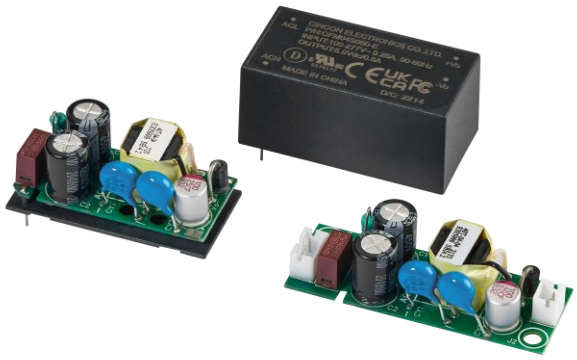
CFM04S SERIES
4 WATT OPEN FRAME AC-DC MODULES

Features

- Universal Input Range 85~305V_{ac}
- High Efficiency up to 82%
- 0.76"x 1.56" Compact Size
- Class II
- No Load Power <0.075W
- Approval IEC/EN/UL 62368-1 Ed 3.0
- Approval EN 55032 Class B and CISPR/FCC Class B
- Design Meets IEC/EN 60335-1
- Operating Altitude 5000m
- Continuous Short Circuit Protection
- Over Voltage Protection
- Over Voltage Category OVC II & OVC III



E176177

MODEL NUMBER	OUTPUT VOLTAGE	OUTPUT CURRENT	RIPPLE& NOISE NOTE2	VOLTAGE ACCURACY NOTE1	LINE REGULATION NOTE3	LOAD REGULATION NOTE4	%EFF. (Typ.) NOTE5
CFM04S033	3.3 V	1.200 A	100 mV	±5%	±1%	±5%	74%
CFM04S050	5.0 V	0.800 A	100 mV	±4%	±1%	±4%	77%
CFM04S120	12 V	0.333 A	120 mV	±3%	±1%	±3%	81%
CFM04S150	15 V	0.266 A	150 mV	±3%	±1%	±3%	81%
CFM04S240	24 V	0.166 A	240 mV	±3%	±1%	±3%	82%

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. (CFM04S033: Add a 0.1uF ceramic capacitor and a 47uF E.L. capacitor.)
3. Line regulation is measured from high line to low line with 100% full load.
4. Load regulation is measured from 0% to 100% full load.
5. Typical efficiency at 230 V_{ac} and 100% full load at 25℃.
6. T Version wafer with JST B3B-PH / B2B-PH and mate with JST PH series or equivalent.

PART NUMBER

Series	Number of Outputs	Nominal Output Voltage	Type
CFM04	X	XXX	-X
CFM04	S：Single	033：3.3V 050：5.0V 120：12V 150：15V 240：24V	Blank：PCB mount T：Wafer E：Encapsulated

Part Number Example:

CFM04S120: 4W, Single 12Vdc Output, PCB Mount Type

CFM04S120-T: 4W, Single 12Vdc Output, Wafer Type

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	85 120		305 431	V_{ac} V_{dc}
Operating Temperature	See Derating Curve	All	-40		80	℃
Storage Temperature		All	-40		85	℃
Operating Altitude	IEC/EN/UL 62368-1 OVC II IEC/EN/UL 62368-1 OVC III Meets IEC/EN 60335-1 OVC II	All			5000 2000 3000	m

INPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Operating Voltage Range		All	100		277	V_{ac}
Input Frequency Range		All	50		60	Hz
Maximum Input Current	100% Full load, V_{in}=100V_{ac}	All			0.25	A
Leakage Current		All			0.1	mA
Inrush Current	V_{in}=240V_{ac}, Cold start at 25℃	All			70	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℃	CFM04S033 CFM04S050 CFM04S120 CFM04S150 CFM04S240	3.135 4.80 11.64 14.55 23.28	3.3 5.0 12 15 24	3.465 5.20 12.36 15.45 24.72	V_{dc}
Operating Output Current Range	V_{in}=85V_{ac}~305V_{ac}, **See Derating Curve**	CFM04S033 CFM04S050 CFM04S120 CFM04S150 CFM04S240			1.200 0.800 0.333 0.266 0.166	A
Holdup Time	V_{in}=115V_{ac}	All		16		ms
Output Voltage Regulation						
Load Regulation	0% to 100% Full load	CFM04S033 CFM04S050 CFM04S120 CFM04S150 CFM04S240			±5.0 ±4.0 ±3.0 ±3.0 ±3.0	%
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	Built-in a TVS component to clamp output voltage	CFM04S033 CFM04S050 CFM04S120 CFM04S150 CFM04S240	6.45 6.45 14.3 17.1 28.5		7.14 7.14 15.8 19.5 31.5	V_{dc}

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Output Ripple and Noise	1. Add a 0.1uF ceramic capacitor and a 10uf aluminum electrolytic capacitor to output (CFM04S033: Add a 0.1uF ceramic capacitor and a 47uF E.L. capacitor). 2. Oscilloscope is 20MHz bandwidth 3. Ambient temperature=25℃	CFM04S033			100	mV
		CFM04S050			100	
		CFM04S120			120	
		CFM04S150			150	
		CFM04S240			240	
Load Capacitance	1. V_{in}=115V_{ac} and 230V_{ac} 2. Output is 100% full load 3. Ambient Temperature=25℃	CFM04S033			1200	uF
		CFM04S050			800	
		CFM04S120			330	
		CFM04S150			266	
		CFM04S240			166	
Efficiency	1. V_{in}=230V_{ac} 2. Output is 100% full load 3. Ambient temperature=25℃	CFM04S033		74		%
		CFM04S050		77		
		CFM04S120		81		
		CFM04S150		81		
		CFM04S240		82		

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		43		kHz

GENERAL SPECIFICATIONS

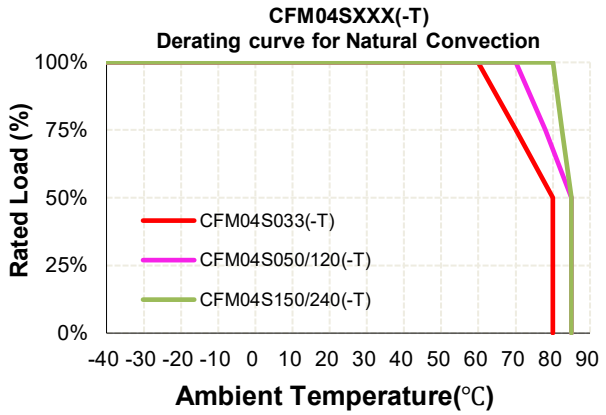
PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	I_o=100%; T_a=25℃ per MIL-HDBK-217F	All	2200			k hours
Humidity	Non-condensing	All			93	% RH
Shock	Meet MIL-STD-810F Table 516.5,Table 516.5-1 10ms, each axis 3 times (±X、±Y、±Z axis)	All		75		g
Vibration	Meet MIL-STD-810F Table 514.5C-VIII,15~2000Hz, X、Y、Z axis, 1 hour (each axis),. Total 3 hrs.	All		4		g
Weight	Blank (PCB mount)	All		10		g
	T (Wafer)			12		
	E (Encapsulated)			30		
Dimensions	Blank (PCB mount)	All	1.56x0.76x0.720 Inches (39.5x19.4x18.30 mm)			
	T (Wafer)		1.95x0.71x0.689 Inches (49.5x18.0x17.50 mm)			
	E (Encapsulated)		1.62x0.83x0.787 Inches (41.1x21.0x20.00 mm)			
Safety	Class II, IEC/EN/UL 62368-1					Ed 3.0
EMC Emission	EN 55032:2015+A1:2020, EN 55032:2015+A11:2020, 47 CFR FCC Part 15 Subpart B, ICES-003 Issue7, EN 61204-3:2018, EN 61000-6-3:2021, EN 61000-6-4:2019 EN 61000-3-2:2019, EN 61000-3-3:2013+A1:2019					Class B
Conducted Disturbance	EN 55032:2015+A1:2020, EN 55032:2015+A11:2020, 47 CFR FCC Part 15 Subpart B, ICES-003 Issue7, EN 61204-3:2018, EN 61000-6-3:2021, EN 61000-6-4:2019					Class B
Radiated Disturbance	EN 55032:2015+A1:2020, EN 55032:2015+A11:2020, 47 CFR FCC Part 15 Subpart B, ICES-003 Issue7, EN 61204-3:2018, EN 61000-6-3:2021, EN 61000-6-4:2019					Class B
Harmonic Current Emissions	EN 61000-3-2:2019					
Voltage Fluctuations & Flicker	EN 61000-3-3:2013+A1:2019					
EMC Immunity	EN 55035:2017+A11:2020, EN 61204-3:2018, EN 61000-6-1:2019, EN 61000-6-2:2019, IEC 61000-4-2, 3, 4, 5, 6, 8, 11					
Electrostatic Discharge (ESD)	IEC 61000-4-2:2008					Criterion A
Surge	IEC 61000-4-5:2014+A1:2017, L-N: ±0.5kV, ±1kV, ±2kV (±2kV requires external parts, refer to the application note “Surge recommendation“)					Criterion A

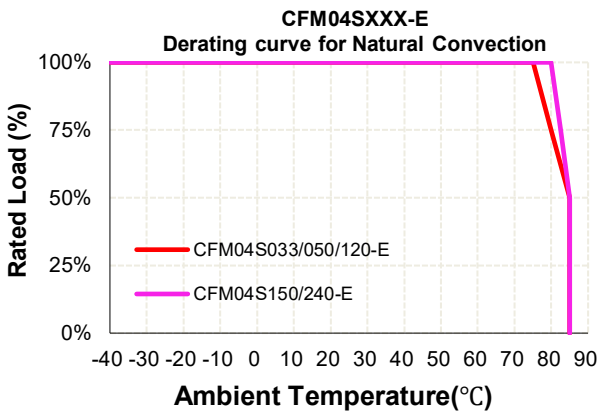
GENERAL SPECIFICATIONS

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
Conducted Disturbances, Induced by RF Fields	IEC 61000-4-6:2013+COR1:2015	Criterion A
Power Frequency Magnetic Field	IEC 61000-4-8:2009	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	CFM04S Series App Notes	

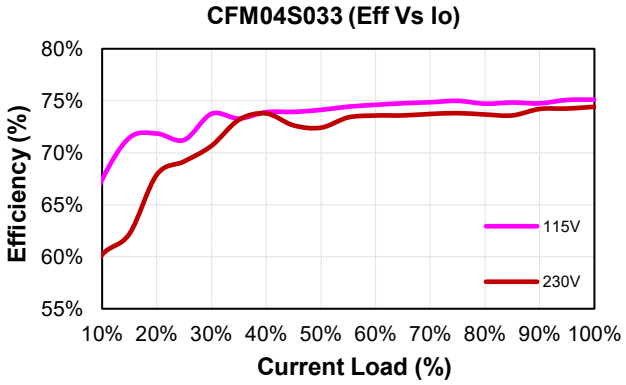
CHARACTERISTIC CURVE

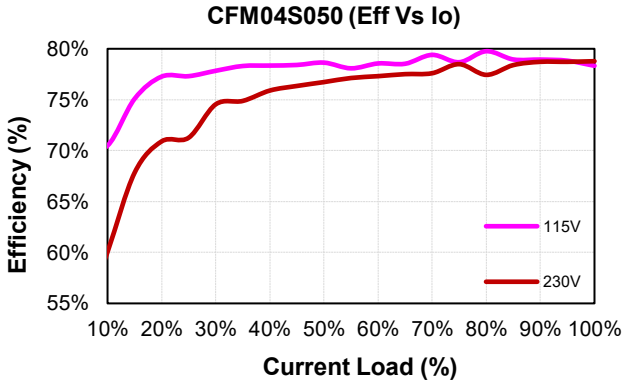
Power Derating Curve

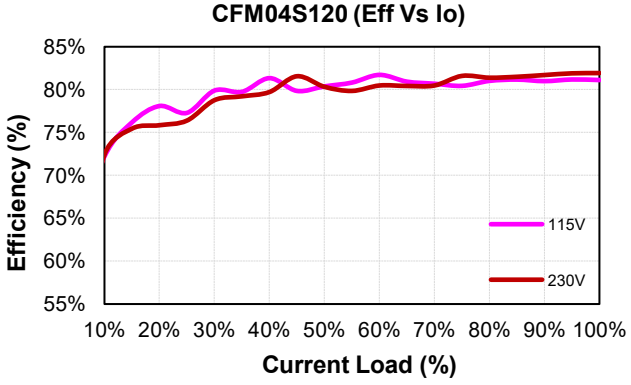


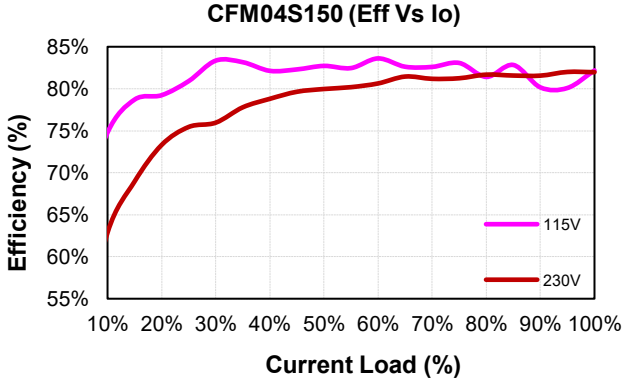


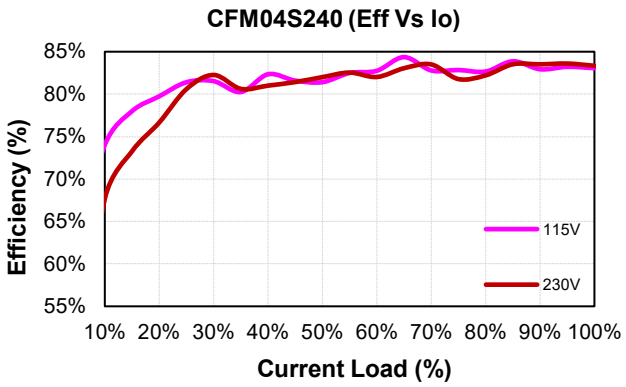
Performance Data



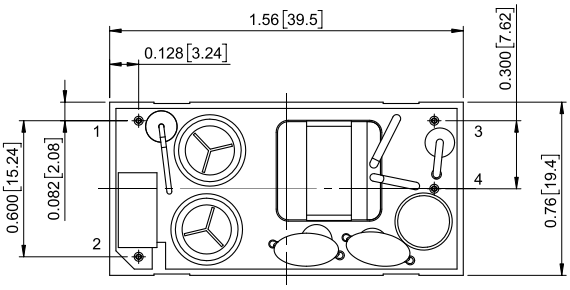


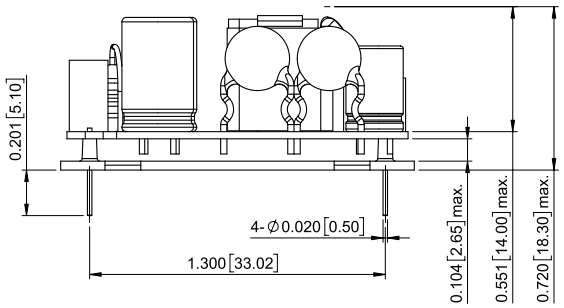


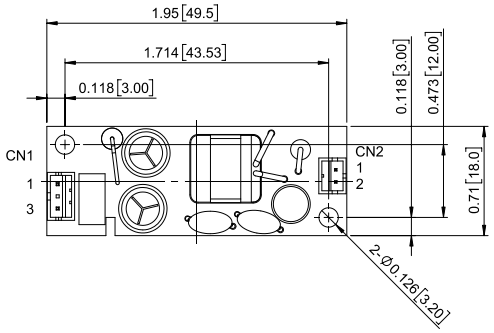


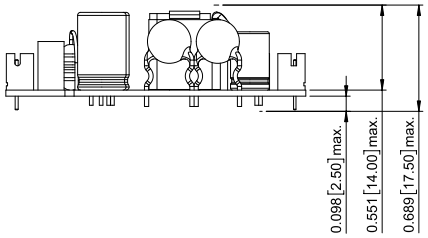


MECHANICAL SPECIFICATION









CFM04SXXX

All Dimensions in Inches[mm]
Tolerance Inches: x.xx=±0.03, x.xxx=±0.020
Millimeters: x.x=±0.7, x.xx=±0.50

Pin Connection

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

CFM04SXXX-T

All Dimensions in Inches[mm]
Tolerance Inches: x.xx=±0.03, x.xxx=±0.020
Millimeters: x.x=±0.7, x.xx=±0.50

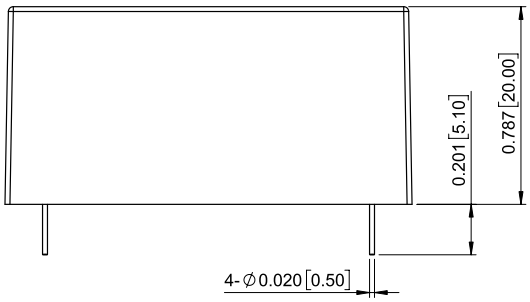
AC Input Connector(CN1):JST B3B-PH-K-S(LF)(SN) or equivalent

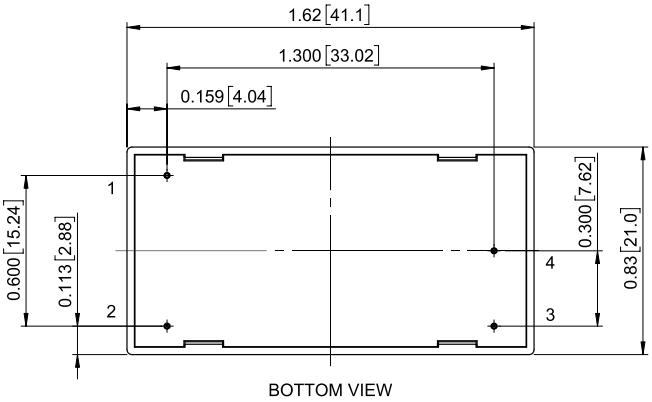
Pin	Function	Mating Housing	Terminal
1	ACN	TKP PHR-3 or equivalent	TKP SPH-002T-P0.5L or equivalent
2	-		
3	ACL		

DC Output Connector(CN2):JST B2B-PH-K-S(LF)(SN) or equivalent

Pin	Function	Mating Housing	Terminal
1	-Vout	TKP PHR-2 or equivalent	TKP SPH-002T-P0.5L or equivalent
2	+Vout		

MECHANICAL SPECIFICATION





CFM04SXXX-E

All Dimensions in Inches[mm]
Tolerance Inches: x.xx=±0.03, x.xxx=±0.020
Millimeters: x.x=±0.7, x.xx=±0.50

Pin Connection

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

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