



5ACFE1W_3.6 series

5W - AC-DC converter

AC-DC Converter

5 Watt

- ⊕ Wide input voltage range: 85-305VAC/70-430VDC
- ⊕ No load power consumption $\leq 0.3W$
- ⊕ Transfer efficiency up to 78% (typ.)
- ⊕ Switching frequency: 65kHz
- ⊕ Protections: short circuit and over current
- ⊕ Isolation voltage: 3600VAC
- ⊕ Meets IEC62368/UL62368/EN62368 test standards
- ⊕ Ultra small size bare board, industrial level design PCB mounting

Introducing our latest 5ACFE1W_3.6 series with a wide input voltage range of 85-305VAC/70-430VDC. This module boasts a no-load power consumption of $\leq 0.3W$ and a transfer efficiency of up to 78% (typical). Operating at a switching frequency of 65kHz, it features protections against short circuits and over current. With an isolation voltage of 3600VAC, it meets the IEC62368/UL62368/EN62368 test standards and comes with a CE Certificate. Designed for industrial applications, this ultra-small size bare board is perfect for PCB mounting.



Common specifications	
Short circuit protection	Full input voltage range - Continuous, self-recovery Hiccup
Over current protection	Input 220VAC, $\geq 110\%$ Io self-recovery - Hiccup
Switching frequency	65 kHz
Operating temperature	-40°C - +85°C (with derating)
Storage temperature	-40°C - +90°C
Soldering temperature	Wave soldering 260°C ($\pm 4^\circ\text{C}$), time 5-10S Manual soldering 360°C ($\pm 8^\circ\text{C}$), 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	85	220	305	VAC
	DC input	70	310	430	VDC
Input frequency range		47	50	63	Hz
Input current	115VAC			0.10	A
	220VAC			0.08	
Surge current	115VAC			11	A
	220VAC			21	
Leakage current	0.25mA typ./230VAC/50Hz				
Recommended external Input fuse	1A-3A/250VAC slow fusing				

Example:

5ACFE1W_05S3.6

5 = 5Watt; AC = AC-DC; F = Open Frame; E1 = Cost effective; W = Wide input; 05 = 5Vout; S = Single output; 3.6 = 3.6kVAC isolation

Output specifications					
Item	Operating condition	Min	Typ	Max	Units
Voltage accuracy*	3.3V		± 2.0	± 8.0	%
	Others		± 2.0	± 6.0	
Line regulation	Nominal load - Vo		± 1.0	± 2.0	%
Load regulation	Nominal input voltage, 20%-100% load - Vo		± 1.0	± 5.0	%
No load consumption	Input 115VAC Input 220VAC			0.3	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)		50		mS
	Input 220VAC (full load)		80		
Dynamic response	Overshoot range 25%-50%-25%	-5.0		+5.0	%
	Recovery time 50%-75%-50%	-5.0		+5.0	mS
Output overshoot	Full input voltage range		$\leq 10\%V_o$		%
Temperature drift			$\pm 0.03\%$		%/°C

Note: * Full input voltage range, 10-100% load (0%-10% load with stable output, could work)

Isolation specifications					
Item	Operating Conditions	Min	Typ	Max	Units
Isolation voltage	I/P-O/P - Test Imin, leakage current $\leq 5\text{mA}$	3600			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 $T_a = 25^\circ\text{C}$, 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 on photo 2)
EMC	EMI	RE		CISPR22/EN55032		CLASS B (See Recommended Circuit on photo 2)
EMC	EMS	RS		IEC/EN61000-4-3	10V/m	Perf.Criteria B (See Recommended Circuit on photo 1)
EMC	EMS	CS		IEC/EN61000-4-6	3Vr.m.s	Perf.Criteria B (See Recommended Circuit on photo 1)
EMC	EMS	ESD		IEC/EN61000-4-2	Contact ±6KV / Air ±8KV	Perf.Criteria B
EMC	EMS	Surge		IEC/EN61000-4-5	±1KV	Perf.Criteria B
EMC	EMS	EFT		IEC/EN61000-4-4	±2KV	Perf.Criteria B
EMC	EMS	Voltage dips, short interruptions and voltage variations immunity		IEC/EN61000-4-11	0%~70%	Perf.Criteria B

Product Selection Guide

Approval	Model	Output Power (W)	Output Voltage (uF)	Output Current (mVp-p)	Max. Capacitive Load (%)	Ripple & Noise 20MHz (Max)	Efficiency Full Load, 220VAC Typ. (%)
UL	5ACFE1W_03S3.6	3.3	3.3	1000	2000	100	68
UL	5ACFE1W_05S3.6	5	5	1000	2000	100	74
UL	5ACFE1W_09S3.6	5	9	556	1000	120	76
UL	5ACFE1W_12S3.6	5	12	416	68	120	78
UL	5ACFE1W_15S3.6	5	15	333	68	120	78
UL	5ACFE1W_24S3.6	5	24	208	47	120	80

Note:

1: The typical value of output efficiency is based on module is full loaded and burned-in after half an hour.

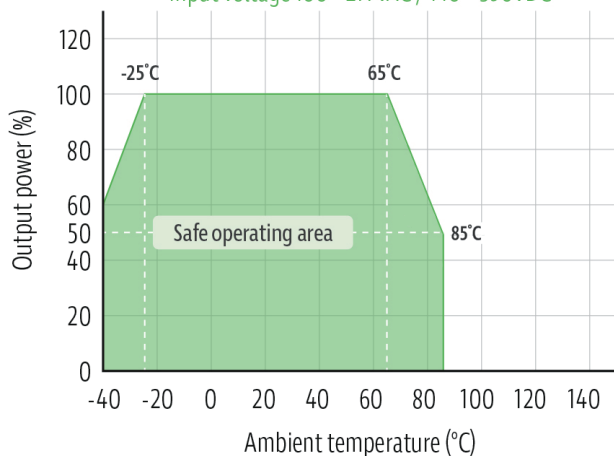
2: The fluctuation range of full load efficiency (%typ) in table is ±2%, full load efficiency= output power/module's input power.

3: Ripple & noise is tested by twisted pair method, details please refer to ripple & noise test at back.

Product characteristic curve

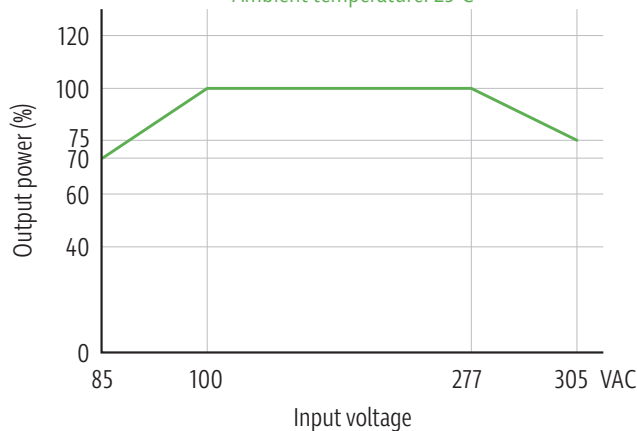
Temperature derating graph

Input voltage 100 - 277VAC / 140 - 390VDC



Input voltage derating curve

Ambient temperature: 25°C



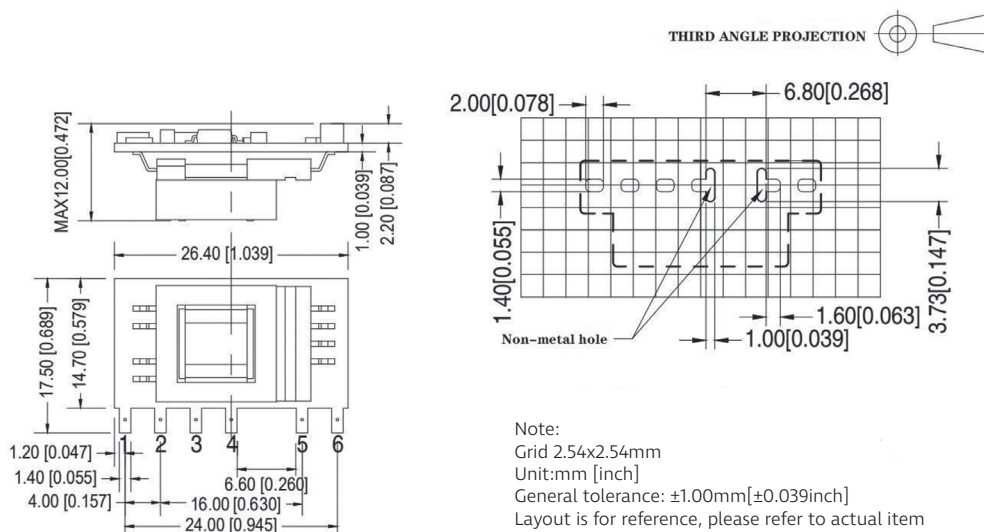
Note 1: Input Voltage should be derated based on Input voltage derating curve when it is 85~100VAC/277~305VAC/120~140VDC/ 390~430VDC.

Note 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



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

Typical application circuit

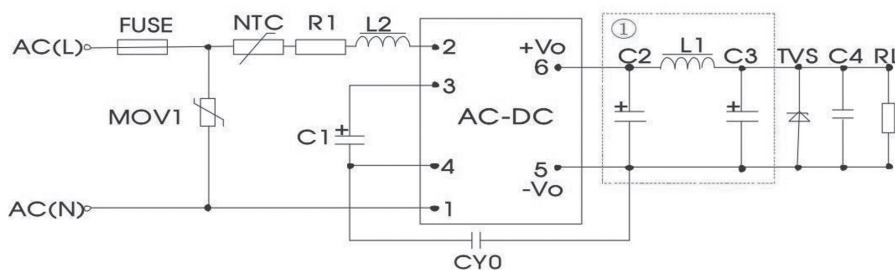
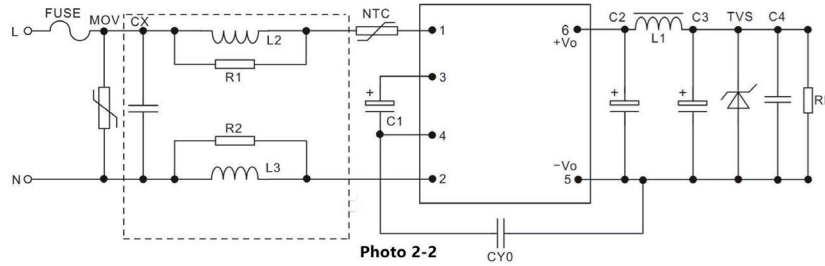
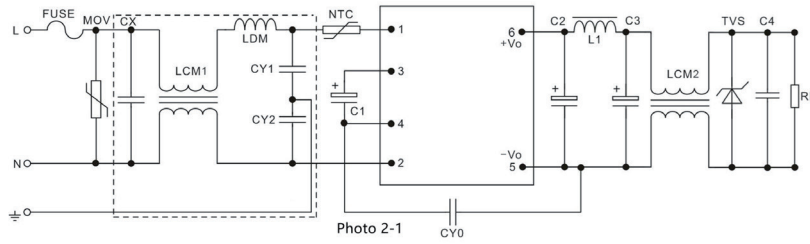


Photo 1
 Note : 1 is Pi type filter

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
5ACFE1W_03S3.6	22uF/450V	470uF/10V	2.0uH	100uF/10V	0.1uF/50V	4.7mH	5D-9	102M/400V	1A/250V	SMBJ7.0A
5ACFE1W_05S3.6	22uF/450V	470uF/10V	2.0uH	100uF/10V	0.1uF/50V	4.7mH	5D-9	102M/400V	1A/250V	SMBJ7.0A
5ACFE1W_09S3.6	22uF/450V	220uF/16V	2.0uH	220uF/16V	0.1uF/50V	4.7mH	5D-9	102M/400V	1A/250V	SMBJ12A
5ACFE1W_12S3.6	22uF/450V	220uF/16V	2.0uH	68uF/16V	0.1uF/50V	4.7mH	5D-9	102M/400V	1A/250V	SMBJ20A
5ACFE1W_15S3.6	22uF/450V	220uF/35V	2.0uH	68uF/35V	0.1uF/50V	4.7mH	5D-9	102M/400V	1A/250V	SMBJ20A
5ACFE1W_24S3.6	22uF/450V	100uF/35V	2.0uH	47uF/35V	0.1uF/50V	4.7mH	5D-9	102M/400V	1A/250V	SMBJ30A

EMC recommended circuit (used under high EMC requirement)



Component	Recommend 1A, 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
LCM2	40mH min	R1, R2	Resistor 2.2K, above 1/8W