

MODEL NO. ENR0625A

This specification defines the performance characteristics of a single-phase (3-wire) 250 watt power supply with wide range input AC capability (100-240VAC/50-60Hz) under operation temperature 50 degree C. The power supply shall be designed for parallel operation. In the event of a power supply failure, the redundant power supply continues to power the system. The number of power supplies per system will be limited to a maximum of two. The power supply shall be designed for "hot swap" exchange and must contain the OR-ing isolation MOSFETs for all outputs.

1. Input Requirement

1.1 AC input requirements

The Power supply must be having a universal power input with active power correction to reduce the line harmonics in accordance with the EN61000-3-2 standard.

The power supply must be capable of operating with the following Conditions

Parameter	Min	Nom.		Max	Unit
V _{in}	90	100	240	264	VACrms
V _{in} Frequency	47	60	50	63	Hz
I _{in}		3.5	1.5		A

1.2 Power Factor

Power factor correction (PF)>0.9 at full load.

1.3 Inrush current regulation

When input power is applied to the power supply any initial current surge or spike of 10ms or less will not exceed 25A peak. Any additional inrush current surges or spikes in the form of AC cycles or multiple AC cycles greater than 10ms, Section

1.3.1. It is acceptable that AC line inrush current may reach up to 60A peak within 1 ms caused by capacitors of EMI filter.

1.3.2 Hot Inrush Current

Not applicable

Note: For any conditions during turn-on the inrush current will not open the primary input fuse or damage any other components.

1.4. Efficiency

The Power supply efficiency typical 80% at 230VAC/50Hz and full load without Fan.

2. Output Requirements

2.1 Output regulation Requirements

All outputs must maintain their regulation with the below limits when measured at the output connector point or across the remote sense(if applicable) in any load condition defined in Section 2.2

Parameter	Range	Min	Nom.	Max	Unit
+12VDC	±5%	+11.4	+12.0	+12.6	Volts
+5VSB	±5%	+4.75	+5.0	+5.25	Volts

AUDIT: _____ CHECK: _____ DESIGN: _____

2.2 Output Current Requirements

All outputs must maintain their regulation as per Section 2.1 when loaded to the following loading combination:

Parameter	Min	Nom.	Max	Peak	Unit
+12VDC	0.5	-	18	20	Amps
+5VSB	0	-	2	2.5	Amps

Notes:

The total output power can not exceed 250W continuously. During load changes from minimum to maximum or maximum to minimum the unit must not shut down.

2.3 Output Ripple and Noise

The following output ripple/noise requirements will be met throughout the load ranges specified in Section 2.2 and under all input voltage conditions specified in Section 1.1. Ripple and noise are defined as periodic or random signals over the frequency band of 10Hz to 20MHz.

Parameter	Ripple&Noise	Unit
+12VDC	120	mVp-p
+5VSB	50	mVp-p

Measurements will be made with an oscilloscope set to 20MHz bandwidth limit. The ripple voltage of the outputs shall be measured at the pins of the output connector when terminated in the load impedance specified in figure1. Ripple and noise are measured at the connectors with a 0.1uF ceramic capacitor and a 10uF electrolytic capacitor to simulate system loading.

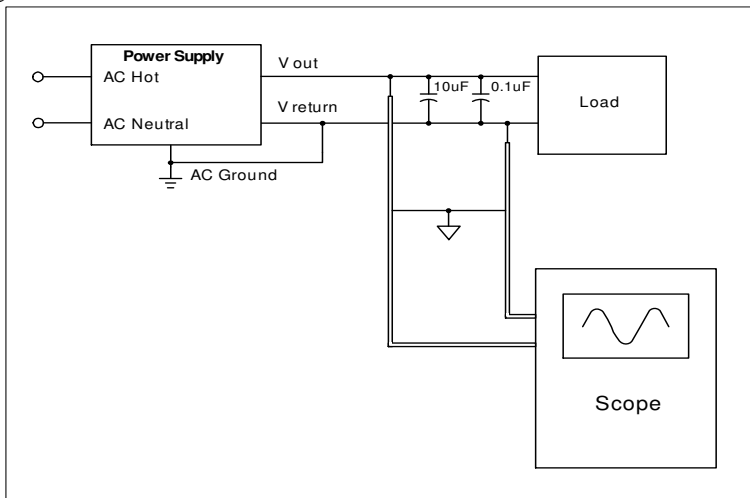


Figure 1. Ripple voltage test circuit

2.4 .Output Transient Response

The output voltages shall remain within the limits specified in Section 2.1 for the step loading. The load transient repetition rate shall be tested between 50 Hz and 5 kHz at duty cycles ranging from 10%-90%. The load transient repetition rate is only a test specification. The Δ step load may occur anywhere within the MIN load to the MAX load shown in Section 2.2

DC Output Transient Step Sizes

output	Step Load Size	Load Slew Rate	Capacitive Load
12VDC	65%of max load	0.5A/uS	2200uF
+5VSB	25%of max load	0.5A/uS	350uF

2.5.Capacitive Loading

The power supply shall be stable and meet all requirements, except dynamic loading requirements, with the following capacitive loading ranges.

Capacitive Loading Conditions

Output	Min	Max
12V	10	10000uF
+5VSB	1	350uF

2.6 Overshoot at Turn-on / Turn-off

The output voltage overshoot upon the application or removal of the input voltage, or the assertion/de-assertion of PS_ON#, under the conditions specified in Section1.0, shall be less than 10% above the nominal voltage. No voltage of opposite polarity shall be present on any output during turn-on or turn-off.

3. Protection Circuits

Protection circuits inside the power supply shall cause only the power supply's main outputs to shutdown. If the power supply latches off due to a protection circuit tripping, an AC cycle OFF for 10 seconds and a PSON# cycle HIGH for 1 second shall be able to reset the power supply.

3.1Over Current Protection

The power supply shall have current limit to prevent +12 V outputs from exceeding the values shown in following Table

Voltage	Over Current Limit(Iout limit)
+12V	110% minimum;150% maximum

3.2Over-power protection

The power supply will be shutdown and latch off when output power over 110% ~150% of rated DC output.

3.3 Over voltage protection

The power supply over voltage protection shall be locally sensed. The power supply shall shutdown and latch off or autorecovery after an over voltage condition occurs. The latch shall be cleared by toggling the PSON# signal or by an AC power interruption.

output	Minimum	Nominal	Maximum	Unit	NOTES
+12 VDC	13.3	14	14.5	Volts	latch-off
+5 VDC	5.7	6	6.5	Volts	Auto-recovery

3.4 Over Temperature Protection

The power supply will be protected against over temperature conditions caused by loss of fan cooling or excessive ambient temperature. In an OTP condition the PSU will shutdown. When the power supply temperature drops to within specified limits, the power supply shall restart power automatically. The OTP circuit must have built in hysteresis such have

a minimum of 4 °C of ambient temperature hysteresis.

3.5 Short circuit

An output short circuit is defined as any output impedance of less than 0.1 ohms. The power supply shall shut down and latch off for shorting the +12 VDC rails to return . Shorts between main output rails and +5VSB shall not cause any damage to the power supply. The power supply shall either shut down and latch off or fold back for shorting the negative rails.+5VSB must be capable of being shorted indefinitely, but when the short is removed,the power supply shall recover automatically or by cycling PS_ON#. The power supply shall be capable of withstanding a continuous short-circuit to the output without damage or overstress to the unit

4. Controls and Signal

4.1 Timing Requirements

Figure 2 is a reference for signal timing for main power connector signals and rails.

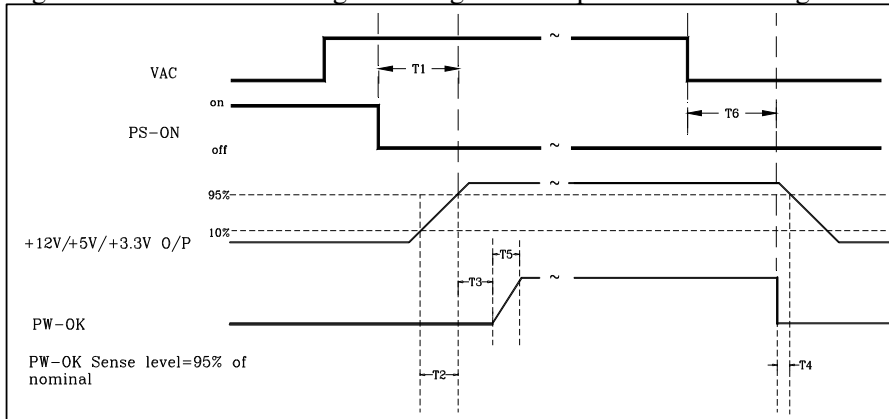


Figure 2. PS-OK Timing Sequence

- (1)T1:Power on delay time (5~400ms)
- (2)T2:Each main output voltage rise time (0.1ms~70ms)
- (3)T3: PW- OK signal turn on delay time (100ms~500ms)
- (4)T4: PW- OK signal turn off delay time (1ms min)
- (5)T5: PW- OK rise time (10ms max)
- (6)T6:Hold up delay time(17mS Min)

4.2 Remote on/off control

When the logic level "PS-ON" is low, the DC outputs are to be enabled.

When the logic level is high or open collector, the DC outputs are to be disabled.

4.3 LED Indicator

A green/red double color Light Emitting Diode (LED) shall be mounted as indicated in mechanical drawing and shall indicate the status of the DC GOOD signal with green color. The LED shall continue to glow under normal operation of the power supply. If this LED is blinking or not lit or in red color, the power supply is not operating properly.

5. Redundancy

5.1 Current Sharing Operation

The power supply shall be designed for active current sharing.

Two power supplies will be paralleled in a system. Each power supply must be able to share load to within +/- 25% share error measured 25% and share load to within +/- 10% share error measured 50, 100% of single power supply full load current.

5Vsb requires an "ORing" diode to provide protection against internal short circuit fault.

5.2 Output Isolation Oring MOSFET

The 12.2V output current must pass through an Oring MOSFET to protect the bus voltage against a power supply internal fault.

5.3 Power Supply Behavior When Faulted

1. The "DC Good" signal and "DC Good Fault" bit status shall be valid.
2. A power supply that fails due to a 12V or 5Vsb Over-Voltage condition will shutdown gracefully and will not cause shutdown of the other power supplies in parallel.

5.4 Parallel Stability

in parallel mode.

5.5 Hot Swap

The power supply must be designed with "hot swap" function with or without active AC line cord. Host existing working power supply shall not be affected by hot swapping power supply.

6.Environmental Requirements

6.1 Normal Operating Ambient(at sea level):

Temperature	0 to 50 °C
Relative Humidity	to 85%,on-condensing

6.2 Shipping and Storage

Temperature	-40 to 70 °C
Relative Humidity	to 95%,non-condensing

6.3 Altitude

Operating	10,000FT max.
Storage	50,000FT max.

6.4Mechanical Shock

The device will withstand the following imposed conditions without electrical or mechanical failure:

- Non-operating Square Wave Shock: 40G, Square wave at 200in/sec (508cm/sec); on all six sides
 Non-operating Half Sine Shock: Half Sine pulse for 70in/sec (178cm/sec) for 2ms; on all sides except top
 Operating Half Sine Shock: Half Sine pulse for 40in/sec (102cm/sec) for 2ms; on all sides except top

6.5 Vibration

Operating: Sinusoidal vibration, 0.5G (0-peak) acceleration. 3-500Hz, sweep at 1/2 octave/min from low to high frequency, and then from high to low. Thirty minute dwell at all resonant points, where resonance is defined as those exciting frequencies at which the device under test experiences excursions two times larger than non-resonant excursions. Plane of vibration to be along three mutually perpendicular axis.

Non-operating: Sinusoidal vibration, 1.0G (0-peak) acceleration. 3-500Hz, sweep at 1/2 octave/min from low to high frequency, and then from high to low. Thirty minute dwell at all resonant points, where resonance is defined as those exciting frequencies at which the device under test experiences excursions two times larger than non-resonant excursions.

7. SAFETY**7.1 Underwriters Laboratory (UL) recognition.**

The power supply designed to meet UL 60950.

8. ELECTROMAGNETIC COMPATIBILITY (EMC)**8.1 IEC 61000-4-2 ESD LEVEL X20KV4.****8.2 IEC 61000-4-3 radiated electrical field requirement.****8.3 IEC 61000-4-4 BURST.****8.4 IEC 61000-4-5 surge Voltages.****8.5 EN 61000-3-2 harmonic current emissions.**

If applicable to sales in Japan or Europe, the power supply shall meet the requirements of EN 61000-3-2 class D and the guidelines for the suppression of harmonics in appliances and general use equipment class D for harmonic line current content at full-rated power.

8.6 EN55022 class B radio interference (CISPR 22)**8.7 FCC part 15, subpart J class B 115VAC operation.****9. MTBF****9.1 MTBF (mean time between failures) calculation**

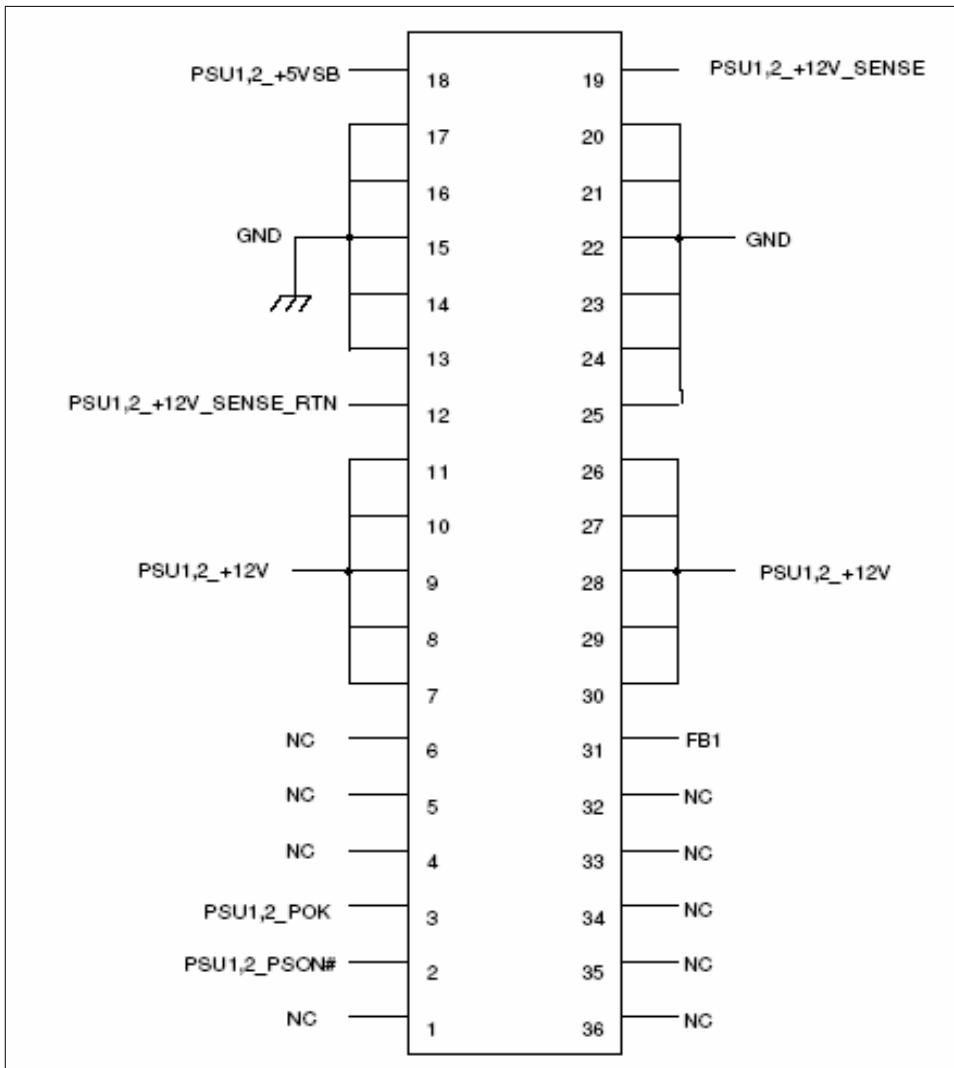
The demonstrated MTBF shall be 100,000 hours of continuous operation at 25°C, full load and 115V AC input. The MTBF of the power supply shall be calculated in accordance with MIL-HDBK-217F. The DC FAN is not included.

10. MECHANICAL REQUIREMENTS**10.1 Output Connector**

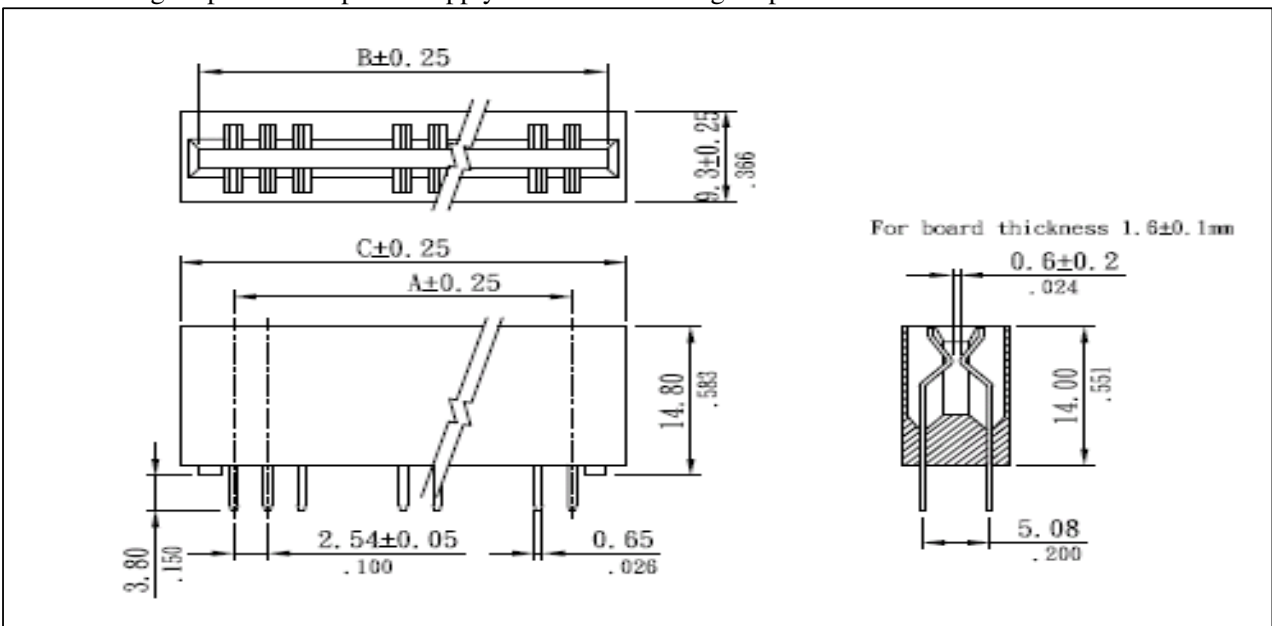
The power supply will provide a card edge connector compatible with the backplane. See power supply mechanical drawing for dimensions. The power supply connector is a 36 pins (18 pair) edge connection type .

PSU Interface, 36pins

Signal	Description	Current	Pins NO.
+5VSB	+5V Standby Power	2A	18
+5VSB_RTN	+5V Standby Power Return	2A	25
+12V	+12V Normal Power	18A	7,8,9,10,11, 26,27,28,29,30
+12V_RTN	+12V Normal Power Return	18A	13,14,15,16,17 20,21,22,23,24
PS_ON#	Remote ON/OFF Control	-	2
POK	Power Good	-	3
GND	Digital Ground	-	4,33
+12V_Sense	+12V Voltage Remote Sense	-	19
+12V_Sense_RTN	+12V Voltage Remote Sense Return	-	12
FAN_Voltage	FAN Voltage	-	6
FAN_Speed	FAN Speed	-	5
Temperature	PSU Temperature	-	34,35
+5VSB sense	+5VSB sense		36
Present#	PSU Present Indication	-	1



Note: The signal pins on the power supply connector will be gold plated to 30 microns.



10.2 Outside Mechanical Drawing

