DATASHEET

GP100 Rectifier for Edge Power Architecture

Advanced Technology to Simplify Your Network

The OmniOn GP100 rectifier for Edge Power Architecture is a true three-phase rectifier. The rectifier efficiently transforms energy from any standard three-phase source into the 48-volt DC power needed for modern data center architectures. The rectifier operates using any three-phase input voltage from 320 VAC to 530 VAC without need for a neutral conductor. This means that one single rectifier can be used globally to meet all your at scale 48-volt powering needs.

The GP100 efficiency is market leading for diode protected, true hot pluggable, three-phase 48-volt rectifiers.

The GP100 rectifier for Edge offers a powerful combination of efficiency, data center architecture simplicity and reliability.

Features & Advantages

- Compact – 1RU form factor provides high power density 27 Watts/cubic inch.
- Efficient – Flat efficiency curve maintains 96% efficiency over a wide range of loads.
- Flexible Output – Provides up to 125 Amps of 48-volt power for fast charging of discharged batteries.
- Programmable – Output is programable between 42 and 58 V_{DC} to support traditional lead-acid and advanced battery chemistries.
- Wide Range Input – Operates at any three-phase AC voltage from 320 to 530 V_{AC}.
- Temperature Hardened – Operates -40°C to 70°C
- Fail-Safe Performance – hot insertion capabilities allow for rectifier replacement without system shutdown; soft start and inrush current protection prevent nuisance tripping of upstream breakers.
- Extended Service Life – parallel operation with automatic load sharing ensures that load is distributed across al units.
- Plug and Play – installation of the rectifier in a shelf connected to a system controller initializes all set up parameters, automatically.
- Compliant to RoHS Directive 2011/65/EU and amended Directive (EU) 2015/863
- Compliant to REACH Directive (EC) No 1907/2006

A True System Solution

- GP100 rectifiers are part of the proven Global Platform Line of rectifier products designed to meet the demanding needs of data center and wireless and telecommunications customers.
- Monitoring/Control – the built in microprocessor controls and monitors all critical rectifier functions and communicates with the system controller using the built in Galaxy Protocol serial interface.
- Designed and tested with in rack battery modules to support a safe, reliable and low cost way to provide five nines data center reliability.

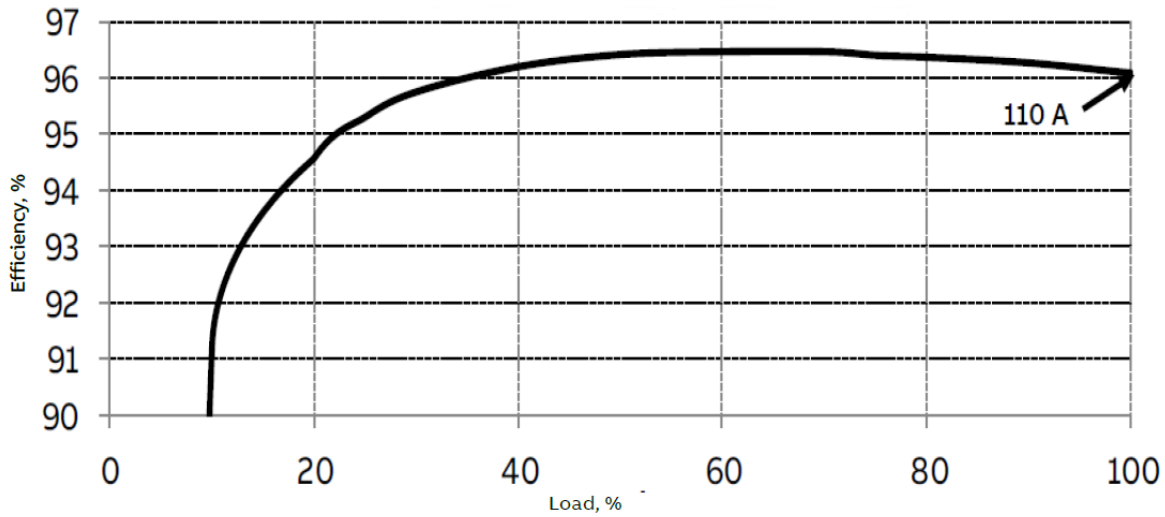
Electrical Specifications for System Design

Environmental, Compliance & Physical

Parameter	Specification
Operating Ambient Temperature Range	-40°C to +70°C (Output de-rates at 2%/°C beginning at 55°C)
Cooling Method	Front to back airflow with onboard temperature controlled fans
Operating Relative Humidity	0 - 95% (non-condensing) for use in a controlled environment
Electromagnetic Compatibility	FCC Part 15, EN 55032 (CISPR32), EN 55035 (CISPR 35), Level A, GR-1089
Lightning Surge	EN/IEC 61000-4-5 Level 4 (Error free), ANSI C62.41 Category B 100 kHz ring and 1.2/50µs combination waves (6kV damage free)
Agency Certifications	UL/CSA/EN62368-1, NEBS GR-1089, GR-63-CORE
Heat Release	217 Watts, or 740 BTU/hr at full load of 6000 Watts
Mean Time Between Failure (MTBF); Life	300k Hours @ 25°C per Telcordia SR-332, Method 1, Case 3; 10 Years
Height x Width x Depth, Weight, Packaged weight	1.6x8x17.9in (41x236x455mm), 8.95 lbs (4.1 kg), 9.85 lbs (4.5 kg)

Input Voltage and Power

Parameter	Specification
Response to AC input voltage	Provides full power between 320 V_{ac} and 530 V_{AC} three-phase.
Ac input current	10A max @380 V_{AC} three-phase; 8A @480 V_{AC} three-phase
Power Factor	0.96-0.995@loads over 50%
THD	< 6% @loads over 70% Typical
Holdover	12 milliseconds, with V_{out} final >40 V
Frequency	47 to 66Hz

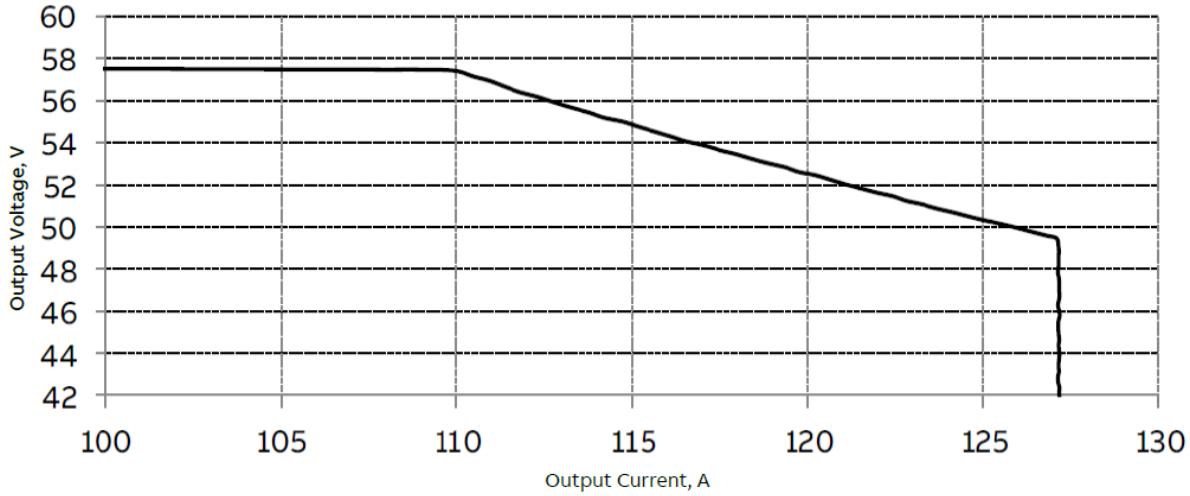


Efficiency vs. Load 25°C, V_{in}480V_{AC}, V_{out} 54V_{DC}

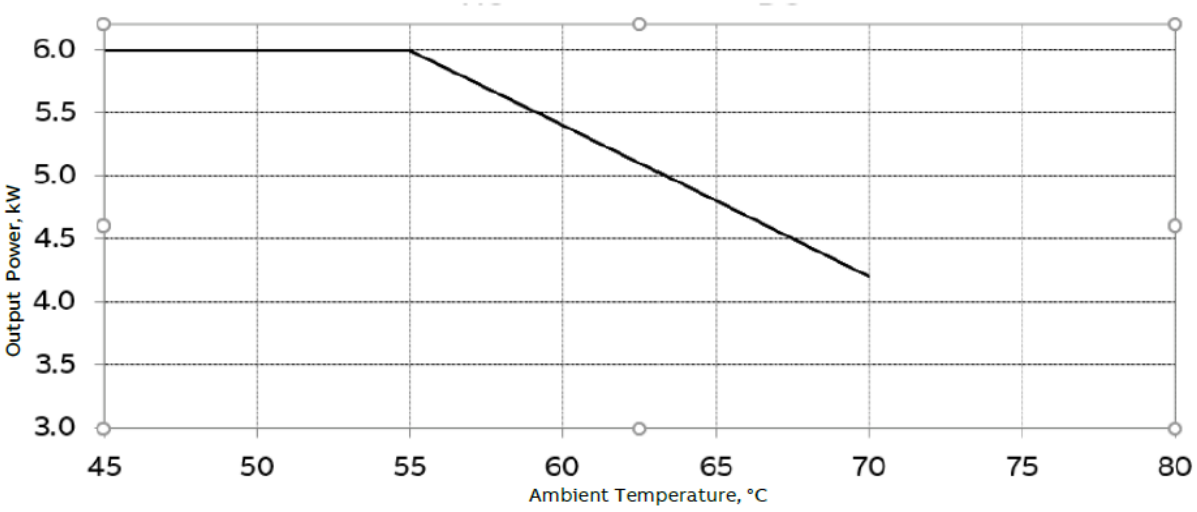
Electrical Specifications for System Design

Output

Parameter	Specification
V_{out}	42–58 V_{DC} range. Default = 52 V_{DC}
I_{out}	110A @ 54.5 V_{DC} output 125A @ 48 V_{DC} output
Regulation	± 1% w/controller
Ripple	100 mV_{rms}, 250 mV_{p-p}
Efficiency	96.5% Peak
Soft Start	Starts up into fully discharged batteries.



Current Limit Profile, Typical 480 V_{AC} Input, 60 Hz @ 25°C



Output Power vs. Temperature 480 V_{AC} Input, 54V_{DC} Output

Technical Specifications

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Input Voltage: Continuous	V_{IN}	0	600	V_{AC}
Operating Ambient Temperature	T_A	-40	70	°C
Storage Temperature	T_{stg}	-40	85	°C
I/O Isolation voltage to Frame (100% factory Hi-Pot tested)			2121	V_{AC}

Input

Parameter		Symbol	Min	Typical	Max	Unit
Operating Voltage Range (three-phase delta with safety frame ground)		V_{IN}	320	380/480	530	V_{AC}
Low voltage	Turn-OFF	V_{IN}			320	
	Turn-ON				330	
	Hysteresis		5			
High voltage	Turn-OFF	V_{IN}	530			
	Turn-ON		520			
	Hysteresis		5			
Input Voltage Phase Inbalance		V_{IN}	-15	1	+10	%
Frequency		F_{IN}	47		63	Hz
Operating Current (three-phase - all phases operational)		I_{IN}			15	A_{AC}
Input Current Phase Inbalance [load > 50% of FL]					1.5	%
Inrush Transient (per Φ at 480V_{RMS} , 25°C, excluding X-Capacitor charging)		I_{IN}			30	A_{PK}
Source Impedance (NEC allows 2.5% of source voltage drop inside a building)			0.20	0.25	0.30	Ω
Idle Power (at 480V_{AC}, 25°C)	Main output OFF Main output ON @ Io=0	P_{IN}			25 45	W
Leakage Current (per Φ , 480V_{AC}, 60Hz)		I_{IN}			5	%
Power Factor (50 – 100% load)		PF	0.96	0.995		
Efficiency (380/480V_{AC} @ 25°C)	30-80% load 50% load	h		93/95 94.5/96.5		%
Holdup Time (with no batteries present) (V_{in} = 320V_{rms}, V_{out} ≥ 40V_{DC}, constant power load)		T	10	12		ms
Ride Through (at 480V_{AC}, 25°C, constant power load)		T	1/2	1		cycle
Isolation (per EN60950)	Input – Output Input-Chassis/Signals	V	3000 2087			V_{AC} V_{AC}

Technical Specifications (continued)

Output 48 V_{DC}

Parameter		Symbol	Min	Typical	Max	Unit
Output Power (380-480V_{AC} – three-phase, T_{AMB}= -5 – 55°C)		W	6050			W_{DC}
Factory Default Set Point V_{IN} = 480V, I = 10% FL, 25°C		V_{OUT}		52		V_{DC}
Overall Regulation (load, temperature, aging) LOAD>2.5A @25°C T_{AMB} > 45°C			-0.5 -2		+0.5 +2	% %
Output Voltage Set Range (Target Resolution +/- 0.012 V_{DC})			42		58	V_{DC}
Output Current Range (54 V_{DC}/, T_{AMB} < 45°C) V_{OUT} = 54V_{DC} V_{OUT} = 52V_{DC} V_{OUT} = 48V_{DC}		I_{Out}	1 1 1		111 115 125	A_{DC}
Current Share (> 50% FL) Max Units Parallelable Using Physical Address/ Virtual Address			-2		2 20/100	%FL units
Proportional Current Share Between Different Power Supplies				<7		%FL
Output Ripple (20MHz bandwidth, load > 10%FL) load < 10%FL	RMS (5Hz to 20Mhz) Peak-to-peak (5Hz to 20Mhz)	V_{OUT}			100 250 400	mV_{rms} mV_{p-p} mV_{p-p}
Voice Band Output Noise	With 880Ahr Battery in System	V_{OUT}			45	dBrnC
	Without Battery				55	
	Psophometric Noise				2	mV_{rms}
External Bulk Load Capacitance		C_{OUT}	0		0.17	F
Turn-On Monotonic Range, Above -5°C		T	30		100	% V_{nom}
Delay	@480V_{in}			5		s
Rise Time – Fast Mode				100		ms
Rise Time – Walk-in Mode (default)	55A (50% load)		2.5			
	83A (75% load)		5			s
	100A (90% load)		8			
Output Overshoot		V_{OUT}			2	%
Load Step Response, ΔV, [load step 20% <->80% Load, @ 1A/µs] Settling Time to Normal Regulation		V_{OUT} T	-5		5 2	% ms
Overload - Power Limit When V_{OUT} ≥ 48V_{DC} Recoverable Current Limit When 40V_{DC} < V_{OUT} < 48V_{DC} Output Shutdown (one retry after a 2 – 10 second delay)		P_{OUT} I_{OUT} V_{OUT}	6050 110		120 36	W_{DC} %FL V_{DC}
Overload Shutdown Delay at Turn On for Other Module Insertion				20		s
Short Circuit Protection		No damage				
Overvoltage Protection	200ms Delayed (Default) Immediate Shutdown	V_{OUT}	59 > 65	59.5	60	V_{DC}
	Programmable Range		44		59.5	
	Latched Shutdown	If one restart fails inside 30s window unit latches OFF				
	Restart Delay		3.5	4	5	sec
Over-Temperature Shutdown Margin (below max device rating) Restart Attempt Hysteresis (below shutdown level)		T		20 10		°C
Restart/Reset Conditions		Loss of input > 100ms or Output OFF then ON command				
Isolation Output-Chassis		V	500			V_{DC}

Technical Specifications (continued)

Digital Information Specifications

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Measurement System Characteristics						
Standard Measurement Parameters	Update frequency Report delay after 25% step Report delay to accuracy				1 2 10	Hz sec sec
I_{OUT} Measurement Range	Linear	I_{MR}	0		130	A_{DC}
V_{OUT} Measurement Range	Linear	$V_{OUT(rMR)}$	0		70	V_{DC}
P_{OUT} Measurement Range	Linear	$P_{OUT(rMR)}$	0		6100	W_{DC}
Temp Measurement Range	Linear	$Temp_{(rMG)}$	0		150	°C
V_{IN} Measurement Range, Each Phase	Linear	$V_{IN(rMG)}$	0		600	V_{AC}
I_{IN} Measurement Range, Each Phase	Linear	$I_{IN(MR)}$	0		20	A_{DC}
P_{IN} Measurement Range, Computed three-phase result	Linear	$P_{in(rng)}$	0		6750	W_{in}
P_{IN} Measurement Accuracy	10-100% Load	$P_{in(ACC)}$	-150		150	W
Fan Speed Measurement Accuracy			-10		10	%
Fan Speed Control – Duty Cycle	Direct		0		100	%

Detailed Environmental Specifications

Parameter		Min	Typ	Max	Units	Notes
Ambient Temperature		-40		70	°C	Air inlet from sea level to 5,000 feet. Designed to start and work at an ambient as low as -40°C, but may not meet operational limits until above -5°C
Storage Temperature		-40		85	°C	
Operating Altitude				3048/10000	m / ft	
Non-operating Altitude				8200/30k	m / ft	
Power Derating with Temperature				2.0	%/°C	55°C to 70°C
Power Derating with Altitude				2.0	°C/305 m °C/1000 ft	Above 1524/5000 m/ft; 3962/13000 m/ft max
Humidity	Operating Storage	5 5		95 95	% %	Relative humidity, non-condensing
Shock and Vibration	Operational	Meets IPC 9592 Class II, Section 5 and GR-63_CORE requirements				
	Packaged	0.02	0.01	0.02	g^2/Hz	ModifiedlASTM-D-4728-91 8 hour duration on each axis
Acoustic Noise			55	58	dBA	Confirmation Pending
Earthquake Rating		4			Zone	Meet GR-63_CORE requirements
Airborne Contamination Protection		PCBs conformally coated with UL 94V-0, UL Recognized component (QMJU2) material				

Technical Specifications (continued)

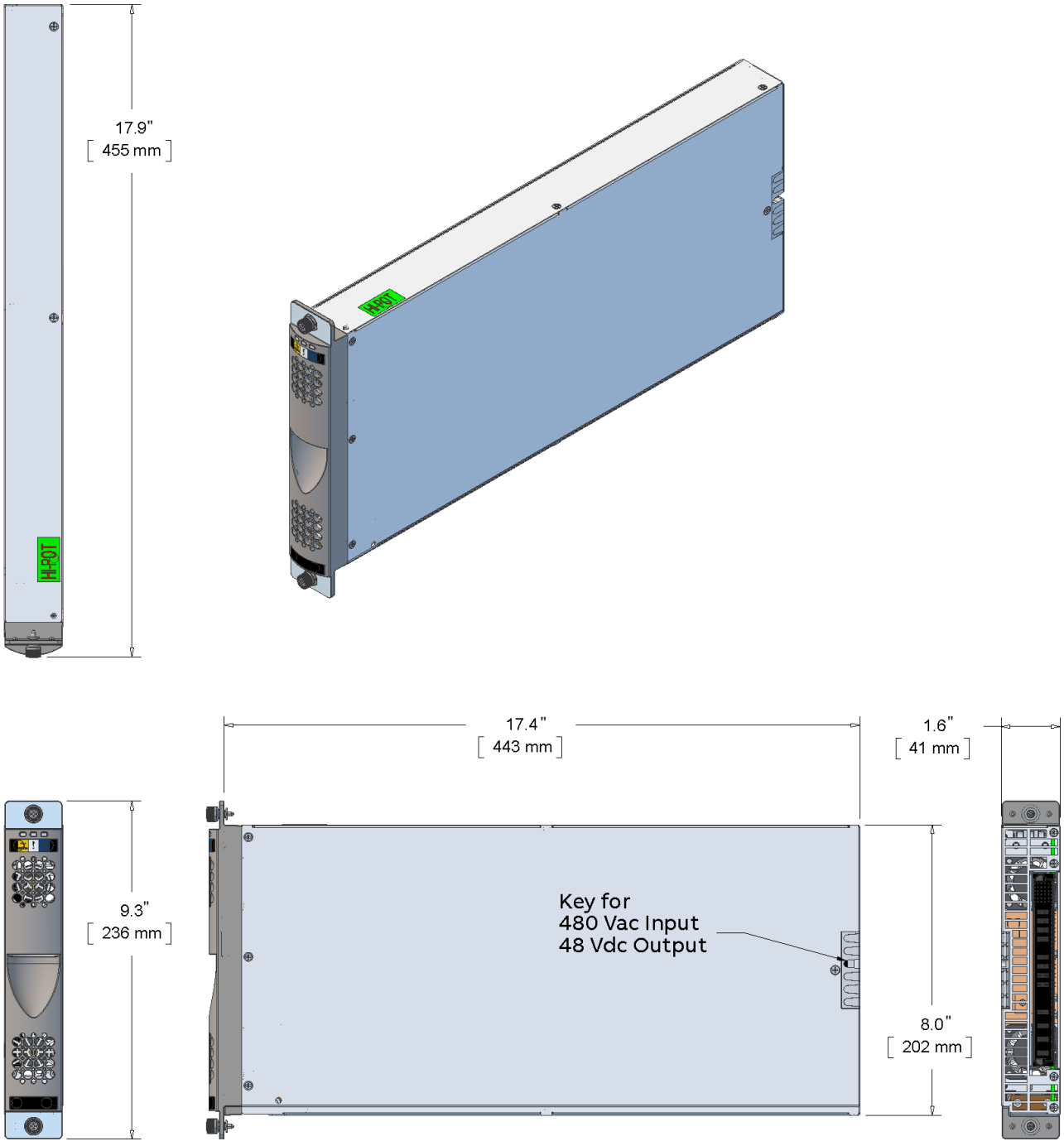
Electromagnetic Compliance

Parameter	Function	Standard	Level	Criteria	Test
AC input	Conducted Emissions	EN55032, FCC part 15 EN61000-3-2, Telcordia GR1089-CORE	A – 6dB margin		0.15 – 30MHz 0 – 2 KHz
	Radiated Emissions	EN55032	A – 6dB margin		30 – 10000MHz
AC Input Immunity	Line surge		3 x V_{NOM} 480V	B	1 F only or all 3F
	Line Sags and Interruptions	EN61000-4-11 Output will stay above 40V_{DC} @ full load Sag must be higher than 80Vrms.		A	-30%, 10ms
				B	-60%, 100ms
				B	-100%, 5sec
				A	25% sag for 2 sec
				A	1 cycle interruption
		SEMI-F47 Compliant at derated power. Output will Stay at derating Power	50% Sag	Any Phase	10 cycles @ 50Hz 12 cycles @ 60Hz
			70% Sag		25 cycles @ 50Hz 30 cycles @ 60Hz
			80% Sag		50 cycles @ 50Hz 60 cycles @ 60Hz
	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 1.2/50µs-8/20µs 550ns EFT burst	3, Category B 3, Category B	B, Table 2 B, Table 3 B, Table 7	6kV/0.5kA 6kV, 3kA 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

Note: Surges and sags applied one phase at a time and all three phases simultaneously; phase angles 0, 90, 270°

Technical Specifications (continued)

Mechanical Outline



Technical Specifications (continued)

LED Reporting Table

		LED State		
	Rectifier Condition	**AC OK Green**	**Fault Red**	**DC OK Green**
1	OK	1	0	1
2	Thermal Alarm (5C before shutdown)	1	Blinks	1
3	Thermal Shutdown	1	1	0
4	Defective Fan	1	1	0
5	Blown AC Fuse in Unit	1	1	0
6	AC Present but not within limits	Blinks	0	0
7	AC not present	0	0	0
8	Boost Stage Failure	1	1	0
9	Over Voltage Latched Shutdown	1	1	0
10	Over Current	1	0	Blinks
11	Non-catastrophic Internal Failure	1	1	1
12	Standby (remote)	1	0	0

Ordering Information

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

Item	Description	Ordering code
GP100 for Edge	True three-phase 380-480 VAC to 48 VDC, 6kW rectifier for data centers	1600092584A

Contact Us

For more information, call us at

+1-877-546-3243 (US)

+1-972-244-9288 (Int'l)

Change History (excludes grammar & clarifications)

Revision	Date	Description of the change
4.4	12/28/2021	Updated as per template Upgraded RoHS standard
4.5	01/12/2024	Updated as per OmniOn template

OmniOn Power Inc.
601 Shiloh Rd.
Plano, TX USA

omnionpower.com