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℃.
6. T Version wafer with JST B3B-XH/B4B-XH and mate with JST housing XH series or equivalent.
7. L Version & EL Version Safety only approved only IEC/EN 60335-1.

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 L: Lead Wire EL: Encapsulated & Lead Wire

Part Number Example:

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

TECHNICAL SPECIFICATIONS

(All specifications are typical at nominal input, 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	90 120		264 370	V_{ac} V_{dc}
Operating Case Temperature	See Derating Curve	All	-40		75	℃
Storage Temperature		All	-40		85	℃
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℃	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=Io max., T_c=25℃	CFM12S050 CFM12S090 CFM12S120 CFM12S150 CFM12S240	4.90 8.82 1176 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% 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 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℃	CFM12S050 CFM12S090 CFM12S120 CFM12S150 CFM12S240			100 100 120 150 240	mV
Load Capacitance	1. V_{in}=115V_{ac} and 230V_{ac} 2. Output is max. load 3. Ambient temperature=25℃	CFM12S050 CFM12S090 CFM12S120 CFM12S150 CFM12S240			2000 1340 1000 800 500	uF

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Efficiency	1. Output is rated load 2. Ambient temperature=25℃ 3. Input voltage is 230V_{ac}	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			3000	V_{ac}
Isolation Resistance	Input to output	All	100			MΩ

FEATURE CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	Pout=max. rated power	All		65		kHz

GENERAL SPECIFICATIONS

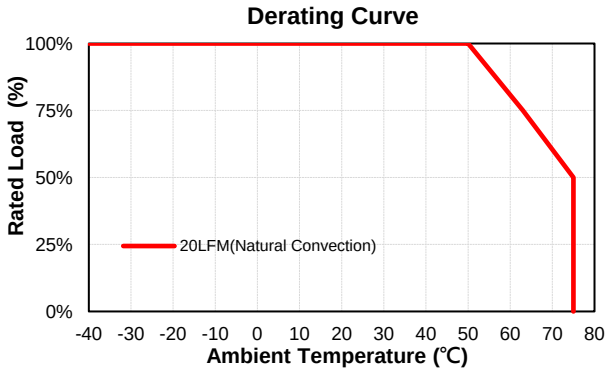
PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	I_o=100%; T_a=25℃ per MIL-HDBK-217F	All	580			k hours
Humidity	Non-condensing	All			93	% RH
Shock	Meet MIL-STD-810F Table 516.5,Table 516.5-I 10ms, each axis 3 times(±X、±Y、±Z axis)	All		75		g
Vibration	Meet MIL-STD-810F Table 514.5C-VIII,15~2000Hz, X、Y、Z axis, 1 hour (each axis),. Total 3 hrs.	All		4		g
Weight		CFM12S CFM12S-E CFM12S-T CFM12S-L CFM12S-EL		16 40 17 21 45		grams
Dimensions	Blank (PCB mount)	All	1.500x1.000x0.756 Inches (38.10x25.40x19.20 mm)			
	E (Encapsulated)	All	1.600x1.100x0.772 Inches (40.64x27.94x19.60mm)			
	T (Wafer)	All	2.150x1.000x0.689 Inches (54.61x25.40x17.50mm)			
	L (Lead wire)	All	1.500x1.000x0.681 Inches (38.10x25.40x17.30mm)			
	EL (Encapsulated & Lead wire)	All	1.600x1.100x0.772 Inches (40.64x27.94x19.60mm)			
Safety	Class II, IEC/EN/UL 62368-1, IEC/UL 60950-1, IEC/EN 60335-1 L Version & EL Version Safety only approved only IEC/EN 60335-1					
EMC Emission	EN 55032, EN 61000-3-2, EN 6100-3-3, EN 61000-6-3, Class B. EN 61000-6-4 47 CFR FCC Part 15 Subpart B (Class B)					Class B
Conducted Disturbance	EN 55032 2015, EN 6100-6-3 2007+A1: 2011+AC: 2012, Class B. EN 61000-6-4 47 CFR FCC Part 15 Subpart B (Class B)					Class B
Radiated Disturbance	EN 55032 2015, EN 6100-6-3 2007+A1: 2011+AC: 2012, Class B. EN 61000-6-4 47 CFR FCC Part 15 Subpart B (Class B)					Class B
Harmonic Current Emissions	EN 61000-3-2:2014					
Voltage Fluctuations & Flicker	EN 61000-3-3:2013					
EMC Immunity	EN 55024 2010+A1:2015, EN 61204-3:2000, EN 61000-6-1:2007, EN 61000-6-2:2005					
Electrostatic Discharge (ESD)	IEC 61000-4-2:2008, Air Discharge: ±8kV, Contact Discharge: ±4kV					Criterion B
Radio-Frequency, Continuous Radiated Disturbance	IEC 61000-4-3:2010					Criterion A
Electrical Fast Transient (EFT)	IEC61000-4-4:2012, ±1kV, ±2kV					Criterion B
Surge	IEC61000-4-5:2014, L-N: ±1kV					Criterion B
Conducted Disturbances, Induced by RF Fields	IEC 61000-4-6:2013					Criterion A

GENERAL SPECIFICATIONS

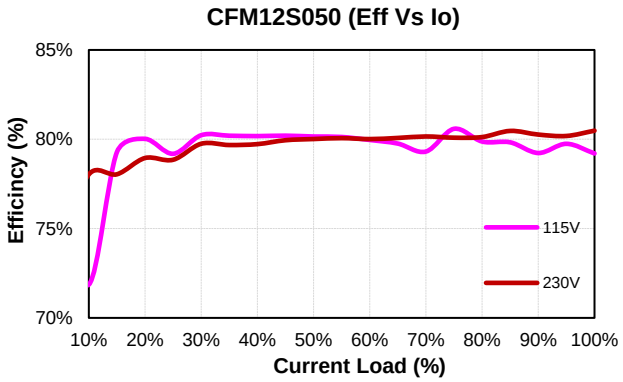
Power Frequency Magnetic Field	IEC 61000-4-8:2009	Criterion A
Voltage Dips	IEC 61000-4-11:2004, Dip: 30% Reduction, Dip >95% Reduction	Criterion C
Voltage Interruptions	IEC 61000-4-11:2004, >95% Reduction	Criterion C
Application Note Link		CFM12S Series App Notes

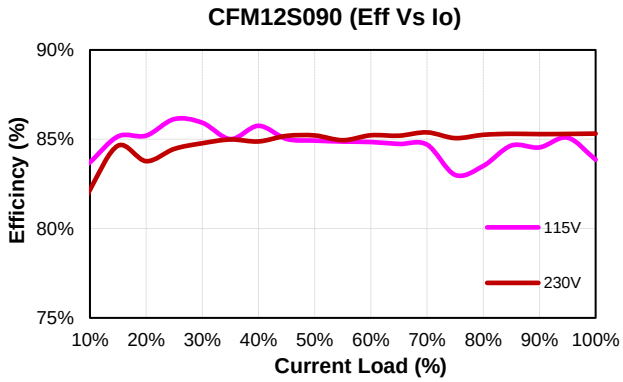
CHARACTERISTIC CURVE

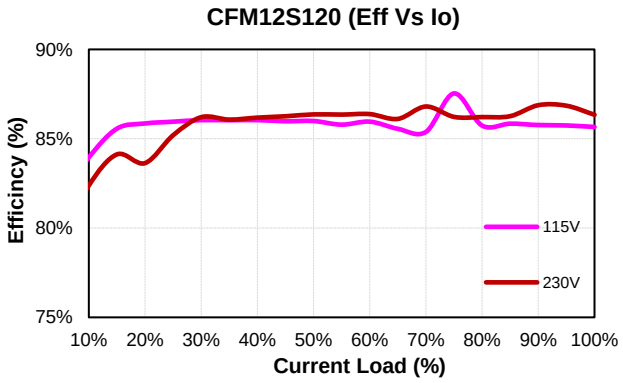
Power Derating Curve

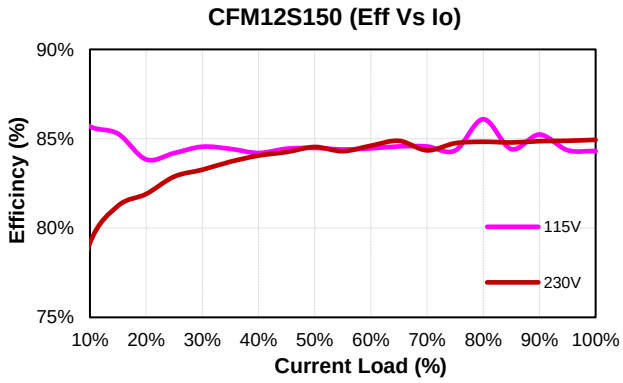


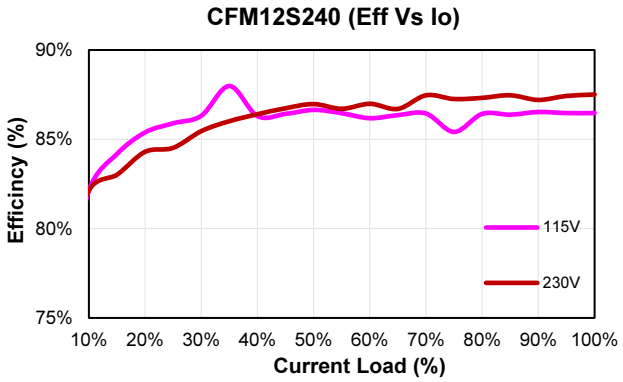
Performance Data





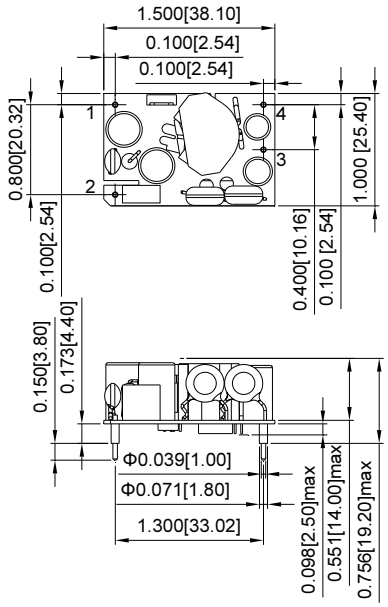




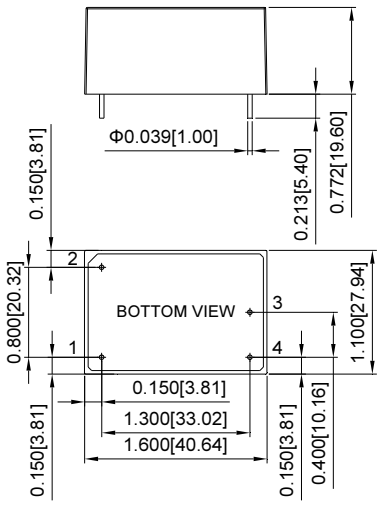


MECHANICAL SPECIFICATION

CFM12SXXX



CFM12SXXX-E

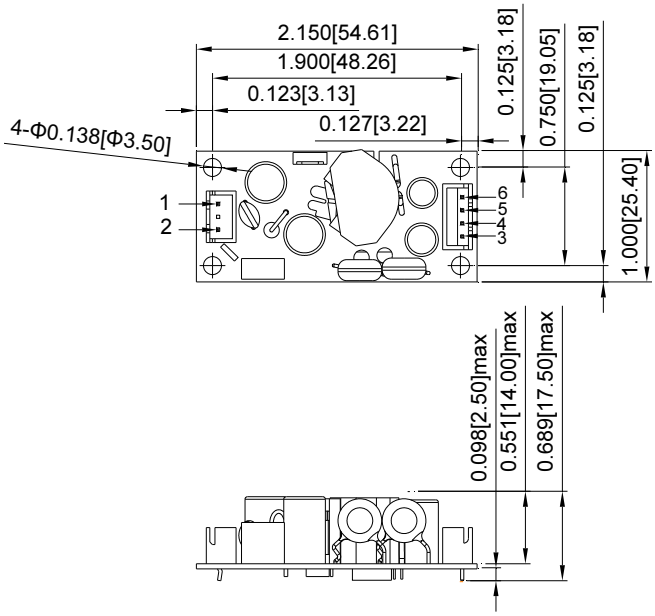


PIN CONNECTION

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

All Dimensions are in inches[mm]
Tolerance:Inches:X.XXX±0.02
Millimeters:X.XX±0.5

CFM12SXXX-T

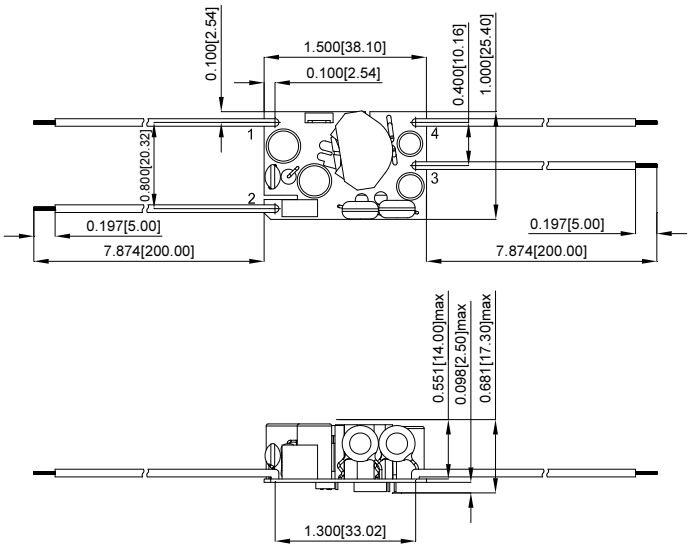


PIN CONNECTION

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

All Dimensions are in inches[mm]
Tolerance:Inches:X.XXX±0.02
Millimeters:X.XX±0.5

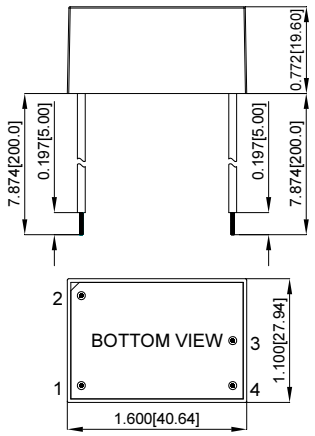
CFM12SXXX-L



CONNECTION	
Pin	Function
1 (Blue)	ACN
2 (Brown)	ACL
3 (Black)	-Vout
4 (Red)	+Vout

Cable: 20AWG/UL 1007, Φ1.8 ± 0.2mm
All Dimensions In Inches[mm]
Tolerance Inches:x.xxx= ± 0.02
Millimeters: x.xx = ± 0.5

CFM12SXXX-EL



CONNECTION	
Pin	Function
1 (Blue)	ACN
2 (Brown)	ACL
3 (Black)	-Vout
4 (Red)	+Vout

Cable: 20AWG/UL 1007, Φ1.8 ± 0.2mm
All Dimensions In Inches[mm]
Tolerance Inches:x.xxx= ± 0.02
Millimeters: x.xx = ± 0.5