



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 90Vac to 264Vac with 100% full load.
4. Load regulation is measured from 10% to 100% full load.
5. Typical efficiency at 230 Vac 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	90 120		264 370	V _{ac} V _{dc}
Operating Temperature	See derating curve	All	-40		75	°C
Storage Temperature		All	-40		85	°C
Operating Altitude	IEC/EN/UL 62368-1 OVC II IEC 62368-1 OVC III IEC/EN 60335-1 OVC II	All			5000 2000 5000	m

INPUT CHARACTERISTICS

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

OUTPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Output Voltage Set Point	V _{in} =Nominal V _{in} , I _o =I _o max., T _c =25°C	CFM12S050 CFM12S090 CFM12S120 CFM12S150 CFM12S240	4.90 8.82 11.76 14.70 23.52	5 9 12 15 24	5.10 9.18 12.24 15.30 24.48	V _{dc}
Operating Output Current Range	V _{in} =90V _{ac} ~264V _{ac} , see derating curve	CFM12S050 CFM12S090 CFM12S120 CFM12S150 CFM12S240			2.0 1.34 1.0 0.8 0.5	A
Holdup Time	V _{in} =115V _{ac}	All		10		ms
Output Voltage Regulation						
Load Regulation	10% to 100% full load	All			±1.0	%
Line Regulation	V _{in} =High line to low line	All			±1.0	%
Over Current Protection	Hiccup mode (Auto recovery)	All	110		180	%
Short Circuit Protection	Auto recovery	All				
Over Voltage Protection	Hiccup mode (Auto recovery)	CFM12S050 CFM12S090 CFM12S120 CFM12S150 CFM12S240			6.3 12.6 15.8 18.9 31.5	V _{dc}
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 CFM12S090 CFM12S120 CFM12S150 CFM12S240			100 100 120 150 240	mV



CFM12S Series

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Load Capacitance	1. $V_{in}=115V_{ac}$ and $230V_{ac}$ 2. Output is 100% full load 3. Ambient temperature= $25^{\circ}C$	CFM12S050			2000	μF
		CFM12S090			1340	
		CFM12S120			1000	
		CFM12S150			800	
		CFM12S240			500	
Efficiency	1. Input voltage is $230V_{ac}$ 2. Output is 100% full load 3. Ambient temperature= $25^{\circ}C$	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			4300	V_{ac}
Isolation Resistance	Input to output	All	100			$M\Omega$

FEATURE CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	$P_{out}=\text{max. rated power}$	All		65		kHz

GENERAL SPECIFICATIONS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	I ₀ =100%; T _a =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	1.500x1.000x0.776 Inches (38.10x25.40x19.70 mm)			
	E (Encapsulated)		1.600x1.100x0.772 Inches (40.64x27.94x19.60mm)			
	T (Wafer)		2.150x1.000x0.709 Inches (54.61x25.40x18.00mm)			
Safety	Class II, IEC/EN/UL 62368-1 (Ed 3.0), IEC/EN 60335-1					
EMC Emission	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					
EMC Immunity	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+C0R1:2015					Criterion A



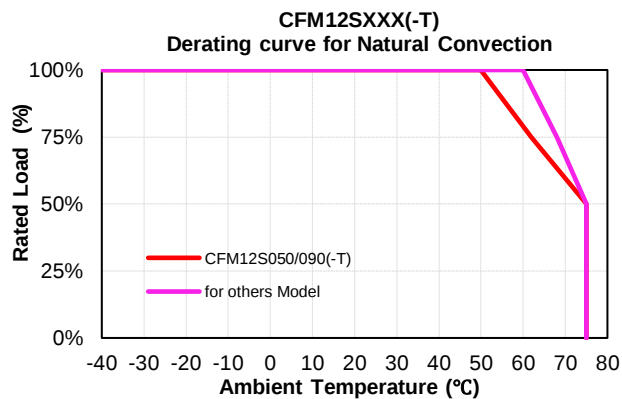
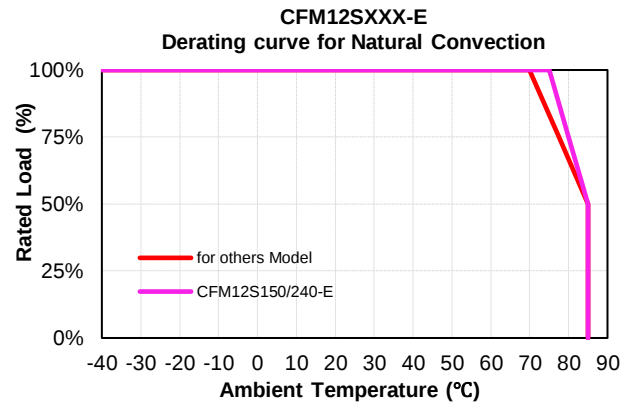
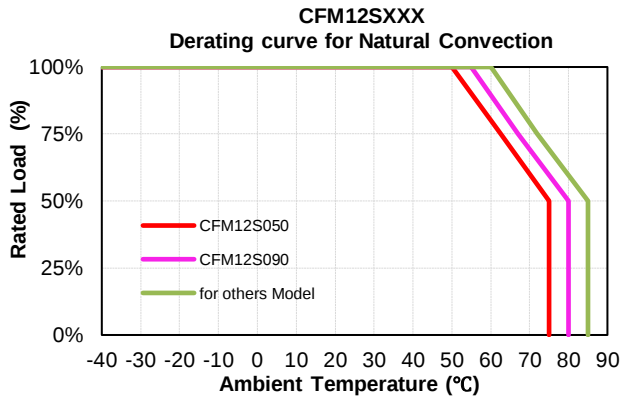
CFM12S Series

GENERAL SPECIFICATIONS

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		CFM12S Series App Notes

CHARACTERISTIC CURVE

Power Derating Curve

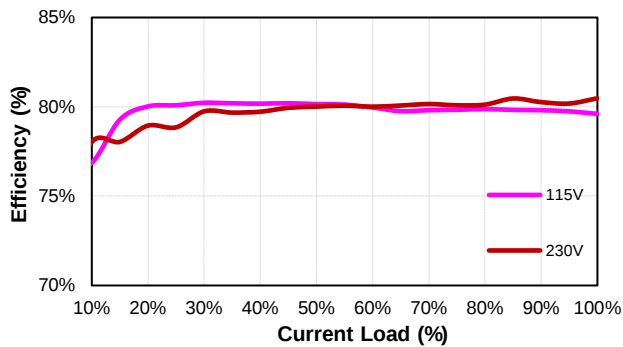




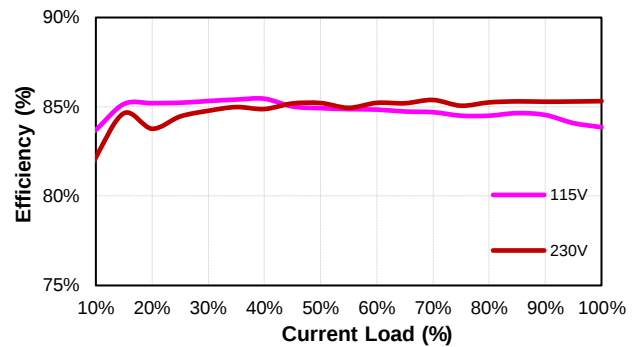
Performance Data

CFM12S Series

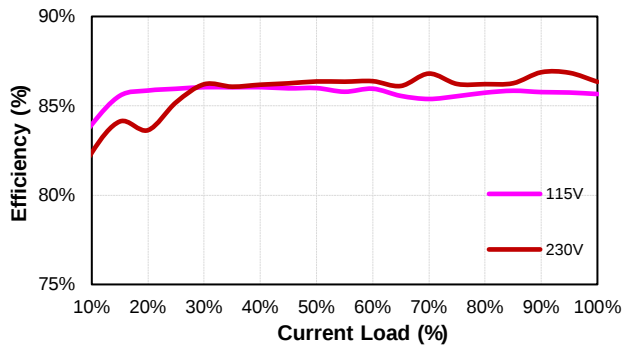
CFM12S050 (Eff Vs Io)



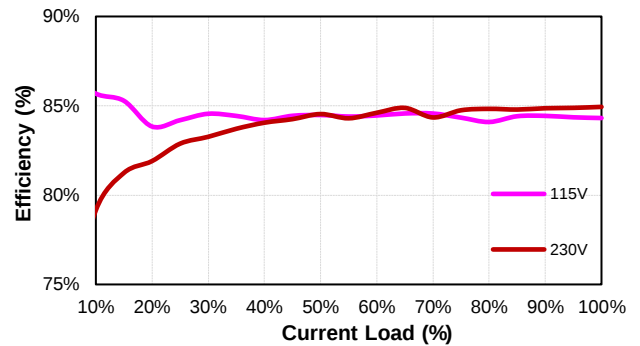
CFM12S090 (Eff Vs Io)



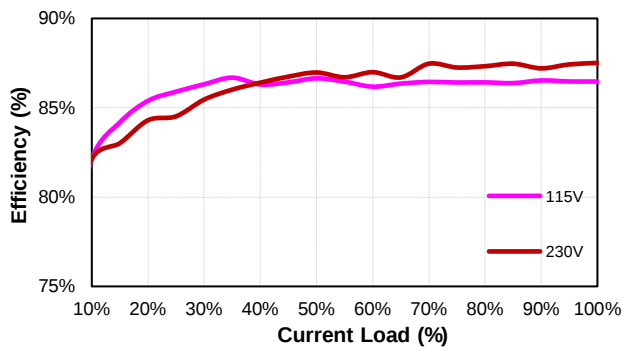
CFM12S120 (Eff Vs Io)



CFM12S150 (Eff Vs Io)



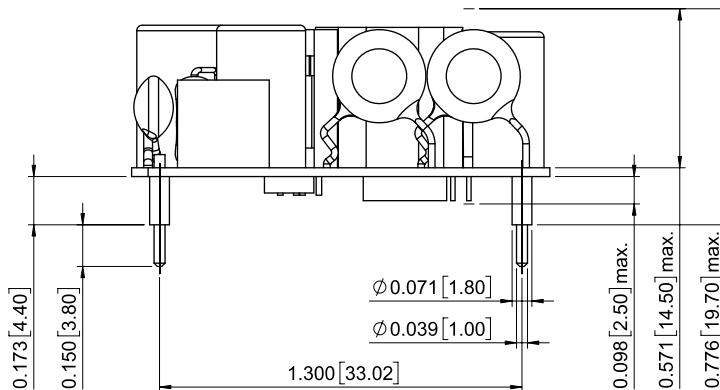
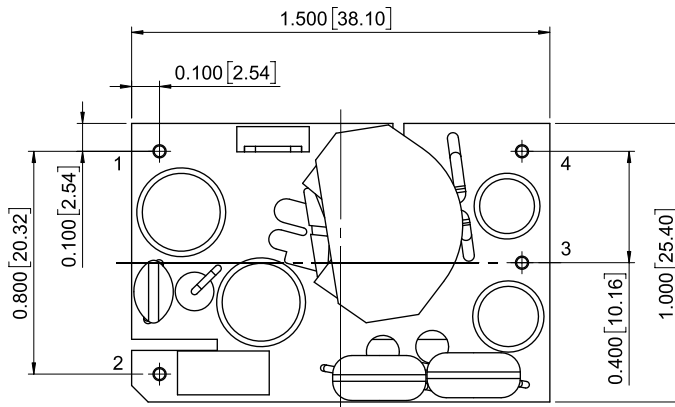
CFM12S240 (Eff Vs Io)





CFM12S Series

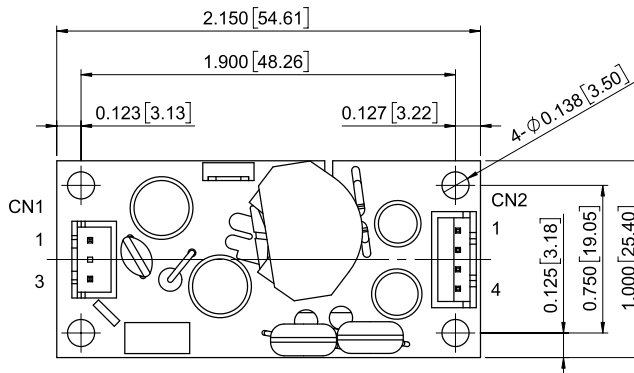
MECHANICAL SPECIFICATION



CFM12SXXX

All Dimensions in Inches[mm]
Tolerance Inches: x.xxx=±0.020
Millimeters: x.xx=±0.50

Pin Connection	
Pin	Function
1	ACN
2	ACL
3	-Vout
4	+Vout



CFM12SXXX-T

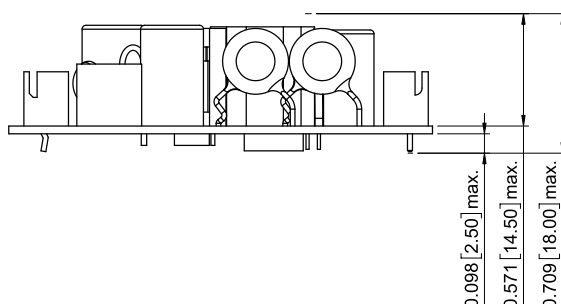
All Dimensions in Inches[mm]
Tolerance Inches: x.xxx=±0.020
Millimeters: x.xx=±0.50

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

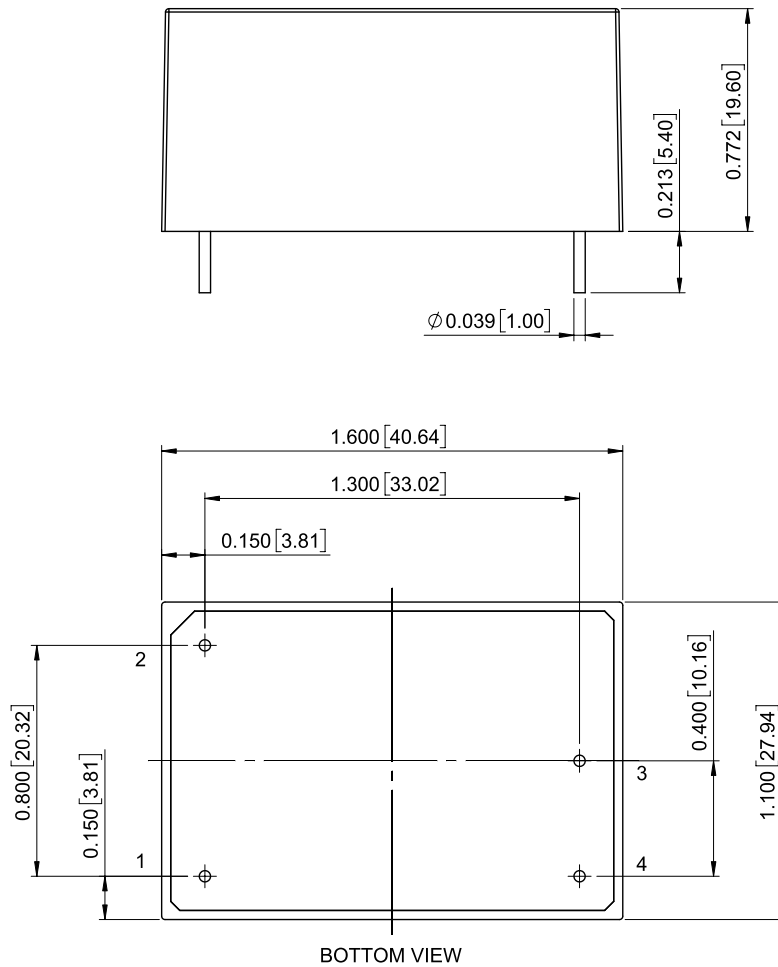
Pin	Function	Mating Housing	Terminal
1	+Vout	JST XHP-4 or equivalent	JST SXH-001T-P0.6N or equivalent
2	+Vout		
3	-Vout		
4	-Vout		





CFM12S Series

MECHANICAL SPECIFICATION



CFM12SXXX-E

All Dimensions in Inches[mm]

Tolerance Inches: x.xxx=±0.020

Millimeters: x.xx=±0.50

Pin Connection

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