

## 2S4A3\_3UP series

2W - Single Output DC-DC Converter - Isolated & Unregulated



### DC-DC Converter

2 Watt

- ⊕ SIP4 package type
- ⊕ Operating temperature range: -40°C to +105°C
- ⊕ Up to 88% efficiency
- ⊕ 3000VDC isolation voltage
- ⊕ International standard pinout
- ⊕ MTBF: 3,500,00 hours
- ⊕ Ripple & noise: max 100 mVp-p

Introducing our new 2S4A3\_3UP series, a compact and high-performance isolated DC-DC converter platform engineered for reliable operation in industrial and globally deployed applications. Designed in a space-efficient SIP4 package with international standard pinout, the series enables seamless integration into existing layouts while maintaining maximum design flexibility.

With reinforced 3000 VDC isolation and efficiencies of up to 88%, the 2S4A3\_3UP series delivers both electrical robustness and optimized power performance. It operates reliably across an extended temperature range from -40°C to +105°C, ensuring stable functionality even in demanding environments. Low ripple & noise performance of max. 100 mVp-p supports sensitive electronic circuits, while an MTBF of 3,500,000 hours guarantees long-term reliability and operational stability in mission-critical systems.



Common specifications	
Short circuit protection	Continuous, self recovery
Switching frequency	220 kHz (full load, nominal input voltage)
Operation temperature	-40°C ~+105°C (with derating)
Storage temperature	-55°C ~+125°C
Soldering profile	Wave-soldering, 260°C (±5°C); time: 5 - 10s Manual-welding, 360°C (±10°C); time: 3 - 5s
Case temperature rise	25°C (Ta = 25°C, input nominal, output full load)
Storage humidity	95% RH (non condensing)
MTBF: (MIL-HDBK-217F@25°C)	> 3,500,000 hours
Input filter	Capacitance filter
Hot plug	Unavailable
Case material	Black plastic; flame-retardant and heat-resistant (UL94V-0)
Package dimensions	11.6 x 6.00 x 10.20mm
Weight	1.3g (typ.)
Cooling method	Free air convection

Output specifications					
Item	Test condition	Min	Typ	Max	Units
Output voltage accuracy	See envelope curve figure 1				
Linear regulation (input voltage variation ±1%)	3.3VDC output Others output		±1.5 ±1.2		%
Load regulation (10% - 100% load)	3.3/5VDC output 9/12/15VDC output 24VDC output		12 6 6		%
Ripple & noise	20MHz bandwidth, 100% load, parallel line test method		45	100	mVp-p
Temperature coefficient	Full load		±0.02		%/°C

Isolation specifications					
Item	Test condition	Min	Typ	Max	Units
Isolation Voltage	Input-output, test time 1 minute, leakage current less than 1mA	3000			VDC
Isolation Resistance	Input-output, isolated voltage 500VDC	1000			MΩ
Isolation capacitance	Input-output, 100kHz/0.1V		20		pF

Input specifications					
Item	Test condition	Min	Typ	Max	Units
Input current (full load/ no load)	<b>3.3VDC Nominal input</b>				
	• 3.3VDC Output		526/10	538/15	
	• 5VDC Output		730/10	745/15	
	• Other Output		710/12	715/18	
	<b>5VDC Nominal input</b>				
	• 3.3VDC Output		325/10	331/15	
	• 5VDC Output		481/10	490/15	
	• 9/12VDC Output		471/10	482/15	
	• 15/24VDC Output		471/18	482/25	
	<b>12VDC Nominal input</b>				
	• 3.3VDC Output		134/8	138/15	mA
	• 5/9VDC Output		198/8	205/15	
• Other Output		190/8	198/15		
<b>15VDC Nominal input</b>	• 3.3VDC Output		107/7	111/15	
	• 5/9VDC Output		153/7	160/15	
	• Other Output		150/7	155/15	
<b>24VDC Nominal input</b>	• 3.3VDC Output		67/5	70/15	
	• 5/9VDC Output		97/5	101/15	
	• Other Output		94/5	98/15	
Reflected ripple current			15		mA
Impulse voltage	3.3VDC Nominal input	-0.7		5	
	5VDC Nominal input	-0.7		9	
	12VDC Nominal input	-0.7		18	VDC
	15VDC Nominal input	-0.7		21	
	24VDC Nominal input	-0.7		30	

- The input voltage should not exceed the specified range value, otherwise it may cause permanent and irreparable damage;
- It is recommended to use at a load of over 5%. If the load is below 5%, the ripple index of the product may exceed the specifications, but it does not affect the reliability of the product;
- The maximum capacitive load is tested within the input voltage range and under full load conditions;
- Unless otherwise specified, all indicators in this datasheet are measured at Ta = 25°C, humidity <75% RH, nominal input voltage, and output rated load;
- All indicator testing methods in this datasheet are based on our company's standards;
- For specific requirements please contact our technical team directly;
- Product specifications are subject to change without prior notice.

#### Example:

**2S4A3\_2405S3UP**

**2 = 2Watt; S4 = SIP; A3 = Series; 24 = 24Vin; 05 = 5Vout; S = Single Output; 3 = 3000VDC isolation; U = Unregulated Output; P = Short circuit protection**

## 2S4A3\_3UP series

2W - Single Output DC-DC Converter - Isolated & Unregulated

### EMC specifications

EMI	CE	CISPR32/EN55032 CLASS B (the EMC recommended circuit is shown in fig.4)
EMI	RE	CISPR32/EN55032 CLASS B (the EMC recommended circuit is shown in fig.4)
EMS	ESD	IEC/EN61000-4-2 Contact $\pm$ 6kV

perf. criteria B

## Product Selection Guide

Approval	Part number	Input Voltage Nominal (VDC)	Output Voltage (VDC)	Output Current max./min.(mA)	Full Load Efficiency (%) typ.*	Capacitive Load max. ( $\mu$ F)
	2S4A3_0303S3UP	3.3	3.3	400/40	76	2400
	2S4A3_0305S3UP	3.3	5	400/40	83	2400
	2S4A3_0309S3UP	3.3	9	222/22	85	1000
	2S4A3_0312S3UP	3.3	12	167/16	85	560
	2S4A3_0315S3UP	3.3	15	133/13	85	560
	2S4A3_0324S3UP	3.3	24	83/8	85	220
	2S4A3_0503S3UP	5	3.3	400/40	81	2400
	2S4A3_0505S3UP	5	5	400/40	83	2400
	2S4A3_0509S3UP	5	9	222/22	86	1000
	2S4A3_0512S3UP	5	12	167/16	85	560
	2S4A3_0515S3UP	5	15	133/13	86	560
	2S4A3_0524S3UP	5	24	83/8	85	220
	2S4A3_1203S3UP	12	3.3	400/40	82	2400
	2S4A3_1205S3UP	12	5	400/40	83	2400
	2S4A3_1209S3UP	12	9	222/22	84	1000
	2S4A3_1212S3UP	12	12	167/16	87	560
	2S4A3_1215S3UP	12	15	133/13	87	560
	2S4A3_1224S3UP	12	24	83/8	87	220
	2S4A3_1503S3UP	15	3.3	400/40	82	2400
	2S4A3_1505S3UP	15	5	400/40	83	2400
	2S4A3_1509S3UP	15	9	222/22	85	1000
	2S4A3_1512S3UP	15	12	167/16	87	560
	2S4A3_1515S3UP	15	15	133/13	88	560
	2S4A3_1524S3UP	15	24	83/8	88	220
	2S4A3_2403S3UP	24	3.3	400/40	82	2400
	2S4A3_2405S3UP	24	5	400/40	84	2400
	2S4A3_2409S3UP	24	9	222/22	85	1000
	2S4A3_2412S3UP	24	12	167/16	88	560
	2S4A3_2415S3UP	24	15	133/13	88	560
	2S4A3_2424S3UP	24	24	83/8	88	220

Notes: \*Efficiency is measured at nominal input voltage and rated output load.

## Typical characteristics

### Temperature derating graph

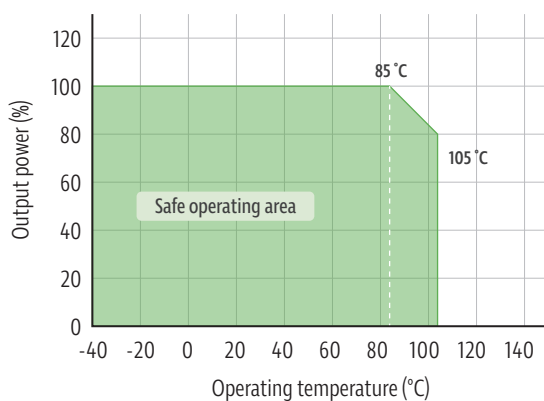


Figure 2

## Typical characteristics

**Output regulation curve**  
3.3VDC output

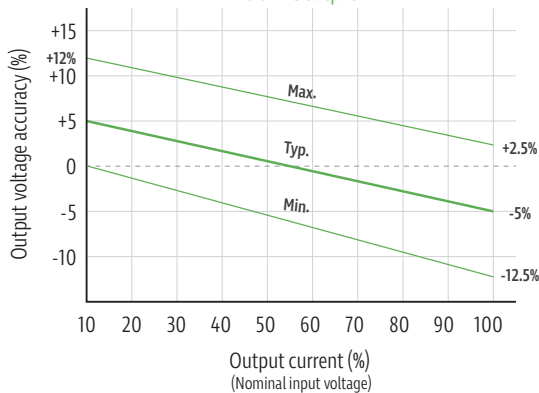


Figure 1-1

**Output regulation curve**  
Other output

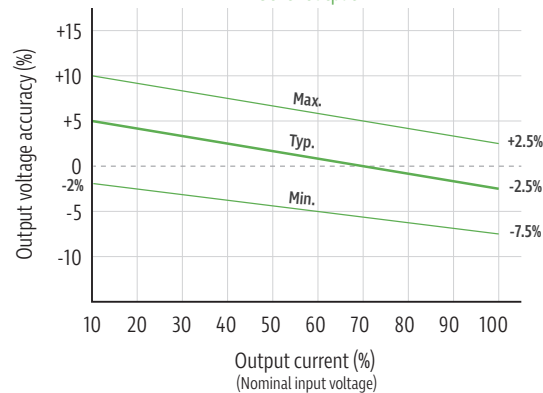
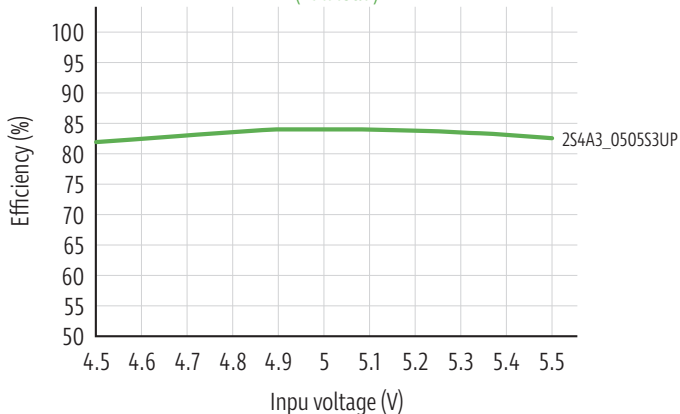
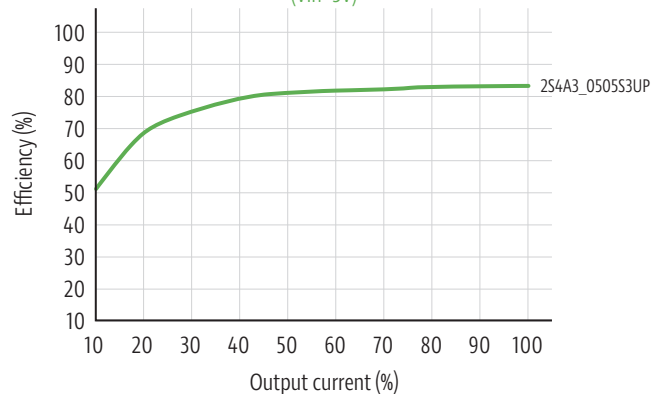


Figure 1-2

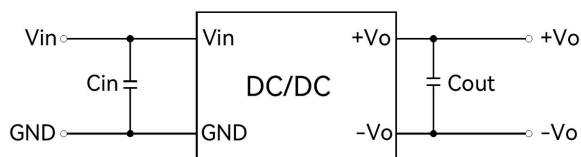
**Efficiency vs input voltage**  
(Full load)



**Efficiency vs output load**  
(Vin=5V)



## Typical circuit design and application



Recommended capacitive load value table

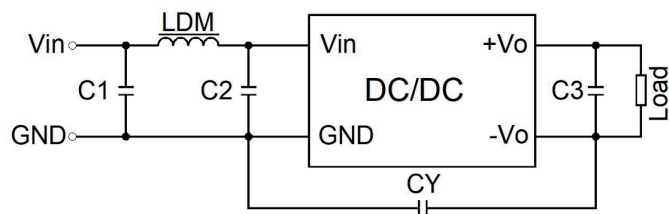
Vin	Cin	Vo	Cout
3.3/5VDC	10uF/16V	3.3/5VDC	10uF/16V
12VDC	4..7uF/25V	9/12VDC	2.2uF/25V
15VDC	2.2uF/25V	15VDC	1.0uF/25V
24VDC	1.0uF/50V	24VDC	1.0uF/50V

All the DC-DC converters of this series are tested before delivery using the recommended circuit shown in fig.3. Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values  $C_{in}$  and  $C_{out}$  and/or by selecting capacitors with a low ESR (equivalent series resistance). Also make sure that the capacitance is not exceeding the specified max. capacitive load value of the product.

## 2S4A3\_3UP series

2W - Single Output DC-DC Converter - Isolated & Unregulated

### Recommended EMC circuit diagram



EMC recommended parameter table

EMC	Component	Value
EMC	C1, C2	4.7μF /50V
EMC	C3	Refer to the Cout parameter in Fig.3
EMC	CY	1000pF/3kV
EMC	LDM	6.8μH

#### 1. Typical applications

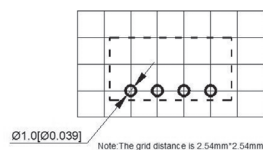
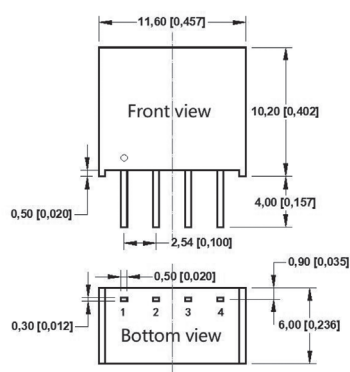
To further reduce input and output ripple, a capacitor filtering network can be connected at the input and output terminals. The application circuit is shown in fig.3. However, care should be taken to select a suitable filter capacitor. If the capacitance is too large, it is likely to cause start-up problems. For each output, the recommended capacitive load values are shown in "recommended capacitive load value table" for safe and reliable operation.

#### 2. See fig. 4 for EMC recommended circuit.

#### 3. Output load requirements

In order to ensure that the module can work efficiently and reliably, the minimum output load should not be less than 10% of the rated load when used. If the power required is really small, connect a resistor in parallel to the output end (the sum of the power consumed by the resistance and the power actually used is greater than or equal to 10% of the rated power).

### Mechanical dimensions



Pin Definition Table	
Pin	Function
1	GND
2	Vin
3	-Vo
4	+Vo

Note:  
Unit: mm [inch]  
Pin section tolerances:  $\pm 0.10$  [ $\pm 0.004$ ]  
General tolerances:  $\pm 0.50$  [ $\pm 0.020$ ]