1S4A3_3UP series

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

DC-DC Converter 1 Watt

- SIP4 package type
- Operating temperature range: -40°C to +105°C
- 3000VDC isolation
- Up to 89% efficiency
- International standard pinout
- MTBF: 3,500,000 hours
- Short circuit protection (SCP)

Introducing our new 1S4A3_3UP series, a compact and reliable DC/DC converter solution designed for demanding industrial applications. Packaged in a space-saving SIP4 format, this series combines high performance with long-term reliability. The converters operate over a wide temperature range from –40 °C to +105 °C, making them suitable for harsh environments. A 3000 VDC isolation rating ensures enhanced safety and signal integrity, while efficiencies of up to 89 % help minimize power losses and thermal stress. The 1S4A3_3UP series allows easy drop-in replacement and seamless integration into existing designs. With an impressive MTBF of 3.5 million hours, these converters are built for long service life in mission-critical systems. Integrated short-circuit protection (SCP) adds an extra layer of robustness, safeguarding both the converter and the connected load.

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	15°C (Ta = 25°C, nominal input, output load)
Storage humidity	5~95% 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 (20LFM)

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

1. The input voltage should not exceed the specified range value, otherwise it may cause permanent and irreparable damage;
2. 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;
3. The maximum capacitive load is tested within the input voltage range and under full load conditions;
4. Unless otherwise specified, all indicators in this datasheet are measured at Ta = 25°C, humidity<75% RH, nominal input voltage, and output rated load;
5. All indicator testing methods in this datasheet are based on our company's standards;
6. For any specific requirement please contact our technical team directly;
7. Product specifications are subject to change without prior notice.

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 Other output		±1.5 ±1.2		%
Load regulation (10% - 100% load)	3.3/4/5VDC output 9/12/15VDC output 18/24VDC output		10 8 6		%
Ripple & noise	20MHz bandwidth, 100% load, use the parallel line test		45	120	mV
Temperature coefficient	Full load		±0.02		%/°C

Input specifications

Item	Test condition	Min	Typ	Max	Units
Input current (full load/ no load)	**3.3VDC Nominal input**				mA
	3.3VDC output		370/10	385/15	
	Other output		356/12	365/18	
	4VDC Nominal input		301/10	311/15	
	5VDC Nominal input				
	3.3VDC output		244/10	256/15	
	5/9VDC output		238/10	250/25	
	Other output		227/18	238/15	
	9VDC Nominal input		127/9	140/15	
	12VDC Nominal input				
	3.3VDC output		99/8	104/15	
	Other output		96/8	101/15	
	15VDC Nominal input				
	3.3VDC output		81/8	86/15	
	5VDC output		78/8	83/15	
	Other output		76/8	80/15	
	18VDC Nominal input		63/6	70/15	
	24VDC Nominal input				
	3.3VDC output		50/5	53/15	
	Other output		48/5	51/15	
Reflected ripple current			15		mA
Impulse voltage	3.3VDC Nominal input	-0.7		5	VDC
	4VDC Nominal input	-0.7		8	
	5VDC Nominal input	-0.7		9	
	9VDC Nominal input	-0.7		15	
	12VDC Nominal input	-0.7		18	
	15VDC Nominal input	-0.7		21	
	18VDC Nominal input	-0.7		24	
	24VDC Nominal input	-0.7		30	

Example:
1S4A3_2405S3UP
1 = 1Watt; S4 = SIP; A3 = Series; 24 = 24Vin; 05 = 5Vout; S = Single Output; 3 = 3000VDC isolation; U = Unregulated Output; P = Short circuit protection

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EMC specifications			
EMI	CE	CISPR32/EN55032 CLASS B (see figure. 4 for EMC recommended circuit)	
EMI	RE	CISPR32/EN55032 CLASS B (see Figure. 4 for EMC recommended circuit)	
EMS	ESD	IEC/EN61000-4-2 Contact ±6kV Air ±8kV	perf. criteria B

Product Selection Guide

Approval	Part n umber	Input Voltage Nominal (Range) (VDC)	Output Voltage (VDC)	Output Current max./min.(mA)	Full Load Efficiency (%) typ.	Capacitive Load max. (µF)
	1S4A3_0303S3UP	3.3	3.3	303/30	82	2400
	1S4A3_0305S3UP	3.3	5	200/20	83	2400
	1S4A3_0309S3UP	3.3	9	111/11	84	1000
	1S4A3_0312S3UP	3.3	12	84/8	85	560
	1S4A3_0315S3UP	3.3	15	67/7	85	560
	1S4A3_0324S3UP	3.3	24	42/4	85	220
	1S4A3_0503S3UP	5	3.3	303/30	82	2400
	1S4A3_0505S3UP	5	5	200/20	84	2400
	1S4A3_0509S3UP	5	9	111/11	86	1000
	1S4A3_0512S3UP	5	12	84/8	88	560
	1S4A3_0515S3UP	5	15	67/7	88	560
	1S4A3_0524S3UP	5	24	42/4	89	220
	1S4A3_1203S3UP	12	3.3	303/30	84	2400
	1S4A3_1205S3UP	12	5	200/20	88	2400
	1S4A3_1209S3UP	12	9	111/11	87	1000
	1S4A3_1212S3UP	12	12	84/8	89	560
	1S4A3_1215S3UP	12	15	67/7	88	560
	1S4A3_1224S3UP	12	24	42/4	89	220
	1S4A3_1503S3UP	15	3.3	303/30	82	2400
	1S4A3_1505S3UP	15	5	200/20	85	2400
	1S4A3_1509S3UP	15	9	111/11	88	1000
	1S4A3_1512S3UP	15	12	84/8	89	560
	1S4A3_1515S3UP	15	15	67/7	89	560
	1S4A3_1524S3UP	15	24	42/4	89	220
	1S4A3_2403S3UP	24	3.3	303/30	84	2400
	1S4A3_2405S3UP	24	5	200/20	87	2400
	1S4A3_2409S3UP	24	9	111/11	89	1000
	1S4A3_2412S3UP	24	12	84/8	88	560
	1S4A3_2415S3UP	24	15	67/7	89	560
	1S4A3_2424S3UP	24	24	42/4	89	220

Note: ③Efficiency is measured at nominal input voltage and rated output load.

Typical characteristics

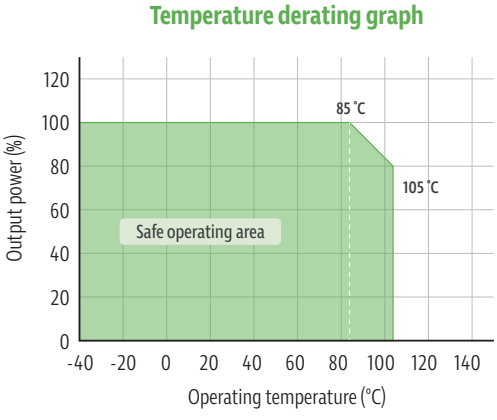


Figure 2

Typical characteristics

Output regulation curve
3.3V output

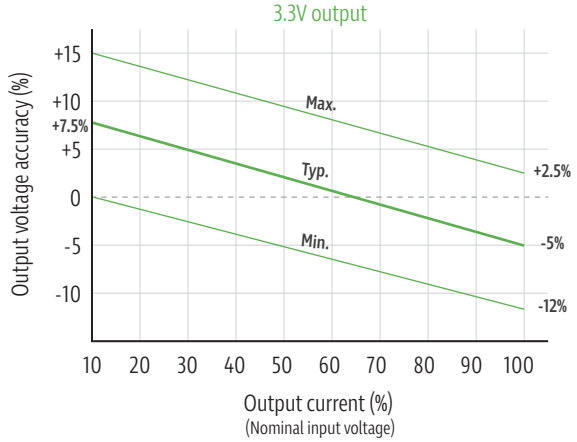


Figure 1-1

Output regulation curve
Other output

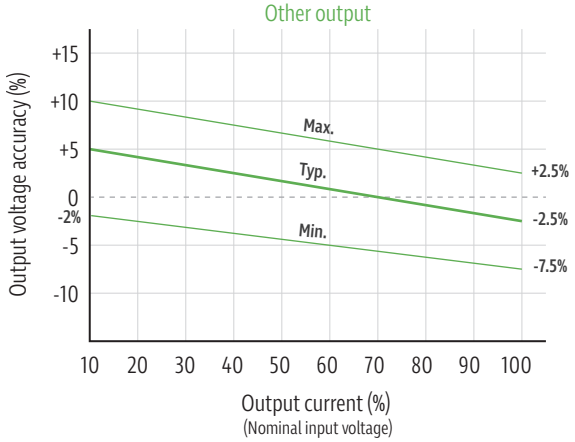
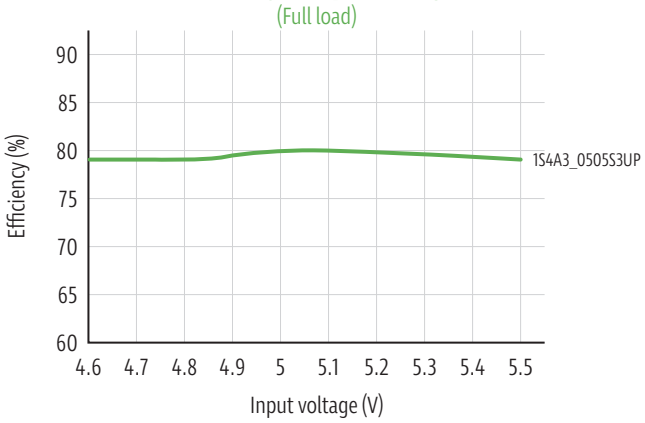
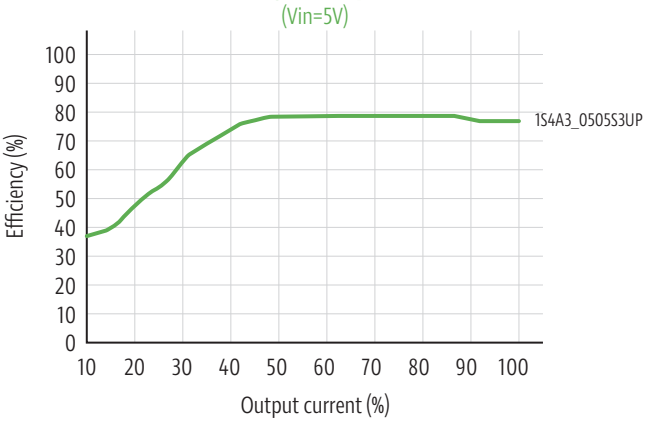


Figure 1-2

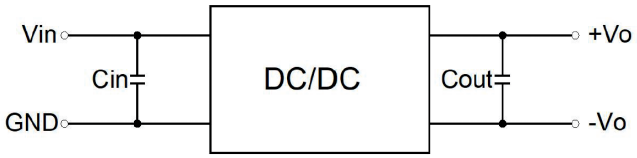
Efficiency vs input voltage
(Full load)



Efficiency vs output load
(Vin=5V)



Typical circuit design and application



Recommended Capacitive Load Value Table

Vin	Cin	Vo	Cout
3.3/4/5VDC	4.7uF/16V	3.3/4/5VDC	10μF/16V
9/12VDC	2.2uF/25V	9/12VDC	4.7μF/16V
15VDC	2.2uF/50V	15VDC	1.0μF/25V
18/24VDC	1.0uF/50V	18/24VDC	0.47μF/50V

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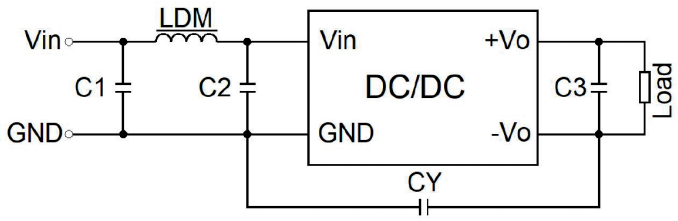
Recommended EMC circuit diagram



EMI Recommended Parameter Table

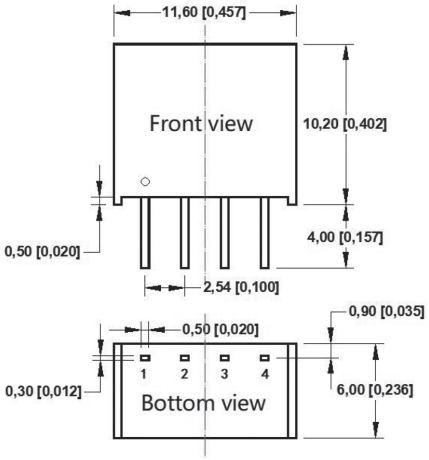
EMI	C1/C2	4.7μF /50V
EMI	C3	Refer figure. 3 Capacitive load value table
EMI	CY	1000pF/3kVDC
EMI	LDM	6.8μH

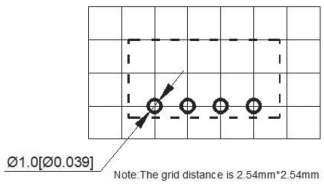
Note:
1. Typical applications
To further reduce input and output ripple, a capacitor filtering network can be connected at the input and output terminals.The application circuit is shown in Figure.3. However, care should be taken to select a suitable filter capacitor. If the capacitance is too large, 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. See figure. 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: ±0.10 [±0.004]
General tolerances: ±0.50 [±0.020]