

### Features :

- 4 x 2 x 1.16 Inches Form Factor
- 60 Watts Convection
- No Load Power < 0.5 W
- -40°C to +70°C Operating Temperature
- Efficiencies up to 87%
- Class II Option Available
- Medical ( BF ) Safety Approvals
- Approved to Household, ITAV and Medical Standards

### SPECIFICATIONS:

| MODEL              |  | OPS2x4-60-05  | OPS2x4-60-12    | OPS2x4-60-15    | OPS2x4-60-24    | OPS2x4-60-48    |  |
|--------------------|--|---|-----------------|-----------------|-----------------|-----------------|--|
| OUTPUT             | NOMINAL DC VOLTAGE   | 5 V   | 12 V            | 15 V            | 24 V            | 48 V            |  |
|                    | RATED CURRENT ( CONVECTION )   | 10 A  | 5 A             | 4 A             | 2.5 A           | 1.25 A          |  |
|                    | RATED CURRENT ( FORCED AIR )   | NA  | NA              | NA              | NA              | NA              |  |
|                    | RATED POWER ( CONVECTION )   | 50 W  | 60 W            | 60 W            | 60 W            | 60 W            |  |
|                    | RATED POWER ( FORCED AIR )   | NA  | NA              | NA              | NA              | NA              |  |
|                    | RIPPLE & NOISE ( max )   | < 1.5 % of Vout   | < 1 % of Vout   | < 1 % of Vout   | < 1 % of Vout   | < 1 % of Vout   |  |
|                    | VOLTAGE ADJ. RANGE   | 5.0 to 6.0 V  | 12 to 14 V      | 15 to 17.5 V    | 24 to 28 V      | 48 to 56 V      |  |
|                    | VOLTAGE TOLERANCE  | ± 1 %   |                 |                 |                 |                 |  |
|                    | LINE REGULATION  | ± 0.5 %   |                 |                 |                 |                 |  |
|                    | LOAD REGULATION  | ± 1 %   |                 |                 |                 |                 |  |
|                    | TURN ON TIME   | < 1 sec @ 230 VAC & < 3 sec @ 115 VAC, Full load  |                 |                 |                 |                 | < 3 sec @ 230 VAC &<br>< 6 sec @ 115 VAC,<br>Full load |
|                    | HOLD UP TIME   | ≥ 60 ms @ 230 VAC & ≥ 10 ms @ 115 VAC, Full load  |                 |                 |                 |                 |  |
|                    | RISE TIME  | < 100 ms  |                 |                 |                 |                 |  |
|                    | FAN OUTPUT   | Not Available   |                 |                 |                 |                 |  |
| TRANSIENT RESPONSE | Max excursion 5 % for step load change from 50 % to 100 % at 0.1 A / μsec slew rate, 50 % duty cycle, 50 / 60 Hz. Recovery time < 5 msec |   |                 |                 |                 |                 |  |
| INPUT              | VOLTAGE RANGE*   | 90 - 264 VAC ( 127 - 370 VDC )<br><b>Note:</b> 90 - 305 VAC operation available on demand.  |                 |                 |                 |                 |  |
|                    | FREQUENCY RANGE  | 47 - 63 Hz  |                 |                 |                 |                 |  |
|                    | EFFICIENCY @ 230 VAC   | Up to 80 %  | Up to 85 %      | Up to 85 %      | Up to 87 %      | Up to 87 %      |  |
|                    | AC CURRENT   | 1.2 A @ 115 VAC; 0.8 A @ 230 VAC  |                 |                 |                 |                 |  |
|                    | POWER FACTOR   | No active PFC is available  |                 |                 |                 |                 |  |
|                    | INRUSH CURRENT   | < 60 Amps; Measured at 264 VAC, 25°C Ambient, Cold start  |                 |                 |                 |                 |  |
|                    | LEAKAGE CURRENT  | < 300 uA; 264 VAC input   |                 |                 |                 |                 |  |
|                    | TOUCH CURRENT  | < 100 uA; 264 VAC input   |                 |                 |                 |                 |  |
|                    | NO LOAD POWER CONSUMPTION  | < 0.5 W; 115 VAC input  |                 |                 |                 |                 |  |
| PROTECTION         | OVERLOAD   | > 110 % of rated output current; Hiccup mode; Autorecovery type.  |                 |                 |                 |                 |  |
|                    | OVERVOLTAGE  | 7 - 9 VDC   | 15.5 - 18.5 VDC | 18.5 - 22.5 VDC | 28.5 - 33.5 VDC | 56.5 - 66.5 VDC |  |
|                    | OUTPUT SHORT CIRCUIT   | Latched type; Input AC power to be recycled to recover the power supply   |                 |                 |                 |                 |  |
|                    | OVER TEMPERATURE   | Power supply shuts down when the temperature of PCB below main transformer reaches typically 120°C; Turns on only after the temperature falls below 90°C typically and AC power is recycled thereafter. |                 |                 |                 |                 |  |
| ENVIRONMENT        | OPERATING TEMP   | - 40°C to + 70°C; De-rate linearly above 50°C from 100 % load at 50°C to 50 % load at 70°C.<br><b>Note:</b> Only start up guaranteed at - 40°C with specification deterioration.                        |                 |                 |                 |                 |  |
|                    | STORAGE TEMP   | - 40°C to + 85°C  |                 |                 |                 |                 |  |
|                    | COOLING  | Natural convection cooled   |                 |                 |                 |                 |  |
|                    | HUMIDITY   | 5 to 95 % RH, Non condensing  |                 |                 |                 |                 |  |
|                    | ALTITUDE   | 2000 m  |                 |                 |                 |                 |  |
|                    | VIBRATION  | Component: 10 ~ 500 Hz, 2 G 10 min. / 1 cycle, Period for 60 min. each along X, Y, Z axes   |                 |                 |                 |                 |  |

**Note:** \*Although power supply will work for the specified DC input voltage range, UL approval is only for the specified AC input voltage range.

| MODEL                       |              | OPS2x4-60-05   | OPS2x4-60-12 | OPS2x4-60-15 | OPS2x4-60-24 | OPS2x4-60-48 |
|-----------------------------|--------------|--|--------------|--------------|--------------|--------------|
| <b>DIELECTRIC WITHSTAND</b> | TEST VOLTAGE | I/P to Earth: 1500 VAC, I/P to O/P: 4000 VAC, O/P to Earth: 1500 VAC |              |              |              |              |
| <b>RELIABILITY</b>          | MTBF         | > 525K hrs. as per MIL-HDBK-217F (25°C)                              |              |              |              |              |
| <b>MECHANICAL</b>           | DIMENSION    | Overall: 4" x 2" x 1.16" ( L x W x H ) ; Height above PCB: 1"        |              |              |              |              |
|                             | WEIGHT       | < 150 gms  |              |              |              |              |
|                             | MOUNTING     | Open Frame   |              |              |              |              |

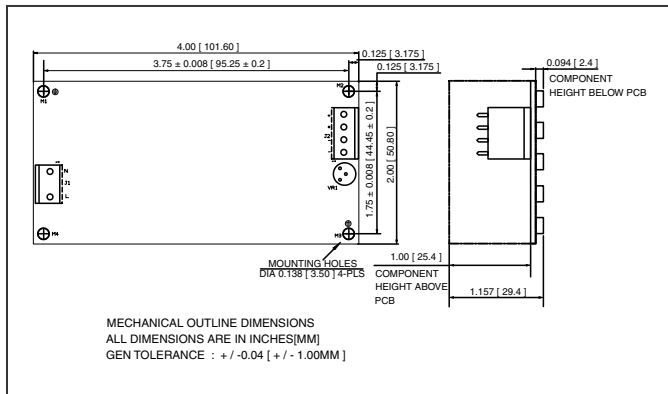
| Means of Protection  |  | Category         |
|----------------------|--|------------------|
| Primary to Secondary | 2 x MOPP ( Means of Patient Protection ) | IEC 60601-1 Ed 3 |
| Primary to Earth     | 1 x MOPP ( Means of Patient Protection ) |                  |
| Secondary to Earth   | 1 x MOPP ( Means of Patient Protection ) |                  |

### Connectors details

| Ref Des | Description         | Type   | Pin number | Function      |
|---------|---------------------|--|------------|---------------|
| J1      | Input AC connector  | Tyco: 640445-3;<br>Mates with 647402-3;<br>Pin: 3-647409-1 | 1          | AC Neutral    |
|         |                     |  | 2          | Not connected |
|         |                     |  | 3          | AC Line       |
| J2      | Output DC connector | Tyco: 640445-4;<br>Mates with 647402-4;<br>Pin: 3-647409-1 | 1, 2       | V1 Negative   |
|         |                     |  | 3, 4       | V1 Positive   |
| -       | Earth*              | Mounting holes marked with Earth symbol                    | -          | Earth         |

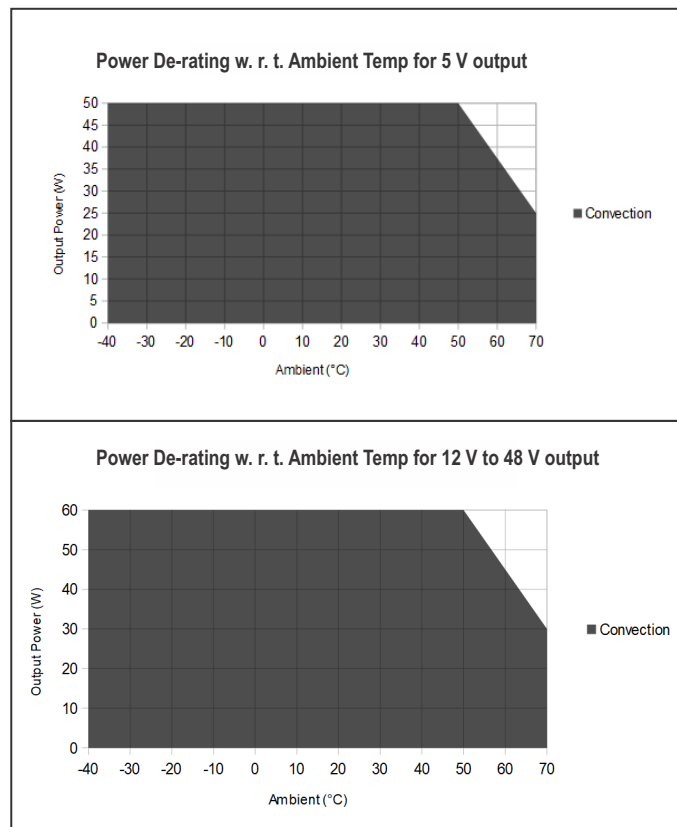
Note: \* All the mounting holes marked with Earth symbol must be Earthed.

### Mechanical dimensions



- Note:**
1. This open frame power supply should preferably be mounted horizontally on 4 metal stand-offs having diameter not more than 6 mm and height not less than 7 mm.
  2. Screws used to fix PCB on stand-offs should not have head diameter more than 6 mm.
  3. Washer used should not have diameter more than 6 mm.

### De-rating curve



**Compliance**

| Applicable EMI / EMC Standards    |  |  |
|-----------------------------------|--|--|
| Category                          | Reference Standards  | Testing Level                              |
| Conducted Emission                | CISPR32  | CLASS B                                    |
| Radiated Emission                 | CISPR32  | CLASS A                                    |
| Electrostatic Discharge           | IEC 61000-4-2  | Level 4, Criteria A<br>Level 3, Criteria A |
| Radiated Susceptibility           | IEC 61000-4-3  | Level 3, Criteria B                        |
| Electrical Fast Transient / Burst | IEC 61000-4-4  | Level 3, Criteria A                        |
| Surge                             | IEC 61000-4-5  | Level 3, Criteria A                        |
| Conducted Susceptibility          | IEC 61000-4-6  | Level 3, Criteria B                        |
| Power Frequency Magnetic Field    | IEC 61000-4-8  | Level 4, Criteria A                        |
| Voltage Dips & Interruption       | IEC 61000-4-11   | Criteria A & B                             |
| Safety                            | Approved to IEC / EN / UL 62368-1;<br>IEC / EN 60601-1; IEC / EN 61558 |  |

**Ordering information**

| Product Code               | Description   | Certification |
|----------------------------|---|---------------|
| <b>OPS2x4-60-05-A-1-CU</b> | Open Frame Power Supply with 4 x 2 x 1.16" Form factor, 5 V / 10 A, 50 Watts with Convection Cooling    |               |
| <b>OPS2x4-60-12-A-1-CU</b> | Open Frame Power Supply with 4 x 2 x 1.16" Form factor, 12 V / 5 A, 60 Watts with Convection Cooling    |               |
| <b>OPS2x4-60-15-A-1-CU</b> | Open Frame Power Supply with 4 x 2 x 1.16" Form factor, 15 V / 4 A, 60 Watts with Convection Cooling    |               |
| <b>OPS2x4-60-24-A-1-CU</b> | Open Frame Power Supply with 4 x 2 x 1.16" Form factor, 24 V / 2.5 A, 60 Watts with Convection Cooling  |               |
| <b>OPS2x4-60-48-A-1-CU</b> | Open Frame Power Supply with 4 x 2 x 1.16" Form factor, 48 V / 1.25 A, 60 Watts with Convection Cooling |               |