1S4AE_3UP series

1Watt - Fixed input voltage, isolated & unregulated single output DC-DC converter

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 approved

The 1S4AE_3UP 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

Output Short Circuit Protection:	Continuous, self-recovery
Cooling methods:	Free air convection
Operation temperature range:	-40°C~+105°C Derating if the temperature ≥85°C, (see Fig. 2)
Storage temperature range:	-55°C~+125°C
Casing Temperature Rise (Ta=25°C)	25°C TYP. -3.3VDC output 15°C TYP. Other output
Storage humidity range:	95% MAX (Non-condensing)
Pin welding resistance temperature:	300°C MAX, Welding spot is 1.5mm away from the casing, 10 seconds
Switching frequency (PWM mode)*:	270kHz TYP, 100% load, nominal input voltage
Case material:	Black flame-retardant and heat-resistant plastic (UL94 V-0)
MTBF (MIL-HDBK-217F@25°C):	3500 K hours MIN
Dimensions	11.60 X 6.00 X 10.16 mm

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	IO, 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

Input specifications

Item	Test condition	Min	Typ	Max	Units
Input current (full load / no-load)	• 3.3VDC/5VDC output • 9VDC/12VDC output • 15VDC/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				

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	 % % % % % %
Temperature Drift Coefficient	100% load		±0.02		%/°C
Ripple & Noise*	20MHz Bandwidth • Other output • 24VDC output		 30 50	 75 100	 mVp-p mVp-p

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

EMC specifications

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

Example:

1S4AE_ 0503S3UP

1 = 1Watt; S4 = SIP4; A = Pinning; E = Cost effective; 5Vin; 3Vout;
S = Single Output; 3 = 3kVDC isolation; 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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Product Selection Guide

Part Number	Certification	Input Voltage [VDC] Nominal	Input Voltage [VDC] Range	Output Voltage [VDC]	Output Current [mA, Max./Min]	Efficiency(2) [%, Min./Typ.] @ Full Load	Capacitive load [µF, Max]
1S4AE_0503S3UP	UL/CE	5	4.5-5.5	3.3	303/30	70/74	2400
1S4AE_0505S3UP	UL/CE	5	4.5-5.5	5	200/20	78/82	2400
1S4AE_0512S3UP	UL/CE	5	4.5-5.5	9	111/12	79/83	1000
1S4AE_0512S3UP	UL/CE	5	4.5-5.5	12	84/9	79/83	560
1S4AE_0515S3UP	UL/CE	5	4.5-5.5	15	67/7	79/83	560
1S4AE_0524S3UP	UL/CE	5	4.5-5.5	24	42/4	81/85	220

Typical Characteristic Curves

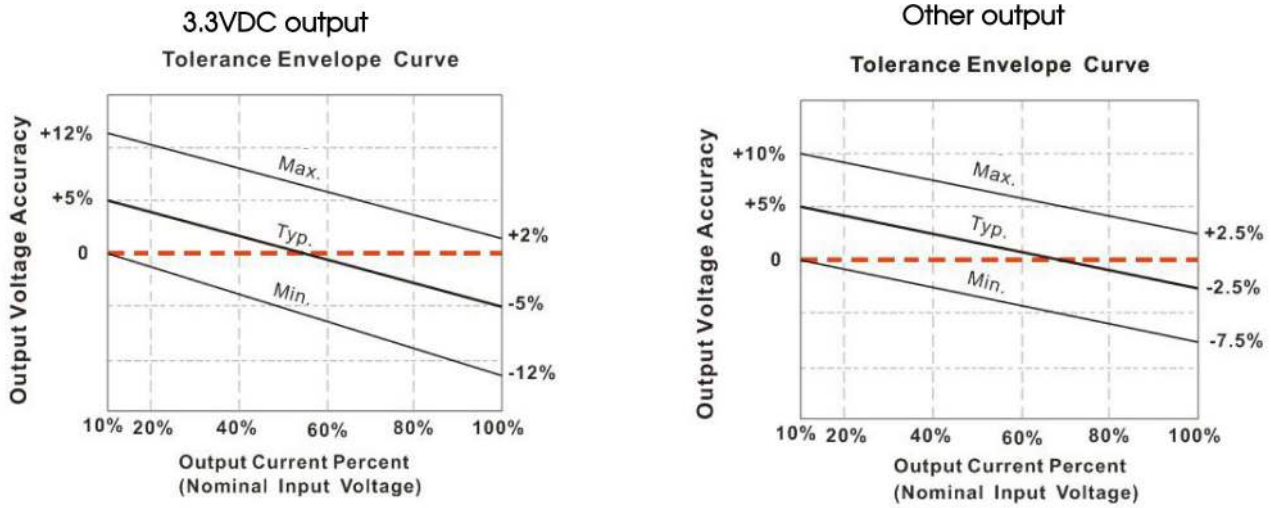


Fig. 1

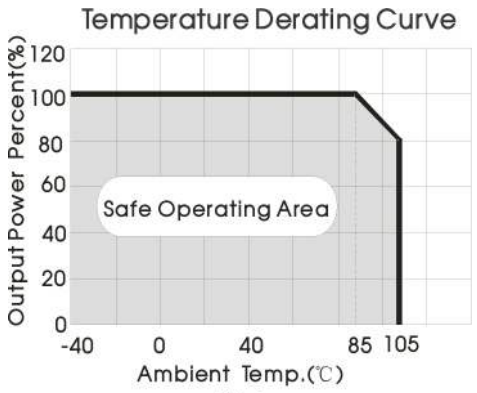
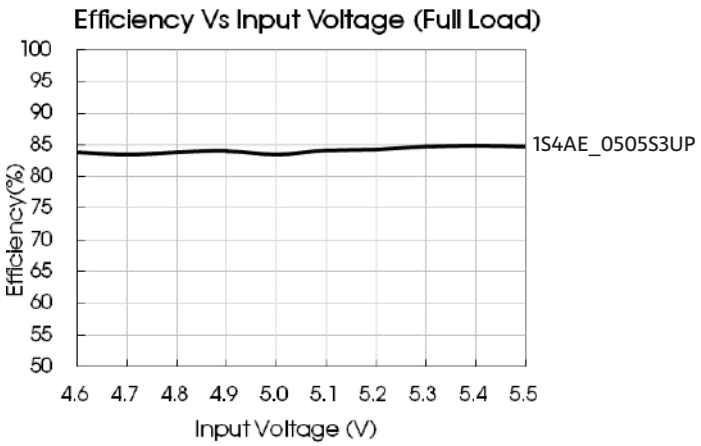
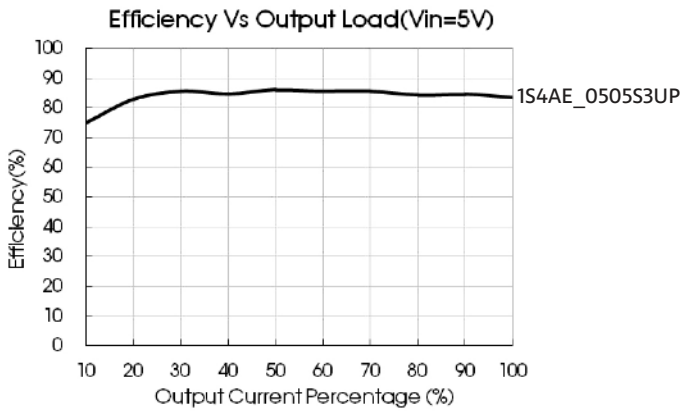
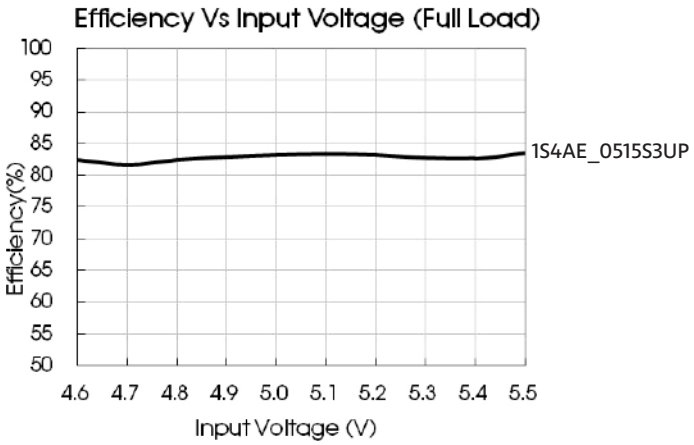


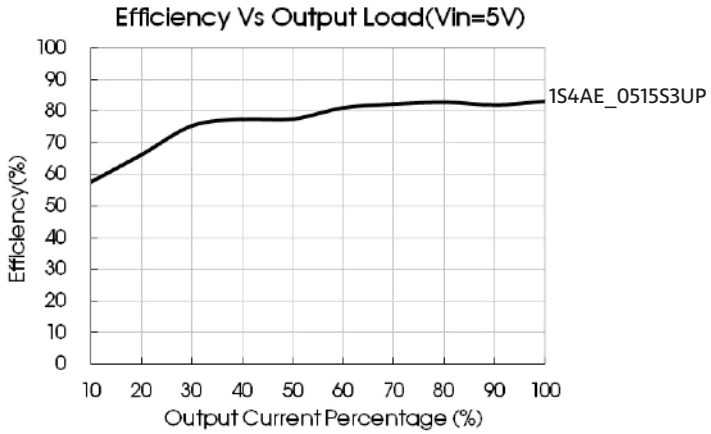
Fig. 2

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

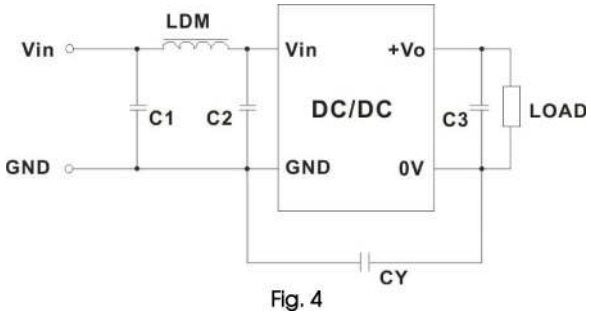


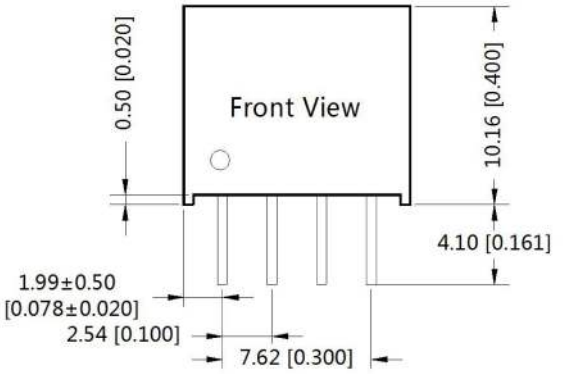
Fig. 4

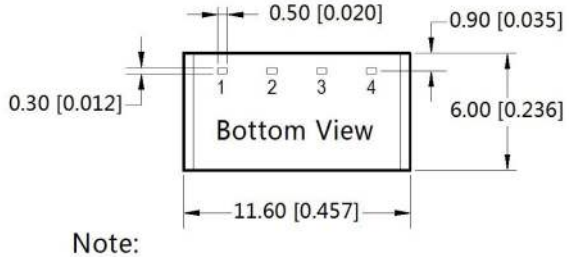
EMC recommended circuit value table (Table 2)

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

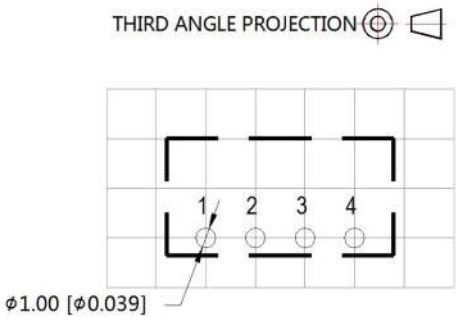
Note: In the case of actual use, the requirements for EMI are high, it is subject to CY.

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