

110 WATTS

GRN-110 SINGLE OUTPUT AC-DC

FEATURES:

- RoHS Compliant
- Advanced SMT Design
- <0.3W No Load Input Power
- 90% Peak Efficiency
- 87% Average Efficiency
- Excellent Light Load Efficiency
- 2 Year Warranty
- Compact 3.0" x 5.0" x 1.25" Size
- EN 60950-1 ITE Certification
- EN 60601-1 Medical Certification
- EN 61000-6-2 & EN 60601-1-2 EMC
- Optional Chassis/Cover








OPEN FRAME



CHASSIS/COVER

SAFETY SPECIFICATIONS

General	Protection Class: I	Overvoltage Category: II	Pollution Degree: 2
	Underwriters Laboratories File E137708/E140259	UL 60950-1 Second Edition, 2007 UL 60601-1 First Edition, 2006 AAMI/ANSI ES6060-1 2005	
		CB Reports/Certificates (including all National and Group Deviations) IEC 60950-1/A1:2009, Second Edition IEC 60601-1:1988 +A1:1991 +A2:1995 IEC 60601-1:2005 Third Edition	
	UL Recognition Mark for Canada File E137708/E140259	CAN/CSA-C22.2 No. 60950-1-07, Second Edition CAN/CSA-C22.2 No. 601-1-M90, 2005 CAN/CSA-C22.2 No. 60601-1:2008	
	TUV	EN 60950-1/A12:2011 EN 60601-1/A2:1995 EN 60601-1:2006	
	Low Voltage Directive RoHS Directive (Recast)	(2006/95/EC of December 2006) (2011/65/EU of June 2011)	

MODEL LISTING

MODEL	OUTPUT
GRN-110-1001	3.3V/22A
GRN-110-1002	5.0V/22A
GRN-110-1003	12V/9.2A
GRN-110-1004	15V/7.3A
GRN-110-1005	24V/4.6A
GRN-110-1006	28V/3.9A
GRN-110-1007	48V/2.3A

ORDERING INFORMATION

Please specify the following optional features when ordering:

CH - Chassis
CO - Cover
OVP - Overvoltage protection

All specifications are maximum at 25°C, 110W unless otherwise stated, may vary by model and are subject to change without notice.

GREEN MODE

OUTPUT SPECIFICATIONS

Output Power at 50°C	110W	85-264 V (see derating chart)
Voltage Centering	±0.5%	(Output at 50% load)
Voltage Adjust Range	95-105%	
Load Regulation	±0.5%	(0-100% load change)
Source Regulation	0.5%	
Ripple & Noise	1.0%	(1001, 1002 < 3%)
Turn On Overshoot	None	
Transient Response	Output recovers to within 1% of initial set point due to a 50% step load change, 500µS maximum, 5% maximum deviation. (maximum deviation on 1001-8%, 1002-6%)	
Overvoltage Protection	Latching, Between 110% and 150% of rated output voltage (optional)	
Overpower Protection	110% rated P _{OUT} min, cycle on/off, auto recovery	
Hold-Up Time	16 ms typical, full power, 115V input	
Start-Up Time	1 sec., 115/230V input	
Output Rise Time	50 ms typical	
Minimum Load	No minimum load required	

INPUT SPECIFICATIONS

Source Voltage	85-264 VAC (see derating chart)	
Frequency Range	47-63 Hz	
Input Protection ⁽⁵⁾	Internal 4A time delay fuse, 1500A breaking capacity	
Peak Inrush Current	50A max. at 230 V	
Peak Efficiency	90%	
Average Efficiency	87% (1003-1007), 86% (1002), 82% (1001)	
Light Load Efficiency	85%, 115/230 V _{IN} , 33% power (1001 >81%)	
No Load Input Power	<0.3W, 115/230 V _{IN} , no load (1001<0.5W)	

ENVIRONMENTAL SPECIFICATIONS

Cooling	Free air convection	
Ambient Operating	0° C to +70° C	
Temperature Range	Derating: see derating chart	
Ambient Storage Temp. Range	-40° C to +85° C	
Operating Relative Humidity Range	20-90% non-condensing	
Altitude	10,000 ft. ASL	Operating
	40,000 ft. ASL	Non-operating
Temperature Coefficient	0.02%/°C	
Vibration	2.5G swept sine, 7-2000Hz, 1 octave/min, 3 axis, 1 hour each.	
Shock	20G 11 ms, 3 axis, 3 each direction.	

GENERAL SPECIFICATIONS

Means of Protection		
Primary to Secondary	2MOPP (Means of Patient Protection)	
Primary to Ground	1MOPP (Means of Patient Protection)	
Secondary to Ground	Operational Insulation (Consult factory for 1MOOP or 1MOPP)	
Dielectric Strength ^(7,8)		
Reinforced Insulation	5656 VDC, primary to secondary, 1 sec.	
Basic Insulation	2545 VDC, primary to ground, 1 sec.	
Operational Insulation	707 VDC, secondary to ground, 1 sec.	

Leakage Current		
Earth Leakage	<300µA NC, <1000µA SFC	
Touch Current	<100µA NC, <500µA SFC	

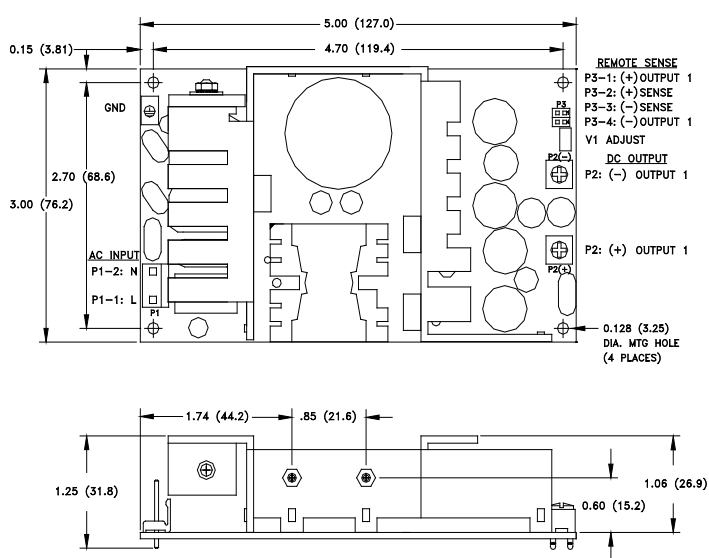
Switching Frequency	65 KHz	
Remote Sense	400 mV compensation of output cable losses	
Mean-Time Between Failures	>250,000 hours, MIL-HDBK-217F, 25° C, GB	
Weight	0.65 lbs. Open frame / 0.85 lbs. Chassis and cover	

ELECTROMAGNETIC COMPATIBILITY SPECIFICATIONS

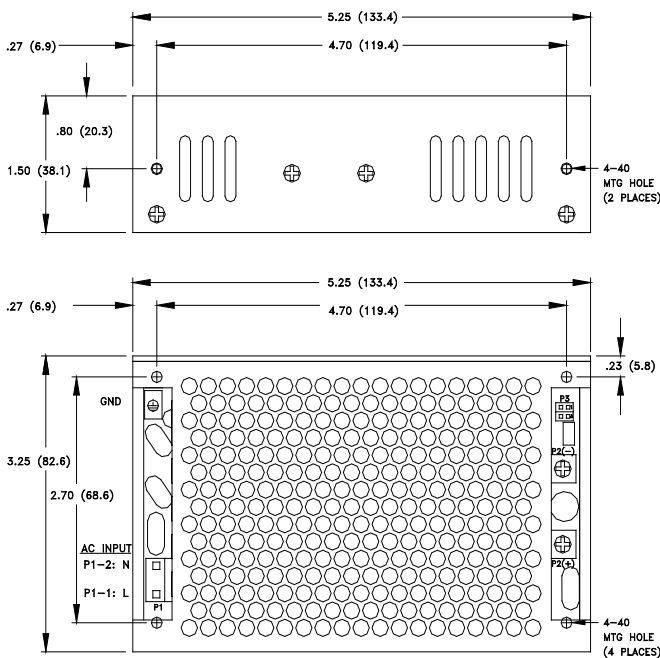
Electrostatic Discharge	EN 61000-4-2	± 6KV contact / ± 8KV air discharge
Radiated Electromagnetic Field	EN 61000-4-3	80-1000MHz, 1.0-2.7GHz 10V/m, 80% AM
EFT/Bursts	EN 61000-4-4	± 2KV
Surges	EN 61000-4-5	± 2KV line to earth / ± 1KV line to line
Conducted Immunity	EN 61000-4-6	.15 to 80MHz, 10V, 80% AM
Magnetic Field Immunity	EN 61000-4-8	30A/m, 50/60Hz.
Voltage Dips	EN 61000-4-11	95% dip, 10ms 30% dip, 100ms 60% reduction, 500ms (Criteria B)
Voltage Interruptions	EN 61000-4-11	95% reduction, 5sec.
Radiated Emissions	EN 55011/22,	Class B
	FCC Part 15	
Conducted Emissions	EN 55011/22,	Class B
	FCC Part 15	
Harmonic Current Emissions	EN 61000-3-2	Class A (<100W P _{IN})
Voltage Fluctuations and Flicker	EN 61000-3-3	Compliance

GRN-110 SINGLE MECHANICAL SPECIFICATIONS

OPEN FRAME

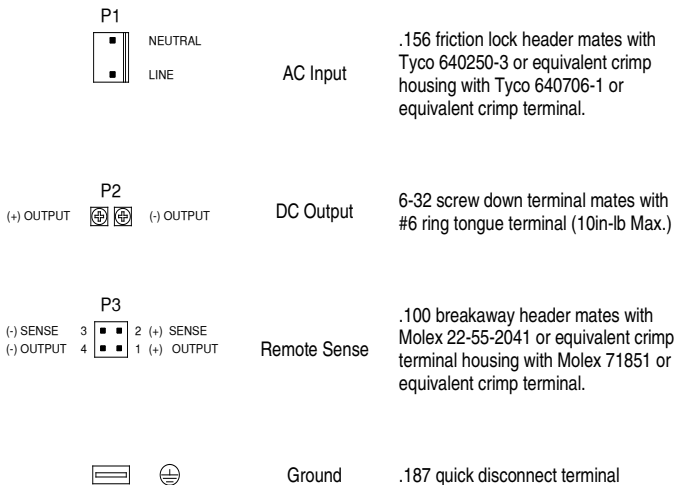


OPTIONAL CHASSIS/COVER



ALL DIMENSIONS IN INCHES (MM)

CONNECTOR SPECIFICATIONS

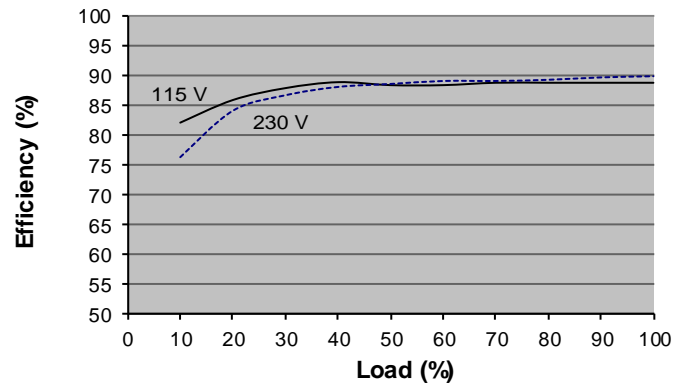


APPLICATIONS INFORMATION

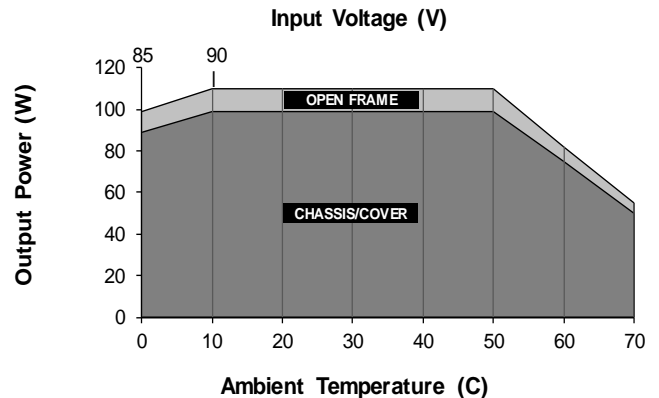
1. Continuous output power must not exceed 110W.
2. Sufficient area must be provided around power supply to allow natural movement of air to develop in convection cooled applications.
3. Generally, adequate cooling is provided when semiconductor case temperatures do not exceed 70° C rise and transformer temperature does not exceed 60° C rise at any specified ambient temperature.
4. This product is intended for use as a professionally installed component within information technology, industrial and medical equipment and is not intended for stand alone operation.
5. This product includes only one fuse in the input circuit. In consideration of clause 8.11.5 of IEC 60601-1-1:2005, a second fuse may be required in neutral conductor of the end product.
6. Peak to peak output ripple and noise is measured directly at the output terminals of the power supply, without the use of the probe ground lead or retractable tip, 20 MHz bandwidth.
7. This product was type tested and safety certified using the dielectric strength test voltages listed in Table 6 of IEC60601-1:2005. In consideration of clause 8.8.3, care must be taken to insure that the voltage applied to a reinforced insulation does not overstress different types and levels of insulation. Primary and secondary to ground capacitors may need to be disconnected prior to performing a dielectric strength type test on the power supply or the end product. It is highly recommended that the DC test voltage listed in DVB.1, annex DVB of UL60601-1 1ST Edition are not exceeded during a production-line dielectric strength test of the assembled end product. Please consult factory for further information.
8. This power supply has been safety approved and final tested using a DC dielectric strength test. Please consult factory before performing an AC dielectric strength test.
9. Maximum screw penetration into bottom chassis mounting holes is .100 inches.
10. Maximum screw penetration into side chassis mounting holes is .188 inches.
11. Common RF shielding precautions may need to be taken to assure emissions compliance. Refer to operating instructions for additional information.
12. To comply with emissions specifications, all four mounting hole pads must be electrically connected to a common metal chassis. Chassis/cover option is recommended.

TYPICAL EFFICIENCY VS. LOAD

(Model GRN-110-1004 Efficiency shown)



MAX P_{OUT} VS. AMBIENT TEMPERATURE/INPUT VOLTAGE



Derating requirements - Derate from 100% load at 50° C to 50% load at 70° C.
 - Derate from 100% load at 90 V_{IN} to 90% load at 85 V_{IN}.
 - Derate 10% with chassis and cover.