

# 2000WFR series

NEW Approved for New Designs

**MARTEK  
POWER**

www.martekpower.com

## Single Output DC/DC Converter



### DESCRIPTIONS

Delivering up to 20 watts in an industry standard 1" X 2" X 0.4" package this broad line of high density converters provide up to 25 watts/in<sup>3</sup> saving valuable board space. Key to providing this high a power level in a 1" X 2" footprint is the outstanding thermal performance with efficiencies up to 89%. The 2000WFR series are available in 12Vdc, 24Vdc and 48Vdc input, with a 2 to 1 input range, and with single output modules of 3.3Vdc, 5Vdc, 12Vdc, 15Vdc making them one of the most versatile product lines available today in the market. They are ideally suited to data communications applications, mobile battery driven equipment, telecommunications equipment, mixed analog/digital subsystems and process/control systems.

### OUTPUT CHARACTERISTICS

	Min	Typ	Max	Unit/Comments
Output Voltage Set Point		±1		% Output voltage at nominal line & FL
Total Band Error	-2		+2	% Output voltage including line/load regulation setting
Line Regulation		±0.3		% Output voltage measured from min. input line to maximum
Load Regulation		±0.5		% Output voltage measured from FL to 10% load (Balanced Loads)
Temperature Coefficient		±0.01		% per degree C
Ripple/Noise		60	100	mV p-p measured at 20 MHz bandwidth with external 1 µf capacitor
Output Voltage and Current				Refer to model selection chart
Load Transient Response		±1		% deviation of Vout voltage for a 25% load change for 300µS
Short Circuit Protection				Indefinite, Automatic Recovery
Overvoltage Protection		125		%; Clamp type (5VDC output set at 6.8VDC)

### FEATURES

- Up to 89% Efficiency
- Single Output, 20 watt converter
- Available in 12, 24 and 48 VDC Inputs 2 - 1 Input Range
- Industry Standard 1.0" X 2.0" X 0.4" Package
- Remote On/Off, Output Over Voltage and Short Circuit Protection
- 6 sided Continuous Shielding and EN55022 Level A

### INPUT CHARACTERISTICS

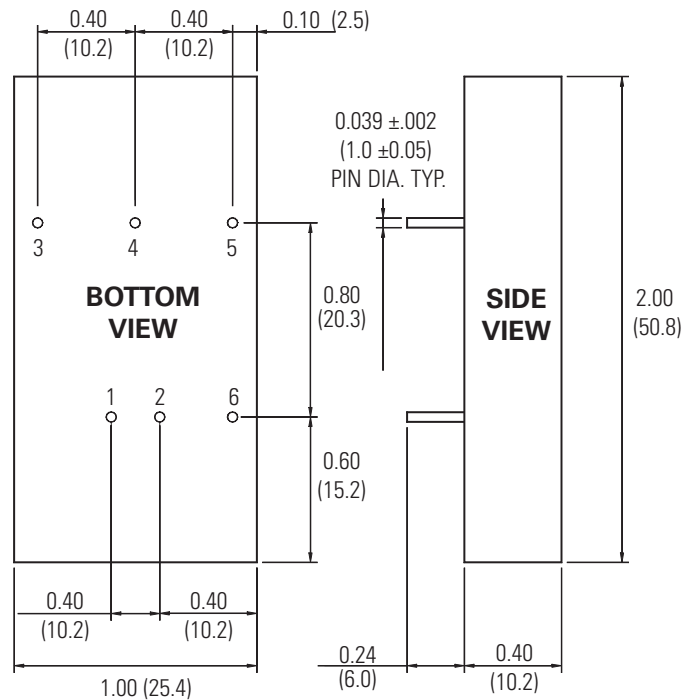
	Min	Typ	Max	Units/Comments
Input Voltage				
12 VDC Input Models	9	12	18	VDC
24 VDC Input Models	18	24	36	VDC
48 VDC Input Models	36	48	75	VDC
Under Voltage Shut Down				
12 VDC Input Models		8.1	8.8	VDC
24 VDC Input Models		16	17.5	VDC
48 VDC Input Models		32	34	VDC
Minimum Input Current				
12 VDC Input Models		30		mA
24 VDC Input Models		17		mA
48 VDC Input Models		10		mA
Full Load Input Current (at Nominal Input Voltage)				
12 VDC Input Models			2.04	A
24 VDC Input Models			1.00	A
48 VDC Input Models			0.49	A
Input Fuse Requirements				
12 VDC Input Models			4	Amps; Slow blow type
24 VDC Input Models			2	Amps; Slow blow type
48 VDC Input Models			1	Amps; Slow blow type
Efficiency by Model				
2003S12WFR		81		%; FL Nominal Line
2005S12WFR		84		%; FL Nominal Line
2012S12WFR		88		%; FL Nominal Line
2015S12WFR		88		%; FL Nominal Line
2003S24WFR		82		%; FL Nominal Line
2005S24WFR		85		%; FL Nominal Line
2012S24WFR		89		%; FL Nominal Line
2015S24WFR		89		%; FL Nominal Line
2003S48WFR		82		%; FL Nominal Line
2005S48WFR		85		%; FL Nominal Line
2012S48WFR		89		%; FL Nominal Line
2015S48WFR		89		%; FL Nominal Line
Switching Frequency	290	330	360	kHz; Factory set
Remote Shut Down	Off	-1	+1	VDC; Referenced to input
	On	3.7		VDC or open; Referenced to input
Input - Output Capacitance		1200		pF
Input Filter				Pi type
Isolation Voltage		1500		VDC
Isolation Resistance		1000		MOhms

Martek Power reserves the right to change specifications without notice.

## MODEL SELECTION CHART

	Input Voltage (VDC)	Output Voltage (VDC)	Full Load Output Current (A)
2003S12WFR	12	3.3	4.00
2005S12WFR	12	5.0	4.00
2012S12WFR	12	12.0	1.67
2015S12WFR	12	15.0	1.34
2003S24WFR	24	3.3	4.00
2005S24WFR	24	5.0	4.00
2012S24WFR	24	12.0	1.67
2015S24WFR	24	15.0	1.34
2003S48WFR	48	3.3	4.00
2005S48WFR	48	5.0	4.00
2012S48WFR	48	12.0	1.67
2015S48WFR	48	15.0	1.34

## OUTLINE DRAWING



## PIN OUT CHART

Pins	FUNCTION
1	+ Vin
2	- Vin
3	+ Vout
4	NO PIN
5	- Vout
6	REMOTE ON/OFF

### Notes:

1. Unless otherwise specified dimensions are in inches (mm).

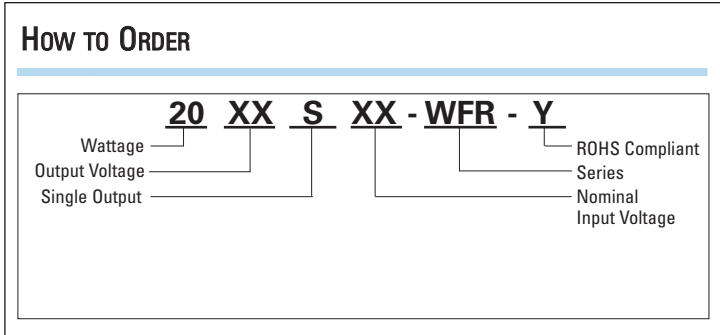
Tolerances	Inches	mm
	X.XX = ±0.02	X.X = ±0.5
	X.XXX = ±0.010	X.XX = ±0.25

## GENERAL CHARACTERISTICS

	Min	Typ	Max	Unit/Comments
Operating Temp. Range	-40		+50	°C; measured at ambient
Operating Temp. Range	-40		+105	°C; measured at case
Storage Temp. Range	-55		+125	°C; measured at case
Material Flammability				UL94V-0
Altitude: Operating			10,000	Feet
Non-Operating			40,000	Feet
Relative Humidity	5		95	% Humidity, non-condensing
Weight			30	Grams
Size				1.0" X 2.0" X 0.4"
Case Material				Metal with non-conductive baseplate
Agency Approvals				UL/CUL1950, EN60950

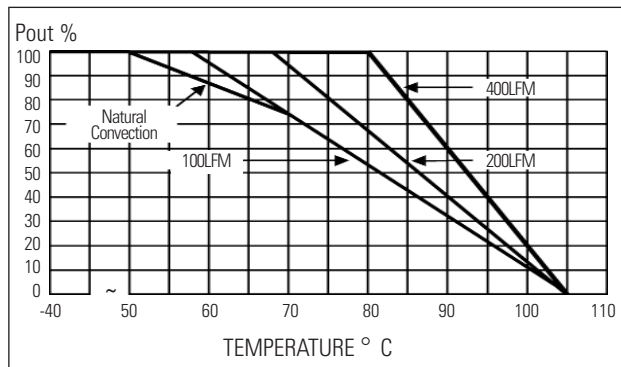
All specifications are typical at nominal input, nominal load and 25° C unless otherwise specified. External, low ESR, 10 microfarad (minimum) capacitor across output is recommended for operation.

# How To ORDER



# DERATING CURVES

### MODEL 2000WFR Single



## Dual Output DC/DC Converter



### DESCRIPTIONS

Delivering up to 20 watts in an industry standard 1" X 2" X 0.4" package this broad line of high density converters provide up to 25 watts/in<sup>3</sup> saving valuable board space. Key to providing this high a power level in a 1" X 2" footprint is the outstanding thermal performance with efficiencies up to 89%. The 2000WFR series are available in 12Vdc, 24Vdc and 48Vdc input, with a 2 to 1 input range, and with dual output modules of +/-12Vdc, +/-15Vdc making them one of the most versatile product lines available today in the market. They are ideally suited to data communications applications, mobile battery driven equipment, telecommunications equipment, mixed analog/ digital subsystems and process/control systems.

### OUTPUT CHARACTERISTICS

	Min	Typ	Max	Unit/Comments
Output Voltage Set Point		±1		% Output voltage at nominal line & FL
Total Band Error	-3		+3	% Output voltage including line/load regulation setting
Line Regulation		±0.3		% Output voltage measured from min. input line to maximum
Load Regulation		±0.5		% Output voltage measured from FL to 10% load (Balanced Loads)
Temperature Coefficient		±0.01		% per degree C
Ripple/Noise		60	100	mV p-p measured at 20 MHz bandwidth with external 1 µf capacitor
Output Voltage and Current				Refer to model selection chart
Load Transient Response		±1		% deviation of Vout voltage for a 25% load change for 300µs
Short Circuit Protection				Indefinite, Automatic Recovery
Overvoltage Protection		120		%; Clamp type

### FEATURES

- Up to 89% Efficiency
- Dual Output, 20 watt converter
- Available in 12, 24 and 48 VDC Inputs 2-1 Input Range
- Industry Standard 1.0" X 2.0" X 0.4" Package
- Remote On/Off, Output Over Voltage and Short Circuit Protection
- 6 sided Continuous Shielding and EN55022 Level A

### INPUT CHARACTERISTICS

	Min	Typ	Max	Units/Comments
Input Voltage				
12 VDC Input Models	9	12	18	VDC
24 VDC Input Models	18	24	36	VDC
48 VDC Input Models	36	48	75	VDC
Under Voltage Shut Down				
12 VDC Input Models	8.1		8.6	VDC
24 VDC Input Models	17		18	VDC
48 VDC Input Models	34		36	VDC
Minimum Input Current				
12 VDC Input Models		30		mA
24 VDC Input Models		17		mA
48 VDC Input Models		10		mA
Full Load Input Current (at Nominal Input Voltage)				
12 VDC Input Models			1.92	A
24 VDC Input Models			0.96	A
48 VDC Input Models			0.47	A
Input Fuse Requirements				
12 VDC Input Models			4.0	Amps; Slow blow type
24 VDC Input Models			2.0	Amps; Slow blow type
48 VDC Input Models			1.0	Amps; Slow blow type
Efficiency by Model				
2012D12WFR		88		%; FL Nominal Line
2015D12WFR		88		%; FL Nominal Line
2012D24WFR		89		%; FL Nominal Line
2015D24WFR		89		%; FL Nominal Line
2012D48WFR		89		%; FL Nominal Line
2015D48WFR		89		%; FL Nominal Line
Switching Frequency	290	330	360	kHz; Factory set
Remote Shut Down	Off	-1	+1	VDC; Referenced to input
	On	2.5		VDC or open ; Referenced to input
Input - Output Capacitance		1200		pF
Input Filter				Pi type
Isolation Voltage		1500		VDC
Isolation Resistance		1000		MΩhms

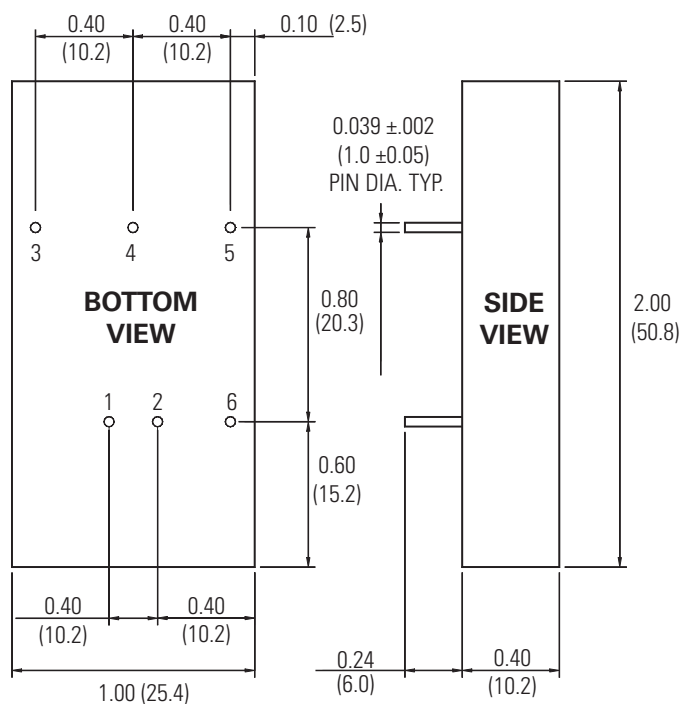
## MODEL SELECTION CHART

	Input Voltage (VDC)	Output Voltage (VDC)	Full Load Output Current (A)
2012D12WFR	12	±12	±0.835
2015D12WFR	12	±15	±0.67
2012D24WFR	24	±12	±0.835
2015D24WFR	24	±15	±0.67
2012D48WFR	48	±12	±0.835
2015D48WFR	48	±15	±0.67

## GENERAL CHARACTERISTICS

	Min	Typ	Max	Unit/Comments
Operating Temp. Range	-40		+50	°C; measured at ambient
Operating Temp. Range	-40		+105	°C; measure at case
Storage Temp. Range	-55		+125	°C; measured at case
Material Flammability				UL94V-0
Altitude: Operating			10,000	Feet
Non-Operating			40,000	Feet
Relative Humidity	5		95	% Humidity, non-condensing
Weight			30	Grams
Size				1.0" X 2.0" X 0.4"
Case Material				Metal with non-conductive baseplate
Agency Approvals				UL/CUL1950, EN60950

## OUTLINE DRAWING



## PIN OUT CHART

Pins	FUNCTION
1	+ Vin
2	- Vin
3	+ Vout
4	COMMON
5	- Vout
6	REMOTE ON/OFF

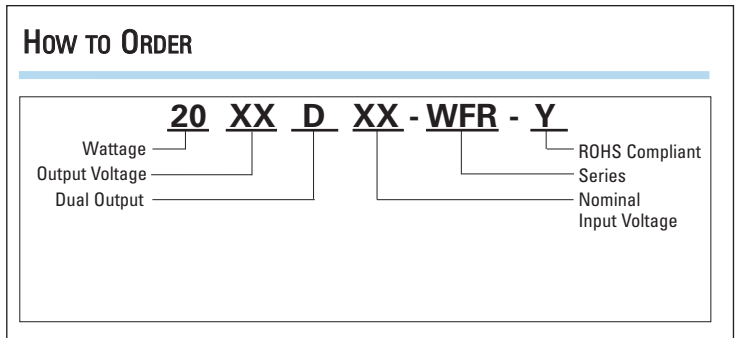
### Notes:

1. 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

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.

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