



0.5S4E_3U series

0.5W - Single Output DC-DC converter - Isolated & Unregulated

DC-DC Converter

0.5 Watt

- ⊕ SIP4 package
- ⊕ Operating temperature range: -40°C to +105°C (with derating)
- ⊕ 3000VDC isolation
- ⊕ Up to 78% efficiency
- ⊕ International standard pin-out
- ⊕ MTBF: 3,500k hours

Introducing our new SIP4 DC-DC Converter 0.5S4E_3U serie, engineered to deliver dependable performance in space-constrained applications. Designed with a robust 3000VDC isolation, this converter ensures safe and efficient operation even in demanding environments. With an extended operating temperature range from -40°C to +105°C (derating applies), the unit maintains stability and functionality across varied conditions. The converter delivers up to 78% efficiency, optimizing power use without compromising output. Its international standard pin-out allows for straightforward integration into existing designs, while a Mean Time Between Failures (MTBF) of 3,500,000 hours underlines its long-term reliability. Housed in a compact SIP4 package, this model is ideal for applications requiring high isolation.



Common specifications	
Short circuit protection	Continuous, self-recovery
Switching frequency	220kHz (full load, nominal input voltage)
Operating temperature	-40°C - +105°C, (with derating)
Storage temperature	-55°C - +125°C
Case temperature rise	+15°C (typ.) Ta = 25°C, nominal input, output load
Pin welding can withstand the highest temperature	300°C (max.) soldering spot is 1.5mm away from case for 10 seconds
Relative humidity	95% RH (non-condensing)
Input Filter	Capacitance filter
Hot Plug	Unavailable
MTBF (MIL-HDBK-217F@25°C)	3,500,000 Hours
Case material	Black plastic; flame-retardant and heat-resistant (UL94V-0)
Package dimensions	11.6 x 6.00 x 10.20mm
Weight	1.6g (typ.)
Cooling method	Free air convection

Input specifications					
Item	Operating condition	Min	Typ	Max	Units
Input current (full load/no load)	3.3VDC Input		216/10	225/15	mA
	5VDC Input		125/9	135/15	
	12VDC Input		55/6	65/15	
	15VDC Input		39/5	50/15	
	24VDC Input		29/3	38/15	
Reflected ripple current			15		mA
Impulse voltage	3.3VDC input	-0.7		5	VDC
	5VDC input	-0.7		9	
	12VDC input	-0.7		18	
	15VDC input	-0.7		21	
	24VDC input	-0.7		30	

Output specifications					
Item	Operating condition	Min	Typ	Max	Units
Output voltage accuracy	See envelope curve figure 1				
Linear regulation rate (input voltage variation ±1%)	3.3VDC output other output		±1.5 ±1.2		%
Load regulation rate (10% - 100% load)	3.3VDC output		8		%
	5VDC output		8		
	9VDC output		7		
	12VDC output		6		
	15VDC output		5		
	24VDC output		5		
Ripple noise	20MHz bandwidth (peak to peak)		45	120	mV
Temperature drift coefficient	Full load		± 0.03		%/°C

Isolation specifications					
Item	Operating conditions	Min	Typ	Max	Units
Isolation voltage	Input-output, test time 1 minute, leakage current less than 1mA	3000			VDC
Isolation resistance	Input-output, insulated voltage 500VDC	1000			MΩ
Isolation capacitance	Input-output, 100kHz/0.1V		20		pF

EMC specifications					
EMI	CE	CISPR32/EN55032 CLASS B (The recommended circuit is shown in Figure 4)			
EMI	RE	CISPR32/EN55032 CLASS B (The recommended circuit is shown in Figure 4)			
EMS	ESD	IEC/EN61000-4-2 Contact ±6kV perf. Criteria B			

Example:

0.5S4E_0509S3U

0.5 = 0.5Watt; S4 = SIP4; E = Series; 05 = 5Vin; 09 = 9Vout; S = Single Output; 3 = 3kVDC isolation; U = Unregulated Output.

- 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 manual are measured at Ta = 25°C, humidity <75% RH, nominal input voltage, and output rated load;
- All indicator testing methods in this manual are based on our company's corporate standards;
- Product specifications are subject to change without prior notice.

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Product Selection Guide

Approval	Part number	Input Voltage Nominal (VDC)	Output Voltage (VDC)	Output Current Min (mA)	Output Current Max (mA)	Full Load Efficiency% (typ.)	Max. Capacitive Load (uF)
	0.5S4E_0303S3U	3.3	3.3	0	151	76	100
	0.5S4E_0305S3U	3.3	5	0	100	76	100
	0.5S4E_0309S3U	3.3	9	0	56	77	100
	0.5S4E_0312S3U	3.3	12	0	42	77	100
	0.5S4E_0315S3U	3.3	15	0	33	77	100
	0.5S4E_0324S3U	3.3	24	0	21	78	100
	0.5S4E_0503S3U	5	3.3	0	151	76	100
	0.5S4E_0505S3U	5	5	0	100	77	100
	0.5S4E_0509S3U	5	9	0	56	77	100
	0.5S4E_0512S3U	5	12	0	42	78	100
	0.5S4E_0515S3U	5	15	0	33	78	100
	0.5S4E_0524S3U	5	24	0	21	79	100
	0.5S4E_1203S3U	12	3.3	0	151	77	100
	0.5S4E_1205S3U	12	5	0	100	77	100
	0.5S4E_1209S3U	12	9	0	56	78	100
	0.5S4E_1212S3U	12	12	0	42	78	100
	0.5S4E_1215S3U	12	15	0	33	78	100
	0.5S4E_1224S3U	12	24	0	21	79	100
	0.5S4E_1503S3U	15	3.3	0	151	78	100
	0.5S4E_1505S3U	15	5	0	100	78	100
	0.5S4E_1509S3U	15	9	0	56	79	100
	0.5S4E_1512S3U	15	12	0	42	79	100
	0.5S4E_1515S3U	15	15	0	33	79	100
	0.5S4E_1524S3U	15	24	0	21	80	100
	0.5S4E_2403S3U	24	3.3	0	151	78	100
	0.5S4E_2405S3U	24	5	0	100	79	100
	0.5S4E_2409S3U	24	9	0	56	79	100
	0.5S4E_2412S3U	24	12	0	42	79	100
	0.5S4E_2415S3U	24	15	0	33	80	100
	0.5S4E_2424S3U	24	24	0	21	80	100

Product characteristic curve

Temperature derating graph

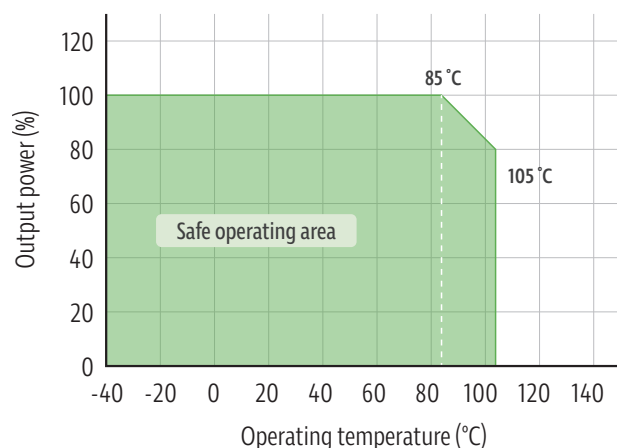


Figure 2

0.5S4E_3U series

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Product characteristic curve

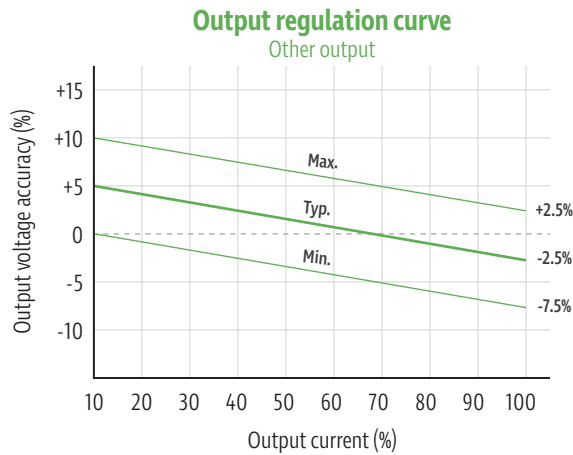


Figure 1-1

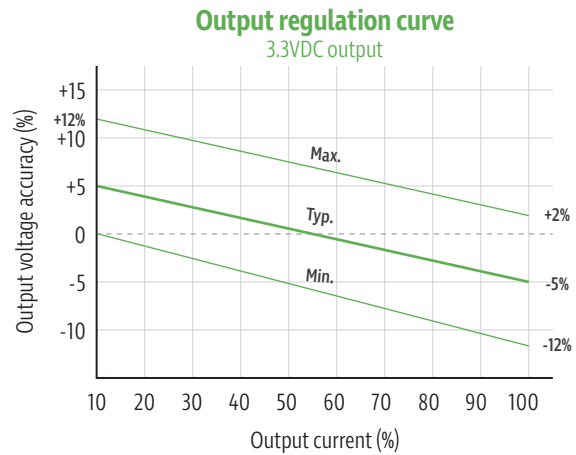


Figure 1-2

Typical Circuit Design And Application

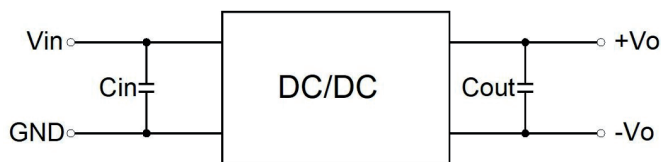


Figure 3

Recommended Capacitive Load Value Table

Vin(VDC)	Cin(μ F)	Vo(VDC)	Cout(μ F)
3.3/5	10	3.3/5	10
12	4.7	9	4.7
15	2.2	12	2.2
24	1	15	1
–	–	24	0.47

EMI compliance circuit

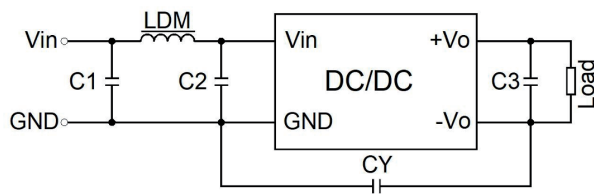


Figure 4

EMI recommended parameter table

EMI	C1, C2	4.7 μ F / 50 μ F
	C3	Refer to the Cout parameter in Figure 3
	CY	270pF / 2kV
	LDM	6.8 μ H

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 Figure 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.

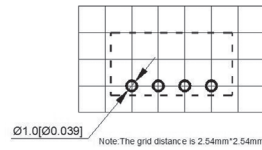
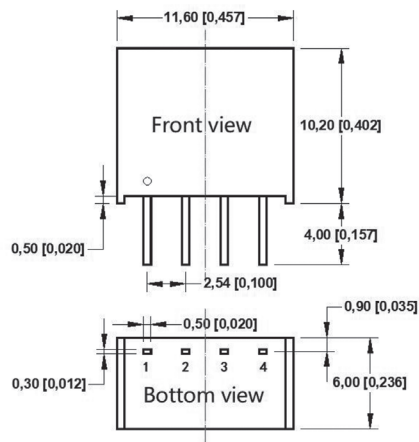
2. EMC typical recommended circuit (see figure 4)

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).

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Mechanical dimensions



Note:
Unit: mm [inch]
Pin section tolerances: ± 0.10 [± 0.004]
General tolerances: ± 0.50 [± 0.020]

Pin definition table

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