



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
- 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



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°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, 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_{ac}
					370	V_{dc}
Operating Case Temperature	See Derating Curve	All	-40		75	°C
Storage Temperature		All	-40		85	°C
Operating Altitude	IEC/EN/UL 62368-1 IEC/EN 60335-1	All			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% 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., $T_c=25^\circ C$	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	$V_{in}=90V_{ac}\sim 264V_{ac}$, 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% Load to 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°C	CFM12S050			100	mV
		CFM12S090			100	
		CFM12S120			120	
		CFM12S150			150	
		CFM12S240			240	
Load Capacitance	1. $V_{in}=115V_{ac}$ and $230V_{ac}$ 2. Output is max. 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 _{ac} 2. Output is rated 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		4000	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

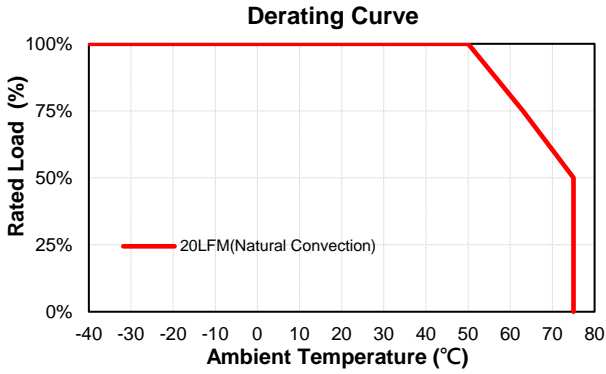
PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	I _o =100%; T _a =25°C per MIL-HDBK-217F	All	580			k hours
Humidity	Non-condensing	All			93	% RH
Shock	Meet MIL-STD-810F Table 516.5, Table 516.5-I 10ms, each axis 3 times(±X · ±Y · ±Z axis)	All		75		g
Vibration	Meet MIL-STD-810F Table 514.5C-VIII, 15~2000Hz, X · Y · Z axis, 1 hour (each axis), Total 3 hrs.	All		4		g
Weight		CFM12S		16		grams
		CFM12S-E		40		
		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)			
Safety	Class II, IEC/EN/UL 62368-1 (Ed 3.0), IEC/EN 60335-1					
EMC Emission	EN 55032:2015, EN 61000-6-3:2017+A1:2011, EN 61000-6-4:2017+A1:2011+AC:2012, EN 61204-3:2000, EN 61000-3-3:2013, 47 CFR FCC Part 15 Subpart B					Class B
Conducted Disturbance	EN 55032:2015, EN 6100-6-3:2007+A1:2011, EN 61000-6-4:2017+A1:2011+AC:2012, EN 61204-3:2000, 47 CFR FCC Part 15 Subpart B					Class B
Radiated Disturbance	EN 55032:2015, EN 6100-6-3:2007+A1:2011, EN 61000-6-4:2017+A1:2011+AC:2012, EN 61204-3:2000, 47 CFR FCC Part 15 Subpart B					Class B
Voltage Fluctuations & Flicker	EN 61000-3-3:2013					
EMC Immunity	EN 55024:2010+A1:2015, EN 61000-6-1:2007, EN 61000-6-2:2005+AC:2005, EN 61204-3:2000					
Electrostatic Discharge (ESD)	IEC 61000-4-2:2009, Air Discharge: ±8kV, Contact Discharge: ±4kV					Criterion B
Radio-Frequency, Continuous Radiated Disturbance	IEC 61000-4-3:2006+A1:2008+A2:2010					Criterion A
Electrical Fast Transient (EFT)	IEC 61000-4-4:2012, ±1kV, ±2kV					Criterion B
Surge	IEC 61000-4-5:2014, L-N: ±1kV					Criterion B
Conducted Disturbances, Induced by RF Fields	IEC 61000-4-6:2014					Criterion A
Power Frequency Magnetic Field	IEC 61000-4-8:2010					Criterion A
Voltage Dips	IEC 61000-4-11:2004, Dip: 30% Reduction, Dip >95% Reduction					Criterion C
Voltage Interruptions	IEC 61000-4-11:2004, >95% Reduction					Criterion C
Application Note Link	CFM12S Series App Notes					



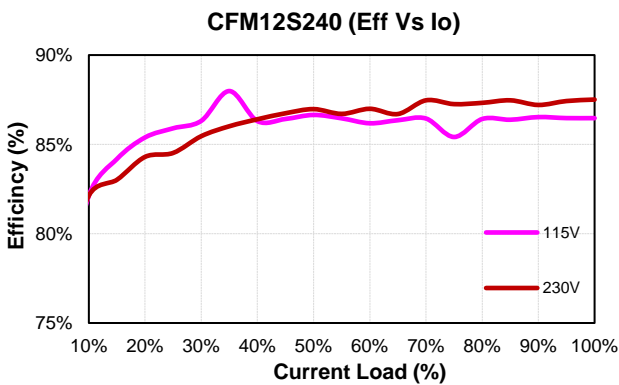
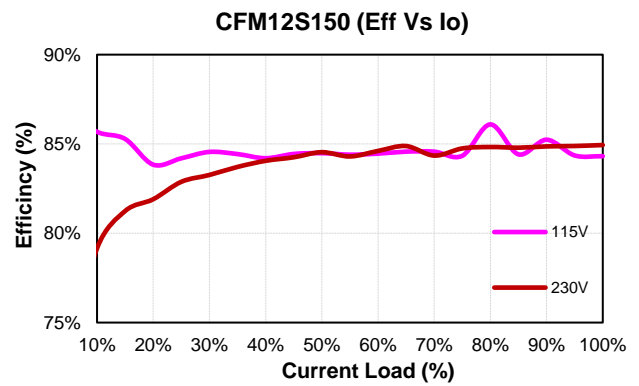
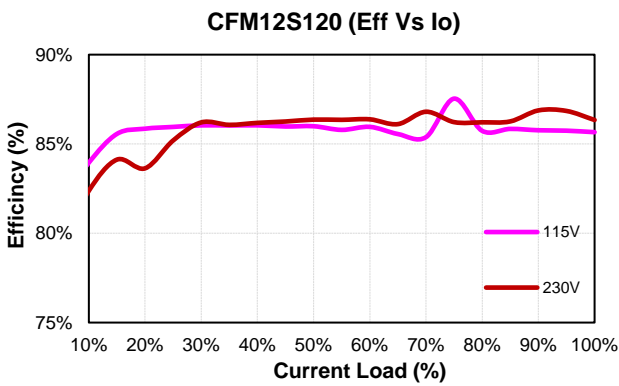
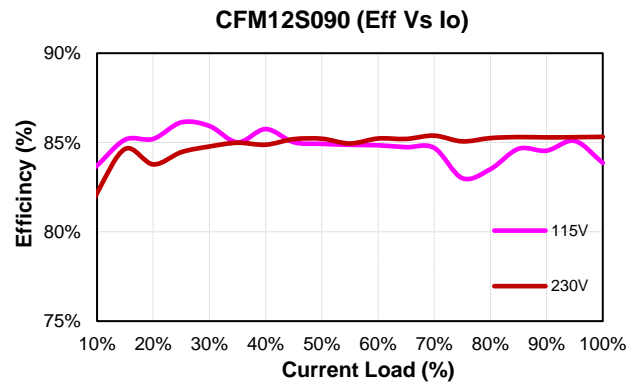
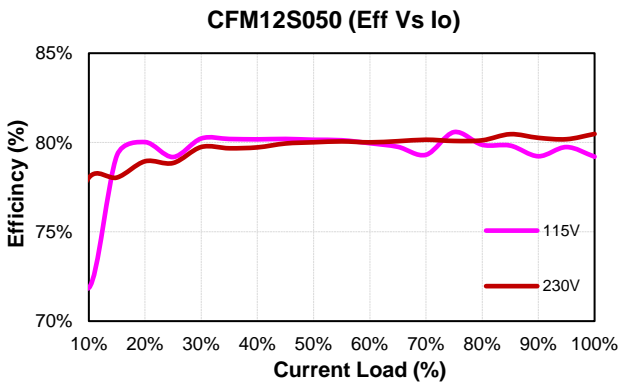
CFM12S Series

CHARACTERISTIC CURVE

Power Derating Curve



Performance Data

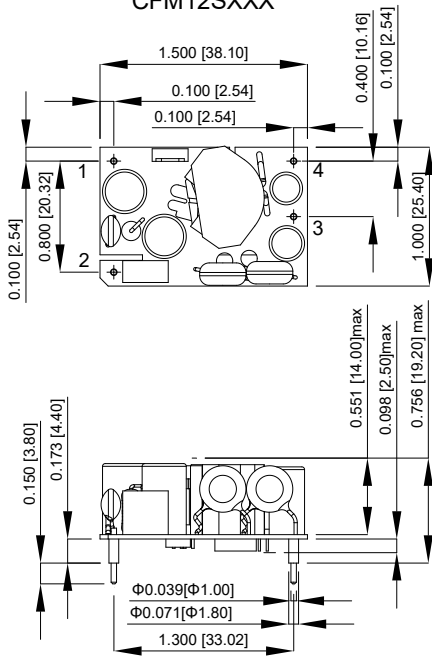




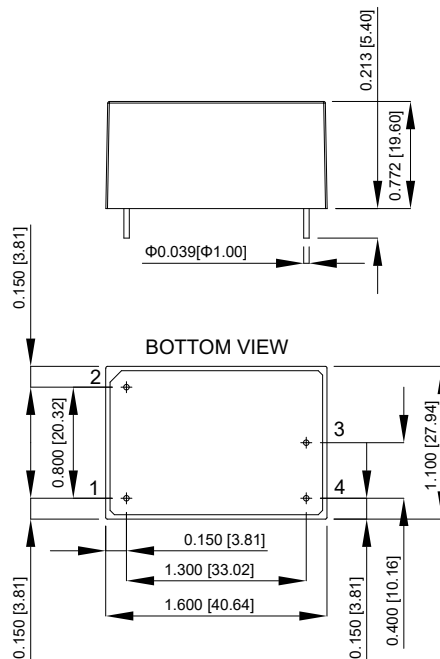
CFM12S Series

MECHANICAL SPECIFICATION

CFM12SXXX



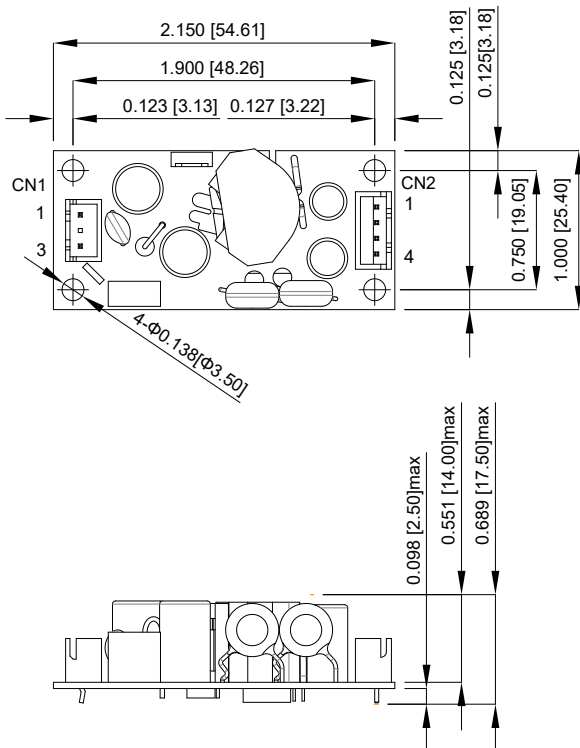
CFM12SXXX-E



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



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		

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