

100W FAN COOLED 80W CONVECTION COOLED

AC-DC POWER SUPPLIES

The FCB100 is a series of open frame AC-DC power supplies designed for medical devices (including BF), industrial electronics, ITE & household applications. The FCB100 is compliant with class B conducted & radiated emissions, can be used in both class I & class II installations and the wide 80VAC to 264VAC operating input range makes it ideal for both home healthcare applications and in hospital use.

With both convection and fan cooled ratings, extremely low emissions and safety & EMC certification for global use, the FCB100 benefits system designers with easy integration into a wide range of applications across multiple end markets



Features

- 100W fan cooled
- 80W convection cooled
- 4" x 2" footprint, low 1.25" profile
- Class I & Class II applications
- Medical (BF), ITE & household approvals
- Class B conducted & radiated emissions
- Input Range 80 to 264VAC
- <0.3W no load input power
- Regulated single outputs from 12 to 48VDC
- Short circuit, overvoltage & overload protection
- -25°C to +70°C operating temperature
- 3 year warranty

Applications



Medical



Household Appliances



Industrial Electronics

Dimensions

4.00" x 2.00" x 1.25" (101.6 x 50.8 x 31.8mm)

Models & Ratings

| Model number | Output Power | Output Voltage | Convection cooled (40°C) | Convection cooled (50°C) | Fan cooled (10cfm) |
|--------------|--------------|----------------|--------------------------|--------------------------|--------------------|
| FCB100US12 | 100W | 12.0VDC | 7.5A | 6.7A | 8.3A |
| FCB100US15 | | 15.0VDC | 6.0A | 5.3A | 6.7A |
| FCB100US19 | | 19.0VDC | 4.7A | 4.2A | 5.3A |
| FCB100US24 | | 24.0VDC | 4.0A | 3.5A | 4.2A |
| FCB100US36 | | 36.0VDC | 2.6A | 2.4A | 2.8A |
| FCB100US48 | | 48.0VDC | 2.0A | 1.8A | 2.1A |

Input

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|---------------------------|--|---------|---------|-------|--|
| Input Voltage | 80 | | 264 | VAC | Derate from 100% at 90VAC to 90% at 85VAC and 80% at 80VAC |
| Input Frequency | 47 | | 63 | Hz | |
| Input Current - Full Load | | 1.8/1.1 | | A rms | 115/230VAC full load |
| No Load Input Power | | | 0.3 | W | |
| Inrush Current | | | 60 | A | At 264VAC, cold start 25°C |
| Earth Leakage Current | | | 270 | μA | |
| Input Protection | Internal T3.15A/300VAC fuse fitted in line and neutral | | | | |

Output

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|----------------------------|---|---------|---------|-------|--|
| Output Voltage | 12 | | 48 | VDC | |
| Initial Set Accuracy | | | 1.5 | % | At 50% load |
| Minimum Load | No minimum load required | | | | |
| Line Regulation | | | ±0.5 | % | 90-264VAC |
| Load Regulation | | | ±1 | % | |
| Start Up Delay | | | 2 | s | |
| Start Up Rise Time | | | 50/150 | ms | ≥0°C/≤10°C |
| Overshoot | | | 5 | % | |
| Hold Up Time | 8 | 14 | | ms | At full load and 115/230VAC |
| Transient Response | | | 4 | % | Deviation, recovery within 1% in less than 500μs for a 25% load change |
| Ripple & Noise | | | 1 | % | 0°C to 70°C |
| Overvoltage Protection | 110 | | 150 | %Vnom | Recycle input to reset |
| Overload Protection | 110 | | 175 | % | |
| Short Circuit Protection | Trip and restart (hiccup mode) | | | | |
| Patient Leakage Current | | | 95 | μA | |
| Overtemperature Protection | Measured internally, recycle input to reset | | | | |
| Temperature Coefficient | | | 0.02 | %/°C | |

General

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|----------------------------|---------|------------|---------|-------------------|-------------------------|
| Efficiency | | 87 | | % | Model dependant |
| Isolation: Input to Output | 4000 | | | VAC | 2 x MOPP |
| Input to Ground | 1500 | | | | 1 x MOPP |
| Output to Ground | 1500 | | | | 1 x MOPP |
| Switching Frequency | 22 | | 70 | kHz | |
| Power Density | | | 10 | W/in ³ | |
| Mean Time Between Failure | | 390 | | khrs | MIL-HDBK-217F, 25°C GB. |
| Weight | | 0.35 (160) | | lb (g) | |

EMC: Emissions

| Phenomenon | Standard | Test Level | Criteria | Notes & Conditions |
|------------------|------------------|------------|----------|--------------------|
| Conducted | EN55032, EN55011 | Class B | | |
| Radiated | EN55032, EN55011 | Class B | | |
| Harmonic Current | EN61000-3-2 | Class A | | |
| Voltage Flicker | EN61000-3-3 | | | |

EMC: Immunity

| Phenomenon | Standard | Test Level | Criteria | Notes & Conditions |
|------------------------------|---------------------------------|-------------------------|------------|------------------------------------|
| ITE | EN55024 EN55035 EN55014-2 | As below | As below | |
| ESD Immunity | EN61000-4-2 | 4 | A | ±8kV contact / ±15kV air discharge |
| Radiated Immunity | EN61000-4-3 | 3 | A | |
| EFT | EN61000-4-4 | 3 | A | |
| Surge | EN61000-4-5 | Installation class 3 | A | |
| Conducted | EN61000-4-6 | 3 | A | |
| Magnetic Fields | EN61000-4-8 | 4 | A | |
| Dips and Interruptions | EN61000-4-11 (100VAC/60Hz) | 100% (0VAC) for 8.4ms | A | Pout = 85W |
| | | 100% (0VAC) for 16.7ms | B | |
| | | 60% (40VAC) for 200ms | B | |
| | | 30% (70VAC) for 500ms | A | Pout = 60W |
| | | 20% (80VAC) for 5000ms | A | |
| | | 100% (0VAC) for 5000ms | B | |
| | EN61000-4-11 (115VAC/60Hz) | 100% (0VAC) for 8.4ms | A | |
| | | 100% (0VAC) for 16.7ms | B | |
| | | 60% (46VAC) for 200ms | B | |
| | | 30% (80VAC) for 500ms | A | Pout = 60W |
| | | 20% (92VAC) for 5000ms | A | |
| | | 100% (0VAC) for 5000ms | B | |
| | EN61000-4-11 (240VAC/50Hz) | 100% (0VAC) for 10ms | A | |
| | | 100% (0VAC) for 20ms | A | |
| | | 60% (96VAC) for 200ms | A | |
| | | 30% (168VAC) for 500ms | A | |
| | | 20% (192VAC) for 5000ms | A | |
| | | 100% (0VAC) for 5000ms | B | |
| | EN60601-1-2 (100VAC/50Hz) | 100% (0VAC) for 10ms | A | Pout = 65W |
| | | 100% (0VAC) for 20ms | A | Pout = 40W |
| 60% (40VAC) for 100ms | | A | Pout = 20W | |
| 30% (70VAC) for 500ms | | A | Pout = 60W | |
| 100% (0VAC) for 5000ms | | B | | |
| EN60601-1-2 (240VAC/50Hz) | 100% (0VAC) for 10ms | A | | |
| | 100% (0VAC) for 20ms | A | | |
| | 60% (96VAC) for 100ms | A | | |
| | 30% (168VAC) for 500ms | A | | |
| | 100% (0VAC) for 5000ms | B | | |

Environmental

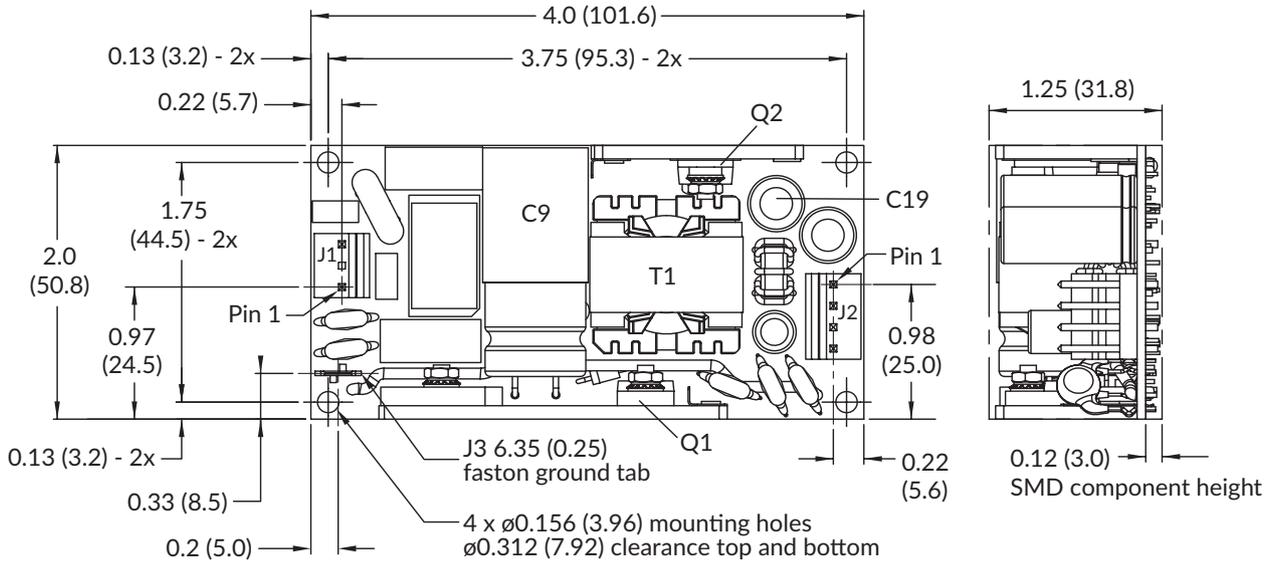
| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|-----------------------|---|---------|-----------|-------|--|
| Operating Temperature | -25 | | +70 | °C | Derate linearly from 80W at +50°C to 40W at +70°C (12, 15, 19V models), Convection cooled Derate linearly from 85W at +50°C to 45W at +70°C (24, 36, 48V models), Convection cooled Derate linearly from 100W at +50°C to 50W at +70°C, Fan cooled |
| Storage Temperature | -40 | | +85 | °C | |
| Cooling | Convection/Fan cooled (see models and ratings) | | | | |
| Humidity | | | 95 | %RH | Non-condensing |
| Operating Altitude | | | 4000/5000 | m | Medical/ITE and Household |
| Shock | ±3 x 30g shocks in each plane, total 18 shocks. 30g = 11ms (±0.5ms) half sine. Conforms to EN60068-2-27 and EN60068-2-47 | | | | |
| Vibration | Single axis 10-500Hz at 2g sweep and endurance at resonance in all 3 planes. Conforms to EN50068-2-6 | | | | |

Safety Approvals

| Certification | Standard | Notes & Conditions |
|---------------|----------------------------------|---|
| CB Report | IEC60950-1, IEC62368-1, IEC60335 | Audio/Video, Information and Communication Technology Equipment, Household and Similar Appliances (report only) |
| | IEC60601-1 | Medical |
| UL | UL62368-1 | Audio/Video, Information and Communication Technology Equipment |
| | ANSI/AAMI ES60601-1 | Medical |
| EN | EN62368-1 | Audio/Video, Information and Communication Technology Equipment - Pending |
| | EN60601-1 | Medical |
| CE | Meets all applicable directives | |
| UKCA | Meets all applicable legislation | |

| Isolation | Standard | Notes & Conditions |
|----------------------|--|--------------------|
| Primary to Secondary | 2 x MOPP (Means of Patient Protection) | IEC60601-1 Ed.3 |
| Primary to Earth | 1 x MOPP (Means of Patient Protection) | |
| Secondary to Earth | 1 x MOPP (Means of Patient Protection) | |

Mechanical Details



| Input Connector J1 | |
|--------------------|---------------|
| Pin | Function |
| 1 | N |
| 2 | No connection |
| 3 | L |

Mates with MOLEX housing 09-50-1031, MOLEX series 5194 crimp terminals.

| Output Connector J2 | |
|---------------------|----------|
| Pin | Function |
| 1 | Return |
| 2 | Return |
| 3 | +Vout |
| 4 | +Vout |

Mates with MOLEX housing 09-50-1041, MOLEX series 5194 crimp terminals.

| J3 Connector | |
|--------------|----------|
| Pin | Function |
| 6.35 faston | E |

Notes:

1. Dimensions in inches (mm).
2. Weight: 0.35lbs (160g)

3. Tolerances x.xx = ± 0.02 , .xxx = ± 0.010 .

Thermal Considerations

In order to ensure safe operation of the PSU in the most adverse conditions permitted in the end-use equipment, the temperature of the components listed in the table below must not be exceeded. See mechanical drawing for component locations. Temperature should be monitored using K type thermocouples placed on the hottest part of the component (out of direct air flow).

| Temperature Measurements at Maximum Ambient 50°C | |
|--|--------------------|
| Component | Max Temperature °C |
| T1 | 120°C |
| C9 | 90°C |
| C19 | 100°C |
| Q1 | 110°C |
| Q2 | 110°C |