

70050M2-12V-5V-PBF

(115Vac, 47- 800Hz Input)

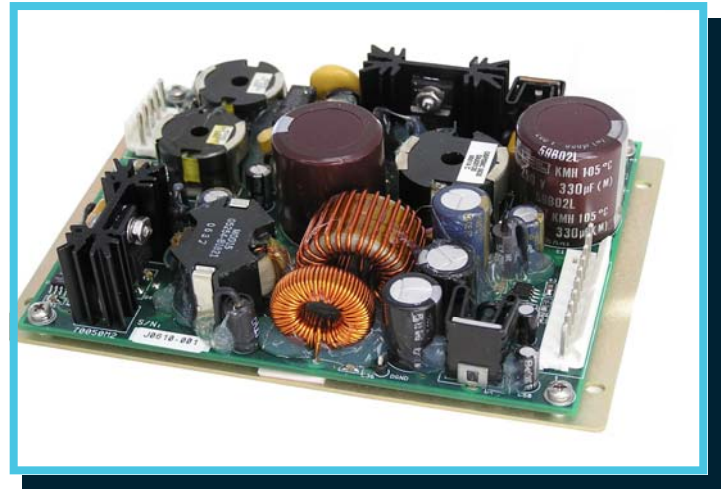
66W, 12V & 5V Dual Output,
Airborne PFC Power Supply



The **70050M2-12V-5V-PBF** power supply contains all the necessary circuitry for complete AC power line compliance with aeronautics specification RTCA/DO-160G and Boeing's D6-44588. Offering dual output voltages and providing 66W of continuous output power, the **70050M2-12V-5V-PBF** is well suited for many avionics' applications requiring a compact and rugged power supply solution.

Each of the two outputs are independently over-current/ over-voltage protected and post-regulated for optimum output regulation. The **70050M2-12V-5V-PBF** is capable of providing uninterrupted ride-through for up to 50W output (any load combination) for greater than 200mSec upon loss of input AC voltage. Hold-up time can be expanded externally; two pins are provided for interconnecting with an external hold-up capacitor bank. An AC status detector signal (ACGOOD-H) is provided in order to indicate loss of AC input power.

The **70050M2-12V-5V-PBF** is mounted to an aluminum plate with outer dimensions of 5.5"X4.0"X1.5" and can be flush mounted to any chassis surface. Interconnection is accomplished using standard Molex header/mate 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: 75% typical: full rated output load, nominal input (line) conditions
	Wide input range: 97Vrms – 134Vrms, 47 – 800Hz
	Complies with RTCA/DO-160G, category M for conducted emissions, susceptibility and power input (section 16), see note X.
	Active inrush current limiting: 4Apk typical, 7Apk maximum
	Size: 5.5" x 4.0" x 1.5", weight: less than 16 ounces
	Dual switched outputs: 12Vdc & 5Vdc at up to 66W continuous output power
	Overvoltage and overcurrent protection on each output
	Overtemperature shutdown (local heatsink temp)
	PFC output overvoltage protection with automatic restart (internal 200Vdc PFC output)
	ACGOOD-H status line (TTL)
	MTBF (RIAC 217Plus, Aic, 50°C OPERATING TEMPERATURE, 65% DC, 2190 Cycles/ yr.) 787,000 HOURS

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PERFORMANCE SUMMARY

PARAMETER	VALUE (TYPICAL)		
	Supply	12V Output	5V Output
Voltage regulation (5)	--	+12.0V \pm 2.5%	+5.0V \pm 2%
Rated output current	--	3A	6A
Pk-Pk Ripple + Noise (20MHz) (7)	--	100mVpp	75mVpp
Supply efficiency / full load	75%	--	--
Output ride-through at full load (1)	140mSec	--	--
Output overcurrent threshold (2)	--	5.5A	7.0A
Output overvoltage set-point (3)	--	14.9V	6.3V
Overtemperature shutdown (4)	92°C \pm -3%		
Minimum load (5)	--	0A	0A
PFC output overvoltage set-point	240V	--	--
Isolation Voltage (6) (Input to Output & Input to Chassis)	1500Vac	--	--

Notes:

1. 940uF internal hold-up capacitance; ride-through based on -20% capacitor tolerance, 115Vrms nominal input, full output load (66W).
2. 5V output is foldback current limited, 12V output is constant current limited with LDO regulator each with auto recovery into full rated output load.
3. Overvoltage set-point; DC/DC converter is inhibited with auto restart.
4. There are two temperature sensors, one on each of the two larger local heatsinks. Overtemperature set point is 92°C and is sensed at each of the heatsink solder posts. There is ~16C hysteresis with auto reset.
5. No minimum load is required to assure proper output regulation. No damage or loss of output regulation will occur if no output load is presented. The 5V output is the main regulating voltage, for proper 12V output regulation a load is required on the 5V output. See cross regulation curve for required load distribution to maintain proper 12V output regulation.
6. 1500Vac for 60 seconds without arc or damage; 8mA rms maximum leakage current (line-to-earth capacitors installed).
7. Ripple + noise can be reduced with external bulk capacitance on either output.



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INTERCONNECTION

Interconnection is accomplished using two Molex vertical headers.

J1	MOLEX P/N 26-60-4050
J1-1	AC LINE
J1-2	AC NEUTRAL
J1-3	CHASSIS GND
J1-4	+200Vdc (EXT CAP)
J1-5	+200Vdc RETURN (EXT CAP)

J2	MOLEX P/N 26-60-4100
J2-1	+12V
J2-2	DC RETURN
J2-3	+12V
J2-4	DC RETURN
J2-5	+5V
J2-6	+5V
J2-7	DC RETURN
J2-8	ACGOOD-H
J2-9	N/C
J2-10	N/C

ORDERING INFORMATION

Standard p/n 70050M2-12V-5V-PBF includes 5.5" x 4.0" aluminum mounting plate as shown.
Order 70050M2N-12V-5V-PBF for supply option with no mounting plate.



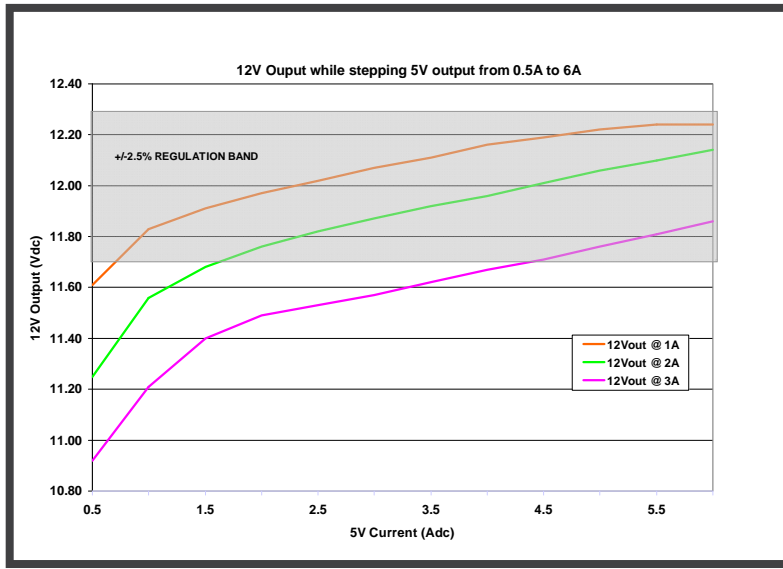
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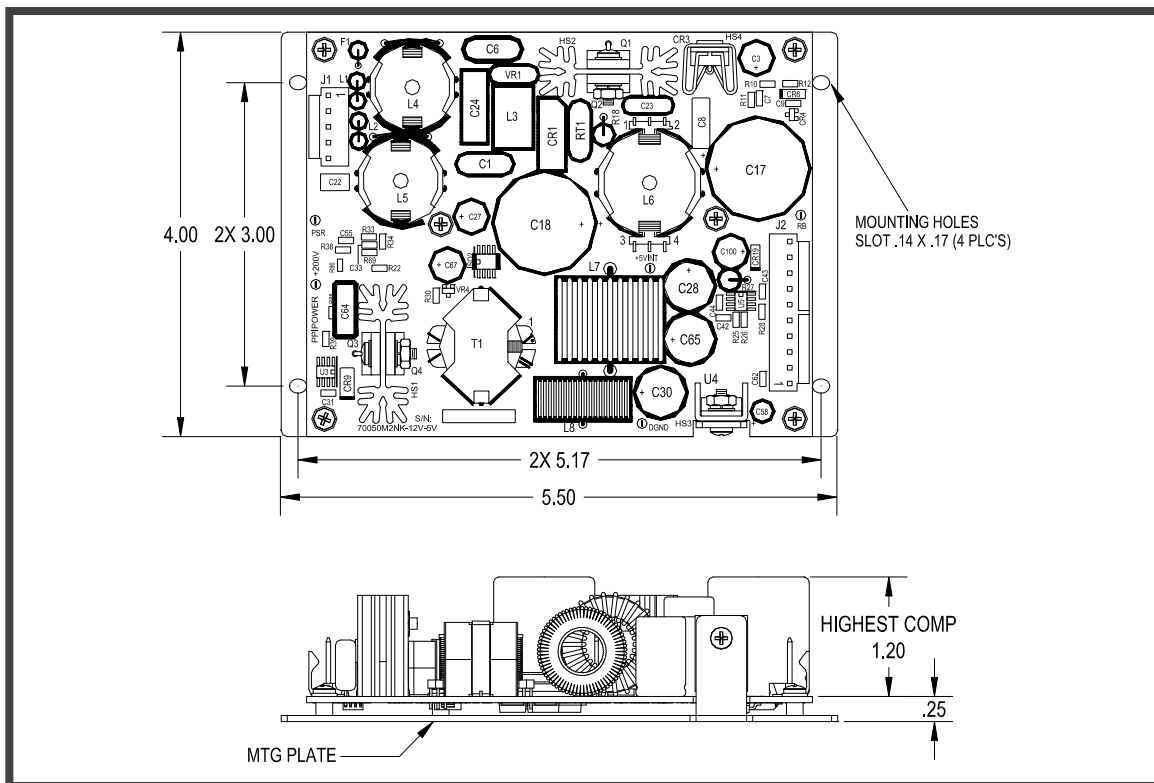
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CROSS REGULATION CURVE



MECHANICAL DIAGRAM



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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	70050M2-12V-5V-PBF	REMARKS	NOTES
INPUT VOLTAGE RANGE	97 – 134Vrms	Complies with normal / abnormal input voltages per DO-160G, 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	75% typical	Full load output (66Wout) (73% min full load, 72% minimum for half load)	2
LEAKAGE CURRENT	< 5mArms	AC Line / Neutral to Chassis at 115Vrms / 400Hz	1
INRUSH CURRENT	< 7Apk maximum	Cold or Warm Start; 4Apk typical	2
TOTAL HARMONIC DISTORTION (Input Current)	< 3.5% max at 360Hz & 400Hz < 5.0% max at 800Hz	50% to 100% output load (33W to 66W)	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% output load (33W to 66W) harmonic currents < 10mA 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 TRIPLES:<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 (33W to 66W) harmonic currents < 10mA disregarded	1
POWER FACTOR	0.98 min at 360Hz - 800Hz	$P_{out} > 30W$	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-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 to -55°C; start-up time will increase at this temperature.	1



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OUTPUT CHARACTERISTICS

PARAMETER	70050M2-12V-5V-PBF	REMARKS	NOTES
RATED OUTPUT POWER	66W	Continuous	2
OUTPUT VOLTAGES	12Vdc +/- 2.5%, 5.0Vdc +/- 2%	See performance summary table, sheet 2	2
OUTPUT OVERCURRENT SET POINT	12V output: 5.5A 5V output: 7.0A	5V output enters pulse retry (current foldback) operation. 12V output enters constant current operation until post-regulator thermal sense circuit engages. Each recover into full rated load once thermal protection (12V) deactivates	2
TEMPERATURE STABILITY COEFFICIENT	0.01% / °C	Output voltage variation with change in ambient temperature	1
OUTPUT RIPPLE + NOISE	12V output: 100mVpp max, 5V output: 75mVpp 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, untested output at full rated load	1
MINIMUM LOAD	0A	No minimum load required for proper output regulation	2
HOLD-UP TIME	200mSec minimum	At 50W output power (5V/5.2A, 12V/2.0A)	2
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
INSULATION RESISTANCE OUTPUT TO CHASSIS	100Mohm min at 250Vdc	No arcing or damage for 60-second test duration , 250Vdc max isolation withstand voltage	1
ACGOOD-H	Transitions to TTL low upon loss of input AC within 10mSec	Secondary referenced, TTL Level	2
OUTPUT OVERVOLTAGE PROTECTION	12V output: 14.9V set-point 5V output: 6.3V	Pulse by pulse protection (inner loop), auto-restart	1
OVERTEMPERATURE PROTECTION	Heatsink post: 92°C +/- 3%	The main DC/DC converter will be shutdown if either local heatsink solder post temperature is sensed at 92°C +/- 3%. DC/DC converter will re-enable once sensed temperature drops by 16 °C	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.

