1S4AE_1.5UP series

1W, Fixed input voltage, isolated & unregulated single output DC-DC Converter

5Vin DC-DC Converter 1 Watt

- Continuous short-circuit protection
- No-load input current as low as 5mA
- Operating temperature range: -40°C to +105°C
- High efficiency up to 85%
- Isolation voltage: 1.5kVDC/min, 3kVDC/1s
- International standard pin-out
- Compact SIP package
- UL62368, EN62368 approval

The 1S4AE_1.5UP series are specially designed for applications where an isolated voltage is required in a distributed power supply system. They are suitable for: pure digital circuits, low frequency analog circuits, relay-driven circuits and data switching circuits.

UL-62368-1 (E347551)

Common specifications

Short Circuit Protection	Continuous, self-recovery			
Operating Temperature	-40 ~ 105°C Derating if the temperature ≥85°C, (see Fig. 2)			
Storage Temperature	-55 ~ 125°C			
Casing Temperature Rise	Ta=25°C • 3.3VDC output • Other output	 25 15		 °C °C
Pin Welding Resistance Temperature	Welding spot is 1.5mm away from the casing, 10 seconds		300°C	
Storage Humidity	Non-condensing		95 %RH	
Switching Frequency	100% load, nominal input voltage	270		KHz
MTBF	3500,000h (MIL-HDBK-217F@25)			
Casing Material	Black flame-retardant and heat-resistant plastic (UL94 V-0)			
Package Dimensions	11.60x6.00x10.16mm			
Weight	1.3g(Typ.)			
Cooling methods	Free air convection			

Output specifications

Item	Test condition	Min	Typ	Max	Units
Output voltage accuracy	See tolerance envelope curve(Fig. 1)				
Line regulation	Input voltage change: ±1% • 3.3VDC output • Others		 	 1.5 1.2	 % %
Load regulation	10% to 100% load • 3.3VDC output • 5VDC output • 9VDC output • 12VDC output • 15VDC output • 24VDC output		 15 10 8 7 6 5	 20 15 10 10 10 10	 % % % % % %
Ripple & Noise*	20MHz Bandwidth • Other output • 24VDC output		 30 50	 75 100	 mVp-p mVp-p
Temperature Drift Coefficient	100% load		±0.02		%/°C

Note: *Ripple and noise tested with "parallel cable" method, please see DC-DC Converter Application Notes for specific operation methods.

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Input-output, leak current lower than 1mA • 1 minute test time • 1 second test time	 1500 3000			 VDC VDC
Isolation resistance	IO, test at 500VDC	1000			MΩ
Isolation capacitance	IO , 100KHz/0.1V		20		pF

EMC specifications

Emissions	CE	CISPR32/EN55032	CLASS B (EMC recommended circuit)
Emissions	RE	CISPR32/EN55032	CLASS B (EMC recommended circuit)
Immunity	ESD	IEC/EN61000-4-2	Air ±8kV, Contact ±4kV perf. Criteria B

Input specifications

Item	Test condition	Min	Typ	Max	Units
Input current (full load / no-load)	• 3.3/5VDC output • 9/12VDC output • 15/24VDC output		270/5 241/12 241/18	286/10 254/20 254/30	mA mA mA
Reflected ripple current*			15		mA
Surge Voltage (1sec. max.)		-0.7		9	VDC
Input filter	Capacitor filter				
Hot plug	Unavailable				

* Reflected ripple current testing method please see DC-DC Converter Application Notes for specific operation.

Example:
1S4AE_ 0505S1.5UP
1 = 1Watt; S4 = SIP4; A = Pinning; E = Cost effective; 05 = 5Vin; 05 = 5Vout; S = Single Output; 1.5 = 1.5kVDC; U = Unregulated output; P = Short circuit protection

Note:
1. 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;
2. The maximum capacitive load offered were tested at input voltage range and full load;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta = 25°C, humidity <75%RH with nominal input voltage and rated output load;
5. All index testing methods in this datasheet are based on our Company's corporate standards;
4. We can provide product customization service, please contact our technicians directly for specific information;
6. Products are related to laws and regulations: see "Features" and "EMC";
7. Classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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1S4AE_1.5UP series

1W, Fixed input voltage, isolated & unregulated single output
DC-DC Converter

Product Selection Guide

Part Number	Certification	Input Voltage [VDC] Nominal	Range	Output Voltage [VDC]	Output Current [mA, Max./Min]	Efficiency[2] [%, Min./Typ.] @ Full Load	Capacitive load [µF, Max]
1S4AE_0503S1.5UP	UL	5	4.5-5.5	3.3	303/30	70/74	2400
1S4AE_0505S1.5UP	UL	5	4.5-5.5	5	200/20	78/82	2400
1S4AE_0512S1.5UP	UL	5	4.5-5.5	9	111/12	79/83	1000
1S4AE_0512S1.5UP	UL	5	4.5-5.5	12	84/9	79/83	560
1S4AE_0515S1.5UP	UL	5	4.5-5.5	15	67/7	79/83	560
1S4AE_0524S1.5UP	UL	5	4.5-5.5	24	42/4	81/85	220

Typical Characteristic Curves

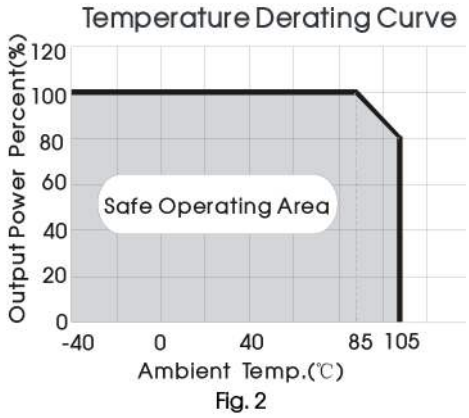
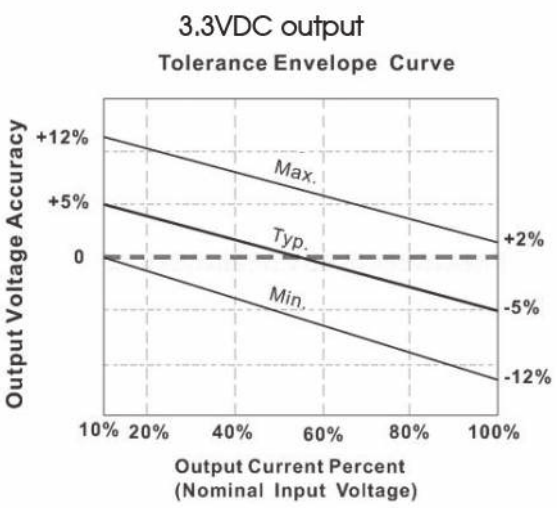
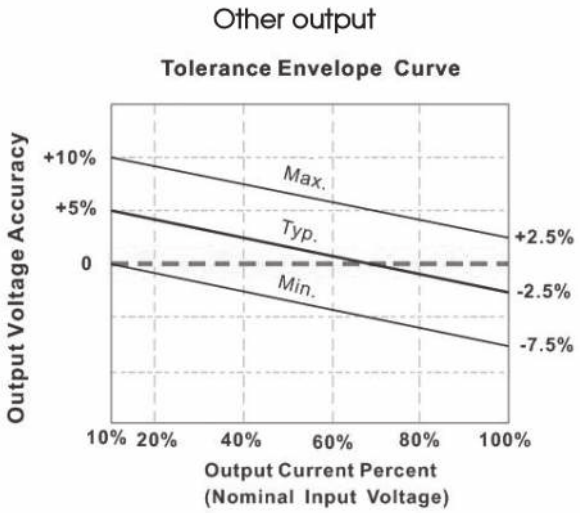
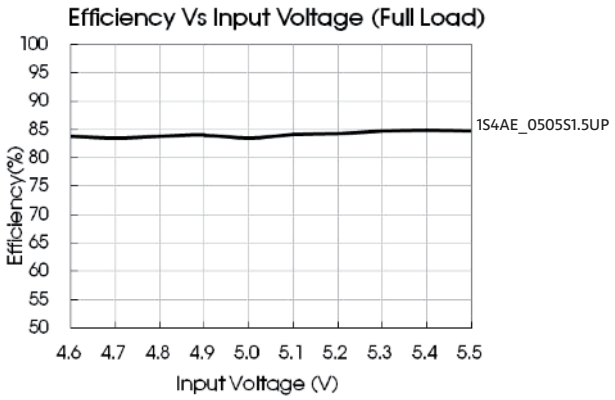


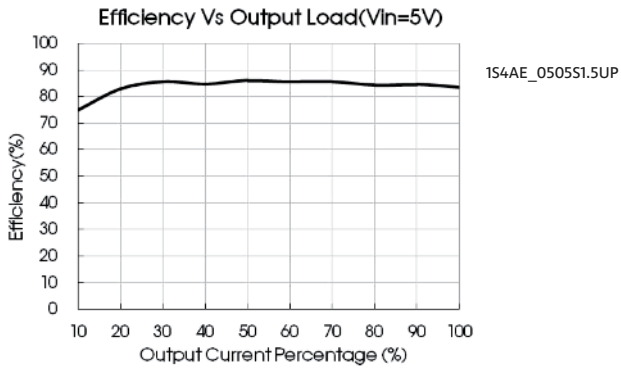
Fig. 2

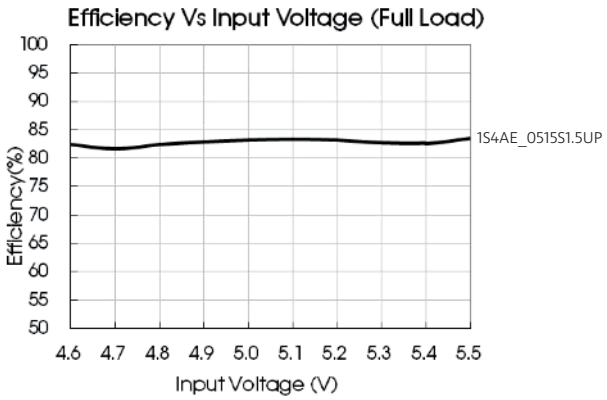


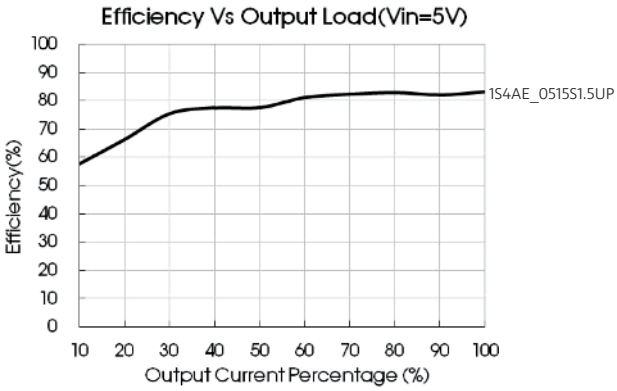


Efficiency curves









Typical application

If it is required to further reduce input and output ripple, a filter capacitor can be connected to the input and output terminals, see Fig.3. Moreover, choosing suitable filter capacitor is very important, start-up problems may be caused by too large capacitance. To ensured the modules running well, the recommended capacitive load values as shown in Table 1.

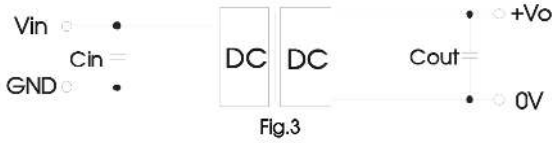


Fig.3

Recommended capacitive load value table (Table 1)

Vin (VDC)	Cin(μF)	Vout (VDC)	Cout (μF)
5	4.7	3.3/5	10
		9/12	2.2
		15/24	1

EMC solution-recommended circuit

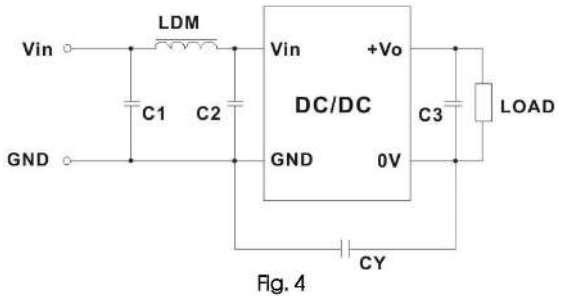


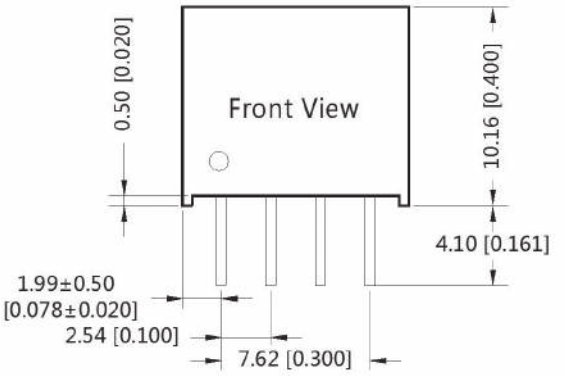
Fig. 4

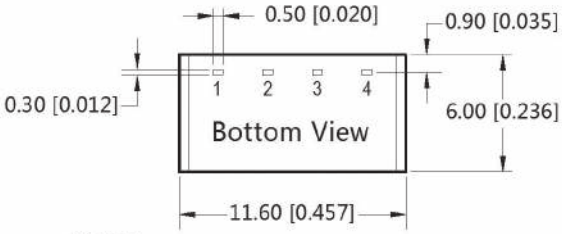
EMC recommended circuit value table (Table 2)

Input voltage 5VDC	Output voltage (VDC)		3.3/5/9	12/15/24
	EMI	C1/C2	4.7μF /25V	4.7μF /25V
		CY		1nF/4KVDC VISHAY HGZ102MBP TDK CD45-E2GA102M-GK
		C3	Refer to the Cout in table 1	
		LDM	6.8μH	6.8μH

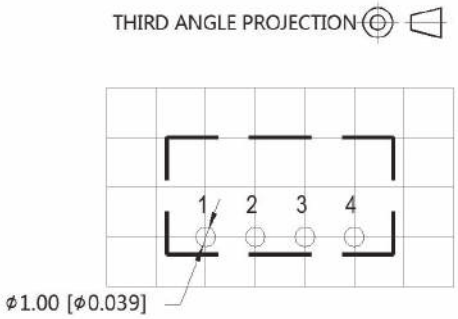
Note:
In the case of actual use, the requirements for EMI are high, it is subject to CY.

Mechanical dimensions and recommended layout





Note:
Unit :mm[inch]
Pin section tolerances :±0.10[±0.004]
General tolerances:±0.25[±0.010]



Note : Grid 2.54*2.54mm

Pin-Out	
Pin	Function
1	GND
2	Vin
3	0V
4	+Vo