

MPR1348FP series front-end

Input: 100-120/200-240V_{AC}; Output: 48V_{DC} @ 1350W



Applications

- 48V_{DC} distributed power architectures
- Datacom and Telecom applications
- Mid to high-end Servers
- Enterprise Networking
- Network Attached Storage
- Telecom Access Nodes
- Routers/Switches
- ATE Equipment

Description

The MPR1348FP front end provides efficient isolated power from world-wide commercial AC mains. Offered in the industry standard compact 1U form factor, this front end provides comprehensive solutions for systems connected to commercial ac mains.

Features

- Universal input with PFC
- Remote ON/OFF control of the 48V_{DC} output
- Remote sense of the 48V_{DC} output
- Isolated 48V_{DC} output configurable as +48 or -48V_{DC}
- No minimum load requirements
- Active current sharing
- Upward directed airflow
- Efficiency: typically 92% @ 220V_{AC} & full load
- 20ms of holdup time
- Auto recoverable OC & OT protection
- Operating temperature: 0 - 50°C
- Radiated and Conducted EMI – exceeds CISPR22 (EN55022) Class A requirements
- Safety approvals: CSA† C22.2 No.60950-1, IEC 60950-1, CE§ Mark available
- Compliant to RoHS EU Directive 2014/35/EU
- ISO** 9001 and ISO 14001 certified manufacturing facilities
- Meets EN6100 immunity and transient standards

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

† CSA is a registered trademark of Canadian Standards Association.

‡ VDE is a trademark of Verband Deutscher Elektrotechniker e.V.

§ Intended for integration into end-user equipment. All the required procedures for CE marking 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.

+ PMBus name and logo are registered trademarks of the System Management Interface Forum (SMIF)

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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 Technical Requirement. Exposure to absolute maximum ratings for extended periods can adversely affect the device reliability.

Parameter	Symbol	Min	Max	Unit
Input Voltage: Continuous	V _{IN}	0	264	V _{AC}
Operating Ambient Temperature	T _A	-10	50	°C
Storage Temperature	T _{stg}	-40	85	°C
I/O Isolation voltage to Frame (100% factory Hi-Pot tested)			1500	V _{AC}

Electrical Specifications

Unless otherwise indicated, specifications apply over all operating input voltage, load, and temperature conditions.

INPUT						
Parameter	Symbol	Min	Typ	Max	Unit	
Operational Range	high line Low line	V _{IN}	180 90	230 110	264 140	V _{AC}
Frequency Range		F _{IN}	47	50/60	63	Hz
Main Output	Turn_OFF ¹	V _{IN}	55		70	V _{AC}
	Turn ON	V _{IN}	75		90	V _{AC}
Maximum Input Current (V _{OUT} = 48V _{DC})	V _{IN} = 100V _{AC} , P _{OUT} = 1000W	I _{IN}			12	A _{AC}
	V _{IN} = 200V _{AC} , P _{OUT} = 1350W				8	
Cold Start Inrush Current ² (Excluding x-caps, 25°C)		I _{IN}			35	A _{PEAK}
	duration				½	cycle
Efficiency (T _{AMB} = 25°C, V _{OUT} = 48V _{DC})	input	V _{IN}	100 / 220			V _{AC}
	100% load			88 / 92		%
	75% load	η		88 / 91		
	50% load			87 / 90		
	20% load			80 / 84		
Power Factor (V _{IN} = 90 - 264V _{AC} , P _{OUT} = 1000W)		PF		0.99		
Holdup time (V _{IN} = 90V _{AC} , T _{AMB} = 25°C, V _{OUT} = 48V _{DC} , I _{OUT} = 20.8A)		T	20			ms
Ride through (output ≥ 46V _{DC})				½		cycle
Leakage Current (V _{IN} = 264V _{AC} , F _{IN} = 60Hz)		I _{IN}			3.5	mA
Isolation	Input/Output	V _{AC}	3000			V _{AC}
	Input/Frame		1500			V _{AC}
	Main output or main_rtn ³ /Frame	V _{DC}	-250		250	V _{DC}

¹ The input fuse cannot clear for any input voltage levels below 90V_{AC}

² 5 minutes OFF time, measured at 25°C, 220V @ 50Hz

³ Either output terminal of the power supply may be tied to frame_ground

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48V _{DC} MAIN OUTPUT						
Parameter	Symbol	Min	Typ	Max	Unit	
Output Power	W	0	-	1350 1000	W	
Regulation	V _{OUT}	47.52	48.00	48.48	V _{DC}	
Set point (V _{IN} = 220V _{AC} , T _{AMB} 25°C, I _{OUT} = 13.5A)				0.01	% / °C	
Temperature drift		-2		+2	%	
Overall regulation (line, load, temperature)				0.5	V _{DC}	
Ripple and noise ⁴ 20MHz bandwidth	V _{OUT}			600 100	mV _{P-P} mV _{RMS}	
Turn-ON or turn-OFF overshoot				+0	%	
Remote ON/OFF delay time	T			40	ms	
Turn-ON				300	ms	
monotonic rise time (10 – 90% of V _{OUT})	C R	0.02		25,000	μF	
External Load capacitance					Ω	
Transient response (di/dt – 1A/μs)	V _{OUT}	-1		1	V _{DC}	
25% step [10%-35%, 100% - 75%]		46.5		50	V _{DC}	
0 – 95%, 95 – 0% load step recovery to within 2% of V _{NOMINAL}				500	μs	
Overvoltage protection, latched (recovery by cycling OFF/ON via hardware or software)				59	V _{DC}	
Output current	I _{OUT}	27.9	28.1	28.4	A _{DC}	
high line						
Low line		20.6	20.8	21		
Overcurrent protection threshold		31.8		36.6		
high line					%	
Low line	23.6		27.0			
Current share	I _{OUT}	-5		5	%	

General Specifications

Parameter	Min	Typ	Max	Units	Notes
Reliability		300,000 100,000		hrs	Full load, 25°C per Bellcore RPP Full load, 50°C per Bellcore RPP
Service Life		10		Yrs	Full load, excluding fans
Weight			2 (4.4)	Kgs (Lbs)	

Feature Specifications

Unless otherwise indicated, specifications apply over all operating input voltage, resistive load, and temperature conditions. All signals are referenced to Signal_Return unless otherwise noted. See Feature Descriptions for additional information. (I_{OL} < 5mA, I_{OH} < 20μA)

Parameter	Symbol	Min	Typ	Max	Unit
Remote ON/OFF (open collector)	V _I	0.7V _{DD}	—	3.3	V _{DC}
Logic HI – normal (or left open) Logic – LO – output OFF		0		0.4	
AC Range (opto isolated open collector signal)	V _I	0.7V _{DD}	—	3.3	V _{DC}
	V _I	0	—	0.4	V _{DC}
Low range - Logic HI ⁵					
High range – Logic LO					

⁴ Measured across a 10μf electrolytic and a 0.1μf ceramic capacitors in parallel. 20MHz bandwidth

⁵ With a 1.5kΩ pull up to a 3.3V_{DC} source, a logic level HI is equivalent to > 2.4V_{DC}

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Environmental Specifications

Parameter	Min	Typ	Max	Units	Notes
Ambient Temperature	-5		50	°C	0 – 1,000m
Storage Temperature	-40		70	°C	
Operating Altitude			4,600/15,000	m/ft	
Non-operating Altitude			15240/50k	m / ft	
Power derating with temperature			2.5	% / °C	To 60°C
Temperature derating with Altitude			3.0	°C/1000 m °C/3280 ft	
Acoustic noise			55	dba	25°C and Full load
OT Protection above NTC turn OFF point	65		100.3	°C ambient	Auto-recoverable
NTC turn ON point			74.7	°C	
Hysteresis			25.6	°C	
Humidity Operating	5		95	%	Relative humidity, non-condensing
Storage	5		95	%	
Vibration			0.2	G	IEC 68-2-6, 5-500Hz; IEC 68-2-64
Shock			10	G	IEC 68-2-27, 10ms intervals 3 shocks per axis; IEC 68-2-31

EMC Compliance

Parameter	Criteria	Standard	Level	Test
AC input	Conducted emissions	FCC and CISPR (EN55022A, VCCI-2)	A +6dB	0.15 – 30MHz
Radiated emissions		EN55022	A +6dB	30 – 10000MHz
Harmonic current	Emissions	EN-61000-3-2	Table 1	
Voltage	Fluctuations & Flicker	En-61000-3-3		
AC Input immunity	Voltage dips	EN61000-4-11	A	-30%, 10ms
			B	-60%, 100ms
			B	-100%, 5sec
	Low energy transients	EN61000-4-12 IEEE C62.41 100kHz ring wave		2kV differential
				4kV common mode
	High energy transients	EN61000-4-5	A	1kV, 1.2 x 50µs, common mode
Fast transients	EN61000-4-4	A	500V, 8 x 20µs, differential mode	
Enclosure immunity	Conducted RF fields	EN61000-4-6	B	±1kV on power lines, 5kHz rate
	Radiated RF fields	EN61000-4-3	A	130dBµV, 0.15-80MHz, 80% AM
		ENV 50140	A	3V/m, 80-1000MHz, 80% AM
	ESD	EN61000-4-2	B	±4kV contact, ±8kV air

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Characteristic Curves

The following figures provide typical characteristics at 25°C.

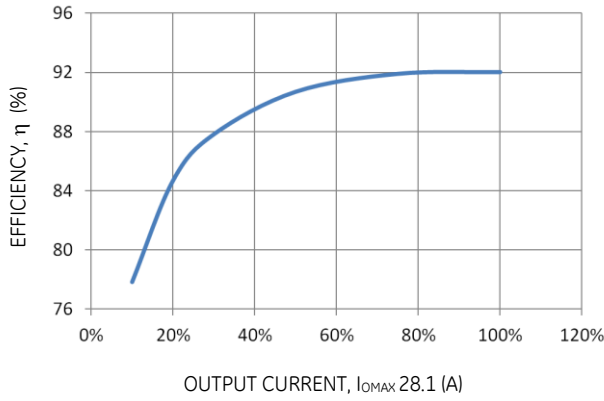


Figure 1. Efficiency V_{IN}: 220V, Freq: 50Hz, T: 25°C

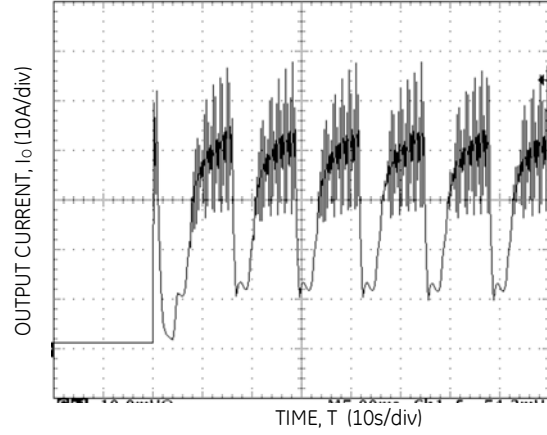


Figure 2. Short circuit Performance, V_{IN} 230 V_{AC}, T 25°C (reading: Max short circuit current – 57.8A, RMS – 23.1A)

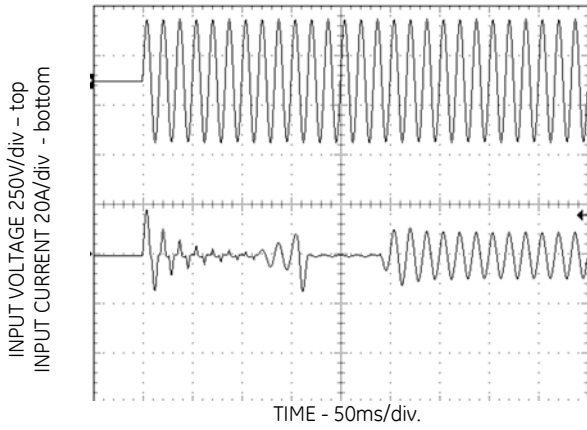


Figure 3. Cold Inrush, V_{IN} 220 V_{AC} (read 17.6A)

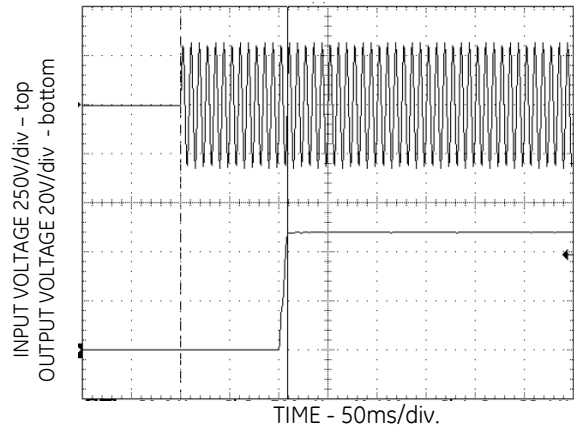


Figure 4. Turn ON delay, V_{IN} 230 V_{AC} (read 218ms)

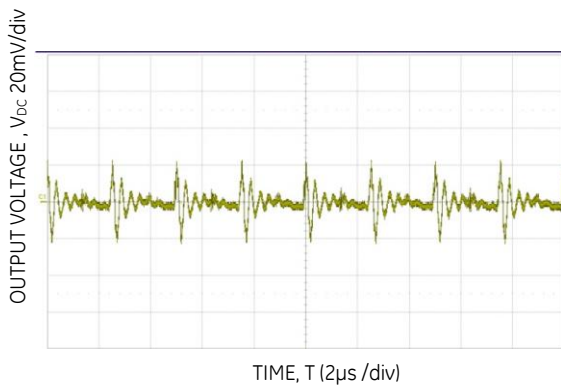


Figure 5. 48V_{DC} output PARD, full load, V_{IN} = 230V_{AC}.

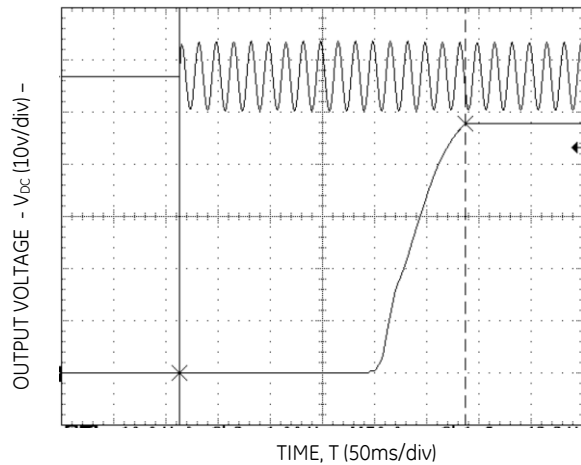


Figure 6. Start up V_{IN} 230 V_{AC}, C_{OUT} 25,600 μF

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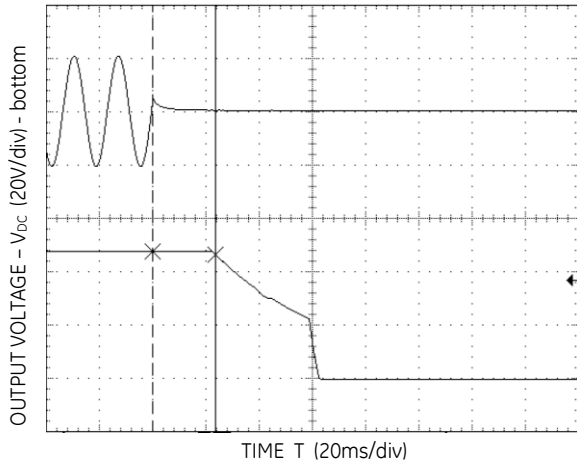


Figure 7. Holdup V_{IN} - 180V_{AC}, FL (23.6ms)

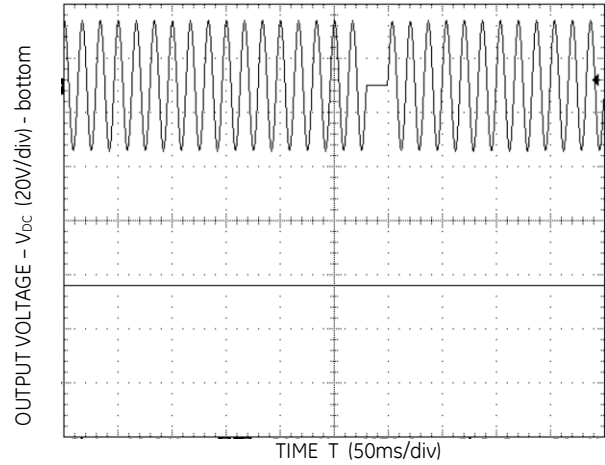


Figure 8. 1/2 cycle ride-through V_{IN} 240 V_{AC}

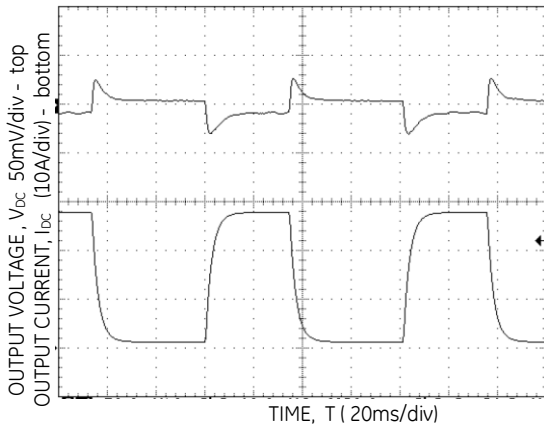


Figure 9. 230V_{AC}; Transient response 5 - 100% load step

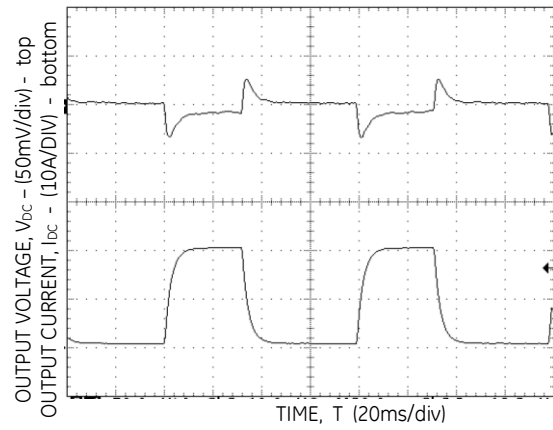


Figure 10. 115V_{AC}; Transient response 5 - 100% load step

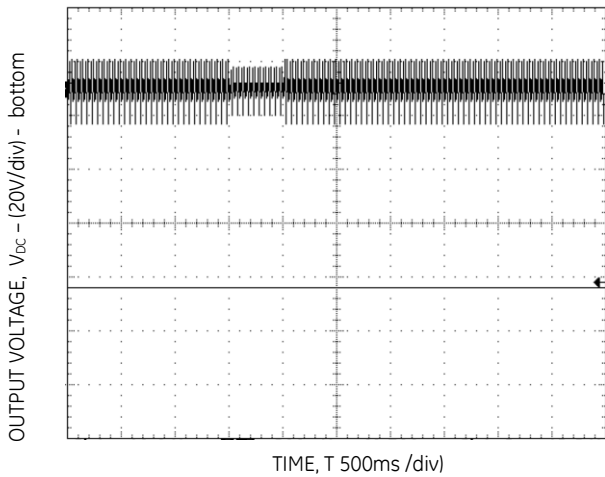


Figure 11. 30% dip ride-through V_{IN} 240 V_{AC}

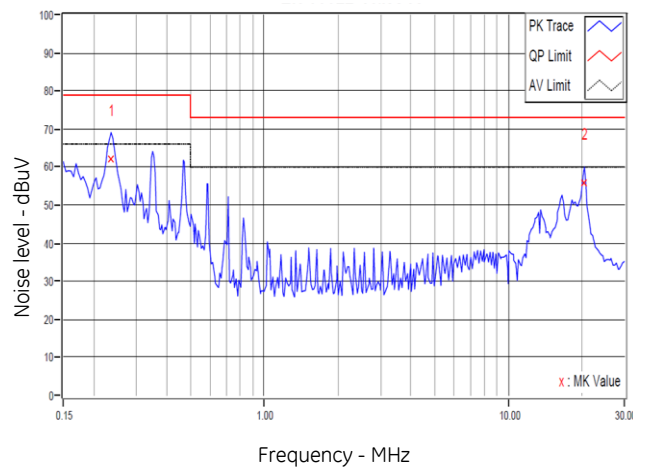
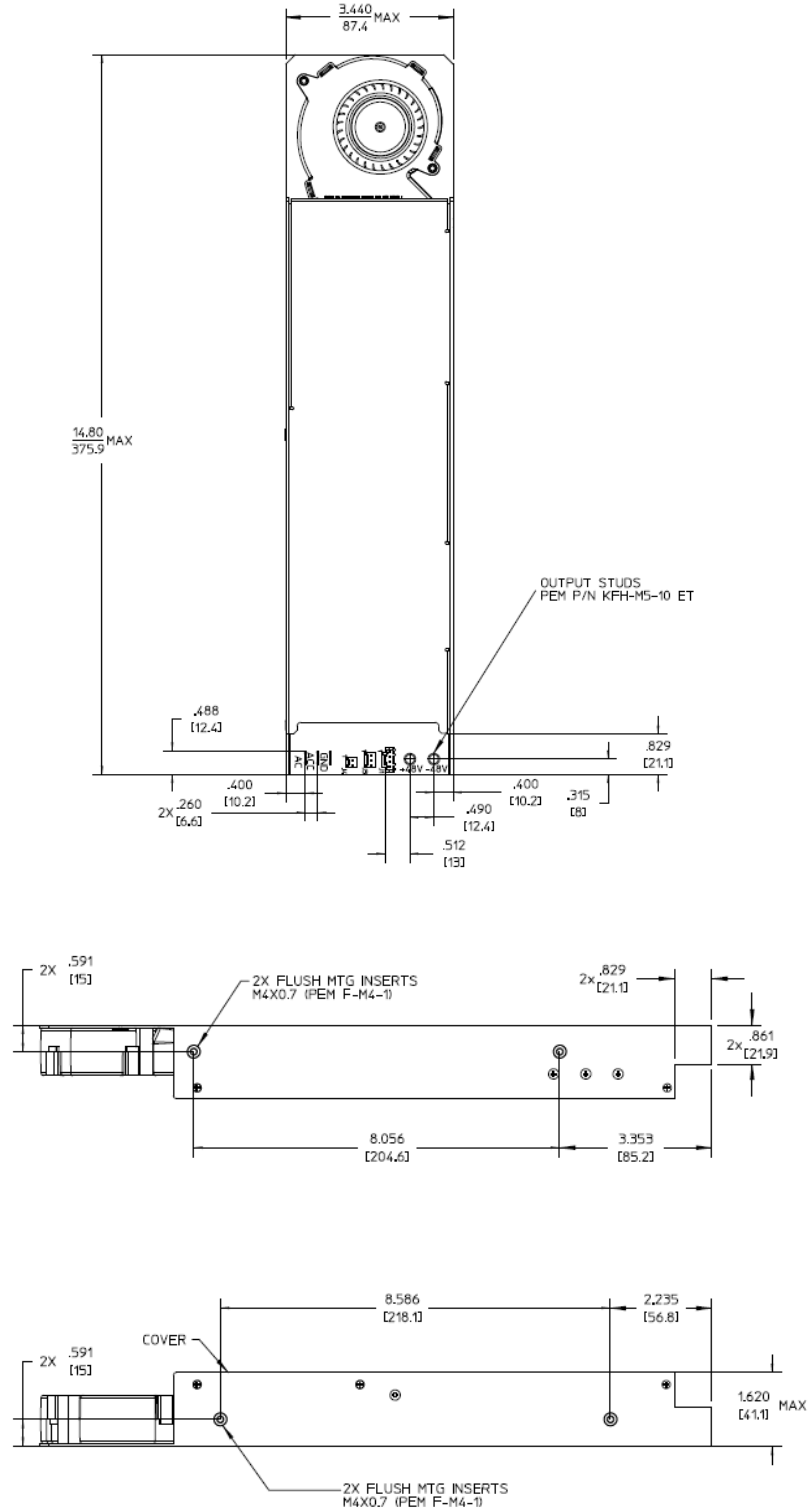


Figure 12. Conducted Emissions

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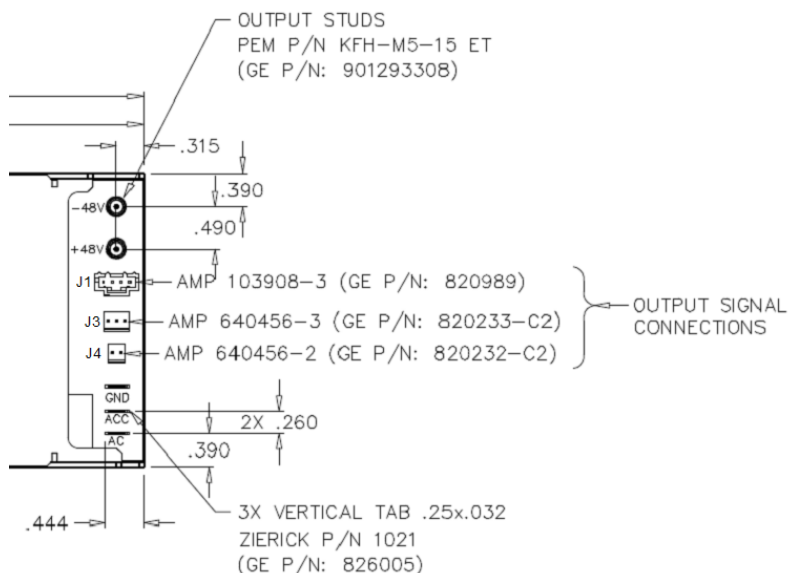
Outline Drawing



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Connectors and Pin Assignments



Power Circuits		
Mate	Function	Operation
Stud	-48V	When + side tied to GRD
Stud	+48V	When - side tied to GRD
FastON	GND	Protective input safety
FastON	ACC	Return side of AC input
FastON	AC	Hi - fused side - of AC input

Signal Circuits					
J1		J3		J4	
Pin	Function	Pin	Function	Pin	Function
1	+ Sense	1	Ishare	1	AC range
2	- Sense	2	Ishare rtn (-48)	2	AC range rtn ⁶
3	Remote	3	n/a		
4	Remote rtn (-)				

⁶ Digital common is isolated from input circuitry or main output power

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Ordering Information

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

PRODUCT	DESCRIPTION	PART NUMBER
1350W Rectifier	Configurable 48V _{OUT} , as either +48V or -48V	MPR1348FPXXXZ01A

Contact Us

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