



# CFM12S SERIES 12 WATT OPEN FRAME AC-DC MODULES

## Features

- Universal Input Range 90~264Vac
- High Efficiency up to 87%
- 1.5"x 1" Open Frame Compact Size
- Class II
- No Load Input Power < 75mW
- Approval IEC/EN/UL 62368-1 Ed 3.0
- Approval IEC/EN 60335-1
- Approval EN 55032 Class B and CISPR/FCC Class B
- Operating Altitude 5000m
- Continuous Short Circuit Protection
- Over Voltage Protection
- Over Voltage Category OVC II & OVC III



MODEL NUMBER	OUTPUT VOLTAGE	OUTPUT CURRENT	VOLTAGE ACCURACY NOTE1	RIPPLE & NOISE NOTE2	LINE REGULATION NOTE3	LOAD REGULATION NOTE4	%EFF. (Typ.) NOTE5
CFM12S050	5 V	2 A	±2%	100mV	±1%	±1%	80%
CFM12S090	9 V	1.34 A	±2%	100mV	±1%	±1%	85%
CFM12S120	12 V	1.0 A	±2%	120mV	±1%	±1%	85%
CFM12S150	15 V	0.8 A	±2%	150mV	±1%	±1%	85%
CFM12S240	24 V	0.5 A	±2%	240mV	±1%	±1%	87%

Note:

1. Voltage accuracy is set at 100% full load.
2. Add a 0.1uF ceramic capacitor and a 10uF E.L. capacitor to output for ripple & noise measurement @20MHz BW.
3. Line regulation is measured from 90V<sub>ac</sub> to 264V<sub>ac</sub> with 100% full load.
4. Load regulation is measured from 10% to 100% full load.
5. Typical efficiency at 230 V<sub>ac</sub> and 100% full load at 25°C.
6. T Version wafer with JST B3B-XH/B4B-XH and mate with JST housing XH series or equivalent.

## PART NUMBER

Series	Number of Outputs	Nominal Output Voltage	Type
CFM12	X	XXX	-XX
CFM12	S : Single	050 : 5V 090 : 9V 120 : 12V 150 : 15V 240 : 24V	Blank : PCB Mount E : Encapsulated T : Wafer

Part Number Example:

**CFM12S120-T**: Open Frame, 12W, Single 12Vdc Output, Wafer



# CFM12S Series

## TECHNICAL SPECIFICATIONS

(All specifications are typical at nominal input, 100% full load at 25°C unless otherwise noted.)

### ABSOLUTE MAXIMUM RATINGS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Input Voltage	Safety approvals only to the AC input	All	90		264	V <sub>ac</sub>
			120		370	V <sub>dc</sub>
Operating Temperature	See Derating Curve	All	-40		75	°C
Storage Temperature		All	-40		85	°C
Operating Altitude	IEC/EN/UL 62368-1 OVC II	All			5000	m
	IEC 62368-1 OVC III			2000		
	IEC/EN 60335-1 OVC II			5000		

### INPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Operating Voltage Range		All	100		240	V <sub>ac</sub>
Input Frequency Range		All	50		60	Hz
Maximum Input Current	100% Full load, V <sub>in</sub> =100V <sub>ac</sub>	All			0.4	A
Leakage Current		All			0.25	mA
Inrush Current	V <sub>in</sub> =240V <sub>ac</sub> , Cold start at 25°C	All			50	A

### OUTPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Output Voltage Set Point	V <sub>in</sub> =Nominal V <sub>in</sub> , I <sub>o</sub> =I <sub>o</sub> max., T <sub>c</sub> =25°C	CFM12S050	4.90	5	5.10	V <sub>dc</sub>
		CFM12S090	8.82	9	9.18	
		CFM12S120	11.76	12	12.24	
		CFM12S150	14.70	15	15.30	
		CFM12S240	23.52	24	24.48	
Operating Output Current Range	V <sub>in</sub> =90V <sub>ac</sub> ~264V <sub>ac</sub> , See Derating Curve	CFM12S050			2.0	A
		CFM12S090			1.34	
		CFM12S120			1.0	
		CFM12S150			0.8	
		CFM12S240			0.5	
Holdup Time	V <sub>in</sub> =115V <sub>ac</sub>	All		10		ms
Output Voltage Regulation						
Load Regulation	10% to 100% full load	All			±1.0	%
Line Regulation	V <sub>in</sub> =High line to low line	All			±1.0	%
Over Voltage Protection	Hiccup mode (Auto recovery)	CFM12S050			6.3	V <sub>dc</sub>
		CFM12S090			12.6	
		CFM12S120			15.8	
		CFM12S150			18.9	
		CFM12S240			31.5	
Output Ripple and Noise	1. Add a 0.1uF ceramic capacitor and a 10uF aluminum electrolytic capacitor to output 2. Oscilloscope is 20MHz band width 3. Ambient temperature=25°C	CFM12S050			100	mV
		CFM12S090			100	
		CFM12S120			120	
		CFM12S150			150	
		CFM12S240			240	
Load Capacitance	1. V <sub>in</sub> =115V <sub>ac</sub> and 230V <sub>ac</sub> 2. Output is 100% full load 3. Ambient temperature=25°C	CFM12S050			2000	uF
		CFM12S090			1340	
		CFM12S120			1000	
		CFM12S150			800	
		CFM12S240			500	



# CFM12S Series

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Efficiency	1. Input voltage is 230V <sub>ac</sub> 2. Output is 100% full load 3. Ambient temperature=25°C	CFM12S050		80		%
		CFM12S090		85		
		CFM12S120		85		
		CFM12S150		85		
		CFM12S240		87		

## ISOLATION CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Input to Output	1 minute	All	3000		4300	V <sub>ac</sub>
Isolation Resistance	Input to output	All	100			MΩ

## FEATURE CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	P <sub>out</sub> =max. rated power	All		65		kHz

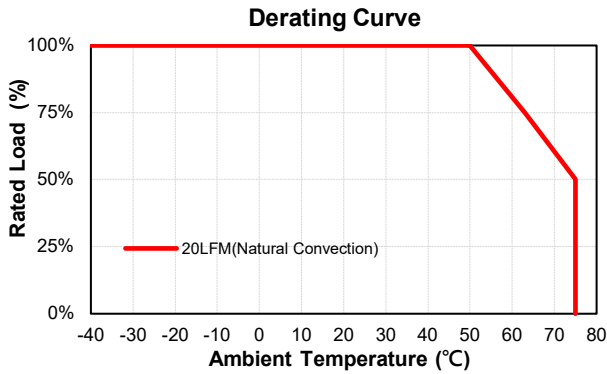
## GENERAL SPECIFICATIONS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	I <sub>o</sub> =100%; T <sub>a</sub> =25°C per MIL-HDBK-217F	All	580			k hours
Humidity	Non-condensing	All			93	% RH
Shock	Meet MIL-STD-810F Table 516.5, Table 516.5-I 10ms, each axis 3 times(±X、±Y、±Z axis)	All		75		g
Vibration	Meet MIL-STD-810F Table 514.5C-VIII, 15~2000Hz, X、Y、Z axis, 1 hour (each axis), Total 3 hrs.	All		4		g
Weight	Blank (PCB mount)	CFM12S		16		grams
	E (Encapsulated)	CFM12S-E		40		
	T (Wafer)	CFM12S-T		17		
Dimensions	Blank (PCB mount)	All	1.500x1.000x0.756 Inches (38.10x25.40x19.20 mm)			
	E (Encapsulated)		1.600x1.100x0.772 Inches (40.64x27.94x19.60mm)			
	T (Wafer)		2.150x1.000x0.689 Inches (54.61x25.40x17.50mm)			
<b>Safety</b>	Class II, IEC/EN/UL 62368-1 (Ed 3.0), IEC/EN 60335-1					
<b>EMC Emission</b>	EN 55032:2015+A1:2020, 47 CFR FCC Part 15 Subpart B, EN 55032:2015+A11:2020, EN 61000-6-3:2021, EN 61000-6-4:2019, EN 61000-3-2:2019+A1:2021, EN 61000-3-3:2013+A2:2021					Class B
Conducted Disturbance	EN 55032:2015+A1:2020, 47 CFR FCC Part 15 Subpart B, EN 55032:2015+A11:2020, EN 61000-6-3:2021, EN 61000-6-4:2019					Class B
Radiated Disturbance	EN 55032:2015+A1:2020, 47 CFR FCC Part 15 Subpart B, EN 55032:2015+A11:2020, EN 61000-6-3:2021, EN 61000-6-4:2019					Class B
Harmonic Current Emissions	EN 61000-3-2:2019+A1:2021					
Voltage Fluctuations & Flicker	EN 61000-3-3:2013+A2:2021					
<b>EMC Immunity</b>	EN 55035:2017+A11:2020, EN 61000-6-1:2019, EN 61000-6-2:2019, IEC 61000-4-2,3,4,5,6,11					
Electrostatic Discharge (ESD)	IEC 61000-4-2:2008, Air Discharge: ±8kV, Contact Discharge: ±4kV					Criterion A
Radio-Frequency, Continuous Radiated Disturbance	IEC 61000-4-3:2020					Criterion A
Electrical Fast Transient (EFT)	IEC 61000-4-4:2012, ±1kV, ±2kV					Criterion A
Surge	IEC 61000-4-5:2014+A1:2017, L-N: ±1kV					Criterion A
Conducted Disturbances, Induced by RF Fields	IEC 61000-4-6:2013+COR1:2015					Criterion A
Voltage Dips	IEC 61000-4-11:2020, Dip: 30% Reduction, Dip >95% Reduction					Criterion A
Voltage Interruptions	IEC 61000-4-11:2020, >95% Reduction					Criterion B
Application Note Link	<a href="#">CFM12S Series App Notes</a>					

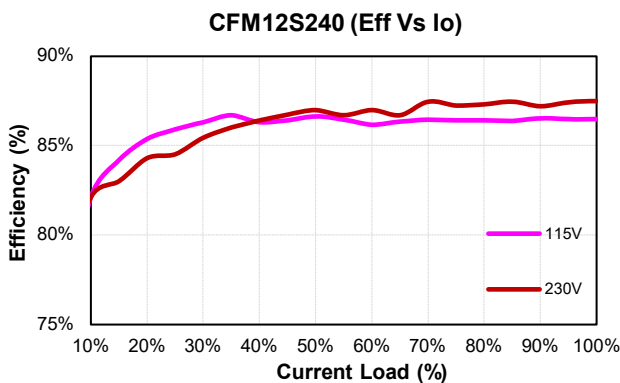
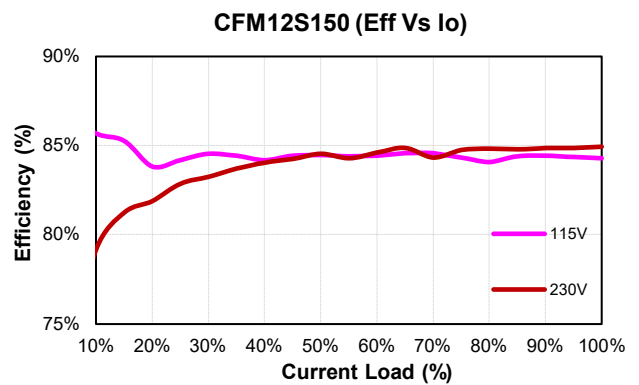
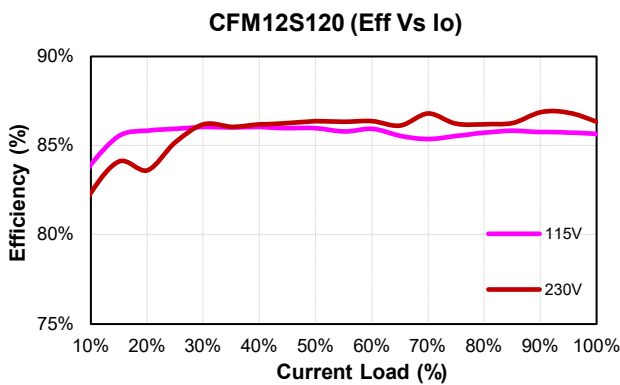
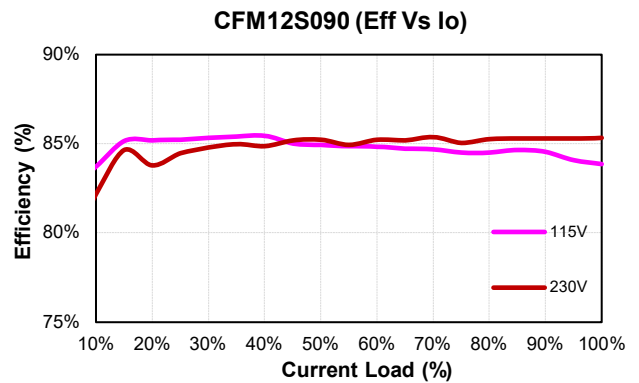
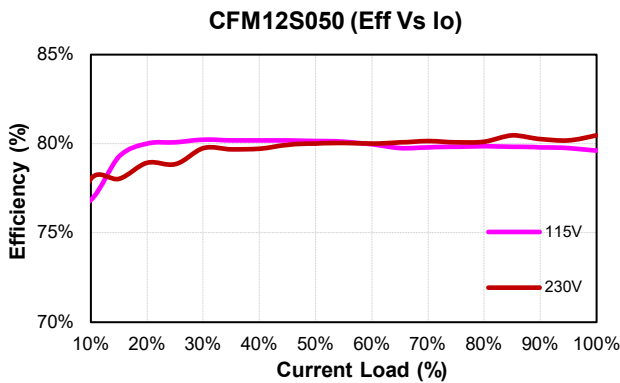


## CHARACTERISTIC CURVE

### Power Derating Curve



### Performance Data

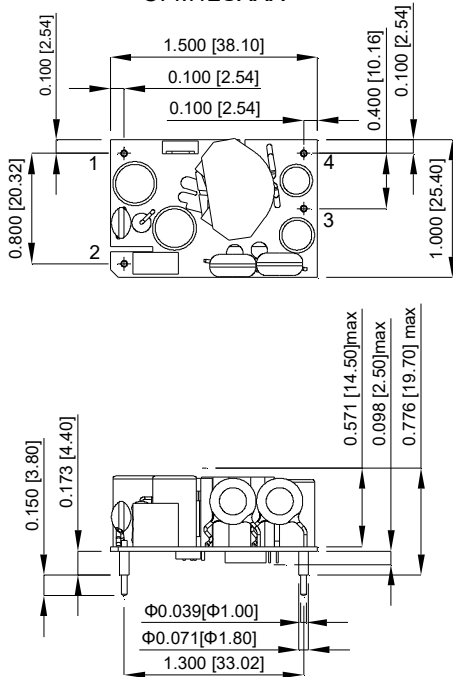




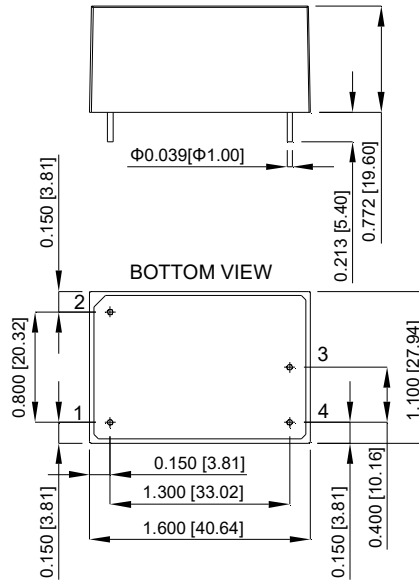
# CFM12S Series

## MECHANICAL SPECIFICATION

CFM12SXXX



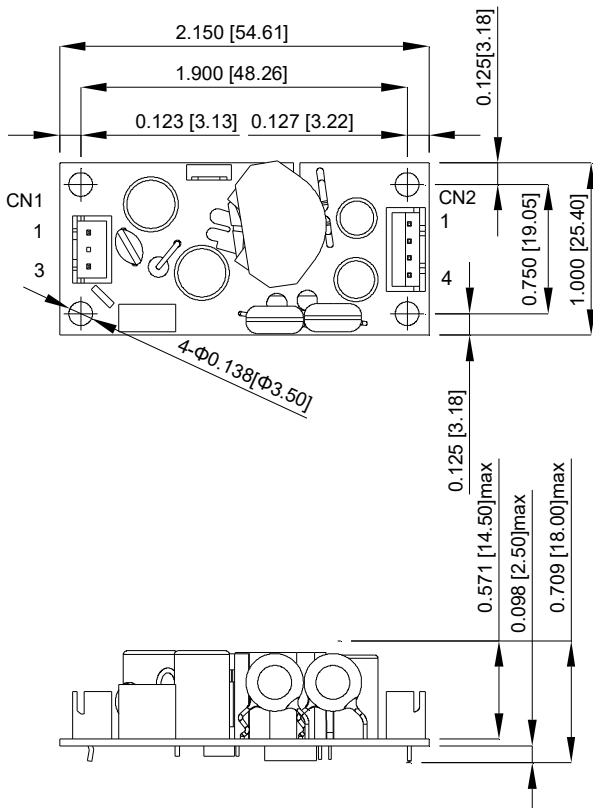
CFM12SXXX-E



PIN CONNECTION	
Pin	Function
1	ACN
2	ACL
3	-Vout
4	+Vout

All Dimensions In Inches[mm]  
 Tolerance Inches:x.xxx= ± 0.02  
 Millimeters: x.xx = ± 0.5

CFM12SXXX-T



All Dimensions In Inches[mm]  
 Tolerance Inches:x.xxx= ± 0.02  
 Millimeters: x.xx = ± 0.5

AC Input Connector(CN1):JST B3B-XH-A(LF)(SN)(2N) or equivalent

Pin	Function	Mating Housing	Terminal
1	ACN	JST XHP-3 or equivalent	JST SXH-001T-P0.6N or equivalent
2	-		
3	ACL		

DC Output Connector(CN2):JST B4B-XH-A(LF)(SN) or equivalent

Pin	Function	Mating Housing	Terminal
1	+Vout	JST XHP-4 or equivalent	JST SXH-001T-P0.6N or equivalent
2	+Vout		
3	-Vout		
4	-Vout		

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