

70125AC-28V-12V-PBF

(115Vac, 47- 800Hz Input)

125W, 28V / 12V Dual Output, Airborne PFC Power Supply



Targeting Point-of-Load (POL) applications, the **70125AC-28V-12V-PbF** provides switched outputs of 28Vdc / 2.1 and 12Vdc / 5.6A and a low current 5Vstandby unswitched output at 2.5W. 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-160G category M emissions. Typical efficiency at full output load (125Wmin) is 80% helping to keep internal heat dissipation to a minimum. The **70125AC-28V-12V-PbF** is capable of providing uninterrupted ride-through at full output load during momentary input AC brown-out conditions for a minimum of 200mSec. Standard protection features are built-in in to assure years of fault-tolerant and reliable operation in the harshest environments.

Weighing less than 26 ounces, the **70125AC-28V-12V-PbF** is housed in an aluminum enclosure with outer dimensions of 7.0" x 4.0" x 1.4". The top cover is perforated; the lower U-Chassis accepts five #4 screws to facilitate system mounting. Interconnection is accomplished using two vertical Samtec connectors.

FEATURES

	Meets both RTCA/DO-160G, section 16 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% typical, full rated output load, nominal input (line) conditions
	Wide input range: 96Vrms – 134Vrms, 47 – 800Hz
	Complies with RTCA/DO-160G, category M for conducted emissions, susceptibility and power input (section 16)
	Complies with RTCA/DO-160G, category S, curve C for operational vibration (section 8)
	Complies with RTCA/DO-160G, category A1 for temperature/ altitude (section 4)
	Active inrush current limiting: 4Apk typical, 6.5Apk maximum
	Size: 7.0" x 4.0" x 1.4", weight: less than 26 ounces
	Dual switched outputs: 28Vdc & 12Vdc and continuous 5Vstby output at up to 125W combined output power
	Overcurrent protection on each output
	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)
	AC status line (TTL)
	Output enable line (TTL)
	MTBF: 333,333 Hours, RIAC 217Plus, Aic category, 50°C case temperature, 65%DC, 2190 Cycles/ year



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STANDARD OUTPUTS

PARAMETER	VALUE (TYPICAL)			
	Supply	28V Output	12V Output	5VStby
Voltage regulation	--	+28.4V ± 2%	+12V +3/-2%	+5V +/-3%
Rated output current (5)	--	2.1A	5.6A	500mA
Minimum load		0A	0A	0A
Pk-Pk Ripple + Noise (20MHz)	--	280mVpp	120mVpp	75mVpp
Supply efficiency / full output load	80%	--	--	--
Switched	--	Yes	Yes	No
Output ride-through at full load (1)	200mSec	--	--	--
Output overcurrent/ short circuit threshold (2)	--	6.0A max	9.5A max	3.0A max
Output overvoltage set-point (3)	--	33V	15V	--
PFC output overvoltage set-point (3)	420V	--	--	--
Isolation Voltage (4) (Input to Output & Input to Chassis)	1500Vac	--	--	--
MTBF (Aic, 50°C case)	333,333 Hours	--	--	--

Notes:

1. 720uF internal hold-up capacitance; ride-through based on -20% capacitor tolerance, 115Vrms nominal input, full output load
2. 28V output is constant current limited with auto recovery into full rated output load (Von setting at 75% of Vout if using active loads). 12V output is foldback current limited incorporating pulse retry protection circuit. 5Vsby output is constant current limited with auto recovery into full rated load (Von setting at 75% of Vout if using active load) and is verified by short-circuit test method only
3. OVP set-point; see output characteristics' table for OVP details
4. 1500Vac for 60 seconds without arc or damage; 9mA rms maximum leakage current (line-to-earth capacitors installed)
5. Up to 4.4A can be drawn from the 28V output continuously if the 12V output is not loaded. Alternately, any combination of output current on the +28V and +12V main output with total output power adding up to 125W can safely be drawn from the supply (with up to 6A on the 12V)
















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APPLICABLE SPECIFICATIONS

	RTCA/DO-160G, section 4, altitude/ temperature (operating) to 15,000 feet, category A1 equipment
	RTCA/DO-160G, section 6, humidity (operating) category A
	RTCA/DO-160G, section 7, shock (operating) category S, curve C
	RTCA/DO-160G, section 8, vibration (operating) category S, curve C
	RTCA/DO-160G, section 15, magnetic effect, category B
	RTCA/DO-160G, section 16, power input requirements for 115V - AC input, category A(WF) equipment
	RTCA/DO-160G, section 17, voltage spike, category B equipment
	RTCA/DO-160G, section 18, conducted susceptibility, category Z equipment
	RTCA/DO-160G, section 19, induced signal susceptibility, category Z equipment
	RTCA/DO-160G, section 20, conducted and radiated susceptibility, category T equipment
	RTCA/DO-160G, section 21, conducted and radiated emissions, category M equipment
	Operating temperature: -25°C to +70°C, forced air and/ or external heatsinking may be required
	Storage temperature: -55°C to +100°C



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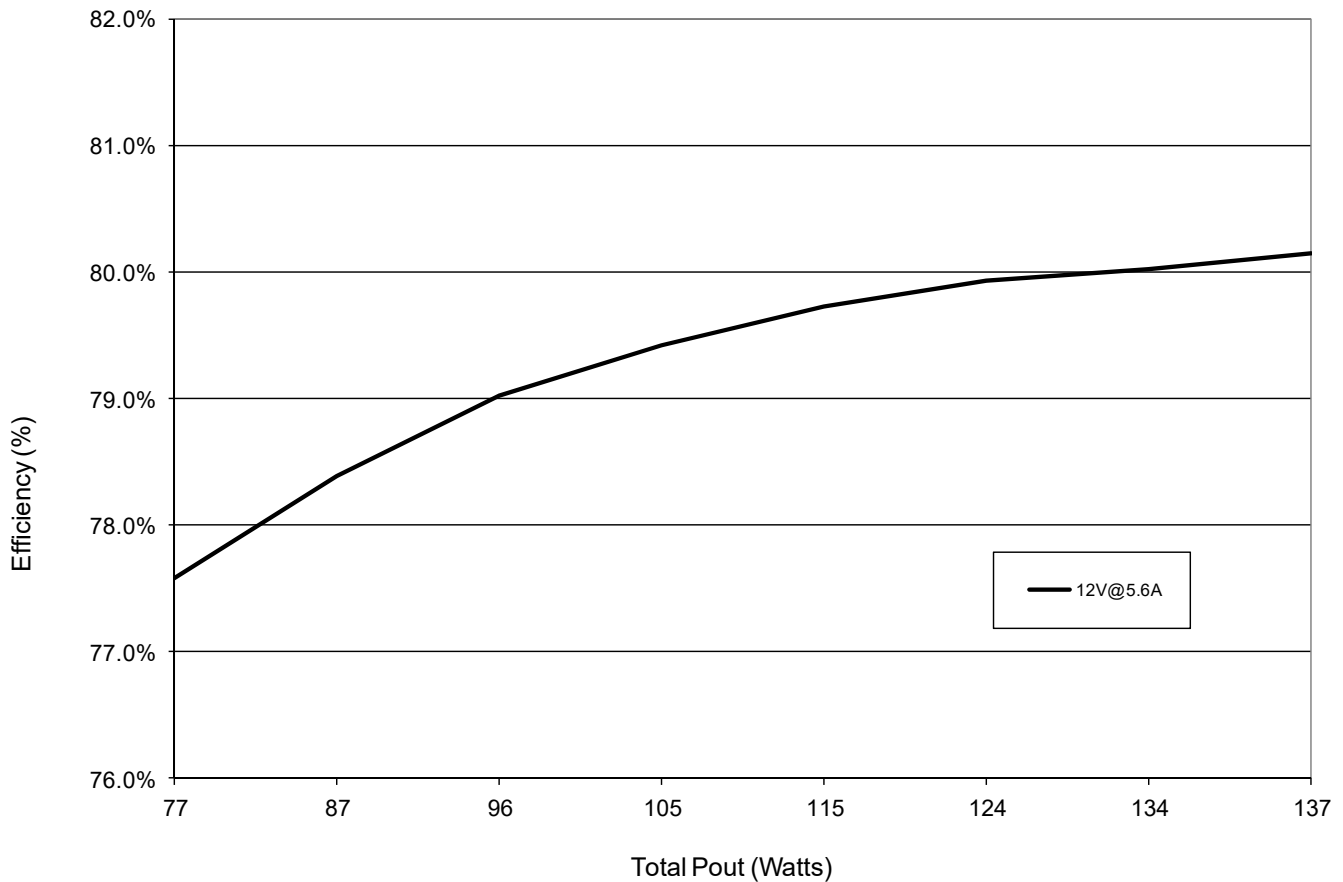
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EFFICIENCY

Overall supply efficiency at nominal 115Vac/ 400Hz line voltage with 12V output at fixed 5.6A (68.4Wout). Balance of output power in total Pout figure comprised of 28V output load (from 340mA to 2.45A).

28V from 0.34A to 2.45Aout with 12V at 5.6A fixed



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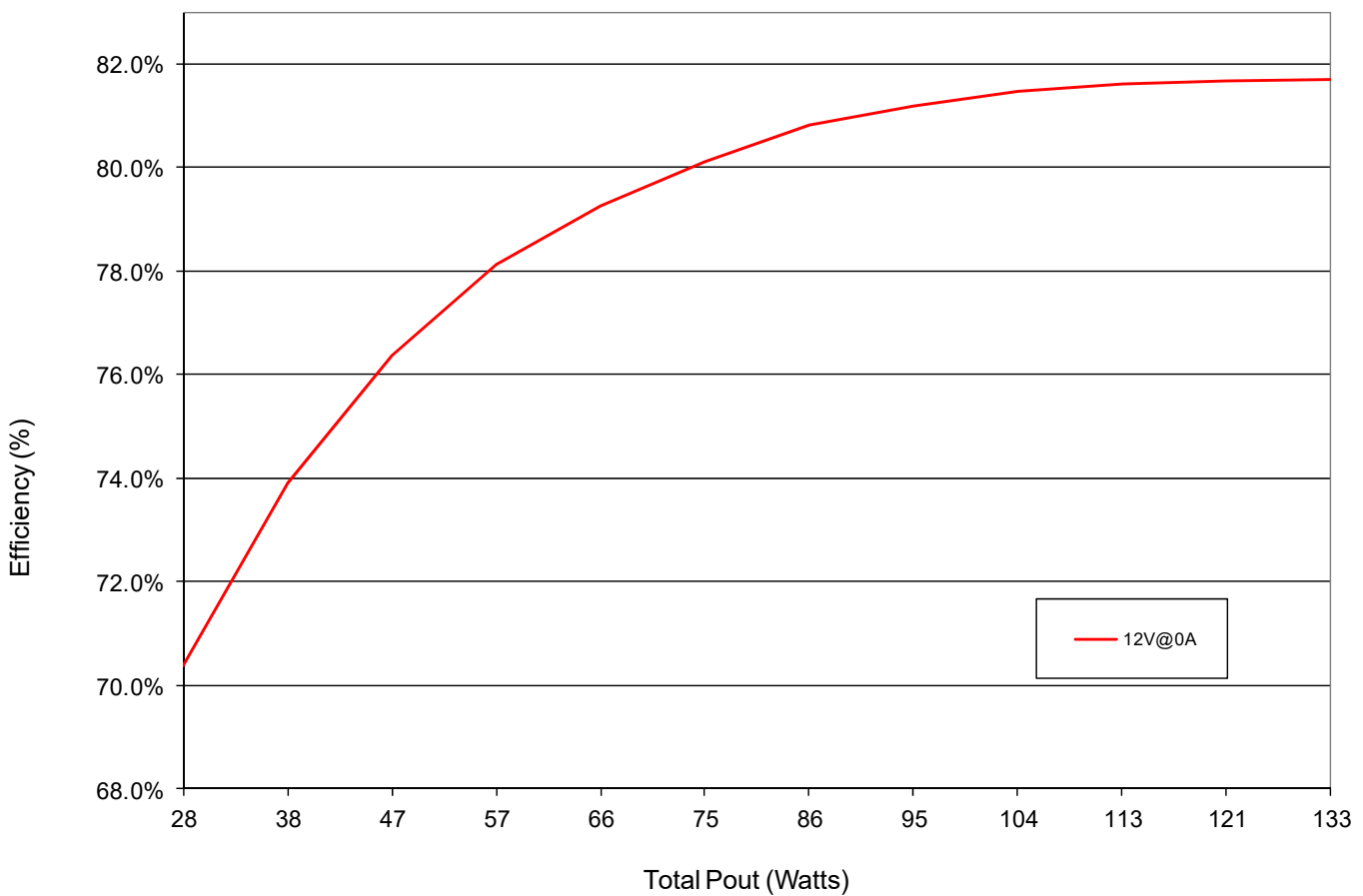
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EFFICIENCY

Overall supply efficiency at nominal 115Vac/ 400Hz line voltage with 12V output at no load. Balance of output power in total Pout figure comprised of 28V output load (28V from 1A through 4.74A).

28V from 1A to 4.74A out with 12V at No Load



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INTERCONNECTION

Interconnection is accomplished with two vertical Samtec connectors. Pin-outs are shown below. Use Samtec IPBS, IPBS, PMSD or PMSS series mating connectors.

Connector	P1	P2
Supply Side Pin	IPBT-103-H1-T-S-K (Samtec 1x3 pin)	IPL1-108-01-L-D-K (Samtec 2x8 pin)
1	AC Neutral	+12Vdc
2	Chassis	DC Return
3	AC Line	+28Vdc
4		DC Return
5		+5Vstby
6		NC
7		DC Return
8		ACPF - L
9		+12Vdc
10		DC Return
11		+28Vdc
12		DC Return
13		+5Vstby
14		DC Return
15		OUTPUTEN- L
16		DCPF - L



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ELECTRICAL SPECIFICATIONS

Unless otherwise specified the following test conditions apply: Ta = 25°C, constant active load applied to output, Vin = 115Vrms, 360Hz to 800Hz, <1.25% sinusoid.

INPUT CHARACTERISTICS

PARAMETER	70125AC-28V-12V-PbF	REMARKS	NOTES
INPUT VOLTAGE RANGE	96 – 134Vrms	Complies with normal / abnormal input voltages per DO-160G, sect 16, cat A.	2
MUST START VOLTAGE	96Vrms minimum	Supply will start and remained enabled for input voltage in the range of 96Vrms < Vin < 134Vrms. Supply will shutdown for sustained input undervoltages.	2
INPUT TRANSIENT & FUSE PROTECTION	240Vac clamping voltage 42J withstand energy	Line-to-line surge absorber with 3A slow blow line fuse on Line input	1
INPUT FREQUENCY RANGE	47 – 800Hz	Reduced distortion performance below 360Hz	2
EFFICIENCY	80% typical	Full output load (125W) See efficiency graphs for overall efficiency versus output power	2
LEAKAGE CURRENT	< 5mArms	AC Line / Neutral to Chassis at 115Vrms / 400Hz	1
INRUSH CURRENT	<17.5Apk for first 3mSec, <7.8Apk 3mSec to 500mSec, <3.9Apk 500mSec to 2Secs	Per RTCA/DO-160G, Section 16, Category A. Cold or warm start. 4Apk typical for <500mSec	2
TOTAL HARMONIC DISTORTION (Input Current)	< 3.5% max at 360Hz & 400Hz < 5.0% max at 800Hz	50% to 100% output load (63W to 125W)	2
INDIVIDUAL HARMONICS AC CLEAN	EVEN: <1% If / n (n < 10) EVEN: <0.1%If (n ≥ 10) ODD: <30% If / n ODD TRIPLENS:<15% If / n	If = Fundamental current Vthd < 1.25%, n = 1 through 99 n = order of harmonic 50% - 100% output load (63W to 125W) harmonic currents < 10mA disregarded	1
INDIVIDUAL HARMONICS DISTORTED INPUT	EVEN: <1% If / n + Vn (n < 10) EVEN: <0.1%If + Vn (n ≥ 10) ODD: <30% If / n + Vn ODD TRIPLENS:<15% If /n+Vn	If = Fundamental current Vthd > 10%, n = 1 through 99 Vn = corr input voltage harmonic 50% - 100% output load (63W to 125W) harmonic currents < 10mA disregarded	1

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INPUT CHARACTERISTICS—CONTINUED

PARAMETER	70125AC-28V-12V-PbF	REMARKS	NOTES
POWER FACTOR	0.98 min 0.98 min	360-440Hz, Pout > 63W 800Hz, Pout > 90W	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-160G	Category M	1, 3
STORAGE TEMP RANGE	-55°C to +100°C	Non-operational	1
OPERATING TEMP RANGE	-25°C to +70°C	Supply can safely operate down to -55°C; start-up time will increase several seconds at low temperature	1
OUTPUT ENABLE SIGNAL (OUTPUTEN-L)	TTL active low signal; internally pulled high to 5Vstby. Pull OUTPUTEN-L signal to output return (DCRTN) to enable switched outputs	Secondary referenced; switched outputs will disable within 1 second of asserting high level logic state (or floating OUTPUTEN-L signal)	2
OVERTEMPERATURE SHUTDOWN	100°C +/- 5°C	Supply is inhibited at or above 100°C frame temperature (at hot spot), auto restart at ~ 80°C frame temp	1

OUTPUT CHARACTERISTICS

PARAMETER	70125AC-28V-12V-PbF	REMARKS	NOTES
RATED OUTPUT POWER	125W	Continuous	2
OUTPUT VOLTAGES	28.4Vdc +/- 2%, 12.0Vdc +3/-2%, 5Vstby is 5.0V +/-3%	For all output loading conditions no load to full load	2
OUTPUT OVERCURRENT/ SHORT-CIRCUIT THRESHOLD	28V output: 6.0A maximum, 12V output: 9.5A maximum, 5Vstby output: 3.0A maximum	28V output is constant current limited. 12V output is foldback current limited. 5Vstby output is constant current limited. Each output auto recovers into respective full rated load. 5Vstby limit is verified by short-circuit test method only	2
TEMPERATURE STABILITY COEFFICIENT	0.01% / °C	Output voltage variation with change in temperature	1
OUTPUT RIPPLE + NOISE	28V output: 280mVpp max, 12V output: 120mVpp max, 5Vstby output: 75mVpp max	20MHz bandwidth	2

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OUTPUT CHARACTERISTICS—CONTINUED

PARAMETER	70125AC-28V-12V-PbF	REMARKS	NOTES
LINE REGULATION	<0.5%	Output deviation for +/- 20% step change in input voltage	1
LOAD REGULATION	Outputs remain in regulation	50% step change in output load	1
MINIMUM LOAD	0A	No minimum load required for proper output regulation	2
HOLD-UP TIME	200mSec minimum	At full rated 125W load (combined)	2
ISOLATION VOLTAGE INPUT TO CHASSIS	1500Vac, 60Hz	No arcing or damage for 60-second test duration (9mArms max leakage)	2
ISOLATION VOLTAGE INPUT TO OUTPUT	1500Vac, 60Hz	No arcing or damage for 60-second test duration (9mArms max leakage)	2
ISOLATION VOLTAGE OUTPUT TO CHASSIS	250Vdc	No arcing or damage for 60-second test duration (100Mohm min)	1
DCPWRFAIL-L (DCPF-L)	4V minimum when outputs are within proper regulation, transitions to TTL low (0.5Vmax) when 28V is sensed 7.5% or greater below regulation window or when main 12V output is sensed at < ~7V	Secondary referenced, TTL Level, 16mA max sink current	2
ACPWRFAIL-L (ACPF-L)	Transitions to 0.5V max upon loss of input AC within 10mSec	Secondary referenced, TTL Level, 16mA max sink current	2
OUTPUT OVERVOLTAGE PROTECTION (SOFT)	28V output: 30.4V set-point 12V output: n/a 5Vstby output: n/a	Pulse by pulse protection (inner loop), supply enters low duty cycle operation as long as fault condition persists, auto-restart	1
OUTPUT OVERVOLTAGE PROTECTION (HARD)	28V output: 33V set-point 12V output: 15V set-point 5Vstby output: n/a	Supply is latched off if prolonged fault condition is sensed. Requires AC power reset to clear	1

Notes:

1. Ensured by design, not 100% tested in production.
2. 100% tested for specification compliance in production.
3. May require small external inductor, common-mode inductor or X capacitor installed on power lines for full compliance when installed in upper level assembly, please contact PPI engineering for details.

