



Size: 2.0in x 1.6in x 0.4in (50.8mm x 40.6mm x 10.2mm)

OPTIONS

- Heatsink
- Single, Dual, or Triple Output
- Input Voltage Range

FEATURES

- 20 Watts Output Power
- High Efficiency up to 87%
- Fixed Switching Frequency
- Six-Sided Continuous Shield
- Standard 2" 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
- RoHS II & REACH Compliant
- UL60950-1, EN60950-1, and IEC60950-1 Safety Approvals

APPLICATIONS

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

DESCRIPTION

The YF/YFW Series of DC/DC converters perform over an ultra-wide input voltage range (2:1 and 4:1), providing indefinite short circuit and overvoltage protection. Single, dual, and triple outputs are available. This design technology provides up to 20 watts of output power in a 1.60" x 2.0" x 0.40" case. These current mode control forward converters are designed for improved transient response and reduced stress on switching components and do not require external input filtering, making it a preferred source over industry alternatives.

MODEL SELECTION TABLE

Single Output Models

Model Number	Input Voltage Range	Output Voltage	Output Current		Ripple & Noise ⁽¹⁾	Input Current		Maximum Capacitive Load ⁽¹⁾	Efficiency ⁽⁴⁾
			Min Load ⁽⁵⁾	Max Load		No Load ⁽²⁾	Full Load ⁽³⁾		
YF12S33-4000	9-18VDC	3.3VDC	280mA	4000mA	75mVp-p	40mA	1507mA	13000µF	77%
YF12S5-4000		5VDC	280mA	4000mA		15mA	2193mA	6800µF	80%
YF12S12-1600		12VDC	134mA	1670mA		40mA	2110mA	2200µF	83%
YF12S15-1330		15VDC	106mA	1330mA		20mA	2083mA	755µF	84%
YF(W)24S33-4000	18-36VDC (9-36VDC)	3.3VDC	280mA	4000mA	75mVp-p	10 (20) mA	733 (764) mA	13000µF	79 (76) %
YF(W)24S5-4000		5VDC	280mA	4000mA		10 (20) mA	1082 (1111) mA	6800µF	81 (79) %
YF(W)24S12-1600		12VDC	134mA	1670mA		10 (20) mA	1018 (1082) mA	2200µF	86 (81) %
YF(W)24S15-1330		15VDC	106mA	1330mA		15 (20) mA	1018 (1082) mA	755µF	86 (81) %
YF(W)48S33-4000	36-75VDC (18-75VDC)	3.3VDC	280mA	4000mA	75mVp-p	10 (15) mA	367 (377) mA	13000µF	79 (77) %
YF(W)48S5-4000		5VDC	280mA	4000mA		10 (10) mA	543 (548) mA	6800µF	82 (80) %
YF(W)48S12-1600		12VDC	134mA	1670mA		15 (10) mA	509 (536) mA	2200µF	86 (82) %
YF(W)48S15-1330		15VDC	106mA	1330mA		25 (10) mA	506 (532) mA	755µF	86 (82) %

MODEL SELECTION TABLE

Dual Output Models

Model Number	Input Voltage Range	Output Voltage	Output Current		Ripple & Noise ⁽¹⁾	Input Current		Maximum Capacitive Load ⁽¹⁾	Efficiency ⁽⁴⁾
			Min Load ⁽⁵⁾	Max Load		No Load ⁽²⁾	Full Load ⁽³⁾		
YF12D5-2000	9-18VDC	±5VDC	±140mA	±2000mA	100mVp-p	15mA	2136mA	±3400µF	82%
YF12D12-830		±12VDC	±67mA	±833mA		35mA	2110mA	±680µF	83%
YF12D15-660		±15VDC	±53mA	±666mA		35mA	2110mA	±450µF	83%
YF(W)24D5-2000	18-36VDC (9-36VDC)	±5VDC	±140mA	±2000mA	100mVp-p	20 (15) mA	1028 (1111) mA	±3400µF	85 (79) %
YF(W)24D12-830		±12VDC	±67mA	±833mA		25 (20) mA	1016 (1068) mA	±680µF	86 (82) %
YF(W)24D15-660		±15VDC	±53mA	±666mA		30 (25) mA	1015 (1068) mA	±450µF	86 (82) %
YF(W)48D5-2000	36-75VDC (18-75VDC)	±5VDC	±140mA	±2000mA	100mVp-p	15 (10) mA	514 (541) mA	±3400µF	85 (81) %
YF(W)48D12-830		±12VDC	±67mA	±833mA		15 (15) mA	502 (527) mA	±680µF	87 (83) %
YF(W)48D15-660		±15VDC	±53mA	±666mA		20 (20) mA	502 (527) mA	±450µF	87 (83) %

MODEL SELECTION TABLE

Triple Output Models

Model Number	Input Voltage Range	Output Voltage	Output Current		Ripple & Noise ⁽¹⁾	Input Current		Maximum Capacitive Load ⁽¹⁾	Efficiency ⁽⁴⁾
			Min Load ⁽⁵⁾	Max Load		No Load ⁽²⁾	Full Load ⁽³⁾		
YF12T3.312-17	9-18VDC	3.3/±12VDC	300/±30mA	3000/±300mA	50/120mVp-p	20mA	1900mA	4700/ ±220µF	79%
YF12T3.315-17		3.3/±15VDC	300/±25mA	3000/±250mA	50/150mVp-p	35mA	1933mA	4700/ ±220µF	79%
YF12T512-17		5/±12VDC	200/±30mA	2000/±300mA	50/120mVp-p	20mA	1885mA	4700/ ±220µF	80%
YF12T515-17		5/±15VDC	200/±25mA	2000/±250mA	50/150mVp-p	40mA	1919mA	4700/ ±220µF	80%
YF24T3.312-17	18-36VDC	3.3/±12VDC	300/±30mA	3000/±300mA	50/120mVp-p	20mA	914mA	4700/ ±220µF	82%
YF24T3.315-17		3.3/±15VDC	300/±25mA	3000/±250mA	50/150mVp-p	20mA	967mA	4700/ ±220µF	79%
YF24T512-17		5/±12VDC	200/±30mA	2000/±300mA	50/120mVp-p	25mA	907mA	4700/ ±220µF	83%
YF24T515-17		5/±15VDC	200/±25mA	2000/±250mA	50/150mVp-p	10mA	922mA	4700/ ±220µF	83%
YF48T3.312-17	18-75VDC	3.3/±12VDC	300/±30mA	3000/±300mA	50/120mVp-p	10mA	457mA	4700/ ±220µF	82%
YF48T3.315-17		3.3/±15VDC	300/±25mA	3000/±250mA	50/150mVp-p	10mA	464mA	4700/ ±220µF	82%
YF48T512-17		5/±12VDC	200/±30mA	2000/±300mA	50/120mVp-p	15mA	448mA	4700/ ±220µF	84%
YF48T515-17		5/±15VDC	200/±25mA	2000/±250mA	50/150mVp-p	15mA	456mA	4700/ ±220µF	84%

SPECIFICATIONS

All specifications are based on 25°C, Nominal Input Voltage, and Maximum Output Current unless otherwise noted.
 We reserve the right to change specifications based on technological advances.

SPECIFICATION	TEST CONDITIONS		Min	Typ	Max	Unit
INPUT SPECIFICATIONS						
Input Voltage Range	YF	12V nominal input	9	12	18	VDC
		24V nominal input	18	24	36	
		48V nominal input	36	48	75	
	YFW	24V nominal input	9	24	36	
48V nominal input		18	48	75		
Input Reflected Ripple				25		mAp-p
Input Surge Voltage (100ms max.)	12V input				36	VDC
	24V input				50	
	48V input				100	
Input Filter			Pi Type			
OUTPUT SPECIFICATIONS						
Output Voltage			See Table			
Voltage Accuracy	Single/Dual Outputs		-1.0		+1.0	%
	Triple: 3.3V, 5V		-1.0		+1.0	
	Triple: 12V, 15V		-5.0		+5.0	
Line Regulation	Low Line to High Line @ Full Load	Single Output	-0.2		+0.2	%
		Dual Output	-0.5		+0.5	
		Triple Output: 3.3V, 5V	-1.0		+1.0	
		Triple Output: 12V, 15V	-5.0		+5.0	
Load Regulation	No Load to Full Load	Single Output	-0.5		+0.5	%
		Dual Output	-3.0		+3.0	
		Triple Output: 3.3V, 5V	-2.0		+2.0	
		Triple Output: 12V, 15V	-5.0		+5.0	
Voltage Adjustability			-10		+10	%
Output Power			See Table			
Output Current			See Table			
Maximum Capacitive Load			See Table			
Ripple & Noise	Measured by 20MHz bandwidth	Single Output		75		mVp-p
		Dual Output		100		
		Triple Output: 3.3V, 5V		50		
		Triple Output: 12V		120		
		Triple Output: 15V		150		
Transient Response Recovery Time	25% load step change	Single/Dual Output		250		µs
		Triple		500		
Start-Up Time	Constant resistive load	Power Up		20		ms
Temperature Coefficient			-0.02		+0.02	%/°C
Cross Regulation ⁽⁶⁾	Dual Models		-5.0		+5.0	%
	Triple Models: 3.3V, 5V		-2.0		+2.0	
	Triple Models: 12V, 15V		-5.0		+5.0	
REMOTE ON/OFF CONTROL ⁽⁷⁾						
Positive Logic	DC-DC ON		Open or 3.5 ~ 12VDC			
	DC-DC OFF		Short or 0 ~ 1.2VDC			
Input Current of CTRL Pin			-0.5		+1.0	mA
Remote OFF Input Current				20		mA
PROTECTION						
Short Circuit Protection			Continuous, Automatic Recovery			
Over Load Protection	% of I _{out} rated				150	%
Over Voltage Protection	Zener diode clamp	3.3V models		3.9		VDC
		5V models		6.2		
		12V models		15		
		15V models		18		

SPECIFICATIONS

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SPECIFICATION	TEST CONDITIONS	Min	Typ	Max	Unit
ENVIRONMENTAL SPECIFICATIONS					
Operating Ambient Temperature	With derating	-40		+85	°C
Storage Temperature		-55		+125	°C
Maximum Case Temperature				+100	°C
Relative Humidity		5		95	% RH
Thermal Shock		MIL-STD-810F			
Thermal Impedance ⁽⁸⁾	Natural Convection		10		°C/W
	Natural Convection with Heatsink		8.24		
Vibration		MIL-STD-810F			
MTBF	MIL-HDBK-217F, Full Load		1,922,000		hours
GENERAL SPECIFICATIONS					
Efficiency		See Table			
Switching Frequency		270	300	330	KHz
Isolation Voltage (1 minute)	Input to Output	1600			VDC
	Input to Case	1600			
	Output to Case	1600			
Isolation Resistance	500VDC	1			GΩ
Isolation Capacitance				300	pF
PHYSICAL SPECIFICATIONS					
Weight		1.69oz (48g)			
Dimensions (L x W x H)		2.0in x 1.6in x 0.40in (50.8mm x 40.6mm x 10.2mm)			
Case Material		Nickel-Coated Copper			
Base Material		Non-Conductive Black Plastic			
Potting Material		Epoxy (UL94 V-0)			
Shielding		Six-Sided			
SAFETY & EMC CHARACTERISTICS					
Safety Approvals		UL60950-1 EN60905-1 IEC60950-1			
EMI ⁽⁹⁾	EN55022				Class A, Class B
ESD	EN61000-4-2	Air ±8kV Contact ±6kV			Perf. Criteria B
Radiated Immunity	EN61000-4-3	10V/m			Perf. Criteria A
Fast Transient (See Note 5)	EN61000-4-4	±2kV			Perf. Criteria B
Surge ⁽¹⁰⁾	EN61000-4-5	±1kV			Perf. Criteria B
Conducted Immunity	EN61000-4-6	10Vr.m.s			Perf. Criteria A
Power Frequency Magnetic Field	EN61000-4-8	100A/m continuous; 1000A/m 1 second.			Perf. Criteria A

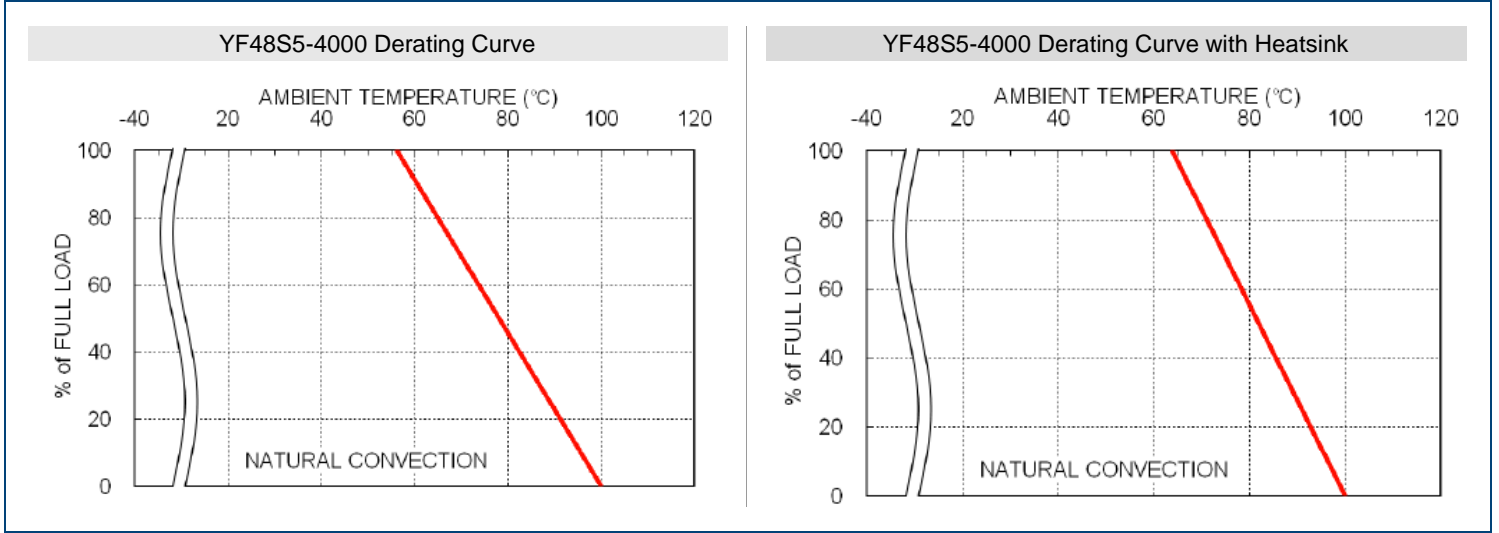
NOTES

- (1) Typical value at nominal input voltage and full load.
- (2) Typical value at nominal input voltage and no load.
- (3) Maximum value at nominal input and full load.
- (4) Test by minimum Vin and constant resistive load.
- (5) 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 specifications.
- (6) 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.
- (7) The ON/OFF control pin voltage is referenced to -Vin.
- (8) Heatsink is optional (for operating temperature range please see derating curve. Contact factory for details.
- (9) The YF/YFW series can meet EN55022 Class A with an external capacitor in parallel with the input pins.
Recommended: 12Vin: 6.8µF/50V 1812 MLCC. 24Vin: N/A 48Vin: 2.2µF/100V 1812 MLCC
- (10) 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.
- (11) The YF Series is a 2:1 wide input range of 18-36VDC and 36-75CSX, the YFW Series is 4:1 ultra wide input range of 9-36VDC and 18-75VDC.

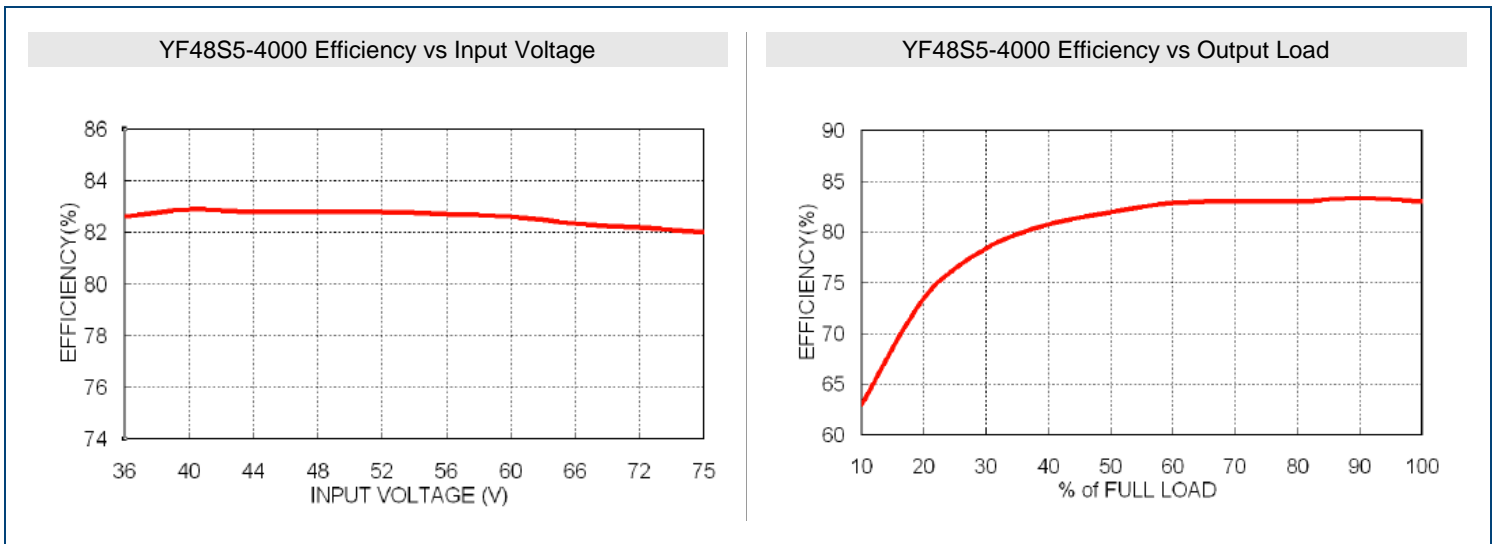
CAUTION: This power module is not internally fused. An input line fuse must always be used.

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

DERATING CURVES



EFFICIENCY GRAPHS



MECHANICAL DRAWINGS

BOTTOM VIEW

Dimensions (inches/mm):
 Total width: 1.60(40.6)
 Pin 4 to Pin 1: 0.600(15.24)
 Pin 2 to Pin 1: 0.70(17.8)
 Pin 2 to Pin 4: 0.200(5.08)
 Total height: 2.00(50.8)
 Pin 8 to Pin 5: 1.800(45.72)
 Pin 8 to Pin 7: 0.300(7.62)
 Pin 7 to Pin 6: 0.700(17.78)
 Pin 6 to Pin 5: 0.100(2.54)
 Pin 5 to Pin 6: 0.500(12.70)
 Side view dimensions: 0.40(10.2) height, 0.22(5.6) width, and a hole diameter of $\phi 0.04(1.0)$.

PIN CONNECTION

PIN	SINGLE	DUAL	TRIPLE
1	+Vin	+Vin	+Vin
2	-Vin	-Vin	-Vin
4	Ctrl	Ctrl	Ctrl
5	No Pin	+Vout	+Aux
6	+Vout	Common	+Vout
7	-Vout	-Vout	Common
8	Trim	Trim	-Aux

EXTERNAL OUTPUT TRIMMING
Output can be externally trimmed by using the method shown below. () For dual output trim.

TRIM UP

TRIM DOWN

Notes:

- All dimensions in inch (mm)
- Tolerance: x.xx±0.02 (x.x±0.5)
x.xxx±0.01 (x.xxx±0.25)
- Pin pitch tolerance ±0.01 (0.25)
- Pin dimension tolerance ±0.004(0.1)

HEATSINK OPTIONS (SUFFIX "HS")

Unit: inches (mm)

Top view dimensions: 1.60(40.6) width, 2.00(50.8) length.

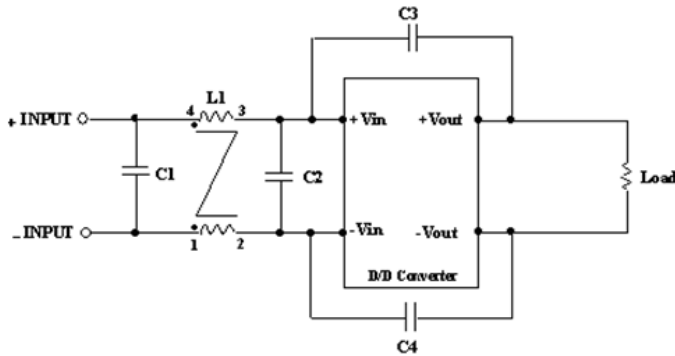
Side view dimensions: 0.67(17.0) MAX height.

Bottom view dimensions: 2.20(56.0) MAX length.

ITEM	Description	Part's NO.	Q'ty
1	F2 Product	--	1
2	F2 Clamp	7Q-CL02A-F	2
3	HeatSink	7G-0011B-F	1
4	Thermal Pad	5T-S0091	1

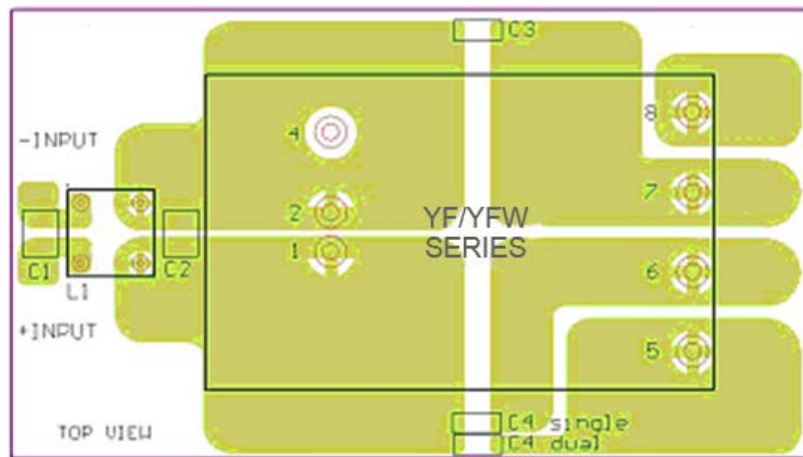
RECOMMENDED FILTERS

Recommended Filter for EN55022 Class B Compliance



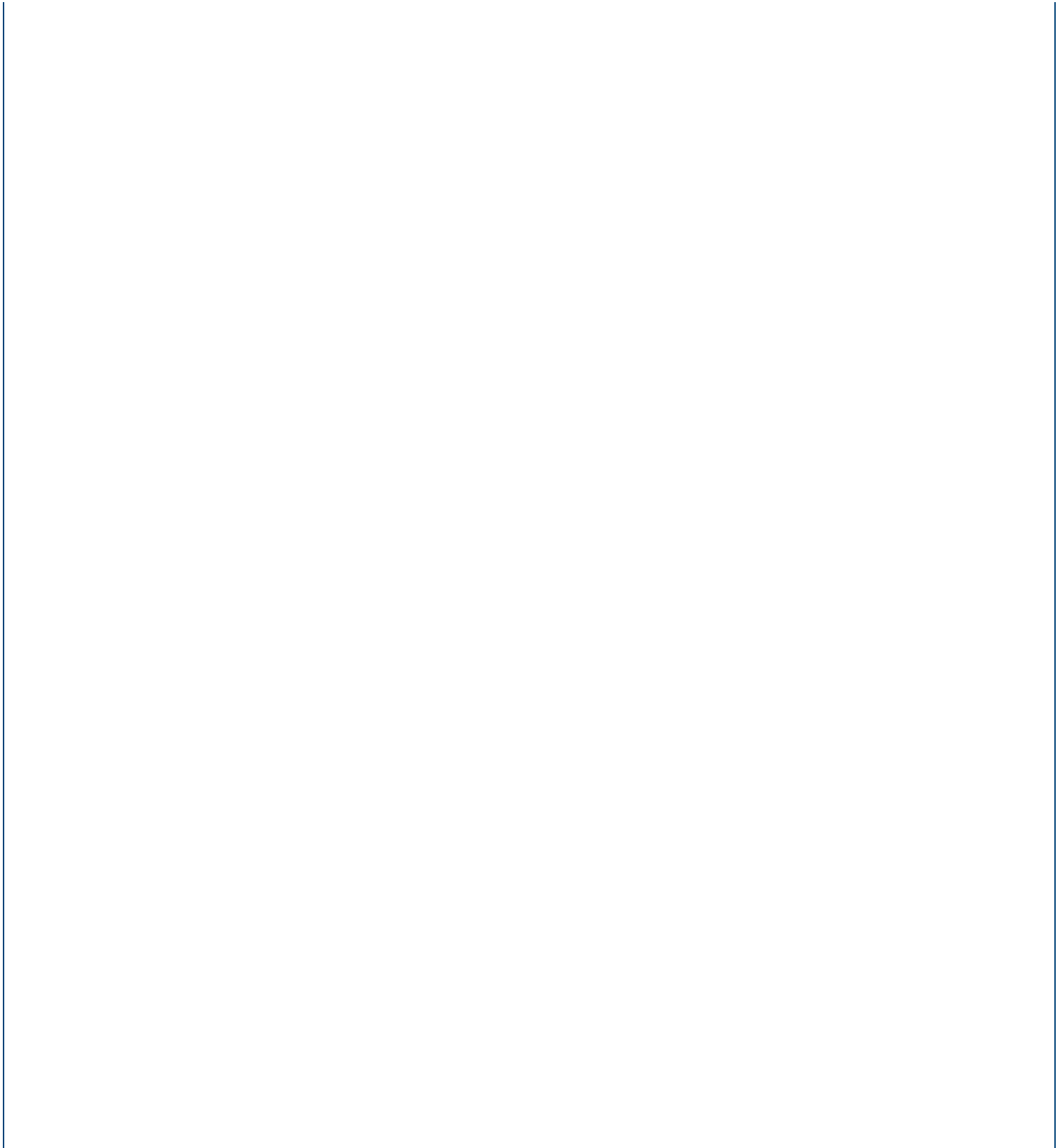
MODEL	C1	C2	C3	C4	L1
YFW12xxx-xxxx	4.7 μ F/50V	N/A	1000pF/2K V	1000pF/2K V	450 μ H Common Choke
YFW24xxx-xxxx	4.7 μ F/50V	N/A	1000pF/2K V	1000pF/2K V	450 μ H Common Choke
YFW48xxx-xxxx	2.2 μ F/100V	2.2 μ F/100V	1000pF/2K V	1000pF/2K V	450 μ H Common Choke

Recommended EN55022 Class B Filter Circuit Layout



OUTPUT VOLTAGE ADJUSTMENT

APPLICATION NOTES



MODEL NUMBER SETUP

Series Name	Output Power	-	Input Voltage	Output Quantity	Ouput Voltage	Remote On/Off & Pin Length

Thru-Hole Inserts	Heatsink ^{(1) (2)}	Terminal Block ^{(2) (3) (4)}

NOTES

1. Models with thru-hole inserts cannot be equipped with a heatsink.
2. Terminal block models (suffix "T", "TF", and "TF1") cannot be equipped with a heatsink.
3. Only 0.200" pin length is available with terminal block options.
4. Models with EMC filter (suffix "TF" and "TF1") meet EN55011, EN55022 Class A.

COMPANY INFORMATION

Wall Industries, Inc. has created custom and modified units for over 50 years. Our in-house research and development engineers will provide a solution that exceeds your performance requirements on-time and on budget. Our ISO9001-2008 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.

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