Make-Ps®
DC/DC CONVERTER

500WFR series

Single Output DC/DC Converter

Features

- Up to 86% Efficiency
- Single Output, 3.3 to 6 watt converter
- 2 - *1 Input Voltage Range*
- Up to 3,000 VDC Input / Output Isolation
- Short Circuit Protection
- Industry Standard Pinout

Descriptions

The 500WFR series single output power modules are 3.3 to 6 watts high efficiency, low profile dc-dc converters that operate over a wide input voltage range of 4.5 - 9 VDC, 9 - 18 VDC, 18 - 36 VDC and 36 - 72 VDC and provide precisely regulated output voltages of 3.3V, 5V, 12V, and 15V.

The -25°C to +71°C operating temperature range makes it ideal for data communication equipment, mobile battery driven equipment, distributed power systems, telecommunication equipment, mixed analog/digital subsystems, process/ machine control equipment, computer peripheral systems and industrial robot systems.

Input Characteristics

	Min	Typ	Max	Unit/Comments
Input Voltage				
5 VDC Input Models	4.5	5	9	VDC
12 VDC Input Models	9	12	18	VDC
24 VDC Input Models	18	24	36	VDC
48 VDC Input Models	36	48	72	VDC
Input Fuse Requirements				
5 VDC Input Models		3000		mA; Slow blow type
12 VDC Input Models		1500		mA; Slow blow type
24 VDC Input Models		700		mA; Slow blow type
48 VDC Input Models		350		mA; Slow blow type
Reverse Polarity Input Current			1	A
Short Circuit Input Power		1000	3000	mW
Input Filter				Pi Filter

Output Characteristics

	Min	Typ	Max	Unit/Comments
Line Regulation				
500WFR, 500WFR-H			±0.5	%; LL to HL @ FL
500WFR-M			±0.3	%; LL to HL @ FL
Load Regulation				
500WFR, 500WFR-H			±0.5	%; 10% load to FL @ Nom.Line
500WFR-M			±1	%; 20% load to FL @ Nom.Line
Output Voltage Accuracy				
500WFR, 500WFR-H			±2	%
500WFR-M			±1	%
Temperature Coefficient				
500WFR, 500WFR-H			±.05	% per degree C
500WFR-M			±.02	% per degree C
Ripple/Noise				p-p, Nom.Line @FL, 20MHz B.W.,
500WFR, 500WFR-H			100	mV (3.3 & 5V Outputs)
500WFR, 500WFR-H			1	% of Vout (12 & 15V Outputs)
500WFR-M			100	mV
Short Circuit Protection				Continuous, Automatic Recovery

General Characteristics

	Min	Typ	Max	Unit/Comments
Agency Approval 500WFR, 500WFR-H				UL/CUL 1950, Rheinland, TUV, EN60950
Isolation Voltage				
500WFR	500			VDC
500WFR-H	3000			VDC
500WFR-M	1500			VDC
Isolation Resistance				
500WFR, 500WFR-H	10			GOhms
500WFR-M	1			GOhms
Switching Frequency				
500WFR, 500WFR-H	100			kHz
500WFR-M		300		kHz

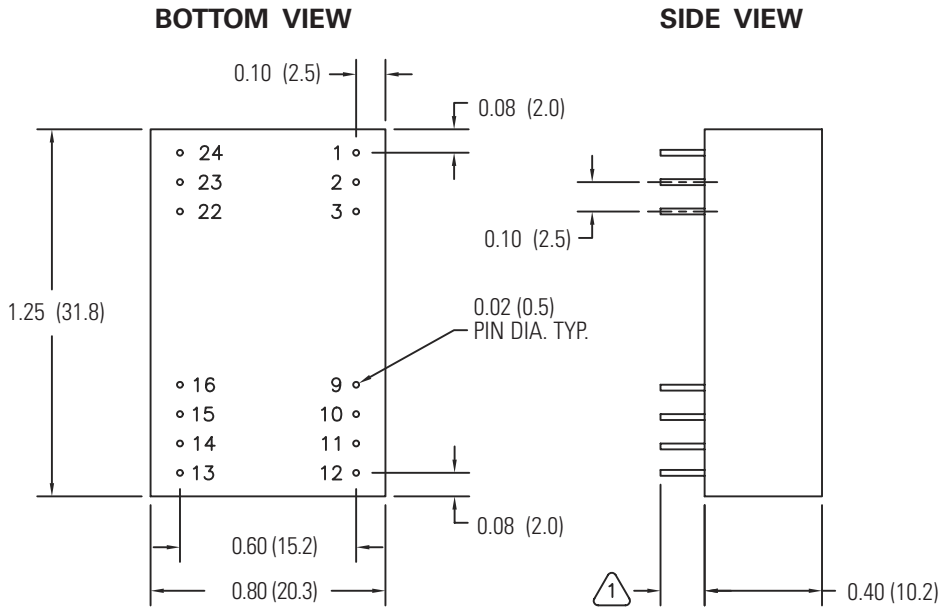
Environmental Specifications

	Min	Typ	Max	Unit/Comments
Operating Temp. Range				
500WFR, 500WFR-H	-25		+71	°C; Ambient
500WFR-M	-40		+71	°C; Ambient
Operating Temp. Range				
500WFR, 500WFR-H	-25		+95	°C; Case
500WFR-M	-40		+90	°C; Case
Storage Temp. Range				
500WFR, 500WFR-H	-40		+100	°C
500WFR-M	-45		+100	°C
Relative Humidity			95	% Humidity; non-condensing
Cooling				Free-Air Convection

Physical Characteristics

	Unit/Comments
Case Size	1.25 x .80 x .40 inches (31.8 x 20.3 x 10.2 mm)
Case Material	
500WFR, 500WFR-H	Black Plastic
500WFR-M	Metal with non-conductive baseplate
Flammability	UL94V-0
Weight	14.2 Grams

Outline Drawing



Pin Out Chart (500WFR Single Output)

Pins	500WFR	500WFR-H	500WFR-M
1	+ Vin	No Pin	No Pin
2	NC	- Vin	-Vin
3	NC	-Vin	-Vin
9	No Pin	NC	No Pin
10	- Vout	NC	No Pin
11	+ Vout	NC	NC
12	- Vin	No Pin	No Pin
13	- Vin	No Pin	No Pin
14	+ Vout	+ Vout	+Vout
15	- Vout	NC	No Pin
16	No Pin	-Vout	-Vout
22	NC	+Vin	+V in
23	NC	+Vin	+V in
24	+Vin	No Pin	No Pin

NC = No Connection

Notes:

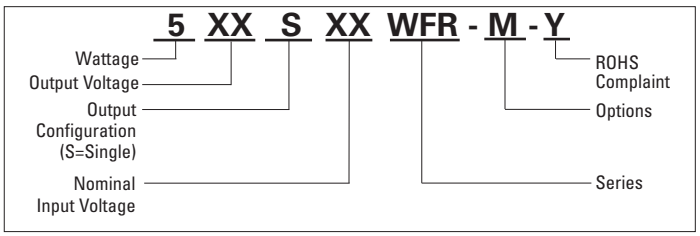
1. 500WFR, 500WFR-H = 0.150 (3.8)
   500WFR-M = 0.160 (4.1)
2. Unless otherwise specified dimensions are in inches (mm).

Tolerances	Inches	mm
	X.XX = ±0.02	X.X = ±0.5
	X.XXX= ±0.010	X.XX = ±0.25
Pin :	±0.002	±0.05

All specifications are typical at nominal input, nominal load and 25° C unless otherwise specified.
External, low ESR, 10 microfarad (minimum) capacitor across output is recommended for operation.

How To Order

How to Order



Optional Features

-M Option, Metal Case: To choose the metal case option to the converter please add a "-M" at the end of the part number. Example: 503S12WFR-M.

-H Option, High Voltage Plastic Isolation Case: To choose the high voltage plastic isolation option, please add a "-H" at the end of the part number. Example: 503S12WFR-H.

Model Selection Chart

Model	Nominal Input Voltage (VDC)	Input Voltage Range (VDC)	Input Current @ No-Load Typ. (mA)	Input Current @ Full Load Typ. (mA)	Output Voltage (VDC)	Full Load Output Current (mA)	Efficiency @ FL (%)
503S12WFR	12	9 - 18	7.5	393	3.3	1000	70
505S12WFR	12	9 - 18	7.5	545	5.0	1000	76
512S12WFR	12	9 - 18	7.5	585	12.0	470	80
515S12WFR	12	9 - 18	7.5	625	15.0	400	80
503S24WFR	24	18 - 36	5	197	3.3	1000	70
505S24WFR	24	18 - 36	5	265	5.0	1000	78
512S24WFR	24	18 - 36	5	285	12.0	470	82
515S24WFR	24	18 - 36	5	305	15.0	400	82
503S48WFR	48	36 - 72	2	98	3.3	1000	70
505S48WFR	48	36 - 72	2	133	5.0	1000	78
512S48WFR	48	36 - 72	2	145	12.0	470	81
515S48WFR	48	36 - 72	2	154	15.0	400	81
503S12WFR-H	12	9 - 18	7.5	393	3.3	1000	70
505S12WFR-H	12	9 - 18	7.5	545	5.0	1000	76
512S12WFR-H	12	9 - 18	7.5	585	12.0	470	80
515S12WFR-H	12	9 - 18	7.5	625	15.0	400	80
503S24WFR-H	24	18 - 36	5	197	3.3	1000	70
505S24WFR-H	24	18 - 36	5	265	5.0	1000	78
512S24WFR-H	24	18 - 36	5	285	12.0	470	82
515S24WFR-H	24	18 - 36	5	305	15.0	400	82
503S48WFR-H	48	36 - 72	2	98	3.3	1000	70
505S48WFR-H	48	36 - 72	2	133	5.0	1000	78
512S48WFR-H	48	36 - 72	2	145	12.0	470	81
515S48WFR-H	48	36 - 72	2	154	15.0	400	81
503S5WFR-M	5	4.5 - 9	70	1065	3.3	1000	75
505S5WFR-M	5	4.5 - 9	70	1265	5.0	1000	79
512S5WFR-M	5	4.5 - 9	70	1463	12.0	470	82
515S5WFR-M	5	4.5 - 9	70	1463	15.0	400	82
503S12WFR-M	12	9 - 18	20	429	3.3	1000	71
505S12WFR-M	12	9 - 18	20	514	5.0	1000	81
512S12WFR-M	12	9 - 18	20	595	12.0	470	84
515S12WFR-M	12	9 - 18	20	595	15.0	400	84
503S24WFR-M	24	18 - 36	5	209	3.3	1000	79
505S24WFR-M	24	18 - 36	5	251	5.0	1000	83
512S24WFR-M	24	18 - 36	5	291	12.0	470	86
515S24WFR-M	24	18 - 36	5	291	15.0	400	86
503S48WFR-M	48	36 - 75	3	104	3.3	1000	79
505S48WFR-M	48	36 - 75	3	126	5.0	1000	83
512S48WFR-M	48	36 - 75	3	145	12.0	470	86
515S48WFR-M	48	36 - 75	3	145	15.0	400	86

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