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_{ac} to 264V_{ac} with 100% full load.
4. Load regulation is measured from 10% to 100% full load.
5. Typical efficiency at 230 V_{ac} and 100% full load at 25℃.
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

TECHNICAL SPECIFICATIONS

(All specifications are typical at nominal input, 100% full load at 25℃ 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_{ac}
			120		370	V_{dc}
Operating Temperature	See Derating Curve	All	-40		75	℃
Storage Temperature		All	-40		85	℃
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_{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℃	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℃	CFM12S050	4.90	5	5.10	V_{dc}
		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_{in}=90V_{ac}~264V_{ac}, **See Derating Curve**	CFM12S050			2.0	A
		CFM12S090			1.34	
		CFM12S120			1.0	
		CFM12S150			0.8	
		CFM12S240			0.5	
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 Voltage Protection	Hiccup mode (Auto recovery)	CFM12S050			6.3	V_{dc}
		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℃	CFM12S050			100	mV
		CFM12S090			100	
		CFM12S120			120	
		CFM12S150			150	
		CFM12S240			240	

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℃	CFM12S050 CFM12S090 CFM12S120 CFM12S150 CFM12S240			2000 1340 1000 800 500	uF
Efficiency	1. Input voltage is 230V_{ac} 2. Output is 100% full load 3. Ambient temperature=25℃	CFM12S050 CFM12S090 CFM12S120 CFM12S150 CFM12S240		80 85 85 85 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			MΩ

FEATURE CHARACTERISTICS

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

GENERAL SPECIFICATIONS

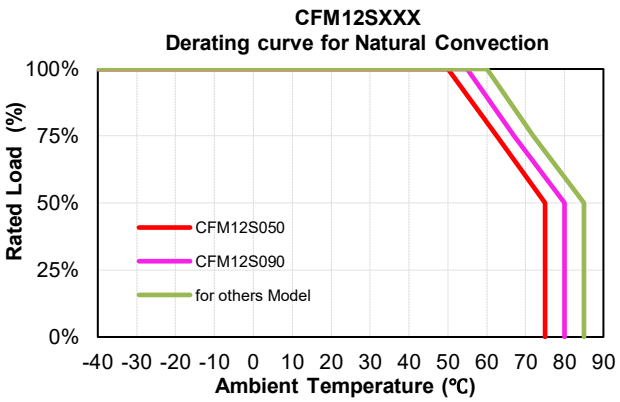
PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	I_o=100%; T_a=25℃ per MIL-HDBK-217F	All	580			k hours
Humidity	Non-condensing	All			93	% RH
Shock	Meet MIL-STD-810F Table 516.5,Table 516.5-I 10ms, each axis 3 times(±X、±Y、±Z axis)	All		75		g
Vibration	Meet MIL-STD-810F Table 514.5C-VIII,15~2000Hz, X、Y、Z axis, 1 hour (each axis),. Total 3 hrs.	All		4		g
Weight	Blank (PCB mount) E (Encapsulated) T (Wafer)	CFM12S CFM12S-E CFM12S-T		16 40 17		grams
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+COR1:2015					Criterion A

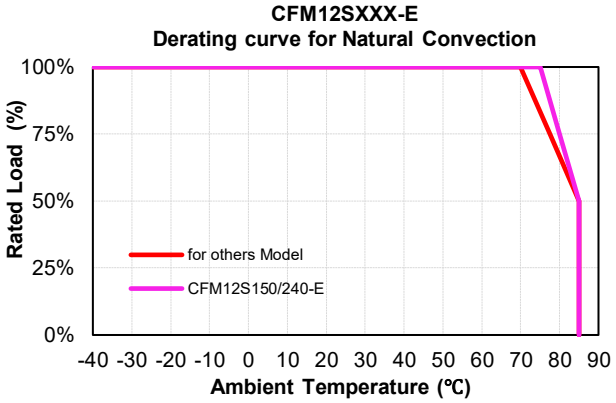
GENERAL SPECIFICATIONS

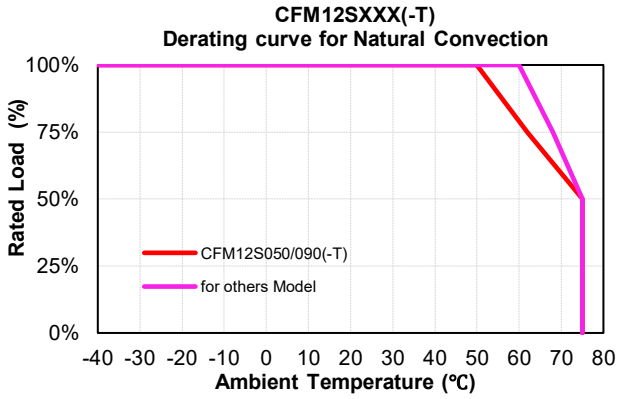
Voltage Dips	IEC 61000-4-11:2020, Dip: 30% Reduction, Dip >95% Reduction	Criterion A
Voltage Interruptions	IEC 61000-4-11:2020, >95% Reduction	Criterion B
Application Note Link	CFM12S Series App Notes	

CHARACTERISTIC CURVE

Power Derating Curve







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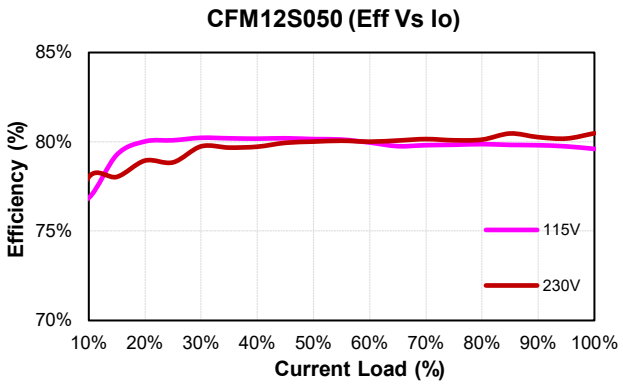
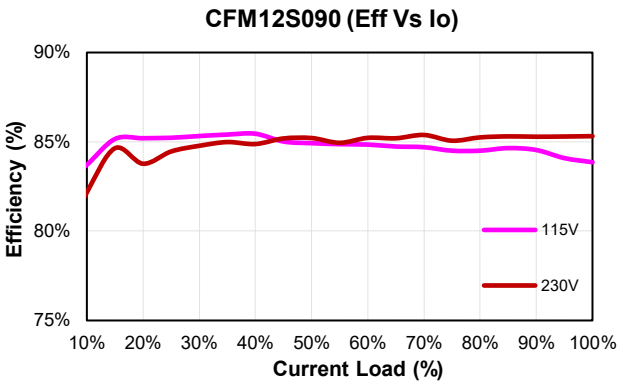
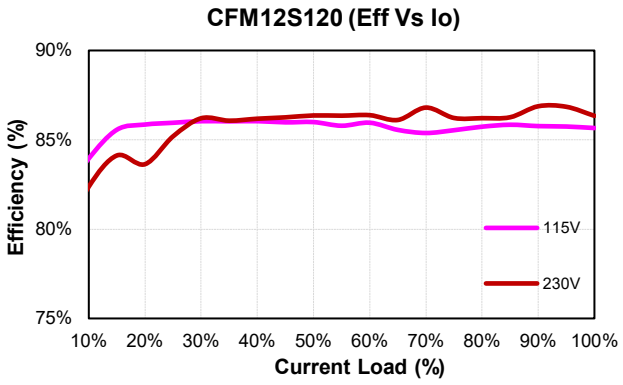
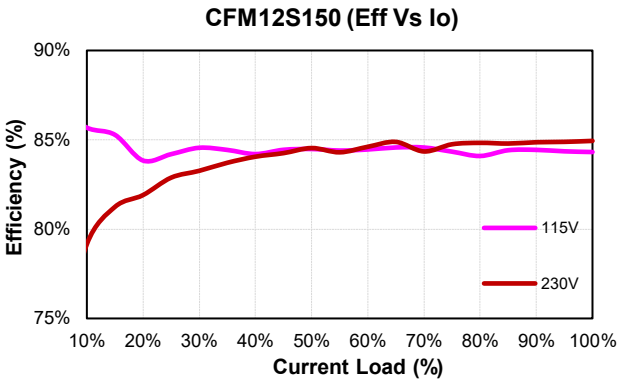
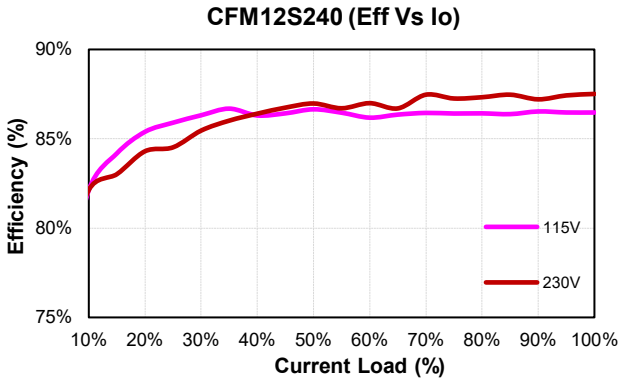




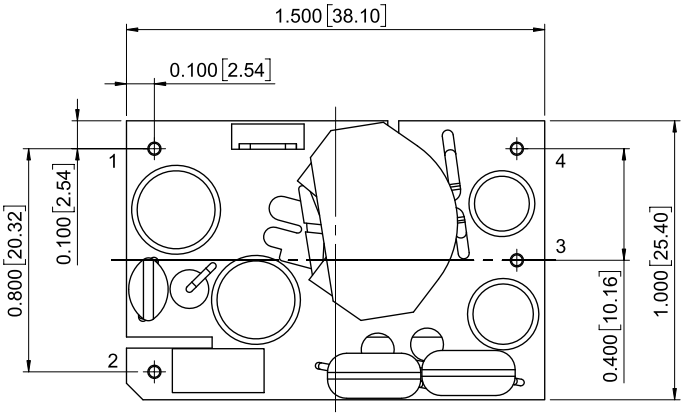


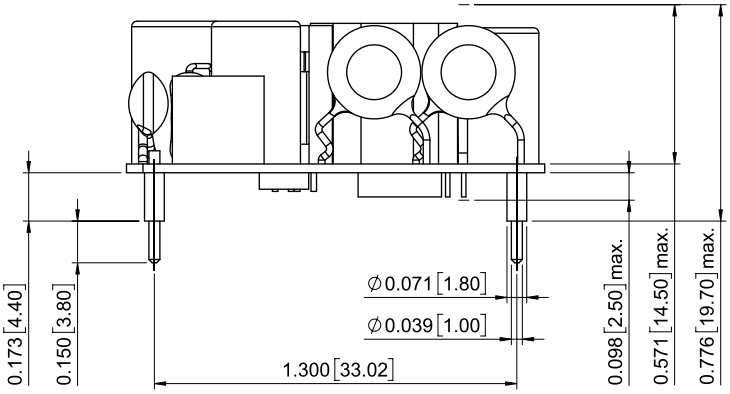




CFM12S Series

MECHANICAL SPECIFICATION



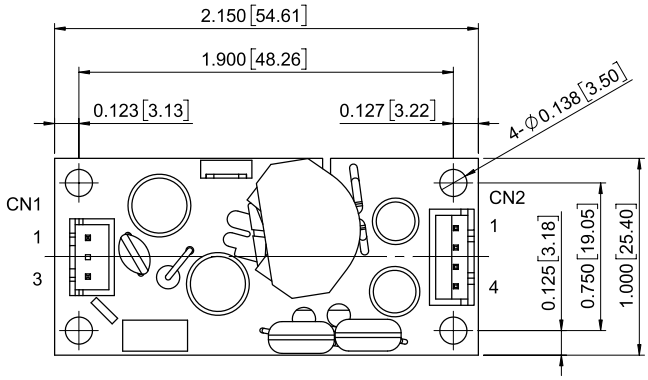


CFM12SXXX

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-E

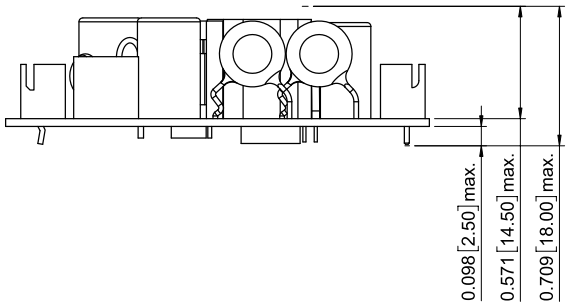
All Dimensions in Inches[mm]
Tolerance Inches: x.xxx=±0.020
Millimeters: x.xx=±0.50

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

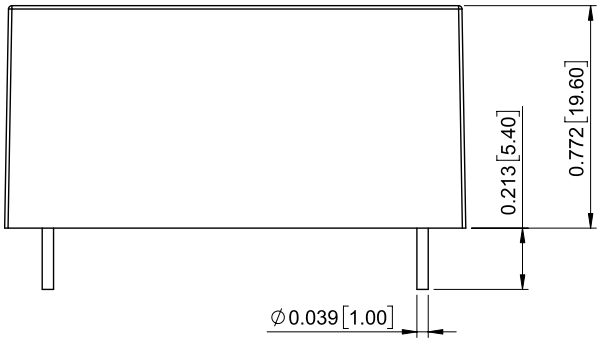
Pin	Function	Mating Housing	Terminal
1	ACN	JST XHP-3 or equivalent	JST SXH-001T-P0.6N or equivalent
2	-		
3	ACL		

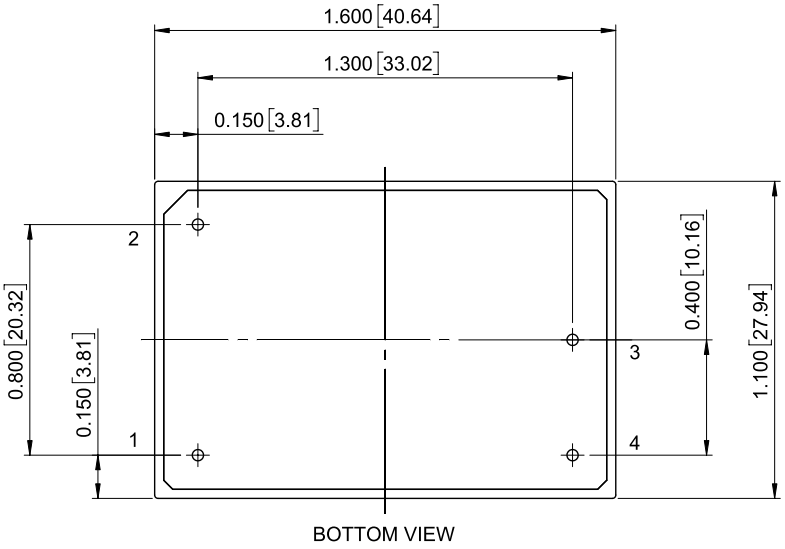
DC Output Connector(CN2):JST B4B-XH-A(LF)(SN) or equivalent

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		



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

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