



### 60W Quad Output Switching Power Supply

## Q-60 series



#### ■ Features :

- Universal AC input / Full range
- Protections: Short circuit / Overload / Over voltage
- Cooling by free air convection
- LED indicator for power on
- Fixed switching frequency at 35KHz
- 2 years warranty

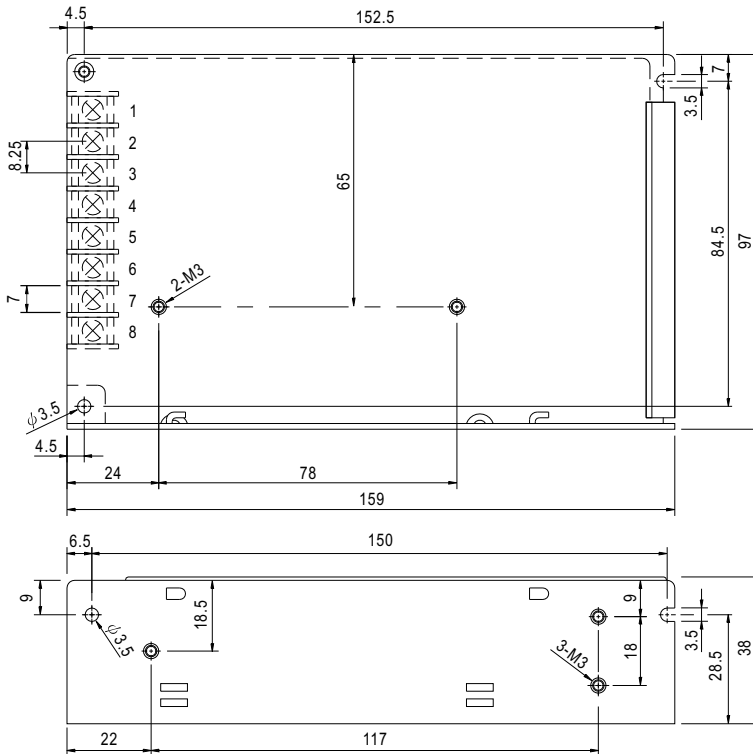


#### SPECIFICATION

| MODEL                 |                              | Q-60B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |          |          |          | Q-60C            |          |          |          | Q-60D            |          |            |          |
|-----------------------|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|----------|------------------|----------|----------|----------|------------------|----------|------------|----------|
| OUTPUT                | OUTPUT NUMBER                | CH1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CH2      | CH3      | CH4      | CH1              | CH2      | CH3      | CH4      | CH1              | CH2      | CH3        | CH4      |
|                       | DC VOLTAGE                   | 5V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 12V      | -5V      | -12V     | 5V               | 15V      | -5V      | -15V     | 5V               | 12V      | 24V        | -12V     |
|                       | RATED CURRENT                | 5.5A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2A       | 0.5A     | 0.5A     | 5.5A             | 1.5A     | 0.5A     | 0.5A     | 4A               | 1A       | 1A         | 0.5A     |
|                       | CURRENT RANGE                | 0.5 ~ 8A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0.1 ~ 3A | 0 ~ 1A   | 0 ~ 1A   | 0.5 ~ 8A         | 0.1 ~ 3A | 0 ~ 1A   | 0 ~ 1A   | 0.5 ~ 8A         | 0.1 ~ 3A | 0.1 ~ 1.5A | 0 ~ 1A   |
|                       | RATED POWER                  | 60W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |          |          |          | 60W              |          |          |          | 62W              |          |            |          |
|                       | RIPPLE & NOISE (max.) Note.2 | 100mVp-p                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 120mVp-p | 100mVp-p | 120mVp-p | 100mVp-p         | 120mVp-p | 100mVp-p | 120mVp-p | 100mVp-p         | 120mVp-p | 150mVp-p   | 120mVp-p |
|                       | VOLTAGE ADJ. RANGE           | CH1: 4.75 ~ 5.5V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          |          |          | CH1: 4.75 ~ 5.5V |          |          |          | CH1: 4.75 ~ 5.5V |          |            |          |
|                       | VOLTAGE TOLERANCE Note.3     | ±2.0%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ±6.0%    | ±5.0%    | ±5.0%    | ±2.0%            | +8,-4%   | ±5.0%    | ±5.0%    | ±2.0%            | ±6.0%    | +8,-4%     | ±5.0%    |
|                       | LINE REGULATION              | ±0.5%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ±1.0%    | ±0.5%    | ±0.5%    | ±0.5%            | ±2.0%    | ±0.5%    | ±0.5%    | ±0.5%            | ±1.0%    | ±2.0%      | ±0.5%    |
|                       | LOAD REGULATION              | ±0.5%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ±4.0%    | ±1.0%    | ±1.0%    | ±0.5%            | ±4.0%    | ±1.0%    | ±1.0%    | ±0.5%            | ±4.0%    | ±4.0%      | ±1.0%    |
| INPUT                 | SETUP, RISE TIME             | 800ms, 20ms/230VAC      1600ms, 20ms/115VAC at full load                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |          |          |                  |          |          |          |                  |          |            |          |
|                       | HOLD UP TIME (Typ.)          | 70ms/230VAC      15ms/115VAC at full load                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |          |          |                  |          |          |          |                  |          |            |          |
|                       | VOLTAGE RANGE                | 85 ~ 264VAC      120 ~ 370VDC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |          |          |          |                  |          |          |          |                  |          |            |          |
|                       | FREQUENCY RANGE              | 47 ~ 63Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |          |          |                  |          |          |          |                  |          |            |          |
|                       | EFFICIENCY (Typ.)            | 70%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |          |          |          | 72%              |          |          |          | 75%              |          |            |          |
|                       | AC CURRENT (Typ.)            | 2A/115VAC      0.8A/230VAC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |          |          |          |                  |          |          |          |                  |          |            |          |
| PROTECTION            | INRUSH CURRENT (Typ.)        | COLD START 15A/115VAC      30A/230VAC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |          |          |          |                  |          |          |          |                  |          |            |          |
|                       | LEAKAGE CURRENT              | <1mA / 240VAC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |          |          |          |                  |          |          |          |                  |          |            |          |
|                       | OVERLOAD                     | 105 ~ 150%/115VAC rated output power<br>Protection type : Hiccup mode, recovers automatically after fault condition is removed                                                                                                                                                                                                                                                                                                                                                                                                 |          |          |          |                  |          |          |          |                  |          |            |          |
| ENVIRONMENT           | OVER VOLTAGE                 | 5V: 5.75 ~ 6.75VDC<br>Protection type : Hiccup mode, recovers automatically after fault condition is removed                                                                                                                                                                                                                                                                                                                                                                                                                   |          |          |          |                  |          |          |          |                  |          |            |          |
|                       | 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℃) on +5V output                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          |          |          |                  |          |          |          |                  |          |            |          |
| SAFETY & EMC (Note 4) | VIBRATION                    | 10 ~ 500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |          |          |          |                  |          |          |          |                  |          |            |          |
|                       | SAFETY STANDARDS             | UL60950-1 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, light industry level, criteria A                                                                                                                                                                                                                                                                                                                                                                                                                                             |          |          |          |                  |          |          |          |                  |          |            |          |
|                       | MTBF                         | 284.8K hrs min.    MIL-HDBK-217F (25℃)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |          |          |          |                  |          |          |          |                  |          |            |          |
|                       | DIMENSION                    | 159*97*38mm (L*W*H)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |          |          |          |                  |          |          |          |                  |          |            |          |
| NOTE                  | PACKING                      | 0.56Kg; 24pcs/14.4Kg/0.75CUFT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |          |          |          |                  |          |          |          |                  |          |            |          |
|                       |                              | 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. |          |          |          |                  |          |          |          |                  |          |            |          |

### Mechanical Specification

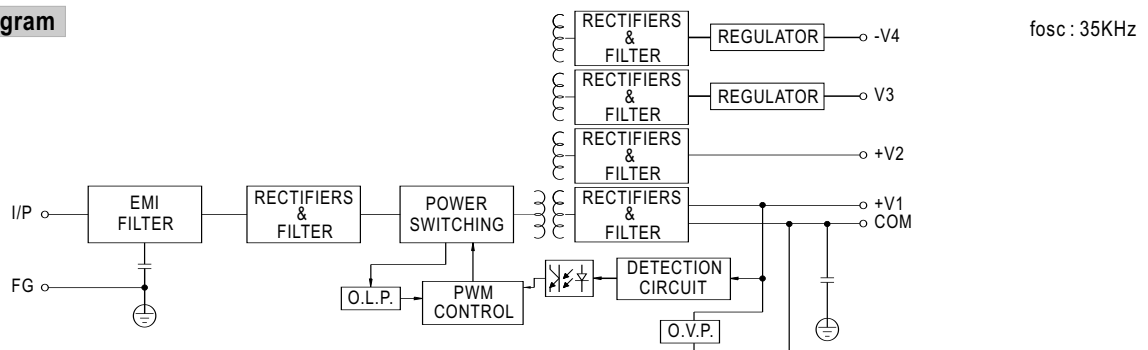
Case No. 901 Unit:mm



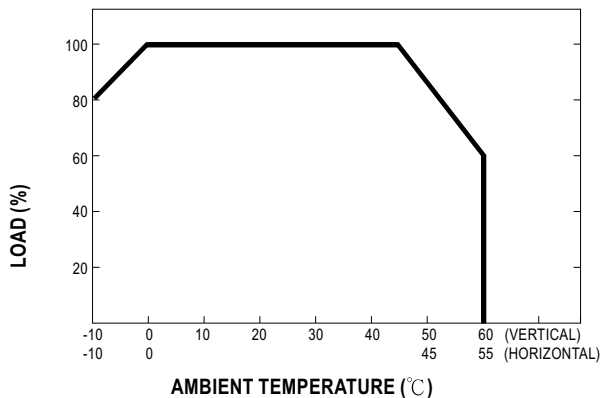
Terminal Pin No. Assignment

| Pin No. | Assignment   | Pin No. | Assignment    |
|---------|--------------|---------|---------------|
| 1       | AC/L         | 5       | DC OUTPUT -V4 |
| 2       | AC/N         | 6       | DC OUTPUT +V2 |
| 3       | FG $\perp$   | 7       | DC OUTPUT COM |
| 4       | DC OUTPUT V3 | 8       | DC OUTPUT +V1 |

### Block Diagram



### Derating Curve



### Static Characteristics

