1S4A3_1.5UP series

1W - Single Output DC-DC converter - Isolated & Unregulated

DC-DC Converter 1 Watt

- SIP4 package
- Operating temperature range: -40°C to 105°C
- 1500VDC isolation
- Up to 89% efficiency
- International standard pin out
- MTBF: 3,500,000 hours

Introducing our innovative 1S4A3_1.5UP series – a compact yet powerful solution designed for today's demanding applications. Built in a space-saving SIP4 package, it operates reliably across a wide temperature range of -40°C to +105°C while delivering up to 89% efficiency. With robust 1500VDC isolation and an impressive MTBF of 3,500,000 hours, it ensures long-term stability and peace of mind. Featuring an international standard pinout for seamless integration, the series is ideally suited for power systems, industrial control, communications, the Internet of Things, automotive applications, and more.

UL62368 - E347551

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 5VDC input 12VDC input 15VDC input 24VDC input		370/3 230/3 99/3 78/3 50/3	390/15 260/15 105/15 85/15 55/15	mA
Reflected ripple current			15		mA
Impulse voltage	3.3VDC input 5VDC input 12VDC input 24VDC input	-0.7 -0.7 -0.7 -0.7		5 9 18 30	VDC

Example:
1S4A3_0509S1.5UP
1 = 1Watt; S4 = SIP4; A3 = Series; 05 = 5Vin; 09 = 9Vout; S = Single Output; 1.5 = 1.5kVDC isolation; U = Unregulated Output; P = Short circuit protection.

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 Others output		±1.5 ±1.2		%
Load regulation rate (10% - 100% load)	3.3VDC output 5VDC output 9VDC output 12VDC output 15VDC output 24VDC output		10 8 8 7 6 6		%
Ripple noise	20MHz bandwidth (peak-peak)		45	70	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	1500			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

1. The input voltage cannot exceed the specified range value, otherwise permanent and irreparable damage may be caused ;
2. Unless otherwise specified,the parameters in this datasheet were measured at 25°C, humidity 40%~75%, input nominal voltage and output pure resistance mode under full load;
3. All index test methods are based on our standards;

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Specifications subject to change without notice.

Product Selection Guide

Approval	Part number	Input Voltage Nominal (Range) (VDC)	Output Voltage (VDC)	Output Current Min (mA)	Output Current Max (mA)	Full Load Efficiency% (typ.)	Max. Capacitive Load (uF)
UL	1S4A3_0303S1.5UP	3.3	3.3	0	303	82	2400
UL	1S4A3_0305S1.5UP	3.3	5	0	200	83	2400
UL	1S4A3_0309S1.5UP	3.3	9	0	111	84	1000
UL	1S4A3_0312S1.5UP	3.3	12	0	84	85	560
UL	1S4A3_0503S1.5UP	5	3.3	0	303	82	2400
UL	1S4A3_0505S1.5UP	5	5	0	200	84	2400
UL	1S4A3_0509S1.5UP	5	9	0	111	86	1000
UL	1S4A3_0512S1.5UP	5	12	0	84	88	560
UL	1S4A3_0515S1.5UP	5	15	0	67	88	560
UL	1S4A3_0524S1.5UP	5	24	0	42	89	220
UL	1S4A3_0909S1.5UP	9	9	0	111	87	1000
UL	1S4A3_1203S1.5UP	12	3.3	0	303	84	2400
UL	1S4A3_1205S1.5UP	12	5	0	200	88	2400
UL	1S4A3_1209S1.5UP	12	9	0	111	87	1000
UL	1S4A3_1212S1.5UP	12	12	0	84	89	560
UL	1S4A3_1215S1.5UP	12	15	0	67	88	560
UL	1S4A3_1224S1.5UP	12	24	0	42	89	220
UL	1S4A3_1503S1.5UP	15	3.3	0	303	85	2400
UL	1S4A3_1505S1.5UP	15	5	0	200	85	2400
UL	1S4A3_1509S1.5UP	15	9	0	111	88	1000
UL	1S4A3_1512S1.5UP	15	12	0	84	89	560
UL	1S4A3_1515S1.5UP	15	15	0	67	89	560
UL	1S4A3_2403S1.5UP	24	3.3	0	303	84	2400
UL	1S4A3_2405S1.5UP	24	5	0	200	87	2400
UL	1S4A3_2409S1.5UP	24	9	0	111	89	1000
UL	1S4A3_2412S1.5UP	24	12	0	84	88	560
UL	1S4A3_2415S1.5UP	24	15	0	67	88	560
UL	1S4A3_2424S1.5UP	24	24	0	42	89	220

Product characteristic curve

Temperature derating graph

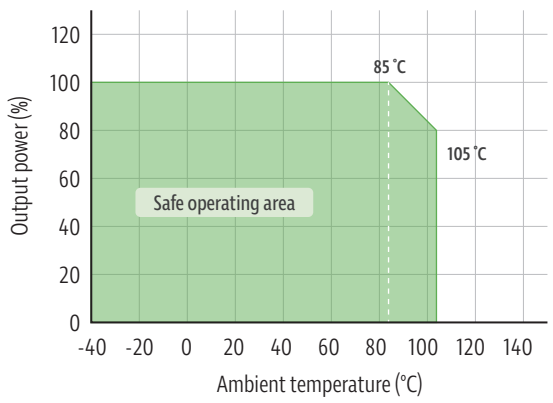


Figure 1

Output regulation curve

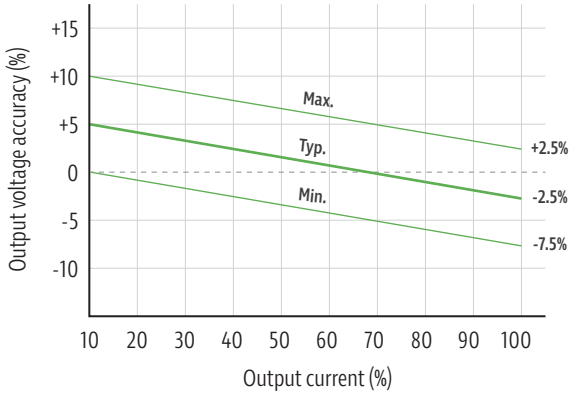
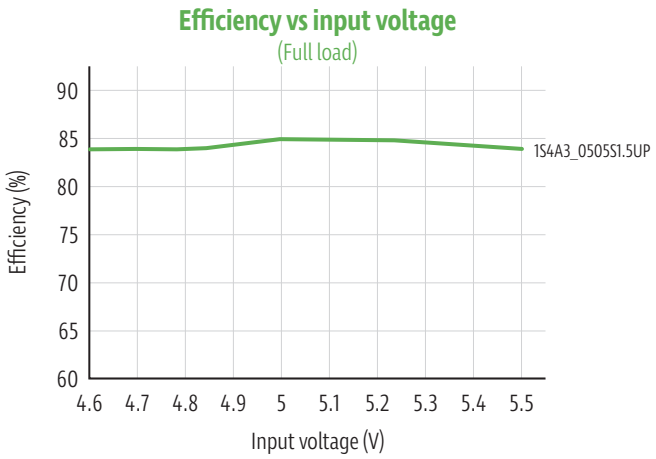
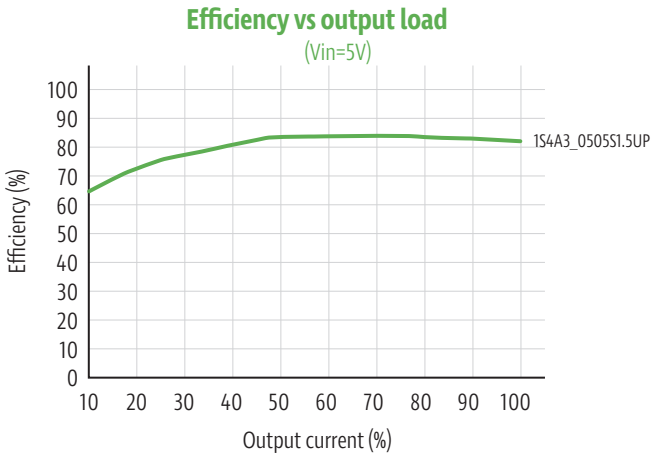


Figure 2

Product characteristic curve





Typical circuit design and application

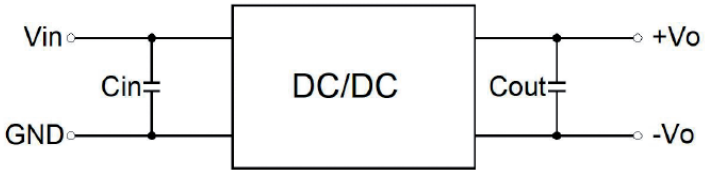


Figure 3

Recommended capacitive load value table

Vin	Cin	Vo	Cout
Vin	Cin	Vo	Cout
3.3/5VDC	4.7uF/16V	3.3/5VDC	10μF/16V
12VDC	2.2uF/25V	9VDC	4.7μF/16V
15VDC	2.2uF/25V	12VDC	2.2μF/25V
24VDC	1.0uF/50V	15VDC	1.0μF/25V
--	--	24VDC	0.47μF/50V

EMI compliance circuit

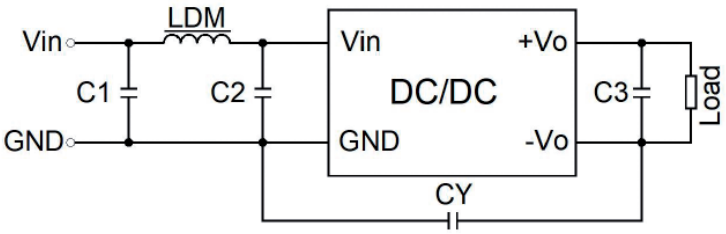


Figure 4

EMI Recommended Parameter Table

EMI	C1	4.7μF /50V
	C2	4.7μF /50V
	C3	Refer to the Cout parameter in Figure 3
	CY	1000pF/2kV
	LDM	6.8μH

1. Typical applications

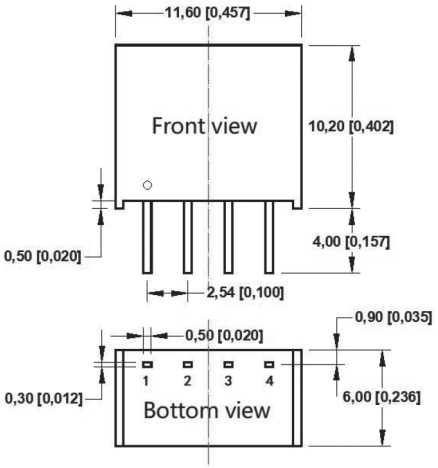
To further reduce input and output ripple, a capacitor filtering network can be connected at the input and output terminals.The application circuit is shown in Figure 3. However, care should be taken to select a suitable filter capacitor. If the capacitance is too large, it is likely to cause start-up problems. For each output, the recommended capacitive load values are shown in Table 1 for safe and reliable operation.

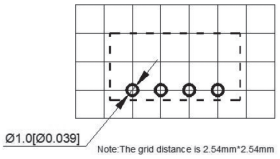
2. **EMC typical recommended circuit**
(see figure 4)

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).

Mechanical dimensions





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

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