

1S7A_1.5UP series

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



DC-DC Converter

1 Watt

- ⊕ SIP7 package type
- ⊕ 1500VDC isolation voltage
- ⊕ Operating temperature range: -40°C to 105°C
- ⊕ Up to 89% efficiency
- ⊕ International standard pin-out
- MTBF: 3,500,000 hours

Introducing our new 1S7A_1.5UP series, a high-performance SIP7 DC/DC converter designed for demanding industrial and embedded applications. With a robust 1500 VDC isolation voltage, it ensures reliable electrical separation and enhanced system safety. The module operates confidently across a wide temperature range from -40°C to +105°C, making it suitable for harsh or thermally challenging environments. Offering efficiency levels of up to 89%, the 1S7A_1.5UP series supports energy-efficient designs while maintaining stable and consistent output performance. The converter features an international standard pin-out for seamless integration and compatibility with widely used layouts. With an impressive MTBF of 3,500,000 hours, the series delivers long-term dependability for 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
Pin welding can withstand the highest temperature	+300°C (soldering spot is 1.5mm away from case for 10 seconds)
Case temperature rise	25°C (Ta = 25°C, nominal input, output 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	19.60 x 6.00 x 10.10mm
Weight	2.1g (typ.)
Cooling method	Free air convection

Input specifications

Item	Test condition	Min	Typ	Max	Units
Input current (full load/ no load)	Single				
	3.3VDC input		370/12	390/15	
	5VDC input 12VDC output		225/18	255/-	
	5VDC input Other output		230/10	260/15	
	12VDC input		99/7	105/15	
	15VDC input		78/5	95/15	
	24VDC input		51/3	85/15	
	Dual				
	3.3VDC input		370/10	390/15	
	5VDC input 15/24VDC output		227/26	258/-	
Reflected ripple current	5VDC input Other output		230/12	260/18	
	12VDC input		99/7	105/15	
	15VDC input		78/5	95/15	
	24VDC input		51/3	85/15	
			15		mA
Impulse voltage	3.3VDC input	-0.7		5	
	5VDC input	-0.7		9	
	12VDC input	-0.7		18	
	15VDC input	-0.7		21	
	24VDC input	-0.7		30	VDC

Example:

1S7A_2405S1.5UP

1 = 1Watt; S7 = SIP; A = Series; 24 = 24Vin; 05 = 5Vout; S = Single Output; 1.5 = 1500VDC isolation; U = Unregulated Output; P = Short circuit protection

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		±1.5		%
	Other output		±1.2		
Load regulation (10% - 100% load)	3.3VDC output		10		
	5VDC output		8		
	9VDC output		8		%
	12VDC output		7		
	15VDC output		6		
	24VDC output		6		
Ripple & noise	20MHz bandwidth (peak-peak)		45	100	mV
Temperature coefficient	Full load		±0.03		%/°C

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Input-output, test time 1 minute, leakage current less than 1mA	1500			VDC
Isolation resistance	Input-output, isolated voltage 500VDC	1000			MΩ
Isolation capacitance	Input-output, 100kHz/0.1V		20		pF

- 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;
- Suggested dual output module load imbalance: ≤ ± 5%. If it exceeds ± 5%, it cannot be guaranteed that the product performance meets all performance indicators in this datasheet;
- 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, Test circuit parameters according to the recommended circuit for application;
- All indicator testing methods in this datasheet are based on our corporate standards;
- Product specifications are subject to change without prior notice.

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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 $\pm 4\text{kV}$ / Air $\pm 8\text{kV}$		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. (μF)
	1S7A_0303S1.5UP	3.3	3.3	303/30	82	4000
	1S7A_0305S1.5UP	3.3	5	200/20	83	4000
	1S7A_0309S1.5UP	3.3	9	111/11	84	2000
	1S7A_0312S1.5UP	3.3	12	84/8	85	1000
	1S7A_0315S1.5UP	3.3	15	67/6	85	680
	1S7A_0503S1.5UP	5	3.3	303/30	83	4000
	1S7A_0505S1.5UP	5	5	200/20	86	4000
	1S7A_0509S1.5UP	5	9	111/11	86	2000
	1S7A_0512S1.5UP	5	12	84/8	88	1000
	1S7A_0515S1.5UP	5	15	67/6	88	680
	1S7A_0524S1.5UP	5	24	42/4	89	560
	1S7A_1203S1.5UP	12	3.3	303/30	84	4000
	1S7A_1205S1.5UP	12	5	200/20	86	4000
	1S7A_1209S1.5UP	12	9	111/11	87	2000
	1S7A_1212S1.5UP	12	12	84/8	87	1000
	1S7A_1215S1.5UP	12	15	67/6	88	680
	1S7A_1224S1.5UP	12	24	42/4	89	560
	1S7A_1505S1.5UP	15	5	200/20	86	4000
	1S7A_1509S1.5UP	15	9	111/11	87	2000
	1S7A_1512S1.5UP	15	12	84/8	87	1000
	1S7A_1515S1.5UP	15	15	67/6	88	680
	1S7A_2403S1.5UP	24	3.3	303/30	84	4000
	1S7A_2405S1.5UP	24	5	200/20	87	4000
	1S7A_2409S1.5UP	24	9	111/11	88	2000
	1S7A_2412S1.5UP	24	12	84/8	88	1000
	1S7A_2415S1.5UP	24	15	67/6	88	680
	1S7A_2424S1.5UP	24	24	42/4	89	560

Approval	Part number	Input Voltage Nominal (VDC)	Output Voltage (VDC)	Output Current max./min.(mA)	Full Load Efficiency (%)typ.	Capacitive Load max. (μF)
	1S7A_0312D1.5UP	3.3	± 12	$\pm 42/4$	85	560
	1S7A_0503D1.5UP	5	± 3.3	$\pm 152/15$	84	2000
	1S7A_0505D1.5UP	5	± 5	$\pm 100/10$	86	2000
	1S7A_0509D1.5UP	5	± 9	$\pm 56/5$	86	1000
	1S7A_0512D1.5UP	5	± 12	$\pm 42/4$	88	560
	1S7A_0515D1.5UP	5	± 15	$\pm 34/3$	88	220
	1S7A_0524D1.5UP	5	± 24	$\pm 21/3$	88	100
	1S7A_1203D1.5UP	12	± 3.3	$\pm 152/15$	84	2000
	1S7A_1205D1.5UP	12	± 5	$\pm 100/10$	86	2000
	1S7A_1209D1.5UP	12	± 9	$\pm 56/5$	87	1000
	1S7A_1212D1.5UP	12	± 12	$\pm 42/4$	87	560
	1S7A_1215D1.5UP	12	± 15	$\pm 34/3$	88	220
	1S7A_1505D1.5UP	15	± 5	$\pm 100/10$	86	2000
	1S7A_1512D1.5UP	15	± 12	$\pm 42/4$	87	560
	1S7A_1515D1.5UP	15	± 15	$\pm 34/3$	88	220
	1S7A_2405D1.5UP	24	± 5	$\pm 100/10$	87	2000
	1S7A_2409D1.5UP	24	± 9	$\pm 56/5$	88	1000
	1S7A_2412D1.5UP	24	± 12	$\pm 42/4$	88	560
	1S7A_2415D1.5UP	24	± 15	$\pm 34/3$	88	220

Typical characteristics

Temperature derating graph

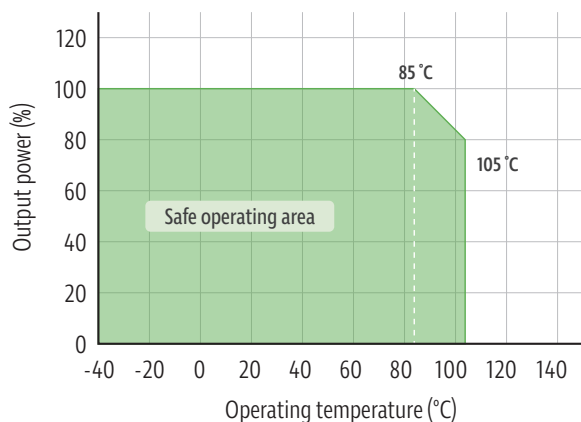


Figure 2

Output regulation curve

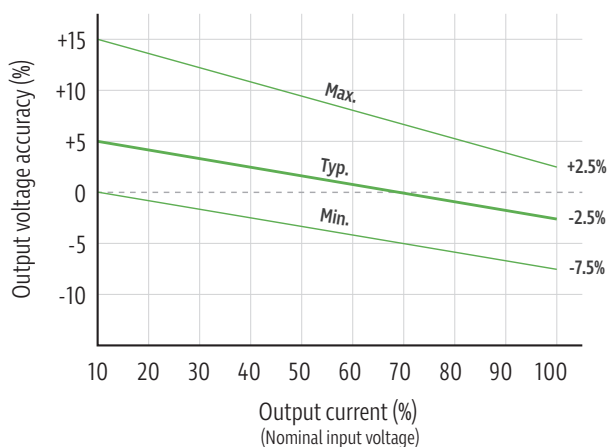


Figure 1-1

Output regulation curve

3.3V output

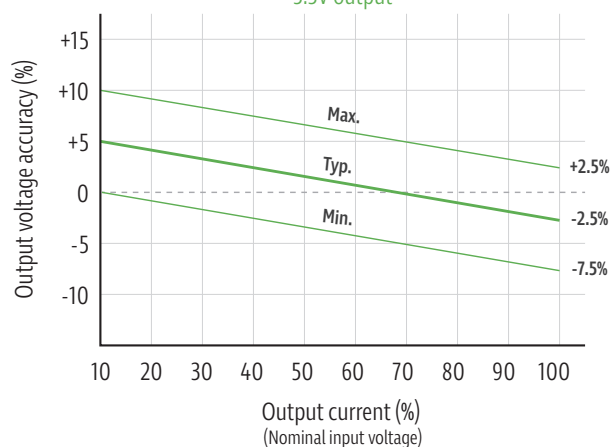
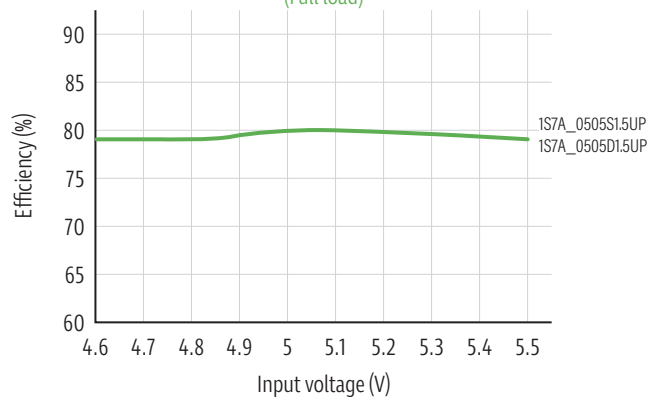


Figure 1-2

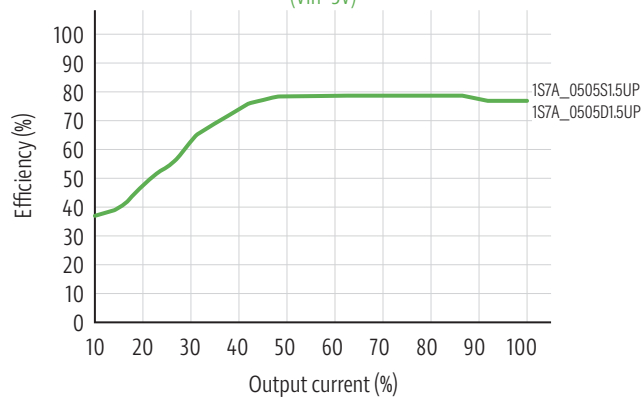
Efficiency vs input voltage

(Full load)



Efficiency vs output load

(Vin=5V)

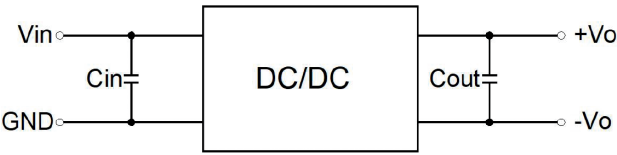


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Typical circuit design and application

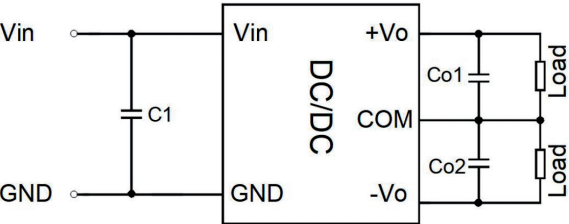
Single



Recommended Capacitive Load Value Table

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

Dual



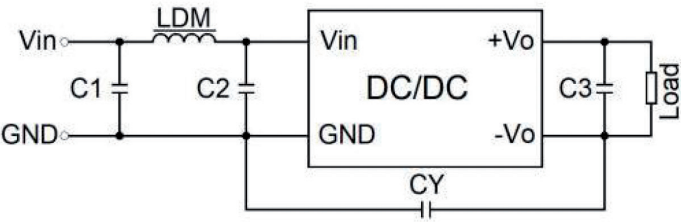
Recommended Capacitive Load Value Table

Vin	Cin	Vo	Co1,Co2
3.3/5VDC	4.7uF/16V	3.3/5VDC	10uF/16V
12VDC	2.2uF/25V	9VDC	4.7uF/16V
15VDC	2.2uF/25V	12VDC	2.2uF/25V
24VDC	1.0uF/50V	15VDC	1.0uF/25V
--	--	24VDC	0.47uF/50V

Figure 3

Recommended EMC circuit diagram

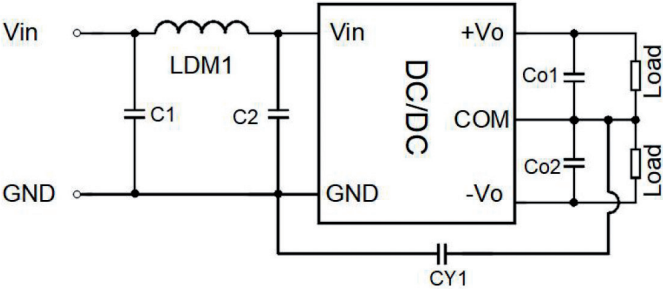
Single



EMI Recommended Parameter Table

EMI	C1, C2	10uF / 50V
EMI	C3	Refer to the Cout parameter in Figure 3
EMI	CY	1000pF / 3kV
EMI	LDM	6.8uH

Dual



EMI Recommended Parameter Table

EMI	C1, C2	4.7uF / 50V
EMI	Co1, Co2	Refer to the parameter in Figure 3
EMI	CY	1000pF / 3kV
EMI	LDM	6.8uH

Figure 4

1. Typical applications

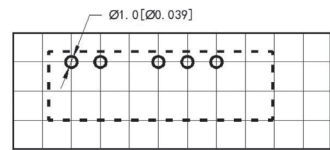
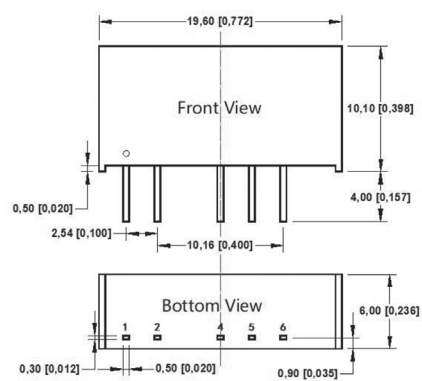
To further reduce input and output ripple, a capacitor filtering network can be connected at the input and output terminals. The application circuit is shown in figure 3. However, care should be taken to select a suitable filter capacitor. If the capacitance is too large, it is likely to cause start-up 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).

Mechanical dimensions



Note: The grid distance is 2.54*2.54 mm

Pin Definition Table		
Pin	Single	Dual
1	Vin	Vin
2	GND	GND
4	-Vo	-Vo
5	No Pin	COM
6	+Vo	+Vo

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