

## GP100H3R48TEZ Global Platform Line High Efficiency Rectifier

3 $\Phi$ -380/480V<sub>AC</sub> Input; Default Output: 525V<sub>dc</sub>@ 6000W – GP interface



**RoHS Compliant**

### Applications

- 48V<sub>DC</sub> distributed power architectures
- Routers/ VoIP/Soft and other Telecom Switches
- LAN/WAN/MAN applications
- File servers, Enterprise Networks, Indoor wireless
- SAN/NAS/iSCSI applications

### Features

- Efficiency 96.5% typical, exceeds 80plus Titanium levels
- Compact 1RU form factor with 30 W/in<sup>3</sup> density
- Constant power from 48 – 58V<sub>DC</sub>
- 6000W from nominal 3 $\Phi$ -380/480V<sub>AC</sub>
- Isolated RS485 based serial bus
- Power factor correction (meets EN/IEC 61000-3-2 and EN 60555-2 requirements)
- Output overvoltage and overload protection
- AC Input overvoltage and undervoltage protection
- Over-temperature warning and protection
- Redundant, parallel operation with active load sharing
- Internally controlled Variable-speed fan
- Hot insertion/removal (hot plug)
- Three front panel LED indicators
- EN/IEC/UL/CSA C22.2 60950-1 2nd edition +A1
- CE mark<sup>§</sup>
- Meets FCC part 15, EN55022 Class A standards
- Meets EN61000 immunity and transient standards
- Shock & vibration: Meets IPC 9592 Class II standards

### Description

The GP100H3R48TE series of rectifiers provide significant efficiency improvements in the Global Platform of Power supplies. High-density front-to-back airflow is designed for minimal space utilization and is highly expandable for future growth. The 3 $\Phi$  - 380/480V<sub>rms</sub> input product is designed to be deployed internationally. It is configured with an isolated RS485 compliant communications bus that allows it to be used in a broad range of applications. Feature set flexibility makes these rectifiers an excellent choice for applications requiring modular, very-high-efficiency AC to - 52V<sub>DC</sub> intermediate voltages, such as in distributed power.

\* UL is a registered trademark of Underwriters Laboratories, Inc.

† CSA is a registered trademark of Canadian Standards Association.

§ This product is intended for integration into end-user equipment. All CE marking procedures of end-user equipment should be followed. (The CE mark is placed on selected products.)

\*\* ISO is a registered trademark of the International Organization of Standards

## GP100H3R48TE Global Platform Line High Efficiency Rectifier

3 $\Phi$ -380/480V<sub>AC</sub> input; Default Output:  $\pm$ 52/48V<sub>DC</sub> @ 6000W

### Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only, functional operation of the device is not implied at these or any other conditions in excess of those given in the operations sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect the device reliability.

| Parameter   | Symbol           | Min | Max  | Unit            |
|---|------------------|-----|------|-----------------|
| Input Voltage: Continuous                                   | V <sub>IN</sub>  | 0   | 600  | V <sub>AC</sub> |
| Operating Ambient Temperature <sup>1</sup>                  | T <sub>A</sub>   | -10 | 75   | °C              |
| Storage Temperature   | T <sub>stg</sub> | -40 | 85   | °C              |
| I/O Isolation voltage to Frame (100% factory Hi-Pot tested) |                  |     | 2087 | V <sub>AC</sub> |

### Electrical Specifications

Unless otherwise indicated, specifications apply over all operating input voltage, V<sub>o</sub>=52V<sub>DC</sub>, resistive load, and temperature conditions. To meet measurement accuracy a warm up time of 1hr may be required.

| INPUT  |   |                 |           |      |                 |       |
|--|---|-----------------|-----------|------|-----------------|-------|
| Parameter  | Symbol  | Min             | Typ       | Max  | Unit            |       |
| Operating Voltage Range (3 $\Phi$ delta with safety frame ground)  | V <sub>IN</sub>                                       | 320             | 380/480   | 530  | V <sub>AC</sub> |       |
| Low voltage  | Turn-OFF<br>Turn-ON<br>Hysteresis                     | V <sub>IN</sub> | (300)     |      |                 | 320   |
|  |   |                 | (315)     |      |                 | 330   |
|  |   |                 | 5         |      |                 |       |
| High voltage   | Turn-OFF<br>Turn-ON<br>Hysteresis                     | V <sub>IN</sub> | 530       |      |                 | (550) |
|  |   |                 | 520       |      |                 | (540) |
|  |   |                 | 5         |      |                 |       |
| Input voltage phase unbalance  | V <sub>IN</sub>                                       | -15             |           | 10   | %               |       |
| Frequency  | F <sub>IN</sub>                                       | 47              |           | 63   | Hz              |       |
| Operating Current (3 $\Phi$ - all phases operational)  | I <sub>IN</sub>                                       |                 |           | 15   | A <sub>AC</sub> |       |
| Input current phase unbalance [load > 50% of FL]   |   |                 |           | 1    | %               |       |
| Inrush Transient<br>(per $\Phi$ at 480V <sub>RMS</sub> , 25°C, excluding X-Capacitor charging)                           | I <sub>IN</sub>                                       |                 | 25        | 30   | A <sub>PK</sub> |       |
| Source Impedance<br>(NEC allows 2.5% of source voltage drop inside a building)   |   | 0.20            | 0.25      |      | $\Omega$        |       |
| Idle Power<br>(at 480V <sub>AC</sub> , 25°C)   | Main output OFF<br>Main output ON @ I <sub>o</sub> =0 | P <sub>IN</sub> | 15        |      | W               |       |
|  |   |                 | 25        |      |                 |       |
| Leakage Current (per $\Phi$ , 530V <sub>AC</sub> , 60Hz)   | I <sub>IN</sub>                                       |                 | 2.5       | 3.5  | mA              |       |
| Power Factor (50 – 100% load)  | PF  | 0.96            | 0.995     |      |                 |       |
| Efficiency (380/480V <sub>AC</sub><br>@ 25°C)  |   | $\eta$          | 10% load  | 91   | %               |       |
|  |   |                 | 20% load  | 94   |                 |       |
|  |   |                 | 50% load  | 96.5 |                 |       |
|  |   |                 | 100% load | 96   |                 |       |
| Holdup time<br>(V <sub>in</sub> = 320V <sub>rms</sub> , V <sub>out</sub> $\geq$ 42V <sub>DC</sub> , constant power load) | T   | 10              | 12        |      | ms              |       |
| Ride through (at 480V <sub>AC</sub> , 25°C, constant power load)   | T   | 1/2             | 1         |      | cycle           |       |
| Isolation (per EN60950)  | Input – Output<br>Input-Chassis/Signals               | V               | 3000      |      | V <sub>AC</sub> |       |
|  |   |                 | 2000      |      | V <sub>AC</sub> |       |

<sup>1</sup> See the derating guidelines under the Environmental Specifications section

# GP100H3R48TE Global Platform Line High Efficiency Rectifier

3Φ-380/480V<sub>AC</sub> input; Default Output: ±52/48V<sub>DC</sub> @ 6000W

## Electrical Specifications (continued)

| 52V <sub>DC</sub> MAIN OUTPUT  |  |             |               |                   |   |
|--|--|-------------|---------------|-------------------|---|
| Parameter  | Symbol   | Min         | Typ           | Max               | Unit  |
| Output Power ( 320 – 530V <sub>AC</sub> – 3Φ, T <sub>AMB</sub> = 0 – 45°C )  | W  | 6000        |               |                   | W <sub>DC</sub>   |
| GP100H3R48TEZ<br>Factory set default set point V <sub>IN</sub> = 480V, I = 10% FL, 25°C<br>Nominal set point (droop regulation; max-no load, min-full load)  | V <sub>OUT</sub>   | -50         | 52            | 450               | V <sub>DC</sub><br>mV <sub>DC</sub>                         |
| GP100H3R48TEZ-IN<br>Factory set default set point V <sub>IN</sub> = 480V, I = 10% FL, 25°C<br>Nominal set point (droop regulation; max-no load, min-full load)   |  | -50         | 48            | 450               | V <sub>DC</sub><br>mV <sub>DC</sub>                         |
| Overall regulation (load, temperature, aging) 0 – 45°C LOAD > 2.5A<br>T <sub>AMB</sub> > 45°C  |  | -0.5<br>-2  |               | +0.5<br>+2        | %<br>%  |
| Output Current (T <sub>AMB</sub> = 45°C)<br>V <sub>OUT</sub> = 52V <sub>DC</sub><br>V <sub>OUT</sub> = 48V <sub>DC</sub>   | I <sub>OUT</sub>   | 1<br>1      |               | 115<br>125        | A <sub>DC</sub>   |
| Current Share ( > 50% FL) remotely controlled I <sub>SHARE</sub> is employed<br>Max units parallelable remotely controlled   |  | -2          |               | 2<br>100          | %FL<br>units  |
| Output Ripple ( 20MHz bandwidth, load > 10%FL)<br>Load < 10%FL<br>RMS (5Hz to 20MHz)<br>Peak-to-Peak (5Hz to 20MHz)  | V <sub>OUT</sub>   |             |               | 100<br>250<br>400 | mV <sub>rms</sub><br>mV <sub>p-p</sub><br>mV <sub>p-p</sub> |
| Voice Band Output Noise<br>With 880Ahr battery in system<br>Without battery<br>Psophometric Noise  | V <sub>OUT</sub>   |             |               | 45                | dBrnC   |
|  |  |             |               | 55                |   |
|  |  |             |               |                   | 2 <sup>2</sup>  |
| External Bulk Load Capacitance   | C <sub>OUT</sub>   | 0           |               | 1,700             | μF/A  |
| Turn-On (monotonic turn-ON from 30 – 100% of V <sub>nom</sub> , above -5°C <sup>3</sup> )<br>Delay<br>Rise Time – RS-485 mode  | T  |             | 5             |                   | s   |
| 55A (50% load )  |  | 2.5         |               |                   | s   |
| 83A (75% load)   |  | 5           |               |                   |   |
| 100A (90% load)  |  | 8           |               |                   |   |
| Output Overshoot   | V <sub>OUT</sub>   |             |               | 2                 | %   |
| Load Step Response<br>ΔI [V <sub>IN</sub> = 380/480V <sub>AC</sub> , 25°C, load step 20% ↔ 80%, di/dt = 1A/μs ]<br>ΔV, ( 380/480 V <sub>AC</sub> , 25°C)<br>Settling Time to normal regulation   | I <sub>OUT</sub><br>V <sub>OUT</sub><br>T                  |             |               | 60<br>5<br>2      | %FL<br>%<br>ms  |
| Overload <sup>4</sup> - Power limit when V <sub>OUT</sub> ≥ 48V <sub>DC</sub><br>recoverable current limit when 40V <sub>DC</sub> < V <sub>OUT</sub> < 48V <sub>DC</sub><br>Output shutdown (one retry after a 2 – 10 second delay)<br>Short circuit protection<br>System power up | P <sub>OUT</sub><br>I <sub>OUT</sub><br>V <sub>OUT</sub>   | 6050<br>110 |               | 120<br>36         | W <sub>DC</sub><br>%FL<br>V <sub>DC</sub>                   |
| No damage<br>Upon startup, delay overload shutdown for 20 seconds to allow the insertion and startup of multiple modules within a system.  |  |             |               |                   |   |
| Overvoltage<br>200ms delayed shutdown (default)<br>Immediate shutdown<br>Programmable range<br>Latched shutdown<br>Restart delay   | V <sub>OUT</sub>   | 59          | 59.5          | 60                | V <sub>DC</sub>   |
|  |  | > 65        |               |                   |   |
|  |  | 44          |               | 59.5              |   |
| If 3 restart attempted within a 30 sec window unit latches OFF   |  |             |               |                   |   |
| Over-temperature warning (prior to commencement of shutdown)<br>Shutdown (below the max device rating being protected)<br>Restart attempt Hysteresis (below shutdown level)  | T  |             | 5<br>20<br>10 |                   | °C  |
| Isolation Output-Chassis   | V  | 500         |               |                   | V <sub>DC</sub>   |
| Restart/Reset conditions   | Loss of input > 100ms or Output OFF followed by ON command |             |               |                   |   |

<sup>2</sup> Complies with ANSI TI.523-2001 section 4.9.2 emissions max limit of 20mV flat unweighted wideband noise limits

<sup>3</sup> Below -5°C, the rise time is approximately 5 minutes to protect the bulk capacitors.

<sup>4</sup> Overload retries must incorporate normal soft-start turn-ON.

# GP100H3R48TE Global Platform Line High Efficiency Rectifier

3 $\Phi$ -380/480V<sub>AC</sub> input; Default Output:  $\pm$ 52/48V<sub>DC</sub> @ 6000W

## General Specifications

| Parameter        | Min   | Typ                | Max | Units | Notes  |
|------------------|---|--------------------|-----|-------|--|
| Reliability      | Calculated  | 560,000<br>190,000 |     | Hours | Full load, 25°C ;<br>Full load, 55°C ; - MTBF per Telecordia SR232 Reliability protection for electronic equipment, issue 3, method I, case III, |
| Service Life     |   | 10                 |     | Years | 80% load, 35°C ambient, excluding fans   |
| Unpacked Weight  |   | 4.3/9.5            |     | kg/lb |  |
| Packed Weight    |   | 4.9/10.8           |     | kg/lb |  |
| Heat Dissipation | 200 Watts or 682 BTUs @ 80% load, 250 Watts or 853 BTUs @ 100% load |                    |     |       |  |

## Signal Specifications

Unless otherwise indicated, specifications apply over all operating input voltage, resistive load, and temperature conditions. Signals are referenced to Logic\_GND unless noted otherwise. See the Signal Definitions table for additional information.

| Parameter  | Symbol | Min | Typ | Max | Unit            |
|--|--------|-----|-----|-----|-----------------|
| <b>Interlock</b> [Connected externally, referenced to Vout ( - )]<br>Normal operation  | V      | 0   |     | 3.3 | V <sub>DC</sub> |
| <b>Interlock2</b> [Connected externally to Logic_GND]<br>Normal operation  | V      | —   |     | 0.4 | V <sub>DC</sub> |
| <b>Module Present</b> [Internally shorted to Logic_GND]<br>Normal operation  | V      | —   |     | 0.4 | V <sub>DC</sub> |
| <b>8V_INT</b> (no components should be connected to this pin)<br>Interconnected between power supplies to back-bias the internal secondary processor |        |     |     |     |                 |

## Digital Interface Specifications

| Parameter   | Conditions  | Symbol                | Min               | Typ | Max               | Unit                       |
|---|---|-----------------------|-------------------|-----|-------------------|----------------------------|
| RS485 Isolation from the main output                        |   |                       |                   |     | 60                | V <sub>DC</sub>            |
| Standard measurement parameters                             | Update frequency<br>Report delay after 25% step<br>Report delay to accuracy |                       |                   |     | 1<br>2<br>10      | Hz<br>sec<br>sec           |
| I <sub>OUT</sub> measurement range                          |   | I <sub>MR</sub>       | 0                 |     | 130               | A <sub>DC</sub>            |
| I <sub>OUT</sub> measurement accuracy 25°C                  | > 25A<br>< 25A  | I <sub>OUT(ACC)</sub> | -1<br>2.5         |     | +1<br>2.5         | % of FL<br>A <sub>DC</sub> |
| V <sub>OUT</sub> measurement range                          |   | V <sub>OUT(MR)</sub>  | 0                 |     | 70                | V <sub>DC</sub>            |
| V <sub>OUT</sub> measurement accuracy <sup>5</sup>          |   | V <sub>OUT(ACC)</sub> | -1                |     | +1                | %                          |
| P <sub>OUT</sub> measurement range                          |   | P <sub>OUT(MR)</sub>  | 0                 |     | 6100              | W <sub>DC</sub>            |
| P <sub>OUT</sub> measurement accuracy                       | 30°C<br>-5°C – 55°C   | P <sub>OUT(ACC)</sub> | -30<br>TBD        |     | 30<br>TBD         | W <sub>DC</sub>            |
| Temp measurement range                                      |   | Temp <sub>(RMG)</sub> | 0                 |     | 150               | °C                         |
| Temp measurement accuracy <sup>6</sup>                      |   | Temp <sub>(ACC)</sub> | -5                |     | +5                | %                          |
| V <sub>IN</sub> measurement range, each phase               |   | V <sub>IN(RMG)</sub>  | 0                 |     | 600               | V <sub>AC</sub>            |
| V <sub>IN</sub> measurement accuracy                        |   | V <sub>IN(ACC)</sub>  | -1.5              |     | +1.5              | %                          |
| I <sub>IN</sub> measurement range, each phase               |   | I <sub>IN(MR)</sub>   | 0                 |     | 20                | A <sub>DC</sub>            |
| I <sub>IN</sub> measurement accuracy                        |   | I <sub>IN(ACC)</sub>  | -0.5              |     | 0.5               | % of FL                    |
| P <sub>IN</sub> measurement range, computed 3 $\Phi$ result |   | P <sub>IN(rng)</sub>  | 0                 |     | 6750              | W <sub>in</sub>            |
| P <sub>IN</sub> measurement accuracy                        | > 500W<br>100 – 500W<br>< 100W  | P <sub>in(acc)</sub>  | -1.5<br>2.5<br>30 |     | +1.5<br>2.5<br>30 | %<br>%<br>W                |

<sup>5</sup> Above 2.5A of load current

<sup>6</sup> Temperature accuracy reduces non-linearly with decreasing temperature

# GP100H3R48TE Global Platform Line High Efficiency Rectifier

3Φ-380/480V<sub>AC</sub> input; Default Output: ±52/48V<sub>DC</sub> @ 6000W

## Environmental Specifications

| Parameter                       | Min                  | Typ  | Max       | Units                  | Notes  |
|---------------------------------|----------------------|--|-----------|------------------------|--|
| Ambient Temperature             | -5 <sup>7</sup>      |  | 55        | °C                     | Air inlet from sea level to 5,000 feet.                  |
| Storage Temperature             | -40                  |  | 85        | °C                     |  |
| Operating Altitude              |                      |  | 1524/5000 | m / ft                 |  |
| Non-operating Altitude          |                      |  | 8200/30k  | m / ft                 |  |
| Power Derating with Temperature |                      |  | 2.0       | %/°C                   | 55°C to 75°C <sup>8</sup>                                |
| Power Derating with Altitude    |                      |  | 2.0       | °C/305 m<br>°C/1000 ft | Above 1524/5000 m/ft; 3962/13000 m/ft max                |
| Humidity                        | Operating<br>Storage | 5<br>5   | 95<br>95  | %<br>%                 | Relative humidity, non-condensing                        |
| Shock and Vibration             | Operational          | Meets IPC 9592 Class II, Section 5 and GR-63_CORE requirements |           |                        |  |
|                                 | Packaged             | 0.02<br>0.01<br>0.005  |           | g <sup>2</sup> /Hz     | Modified IASTM-D-4728-91<br>8-hour duration on each axis |
| Acoustic Noise                  |                      | 55   | 58        | dBa                    |  |
| Earthquake Rating               |                      | 4  |           | Zone                   | Meet GR-63_CORE requirements                             |
| Insulation Resistance           |                      |  |           |                        |  |

## EMC [Surges and sags applied one Φ at a time and all 3Φ's simultaneously; phase angles 0, 90, 270°

| Parameter          | Function  | Standard   | Level                                  | Criteria                                  | Test                        |
|--------------------|---|--|--|---|-----------------------------|
| AC input           | Conducted emissions   | EN55022, FCC part 15<br>EN61000-3-2<br>Telcordia GR1089-CORE   | A – 6dB margin                         |   | 0.15 – 30MHz<br>0 – 2 KHz   |
|                    | Radiated emissions  | EN55022  | A – 6dB margin                         |   | 30 – 10000MHz               |
| AC Input Immunity  | Line surge  |  | 3 x V <sub>NOM</sub> 480V              | B   | 1 Φ only or all 3Φ          |
|                    | Line sags and interruptions   | EN61000-4-11<br><br>Output will stay above 40V <sub>DC</sub> @ full load<br>Sag must be higher than 80V <sub>rms</sub> . |  | A   | -30%, 10ms                  |
|                    |   |  |  | B   | -60%, 100ms                 |
|                    |   |  |  | B   | -100%, 5sec                 |
|                    | Lightning surge   | EN61000-4-5, Level 4, 1.2/50μs – error free  |  | A   | 4kV, comm                   |
|                    |   |  |  | A   | 2kV, diff                   |
|                    | ANSI C62.41-2002 100kHz ring wave<br>1.2/50μs-8/20μs<br>550ns EFT burst | 3, Category B<br>3, Category B   | B, Table 2<br>B, Table 3<br>B, Table 7 | 6kV/0.5kA<br>6kV, 3kA<br>2kV, severity II |                             |
| Fast transients    | EN61000-4-4   | 3  | A                                      | 5/50ns, 2kV (common mode)                 |                             |
| Enclosure immunity | Conducted RF fields   | EN61000-4-6  | 3                                      | A   | 130dBμV, 0.15-80MHz, 80% AM |
|                    | Radiated RF fields  | EN61000-4-3  | 3                                      | A   | 10V/m, 80-1000MHz, 80% AM   |
|                    |   | ENV 50140  |  | A   |                             |
|                    | ESD   | EN61000-4-2  | 4                                      | A   | 8kV contact, 15kV air       |

- Criteria**      **Performance**
- A      No performance degradation
  - B      Temporary loss of function or degradation not requiring manual intervention
  - C      Temporary loss of function or degradation that may require manual intervention
  - D      Loss of function with possible permanent damage

<sup>7</sup> Designed to start and work at an ambient as low as -40°C, but may not meet operational limits until above -5°C

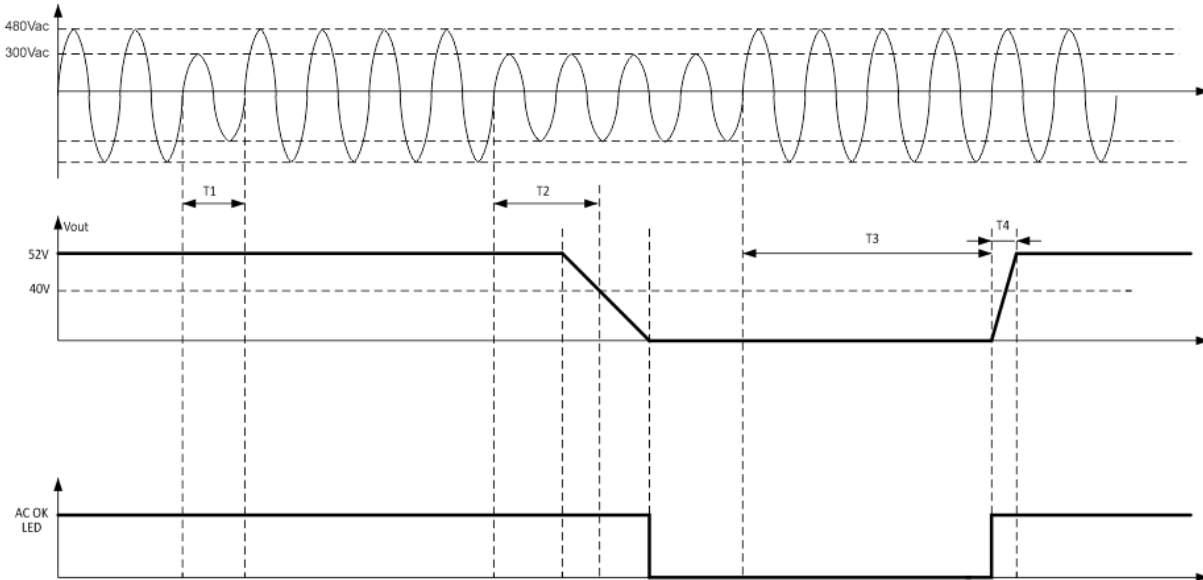
<sup>8</sup> The maximum operational ambient is reduced in Europe in order to meet certain power cord maximum ratings of 70°C. The maximum operational ambient where 70°C rated power cords are utilized is reduced to 60°C until testing demonstrates that a higher level is acceptable.

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3Φ-380/480V<sub>AC</sub> input; Default Output: ±52/48V<sub>DC</sub> @ 6000W

## Timing diagrams

### Response to input fluctuations



T1 – ride through time – 0.5 to 1 cycles [ 10 – 20ms] V<sub>OUT</sub> remains within regulation – load dependent

T2 – hold up time - 15ms – V<sub>OUT</sub> stays above 40V<sub>DC</sub>

T3 – delay time – <5s – from when the AC returns within regulation to when the output starts rising

T4 – rise time – varies according to output loading, up to 8 seconds at full load

# GP100H3R48TE Global Platform Line High Efficiency Rectifier

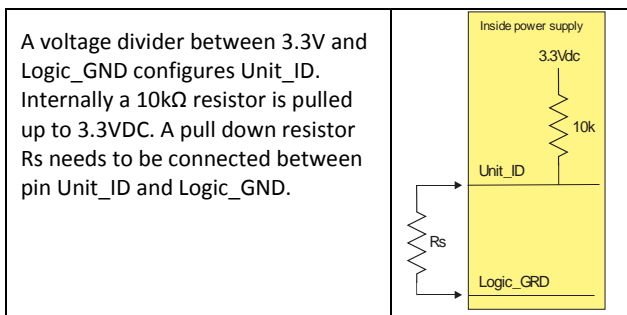
3Φ-380/480V<sub>AC</sub> input; Default Output: ±52/48V<sub>DC</sub> @ 6000W

## Control and Status

This Rectifier incorporates the GE Galaxy, RS485 based, protocol. GE will provide separate documentation on the Galaxy RS485 based protocol for users desiring to interface to the rectifier. Contact your local GE representative for details.

## Control Signals

**Bay\_ID<sup>9</sup>:** Up to 10 different units are selectable.



| Bay_ID  | Voltage level | Rs (± 0.1%) |
|---------|---------------|-------------|
| Invalid | 3.30          |             |
| 1       | 3.00          | 100k        |
| 2       | 2.67          | 45.3k       |
| 3       | 2.34          | 24.9k       |
| 4       | 2.01          | 15.4k       |
| 5       | 1.68          | 10.5k       |
| 6       | 1.35          | 7.15k       |
| 7       | 1.02          | 4.99k       |
| 8       | 0.69          | 2.49k       |
| 9       | 0.36          | 1.27k       |
| 10      | 0             | 0           |

**Device address in RS485 mode:** The address in RS485 mode is divided into two components; Slot\_ID and Shelf\_ID

**Slot\_ID:** Up to 10 different modules could be positioned across a 19" shelf if the modules are located vertically within the shelf. The resistor below needs to be placed between Slot\_ID and Vout (-). Internal pull-up to 3.3V is 10kΩ.

| Slot    | Resistor | Voltage | Slot | Resistor | Voltage |
|---------|----------|---------|------|----------|---------|
| invalid | none     | 3.3V    | 6    | 7.15k    | 1.35V   |
| 1       | 100k     | 3V      | 7    | 4.99k    | 1.02V   |
| 2       | 45.3k    | 2.67V   | 8    | 2.49k    | 0.69V   |
| 3       | 24.9k    | 2.34V   | 9    | 1.27k    | 0.36V   |
| 4       | 15.4k    | 2.01V   | 10   | 0        | 0       |
| 5       | 10.5k    | 1.68V   |      |          |         |

<sup>9</sup> Bay\_ID and Unit\_ID are the same signals.

**Shelf\_ID:** When placed horizontally up to 20 shelves can be stacked on top of each other in a fully configured rack. The shelf will generate the precision voltage level tabulated below referenced to Vout (-).

| Shelf | V <sub>MIN</sub> | V <sub>NOM</sub> | V <sub>MAX</sub> |
|-------|------------------|------------------|------------------|
| Fault | 0                | 0                | 0                |
| 1     | 1.21             | 1.23             | 1.24             |
| 2     | 2.42             | 2.45             | 2.48             |
| 3     | 3.63             | 3.68             | 3.72             |
| 4     | 4.84             | 4.90             | 4.96             |
| 5     | 6.06             | 6.13             | 6.20             |
| 6     | 7.27             | 7.35             | 7.43             |
| 7     | 8.48             | 8.58             | 8.67             |
| 8     | 9.69             | 9.80             | 9.91             |
| 9     | 10.90            | 11.03            | 11.15            |
| 10    | 12.11            | 12.25            | 12.39            |
| 11    | 13.32            | 13.48            | 13.63            |
| 12    | 14.53            | 14.70            | 14.87            |
| 13    | 15.74            | 15.93            | 16.11            |
| 14    | 16.95            | 17.15            | 17.35            |
| 15    | 18.17            | 18.38            | 18.59            |
| 16    | 19.38            | 19.60            | 19.82            |
| 17    | 20.59            | 20.83            | 21.06            |
| 18    | 21.80            | 22.05            | 22.30            |
| 19    | 23.01            | 23.28            | 23.54            |
| 20    | 24.22            | 24.50            | 24.78            |

**Interlock<sup>10</sup>/Interlock2:** This is a short pin utilized for hot-plug applications to ensure that the rectifier turns **OFF** before the power pins are disengaged. It also ensures that the rectifier turns **ON** only after the power pins have been engaged. Must be connected to V\_OUT (-) for the rectifier to be ON.

**8V\_INT:** Single wire connection between modules, provides redundant bias to the DC/DC control circuitry of an unpowered module.

## LEDs

Three LEDs are located on the front faceplate. The AC\_OK LED provides visual indication of the INPUT signal function. When the LED is ON GREEN the rectifier input is within normal design limits.

The second LED is the DC\_OK LED. When GREEN the DC output is present. When 'blinking' a power limit or overload condition exists. When OFF the output is not present.

The third LED is the FAULT LED. A continuous RED condition indicates a fault. Blinking of the RED LED indicates loss of communications.

<sup>10</sup> Dual functionality of Slot\_ID and Interlock

# GP100H3R48TE Global Platform Line High Efficiency Rectifier

3Φ-380/480V<sub>AC</sub> input; Default Output: ±52/48V<sub>DC</sub> @ 6000W

**Table 2: Alarm and LED state summary**

| Condition                                       | Rectifier LED State |                |              | Monitoring Signals <sup>13</sup> |       |                |
|---|---------------------|----------------|--------------|----------------------------------|-------|----------------|
|   | AC OK<br>Green      | DC OK<br>Green | Fault<br>Red |                                  | Fault | Module Present |
| OK  | 1                   | 1              | 0            |                                  | HI    | LO             |
| Thermal Alarm (5°C before shutdown)             | 1                   | 1              | Blinks       |                                  | HI    | LO             |
| Thermal Shutdown                                | 1                   | 0              | 1            |                                  | LO    | LO             |
| Defective Fan                                   | 1                   | 0              | 1            |                                  | LO    | LO             |
| Blown AC Fuse in Unit                           | 1                   | 0              | 1            |                                  | LO    | LO             |
| AC Present but not within limits                | Blinks              | 0              | 0            |                                  | HI    | LO             |
| AC not present <sup>11</sup>                    | 0                   | 0              | 0            |                                  | HI    | LO             |
| Boost Stage Failure                             | 1                   | 0              | 1            |                                  | LO    | LO             |
| Over Voltage Latched Shutdown                   | 1                   | 0              | 1            |                                  | LO    | LO             |
| Over Current                                    | 1                   | Blinks         | 0            |                                  | HI    | LO             |
| Non-catastrophic Internal Failure <sup>12</sup> | 1                   | 1              | 1            |                                  | LO    | LO             |
| Missing Module                                  |                     |                |              |                                  |       | HI             |

<sup>11</sup> This signal is correct if the rectifier is back biased from other power supplies in the shelf .

<sup>12</sup> Any detectable fault condition that does not cause a shutting down. For example, ORing FET failure, boost section out of regulation, etc.

<sup>13</sup> Signal transition from HI to LO is output load dependent

**Table 3: Signal Definitions**

Signals are referenced to Logic\_GND unless otherwise stated.

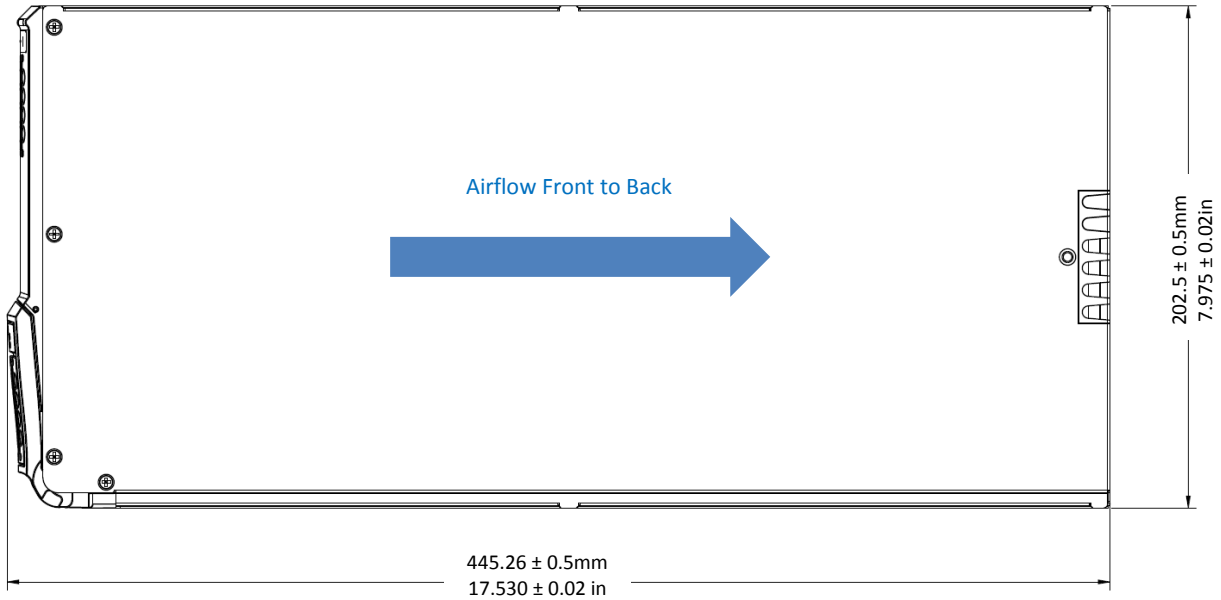
| Function               | Label                | Type      | Description   |
|------------------------|----------------------|-----------|---|
| Module Present         | MOD_PRES             | Output    | Short pin, Connected to Logic_GND notifies the system that module is present,   |
| Slot Address/Interlock | Slot_ID<br>INTERLOCK | Input     | Short pin referenced to Vout( - ) . This signal provides the last-to-make and first-to-break function to properly control the rectifier for hot plug and hot disengagement. A voltage level identifies the rectifier slot address in a shelf. |
| Shelf Address          | Shelf_ID             | Input     | A voltage level referenced to Vout ( - ) identifies the shelf address   |
| Bay Address            | Bay_ID               | Input     |   |
| DC-DC Back bias        | 8V_INT               | Bi-direct | Used to back bias the DSP from other operating Power supplies. Ref: Vout ( - ).   |
| Interlock2             | INTERLOCK2           | Input     | A short pin referenced to Logic_GND. This signal provides a second interlocking feature of last-to-make and first-to-break function to properly control the rectifier for hot plug insertion and disengagement.                               |



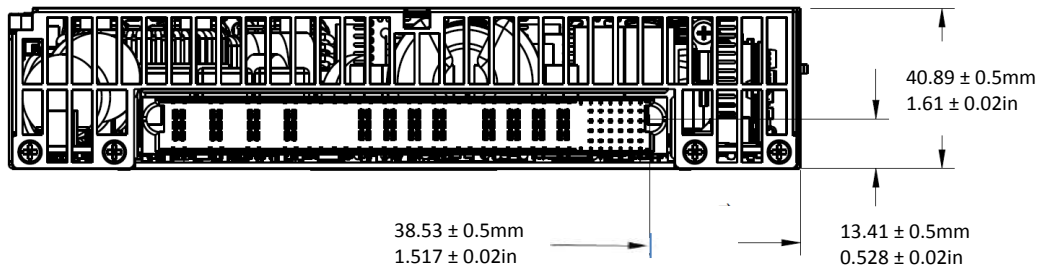
# GP100H3R48TE Global Platform Line High Efficiency Rectifier

3Φ-380/480V<sub>AC</sub> input; Default Output: ±52/48V<sub>DC</sub> @ 6000W

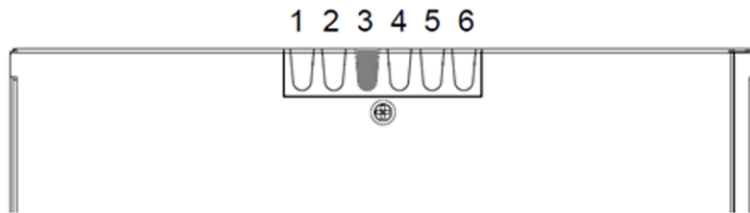
## Mechanical Outline



**Top View** [Note: add safety label to side of unit per UL, EC directives, TUV, Power Systems Practices]



**Rear View**



**Keying**

| Product           | Keying Location Notched |
|-------------------|-------------------------|
| GP communications | 3                       |

# GP100H3R48TE Global Platform Line High Efficiency Rectifier

3Φ-380/480V<sub>AC</sub> input; Default Output: ±52/48V<sub>DC</sub> @ 6000W



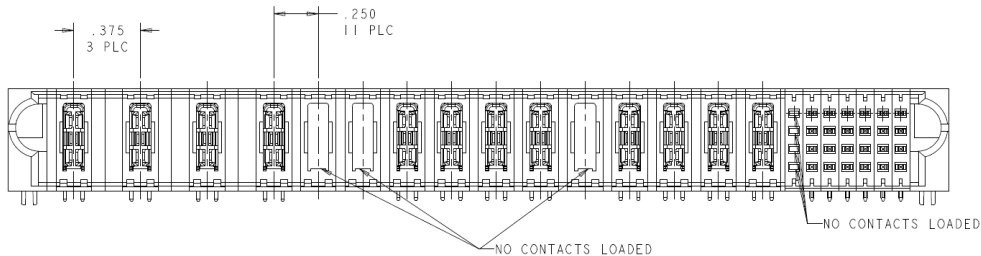
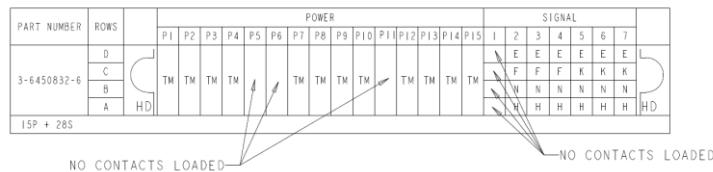
Front View: Faceplate Color: Spattered Finish CO White (OS1148)

Front Panel LEDs

| Symbol | Color | Function  |
|--------|-------|---|
| ~      | Green | <b>ON:</b> Input ok<br><b>Blinking:</b> Input out of limits |
| !      | Red   | <b>ON:</b> Fault<br><b>Blinking:</b> loss of communications |
| ≡      | Green | <b>ON:</b> Output ok<br><b>Blinking:</b> Overload           |

Mating Connector

Rectifier side: Tyco 3-6450832-6



| AC INPUT |    |    |           | DC OUTPUT |       |        |        |        |        |       |        |        |        |        | SIGNALS |                   |   |            |          |        |   |           |   |
|----------|----|----|-----------|-----------|-------|--------|--------|--------|--------|-------|--------|--------|--------|--------|---------|-------------------|---|------------|----------|--------|---|-----------|---|
| P1       | P2 | P3 | P4        | P5        | P6    | P7     | P8     | P9     | P10    | P11   | P12    | P13    | P14    | P15    | 1       | 2                 | 3 | 4          | 5        | 6      | 7 |           |   |
| L1       | L2 | L3 | Frame Gnd | Empty     | Empty | Vout + | Vout + | Vout + | Vout + | Empty | Vout - | Vout - | Vout - | Vout - | Empty   | SLOT_ID INTERLOCK |   | Bay_ID     |          | RS485- |   | RS485+    | D |
|          |    |    |           |           |       |        |        |        |        |       |        |        |        |        | Empty   | SHELF_ID          |   |            | MOD_PRES |        |   | LOGIC_GND | C |
|          |    |    |           |           |       |        |        |        |        |       |        |        |        |        | Empty   | 8V_INT            |   |            |          |        |   |           | B |
|          |    |    |           |           |       |        |        |        |        |       |        |        |        |        | Empty   |                   |   | INTERLOCK2 |          |        |   |           | A |

- Notes:
- Short Pin
  - System side mating connector must have its Frame GRD pin the longest to ensure that it is mating first.
  - Slot location

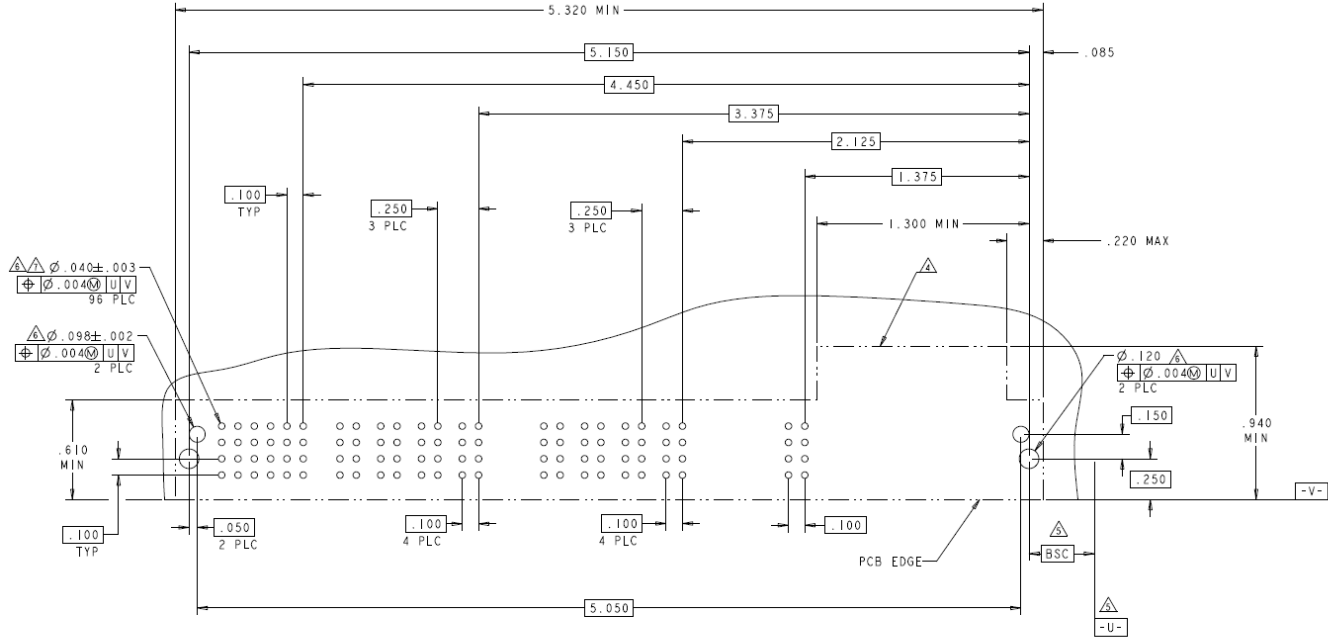
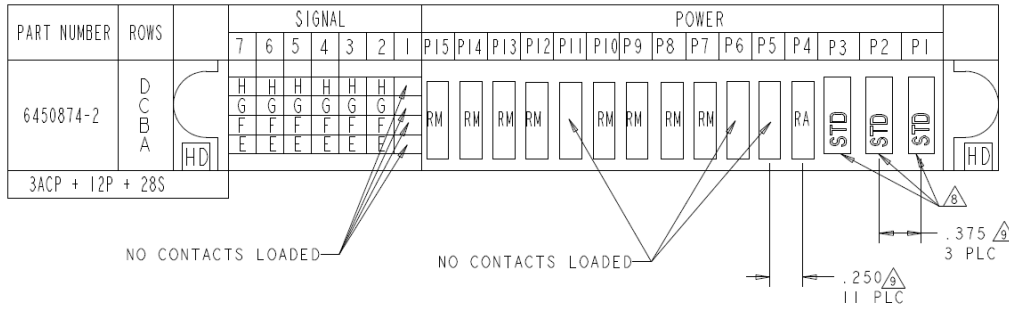
Pin out as looking straight at the connector

| SIGNALS |                   |   |            |          |        |           |   |
|---------|-------------------|---|------------|----------|--------|-----------|---|
| 1       | 2                 | 3 | 4          | 5        | 6      | 7         |   |
| Empty   | SLOT_ID INTERLOCK |   | Bay_ID     |          | RS485- | RS485+    | D |
| Empty   | SHELF_ID          |   |            | MOD_PRES |        | LOGIC_GND | C |
| Empty   | 8V_INT            |   |            |          |        |           | B |
| Empty   |                   |   | INTERLOCK2 |          |        |           | A |

# GP100H3R48TE Global Platform Line High Efficiency Rectifier

3Φ-380/480V<sub>AC</sub> input; Default Output: ±52/48V<sub>DC</sub> @ 6000W

- System side receptacle:** Tyco soldered version: 6450874-2  
 press-fit version: 6450884-2  
 AC power contact: 1-1600961-8 (3X)  
 AC power contact secondary lock: 1600903-1 (3X)

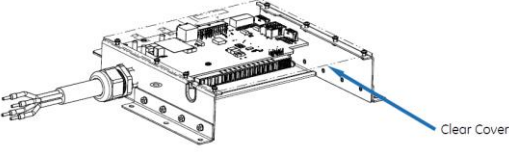



**RECOMMENDED PCB LAYOUT**

# GP100H3R48TE Global Platform Line High Efficiency Rectifier

3Φ-380/480V<sub>AC</sub> input; Default Output: ±52/48V<sub>DC</sub> @ 6000W

## Accessories

| Item  | Description  | Part number                           |
|---|--|---------------------------------------|
|  | <p>1u_GP100_interface: Rectifier interface board. This debug tool can be used to evaluate the performance of the rectifier. The input interface is a set of 4 wires, 3-phases and a frame ground connection. The output is a set of DC lug landings. See the installation guide for further information.</p> | <p><a href="#">150044268</a></p>      |
|   | <p>1u_GP100_interface Installation Guide</p>   | <p><a href="#">850048307</a></p>      |
|  | <p>Designed to mount into standard 19" EIA-310-D racks, these GE shelves provide a turn-key solution for customers. The selection guide is documented on the GE website.</p>   | <p><a href="#">See GE website</a></p> |

## Ordering Information

Please contact your GE Sales Representative for pricing, availability and optional features.

| Item                    | Description   | Comcode                          |
|-------------------------|---|----------------------------------|
| <p>GP100H3R48TEZ</p>    | <p>110A rectifier with isolated RS485 communications, 52.5Vdc default</p> | <p><a href="#">150034309</a></p> |
| <p>GP100H3R48TEZ-IN</p> | <p>110A rectifier with isolated RS485 communications, 48Vdc default</p>   | <p><a href="#">150045497</a></p> |