

FEATURES

60W, AC-DC CONVERTER

- ◆ Universal 85-305V_{AC}/100-430V_{DC} input voltage
- ◆ Operating ambient temperature range:-25℃~+55℃
- ◆ High I/O isolation test voltage up to 3000V_{AC}
- ◆ Regulated output, low ripple/noise
- ◆ Output short circuit, over-current, over-voltage protection
- ◆ High efficiency, high reliability
- ◆ Meets EMI CLASS B and surge ±2KV/±4KV(level4) without additional circuits
- ◆ EN62368 safety approval
- ◆ Three year warranty



Selection Guide

Certification	Part No.	Output Power	Nominal Output Voltage and Current	Efficiency (230V _{AC} , %/Typ.)	Capacitive Load (μF)
	CFAM40S05R2	40W	5V/8A	85	4000
	CFAM50S09R2	50W	9V/5.55A	85	2200
	CFAM50S12R2		12V/4.16A	88	1000
	CFAM50S15R2		15V/3.33A	88	1000
	CFAM50S18R2		18V/2.77A	88	1000
	CFAM50S24R2		24V/2.08A	89	680
	CFAM50S28R2		28V/1.78A	89	680
	CFAM50S30R2		30V/1.66A	89	680
	CFAM50S36R2		36V/1.38A	89	470
	CFAM50S48R2		48V/1.04A	89	470

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	AC input	85	--	305	V _{AC}
	DC input	100	--	430	V _{DC}
Input Frequency		47	--	63	Hz
Input Current	115V _{AC}	--	--	1.4	A
	230V _{AC}	--	--	0.8	
Inrush Current	115V _{AC}	--	45	--	
	230V _{AC}	--	90	--	
Leakage Current	240V _{AC} /50Hz	0.25mA Max.			
Recommended External Input Fuse		3.15A/250V slow-blow required			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		--	±2	--	%
Line Regulation	Full load	--	±0.5	--	
Load Regulation	0%-100% load	--	±1	--	
Ripple/Noise*	20MHz bandwidth(peak-to-peakvalue)	--	--	150	mV
Stand-by Power Consumption	5/12/15/24V output	--	--	0.5	W
	48V output	--	--	0.65	

Temperature Coefficient		--	±0.02	--	%/°C
Short Circuit Protection		Hiccup,continuous,self-recovery			
Over-current Protection		≥110%Io,self-recovery			
Over-voltage Protection	5V _{DC} Output	≤9V _{DC} (Output voltage clamp or turn off)			
	12V _{DC} Output	≤16V _{DC} (Output voltage clamp or turn off)			
	15V _{DC} Output	≤24V _{DC} (Output voltage clamp or turn off)			
	24V _{DC} Output	≤35V _{DC} (Output voltage clamp or turn off)			
	48V _{DC} Output	≤60V _{DC} (Output voltage clamp or turn off)			
Minimum Load		0	--	--	%
Hold-up Time	115V _{AC} input	--	8	--	ms
	230V _{AC} input	--	65	--	

Note:*The "parallel cable"method is used for ripple and noise test

General Specifications

Item		Operating Conditions	Min.	Typ.	Max.	Unit
Isolation	Input-PE	Electric Strength Test for 1min,leakage current<5mA	2000	--	--	V _{AC}
	Input-Output		3000	--	--	
	Output-PE		500	--	--	V _{DC}
Operating Temperature			-40	--	+70	°C
Storage Temperature			-40	--	+85	
Storage Humidity			--	--	95	%RH
Soldering Temperature		Wave-soldering	260±5℃;time : 5-10s			
		Manual-welding	360±10℃;time : 3-5s			
Power Derating		-40℃ to -30℃	4.0	--	--	% / °C
		+45℃ to +70℃(5V output)	3.0	--	--	
		+50℃ to +70℃(12V,15V output)	2.5	--	--	
		+55℃ to +70℃(24V,48V output)	2.5	--	--	
		85V _{AC} -110V _{AC}	1.0	--	--	% / V _{AC}
		240V _{AC} -264V _{AC}	0.42	--	--	
Safety Standard			IEC62368/EN62368/UL62368			
Safety Certification			EN62368			
Safety Class			CLASS I			
MTBF			MIL-HDBK-217F@25℃>300,000h			

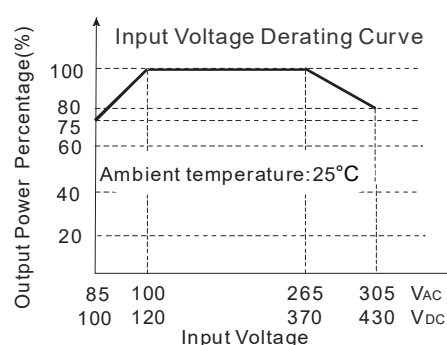
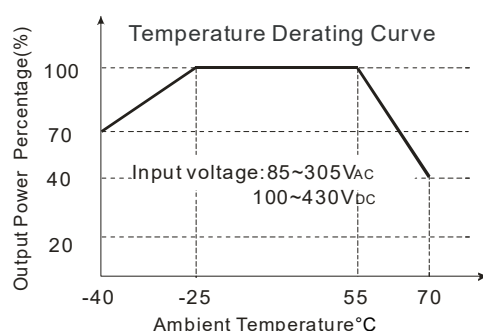
Mechanical Specifications

Case Material		Aluminum alloy shell packaging
Dimension	Horizontal package	72.0x50.0x25.0mm
	Z Din-Rail mounting	96.0x54.0x36.6mm
Weight	Horizontal package	120g(Typ.)
	Z Din-Rail mounting	270g(Typ.)
Cooling method		Free ai rconvection

Electromagnetic Compatibility(EMC)

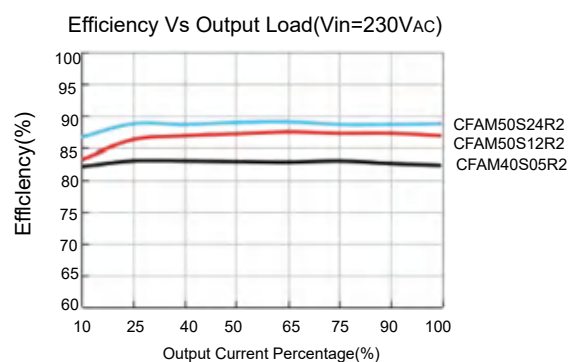
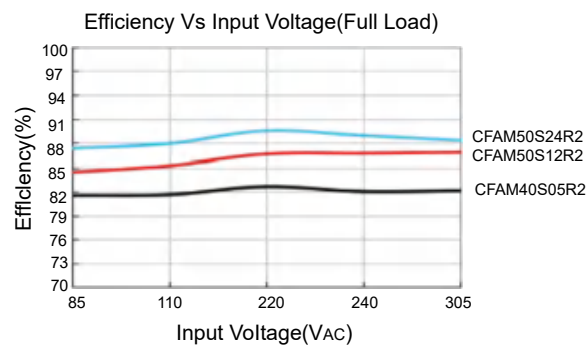
Emissions	CE	CISPR32/EN55032 CLASS B	
	RE	CISPR32/EN55032 CLASS B	
Immunity	ESD	IEC/EN61000-4-2	Contact $\pm 6\text{KV}$ /Air $\pm 8\text{KV}$ perf.Criteria B
	RS	IEC/EN61000-4-3	10V/m perf.Criteria A
	EFT	IEC/EN61000-4-4	$\pm 4\text{KV}$ perf.Criteria B
	Surge	IEC/EN61000-4-5	line to line $\pm 2\text{KV}$ /line to ground $\pm 4\text{KV}$ perf.Criteria B
		IEC/EN61000-4-5	line to line $\pm 4\text{KV}$ /line to ground $\pm 6\text{KV}$ (See Fig.2 for recommended circuit) perf.Criteria B
	CS	IEC/EN61000-4-6	10Vr.m.s perf.Criteria A
	Voltage dips, short interruption and voltage variations	IEC/EN61000-4-11	0%, 70% perf.Criteria B

Product Characteristic Curve



Note: ① With an AC input between 85-110V/240-305V_{AC} and a DC input between 100-160V_{DC}/340-430V_{DC}, the output power must be derated as per temperature derating curves;

② This product is suitable for applications using natural air cooling; for applications in closed environment please consult factory or one of our FAE.



Design Reference

1. Typical application

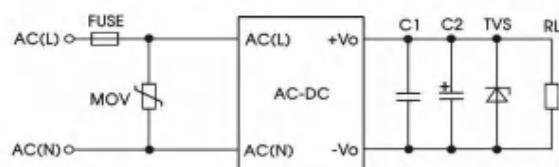


Fig.1: Typical circuit diagram

Part No.	C1(μF)	C2(μF)	FUSE	MOV	TVS
CFAM40S05R2	1	680	3.15A/250V slow-blow required	S14K300	SMBJ7.0A
CFAM50S12R2		330			SMBJ20A
CFAM50S15/18R2		330			SMBJ20A
CFAM50S24R2		200			SMBJ30A
CFAM50S48R2		100			SMBJ64A

Output Filter Components:

We recommend using an electrolytic capacitor with high frequency, and low ESR rating for C2 (refer to manufacture's datasheet). Choose a Capacitor voltage rating with at least 20% margin, in other words not exceeding 80%. C1 is a ceramic capacitor used for filtering high-frequency noise and TVS is a recommended suppressor diode to protect the application in case of a converter failure.

2. EMC compliance recommended circuit

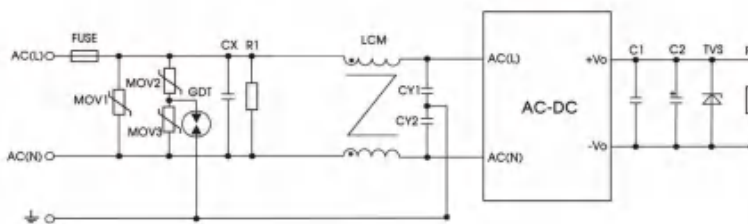
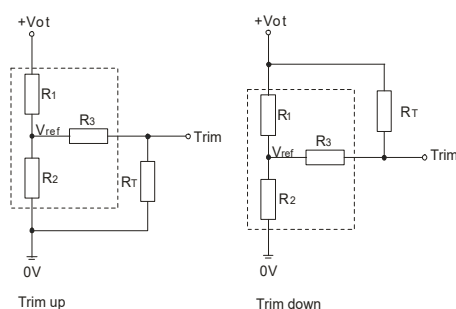


Fig 2: EMC application circuit with higher requirements

Component	Recommended value
MOV1	S20K300
MOV2	S14K350
MOV3	S14K350
CX	0.15μF/300V _{AC}
CY1	2.2nF/400V _{AC}
CY2	2.2nF/400V _{AC}
R1	1MΩ/2W
LCM	2.2mh, common mode inductance
GDT	B5G3600
FUSE	3.15A/250V slow-blow required

3. Trim Function for Output Voltage Adjustment (open if unused)



TRIM resistor connection (dashed line shows internal resistor network)

Calculating Trim resistor values:

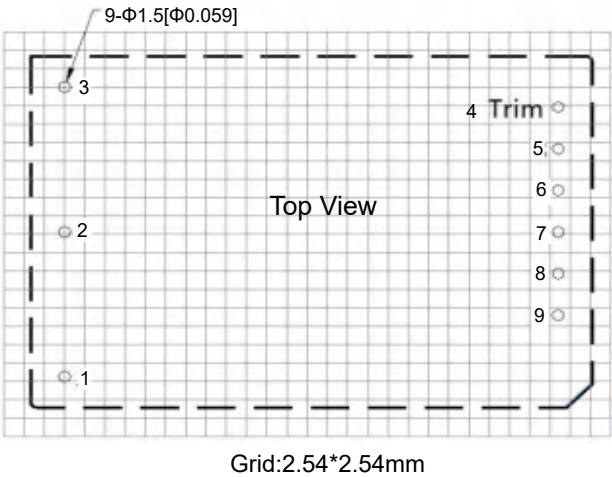
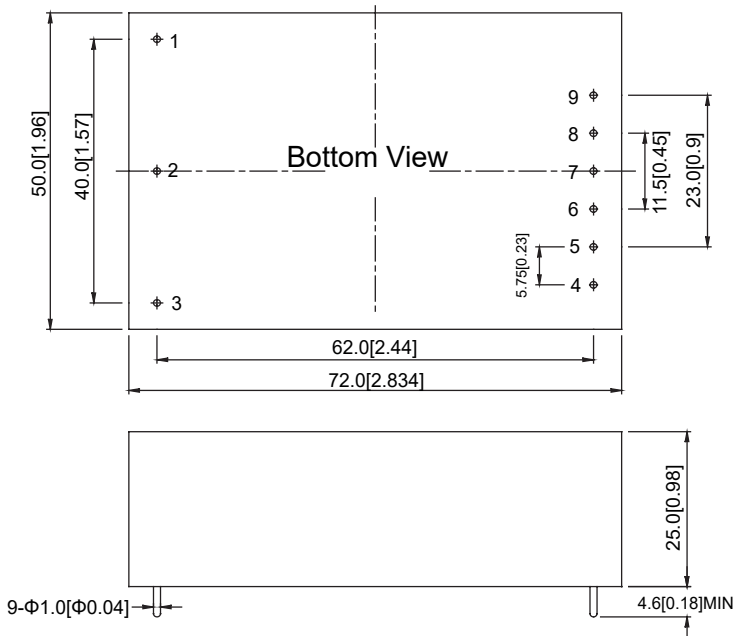
$$\begin{aligned} \text{up: } R_T &= \frac{aR_2}{R_2 - a} - R_3 & a &= \frac{V_{ref}}{V_{ot} - V_{ref}} \cdot R_1 \\ \text{down: } R_T &= \frac{aR_1}{R_1 - a} - R_3 & a &= \frac{V_{ot} - V_{ref}}{V_{ref}} \cdot R_2 \end{aligned}$$

R_T = Trim Resistor value;
 a = self-defined parameter;
 V_{ot} = desired output voltage
 (±10% max.).

Vout nominal	R1(kΩ)	R2(kΩ)	R3(kΩ)	Vref(V)	Vot(V)
5V	3.3	3.3	1	2.5	Resulting Trimmed Output voltage; range±10%
12V	3.83	1	1	2.5	
15V	7.5	1.5	1	2.5	
24V	8.66	1	1	2.5	
48V	33	1.8	1	2.5	

Dimensions and Recommended Layout

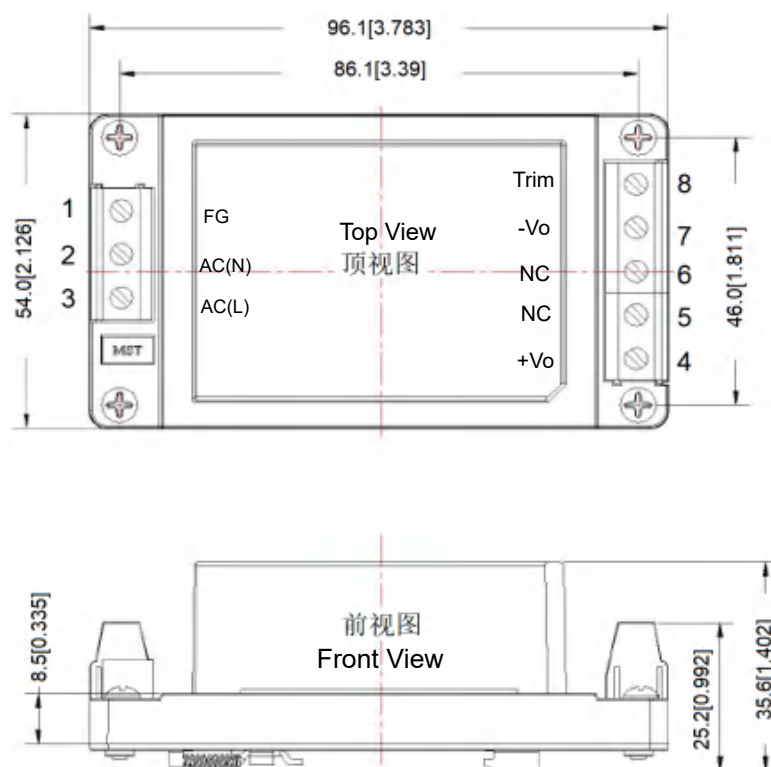
THIRD ANGLE PROJEON 



Unit:mm[inch]
General tolerances:±0.5[±0.02]

Pin	1	2	3	4	5	6	7	8	9
Tingle	L	N	FG	Trim	-Vo	NP	NP	NP	+Vo

Z Dimensions

Third angle projection 

Note:

Unit:mm[inch]

Wire range: 24-12 AWG

Tightening torque: Max 0.4 N·m

Mounting rail: T\$35, rail needs to connect safety ground

General tolerances: ± 0.5 [± 0.02]

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