$<br>V3: $\pm 2\%$<br>V4: $\pm 1\%$<br>C: V1: $\pm 1\%$<br>V2: $\pm 1\%$<br>V3: $\pm 2\%$<br>V4: $\pm 1\%$<br>D: V1: $\pm 1\%$<br>V2: $\pm 1\%$<br>V3: $\pm 2\%$<br>V4: $\pm 1\%$<br>E: V1: $\pm 1\%$<br>: V2: $\pm 1\%$<br>V3: $\pm 2\%$<br>V4: $\pm 1\%$<br>F: V1: $\pm 1\%$<br>V2: $\pm 1\%$<br>V3: $\pm 2\%$<br>V4: $\pm 1\%$<br>G: V1: $\pm 1\%$<br>: V2: $\pm 2\%$<br>V3: $\pm 2\%$<br>V4: $\pm 1\%$<br>H: V1: $\pm 1\%$<br>V2: $\pm 2\%$<br>V3: $\pm 2\%$<br>V4: $\pm 1\%$ | A: V1: 0.00% ~ 0.00%<br>V2: 0.00% ~ 0.00%<br>V3: 0.00% ~ -0.049%<br>V4: 0.00% ~ 0.00%<br>B: V1: 0.00% ~ 0.00%<br>V2: 0.00% ~ 0.00%<br>V3: -0.049% ~ 0.00%<br>V4: 0.00% ~ 0.00%<br>C: V1: 0.00% ~ 0.00%<br>V2: 0.00% ~ 0.00%<br>V3: 0.00% ~ 0.00%<br>V4: -0.04% ~ 0.00%<br>D: V1: 0.00% ~ 0.00%<br>V2: 0.00% ~ 0.00%<br>V3: -0.03% ~ 0.00%<br>V4: -0.05% ~ 0.00%<br>E: V1: -0.12% ~ 0.00%<br>V2: 0.00% ~ 0.00%<br>V3: -0.03% ~ 0.00%<br>V4: 0.00% ~ 0.00%<br>F: V1: 0.00% ~ 0.00%<br>V2: 0.00% ~ 0.00%<br>V3: -0.03% ~ 0.00%<br>V4: 0.00% ~ 0.00%<br>G: V1: -0.118% ~ +0.118%<br>V2: -1.124% ~ +1.124%<br>V3: -1.64% ~ +2.685%<br>V4: 0.00% ~ 0.00%<br>H: V1: 0.00% ~ 0.00%<br>V2: 0.00% ~ 0.00%<br>V3: -0.038% ~ 0.00%<br>V4: 0.00% ~ +0.118% | P       |

| NO | TEST ITEM                | TEST CONDITION / SPECIFICATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | RESULT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | VERDICT |
|----|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 3  | LOAD REGULATION          | I/P:230VAC SPEC:<br>O/P:MIN. TO FULL LOAD<br>A: V1: $\pm 2\%$<br>V2: $\pm 2\%$<br>V3: $\pm 6\%$<br>V4: $\pm 2\%$<br>B: V1: $\pm 2\%$<br>V2: $\pm 2\%$<br>V3: $\pm 6\%$<br>V4: $\pm 2\%$<br>C: V1: $\pm 2\%$<br>V2: $\pm 2\%$<br>V3: $\pm 6\%$<br>V4: $\pm 2\%$<br>D: V1: $\pm 2\%$<br>V2: $\pm 2\%$<br>V3: $\pm 6\%$<br>V4: $\pm 2\%$<br>E: V1: $\pm 2\%$<br>V2: $\pm 2\%$<br>V3: $\pm 6\%$<br>V4: $\pm 2\%$<br>F: V1: $\pm 2\%$<br>V2: $\pm 2\%$<br>V3: $\pm 6\%$<br>V4: $\pm 2\%$<br>G: V1: $\pm 2\%$<br>V2: $\pm 6\%$<br>V3: $\pm 6\%$<br>V4: $\pm 2\%$<br>H: V1: $\pm 2\%$<br>V2: $\pm 6\%$<br>V3: $\pm 6\%$<br>V4: $\pm 2\%$ | A: V1: -0.355% ~ +0.256%<br>V2: -0.38% ~ +0.355%<br>V3: +0.414% ~ +1.4%<br>V4: -0.119% ~ +0.259%<br>B: V1: -0.36% ~ +0.12%<br>V2: -0.18% ~ +0.00%<br>V3: +0.36% ~ +1.00%<br>V4: -0.05% ~ +0.099%<br>C: V1: -0.36% ~ +0.24%<br>V2: -0.36% ~ +0.18%<br>V3: +0.12% ~ +0.12%<br>V4: +0.00% ~ +0.04%<br>D: V1: -0.35% ~ +0.24%<br>V2: -0.67% ~ +0.36%<br>V3: -0.67% ~ +2.06%<br>V4: +0.00% ~ +0.05%<br>E: V1: -0.24% ~ +0.24%<br>V2: -0.15% ~ +0.31%<br>V3: -0.57% ~ +1.56%<br>V4: -0.05% ~ +0.05%<br>F: V1: -0.24% ~ +0.24%<br>V2: -0.12% ~ +0.25%<br>V3: -0.62% ~ +1.66%<br>V4: -0.04% ~ +0.00%<br>G: V1: -0.118% ~ +0.118%<br>V2: -1.124% ~ +1.124%<br>V3: -1.64% ~ +2.685%<br>V4: 0.00% ~ 0.00%<br>H: V1: -0.356% ~ +0.118%<br>V2: -1.05% ~ +1.8%<br>V3: -2.21% ~ +3.297%<br>V4: 0.00% ~ 0.00% | P       |
| 4  | OUTPUT VOLTAGE TOLERANCE | I/P:90~264VAC SPEC:<br>O/P:20% TO FULL LOAD<br>A: V1: $\pm 3\%$<br>V2: $\pm 3\%$<br>V3: $\pm 6\%$<br>V4: $\pm 5\%$<br>B: V1: $\pm 3\%$<br>V2: $\pm 3\%$<br>V3: $\pm 6\%$<br>V4: $\pm 5\%$<br>C: V1: $\pm 3\%$<br>V2: $\pm 3\%$<br>V3: -6%~+8%<br>V4: $\pm 5\%$<br>D: V1: $\pm 3\%$<br>V2: $\pm 3\%$<br>V3: $\pm 6\%$<br>V4: $\pm 5\%$<br>E: V1: $\pm 3\%$<br>V2: $\pm 3\%$<br>V3: $\pm 6\%$<br>V4: $\pm 5\%$<br>F: V1: $\pm 3\%$<br>V2: $\pm 3\%$<br>V3: $\pm 6\%$<br>V4: $\pm 5\%$<br>G: V1: $\pm 3\%$<br>V2: $\pm 6\%$<br>V3: -6%~+10%<br>V4: $\pm 5\%$<br>H: V1: $\pm 3\%$<br>V2: -10%~+6%<br>V3: $\pm 8\%$<br>V4: $\pm 5\%$   | A: V1: -0.61%~ +0.00%<br>V2: -0.56%~ +0.35%<br>V3: -4.39%~ +2.59%<br>V4: -0.49%~ +0.00%<br>B: V1: -0.5%~ +0.12%<br>V2: -0.36%~ +0.4%<br>V3: -3.74%~ +3.54%<br>V4: -2.6%~ +0.05%<br>C: V1: -0.74%~ +0.00%<br>V2: -0.56%~ +0.35%<br>V3: -2.72%~ +4.36%<br>V4: -1.35%~ +0.12%<br>D: V1: -0.49%~ +0.35%<br>V2: -0.56%~ +0.36%<br>V3: -1.75%~ +4.88%<br>V4: -0.05%~ +0.16%<br>E: V1: -0.49%~ +0.26%<br>V2: -0.413%~ +0.1%<br>V3: -1.73%~ +3.79%<br>V4: -1.85%~ +0.11%<br>F: V1: -0.49%~ +0.24%<br>V2: -0.38%~ +0.08%<br>V3: -1.60%~ +3.8%<br>V4: -0.03%~ +0.13%<br>G: V1: -0.237%~ +0.11%<br>V2: -1.8%~ 3.183%<br>V3: -6%~ +7.36%<br>V4: +0.23%~ +0.23%<br>H: V1: -0.49%~ +0.18%<br>V2: -1.66%~ +3.24%<br>V3: -2.8%~ +5.47%<br>V4: -0.138%~ +0.27%                                                 | P       |

| NO | TEST ITEM                | TEST CONDITION / SPECIFICATION                                                                                                                                                                                                                                                                                                                                                                                                                                                               | RESULT                                                                                                                                                                                                                                                                                                                                                                      | VERDICT |
|----|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 5  | RIPPLE&NOISE             | I/P:230VAC<br>O/P:FULL LOAD<br>SPEC:<br>A: V1: 100mV<br>V2: 100mV<br>V3: 150mV<br>V4: 150mV<br>B: V1: 100mV<br>V2: 100mV<br>V3: 150mV<br>V4: 150mV<br>C: V1: 100mV<br>V2: 100mV<br>V3: 150mV<br>V4: 150mV<br>D: V1: 100mV<br>V2: 100mV<br>V3: 150mV<br>V4: 150mV<br>E: V1: 120mV<br>V2: 150mV<br>V3: 200mV<br>V4: 150mV<br>F: V1: 120mV<br>V2: 150mV<br>V3: 200mV<br>V4: 150mV<br>G: V1: 100mV<br>V2: 150mV<br>V3: 150mV<br>V4: 100mV<br>H: V1: 100mV<br>V2: 150mV<br>V3: 150mV<br>V4: 100mV | A:V1:58mV<br>V2:14mV<br>V3:77mV<br>V4:5mV<br>B:V1:80mV<br>V2:21mV<br>V3:52mV<br>V4:17mV<br>C:V1:61mV<br>V2:26mV<br>V3:60mV<br>V4:50mV<br>D:V1:65mV<br>V2:20mV<br>V3:66mV<br>V4:50mV<br>E:V1:71mV<br>V2:87mV<br>V3:79mV<br>V4:50mV<br>F:V1:67mV<br>V2:101mV<br>V3:85mV<br>V4:50mV<br>G:V1:32mV<br>V2:17mV<br>V3:28mV<br>V4:9mV<br>H:V1:35mV<br>V2:17mV<br>V3:42mV<br>V4:11mV | P       |
| 6  | AC INPUT CURRENT         | I/P:230VAC<br>O/P:FULL LOAD<br>SPEC:1.2A                                                                                                                                                                                                                                                                                                                                                                                                                                                     | B:0.887A                                                                                                                                                                                                                                                                                                                                                                    | P       |
| 7  | MAX. INRUSH CURREN       | I/P:230VAC<br>O/P: FULL LOAD<br>SPEC: A-F:45A<br>G.H:40A                                                                                                                                                                                                                                                                                                                                                                                                                                     | B:36.984A                                                                                                                                                                                                                                                                                                                                                                   | P       |
| 8  | O/P VOLTAGE<br>ADJ.RANGE | I/P:230VAC<br>O/P:MIN. LOAD<br>SPEC: A~F:CH1,CH2:-5%~+10%<br>G.H:CH1:-5%~+10%                                                                                                                                                                                                                                                                                                                                                                                                                | A: V1 4.57V~5.82V<br>: V2 3.07V~3.8V<br>B: V1 4.455V~5.85V<br>V2 3.046V~3.774V<br>C: V1 4.413V~5.803V<br>V2 3.030V~3.733V<br>D: V1 4.46V~5.81V<br>V2 3.03V~3.79V<br>E: V1 4.47V~5.834V<br>V2 10.28V~13.745V<br>F: V1 4.447V~5.8V<br>V2 12.308V~17.379V<br>G: V1 4.48V~5.77V<br>H: V1 4.5V~5.833V                                                                            | P       |
| 9  | SET UP TIME              | I/P:230VAC<br>O/P:FULL LOAD<br>SPEC: A-F:800mS<br>G.H:1S                                                                                                                                                                                                                                                                                                                                                                                                                                     | B: 331mS                                                                                                                                                                                                                                                                                                                                                                    | P       |
| 10 | HOLD UP TIME             | I/P:230VAC<br>O/P:FULL LOAD<br>SPEC:16mS                                                                                                                                                                                                                                                                                                                                                                                                                                                     | B: 22.67mS                                                                                                                                                                                                                                                                                                                                                                  | P       |
| 11 | EFFICIENCY               | I/P:230VAC<br>O/P:FULL LOAD<br>SPEC:<br>A:73%<br>B:75%<br>C:74%<br>D:76%<br>E:78%<br>F:78%<br>G:76%<br>H:77%                                                                                                                                                                                                                                                                                                                                                                                 | A:76.13%<br>B:79.913%<br>C:75.681%<br>D:77.455%<br>E:79.842%<br>F:79.885%<br>G:76.408%<br>H:78.248%                                                                                                                                                                                                                                                                         | P       |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                   |                                                                                                                                                                                                                                                                |                                                                                                                                                     |                                                                                                                                                                                        |   |          |     |      |        |     |              |        |     |    |                 |        |        |    |                       |        |        |     |           |        |        |     |                      |        |       |     |           |        |        |    |                      |        |        |     |                         |        |       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|----------|-----|------|--------|-----|--------------|--------|-----|----|-----------------|--------|--------|----|-----------------------|--------|--------|-----|-----------|--------|--------|-----|----------------------|--------|-------|-----|-----------|--------|--------|----|----------------------|--------|--------|-----|-------------------------|--------|-------|
| 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | OVER LOAD PROTECTION                                              | I/P:230VAC<br>O/P:TESTING                                                                                                                                                                                                                                      | SPEC: A~F:105%~150%<br>G.H :105%~135%                                                                                                               | A:134.6%<br>B:133.02%<br>C:130.33%<br>D:128.3%<br>E:128.2%<br>F:121.7%<br>G:118%<br>H:122%                                                                                             | P |          |     |      |        |     |              |        |     |    |                 |        |        |    |                       |        |        |     |           |        |        |     |                      |        |       |     |           |        |        |    |                      |        |        |     |                         |        |       |
| 13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | OVER VOLTAGE PROTECTION                                           | I/P:230VAC<br>O/P:FULL LOAD                                                                                                                                                                                                                                    | SPEC: A~D: CH1:5.75~6.75V<br>CH2:3.8V~4.4V<br>E: CH1:5.75~6.75V<br>CH2:13.8V~16.2V<br>F: CH1:5.75~6.75V<br>CH2:17.25V~20.25V<br>G.H: CH1:5.75~6.75V | A : CH1:5.96V CH2:3.95V<br>B : CH1:6.16V CH2:4.05V<br>C : CH1:6.05V CH2:4.12V<br>D : CH1:6.07V CH2:3.9V<br>E : CH1:6.07V CH2:4.2V<br>F : CH1:5.98V CH2:3.9V<br>G : 6.24V<br>H : 6.246V | P |          |     |      |        |     |              |        |     |    |                 |        |        |    |                       |        |        |     |           |        |        |     |                      |        |       |     |           |        |        |    |                      |        |        |     |                         |        |       |
| 14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | GROUND LEAKAGE CURRENT                                            | I/P:240VAC                                                                                                                                                                                                                                                     | SPEC: L-FG--<3.5mA<br>N-FG--<3.5mA                                                                                                                  | F: L-FG:0.7mA<br>N-FG:0.7mA                                                                                                                                                            | P |          |     |      |        |     |              |        |     |    |                 |        |        |    |                       |        |        |     |           |        |        |     |                      |        |       |     |           |        |        |    |                      |        |        |     |                         |        |       |
| 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | INSULATION RESISTANCE                                             | SPEC: I/P-O/P: 500VDC/100M Ohms MIN.<br>I/P-FG: 500VDC/100M Ohms MIN.<br>O/P-FG: 500VDC/100M Ohms MIN.                                                                                                                                                         |                                                                                                                                                     | B: O/P-FG >100M Ohms<br>I/P-O/P >100M Ohms<br>I/P-FG >100M Ohms                                                                                                                        | P |          |     |      |        |     |              |        |     |    |                 |        |        |    |                       |        |        |     |           |        |        |     |                      |        |       |     |           |        |        |    |                      |        |        |     |                         |        |       |
| 16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | DIELECTRIC / WITHSTAND VOLTAGE                                    | SPEC: I/P- O/P: 3KVAC/ 1 min.(10mA CUT-OFF)<br>I/P - FG: 1.5KVAC/ 1 min.(10mA CUT-OFF)<br>O/P - FG: 0.5KVAC/ 1 min.(10mA CUT-OFF)                                                                                                                              |                                                                                                                                                     | B: I/P-O/P :5.18mA<br>I/P-FG :4.15mA<br>O/P-FG :8.05mA                                                                                                                                 | P |          |     |      |        |     |              |        |     |    |                 |        |        |    |                       |        |        |     |           |        |        |     |                      |        |       |     |           |        |        |    |                      |        |        |     |                         |        |       |
| 17                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | BURN-IN TEST                                                      | I/P: 230VAC O/P: FULL LOAD<br>TA:22.2°C BURN-IN DURATION : 5.5 hrs                                                                                                                                                                                             |                                                                                                                                                     | B:NON BREAK                                                                                                                                                                            | P |          |     |      |        |     |              |        |     |    |                 |        |        |    |                       |        |        |     |           |        |        |     |                      |        |       |     |           |        |        |    |                      |        |        |     |                         |        |       |
| 18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ENVIRONMENT TEST<br>( SAMPLE B:)                                  | HIGH AMBIENT TEMPERATURE FULL LOAD TEST<br>I/P:230VAC O/P:FULL LOAD<br>AMBIENT TEMPERATURE:53.7°C                                                                                                                                                              |                                                                                                                                                     | AFTER 14 hrs<br>NON BREAK                                                                                                                                                              | P |          |     |      |        |     |              |        |     |    |                 |        |        |    |                       |        |        |     |           |        |        |     |                      |        |       |     |           |        |        |    |                      |        |        |     |                         |        |       |
| 19                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | TEMPERATURE RISE TEST T rise OF PARTS                             | B: I/P :230VAC AFTER 5.5 hr BURN-IN<br>O/P :FULL LOAD TA:22.2°C                                                                                                                                                                                                |                                                                                                                                                     |                                                                                                                                                                                        | P |          |     |      |        |     |              |        |     |    |                 |        |        |    |                       |        |        |     |           |        |        |     |                      |        |       |     |           |        |        |    |                      |        |        |     |                         |        |       |
| <table><tr><td>POSITION</td><td>P/N</td><td>TEMP</td><td>T rise</td></tr><tr><td>BD1</td><td>BRIDGE DIODE</td><td>29.2°C</td><td>7°C</td></tr><tr><td>Q1</td><td>MAIN TRANSISTOR</td><td>39.5°C</td><td>17.3°C</td></tr><tr><td>T1</td><td>MAIN TRANSFORMER WIRE</td><td>50.5°C</td><td>28.3°C</td></tr><tr><td>D51</td><td>O/P DIODE</td><td>47.3°C</td><td>25.1°C</td></tr><tr><td>C57</td><td>O/P FILTER CAPACITOR</td><td>30.6°C</td><td>8.4°C</td></tr><tr><td>L51</td><td>O/P CHOCK</td><td>55.3°C</td><td>33.1°C</td></tr><tr><td>C5</td><td>I/P FILTER CAPACITOR</td><td>33.3°C</td><td>11.1°C</td></tr><tr><td>LF2</td><td>LIME FILTER TRANSFORMER</td><td>27.8°C</td><td>5.6°C</td></tr></table> |                                                                   |                                                                                                                                                                                                                                                                |                                                                                                                                                     |                                                                                                                                                                                        |   | POSITION | P/N | TEMP | T rise | BD1 | BRIDGE DIODE | 29.2°C | 7°C | Q1 | MAIN TRANSISTOR | 39.5°C | 17.3°C | T1 | MAIN TRANSFORMER WIRE | 50.5°C | 28.3°C | D51 | O/P DIODE | 47.3°C | 25.1°C | C57 | O/P FILTER CAPACITOR | 30.6°C | 8.4°C | L51 | O/P CHOCK | 55.3°C | 33.1°C | C5 | I/P FILTER CAPACITOR | 33.3°C | 11.1°C | LF2 | LIME FILTER TRANSFORMER | 27.8°C | 5.6°C |
| POSITION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | P/N                                                               | TEMP                                                                                                                                                                                                                                                           | T rise                                                                                                                                              |                                                                                                                                                                                        |   |          |     |      |        |     |              |        |     |    |                 |        |        |    |                       |        |        |     |           |        |        |     |                      |        |       |     |           |        |        |    |                      |        |        |     |                         |        |       |
| BD1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | BRIDGE DIODE                                                      | 29.2°C                                                                                                                                                                                                                                                         | 7°C                                                                                                                                                 |                                                                                                                                                                                        |   |          |     |      |        |     |              |        |     |    |                 |        |        |    |                       |        |        |     |           |        |        |     |                      |        |       |     |           |        |        |    |                      |        |        |     |                         |        |       |
| Q1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | MAIN TRANSISTOR                                                   | 39.5°C                                                                                                                                                                                                                                                         | 17.3°C                                                                                                                                              |                                                                                                                                                                                        |   |          |     |      |        |     |              |        |     |    |                 |        |        |    |                       |        |        |     |           |        |        |     |                      |        |       |     |           |        |        |    |                      |        |        |     |                         |        |       |
| T1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | MAIN TRANSFORMER WIRE                                             | 50.5°C                                                                                                                                                                                                                                                         | 28.3°C                                                                                                                                              |                                                                                                                                                                                        |   |          |     |      |        |     |              |        |     |    |                 |        |        |    |                       |        |        |     |           |        |        |     |                      |        |       |     |           |        |        |    |                      |        |        |     |                         |        |       |
| D51                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | O/P DIODE                                                         | 47.3°C                                                                                                                                                                                                                                                         | 25.1°C                                                                                                                                              |                                                                                                                                                                                        |   |          |     |      |        |     |              |        |     |    |                 |        |        |    |                       |        |        |     |           |        |        |     |                      |        |       |     |           |        |        |    |                      |        |        |     |                         |        |       |
| C57                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | O/P FILTER CAPACITOR                                              | 30.6°C                                                                                                                                                                                                                                                         | 8.4°C                                                                                                                                               |                                                                                                                                                                                        |   |          |     |      |        |     |              |        |     |    |                 |        |        |    |                       |        |        |     |           |        |        |     |                      |        |       |     |           |        |        |    |                      |        |        |     |                         |        |       |
| L51                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | O/P CHOCK                                                         | 55.3°C                                                                                                                                                                                                                                                         | 33.1°C                                                                                                                                              |                                                                                                                                                                                        |   |          |     |      |        |     |              |        |     |    |                 |        |        |    |                       |        |        |     |           |        |        |     |                      |        |       |     |           |        |        |    |                      |        |        |     |                         |        |       |
| C5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | I/P FILTER CAPACITOR                                              | 33.3°C                                                                                                                                                                                                                                                         | 11.1°C                                                                                                                                              |                                                                                                                                                                                        |   |          |     |      |        |     |              |        |     |    |                 |        |        |    |                       |        |        |     |           |        |        |     |                      |        |       |     |           |        |        |    |                      |        |        |     |                         |        |       |
| LF2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | LIME FILTER TRANSFORMER                                           | 27.8°C                                                                                                                                                                                                                                                         | 5.6°C                                                                                                                                               |                                                                                                                                                                                        |   |          |     |      |        |     |              |        |     |    |                 |        |        |    |                       |        |        |     |           |        |        |     |                      |        |       |     |           |        |        |    |                      |        |        |     |                         |        |       |
| 20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | LIFE CYCLE                                                        | B: SUPPOSE C57 IS THE MOST CRITICAL COMPONENT<br>I/P:230VAC O/P:FULL LOAD Ta:25°C Tc57:30.6°C Life: 868070hrs<br>I/P:230VAC O/P:FULL LOAD Ta:50°C Tc57:63.4°C Life: 140217hrs                                                                                  |                                                                                                                                                     |                                                                                                                                                                                        |   |          |     |      |        |     |              |        |     |    |                 |        |        |    |                       |        |        |     |           |        |        |     |                      |        |       |     |           |        |        |    |                      |        |        |     |                         |        |       |
| 21                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | CRITICAL COMPONENT RECORD<br>( FOR QC INSPECTION REFERENCE ONLY ) | B: FUSE :4A/250V<br>BRIDGE DIODE :D4SB80<br>LINE FILTER :LF-201 EF-28<br>TRANSFOMER TF-741<br>POWER SWITCHER :IRFP450 14A/500V<br>OUTPUT DIODE :BYQ28X-200<br>OUTPUT CAPACITOR :2200u/10V RUBYCON YXG<br>INPUT CAPACITOR :150uF/400V 85°C<br>P.C.B :QTP-150-R2 |                                                                                                                                                     |                                                                                                                                                                                        |   |          |     |      |        |     |              |        |     |    |                 |        |        |    |                       |        |        |     |           |        |        |     |                      |        |       |     |           |        |        |    |                      |        |        |     |                         |        |       |

| DATE     | SAMPLE                                                                                                    | TEST RESULT | TEST    | APPROVAL |
|----------|-----------------------------------------------------------------------------------------------------------|-------------|---------|----------|
| 20000205 | RD<br>SAMPLE<br>QP-150-3A<br>QP-150-3B<br>QP-150-3C<br>QP-150-3D<br>QP-150D<br>QP-150E                    | PASS        | VINCENT | Max Lin  |
| 20000408 | PRODUCTION<br>SAMPLE<br>A203A32<br>QP-150-3A<br>QP-150-3B<br>QP-150-3C<br>QP-150-3D<br>QP-150D<br>QP-150E | PASS        | VINCENT | Max Lin  |
| 20000905 | PRODUCTION<br>SAMPLE<br>A209C29<br>QP-150F                                                                | PASS        | VINCENT | Max Lin  |
| 20010301 | PRODUCTION<br>SAMPLE<br>A211C35A<br>QP-150D<br>QP-150F                                                    | PASS        | VINCENT | Max Lin  |