Wall Industries, Inc.

Rev B

YF/YFW Series
20 Watt DC/DC Converter
Single, Dual, and Triple Outputs
2:1 and 4:1 Wide Input Voltage Range

FEATURES

- UL60950-1 Licensed
- 20 Watts Output power
- High Efficiency up to 87%
- Fixed Switching Frequency
- Six-Sided Continuous Shield
- Standard 2.0” x 1.6” x 0.4” package
- 2:1 and 4:1 Wide Input Voltage Range
- Single, Dual, and Triple Outputs Available
- ISO9001 Certified Manufacturing Facilities
- Compliant to RoHS EU Directive 2002/95/EC

APPLICATIONS

- Measurement
- Telecom/Datacom
- Wireless Networks
- Industry Control Systems
- Semiconductor Equipment

SPECIFICATIONS: *YF/YFW Series*

All specifications apply @ 25°C ambient unless otherwise noted

INPUT SPECIFICATIONS

Input Voltage Range		
YF	12V nominal input	9-18VDC
	24V nominal input	18-36VDC
	48V nominal input	36-75VDC
YFW	24V nominal input	9-36VDC
	48V nominal input	18-75VDC
Input Filter		Pi Type
Input Surge Voltage (100ms max)	12V input	36VDC
	24V input	50VDC
	48V input	100VDC
Input Reflected Ripple Current (nominal Vin and full load)		25mAp-p
Start Up Time (nominal Vin and constant resistive load)		20ms typ.
Remote ON/OFF (See Note 8)		
(Positive Logic)	DC-DC ON	Open or 3.5V < Vr < 12V
	DC-DC OFF	Short or 0V < Vr < 1.2V
Input Current of Remote Control Pin (nominal Vin)		-0.5mA ~ 1.0mA
Remote Off State Input Current (nominal Vin)		20mA

OUTPUT SPECIFICATIONS

Output Voltage		see table
Voltage Accuracy (nominal Vin and full load)	Single & Dual	±1%
	Triple 3.3V/5V	±1%
	Auxiliary	±5%
Voltage Adjustability		±10%
Output Current		see table
Output Power		20 watts max.
Line Regulation (LL to HL at FL)	Single (W)	±0.2%
	Dual (W)	±0.5%
	Triple 3.3V/5V	±1%
	Auxiliary	±5%
Load Regulation (no load to full load)	Single	±0.5%
	Dual	±3%
	Triple 3.3V/5V	±2%
	Auxiliary	±5%
Cross Regulation (See Note 7)	Dual	±5%
	Triple 3.3V/5V	±2%
	Auxiliary	±5%
Minimum Load (See Note 6)		see table
Ripple/Noise (20 MHz BW)		see table
Transient Response Recovery Time (25% load step)	Single	250µs
	Dual	250µs
	Triple	500µs

PROTECTION SPECIFICATIONS

Over Voltage Protection	3.3V Output	3.9V
Zener diode clamp	5V Output	6.2V
	12V Output	15V
	15V Output	18V
Over Load Protection (% of full load at nominal input)		150% max.
Short Circuit Protection		Hiccup, automatic recovery

GENERAL SPECIFICATIONS

Efficiency	see table
Switching Frequency	300KHz typ.
Isolation Voltage (Input to Output)	1600VDC min.
Isolation Resistance	10^9 ohms min.
Isolation Capacitance	300pF max.

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	-40°C to +85°C (with derating)
Storage Temperature	-55°C ~ +105°C
Maximum Case Temperature	+100°C
Relative Humidity (non-condensing)	5% to 95% RH
Temperature Coefficient	±0.02% / °C max.
Thermal Impedance (See Note 9)	
Natural Convection	10°C / Watt
Natural Convection with Heat-Sink	8.24°C/Watt
Thermal Shock	MIL-STD-810F
Vibration	10~55Hz, 10G, 30 minutes along X, Y, and Z
MTBF (See Note 1)	1.928 x 10^6 hrs

PHYSICAL SPECIFICATIONS

Weight	48g (1.69 oz)
Dimensions	2.0 x 1.6 x 0.40 inches (50.8 x 40.6 x 10.2 mm)
Case Material	Nickel-coated copper
Base Material	Non-conductive black plastic
Potting material	Epoxy (UL94-V0)
Shielding	six – sided

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SAFETY & EMC

Approvals and Standards.....UL60950-1

EMI (See Note 7) ..... EN55022.....Class A

ESD..... EN61000-4-2…….. Air ± 8KV Contact ± 6KV ……Perf. Criteria B

Radiated Immunity..... EN61000-4-3……10V/m Perf. Criteria A

Fast Transient..... EN61000-4-4 ..... ±2KV Perf. Criteria B

Surge (See Note 11)..... EN61000-4-5……..±1KV Perf. Criteria B

Conducted Immunity..... EN61000-4-6……10 Vrms Perf. Criteria A

Due to advances in technology, specifications subject to change without notice

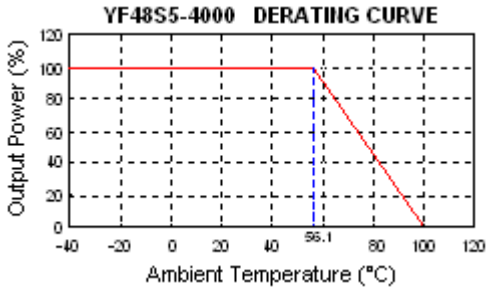
MODEL SELECTION GUIDE

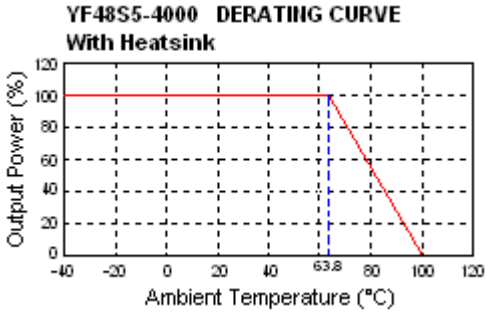
Model Number	Input Range	Output Voltage	Output Current		Output [4] Ripple & Noise	Input Current		Eff [4] (%)	Capacitor[5] Load max
			Min. load	Full load		No load [3]	Full load [2]		
YF12S33-4000	9 - 18 VDC	3.3 VDC	280mA	4000mA	75mVp-p	40mA	1507mA	77	13000µF
YF12S5-4000		5 VDC	280mA	4000mA	75mVp-p	15mA	2193mA	80	6800µF
YF12S12-1600		12 VDC	134mA	1670mA	75mVp-p	40mA	2110mA	83	2200µF
YF12S15-1330		15 VDC	106mA	1330mA	75mVp-p	20mA	2083mA	84	755µF
YF12D5-2000		±5 VDC	±140mA	± 2000mA	100mVp-p	15mA	2136mA	82	±3400µF
YF12D12-830		±12 VDC	±67mA	±833mA	100mVp-p	35mA	2110mA	83	±680µF
YF12D15-660		±15VDC	±53mA	±666mA	100mVp-p	35mA	2110mA	83	±450µF
YF12T3.312-17		3.3 / ±12 VDC	300 / ± 30mA	3000 / ± 300mA	50/ ±120mVp-p	20mA	1900mA	79	4700 / ±220µF
YF12T3.315-17		3.3 / ±15 VDC	300 / ± 25mA	3000 / ± 250mA	50/ ±150mVp-p	35mA	1933mA	79	4700 / ±220µF
YF12T512-17		5 / ±12 VDC	200 / ± 30mA	2000 / ± 300mA	50/ ±120mVp-p	20mA	1885mA	80	4700 / ±220µF
YF12T515-17		5 / ±15 VDC	200 / ± 25mA	2000 / ± 250mA	50/ ±150mVp-p	40mA	1919mA	80	4700 / ±220µF
YF(W)24S33-4000	18 - 36 VDC (9 - 36 VDC)	3.3 VDC	280mA	4000mA	75mVp-p	10 (20)mA	733 (764mA)	79 (76)	13000µF
YF(W)24S5-4000		5 VDC	280mA	4000mA	75mVp-p	10 (10)mA	1082 (1111mA)	81 (79)	6800µF
YF(W)24S12-1600		12 VDC	134mA	1670mA	75mVp-p	10 (20)mA	1018 (1082mA)	86 (81)	2200µF
YF(W)24S15-1330		15 VDC	106mA	1330mA	75mVp-p	15 (20)mA	1018 (1082mA)	86 (81)	755µF
YF(W)24D5-2000		±5 VDC	±140mA	±2000mA	100mVp-p	20 (15)mA	1028 (1111mA)	85 (79)	±3400µF
YF(W)24D12-830		±12 VDC	±67mA	±833mA	100mVp-p	25 (20)mA	1016 (1068mA)	86 (82)	±680µF
YF(W)24D15-660		±15 VDC	±53mA	±666mA	100mVp-p	30 (25)mA	1015 (1068mA)	86 (82)	±450µF
YF24T3.312-17		3.3 / ±12 VDC	300 / ±30mA	3000 / ±300mA	50/ ±120mVp-p	20mA	914mA	82	4700 / ±220µF
YF24T3.315-17		3.3 / ±15 VDC	300 / ±25mA	3000 / ±250mA	50/ ±150mVp-p	20mA	967mA	79	4700 / ±220µF
YF24T512-17		5 / ±12 VDC	200 / ±30mA	2000 / ±300mA	50/ ±120mVp-p	25mA	907mA	83	4700 / ±220µF
YF24T515-17		5 / ±15 VDC	200 / ±25mA	2000 / ±250mA	50/ ±150mVp-p	10mA	922mA	83	4700 / ±220µF
YF(W)48S33-4000	36 - 75 VDC (18 - 75 VDC)	3.3 VDC	280mA	4000mA	75mVp-p	10 (15)mA	367 (377mA)	79 (77)	13000µF
YF(W)48S5-4000		5 VDC	280mA	4000mA	75mVp-p	10 (10)mA	543 (548mA)	82 (80)	6800µF
YF(W)48S12-1600		12 VDC	134mA	1670mA	75mVp-p	15 (10)mA	509 (536mA)	86 (82)	2200µF
YF(W)48S15-1330		15 VDC	106mA	1330mA	75mVp-p	25 (10)mA	506 (532mA)	86 (82)	755µF
YF(W)48D5-2000		±5 VDC	±140mA	±2000mA	100mVp-p	15 (10)mA	514 (541mA)	85 (81)	±3400µF
YF(W)48D12-830		±12 VDC	±67mA	±833mA	100mVp-p	15 (15)mA	502 (527mA)	87 (83)	±680µF
YF(W)48D15-660		±15 VDC	±53mA	±666mA	100mVp-p	20 (20)mA	502 (527mA)	87 (83)	±450µF
YF48T3.312-17		3.3 / ±12 VDC	300 / ±30mA	3000 / ±300mA	50/ ±120mVp-p	10mA	457mA	82	4700 / ±220µF
YF48T3.315-17		3.3 / ±15 VDC	300 / ±25mA	3000 / ±250mA	50/ ±150mVp-p	10mA	464mA	82	4700 / ±220µF
YF48T512-17		5 / ±12 VDC	200 / ±30mA	2000 / ±300mA	50/ ±120mVp-p	15mA	448mA	84	4700 / ±220µF
YF48T515-17		5 / ±15 VDC	200 / ±25mA	2000 / ±250mA	50/ ±150mVp-p	15mA	456mA	84	4700 / ±220µF

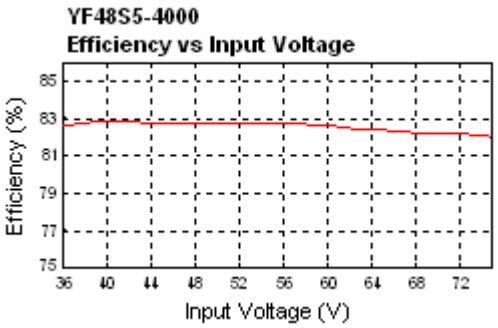
NOTES

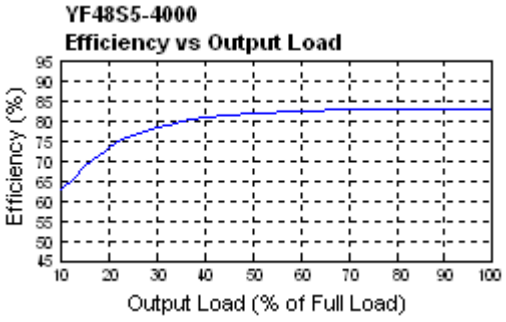
1. BELLCORE TR-NWT-000332. Case I: 50% Stress, Temperature at 40ºC. (Ground fixed and controlled environment)
2. Maximum value at nominal input voltage and full load.
3. Typical value at nominal input voltage and no load.
4. Typical value at nominal input voltage and full load.
5. Test by minimum Vin and constant resistive load.
6. The output requires a minimum loading on the output to maintain specified regulation. Operation under no-load condition will not damage these devices, however they may not meet all listed specification.
7. Cross Regulation: Dual output—Asymmetrical load 25% to 100% full load
   Triple Output – 3.3V / 5V 100% load and one of auxiliary 100% load, other auxiliary load change from 25% to 100% load
8. The ON/OFF control pin voltage is referenced to -Vin
9. Heat sink is optional (for operation temperature range please see derating curve). Contact Factory for ordering details.
10. The YF/YFW Series can meet EN55022 Class A with an external capacitor in parallel with the input pins.
    Recommend: 12Vin: 6.8µF/50V 1812 MLCC. 24Vin: N/A. 48Vin: 2.2µF/100V 1812 MLCC.
11. An external filter capacitor is required if the module has to meet EN61000-4-5. The filter capacitor Wall Industries suggests is Nippon chemi-con KY Series, 220µF/100V, ESR 48mΩ.
12. The YF Series is 2:1 wide input range of 18-36VDC and 36-75VDC; the YFW Series is 4:1 ultra wide input range of 9-36VDC and 18-75VDC.

DERATING CURVES & EFFICIENCY GRAPHS



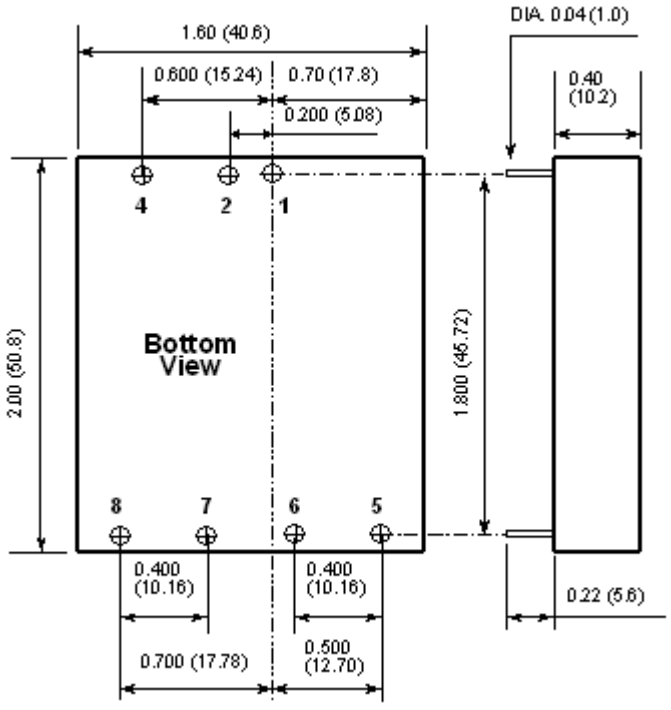






MECHANICAL DRAWING

Unit: inches (mm)



1. Tolerance: X.XX±0.02 (X.X±0.5)
   X.XXX±0.01 (X.XX±0.25)
2. Pin pitch tolerance ±0.01 (0.25)

PIN CONNECTION			
PIN	**SINGLE**	**DUAL**	**TRIPLE**
1	+INPUT	+INPUT	+INPUT
2	-INPUT	-INPUT	-INPUT
4	CTRL	CTRL	CTRL
5	NO PIN	+OUTPUT	+AUXILIARY
6	+OUTPUT	COMMON	+3.3V / +5V
7	-OUTPUT	-OUTPUT	COMMON
8	TRIM	TRIM	-AUXILIARY

EXTERNAL OUTPUT TRIMMING

Output can be externally trimmed by using the method shown below.
( ) for dual output trim

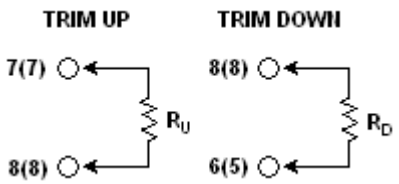
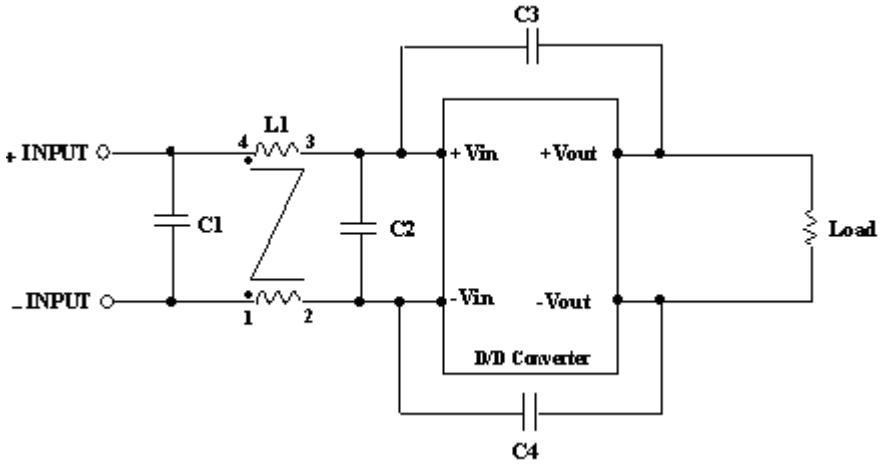


Figure 1

Recommended Filter for EN55022 Class B Compliance



The components used in Figure 1 are as follows:

	C1	C2	C3	C4	L1
YFW12xxx-xxxx	4.7µF/50V	N/A	1000pF/2KV	1000pF/2KV	450µH Common Choke
YFW24xxx-xxxx	4.7µF/50V	N/A	1000pF/2KV	1000pF/2KV	450µH Common Choke
YFW48xxx-xxxx	2.2µF/100V	2.2µF/100V	1000pF/2KV	1000pF/2KV	450µH Common Choke

Figure 2

Recommended EN55022 Class B Filter Circuit Layout