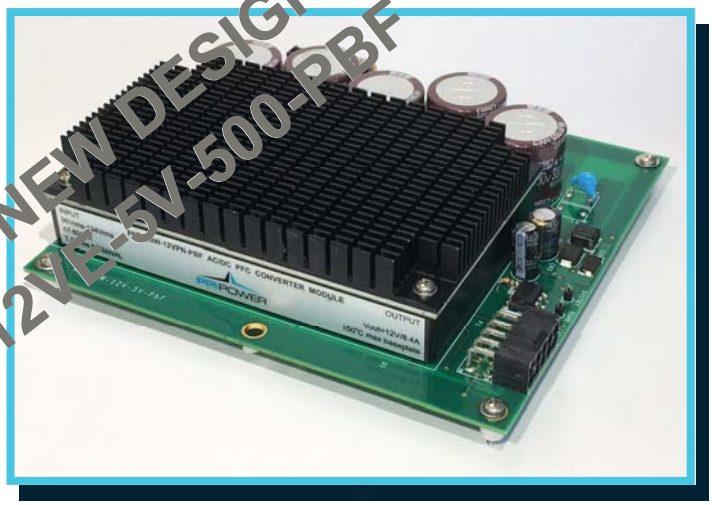
MS100W-12V-5V-PBF

(115Vac, 47- 800Hz Input)

100W/12Vdc, 5Vdc Dual Output, Airborne PFC Power Supply



Providing two isolated output voltages and up to 100W continuous output power, the **MS100W-12V-5V-PBF** modular supply is optimized for 115Vac/ 47-800Hz single phase RTCA/DO-160G airborne applications.

Accurate output regulation is assured by implementation of the main module's remote sense feature. Standard protection features are built-in in to assure years of fault-tolerant and reliable operation in the harshest environments.

The **MS100W-12V-5V-PBF** is capable of providing uninterrupted ride-through at full output load during momentary input AC brown-out conditions for up to 200mSec.

Revisions.txt

Weighing less than 26 ounces, the **MS100W-12V-5V-PBF** is constructed on a multi-layer PWB occupying ~34in^2. Component height is less than 1.25" with integral finned heatsink. Interconnection is accomplished using Samtec IPBT connectors. The **MS100W-12V-5V-PBF** is designed and manufactured to stand-up to the harsh operating environments encountered in today's aircraft installations.

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) at ½ to full rated load
	Complies with RTCA/DO-160G for conducted emissions, susceptibility and power input (section 16), see note X
	Efficiency: 82% typical at full rated output load
	Wide input range: 96 – 134Vac, 47-800Hz
	Active inrush current limiting: < 4Apk typical, 7Apk maximum
	Size: 6" x 5.6" x 1.50"; Weight: less than 26 ounces
	Two isolated DC outputs: +12V / 8.4A (switched), +5Vstby / 250mA (unswitched)
	Overcurrent protection with constant current limiting each output
	DC output valid status line (TTL)
	AC valid status line (TTL)
	Over-temperature protection (main module)
	MTBF: 650,000 Hours (RAIC 217Plus, Aic, 50°C operating temperature, 65% DC, 2190 Cycles/ yr.)

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STANDARD OUTPUTS

PARAMETER	OUTPUT VOLTAGE	
	+12V	**+5Vstby**
Voltage Regulation	12.2V ± 2%	5.0V +3%/-2%
Output Current	8.2A	250mA
Maximum Load	100W	1.2W
Minimum Load	0A	0A
Pk-pk Ripple + Noise (20MHz)	< 180mVpp	< 50mVpp
Overcurrent Trip-point	10.5A	600mA

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, category A(WF) equipment
	RTCA/DO-160G, section 17, voltage spike, category B equipment
	RTCA/DO-160G, section 18, conducted susceptibility, category R(WF) 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, cate M equipment, with external power line EMI filter
	Operating temperature: -40°C to +70°C, forced air required at elevated ambient temperature
	Storage temperature: -55°C to +100°C

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INTERCONNECTION

SUPPLY SIDE CONNECTORS AND PIN-OUTS

Connector	P1	P2
Pin #	**SAMTEC P/N** IPBT-103-H1-T-S-K	**SAMTEC P/N** IPBT-105-H1-T-D-RA-K
1	LINE	+12Vout
2	CHASSIS GROUND	DCRTN
3	NEUTRAL	DCRTN
4	--	ACPF-L
5	--	DCPF-L
6	--	+12Vout
7	--	+12Vout
8	--	DCRTN
9	--	OUTPUTEN-L
10	--	+5Vstby

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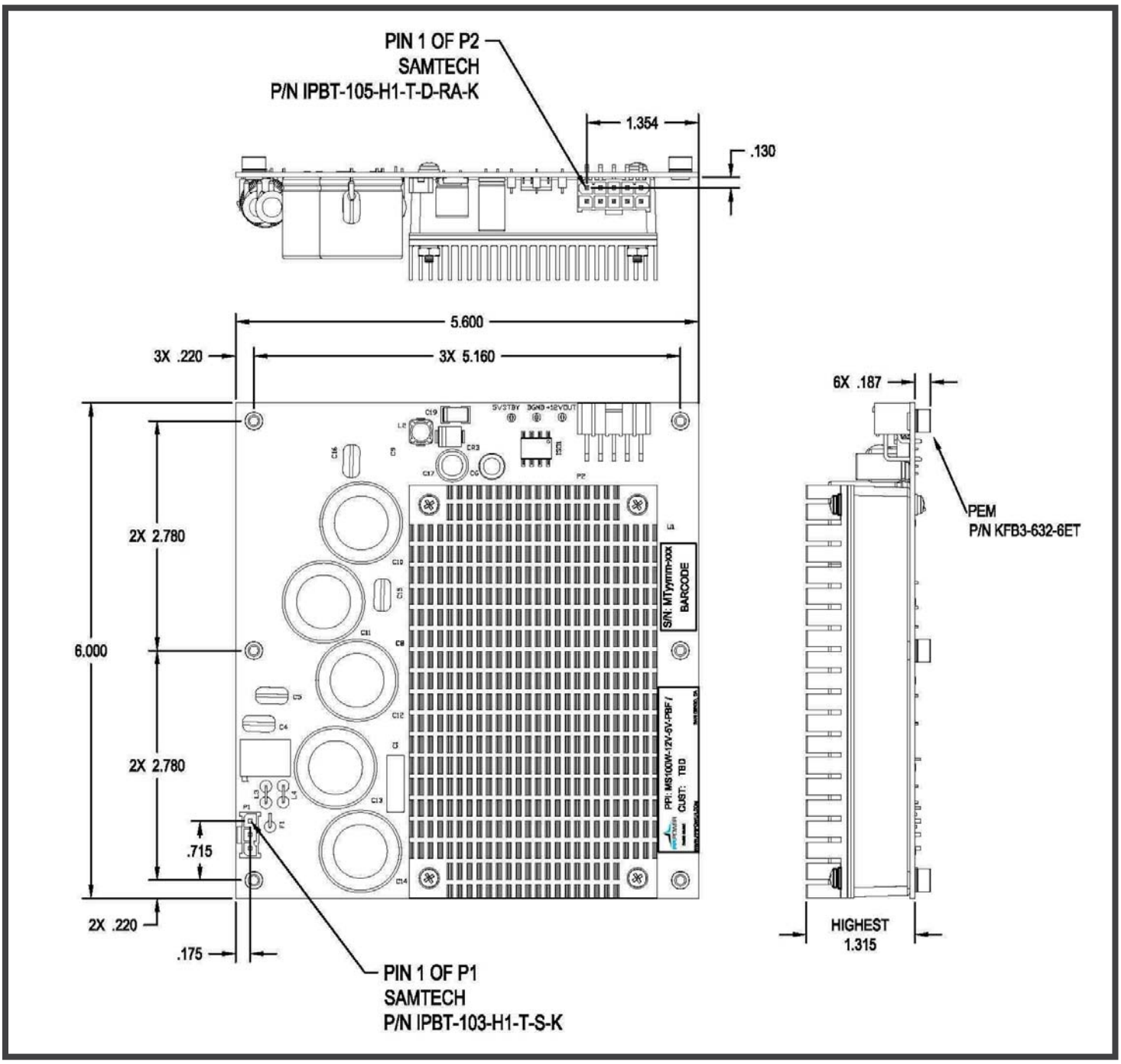
MECHANICAL DIAGRAM



OUTLINE OR DETAILED SOLIDWORKS DRAWING FURNISHED UPON REQUEST

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ELECTRICAL SPECIFICATIONS

UNLESS OTHERWISE SPECIFIED THE FOLLOWING TEST CONDITIONS APPLY: Ta = 25°C. CONSTANT ACTIVE LOADS APPLIED TO OUTPUTS, Vin = 115Vrms/ 400Hz.

INPUT CHARACTERISTICS

PARAMETER	MS100W-12V-5V-PBF	REMARKS	NOTES
INPUT VOLTAGE RANGE	96 – 134Vrms	Complies with normal/ abnormal input voltages for AC operation per RTCA/DO-160G, Section 16, Category A.	2
MUST START VOLTAGE	96Vrms minimum	Supply will start and remained enabled for input voltage in the range of 96Vrms < Vin < 134Vrms.	2
MUST INHIBIT VOLTAGE	89Vrms maximum	Supply output will inhibit following ~800mSec turn-off delay upon detection of input undervoltage ≤89Vrms. 12V output to disable monotonically and remain disabled as long as input voltage remains ≤89Vrms.	2
INPUT FREQUENCY RANGE	47 – 800Hz	Reduced distortion performance below 360Hz.	2
EFFICIENCY	80% minimum at full load (100W) 78.5% minimum at half load (50W)	82% typical full load efficiency.	2
POWER FACTOR	0.98 min	Pout > 50W at 400Hz, Pout > 82W at 800Hz.	2
INRUSH CURRENT	< 7Apk max	Cold or warm start; < 4Apk typical.	2
START-UP TIME	<750mSec	Outputs within regulation	2
CONDUCTED EMISSIONS	RTCA/DO-160G	Section 21, category M.	1, 3
QUIESCENT POWER	6.5W typical	Pout = 0W.	2
STORAGE TEMPERATURE RANGE	-55°C to +100°C	Non-operational.	1
OPERATING TEMPERATURE RANGE	-40°C to +70°C	Observe maximum baseplate temperature of +100°C.	1
OUTPUTEN-L	Pull to >2.5Vdc with respect to DCRTN in order to disable the +12V output	Default state is pulled low with internal 10k pull-down. Pull to >2.5Vdc using ~5.1k pull-up resistor to 5Vstby in order to disable. 5Vstby output is unaffected by this signal.	2

INPUT CHARACTERISTICS—CONTINUED

PARAMETER	MS100W-12V-5V-PBF	REMARKS	NOTES
OVERTEMPERATURE SHUTDOWN	100°C ± 4°C	Module's 12V output is inhibited at or above 100°C. Auto restart occurs at ~80°C module baseplate temperature.	1
Athd INPUT CURRENT	< 5.0%	50% - 100% output load (50W - 100W).	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 = order of harmonic (1 - 40) 50% - 100% output load (50W - 100W). Harmonics < 10mA disregarded.	1
INDIVIDUAL HARMONICS DISTORTED INPUT	EVEN: <1% If / n + 1.25Vn (n < 10) EVEN: <0.1%If + 1.25Vn (n ≥ 10) ODD: <30% If / n + 1.25Vn ODD TRIPLENS:<15% If /n+1.25Vn	If = Fundamental current Vthd > 10% (clipped method), n = order of harmonic (1 - 40) Vn = corr input voltage harmonic. 50% - 100% output load (50W - 100W). Harmonics < 10mA disregarded.	1

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OUTPUT CHARACTERISTICS

PARAMETER	MS100W-12V-5V-PBF	REMARKS	NOTES
RATED OUTPUT POWER	100W	Continuous. Observe maximum allowable baseplate temperature; see PFC100W-12VPN-PBF specification application information for details.	2
OUTPUT VOLTAGE	+12.2V ± 2% +5.0V ± 2%	See "STANDARD OUTPUTS" table. 5V output may be +5.0V +3/-2% at no load.	2
OUTPUT OVERCURRENT THRESHOLD	12V output: 10.5A maximum 5V output: 600mA maximum	Output voltage will foldback, auto-recovery. No damage will occur to module during indefinite output short circuit conditions.	2
TEMPERATURE STABILITY COEFFICIENT	0.05% / °C	Output voltage variation with temperature (500uV / °C).	1
OUTPUT RIPPLE + NOISE (pk-pk)	<180mVpp: +12Voutput <50mVpp: +5Vstby output	20MHz Bandwidth. 100mVpp typical for 12Voutput. Can be reduced with external capacitors, see PFC100W-12VPN-PBF specification application notes.	2
MINIMUM OUTPUT LOAD	0A	No minimum load is necessary.	2
LINE REGULATION	<0.5%	Individual output deviation for ± 20% step change in input voltage.	1
LOAD REGULATION (TRANSIENT LOAD RECOVERY)	Outputs remain within regulation limits	50% step change in output load. Full load to half load or half load to full load. 10uSec rise/fall time.	1
HOLD-UP TIME	200mSec @ Pout = 100W	Uninterrupted ride through for momentary power interrupt.	2
ISOLATION VOLTAGE INPUT TO OUTPUT	1500Vac	No arcing or damage for 60 second test duration (7.2mArms max leakage).	1
ISOLATION VOLTAGE INPUT TO CHASSIS	1500Vac	No arcing or damage for 60 second test duration (7.2mArms max leakage).	1
INSULATION RESISTANCE OUTPUT TO CHASSIS	100M-ohms at 500Vdc	If removing 0-ohm SPG resistors (R12 and R13) from DGND to Chassis ground. Otherwise IR = 0 ohms.	1
DC OUTPUT STATUS "DCPF-L"	Transitions to TTL low (0.5Vmax) when 12Vdc output is detected on low side of regulation band	TTL level, 3mA max sink current. Time to activation on a fault is 1mSec typical, 2.5mSec maximum.	2
AC POWER FAIL STATUS "ACPF-L"	Transitions to TTL low (0.5Vmax) upon detection of invalid input AC (≤ 89Vrms from 0% - 100% load)	TTL level, 16mA max sink current, 5mSec maximum delay time to activate on loss of input AC.	2
OUTPUT OVERVOLTAGE PROTECTION	12V output: 13.6V ± 3% 5V output: n/a	Pulse by pulse protection (inner loop), auto-restart.	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, see application section for details.