3ACFE1W_3.1 series

3W - AC-DC converter

AC-DC Converter 3 Watt

- Wide input voltage range: 85-305VAC/120-430VDC
- No load power consumption ≤0.35W
- Transfer efficiency up to 76% (typ.)
- Switching frequency: 65kHz
- Protections: short circuit and over current
- Isolation voltage: 3100VAC
- Meet IEC62368/UL62368/EN62368 test standard
- Ultra small size bare board, industrial level design
- PCB mounting

Introducing our compact power supply 3ACFE1W_3.1 series with a wide input voltage range of 85-305VAC/120-430VDC. With a no-load power consumption of ≤0.35W and transfer efficiency up to 76%, it operates at a switching frequency of 65KHz. This module includes protections for short circuit and over current, and offers an isolation voltage of 3100VAC. Designed to meet IEC62368/UL62368/EN62368 standards, it features an ultra-small size and industrial-level design, perfect for PCB mounting.

SHORT CIRCUIT PROTECTED

100% RoHS compliant

c UL us
UL62368 - E347551
Pending

Common specifications

Short circuit protection	Full input voltage range - Continuous, self-recovery Hiccup
Over current protection	Input 220VAC - ≥110% Io self-recovery - Hiccup
Switching frequency	65 KHz
Operating temperature	-40°C - +85°C (derating)
Storage temperature	-40°C - +90°C
Soldering temperature	Wave soldering 260°C (±4°C), time 5-10S Manual soldering 360°C (±8°C), time 4-7S
Relative humidity	10~90% RH
Hot plug	Unavailable
Remote control terminal	Unavailable
Safety standard	EN62368, IEC62368, UL62368
Vibration	10-55Hz, 10G, 30Min, along X, Y, Z
Safety standard	CLASS II
MTBF (MIL-HDBK-217F@25°C)	>300,000 Hours

Input specifications

Item	Operating condition	Min	Typ	Max	Units
Input voltage range	AC input DC input	85 120	220 310	305 430	VAC VDC
Input frequency range		47	50	63	Hz
Input current	115VAC 220VAC			0.10 0.07	A
Surge current	115VAC 220VAC			22 24	A
Leakage current	0.25mA TYP/230VAC/50Hz				
Recommended external Input fuse	1A-3A/250VAC slow fusing				

Example:
3ACFE1W_05S3.1
3 = 3Watt; AC = AC-DC; F = Open Frame; E1 = Cost effective;
W = Wide input; 05 = 5Vout; S = Single output; 3.1 = 3.1 kVAC isolation

Output specifications

Item	Operating condition	Min	Typ	Max	Units
Voltage accuracy	Full input voltage range, 10-100% load(0%-10% load with stable output, could work) - Vo1		±2.0	±6.0	%
Line regulation	Nominal load - Vo1		±1.0	±2.0	%
Load regulation	Nominal input voltage, 20%~100% load - Vo1		±1.0	±3.0	%
No load consumption	Input 115VAC Input 220VAC			0.35	W
Minimum load	Single Output	10			%
Start up delay time	Nominal input voltage (full load)		600		mS
Power-off holding time	Input 115VAC (full load) Input 220VAC (full load)		50 80		mS
Dynamic response	Overshoot range 25%~50%~25% Recovery time 50%~75%~50%	-5.0 -5.0		+5.0 +5.0	% mS
Output overshoot	Full input voltage range		≤10%Vo		%
Temperature drift		-	±0.03%	-	%/°C

Isolation specifications

Item	Operating Conditions	Min	Typ	Max	Units
Isolation voltage	I/P-O/P - Test 1min, leakage current ≤5mA	3100			VAC
Insulation resistance	I/P-O/P @ DC500V	100			MΩ

1. The product should be used within the specification range, or it will cause permanent damage to it;
2. The input terminal should connect to fuse;
3. If the product is worked under the minimum requested load, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
4. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
5. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta = 25°C, humidity <75% with nominal input voltage and rated output load (pure resistance load);
6. All index testing methods in this datasheet are based on our company's corporate standards;
7. The performance indexes of the product models listed in this manual are as above, but some indexes of non standard model products will exceed the above mentioned requirements, please directly contact our technician for specific information;
8. We can provide product customization service,
9. Specifications are subject to change without prior notice, please follow up with our website for latest manual

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EMC specifications					
EMC	EMI	CE	CISPR22/EN55032	CLASS B (See Recommended Circuit photo 2-1)	
EMC	EMI	RE	CISPR22/EN55032	CLASS B (See Recommended Circuit photo 2-1)	
EMC	EMS	RS	IEC/EN61000-4-3	10V/m	Perf.Criteria B (See Recommended Circuit photo 1)
EMC	EMS	CS	IEC/EN61000-4-6	3Vr.m.s	Perf.Criteria B (See Recommended Circuit photo 1)
EMC	EMS	ESD	IEC/EN61000-4-2	Contact ±6KV / Air ±8KV	Perf.Criteria B
EMC	EMS	Surge	IEC/EN61000-4-5	Line to line ±2KV	Perf.Criteria B
EMC	EMS	EFT	IEC/EN61000-4-4	±4KV	Perf.Criteria B (See Recommended Circuit photo 2-1)
EMC	EMS	Voltage dips and interruptions	IEC/EN61000-4-11	0%~70%	Perf.Criteria B

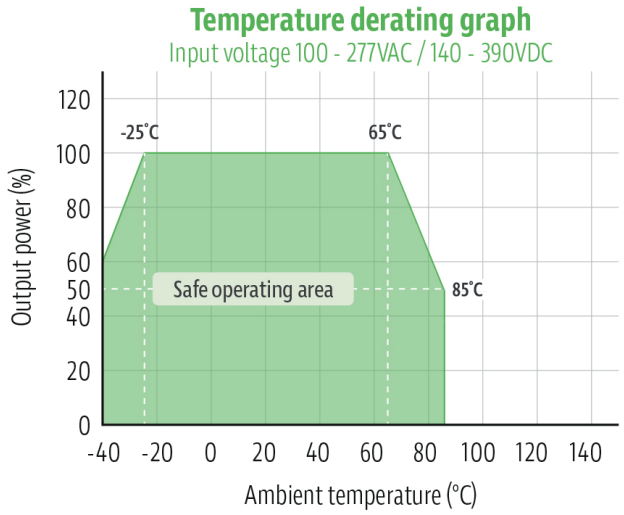
Product Selection Guide

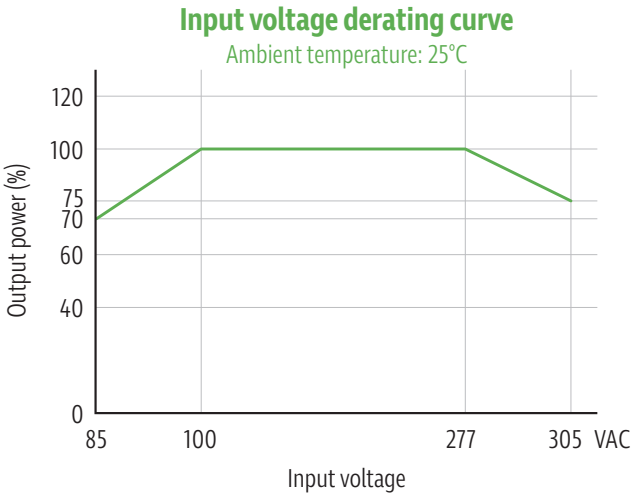
Approval	Model	Output Power (W)	Output Voltage 1 Vo1(V)	Output Current 1 Io1(mA)	Output Voltage 2 Vo2(V)	Output Current 2 Io2(mA)	Max. Capacitive Load (uF)	Ripple & Noise 20MHz (Max)	Efficiency Full Load, 220VAC Typ. (%)
	3ACFE1W_03S3.1	2	3.3	600	-	-	500	100	69
	3ACFE1W_05S3.1	3	5	600	-	-	500	100	73
	3ACFE1W_09S3.1	3	9	333	-	-	100	100	75
	3ACFE1W_12S3.1	3	12	250	-	-	100	100	76
	3ACFE1W_15S3.1	3	15	200	-	-	68	120	76
	3ACFE1W_24S3.1	3	24	125	-	-	22	150	77

Note

1: Ripple & noise is tested by twisted pair method, details please refer to ripple & noise test at back.
2: The typical value of output efficiency is based on module is full loaded and burned-in after half an hour.
3: The fluctuation range of full load efficiency (%typ) in table is ±2%, full load efficiency = output power/module's input power.

Product characteristic curve





Note

1. Input Voltage should be derated b ased on Input v ol tage derating curve when it is 85~100VAC/277 ~305VAC/120~390~430VDC
2. Our product is suitable to use under natural air cooling environment, if use it under closed condition, please contact us.

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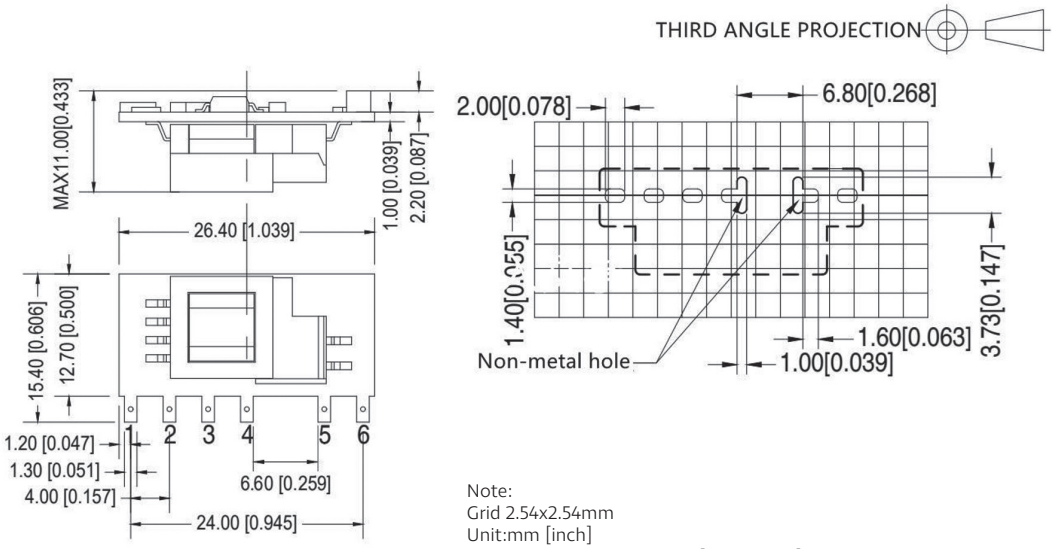
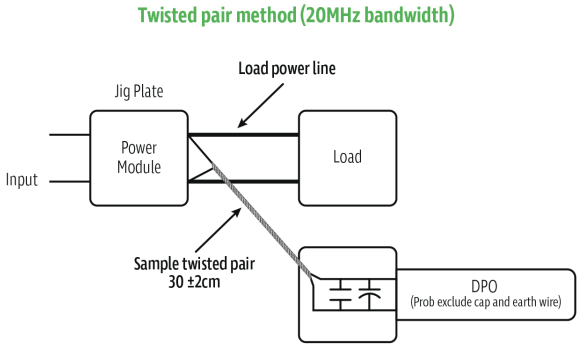
Dimensions and recommended layout



Note:
Grid 2.54x2.54mm
Unit:mm [inch]
General tolerance: ±1.00mm[±0.039inch]
Layout is for reference, please refer to actual item

Pin	1	2	3	4	5	6
Single	AC(L)	AC(N)	+Vc	-Vc	-Vo	+Vo

Ripple & noise test: (twisted pair method 20MHz bandwidth)

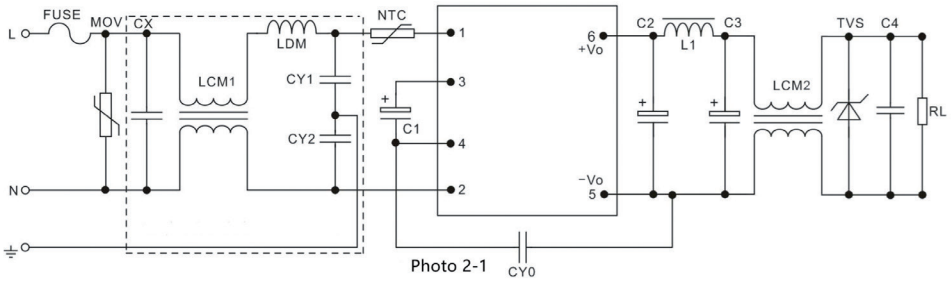


Test Method:

1. Connect the twisted pair, set the oscilloscope bandwidth to 20MHz, use a 100M bandwidth probe, and terminate with a 0.1uF polypropylene capacitor and a 10uF high-frequency low-resistance electrolytic capacitor in parallel. Configure the oscilloscope to sample mode.

2. Connect the input terminal to the power supply and the output terminal to the electronic load using a jig plate. Use a 30cm (±2 cm) sampling line, and select the power line from appropriately insulated wires of the corresponding diameter according to the output current flow.

EMC recommended circuit (used under high EMC requirement)



FUSE	Recommend 3.15A, 250V (Necessary)	NTC	5D-9
MOV	10D561K	CY1, CY2	1nF/400VAC
CX	Recommended 0.22uF/275VAC	LDM	330uH
LCM1	40mH min	L2,L3	Color ring inductor 1mH, 1W
R1, R2	Resistor 2.2K, above 1/8W		

Typical application circuit

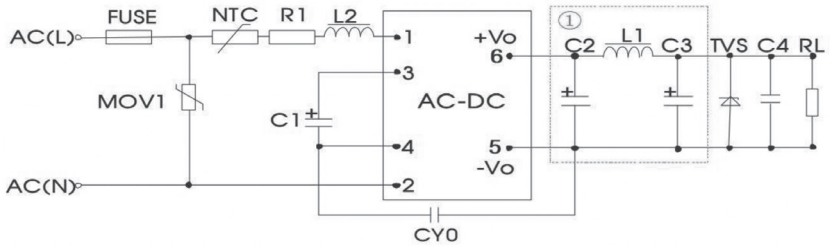


Photo 1
Note : 1 as Pi filter circuit

Products Number	C1 (Necessary)	C2 (Necessary to connect to external electrolytic capacitor)	L1 (Necessary)	C3 (Necessary to connect to external electrolytic capacitor)	C4	L2	NTC	CY0	FUSE (Necessary)	TVS Tube
3ACFE1W_03S3.1	10uF/450V	220uF/10V	2.0uH	220uF/10V	0.1uF/50V	4.7mH	5D-9	102M/400V	1A/250V	SMBJ7.0A
3ACFE1W_05S3.1	10uF/450V	220uF/10V	2.0uH	220uF/10V	0.1uF/50V	4.7mH	5D-9	102M/400V	1A/250V	SMBJ7.0A
3ACFE1W_09S3.1	10uF/450V	220uF/16V	2.0uH	68uF/16V	0.1uF/50V	4.7mH	5D-9	102M/400V	1A/250V	SMBJ12A
3ACFE1W_12S3.1	10uF/450V	220uF/16V	2.0uH	68uF/16V	0.1uF/50V	4.7mH	5D-9	102M/400V	1A/250V	SMBJ20A
3ACFE1W_15S3.1	10uF/450V	220uF/35V	2.0uH	68uF/35V	0.1uF/50V	4.7mH	5D-9	102M/400V	1A/250V	SMBJ20A
3ACFE1W_24S3.1	10uF/450V	68uF/35V	2.0uH	47uF/35V	0.1uF/50V	4.7mH	5D-9	102M/400V	1A/250V	SMBJ30A

Note: 1) C1: AC input, C1 is input filter electrolytic capacitor (necessary), recommended value is 10uF/450V; DC input, C1 is filter big capacitor in the EMC filter (necessary), recommended value is 10uF/450V;
2) R1 is limited resistor, recommended value is 12Ω, 5W;
3) MOV1 is piezoresistor, recommended products number is 10D561K;