



**THE DATASHEET OF
PFC250-1024**



PFC250 Series

AC-DC Power Supplies

The PerFormanCe Power PFC250 Series combines Power Factor Correction (PFC) with wide-range outputs to meet the requirements of data communications and industrial controls. The PFC250-4530G and PFC250-4350G provide high current +3.3 V and +5 V on a single platform to support mixed-mode, high-speed digital circuitry.

Bel Power Solutions unique dual-converter architecture combines high reliability with exceptional regulation. All models feature remote sense on outputs V1 and V2 to provide independent compensation of output cable losses. Other standard features include independent current sharing on V1 and V2, thermal shutdown, and remote inhibit. Airflow of 300 linear feet per minute (LFM) is required to deliver the full power density of 3.0 watts per cubic inch.

The PFC250 Series meets international safety requirements.



KEY FEATURES

- RoHS Compliant
- Greater than 1 million hours demonstrated MTBF
- Active Power Factor Correction (PFC) meets EN 61000-3-2
- Dual main outputs provide 3.3 V and 5 V for mixed-mode applications
- Single-wire current sense on outputs V1 and V2
- Remote sense on outputs V1 and V2
- Overtemperature, overload, and overvoltage protection
- Available with metric or SAE mountings
- Isolated V3 and V4 can be used as positive or negative outputs



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1. SINGLE-OUTPUT MODEL SELECTION

| MODEL ³ | OUTPUT VOLTAGE | ADJUSTMENT RANGE | MAX. OUTPUT CURRENT ¹ | LINE REGULATION | LOAD REGULATION | RIPPLE & NOISE % p-p ² | INITIAL SETTING ACCURACY |
|--------------------|----------------|------------------|----------------------------------|-----------------|-----------------|-----------------------------------|--------------------------|
| PFC250-1003G | 3.3V | 3.15V to 3.45V | 50A | 0.5% | 0.8% | 1% | 3.28V to 3.32V |
| PFC250-1005G | 5V | 4.5V to 5.5V | 50A | 0.5% | 0.8% | 1% | 4.98V to 5.02V |
| PFC250-1012G | 12V | 10.8V to 13.5V | 23A | 0.5% | 0.8% | 1% | 11.94V to 12.06V |
| PFC250-1015G | 15V | 13.5V to 18.3V | 18.3A | 0.2% | 1.0% | 1% | 14.92V to 15.08V |
| PFC250-1024G | 24V | 21.6V to 26.4V | 10.5A | 0.5% | 0.8% | 1% | 23.88V to 24.12V |
| PFC250-1048G | 48V | 46.0V to 56.0V | 6A | 0.5% | 1.0% | 1% | 47.52V to 48.48V |

NOTES:

- ¹ Output currents ratings are expressed with 300 LFM forced air.
- ² Maximum peak-to-peak noise expressed as a percentage of output voltage, 20 MHz bandwidth.
- ³ Models without suffix G are not RoHS-compliant (lead solder used) and are not recommended for new designs or already EOL.

2. MULTIPLE-OUTPUT MODEL SELECTION

250 W with 300 LFM Forced-Air Cooling. Isolated V3 and V4 can be used as Positive or Negative Outputs

| MODEL ⁵ | OUTPUT VOLTAGE | ADJUSTMENT RANGE | OUTPUT CURRENT | LINE REGULATION | LOAD REGULATION | RIPPLE & NOISE % p-p ¹ | INITIAL SETTING ACCURACY |
|-----------------------------|----------------|------------------|----------------|-----------------|-----------------|-----------------------------------|--------------------------|
| PFC250-4000G ² | +5V | 5.0V to 5.5V | 40A | 0.5% | 1% | 1% | 4.98V to 5.02V |
| | +12V | 10.8V to 13.2V | 10A | 0.5% | 1% | 1% | 11.94V to 12.06V |
| | 12V | 10.8V to 13.2V | 6A | 0.5% | 7% | 1% | 11.94V to 12.06V |
| | 5V | 5.0V to 5.5V | 3A | 0.5% | 2% | 1% | 4.98V to 5.02V |
| PFC250-4001G ^{2,4} | +5V | 5.0V to 5.5V | 40A | 0.5% | 1% | 1% | 4.98V to 5.02V |
| | +12V | 10.8V to 13.2V | 10A | 0.5% | 1% | 1% | 11.94V to 12.06V |
| | 12V | 10.8V to 13.2V | 6A | 0.5% | 7% | 1% | 11.75V to 12.06V |
| PFC250-4004G ^{3,4} | 12V | 10.8V to 13.2V | 3A | 0.5% | 7% | 1% | 11.75V to 12.06V |
| | +5V | 5.0V to 5.5V | 40A | 0.5% | 1% | 1% | 4.98V to 5.02V |
| | +12V | 10.8V to 13.2V | 10A | 0.5% | 1% | 1% | 11.94V to 12.06V |
| PFC250-4004G ^{3,4} | 15V | 13.5V to 16.5V | 6A | 0.5% | 7% | 1% | 14.70V to 15.30V |
| | 15V | 13.5V to 16.5V | 3A | 0.5% | 7% | 1% | 14.70V to 15.30V |
| | +3.3V | 3.15V to 3.45V | 40A | 0.5% | 1.5% | 1% | 3.28V to 3.32V |
| PFC250-4350G ^{2,4} | +5V | 5.0V to 5.5V | 20A | 0.5% | 1% | 1% | 5.00V to 5.04V |
| | 12V | 10.8V to 13.2V | 6A | 0.5% | 7% | 1% | 11.75V to 12.06V |
| | 12V | 10.8V to 13.2V | 3A | 0.5% | 7% | 1% | 11.75V to 12.06V |
| PFC250-4530G ^{2,4} | +5V | 5.0V to 5.5V | 40A | 0.5% | 1% | 1% | 4.98V to 5.02V |
| | +3.3V | 3.15V to 3.45V | 20A | 0.5% | 1.5% | 1% | 3.28V to 3.32V |
| | 12V | 10.8V to 13.2V | 6A | 0.5% | 7% | 1% | 11.75V to 12.06V |
| PFC250-4530G ^{2,4} | 12V | 10.8V to 13.2V | 3A | 0.5% | 7% | 1% | 11.75V to 12.06V |

NOTES:

- ¹ Maximum peak-to-peak expressed as a percentage of output voltage, 20 MHz bandwidth.
 - ² Total current available from V1 + V2 is 40 amperes, total current available from V3 + V4 is 6.6 amperes.
 - ³ Total current available from V1 + V2 is 40 amperes, total current available from V3 + V4 is 6.0 amperes.
 - ⁴ One adjustment pot is provided for both V3 and V4 outputs. One-to-one tracking is provided on V3 and V4 when equally loaded.
 - ⁵ Models without suffix G are not RoHS-compliant (lead solder used) and are not recommended for new designs or already EOL.
- Model numbers highlighted in yellow are not recommended for new designs or EOL.

3. INPUT SPECIFICATIONS

| PARAMETER | CONDITIONS / DESCRIPTION | MIN | NOM | MAX | UNITS |
|----------------------|--|------|-----|-----|------------------|
| Input Voltage - AC | Continuous input range. | 85 | | 264 | VAC |
| Input Frequency | AC Input. | 47 | | 63 | Hz |
| Brown Out Protection | Lowest AC input voltage that regulation is maintained with full rated loads. | 80 | | | VAC |
| Hold-up Time | After last AC line peak at 250 watts. | 20 | | | ms |
| Input Current | 85 VAC at full rated load. | | | 4.5 | A _{RMS} |
| Input Protection | Non-user serviceable internally located AC input line fuse. | | | | |
| Inrush Surge Current | Internally limited by thermistor. Vin = 230 VAC, one cycle, 25°C. | | | 35 | A _{PK} |
| Power Factor | Per EN61000-3-2. | 0.95 | | | W/VA |
| Operating Frequency | Switching frequency of main output transformer. | | 129 | | |
| | Switching frequency of secondary transformer. | | 70 | | kHz |
| | Switching frequency of Power Factor Correction circuit. | | 60 | | |

4. OUTPUT SPECIFICATIONS

| PARAMETER | CONDITIONS / DESCRIPTION | MIN | NOM | MAX | UNITS |
|-----------------------|---|----------------------|------|-----|----------------------|
| Efficiency | Full rated load, 110 VAC. Varies with distribution of loads among outputs. | 65 | 75 | | % |
| Minimum Load, V1 | Min. load required to maintain regulation on V2 | Single output models | 0 | | A |
| | | All other models | 4 | | |
| Minimum Load, V3 | Min. load required to maintain regulation on V4 | Single output models | N/A | | A |
| | | PFC250-4000G | 1.25 | | |
| | | All other models | 0.6 | | |
| Ripple and Noise | Full load, 20 MHz bandwidth. | | | | See Model Selections |
| Output Power | 300 LFM forced-air cooling. | | | 250 | W |
| Overshoot /Undershoot | Output voltage overshoot/undershoot at turn-on. | | | 0 | % |
| | Varies by output. Total regulation includes: line changes over the specified input range, changes in load starting at 20% load and changing to 100% load. | | | | See Model Selections |
| Transient Response | Recovery time to within 1% of initial set point due to a 25% step load from any load setting from minimum to maximum load. | | 500 | | μs |
| Turn-on Delay | Time required for initial output voltage stabilization. | | 2 | | s |
| Turn-on Rise Time | Time required for output voltage to rise from 10% to 90%. | | 20 | | ms |

5. INTERFACE SIGNALS & INTERNAL PROTECTION

| PARAMETER | CONDITIONS / DESCRIPTION | MIN | NOM | MAX | UNITS |
|----------------------------|--|--------------------|------|------|-------|
| Overvoltage Protection | Latch style overvoltage protection. Available on all single output models and V1, V2, and V3 on all multiple-output models. | 3.3V output, V1 | 4.1 | 4.65 | V |
| | | 3.3V output, V2 | 4.2 | 4.2 | |
| | | 5V output, V1, V2 | 6.0 | 6.4 | |
| | | 12V output, V1, V2 | 14.0 | 16.0 | |
| | | 15V output, V1 | 18.3 | 19.8 | |
| | | 24V output, V1 | 27.0 | 30.7 | |
| 48V output, V1 | 60.0 | 70.0 | | | |
| Overload Protection | Fully protected against output overload and short circuit. Automatic recovery upon removal of overload condition. | | | | |
| Overtemperature Protection | System shutdown due to excessive internal temperature, automatic reset. | | | | |
| Output Good | TTL compatible signal. Signal is high when V1 output is within 5% of nominal. Signal shall remain low for 20 milliseconds following loss of Output Good. | 3.3 V | 3.16 | | V |
| | | 5 V | 4.75 | | |
| Input Power Fail Warning | TTL compatible logic signal. Time before regulation dropout due to loss of input power. May be used as independent PSOK signal in redundant applications. | | 5 | | ms |
| Current Share | Accuracy of shared current with up to 6 parallel units. Single-wire current share on V1 and V2 with return via negative (-) Sense return. Minimum current share load is 6 A or 50 W, whichever is smaller. | | | 10 | % |
| Remote Sense | Available on V1 and V2. Total voltage compensation for cable losses with respect to the main output. | | | 250 | mV |
| Inhibit | Output voltage is inhibited by application of external high (5 V) signal. | | | | |
| Standby Power | Available with fan option versions only (+5 VDC). | | | 100 | mA |

6. SAFETY, REGULATORY AND EMC SPECIFICATIONS

| PARAMETER | CONDITIONS / DESCRIPTION | MIN | NOM | MAX | UNITS |
|------------------------------|---|----------------|-----|----------|-------|
| Agency Approvals | Approved to the latest edition of the following standards: UL/CSA 60950-1, EN 62368-1 and IEC 62368-1 | | | Approved | |
| Dielectric Withstand Voltage | Input to Output | 4242 | | | VDC |
| Electromagnetic Interference | FCC CFR title 47 Part 15 Sub-Part B - Conducted. EN 55032 / CISPR 32 Conducted. | B B | | | Class |
| ESD Susceptibility | Per EN 61000-4-2, level 4. | 8 | | | kV |
| Radiated Susceptibility | Per EN 61000-4-3, level 3. | 10 | | | V/M |
| EFT/Burst | Per EN 61000-4-4, level 4. | ± 4 | | | kV |
| Input Transient Protection | Per EN 61000-4-5 level 3. | Line-to-Line | 1 | | kV |
| | | Line-to-Ground | 2 | | |
| Insulation Resistance | Input-to-Output. | | | 10 | MΩ |
| Touch Current | Per EN 62368-1, 264 VAC. | | | 2 | mA |

7. ENVIRONMENTAL SPECIFICATIONS

| PARAMETER | CONDITIONS / DESCRIPTION | MIN | NOM | MAX | UNITS |
|-------------------------|--|-------------------------------|--------|------------|------------------|
| Altitude | Operating. Non-Operating. | | | 10k 40k | ASL Ft. |
| Operating Temperature | Derate linearly above 50°C by 2.5% per °C. | At 100% load: At 50% load: | 0 | 50 70 | °C |
| Storage Temperature | | -55 | | 85 | °C |
| Temperature Coefficient | 0°C to 70°C (after 15 minute warmup). | | ± 0.02 | ± 0.05 | %/°C |
| Relative Humidity | Non-Condensing. | 5 | | 95 | %RH |
| Shock | Peak acceleration. | | | 20 | G _{PK} |
| Vibration | Random vibration, 10 Hz to 2 kHz, 3 axes. | | | 6 | G _{RMS} |

8. MECHANICAL SPECIFICATIONS

| PARAMETER | CONDITIONS / DESCRIPTION | MIN | NOM | MAX | UNITS |
|------------|--------------------------|-----|----------------------|-----|-------|
| Dimensions | Overall Size | | 215.9 x 120.7 x 50.8 | | mm |
| | | | 8.50 x 4.75 x 2.00 | | in |
| Weight | Overall Length with Fan | | 250.4 | | mm |
| | | | 10.00 | | in |
| Weight | | | 1.12 | | kg |
| | | | 2.75 | | lb |

9. OPTIONS

| PARAMETER | CONDITIONS / DESCRIPTION | MIN | NOM | MAX | UNITS |
|-----------------|---|----------------------|-----|-----|-------|
| Metric Mounting | Add "M" as a suffix to the model number to order chassis with M4 x 0.7 mounting inserts. | 215.9 x 120.7 x 50.8 | | | mm |
| | | 8.50 x 4.75 x 2.00 | | | in |
| Fan | Add "F" as a suffix to the model number to order integral fan. Adds 1.5" (38.1 mm) to overall length and 0.5" (12.7 mm) to height. | 250.4 x 120.7 x 63.5 | | | mm |
| | | 10.00 x 4.75 x 2.50 | | | in |

10. CONNECTIONS

| CONNECTOR | MOLEX SERIES | HOUSING | PIN SERIES | PINS (LOOSE) | PINS (CHAIN) | WIRE GAUGE |
|-----------|--------------|------------|------------|--------------|--------------|------------|
| J1 | 41695 | 09-50-8051 | 6838 | 08-50-0189 | 08-50-0187 | 18-20 AWG |
| | 41695 | 09-50-8051 | 2478 | 08-50-0106 | 08-50-0105 | 18-20 AWG |
| | 2139 | 09-50-3051 | 2478 | 08-50-0106 | 08-50-0105 | 18-20 AWG |
| J3 | 41695 | 09-50-8061 | 6838 | 08-50-0189 | 08-50-0187 | 18-20 AWG |
| | 41695 | 09-50-8061 | 2478 | 08-50-0106 | 08-50-0105 | 18-20 AWG |
| | 2139 | 09-50-3061 | 2478 | 08-50-0106 | 08-50-0105 | 18-20 AWG |
| J6 * | 5264-N | 50-37-5113 | 5263 | 08-70-1040 | 08-70-1039 | 22-28 AWG |

NOTE: * The +5V @ 100mA standby power output (J6-11) is available only on units with the fan option.



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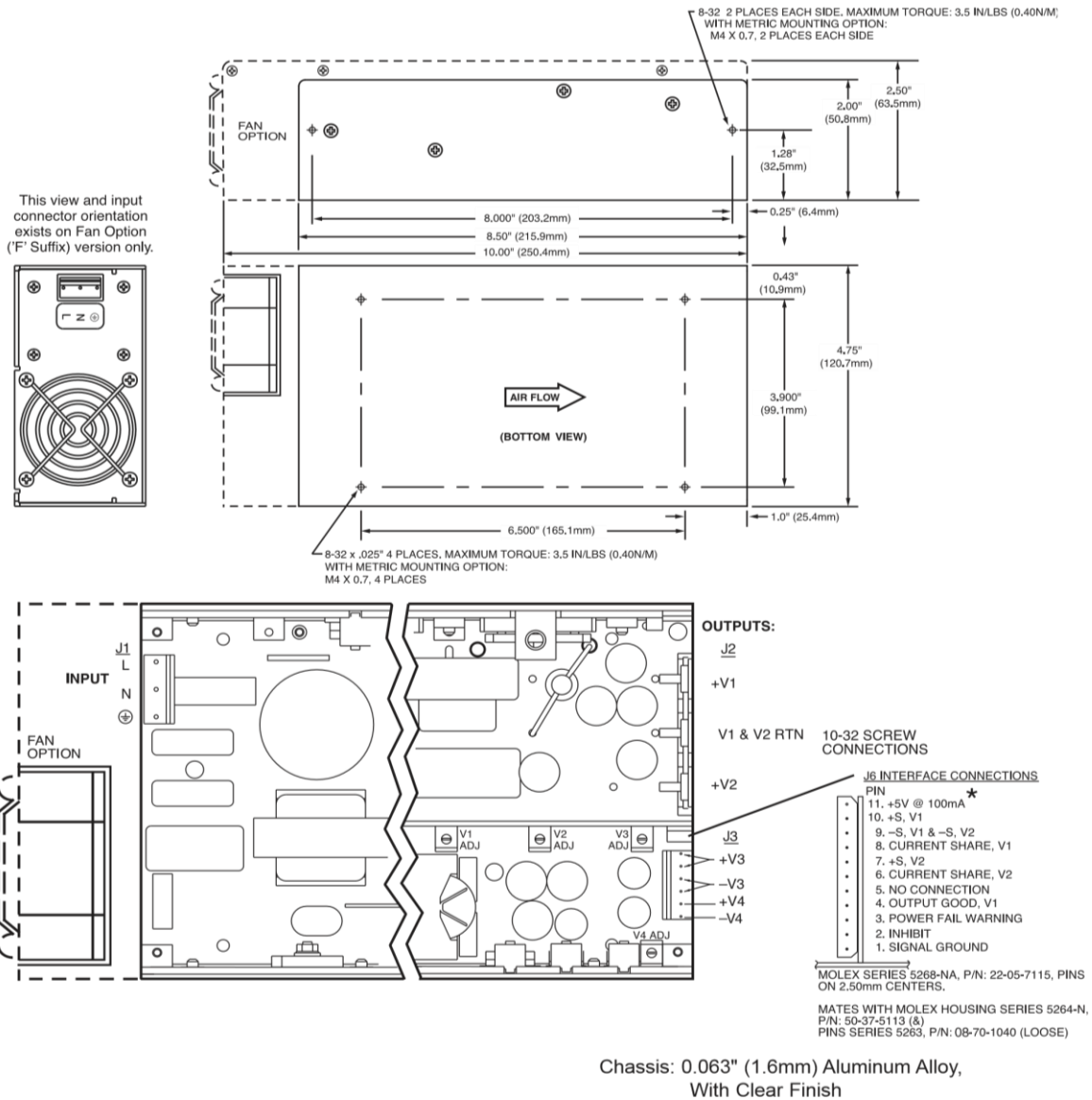


Figure 1. Mechanical Drawing PFC250

For more information on these products consult: tech.support@psbel.com

NUCLEAR AND MEDICAL APPLICATIONS - Products are not designed or intended for use as critical components in life support systems, equipment used in hazardous environments, or nuclear control systems.

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