

15ACE1W_4 series

15W - AC-DC converter



AC-DC Converter

15 Watt

- ⊕ Wide input voltage range: 85-305VAC/120-430VDC
- ⊕ No-load power consumption $\leq 0.3W$
- ⊕ Transfer efficiency: 86% (typ.)
- ⊕ Protection: short circuit, over current and over voltage
- ⊕ Switching frequency: 65kHz (typ.)
- ⊕ Isolation voltage: 4000VAC
- ⊕ Safety class: CLASS II & OVCIII
- ⊕ 4000m altitude application

Introducing our latest 15ACE1W_4 series: designed with a wide input voltage range of 85-305VAC/120-430VDC, this converter ensures flexibility and versatility in various applications. With no-load power consumption $\leq 0.3W$ and a typical transfer efficiency of 86%, it delivers efficient performance. The converter includes comprehensive protection features such as short circuit, over current, and over voltage protection. Operating at a typical switching frequency of 65KHz, it provides reliable and stable performance. It features a robust isolation voltage of 4000VAC and meets stringent safety standards and classified as CLASS II for safety.



Common specifications

Short circuit protection	Full input voltage range - Continuous, self-recovery Hiccup
Over current protection	Input 220VAC - $\geq 120\%$ Io Self-recovery; Hiccup
Over voltage protection	Output 5VDC ≤ 7.5 VDC Output 12V/12.5V DC ≤ 18 VDC Output 15VDC ≤ 20 VDC Output 24VDC ≤ 30 VDC
Switching frequency	61 kHz (min.) 65 kHz (typ.) 73 kHz (max.)
Operating temperature*	-40°C - +75°C (with derating)
Storage temperature	-40°C - +85°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
Vibration	10-55Hz, 10G, 30Min, along X, Y, Z
MTBF (MIL-HDBK-217F@25°C)	>300,000 Hours

Should be used based on Temperature Derating Curve, please refer to the Product Characteristic Curve in back of DS.

Output specifications

Item	Operating condition	Min	Typ	Max	Units
Voltage accuracy	Full input voltage Range, Any load			± 3.0	%
Line regulation	Nominal Load			± 0.5	%
Load regulation	Nominal input Voltage 20%~100% load			± 3.0	%
No load consumption	Input 115VAC Input 220VAC			0.2	W
Minimum load	Single Output	0			%
Turn-on delay time	Input 220VAC (full load)		1000		mS
Power-off holding time	Input 220VAC (full load)		100		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		$\leq 10\%V_o$		%
Drift coefficient			$\pm 0.03\%$		%/°C
Ripple & noise*	Full input voltage range		80	150	mV

Note: *Tested by Twisted Pair method, for details please check at back of datasheet.

Input specifications

Item	Operating condition	Min	Typ	Max	Units
Input voltage range	AC input DC input	85 120	220 300	305 430	VAC VDC
Input frequency range		47	50	63	Hz
Input current	115VAC 220VAC			0.45 0.3	A
Surge current	115VAC 220VAC			30 60	A
No load consumption	Input 115VAC Input 230VAC			0.3	W
Leakage current	0.5mA typ./230VAC/50Hz				
Recommended external Input fuse	2A/300VAC slow fusing				

Isolation specifications

Item	Operating Conditions	Min	Typ	Max	Units
Isolation voltage	I/P-O/P - Test 1min, leakage current - $\leq 5\text{mA}$	4000			VAC
Insulation resistance	I/P-O/P @DC500V	100			MΩ

- The product should be used under the specification range, otherwise it will cause permanent damage to it.
- Product's input terminal should connect to fuse;
- If the product is not worked under the load range(below the minimum load or beyond the load range), we cannot ensure that the performance of product is in accordance with all the indexes in this manual;
- Unless otherwise specified, data in this datasheet are tested under conditions of $T_a = 25^\circ\text{C}$, humidity <75% when inputting nominal voltage and outputting rated load(pure resistance load);
- All index testing methods in this datasheet are based on our company's corporate standards
- 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;
- We can provide customized product service.

Example:

15ACE1W_05S4

15 = 15Watt; AC = AC-DC; E1 = Series; W = Wide input;
05 = 5Vout; S = Single output; 4 = 4 kVAC isolation

15ACE1W_4 series

15W - AC-DC converter

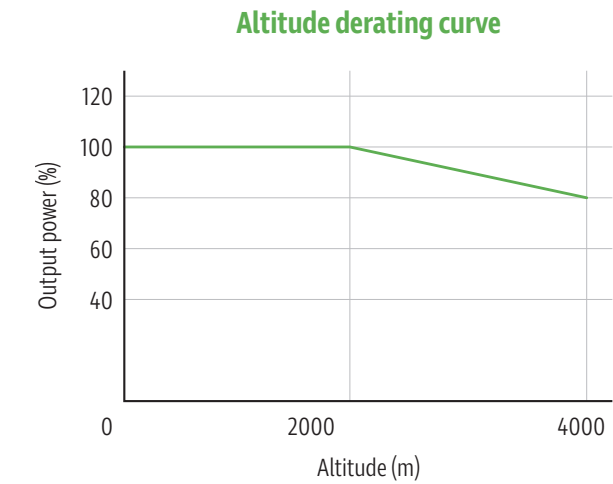
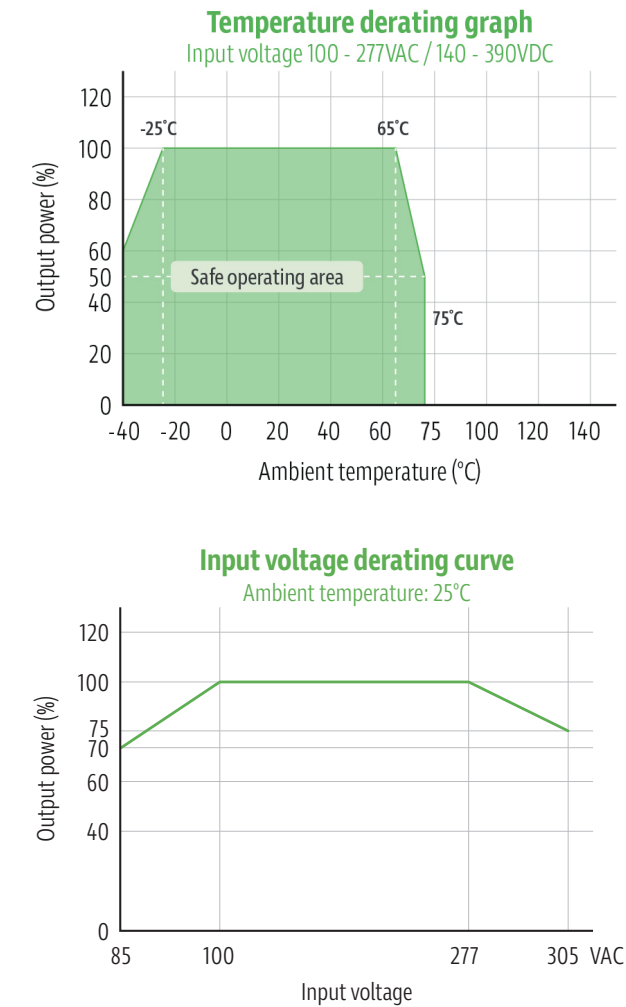
EMC specifications				
EMI	CE	CISPR22/EN55022	CLASS B (see recommended circuit Photo 1)	
EMI	RE	CISPR22/EN55022	CLASS B (see recommended circuit Photo 1)	
EMC	ESD	IEC/EN61000-4-2	±6KV/8KV	Perf.Criteria B
EMC	RS	IEC/EN61000-4-3	10V/m	Perf.Criteria A
EMC	EFT	IEC/EN61000-4-4	±2KV	Perf.Criteria B
		IEC/EN61000-4-4	±4KV (see recommended circuit Photo 1)	Perf.Criteria A
EMC	Surge	IEC/EN61000-4-5	line to line ±1KV	Perf.Criteria B
		IEC/EN61000-4-5	line to line ±2KV / line to ground ±4KV (see recommended circuit Photo 1)	Perf.CriteriaA
EMC	CS	IEC/EN61000-4-6	10Vr.m.s	Perf.Criteria A
EMC	PFMF	IEC/EN61000-4-8	10A/m	Perf.Criteria A
EMC	Voltage dips and interruptions	IEC/EN61000-4-11	0%-70%	Perf.Criteria B

Product Selection Guide

Approval	Model	Output Power (W)	Output Voltage Vo(V)	Output Current Io(mA)	Max. Capacitive Load (uF)	Ripple & Noise 20MHz - Max. (mVp-p)	Efficiency Full Load, 220VAC Typ. (%)
UL	15ACE1W_05S4	15	5	3000	5000	70	85
UL	15ACE1W_12S4	15	12	1250	2000	120	85
UL	15ACE1W_12.5S4	15	12.5	1200	2000	120	85
UL	15ACE1W_24S4	15	24	625	1000	120	86

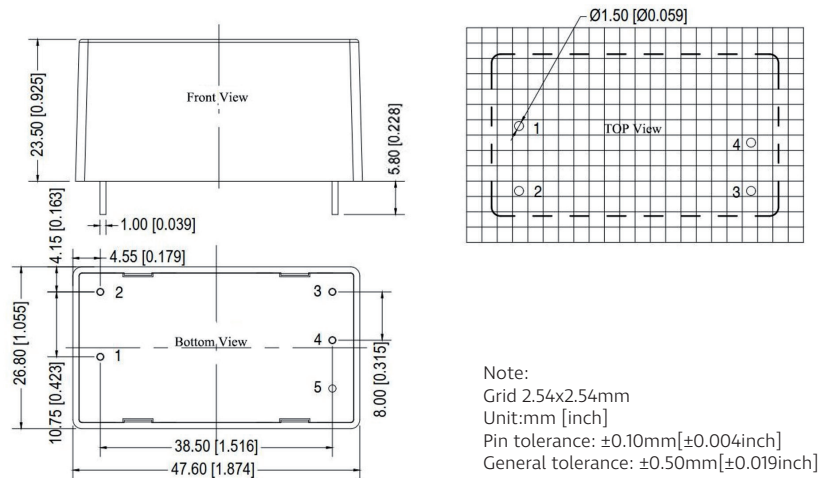
Note:
1: Due to the instrument deviation of the test equipment, the minimum efficiency is -2% of the typical value.
2: The typical output efficiency is based on that product is full loaded and burned-in after half an hour.
3: For other items not in above list, please contact our sales team for more details.

Product characteristic curve



Note:
1. Input Voltage should be derated base on Input Voltage Derating Curve when it is 85~100VAC/ 277~305VAC/ 120~140VDC/ 390~430VDC.
2. Our product is suitable to use under natural air cooling environment, if use it under closed condition, please contact with us.

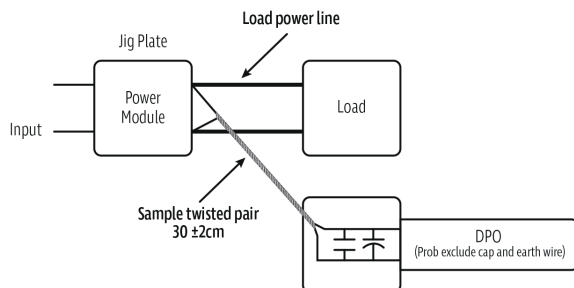
Dimensions and recommended layout



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

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

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 Solution and recommend circuit

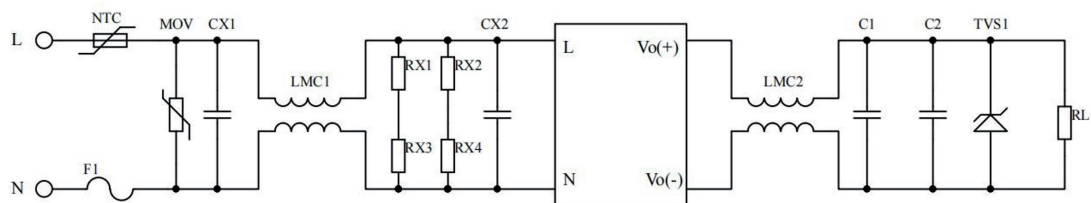


Photo 1

- Note:
1. FUSE: recommend 2A~250VAC, slow fusing, block form;
 2. MOV is voltage dependent resistor, recommend model: 14D561K;
 3. NTC is thermistors, recommend model: 10D-11, to prevent the module from damage when lightning surge.
 4. LCM1, LCM2 is CM inductor, LCM1 recommend 30mH; LCM2 recommend 40uH.
 5. CX1 is X capacitor, recommend model: 0.22uF/275VAC; CX2 is X capacitor, recommend model: 0.1uF/275VAC;
 6. RX1, RX2, RX3, RX4 are chip resistors, recommend model 1206, 1M Ω ;
 7. C1 choose high-frequency and low-impedance electrolytic capacitor, capacitance smaller than capacitive load, and withstand voltage is 1.5 times above the output voltage.
 8. C2 choose 0.1uF ceramic chip capacitors, withstand voltage is 1.5 times above the output voltage;
 9. TVS1 is TVS tube, 5V output recommend: SMBJ7.0A, 9V output recommend: SMBJ12.0A, 12V output recommend: SMBJ20A, 15V output recommend: SMBJ20.0A, 24V output recommend: SMBJ30.0A, 48V output recommend: SMBJ64A.

External circuit to lower ripple

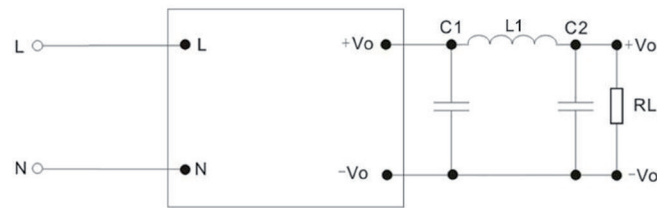


Photo 2

Note:

- 1) C1, C2 are electrolytic capacitors, C1 is 330uF/10V, C2 is 220uF/10V;
- 2) L1 is rod type inductor, inductance 2.2uH, wire diameter is 0.7mm above.