

Integral Metal Substrate



*Non-encapsulated, six-sided shielding*

## WRF20 Series

(Wide Range input)

Single & triple Outputs

- Industry Standard Pinout**
- Six-sided shielding**
- Wide Input Range 4:1**
- High Efficiency to 86%**
- Remote On/Off**
- External Trim**
- Under-Voltage Lockout**
- 40C To 105C Operation**
- Overvoltage & Short Circuit Protection**
- 1500Vdc Isolation**

The WRF20 series of DC-DC converters have been designed as an Industry Standard Pinout solution for a wide range of applications where light weight and ease of assembly are needed. Utilizing the latest thermal transfer techniques the WRF20 series packs up to 20 watts of power @ a 4:1 DC input range, in a 1.60" x 2.0" x .375" open frame construction and operating temperatures of -40c to + 105C. All models are designed to meet UL1950, CSA 950 and EN 60950.

### Model Selection Guide

Input Voltage		Iin @ Vin nom.		Output V1 & V2/V3	Output Current(FL)	Po (W)	Output OVP	Typical Efficiency	Model Number
Nom.	Range	FL	NL						
12Vdc	9-36Vdc	1.213	7mA	3.30	3.5A	11.5	3.9V	79%	WRF20-12S3V3
12Vdc	9-36Vdc	1.626	7mA	5.00	3.2A	16	6.8V	82%	WRF20-12S05
12Vdc	9-36Vdc	1.587	7mA	12.00	1.33A	16	15V	84%	WRF20-12S12
12Vdc	9-36Vdc	1.569	7mA	15.00	1.06A	16	18V	85%	WRF20-12S15
12Vdc	9-36Vdc	1.646	7mA	3.3 & +/-12.00	3.3&+/-500	16	3.9 (V1)	81%	WRF20-12T3D12*
12Vdc	9-36Vdc	1.626	7mA	3.3 & +/-15.00	3.3&+/-500	16	3.9 (V1)	82%	WRF20-12T3D15*
12Vdc	9-36Vdc	1.606	7mA	5.0 & +/-12.00	3.0&+/-500	16	6.8 (V1)	83%	WRF20-12T5D12*
12Vdc	9-36Vdc	1.587	7mA	5.0 & +/-15.00	3.0&+/-500	16	6.8 (V1)	84%	WRF20-12T5D15*
48Vdc	18-75Vdc	0.391	7mA	3.30	4.5A	15	3.9V	80%	WRF20-48S3V3
48Vdc	18-75Vdc	0.502	7mA	5.00	4A	20	6.8V	83%	WRF20-48S05
48Vdc	18-75Vdc	0.490	7mA	12.00	1.67A	20	15V	85%	WRF20-48S12
48Vdc	18-75Vdc	0.484	7mA	15.00	1.33A	20	18V	86%	WRF20-48S15
48Vdc	18-75Vdc	0.508	7mA	3.3 & +/-12.00	3.3&+/-500	20	3.9 (V1)	82%	WRF20-48T3D12*
48Vdc	18-75Vdc	0.502	7mA	3.3 & +/-15.00	3.3&+/-500	20	3.9 (V1)	83%	WRF20-48T3D15*
48Vdc	18-75Vdc	0.496	7mA	5.0 & +/-12.00	3.0&+/-500	20	6.8 (V1)	84%	WRF20-48T5D12*
48Vdc	18-75Vdc	0.490	7mA	5.0 & +/-15.00	3.0&+/-500	20	6.8 (V1)	85%	WRF20-48T5D15*

\* Total output power on chart not to be exceeded

Modified and customs available

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# Specifications All specifications Are Typical @ Nominal Input, Full Load & 25C Unless Otherwise Stated

## Input

Input Voltage Range	.....	4:1
Note (3)	.....	9-36Vdc (12V Models)
	.....	18-75Vdc (48V Models)
Input filter	.....	Pi Type
Under Voltage Lockout	.....	8.5V (12V Models)
	.....	16.5V (48V Models)
Remote :ON	.....	+5V or open, Ref. (-)Vin
:OFF	.....	<0.8V, Ref (-)Vin
Conducted Noise	.....	EN55022, level A (Note 5)

## Output

Output Power	.....	20 W Continuous(Max)
Output Voltage/current	.....	See Model Table
Output Setting Accuracy		
Singles	.....	+/- 1% typ., +/- 1.5%max.
Aux	.....	+/-3%
Load Variation		
Singles(FL-10%L)	.....	+/- 0.5% Note (4),(6)
Aux (FL-50%L)	.....	+/-4%, V1(20%-FL)
Aux (FL-20%L)	.....	+/-10%, V1 (10%-FL)
Line Regulation	.....	+/- 0.5%(Vo1), +/-2% Aux
Total Error Band		
Singles	.....	+/- 3%, Line/Load&Temp.
Auxiliary outputs	.....	+/-10%(Io1,2&3 @ 20%-FI)
Ripple & Noise(20Mhz BW)	.....	100mV(Vo1), 1%(Aux)
Transient Response (FL-1/2L)	.....	2 % Deviation, 200uS
Temperature Coefficient	.....	+/- .01%/c
Short circuit Protection	.....	Indefinite, Modulated, Automatic Recovery

## General

Efficiency	.....	See Model Table
Isolation Voltage	.....	1500Vdc ( 1Min)
Isolation Resistance	.....	100M
Switching Frequency	.....	400Khz
MTBF	.....	1.0M hrs.MIL-HDBK-217F Ground Benign @ 25C

## Environmental

Operating Temperature Range	.....	- 40C to + 105C (See Derating Curve)
	.....	-40C To + 65C @ FL
Storage Temperature Range	.....	-55C To + 125C
Maximum Case Temperature	.....	110 C
Humidity	.....	5% To 95% RH, Non-condensing
Cooling	.....	Natural Convection

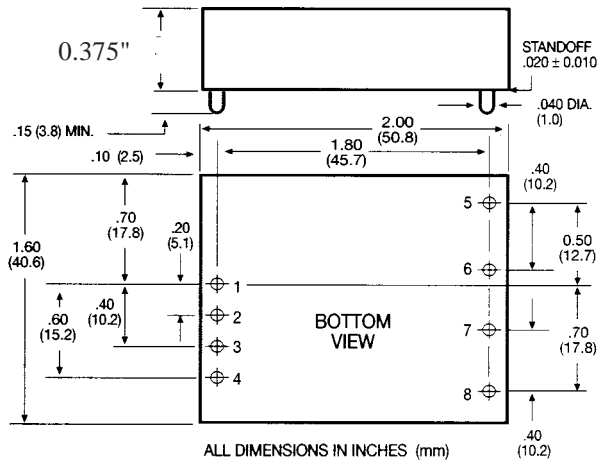
## Mechanical

Size	.....	1.60" X 2.00" X 0.375"
Weight	.....	24G
Case/Material	.....	Aluminum baseplate with Anodized aluminum case

### Notes:

- 1) O.V.P. protection is across Vo1.
- 2) Consult factory for recommended reflow profile.
- 3) Typical start-up for 12Vin models is 9V. Maximum startup is 9.5V, with full operation down to 9.0V
- 4) Operation is allowed to No-Load on single outputs, however operation below 10% load may cause ripple & noise to exceed spec.
- 5) External Capacitor required to meet conducted noise requirement.
- 6) Auxillary output regulation rely's on cross coupling of output channels. A 10% minimum load is required on Vo1 for regulation
- 7) Output currents are maximum for each output however, max power is not to exceed is rated power output (refer to table)

# Mechanical Specifications



TOLERANCES  
.XX = ±0.2  
.XXX = ±0.005

## Pin Connections

Pin No.	Single	Triple
1	+Vin	+Vin
2	-Vin	-Vin
3	No Pin	No Pin
4	ON/OFF	ON/OFF
5	No Pin	+Aux
6	+V	+V1
7	-V	Com.
8	Trim	-Aux

