

70170AC-1-PBF

(115Vac, 47- 800Hz Input)

170W, 28V Single Output,
Airborne PFC Power Supply



Targeting Point-of-Load (POL) applications, the **70170AC-1-PBF** provides a single 28Vdc output at up to 6A continuous output current. It meets the most stringent airborne requirements including those for variable frequency 115Vac generator systems over the wide frequency range of 360-800Hz and RTCA/DO-160D category M emissions. Efficiency exceeds 80% at ½ to full output load helping to keep internal heat dissipation to a minimum. The **70170AC-1-PBF** is capable of providing uninterrupted ride-through at full output load during momentary input AC brown-out conditions for up to 200mSec. Standard protection features are built-in in to assure years of fault-tolerant and reliable operation in the harshest environments.

Weighing less than 36 ounces, the **70170AC-1-PBF** is housed in an aluminum enclosure with outer dimensions of 8.0" x 4.75" x 1.4". The top cover is perforated; the lower U-Chassis accepts five #4 screws to facilitate system mounting. Interconnection is accomplished using a single Samtec right angle connector.

A second supply configuration is available, the **70170AC-2-PBF**, that meets all of these same requirements except the output is scaled down to provide a maximum output current of 3.6A (100W output power). This configuration provides greater than 330mSec uninterrupted ride through and complies with all of the same standards, including the wide frequency distortion requirements, over the output power range of 50W to 100W. Please contact PPI's sales department for further information on this supply configuration.



FEATURES

| | |
|--|--|
| | Meets both RTCA/DO-160D, section 16, notice 2 and Airbus ABD0100.1.8 issue D for power factor and input current harmonic distortion levels over the wide frequency operating range (360Hz – 800Hz) |
| | Efficiency: 80% minimum: ½ to full rated output load, all input (line) conditions |
| | Wide input range: 97Vrms – 134Vrms, 47 – 800Hz |
| | Complies with RTCA/DO-160D for conducted emissions, susceptibility and power input (section 16) |
| | Active inrush current limiting: 7Apk typical, 12Apk maximum |
| | Size: 8.0" x 4.75" x 1.4", weight: less than 32 ounces |
| | Single output: 28Vdc at up to 170W output power |
| | Overcurrent protection with constant current limiting |
| | Three layers of 28Vdc output overvoltage protection |
| | PFC output overvoltage protection with automatic restart (internal 360Vdc PFC output) |
| | Over-temperature shutdown with automatic restart (at or above 100°C) |
| | Under-temperature inhibit (at or below -20°C) |
| | AC status line (TTL) |
| | Output enable line (TTL) |
| | MTBF: 25,000 Hours, Aic category, 30°C case temperature (MIL-HDBK-217F) |

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PERFORMANCE SUMMARY

| PARAMETER | VALUE (TYPICAL) |
|--|-----------------|
| Voltage regulation | +28Vdc +/-2% |
| Output current | 6A |
| Minimum load | 60mA |
| Pk-Pk Ripple + Noise (20MHz) | 30mVpp |
| Efficiency | 84% |
| Output ride-through / full load | 200mSec |
| Output overcurrent threshold (1) | 6.7A |
| Output overvoltage trip-point "soft" protection | 30.4V |
| Output overvoltage trip-point "hard" protection | 34.9V |
| Output overvoltage "crowbar" activation set point | 38.0V |
| PFC output overvoltage trip-point | 420V |
| MTBF (Aic, 30°C case) | 25,000 Hours |

Notes:

1. Constant current limiting limited. Output will recover into full 6A load automatically when overcurrent fault condition clears.















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SPECIFICATIONS

| | |
|--|---|
|  | RTCA/DO-160D, Section 4, Temperature, category A1 equipment, -15°C to 70°C operating |
|  | RTCA/DO-160D, Section 4, Category A1 equipment, Altitude: 15,000 feet, Decompression: 55,000 feet, Overpressure: 170kPa |
|  | RTCA/DO-160D, Section 5, Temperature variation, category C |
|  | RTCA/DO-160D, Section 6, Humidity (operating) category A |
|  | RTCA/DO-160D, Section 7, Shock (operating) category B |
|  | RTCA/DO-160D, Section 8, Vibration (operating) category S, curve B |
|  | RTCA/DO-160D, Section 15, Magnetic effect, category Z |
|  | RTCA/DO-160D, Section 16, Change notice 2, Power input requirements for category A(WF) equipment |
|  | RTCA/DO-160D, Section 17, Voltage spike, category A |
|  | RTCA/DO-160D, Section 18, Audio frequency conducted susceptibility, category A(WF) equipment |
|  | RTCA/DO-160D, Section 19, Induced signal susceptibility, category Z |
|  | RTCA/DO-160D, Section 20, Conducted and radiated susceptibility, category T, R |
|  | RTCA/DO-160D, Section 21, Conducted and radiated emissions, category M |
|  | RTCA/DO-160D, Section 25, Electrostatic discharge, category A |

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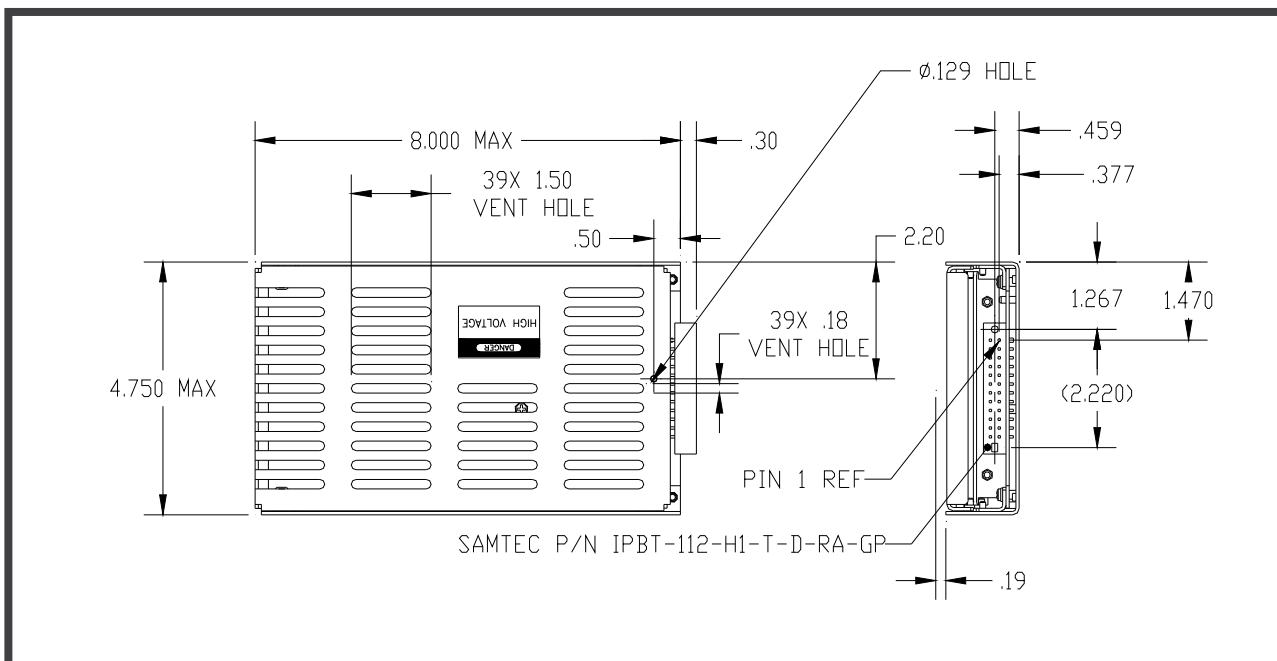


INTERCONNECTION

Interconnection is accomplished with a single Samtec IPBT-112-H1-T-D-RA-GP. Pin-outs are shown below. Use Samtec PMSD or PMSS series mating connector.

| Pin | Signal | Pin | Signal | Pin | Signal |
|-----|-------------|-----|-------------|-----|-------------------|
| 1 | +28Vout | 9 | NC | 17 | 28V Current Sense |
| 2 | DCRTN | 10 | NC | 18 | NC |
| 3 | DCRTN | 11 | Chassis | 19 | NC |
| 4 | ACPWRFAIL-L | 12 | NC | 20 | NC |
| 5 | NC | 13 | +28Vout | 21 | NC |
| 6 | NC | 14 | DCRTN | 22 | AC Neutral |
| 7 | NC | 15 | OUTPUTEN-L | 23 | NC |
| 8 | NC | 16 | DCPWRGOOD-L | 24 | AC Line |

MECHANICAL DIAGRAM



A DETAILED OUTLINE DRAWING FURNISHED UPON REQUEST

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ELECTRICAL SPECIFICATIONS

Unless otherwise specified the following test conditions apply: $T_a = 25^{\circ}\text{C}$, constant active load applied to output, $V_{in} = 115\text{Vrms}$, 360Hz to 800Hz, <1.25% sinusoid.

INPUT CHARACTERISTICS

| PARAMETER | 70170AC-1-PBF | REMARKS | NOTES |
|---|--|--|-------|
| INPUT VOLTAGE RANGE | 97 – 134Vrms | Complies with normal / abnormal input voltages per DO-160D, section 16 | 2 |
| INPUT UNDERVOLTAGE DISABLE | 97Vrms minimum | Supply will start and remained enabled for input voltage in the range of $97\text{Vrms} < V_{in} < 134\text{Vrms}$. Supply will shutdown for sustained input undervoltages. | 2 |
| INPUT FREQUENCY RANGE | 47 – 800Hz | Reduced distortion performance below 360Hz | 2 |
| EFFICIENCY | 80% minimum | 50% to 100% Output Load (85W to 170W); 84% typical | 2 |
| LEAKAGE CURRENT | < 5mArms | AC Line / Neutral to Chassis at 115Vrms / 400Hz | 1 |
| INRUSH CURRENT | <12.2Apk maximum | Cold or Warm Start; 7Apk typical | 2 |
| TOTAL HARMONIC DISTORTION (INPUT CURRENT) | < 5.0% | 50% to 100% Output Load (85W to 170W) | 2 |
| INDIVIDUAL HARMONICS AC CLEAN | EVEN: <1% I_f / n ($n < 10$) EVEN: <0.1% I_f ($n \geq 10$) ODD: <30% I_f / n ODD TRIPLES:<15% I_f / n | I_f = Fundamental Current $V_{thd} < 1.25\%$, $n=1$ through 99 n = order of harmonic 50% to 100% Load (85W to 170W) | 1 |
| INDIVIDUAL HARMONICS DISTORTED INPUT | EVEN: <1% $I_f / n + V_n$ ($n < 10$) EVEN: <0.1% $I_f + V_n$ ($n \geq 10$) ODD: <30% $I_f / n + V_n$ ODD TRIPLES:<15% $I_f / n + V_n$ | I_f = Fundamental Current $V_{thd} > 5\%$, $n=1$ through 99 V_n = corresponding voltage harmonic 50% to 100% Load (85W to 170W) | 1 |
| POWER FACTOR | 0.98 minimum 0.96 minimum | $P_{out} > 85\text{W}$, 360Hz line frequency $P_{out} > 85\text{W}$, 800Hz line frequency | 2 |
| CREST FACTOR (CURRENT) | 1.314 – 1.514 | Ratio of Peak / RMS | 1 |
| START-UP TIME | < 1000mSec | Outputs within regulation | 2 |
| CONDUCTED EMISSIONS | RTCA/DO-160D | Category M | 1 |
| STORAGE TEMPERATURE RANGE | -55°C to +100°C | Non-operational | 1 |
| OPERATING TEMPERATURE RANGE | -15°C to +70°C | Supply in inhibited at or below -20°C Auto Restart | 1 |

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INPUT CHARACTERISTICS—CONTINUED

| PARAMETER | 70170AC-1-PBF | REMARKS | NOTES |
|--------------------------|--|---|-------|
| OUTPUT ENABLE SIGNAL - L | TTL active LOW signal; requires a TTL HIGH (> 5mA drive current) to disable supply | Secondary referenced; supply will disable within 1 second of asserting high level logic state | 1 |
| OVERTEMPERATURE SHUTDOWN | 100°C +/- 4°C | Supply is inhibited at or above 100°C Auto Restart at ~ 80°C case temp | 1 |

Notes:

1. Ensured by design, not 100% tested in production.
2. 100% tested for specification compliance in production.

OUTPUT CHARACTERISTICS

| PARAMETER | 70170AC-1-PBF | REMARKS | NOTES |
|-----------------------------------|--|--|-------|
| RATED OUTPUT POWER | 170W | Continuous | 2 |
| OUTPUT VOLTAGE | 28Vdc +/- 2% typical, 28Vdc +/-3% maximum | | 2 |
| OUTPUT OVERCURRENT THRESHOLD | 6.7A typical, 7.2A maximum | Constant current limited, auto-recovery into 6A load | 2 |
| TEMPERATURE STABILITY COEFFICIENT | 0.01% / °C | Output voltage variation with temperature | 1 |
| OUTPUT RIPPLE + NOISE | 150mVpp | 150mVpp maximum; 30mVpp typical. 20MHz bandwidth | 2 |
| LINE REGULATION | <0.5% | 28V output deviation for +/- 20% step change in input voltage | 1 |
| LOAD REGULATION | Output remains in regulation | 50% step change in output load | 1 |
| MINIMUM LOAD | 60mA | 60mA minimum for proper output regulation. Can safely unload the output – supply may not regulate within -5% limit when output is unloaded at high line | 2 |
| HOLD-UP TIME | 200mSec minimum | Full output load | 2 |

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OUTPUT CHARACTERISTICS—CONTINUED

| PARAMETER | 70170AC-1-PBF | REMARKS | NOTES |
|---|---|---|-------|
| DIELECTRIC WITHSTAND INPUT TO CHASSIS | 1500Vac, 60Hz | No arcing or damage for 60-second test duration (8mAmrs max leakage) | 1 |
| DIELECTRIC WITHSTAND INPUT TO OUTPUT | 1500Vac, 60Hz | No arcing or damage for 60-second test duration (8mAmrs max leakage) | 1 |
| INSULATION RESISTANCE OUTPUT TO CHASSIS | 500Vdc | No arcing or damage for 60-second test duration (200Mohm min) | 2 |
| DCPWRGOOD-L | 0.5V maximum when output is within proper regulation | TTL Level, 16mA max sink current | 2 |
| ACPWRFAIL-L | Transitions to 0.5V max within 10mSec upon loss of input AC | Secondary referenced, TTL Level, 16mA max sink current | 2 |
| 28V CURRENT SENSE | 500mV +/-10% per Amp | Valid for all Iout > 0.5A | 2 |
| OUTPUT OVERVOLTAGE PROTECTION (SOFT) | 30.4V set-point | Pulse by pulse protection (inner loop), auto-restart | 1 |
| OUTPUT OVERVOLTAGE PROTECTION (HARD) | 34.9V set-point | Supply enters low duty cycle operation as long as fault condition persists, auto-restart | 1 |
| OUTPUT OVERVOLTAGE PROTECTION (CROWBAR) | 38.0V set-point | Output is clamped to this level if soft and hard OVP circuits fail to limit output voltage. | 1 |
| OUTPUT VOLTAGE ADJUSTMENT | None | | |

Notes:

1. Ensured by design, not 100% tested in production.
2. 100% tested for specification compliance in production.

To inquire about price, delivery and supply options information please contact PPI sales department.