

# AC35W-12V-3.3V-PBF

(115Vac, 47-800Hz INPUT)

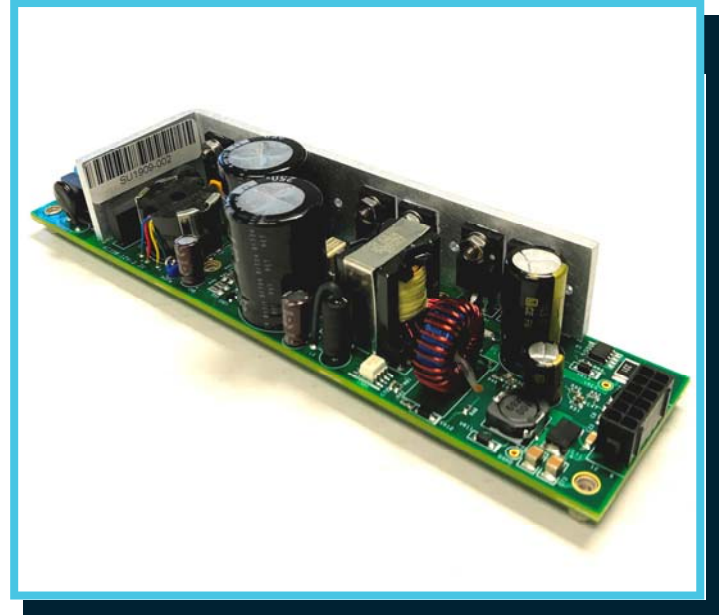
35W/12Vdc, 3.3Vdc DUAL OUTPUT

115Vac INPUT PFC POWER SUPPLY



Providing two isolated output voltages and up to 35W continuous output power, the **AC35W-12V-3.3V-PBF** is optimized for 115Vac/ 47-800Hz single phase RTCA/DO-160G airborne applications. 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. The **AC35W-12V-3.3V-PBF** is capable of providing up to 35W output during momentary input AC interrupt conditions for 200mSec or greater.

Weighing less than 10 ounces, the **AC35W-12V-3.3V-PBF** is constructed on a multi-layer PWB occupying  $\sim 12.6\text{in}^2$ . Component height is less than 1.2" and the supply contains six press fit nuts for easy mounting. Interconnection is accomplished using two vertical TE connectors. The **AC35W-12V-3.3V-PBF** is designed and manufactured to stand-up to the harsh operating environments encountered in today's aircraft installations.



## FEATURES

	<b>Efficiency: 79% typical at full rated output load</b>
	<b>Wide input range: 97 – 134Vac, 47-800Hz</b>
	<b>Inrush current limiting: &lt; 3.7Apk</b>
	<b>Size: 7.20" x 1.75" x 1.5"; PCB thickness: 0.092"; Weight: less than 10 ounces</b>
	<b>Two isolated DC outputs: +12V (switched), +3.3Vstby (unswitched)</b>
	<b>Independent over-current and over-voltage protection on each output</b>
	<b>Output DC valid status line (TTL)</b>
	<b>Over-temperature fault signal (TTL)</b>
	<b>MTBF: 649,000 Hours, RIAC 217Plus, Aic category, 50°C L-bracket temp, 65%DC, 2190 Cycles/ year</b>



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## STANDARD OUTPUTS

PARAMETER	OUTPUT VOLTAGE	
	+12V	+3.3Vstby
Voltage Regulation	12.1V $\pm$ 2%	3.3V $\pm$ 3%
Output Current	2.1A	3A
Maximum Load	25.2W	9.9W
Minimum Load	200mA	0A
Pk-pk Ripple + Noise (20MHz)	< 120mVpp	< 50mVpp
Overcurrent Set Point	2.6A (3.5A Max *)	5A (6A Max)
Notes	1, 2	1, 2

### Notes:

1. Constant-current limited
2. Any combination of 12V current (up to ~3A) and 3.3Vstby current (up to 3A) adding up to ~35.1W of total output power can be drawn from the supply. \* 12V output current limit is affected by 3.3V load current.

## 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 AC input, cat A(WF) equip, includes harmonic distortion
	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, with external power line EMI
	Operating temperature: -25°C to +70°C, no forced air required
	Storage temperature: -55°C to +100°C



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## INTERCONNECTION

### SUPPLY SIDE CONNECTORS AND PIN-OUTS

Connector	J1	J2
Pin #	TE Vertical 3-794630-6	TE Vertical 4-794630-2
1	n/c	ACPF-L
2	Chassis Gnd	DCRTN
3	n/c	DCRTN
4	Line	DCRTN
5	n/c	+12Vout
6	Neutral	DCGOOD-L
7	--	+3.3Vstby
8	--	OUTPUTEN-L
9	--	DCRTN
10	--	OVERTEMP-L
11	--	+12Vout
12	--	+3.3Vstby



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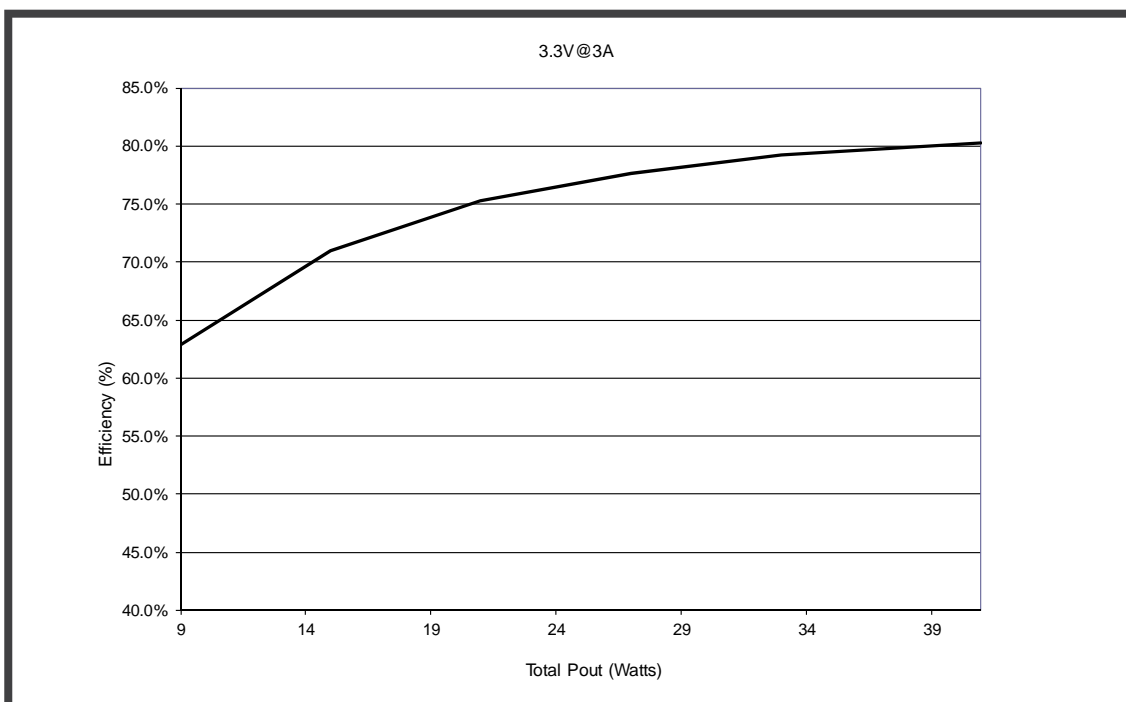
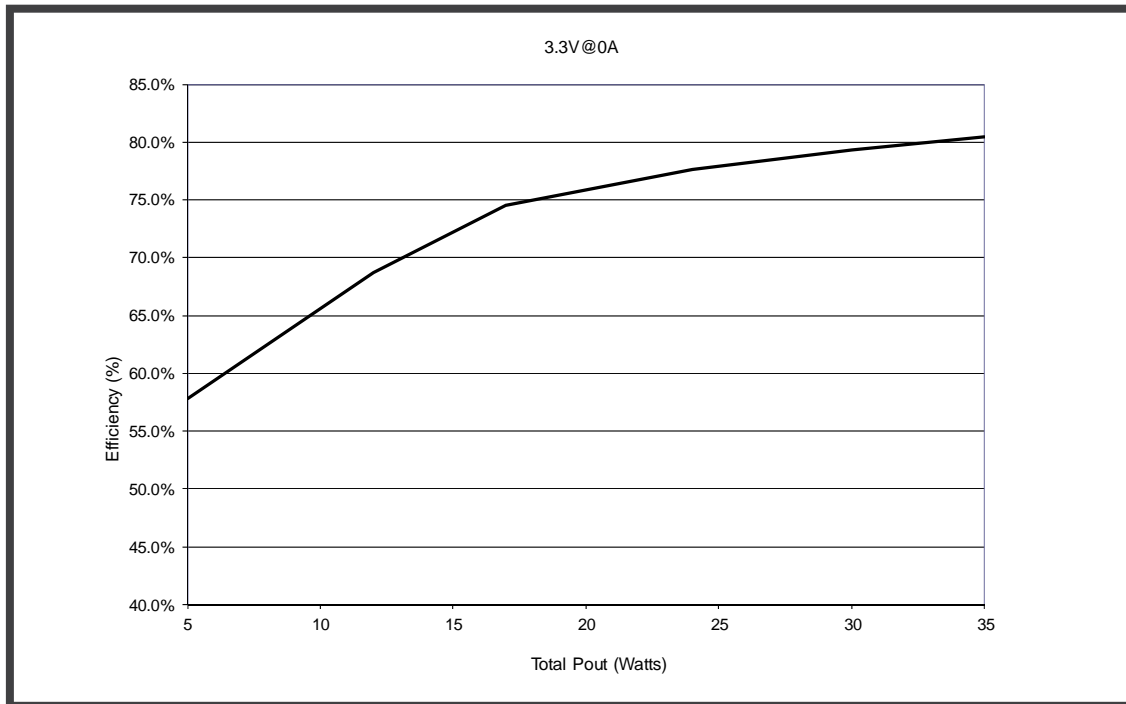
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## EFFICIENCY CURVES

Data recorded using the following test conditions:  $T_a = 23^\circ\text{C}$ , active load applied to both outputs.  $V_{in} = 115\text{Vrms}/400\text{Hz}$ . 3.3Vstby load set to 0A and 3A with remainder of load applied to 12V output.



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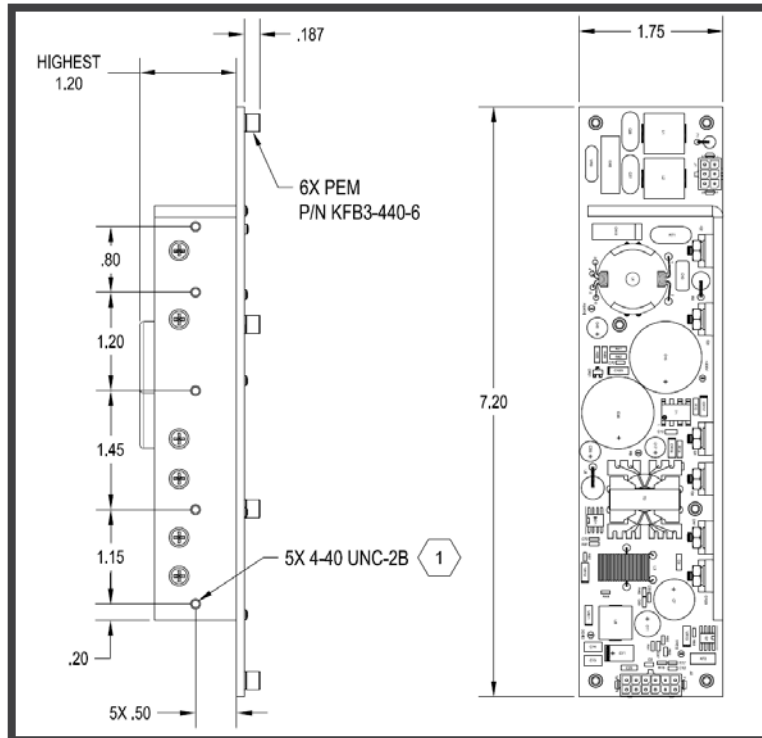
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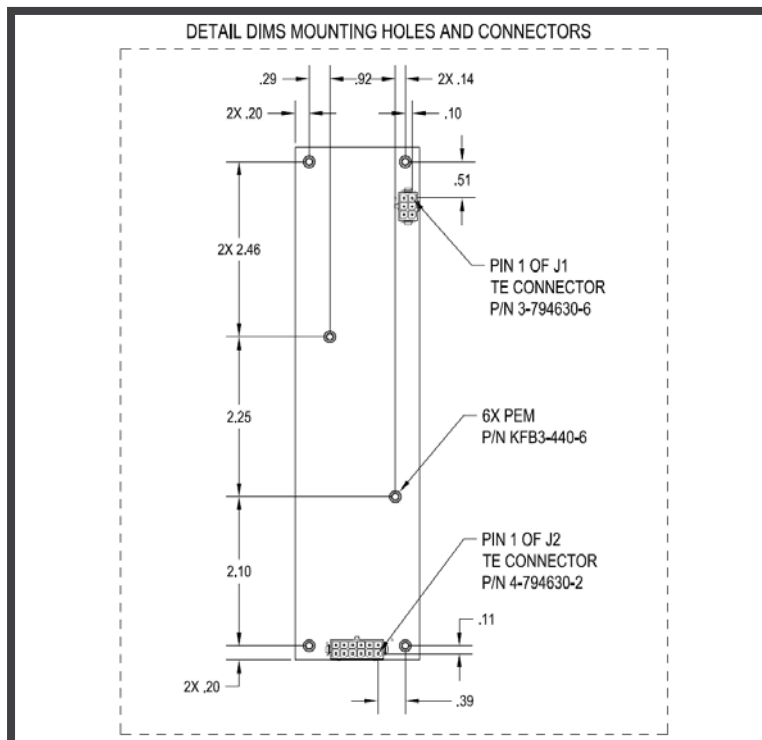
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## MECHANICAL DIAGRAMS



### TOP AND SIDE VIEWS



### MOUNTING AND CONNECTORS

OUTLINE OR DETAILED SOLIDWORKS DRAWING FURNISHED UPON REQUEST



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## ELECTRICAL SPECIFICATIONS

UNLESS OTHERWISE SPECIFIED THE FOLLOWING TEST CONDITIONS APPLY: Ta = 23°C. CONSTANT ACTIVE LOAD APPLIED TO OUTPUTS, Vin = 115Vrms/ 400Hz.

## INPUT CHARACTERISTICS

PARAMETER	AC35W-12V-3.3V-PBF	REMARKS	NOTES
INPUT VOLTAGE RANGE	97 – 134Vrms	Complies with normal/ abnormal input voltages for AC operation per RTCA/DO-160G, Section 16, Category A	2
MUST START VOLTAGE	97Vrms minimum	Supply will start and remained enabled for input voltage in the range of 97Vrms < Vin < 134Vrms.	2
INPUT FREQUENCY RANGE	47 – 800Hz	Reduced distortion performance below 360Hz.	2
EFFICIENCY (FULL LOAD)	79% typical	Full rated output load (35W), see efficiency curve	2
INPUT CURRENT	380mArms at 115Vrms	Full rated output load (35W)	1
INRUSH CURRENT	<3.7Apk	Cold Start	2
CREST FACTOR (CURRENT)	1.314 – 1.514	Ratio of peak / RMS	1
LINE FUSE	2A, 125Vac	Line lead, slow-blow, not user-serviceable	1
INPUT TRANSIENT SUPPRESSION	TVS, 240Vac clamping, 42J, 3.5kA	Line to neutral after input line fuse, 150Vac allowable continuous applied input AC without activating TVS device	1
POWER FACTOR	0.98 min 0.98 min	Pout > 15W at 400Hz Pout > 20W at 800Hz	2
START-UP TIME	<1000mSec	Outputs within regulation	2
CONDUCTED EMISSIONS	RTCA/DO-160G, Section 21	Category M equipment	1, 4
QUIESCENT POWER	2.2W typical	Outputs Enabled, Pout = 0W	2
TOTAL HARMONIC DISTORTION (INPUT CURRENT)	< 5.5%	18W-35W output load	2
INDIVIDUAL HARMONICS AC CLEAN INPUT	EVEN: <1% If / n (n < 10) EVEN: <0.1%If (n ≥ 10) ODD: <30% If / n ODD TRIPLES:<15% If / n	If = Fundamental current Vthd < 1.25%, n = order of harmonic (1 - 40) 18W-35W output load Harmonics < 10mA disregarded	1



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## INPUT CHARACTERISTICS—CONTINUED

PARAMETER	AC35W-12V-3.3V-PBF	REMARKS	NOTES
INDIVIDUAL HARMONICS DISTORTED INPUT	EVEN: $<1\% I_f / n + 1.25V_n (n < 10)$ EVEN: $<0.1\% I_f + 1.25V_n (n \geq 10)$ ODD: $<30\% I_f / n + 1.25V_n$ ODD TRIPLENS: $<15\% I_f / n + 1.25V_n$	$I_f$ = Fundamental current $V_{thd} > 10\%$ (clipped method) $n$ = order of harmonic (1 - 40) $V_n$ = corr input voltage harmonic 18W-35W output load Harmonics $< 10mA$ disregarded	1
STORAGE TEMPERATURE RANGE	-55°C TO +100°C	Non operational	1
OPERATING TEMPERATURE RANGE	-25°C TO +70°C	No external airflow required	1
OUTPUTEN-L	Pull to $<2V_{dc}$ with respect to DCRTN in order to enable the +12V output	Internally pulled high to $3.3V_{stby}$ through 1k pull-up resistor. Pull to $<2V_{dc}$ with respect to DCRTN in order to enable +12V output. $3.3V_{stby}$ output is unaffected by this signal	2

## OUTPUT CHARACTERISTICS

PARAMETER	AC35W-12V-3.3V-PBF	REMARKS	NOTES
RATED OUTPUT POWER	35W	Continuous	2
OUTPUT VOLTAGE TOLERANCE	+12.1V $\pm$ 2% +3.3V $\pm$ 3%	See "STANDARD OUTPUTS" table	2
TEMPERATURE STABILITY COEFFICIENT	0.01% / °C	Maximum output voltage drift with temperature	1
OUTPUT RIPPLE + NOISE (pk-pk)	$<120mV_{pp}$ : +12V output $<50mV_{pp}$ : +3.3Vstby output	20MHz Bandwidth	2
MINIMUM OUTPUT LOAD	200mA on 12V or 750mA on 3.3V	200mA minimum load is required for proper output regulation on the 12V output if output is enabled. No damage or overvoltage condition will result if minimum load is not provided	2
LINE REGULATION	$<0.5\%$	Individual output deviation for $\pm 20\%$ step change in input voltage	1
LOAD REGULATION (TRANSIENT LOAD RECOVERY)	Outputs remain within regulation limits	50% to 100% step change in individual output load currents	1
HOLD-UP TIME	200mSec min @ Pout = 35W	Uninterrupted ride through for momentary power interrupt	2



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## OUTPUT CHARACTERISTICS—CONTINUED

PARAMETER	AC35W-12V-3.3V-PBF	REMARKS	NOTES
ISOLATION VOLTAGE INPUT TO OUTPUT	1500Vac	No arcing or damage for 60 second test duration	2
ISOLATION VOLTAGE INPUT TO CHASSIS	1500Vac	No arcing or damage for 60 second test duration	2
OUTPUT OVERVOLTAGE PROTECTION (non-latching)	+12V output is limited to 108% of nominal set point	Pulse-by-pulse protection, 4mSec fault to activation delay, auto-restart	1
OUTPUT OVERVOLTAGE PROTECTION (latching)	+12V set point = 14.5V +3.3Vstby set point = 3.9V	Supply will shutdown and remain disabled until input AC power is recycled if OVP set points are detected internally	1
OVERTEMP-L STATUS SIGNAL	Transitions to 0.5V max level upon detecting an internal operating temperature of +100°C +/- 7°C	Supply provides status signal OVERTEMP-L that asserts low when supply PWB temperature is sensed at 100°C, with ~2°C hysteresis. OVERTEMP-L signal is secondary side referenced w/ respect to DCRTN), capable of sinking 16mA	1
DC OUTPUT STATUS “DCGOOD-L”	Transitions to TTL high (4V min) upon detection of +12V output 6% below nominal set point	Secondary side referenced (w/ respect to DCRTN), 10mSec delay time, TTL level, 1mA max source current; 16mA max sink current	2
AC INPUT STATUS “ACPF-L”	Transitions to TTL low (0.5V max) upon detection of invalid input AC	Secondary side referenced (w/ respect to DCRTN), Invalid AC is defined as level that PFC boost converter disables or ~75Vrms at 400Hz. 10mSec delay time, TTL level, 1mA max source current; 16mA max sink current	2
PFC 200Vdc OUTPUT	200Vdc ± 3%	5W ≤ Pout < 35W.	2, 3

### Notes:

1. Ensured by design, not 100% tested in production.
2. 100% tested for specification compliance in production.
3. 200Vdc PFC output voltage tolerance is +/-5% for Pout < 5W.
4. Requires small external power line filter for compliance. Contact PPI for details.

