



## 1S4AE\_1.5UP series

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

### 3.3Vin DC-DC Converter 1 Watt

- ⊕ Continuous short-circuit protection
- ⊕ No-load input current as low as 8mA
- ⊕ Operating ambient temp. range: -40°C to +105°C
- ⊕ High efficiency up to 80%
- ⊕ I/O isolation test voltage 1.5kVDC
- ⊕ Industry standard pin-out

The 1S4AE\_1.5UP series is especially designed for distributed power supply systems where an isolated voltage is required. They are suitable for occasions of: pre-interference isolation, ground interference elimination, pure digital circuit, voltage isolation conversion, general low frequency analog circuit, relay drive circuit, etc.



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; 25 °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	20KHz
MTBF	3500,000h (MIL-HDBK-217F@25 °C)	
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 output regulation 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 • Others		30	75	%	
			50	100	%	
Ripple & Noise*	20MHz Bandwidth • 3.3/5/9/12/5VDC output • 24VDC output		30	75	mVp-p	
			50	100	mVp-p	
Temperature Drift Coefficient	100% load		±0.02		%/°C	

Note: • The 'parallel cable' method is used for Ripple and Noise test, please refer to DC-DC Converter Application Notes for specific information.

Isolation specifications						
Item	Test condition	Min	Typ	Max	Units	
Isolation voltage	Input-output electric strength test for 1 minute with a leakage current of 1 mA max.	1500			VDC	
Isolation resistance	Input-output resistance at 500VDC	1000			MΩ	
Isolation capacitance	Input-output capacitance at 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	Contact ±6kV	perf. Criteria B		

#### Example:

#### 1S4AE\_030551.5UP

1 = 1Watt; S4 = SIP4; A = Pinning; E = Cost effective; 3 = 3.3Vin;  
05 = 5Vout; S = Single Output; 1.5 = 1.5kVDC; U = Unregulated output;  
P = Short circuit protection

Input specifications						
Item	Test condition	Min	Typ	Max	Units	
Input current (full load / no-load)	• 3.3/5VDC output • Others output		405/8	427/-	mA	
				379/8	399/-	mA
Reflected ripple current*			30		mA	
Surge Voltage (1sec. max.)		-0.7		5	VDC	
Input filter	Capacitor filter					
Hot plug	Unavailable					

\* Refer to DC-DC Converter Application Notes for detailed description of reflected ripple current test method.

#### Note:

- 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;
- The maximum capacitive load offered were tested at input voltage range and full load;
- 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;
- All index testing methods in this datasheet are based on our Company's corporate standards;
- We can provide product customization service, please contact our technicians directly for specific information;
- Products are related to laws and regulations: see "Features" and "EMC";
- Classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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DC-DC Converter

### Product Selection Guide

Part Number	Certification	Input Voltage [VDC]		Output Voltage [VDC]	Output Current [mA, Max./Min]	Efficiency <sup>(2)</sup> [%, Min./Typ.] @ Full Load	Capacitive load [μF, Max]
		Nominal	Range				
1S4AE_0303S1.5UP		3.3	2.97-3.63	3.3	303/30	71/75	2400
1S4AE_0305S1.5UP		3.3	2.97-3.63	5	200/20	76/80	2400
1S4AE_0312S1.5UP		3.3	2.97-3.63	9	111/12	76/80	1000
1S4AE_0312S1.5UP		3.3	2.97-3.63	12	83/8	76/80	560
1S4AE_0315S1.5UP		3.3	2.97-3.63	15	67/7	76/80	560
1S4AE_0324S1.5UP		3.3	2.97-3.63	24	42/4	76/80	220

### Typical Characteristic Curves

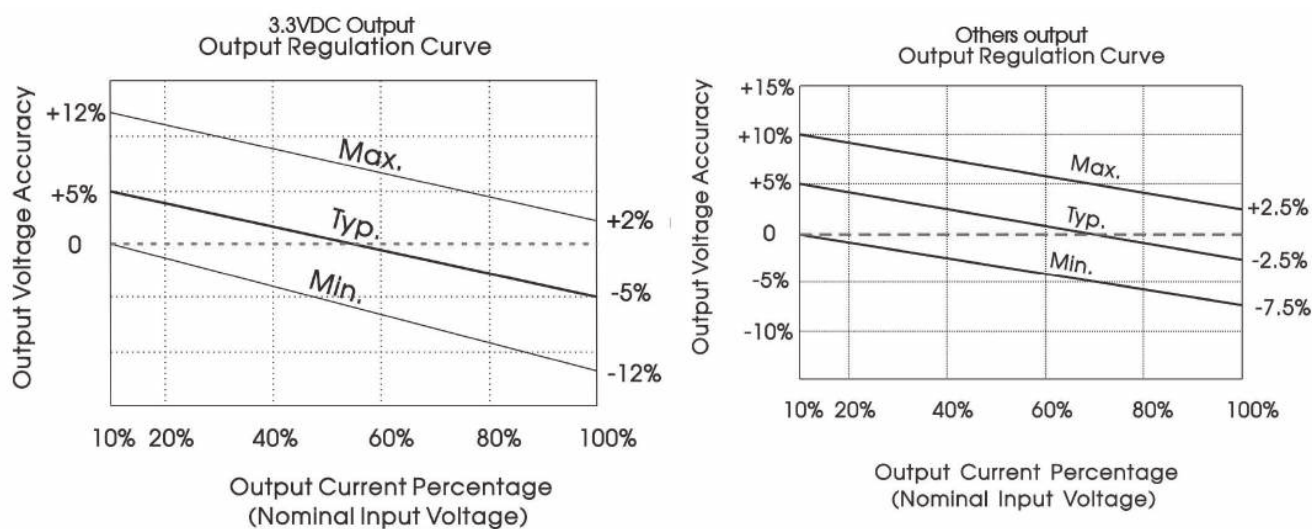


Fig.1

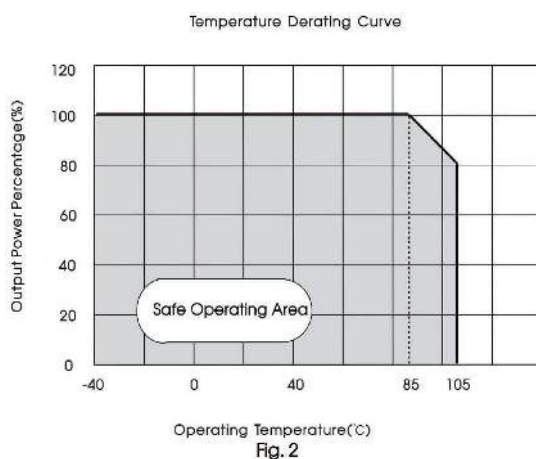


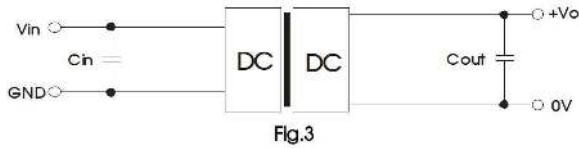
Fig.2

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## 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 ensure the modules running well, the recommended capacitive load values as shown in Table 1.



Recommended capacitive load value table (Table 1)

Vin (VDC)	Cin(μF)	Vout (VDC)	Cout (μF)
3.3	2.2μF/25V	3.3VDC/5VDC	10μF/16V
		9VDC	2.2μF/16V
		12VDC	2.2μF/25V
		15VDC	1μF/25V
		24VDC	1μF/50V

## EMC solution-recommended circuit

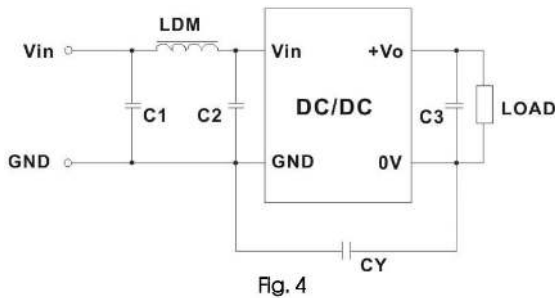
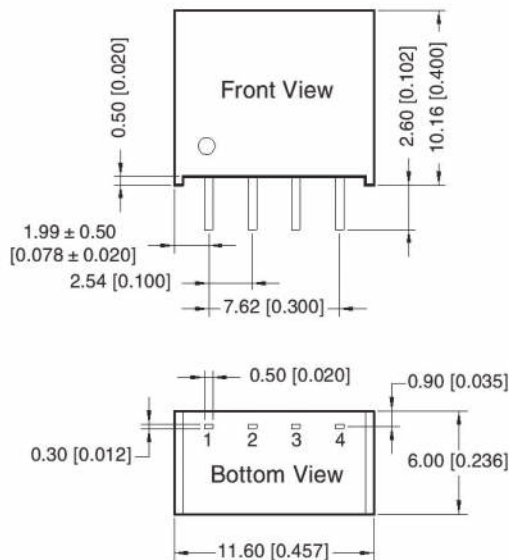


Table 2: Recommended EMC filter values

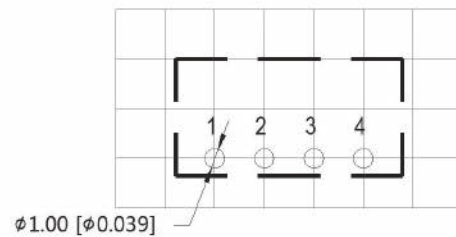
Emissions	C1/C2	4.7μF /50V
	C3	Refer to the Cout in Rg.3
	LDM	6.8μH
	CY	270pF /2kV

## Mechanical dimensions and recommended layout



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

THIRD ANGLE PROJECTION



Note : Grid 2.54\*2.54mm

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