Wall Industries, Inc.

APPLICATION NOTES
Rev. B

MPQ48S24-100

100 W DC-DC Converter
36-75 Vdc Input
24 Vdc Output at 4.17 A
Quarter-Brick Package

Features:

- **Over 87% Efficient at Full Load**
- **Fast Transient Response**
- **Operation to No Load**
- **Output Trim +/-10%**
- **Remote ON/OFF**
- **Remote Sense Compensation**
- **Low Output Ripple**
- **Fixed Switching Frequency**
- **Output Over Current Protection**
- **Output Short Circuit Protection**
- **Over Temperature Protection**
- **1500 VDC Isolation**
- **100% Burn In**
- **Heatsink Available**

Description:

The MPQ series is a high density, low voltage input quarter brick converter that incorporates the desired features required in today's demanding applications while maintaining low cost. When performance, reliability, and low cost are needed, the MPQ series delivers.

Technical Specifications	*Model No.*	MPQ48S24-100			
All specifications are based on 25C, Nominal Line and Full Load unless otherwise noted. We reserve the right to change specifications based on technological advances.					
SPECIFICATION	**Related condition**				
		MIN	**NOM**	**MAX**	**Unit Measured**
INPUT					
Turn on at			**35**		Volt DC
Turn off at			**34**		Volt DC
Input Over voltage Shutdown					
Turn off at			**n/a**		Volt DC
Turn on at			**n/a**		Volt DC
Operating Voltage Range	Rated Input Voltage	**36**	**48**	**75**	Volt DC
Maximum Input Current	Low Line 100% load		**3**		A
No Load Input Current			**94**		mA
Input Current under "LOGIC OFF"			**1**		mA
Inrush Current Transient Rating			**1**		A^2 Sec
Reflected Ripple Current	12uH / 33 uF input filter		**6**		mA
OUTPUT					
Output Voltage Set point		**23.76**	**24**	**24.24**	Volt DC
Output Voltage Regulation					
Over Load			**± 0.2**		%
Over Line			**± 0.2**		%
Over Temperature			**0.02**		% / °C
Output Voltage Ripple and Noise					
Basic Ripple			**70**	**200**	mV
Spikes P-P			**100**	**200**	mV
Output Current Ranges	Rated Output Current	**0**		**4.17**	A
Output Current Limit	Self Resetting	**4.59**	**5.4**	**6.2**	A
Short Term Output Current Surge					A/sec
DYNAMIC CHARACTERISTICS					
Input Voltage Ripple Rejection	120 Hz		**60**		dB
Output Transient and Load Changes					
Load step / Δ V	**X** 50 to 75% ☐ 50 to 100%		**130**		mV
Load step / Δ V	**X** 75 to 50% ☐ 100 to 50 %		**90**		mV
Recovery Time	To within 1% Rated Vo		**50**		µsec
Turn on Delay	From Vin(nom) to 90% Vout (nom)		**25**		msec
Overshoot of Output Voltage	Full Load Resistive		**0**		%
EFFICIENCY					
@ 100% load			**91**		%
@ 75% load			**92**		%
@ 50% load			**92**		%
@ 25% load			**87**		%
TEMPERATURE CONSIDERATIONS					
Thermal Resistance					
Normal Convection	Rθc-a				°C/Watt
100 lfm					°C/Watt
200 lfm					°C/Watt
300 lfm					°C/Watt
400 lfm					°C/Watt
Heatsink Considerations	Available, Contact Factory				
General Technical Data					
Switching Frequency	Fixed		**330**		KHz
Remote ON OFF Control	Acitve HIGH or LOW				High/Low TTL
Trimmablility		**21.6**		**26.4**	Volt DC
Over Temperature Shutdown	PCB Temperature			**125**	°C
MTBF					
	Bellcore TR-332		**1.81 E6**		Hours

Note: Positive Remote ON/OFF control is standard. To order negative logic Remote ON/OFF control add the suffix "R" to the part number.

Table 1: Pin Assignments

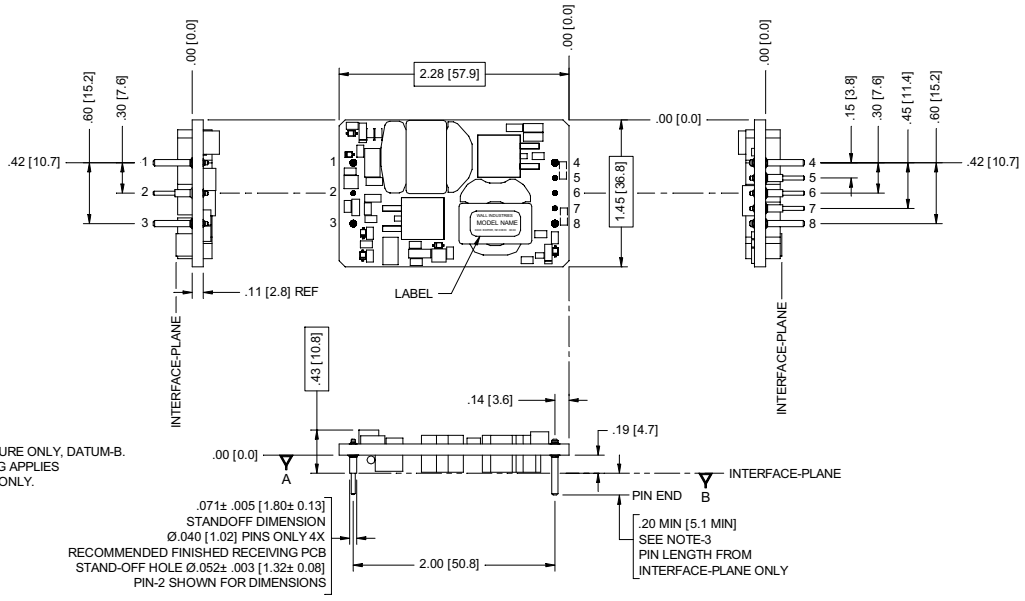
Pin #	Pin Name	Function	Comments
1	+Vin	Positive Input	
2	Enable	Remote On/Off	If not used, leave open for standard unit, short to –Vin on 'R' units.
3	-Vin	Negative Input	
4	+Vout	Negative Output	
5	+SENSE	Negative Remote Sense	If not used, short to –Vo.
6	TRIM	Output Voltage Trim	If not used, leave open.
7	-SENSE	Positive Remote Sense	If not used, short to +Vo.
8	-Vout	Positive Output	

Figure 1: Mechanical Dimensions

(Open Frame - no suffix)

Unit: inches [mm]

PIN DESIGNATION		PIN Ø
1	+ Vin	Ø.062 [1.57]
2	ON/OFF	Ø.040 [1.02]
3	-Vin	Ø.062 [1.57]
4	+ Vout	Ø.062 [1.57]
5	+ SENSE	Ø.040 [1.02]
6	TRIM	Ø.040 [1.02]
7	-SENSE	Ø.040 [1.02]
8	-Vout	Ø.062 [1.57]



NOTES:

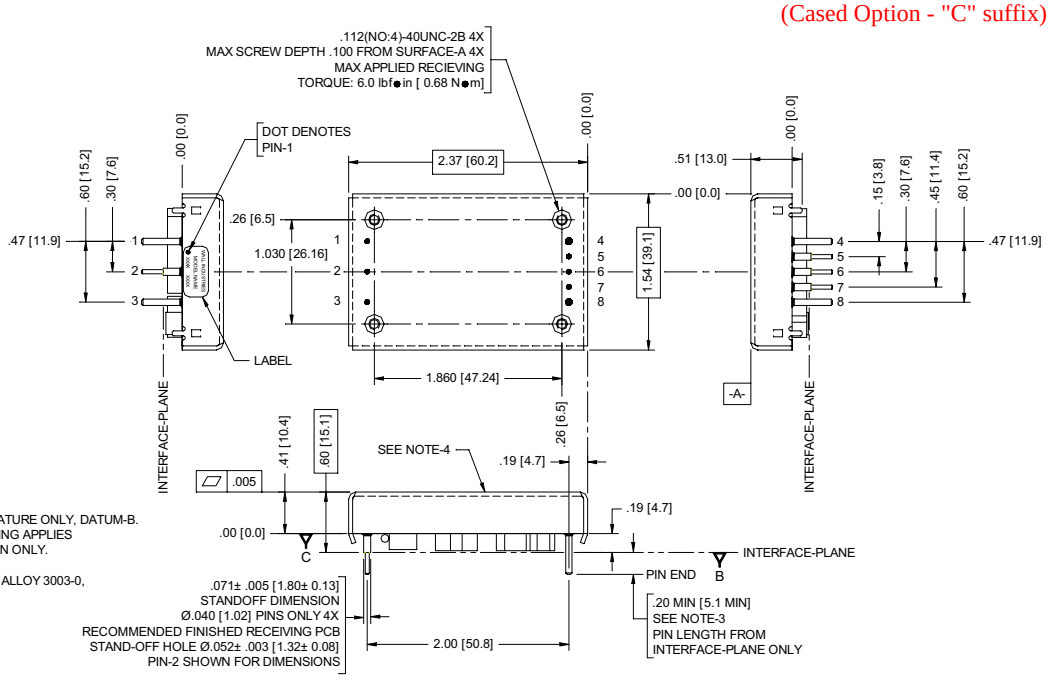
1. PIN TO PIN TOLERANCE: ± .010 [± 0.25] MEASURED AT STANDOFF FEATURE ONLY, DATUM-B.
2. PIN DIAMETER TOLERANCE OF : ± .005 [± 0.13] MEASUREMENT READING APPLIES TO AREA FROM INTERFACE-PLANE SURFACE DATUM-B TO END OF PIN ONLY.
3. UNLESS OTHERWISE SPECIFIED.

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES
[XX] ARE IN MILLIMETERS
APPLIED TOLERANCES:
ANGLES= ± 1°
.XX= ± .02[0.5] .XXX= ± .010[0.25]
DO NOT SCALE DRAWING
INTERPRET DIMENSION AND TOLERANCE
PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

(Cased Option - "C" suffix)

PIN DESIGNATION		PIN Ø
1	+ Vin	Ø.062 [1.57]
2	ON/OFF	Ø.040 [1.02]
3	-Vin	Ø.062 [1.57]
4	+ Vout	Ø.062 [1.57]
5	+ SENSE	Ø.040 [1.02]
6	TRIM	Ø.040 [1.02]
7	-SENSE	Ø.040 [1.02]
8	-Vout	Ø.062 [1.57]

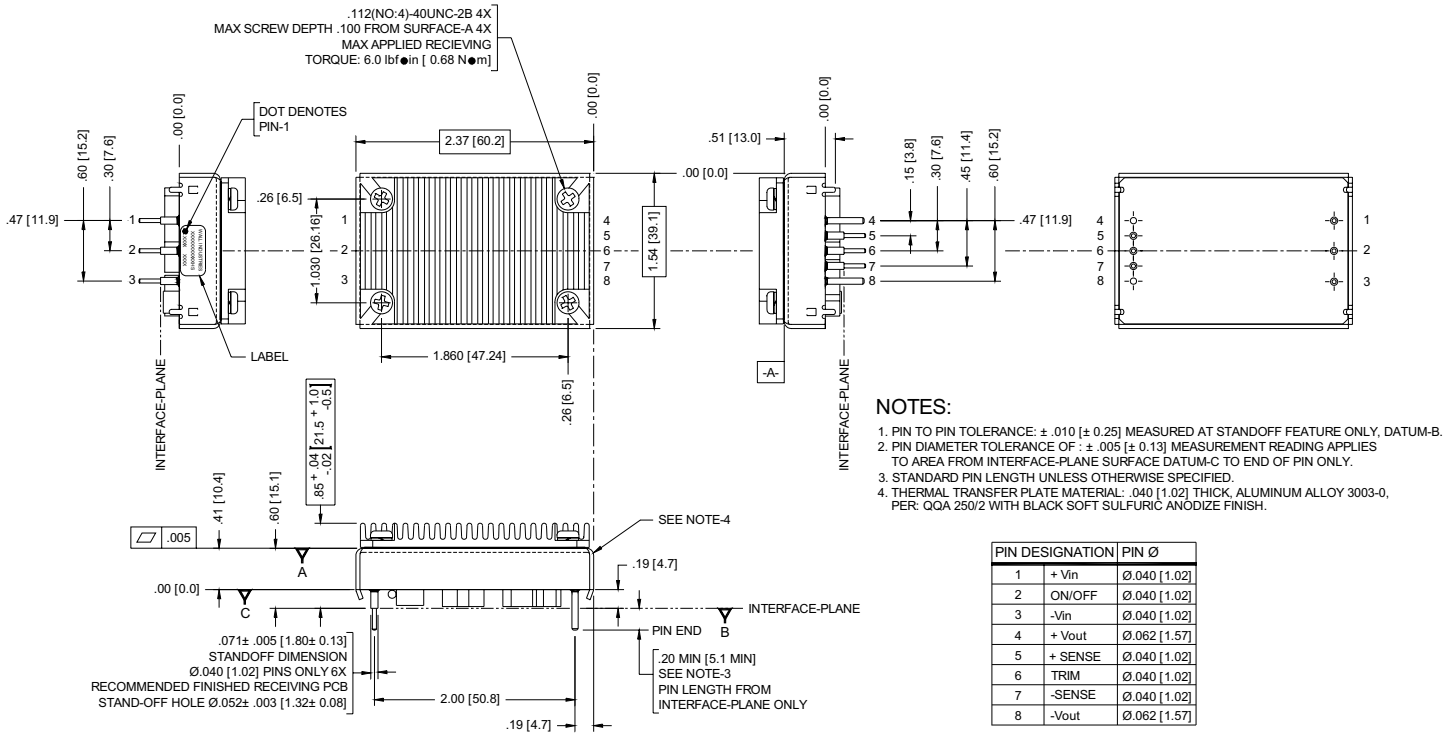


NOTES:

1. PIN TO PIN TOLERANCE: ± .010 [± 0.25] MEASURED AT STANDOFF FEATURE ONLY, DATUM-B.
2. PIN DIAMETER TOLERANCE OF : ± .005 [± 0.13] MEASUREMENT READING APPLIES TO AREA FROM INTERFACE-PLANE SURFACE DATUM-C TO END OF PIN ONLY.
3. UNLESS OTHERWISE SPECIFIED.
4. THERMAL TRANSFER PLATE MATERIAL: .040 [1.02] THICK, ALUMINUM ALLOY 3003-0, PER: QQA 250/2 WITH BLACK SOFT SULFURIC ANODIZE FINISH.

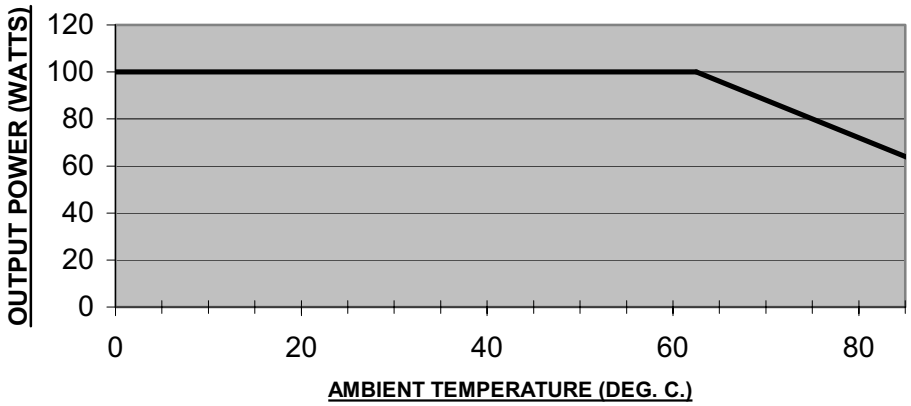
Mechanical Dimensions (Heatsink Option - "HS" suffix)

Unit: inches [mm]

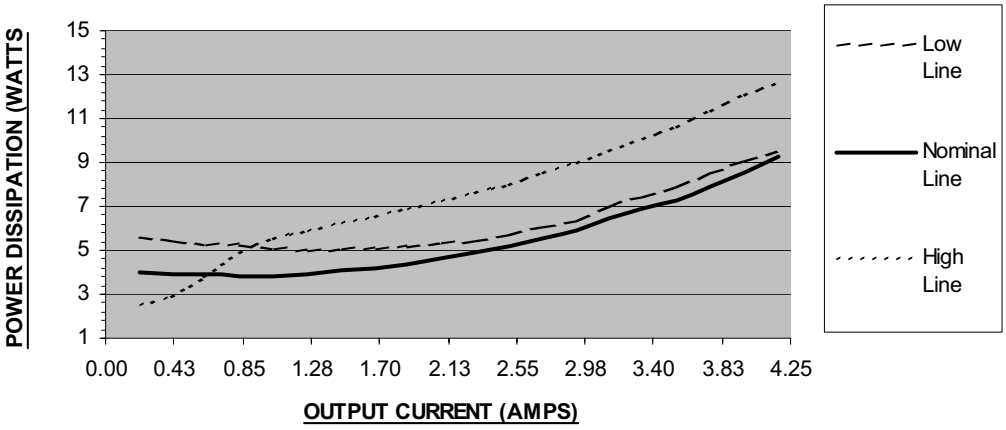


PIN DESIGNATION		PIN Ø
1	+ Vin	Ø.040 [1.02]
2	ON/OFF	Ø.040 [1.02]
3	-Vin	Ø.040 [1.02]
4	+ Vout	Ø.062 [1.57]
5	+ SENSE	Ø.040 [1.02]
6	TRIM	Ø.040 [1.02]
7	-SENSE	Ø.040 [1.02]
8	-Vout	Ø.062 [1.57]

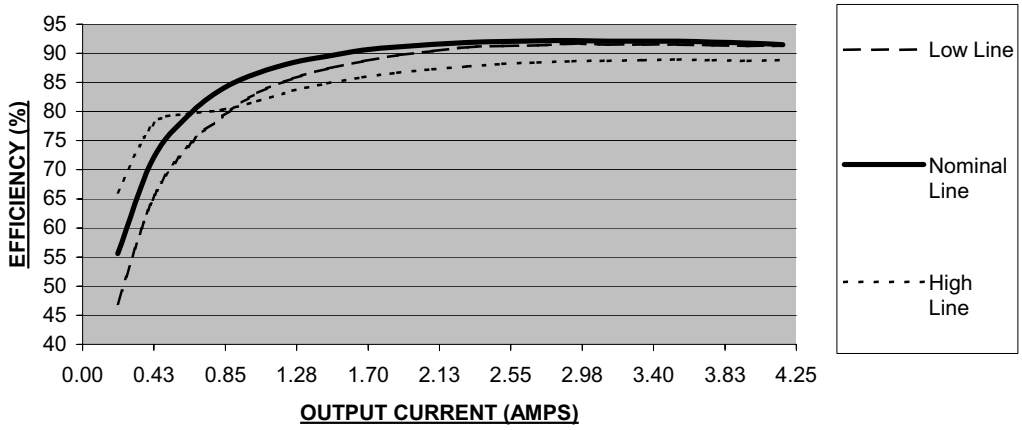
DERATING CURVE

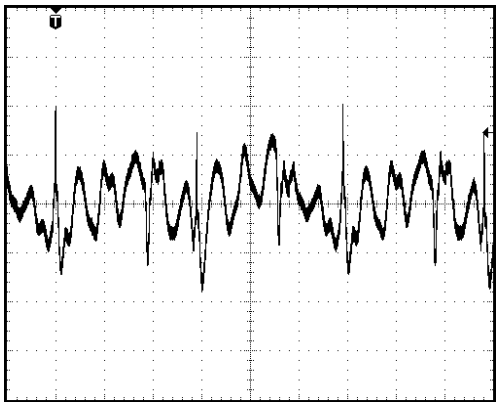


POWER DISSIPATION VS OUTPUT CURRENT

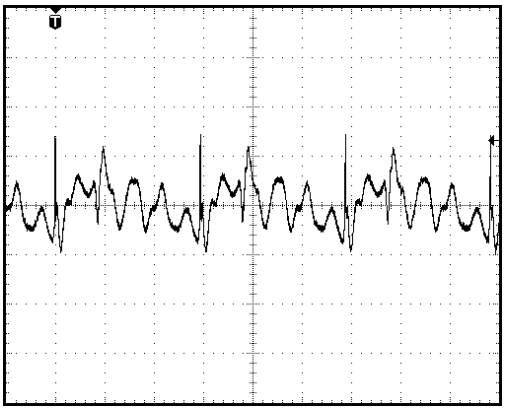


EFFICIENCY VS OUTPUT CURRENT

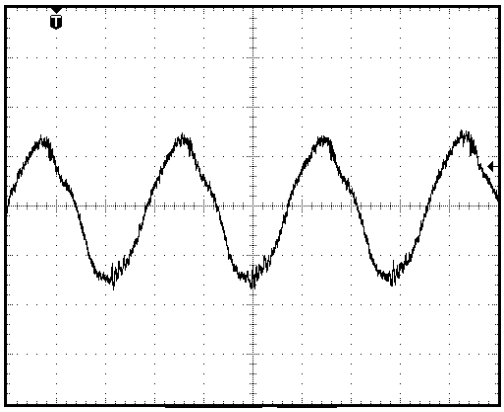




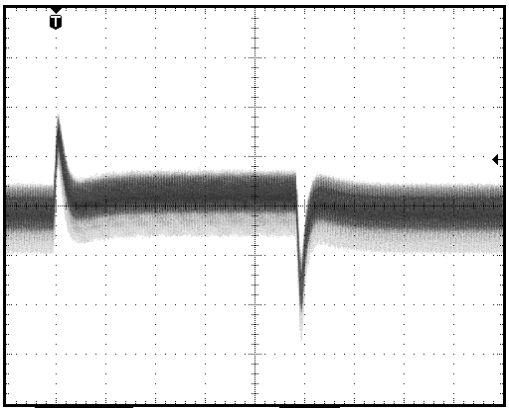
TYPICAL OUTPUT RIPPLE
50mV/div, 1uS/div, full load, 36Vin
10uF // 0.1uF decoupling caps room temp



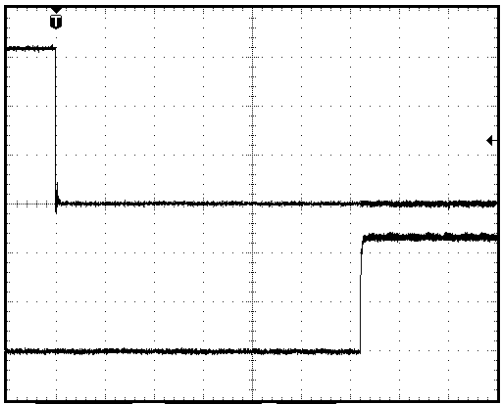
TYPICAL OUTPUT RIPPLE
50mV/div, 1uS/div, full load 75Vin
10uF // 0.1uF decoupling cap room temp



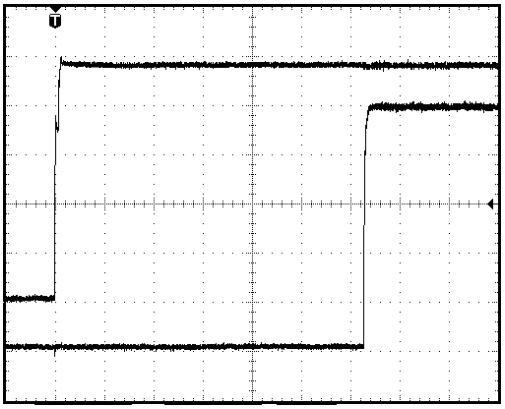
TYPICAL INPUT RIPPLE CURRENT
2mA/div, 1uS/div, full load 48Vin at
room temp with a 12 uH / 33 uF input filter



TYPICAL TRANSIENT RESPONSE
50mV/div, 200uS/div, 50% full load
to 100% full load 48Vin room temp



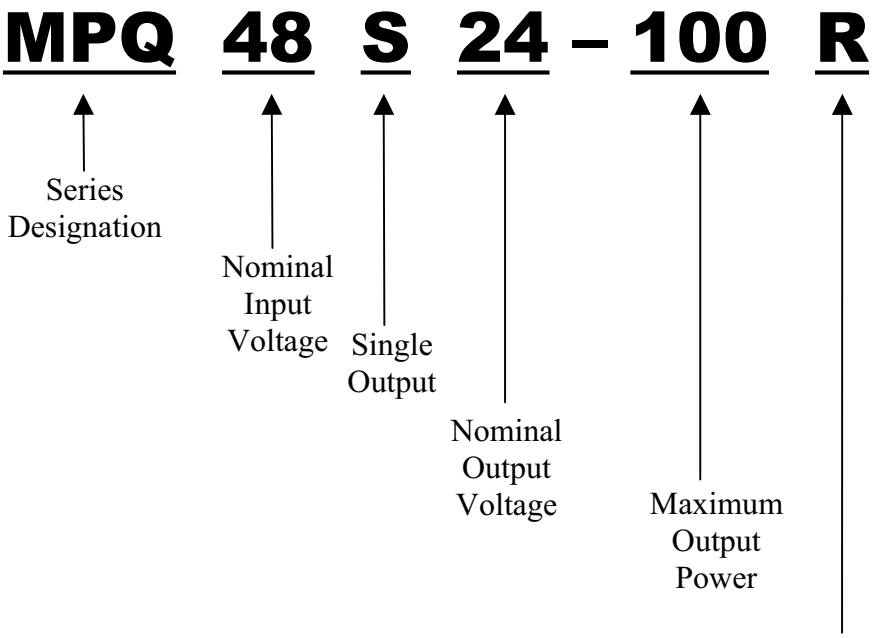
TYPICAL RISE TIME & TURN-ON DELAY
USING LOGIC ENABLE
2V/div, 4mS/div (Vout), 1V/div 4mS/div (logic
enable) 36Vin, full load at room temp



TYPICAL RISE TIME & TURN-ON DELAY
WITH Vin 0-48V
1V/div, 4mS/div (Vout), 10V/div, 4mS/div (Vin)
at room temp

Ordering Information:

Part Number Example:



Options	
	Leave Blank for no Options
R	Active Low
C	Case
HS	Heatsink

Company Information:

Wall Industries, Inc. has created custom and modified units for over 40 years. Our in-house research and development engineers will provide a solution that exceeds your performance requirements on-time and on budget. Our ISO9001-2000 certification is just one example of our commitment to producing a high quality, well documented product for our customers.

Our past projects demonstrate our commitment to you, our customer. Wall Industries, Inc. has a reputation for working closely with its customers to ensure each solution meets or exceeds form, fit and function requirements. We will continue to provide ongoing support for your project above and beyond the design and production phases. Give us a call today to discuss your future projects.

Contact **Wall Industries** for further information:

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