



## 2S4A\_1.5UP series

2W - Single Output - Fixed Input - Isolated & Unregulated

### DC-DC Converter

**2 Watt**

- Operating temperature range: -40°C to +85°C
- Ultra compact SIP package
- Isolation voltage: 1.5kVDC
- High power density
- No external component required
- International standard pin-out



#### Common specifications

Short circuit protection*:	Continuous, automatic recovery 2S4A_0505S1.5UP: 1s
Operation temperature range:	-40°C~+85°C (Derating if the temperature ≥71°C)
Storage temperature range:	-55°C ~+125°C
Storage humidity range:	< 95%
Casing Temperature Rise:	25°C TYP Ta = 25°C
Lead temperature range:	300°C MAX, 1.5mm from case for 10 sec
MTBF (MIL-HDBK-217F@25°C):	>3,500,000 hours
Case material:	Black flame-retardant and heat-resistant plastic (UL94 V-0)
Cooling Method:	Free air convection
Dimensions:	11.60*7.55*10.16 mm
Weight:	1.6g TYP

\* Supply voltage must be discontinued at the end of short circuit duration for others series.

#### Input specifications

Item	Test condition	Min	Typ	Max	Units
Input current (full load/no load)	• 5V input • 12V input • 24V input		506/23 200/15 105/6	-/60 -/50 -/30	mA
Reflected ripple current			15		mA
Surge voltage	• 5V input • 12V input • 24V input	-0.7 -0.7 -0.7		9 18 30	VDC
Input filter	Filter capacitor				
Hot plug	Unavailable				

#### Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Tested for 1 minute and 1mA max	1500			VDC
Isolation resistance	Test at 500VDC	1000			MΩ
Isolation capacitance			20		pF

The 2S4A\_1.5UP series are specially designed for applications where an isolated voltage is required in a distributed power supply system. They are suitable for

- Where the voltage of the input power supply is stable (voltage variation: ±10%Vin);
- Where isolation between input and output is necessary (isolation voltage ≤1500VDC);
- Where the output voltage regulation and the ripple & noise of the output voltage is not strictly required;
- Typical application: digit circuit condition; normal low-frequency artificial circuit condition; relay drive circuit condition, etc.

#### Output specifications

Item	Test condition	Min	Typ	Max	Units
Output voltage accuracy	See tolerance envelope graph (Fig. 1)				
Line regulation	For Vin change of 1% • 3.3V output • Other output			±1.5 ±1.2	% %
Load regulation	10% to 100% full load • 3.3V output • Other output		15 10		% %
Ripple & noise*	20MHz Bandwidth		75	150	mVp-p
Temperature Coefficient	full load			±0.03	%/°C
Switching frequency	Full load, nominal input		100		KHz

Note: \* Ripple and noise are measured by "parallel cable" method, please see DC-DC Converter Application Notes for specific operation;

\*\* Supply voltage must be discontinued at the end of short circuit duration for others series.

#### EMC specifications

Emissions	CE	CISPR32/EN55032	CLASS B
		(External Circuit Refer to EMC recommended circuit)	
Immunity	RE	CISPR32/EN55032	CLASS B
		(External Circuit Refer to EMC recommended circuit)	
Immunity	ESD	IEC/EN61000-4-2	Contact ±8KV perf. Criteria B

#### Example:

**2S4A\_0505S1UP**

2 = 2 Watt; S4 = SIP4; A = Pinning; 05 = 5Vin; 05 = 5Vout; S = Single Output; 1.5 = 1.5kVDC isolation; U = Unregulated Output; P = Short Circuit Protection (SCP)

#### Note:

- Operation under minimum load will not damage the converter; However, they may not meet all specification listed, and that will reduce the life of product.
- All specifications measured at TA = 25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
- Only typical models listed, other models may be different, please contact our technical person for more details.

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## Selection Guide

Part Number	Input Voltage [Nominal, Range, V]	Output Voltage [VDC, Nominal]	Current [mA, Max./Min.]	Efficiency @ Full Load [% ,Min./Typ.]	Max. Capacitive Load [μF]
2S4A_0505S1.5UP	5 (4.5-5.5)	5	400/40	75/79	220
2S4A_0509S1.5UP	5 (4.5-5.5)	9	223/23	80/84	220
2S4A_0512S1.5UP	5 (4.5-5.5)	12	167/17	75/79	220
2S4A_0515S1.5UP	5 (4.5-5.5)	15	133/13	75/79	220
2S4A_0524S1.5UP	5 (4.5-5.5)	24	84/9	80/84	220
2S4A_1203S1.5UP	12 (10.8-13.2)	3.3	400/40	69/73	220
2S4A_1212S1.5UP	12 (10.8-13.2)	12	167/17	78/83	220
2S4A_2405S1.5UP	24 (21.6-26.4)	5	400/40	75/79	220
2S4A_2415S1.5UP	24 (21.6-26.4)	15	133/13	78/82	220

## Typical characteristics

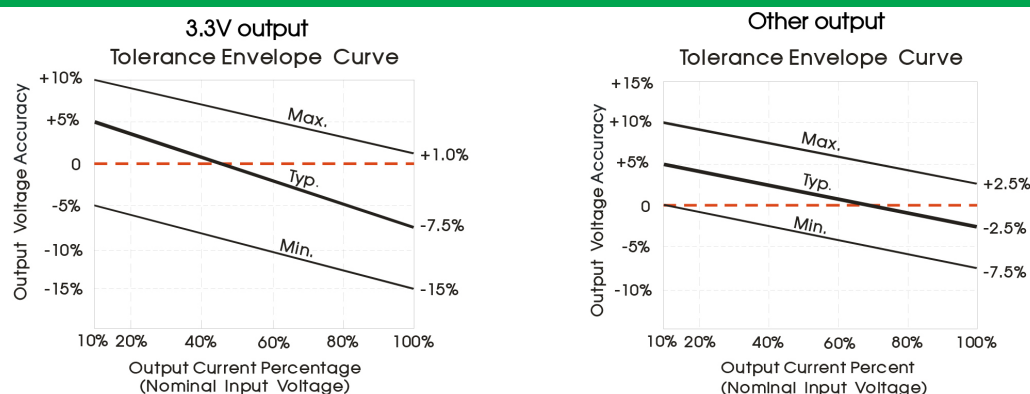


Fig. 1

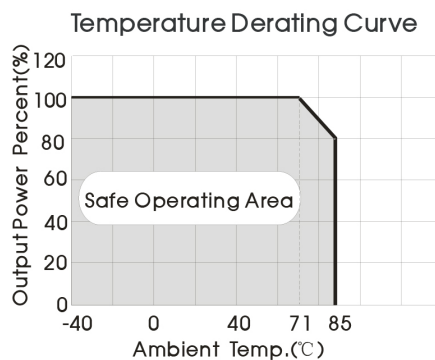
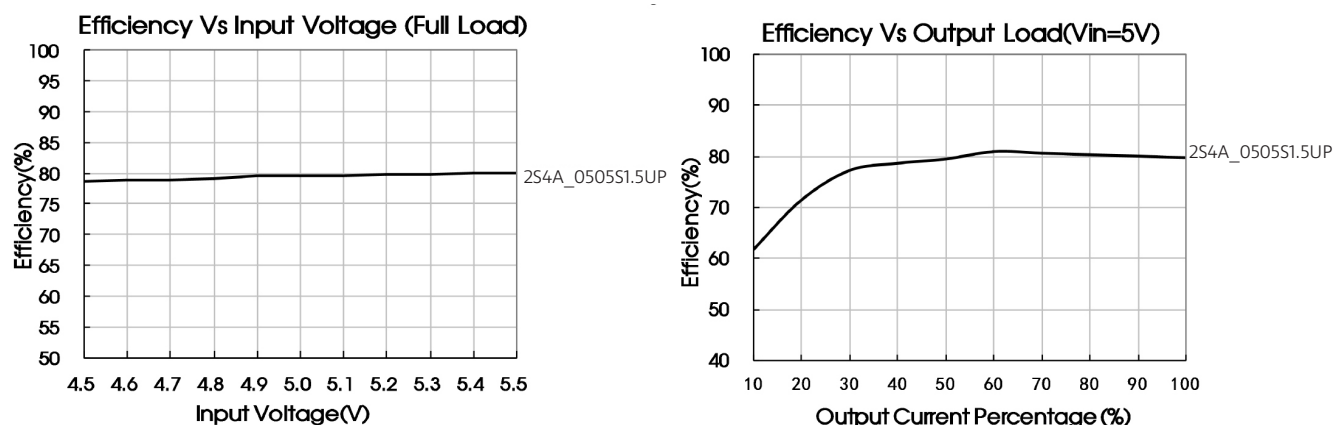


Fig. 2

## Efficiency

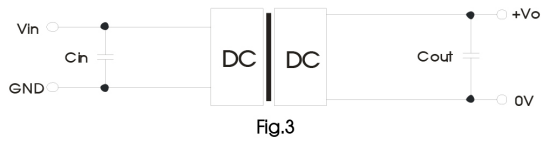


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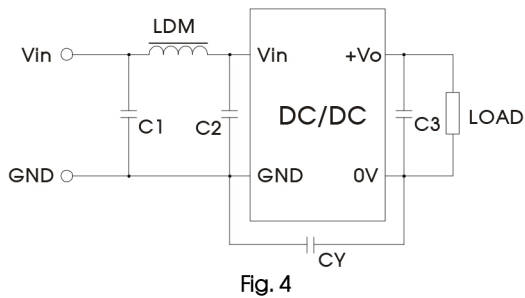
Typical application circuit

If it is required to further reduce input and output ripple, a filter capacitor may be connected to the input and output terminals, see Fig.3. Moreover, choosing a suitable filter capacitor is very important, start-up problems may be caused if the capacitance is too large. Under the condition of safe and reliable operation, the recommended capacitive load values are shown in Table 1.



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

EMC recommended circuit



Input voltage (VDC)		5/12	24
EMI	C1/C2	4.7μF /50V	
	CY	-	1nF/2KV
	C3	Refer to the Cout in Fig.3	
	LDM	6.8μH	

Note: 1. 24V input series is subject to CY (CY : 1nF/2KV).  
2. It is not needed to add the component in the peripheral circuit when parameter with the symbol of „-“.

Output load requirements

When using, the minimum load of the module output should not be less than 10% of the nominal load. In order to meet the performance parameters of this datasheet, please connect a 10% dummy load in parallel at the output end, the dummy load is generally a resistor. Please note that the resistor needs to be used in derating.

Mechanical dimensions

