

# 70170AC-28V-5V

(115Vac, 47- 800Hz Input)

120W, 28V / 5V Dual Output,  
Airborne PFC Power Supply



Targeting Point-of-Load (POL) applications, the **70170AC-28V-5V** provides switched outputs of 28Vdc / 3.5A and 5Vdc / 4A and a low current 5V standby unswitched output. 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-160E category M emissions. Efficiency exceeds 80% at full output load helping to keep internal heat dissipation to a minimum. The **70170AC-28V-5V** is capable of providing uninterrupted ride-through at full output load during momentary input AC brown-out conditions for greater than 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-28V-5V** 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.

70170AC-1 SHOWN



## FEATURES

	Meets both RTCA/DO-160E, 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% minimum: full rated output load, nominal input (line) conditions
	Wide input range: 97Vrms – 134Vrms, 47 – 800Hz
	Complies with RTCA/DO-160E, category M 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
	Dual switched outputs: 28Vdc & 5Vdc and continuous 5Vstby output at up to 120W combined output power
	Overcurrent protection on each output with foldback limiting
	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: 25,000 Hours, Aic category, 30°C case temperature (MIL-HDBK-217F)

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## PERFORMANCE SUMMARY

PARAMETER	VALUE (TYPICAL)			
	Supply	28V Output	5V Output	5V Stby
Voltage regulation	--	+28.4V $\pm$ -2%	+5.05V $\pm$ 2%	+5.0V $\pm$ 2%
Rated output current (5)	--	3.5A	4A	100mA
Minimum load		0A	0A	0A
Pk-Pk Ripple + Noise (20MHz)	--	280mVpp	50mVpp	50mVpp
Module efficiency / full load	80%	--	--	--
Switched	--	Yes	Yes	No
Output ride-through at full load (1)	230mSec	--	--	--
Output overcurrent threshold (2)	--	6.5A max	5.7A max	220mA
Output overvoltage set-point (3)	--	36.5V	5.48V	--
PFC output overvoltage set-point (3)	420V	--	--	--
Isolation Voltage (4) (Input to Output & Input to Chassis)	1500Vac	--	--	--
MTBF (Aic, 30°C case)	25,000 Hours	--	--	--

Notes:

1. 880uF internal hold-up capacitance; ride-through based on -20% capacitor tolerance, 115Vrms nominal input, full output load
2. Foldback current limited with auto recovery into full rated output load
3. Crowbar set-point; see output characteristics' table for details
4. 1500Vac for 60 seconds without arc or damage; 8mArms maximum leakage current (line-to-earth capacitors installed)
5. Up to 4.5A can be drawn from the 28V output continuously if the 5V output is not loaded

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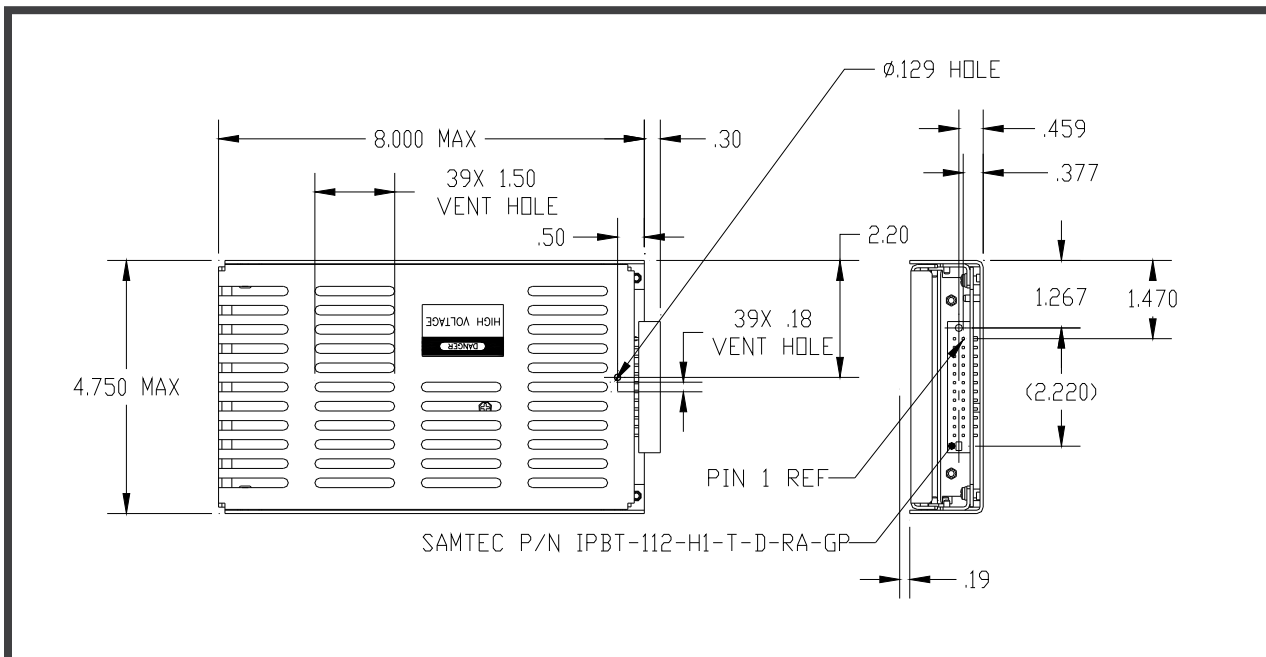


## INTERCONNECTION

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	5VStby
2	DCRTN	10	NC	18	+5Vout
3	DCRTN	11	Chassis	19	NC
4	ACPWRFAIL-L	12	NC	20	NC
5	+5Vsns	13	+28Vout	21	NC
6	+5Vout	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-28V-5V	REMARKS	NOTES
INPUT VOLTAGE RANGE	97 – 134Vrms	Complies with normal / abnormal input voltages per DO-160E, section 16	2
MUST START VOLTAGE	97Vrms minimum	Supply will start and remained enabled for input voltage in the range of 97Vrms < $V_{in}$ < 134Vrms. Supply will shutdown for sustained input undervoltages.	2
INPUT FREQUENCY RANGE	47 – 800Hz	Reduced distortion performance below 360Hz	2
EFFICIENCY	80% minimum	Full load output (120Wout) (76% minimum for 50% load)	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)	< 3.5% max at 360Hz & 400Hz < 5.0% max at 800Hz	50% to 100% output load (60W to 120W)	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 TRIPLENS:<15% $I_f / n$	$I_f$ = Fundamental current $V_{thd} < 1.25\%$ , $n = 1$ through 99 $n$ = order of harmonic 50% to 100% output load (60W - 120W) harmonic currents < 5mA disregarded	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 TRIPLENS:<15% $I_f / n + V_n$	$I_f$ = Fundamental current $V_{thd} > 10\%$ , $n = 1$ through 99 $V_n$ = corr input voltage harmonic 50% to 100% output load (60W - 120W) harmonic currents < 5mA disregarded	1
POWER FACTOR	0.98 min at 360Hz & 400Hz 0.95 min at 800Hz	$P_{out} > 60W$	2
CREST FACTOR (Current)	1.314 – 1.514	Ratio of peak / RMS	1
START-UP TIME	< 750mSec	Outputs within regulation	2
CONDUCTED EMISSIONS	RTCA/DO-160E	Category M	1, 3
STORAGE TEMP RANGE	-55°C to +100°C	Non-operational	1

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## INPUT CHARACTERISTICS—CONTINUED

PARAMETER	70170AC-28V-5V	REMARKS	NOTES
OPERATING TEMP RANGE	-20°C to +70°C	Supply can safely operate down to -55°C; start-up time will increase several seconds at this 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 +/- 4°C	Supply is inhibited at or above 100°C, auto restart at ~ 80°C case temp.	1

## OUTPUT CHARACTERISTICS

PARAMETER	70170AC-28V-5V	REMARKS	NOTES
RATED OUTPUT POWER	120W	Continuous	2
OUTPUT VOLTAGES	28.4Vdc +/- 2%, 5.05Vdc +/- 2%, 5Vstby is 5.0V +/- 2%		2
OUTPUT OVERCURRENT THRESHOLD	28V output: 6.5A maximum, 5V output: 5.7A maximum, 5V Stby output: 220mA typical	Output voltage will foldback and recover automatically into full rated load	2
TEMPERATURE STABILITY COEFFICIENT	0.01% / °C	Output voltage variation with change in temperature	1
OUTPUT RIPPLE + NOISE	28V output: 280mVpp max, 5V output: 50mVpp max, 5V stby output: 50mVpp max	20MHz bandwidth	2
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	230mSec typical at 120W output power	2

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## OUTPUT CHARACTERISTICS—CONTINUED

PARAMETER	70170AC-28V-5V	REMARKS	NOTES
ISOLATION VOLTAGE INPUT TO CHASSIS	1500Vac, 60Hz	No arcing or damage for 60-second test duration (8mArms max leakage)	1
ISOLATION VOLTAGE INPUT TO OUTPUT	1500Vac, 60Hz	No arcing or damage for 60-second test duration (8mArms max leakage)	1
ISOLATION VOLTAGE OUTPUT TO CHASSIS	250Vdc	No arcing or damage for 60-second test duration (100Mohm min)	1
DCPWRGOOD-L	0.5V maximum when outputs are within proper regulation	Secondary referenced, TTL Level, 16mA max sink current	2
ACPWRFAIL-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: 30.5V set-point 5V output: n/a	Pulse by pulse protection (inner loop), auto-restart	1
OUTPUT OVERVOLTAGE PROTECTION (HARD )	28V output: 34.9V set-point 5V output: n/a	Supply enters low duty cycle operation as long as fault condition persists, auto-restart	1
OUTPUT OVERVOLTAGE PROTECTION (CROWBAR)	28V output: 36.5V set-point 5V output: 5.48V set-point	Output is clamped to this level if soft and hard OVP circuits fail to limit output voltage; individual outputs may not recover if overvoltage fault persists	1
OUTPUT VOLTAGE ADJUSTMENT	None		

**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.