ECM4000-28F-AC

Product Overview

The Edge-Core is ECM4000-28F-AC is a 135 **Watts Telecom PSU, Wide Range**, Power factor corrected, single +12v output operating at –40degC to 65degC ambient temperature.

Safety and Compliance Requirements

CB IEC60950-1

CE mark (LVD)

Conducted Emission

EN55022, CISPR22 and FCC Part 15 Subpart B Class B.

GR-1089-CORE Section 3.2.3--Conducted Emission, AC Power Leads--Voltage, 450 kHz to 30 MHz

GR-1089-CORE Section 3.2.4--Conducted Emission, AC & DC Power & Signal Leads-Current, 10 kHz to 30 MHz

GR-1089-CORE Section 3.2.5--Conducted Emission, Analog Voice band Leads, 8 kHz to 6 MHz

Radiated EMI

EN55022, CISPR22, and FCC Part 15 Subpart B Class B.

Electromagnetic Compatibility/Input Transients

EN61000-3-2 Harmonics

EN61000-3-3 Voltage fluctuations

EN61000-4-2 ESD: +/-15KV air, +/-12kV contact discharge criteria C 10KV discharge by air & 6KV discharge by contact , Criteria A.

EN61000-4-3 Radiated Immunity: 80 – 1000 MHz, 10V/m, AM 80% (1KHz), 900MHz, 10V/M, PM 100% (200Hz), Criteria A

EN61000-4-4 Fast Transient:

2KV for AC power port

1.0 KV for DC power, I/O and signal ports, performance Criteria B.

EN61000-4-5 Surges: 3KV common mode and 1.5KV L-N for AC power ports.

GR-1089-CORE Section 4.5.9--Intrabuilding Lightning

EN61000-4-6 Low frequency conducted immunity

GR-1089-CORE Section 3.3.3--Conducted Immunity, AC & DC Power & Signal Leads, 10 kHz to 30 MHz

EN61000-4-11 Voltage Dips and Interruptions

EN55024:1998 – Information Technology Equipment – Immunity Characteristics, Limits and Method of Measurement

Performance Criterion:

The EUT shall continue to operate as intended during the test.

The EUT shall self-recover to nominal performance mode after the test.

The EUT shall not suffer permanent damage after the test; the user may perform a power cycle to recover the EUT.

Isolation Requirement

A minimum of 3000VAC / 4242VDC isolation is required from primary to secondary and

1500VAC / 2121VDC from primary to chassis ground. To give some margin at system level, design for 2250VDC isolation. All primary components (Y caps, etc.) that terminate to earth ground shall do so through chassis ground.

Dielectric Test / Hipot Test and Ground Continuity Fault Test

Tests below must be conducted 100% on all production units required by Production Line Testing for TUV – Licensed Products per IEC950 / 1986 / EN60950 latest standard.

Dielectric/Hi-pot Test:

From primary and neutral to safety earth ground:

1500Vac 50 or 60Hz for 1 minute (production line test may be reduced to 1 second) or

2121Vdc for 1 minute (production line test may be reduced to 1 second)

Note: Hi-pot voltage rise up time is 10S.

30 Ampere ground continuity fault test

The test voltage shall not exceed 12V and may be either ac or dc. The test current shall be 30A.

ECM4000-28F-AC Product Specifications

Features

Environmental Requirements

Operating Temperature:-40 to +65 ° C; Airflow

Storage Temperature:-50 to +85 ° C

Operating Relative Humidity:90% non-condensing

Storage Relative Humidity:95% non-condensing

Operating Altitude: Up to 10,000 feet above sea level.

Storage Altitude: Up to 15,000 feet above sea level

Cooling: For proper operation, the system must provide airflow of not less than NLT 1.2m/s to the PSU at worst case condition.

Electrical Input Requirements

Input Voltage 85 to 264 VAC. The supply is wide range-universal input design and require no switches or jumpers for input voltage selection.

Nomimal Input voltage:

100 - 240Vac 50/60Hz

Input Frequency Range 47 to 63 Hz, single phase AC.

Power Factor Correction:

Harmonic line currents meet IEC 1000-3-2 from 110VAC and 230VAC with full load condition. PF > 0.9 .

Input Current

2A @ 90Vac

1A @ 180Vac.

Inrush Current

At cold start condition, inrush current will not exceed below peak currents criteria

70A peak maximum at 220Vac

30A peak maximum at 100Vac

Leakage Current

0.35mA maximum at 250vac input voltage.

ON/OFF Power Switch

The ON/OFF switch is used in the module to turn on/off the power. The switch is installed in the PSU front panel.

Input Fusing

The AC input line is protected by one internal, fuse in the HOT Line.

Efficiency

75% minimum efficiency at full rated output power

Input Connector

AC input connector is standard IEC320 C14 male connector located at the front panel of the PSU.

Electrical Output Requirements

Output Voltage and Current

The power supply output will remain within regulation at any line condition specified on section 4.1 and any load condition within the minimum and maximum range specified below.

Table 1

Output	Nominal Output Voltage Set Point	Combined Line Regulation/load regulation	Minimum Current	Maximum Current	Output Ripple P/P
12.0V	12.0Vdc +/-2%	+3% -3%	0 A	11.25A	120mV*

***Note 1: Ripple & Noise test : Use 20 M Hz band width frequency oscilloscope.**

***Note 2: Add 0.1uF / 47uF capacitors at output connector terminal for Ripple & Noise test.**

Load Transient Deviation and Response

Output stay within static regulation requirement when subjected to below dynamic loading condition

Load step on +12 output

Load step 1: 0.36A to 5.63A Load step 2: 5.63A to 11.25A

Slew rate 0.05A/uS, 100Hz & 1KHz 50% Duty.

Output Rise Time

The 12V output is within its error band 5 seconds after application of 120Vac and under any conditions defined

The Output rise is monotonic and less than 50ms at any condition defined. Rise time is defined, as the time requires changing from 5% to 90% of the rated output.

Redundancy/Hot swapping/Current Sharing

The power supply meets all items in this specification while operating in a parallel redundant configuration.

The power supply contains single wire forced current share circuitry on the 12VDC output.

It operates in parallel with second power supply with 50/50 +/-10% load sharing. This power supply is hot pluggable with hot swap function.

An Oring diode or Oring MOSFET is used to isolate and protect the good PSU from faulty PSU.

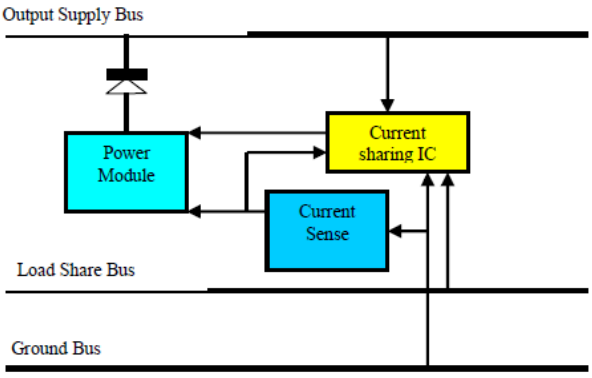

Figure 1. Current sharing

Features

Turn On Delay

The main output reaches its regulation limit within 5 seconds after application of AC power. PSU was tested at 115Vac input power.

Hold-Up Time

The output remain within regulation for a minimum of 20 milliseconds from a complete line loss, occurring at any point in the line cycle, at the maximum rated output loading.

Over Current Protection

The current of output may not be over 115% (150% MAX) of the specified max and it can be protected with active monitoring and protection. The OCP set up will be 12.9A to 16.8A. If the current protection triggers, the module will shut down and run under hiccup mode. Upon removal of over current, the PSU will automatically resume.

Continuous overload without hitting OCP may damage the PSU but will not cause safety hazard.

Short Circuit Protection

Shorting of the output of the power supply to ground or any other output will not result in permanent damage to the supply.

The output will auto-recover when short circuit is removed.

Over Voltage Protection

The power supply will provide latch mode during over voltage protection as defined in the following table.

The input power must be recycled to reset the PSU after the fault is removed.

	Over Voltage	
Output Level	Minimum	Maximum
+12V	**14.0V**	16.0V

Over Temperature

The power supply will internally protected against over temperature conditions to prevent the power supply from overheating and causing a safety hazard or damage to the power supply unit.

When the OT circuit is activated, the power supply will latch-off until it is the AC main is removed.

Line Transient Deviation and Response

The maximum transient amplitude on 12V output is less than 3% of the nominal output voltage following an input line step of +/-15% of nominal line voltage.

No Load operation

Under no load operation, the PSU need not operate to specification but must not sustain damaged.

The output voltage must stay below the max tolerance and may not trigger OVP.

Set-Point Adjustment

The PSU to be shipped will have an output voltage adjusted to the set-point shown in Table 1 at 50% load at 120Vac input voltage.

Dying Gasp Signal Hold-Up Time

The dying gasp signal will give a warning to the system at least 5ms minimum before the output goes out of regulation limits from a complete line loss, occurring at any point in the line cycle, the system loading conditions are:

1, Minimum load 3A/12V, FULL LOAD 5A/12V

2, Minimum load 3.5A/12V, FULL LOAD 5.5A/12V 3, minimum load 4A/12V, FULL LOAD 6.5A/12V

This will give the system enough time to send a broadcast packet to all the ports that the system is losing power.

Controls Signals

Present Pin

Connects to +12V through a 10K resistor, active high. Refer to Fig. 2.

Present Pin is active high signal

This signal is consider active if its voltage level is >9.6V

Board ID Pin

ID0: connects to GND through 10K resistor:

ID1: Connects to +12V after Oring diode/MOSFET through 10Kohm resistor. Refer to Fig. 2.

Dying Gasp Signal

When the power supply looses input AC power, the system needs a warning (through dying gasp signal) , at least 5 msec before the 12V output goes out of regulation limits so that the system can send a broadcast packet to all the ports warning that system is loosing the power.

This signal is considered active HIGH, if it's voltage level is >6V

This signal is considered active LOW, if it's voltage level is <6V

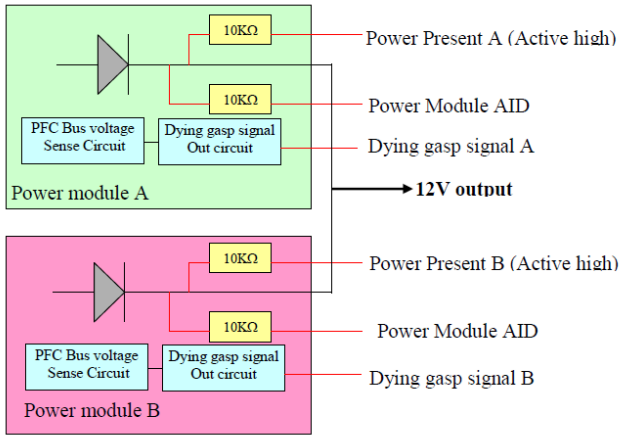

Figure 2. PSU Signal connection

Features

Load Share Bus/Current Sharing Pin

This pin will allow load sharing between two power supplies installed in the system. The Power supply shall operate within specification if this pin is left floating.

Mechanical

The 135Watts power supply PCBA overall outside dimension is 188mm*73mm*25.85mm (L x W x H).

The limited height of components on topside is 21.25mm as well as 3.0mm on solder side (without Nylon Rivet

The ON/OFF Switch and AC Inlet Receptacle are fixed in front panel. The power supply will have proper insulation and metal cover to prevent access to safety hazard voltages when AC is plugged to PSU.

Output Connector

This PSU uses AMP Board Mount Connectors 6450160-3 for output connector.

Shock/Vibration

The PSU meets the following shock and vibration requirements per system.

Office Vibration GR-63-CORE

PSU is subjected to a swept sine survey at acceleration amplitude of 1g from 5 to 100 Hz and back to 5 Hz at a rate of 0.25 Octaves/min.

Transportation Vibration GR-63-CORE .

UUT shall be subjected to vibration once along each of three mutually perpendicular axes. Subject the package to a single sweep as indicated on figure below.

Shock (non-operating)

Shock test condition is referenced to IEC68-2-27 The test condition is selected as typical of : Acceleration : 30g

Pulse : Halfsine Duration : minimum 6ms

Directions : all 6 faces, 3 times in each positive and negative directions.

Shock (operating)

The test condition is selected as typical of : Acceleration : 4g

Pulse : Halfsine

Duration : minimum 22ms

Directions : all 6 faces, 3 times in each positive & negative directions.

Reliability and Quality

MTBF

CMTBF

Bellcore Method 1 Option "Case 1" is a black box option with the assumed operating temp and electrical stress of 40 deg C/50%.

Lab and field data based on previous product performance and failure rates will also be applied to Bellcore

Standard TR332, Issue 6 (Telcordia Standard SR332 Issue 1 or 2) Method 2 and

3.Calculations using Mil Standard 217 are unacceptable

E-cap Life

Use E-cap (Electrolytic capacitors) load life > 5000 hrs,

Minimum E-cap life is 40Khours measured at nominal line, full load, and 25 deg C ambient temperature.

RoHS Compliant, Lead-Free Requirements;

Definition

This PSU meet the generally accepted RoHS specification, ROHS 6/6. Compliance with this specification shall include all of the components, parts, assemblies and packaging of this product. Restricted Materials cannot be contained in the product or used in the manufacturing of this product or its components above the designated thresholds.

China RoHS

This PSU shall meet China RoHS requirement and applicable marking must be placed in the PSU model label.

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