1S7A3_1.5UP series

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

DC-DC Converter 1 Watt

- SIP7 package
- Operating temperature range: -40°C to 105°C
- Isolation voltage: 1500VDC
- Up to 89% efficiency
- International standard pin out
- MTBF: 3,500.000 hours

Introducing our new 1S7A3_1.5UP series. A compact, efficient, and built for reliability, the new 1S7A3_1.5UP series sets a new standard for high-performance power conversion in a space-saving SIP7 package. Designed to operate across a wide temperature range from –40°C to +105°C, it ensures dependable performance even in demanding environments. With an isolation voltage of 1500 VDC and an efficiency of up to 89%, this series delivers exceptional energy performance and safety. Featuring an international standard pinout for easy integration and an impressive MTBF of 3.5 million hours and combines cutting-edge engineering with proven durability for long-term, maintenance-free operation.

Common specifications

Short circuit protection	Continuous, self recovery
Switching frequency	220 kHz (full load, nominal input voltage)
Operation temperature	-40°C ~+105°C derating when operating temperature ≥85°C, (see figure 1)
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**				mA
	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/--	
	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	
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	

Example:
1S7A3_2405S1.5UP
1 = 1Watt; S7 = SIP; A3 = 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 2				
Linear regulation (input voltage variation ±1%)	3.3VDC output Other output		±1.5 ±1.2		%
Load regulation (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	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

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. Suggested dual output module load imbalance: ≤ ± 5%. If it exceeds ± 5%, it cannot be guaranteed that the product performance
4. meets all performance indicators in this manual;
5. The maximum capacitive load is tested within the input voltage range and under full load conditions;
6. Unless otherwise specified, all indicators in this manual 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;
7. All indicator testing methods in this manual are based on our company's corporate standards;
8. Our company can provide product customization, and specific requirements can be directly contacted by our technical personnel;
9. 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 ±4kV / Air ±8kV	perf. criteria B

Product Selection Guide

Approval	Part number	Input Voltage Nominal (Range) (VDC)	Output Voltage (VDC)	Output Current max./min.(mA)	Full Load Efficiency (%) typ.	Capacitive Load max. (µF)
	1S7A3_0303S1.5UP	3.3	3.3	303/30	82	4000
	1S7A3_0305S1.5UP	3.3	5	200/20	83	4000
	1S7A3_0309S1.5UP	3.3	9	111/11	84	2000
	1S7A3_0312S1.5UP	3.3	12	84/8	85	1000
	1S7A3_0315S1.5UP	3.3	15	67/6	85	680
	1S7A3_0503S1.5UP	5	3.3	303/30	83	4000
	1S7A3_0505S1.5UP	5	5	200/20	86	4000
	1S7A3_0509S1.5UP	5	9	111/11	86	2000
	1S7A3_0512S1.5UP	5	12	84/8	88	1000
	1S7A3_0515S1.5UP	5	15	67/6	88	680
	1S7A3_0524S1.5UP	5	24	42/4	89	560
	1S7A3_1203S1.5UP	12	3.3	303/30	84	4000
	1S7A3_1205S1.5UP	12	5	200/20	86	4000
	1S7A3_1209S1.5UP	12	9	111/11	87	2000
	1S7A3_1212S1.5UP	12	12	84/8	87	1000
	1S7A3_1215S1.5UP	12	15	67/6	88	680
	1S7A3_1224S1.5UP	12	24	42/4	89	560
	1S7A3_1505S1.5UP	15	5	200/20	86	4000
	1S7A3_1509S1.5UP	15	9	111/11	87	2000
	1S7A3_1512S1.5UP	15	12	84/8	87	1000
	1S7A3_1515S1.5UP	15	15	67/6	88	680
	1S7A3_2403S1.5UP	24	3.3	303/30	84	4000
	1S7A3_2405S1.5UP	24	5	200/20	87	4000
	1S7A3_2409S1.5UP	24	9	111/11	88	2000
	1S7A3_2412S1.5UP	24	12	84/8	88	1000
	1S7A3_2415S1.5UP	24	15	67/6	88	680
	1S7A3_2424S1.5UP	24	24	42/4	89	560

Approval	Part number	Input Voltage Nominal (Range) (VDC)	Output Voltage (VDC)	Output Current max./min.(mA)	Full Load Efficiency (%) typ.	Capacitive Load max. (µF)
	1S7A3_0312D1.5UP	3.3	±12	±42/4	85	560
	1S7A3_0503D1.5UP	5	±3.3	±152/15	84	2000
	1S7A3_0505D1.5UP	5	±5	±100/10	86	2000
	1S7A3_0509D1.5UP	5	±9	±56/5	86	1000
	1S7A3_0512D1.5UP	5	±12	±42/4	88	560
	1S7A3_0515D1.5UP	5	±15	±34/3	88	220
	1S7A3_0524D1.5UP	5	±24	±21/3	88	100
	1S7A3_1203D1.5UP	12	±3.3	±152/15	84	2000
	1S7A3_1205D1.5UP	12	±5	±100/10	86	2000
	1S7A3_1209D1.5UP	12	±9	±56/5	87	1000
	1S7A3_1212D1.5UP	12	±12	±42/4	87	560
	1S7A3_1215D1.5UP	12	±15	±34/3	88	220
	1S7A3_1505D1.5UP	15	±5	±100/10	86	2000
	1S7A3_1512D1.5UP	15	±12	±42/4	87	560
	1S7A3_1515D1.5UP	15	±15	±34/3	88	220
	1S7A3_2405D1.5UP	24	±5	±100/10	87	2000
	1S7A3_2409D1.5UP	24	±9	±56/5	88	1000
	1S7A3_2412D1.5UP	24	±12	±42/4	88	560
	1S7A3_2415D1.5UP	24	±15	±34/3	88	220

Typical characteristics

Temperature derating graph

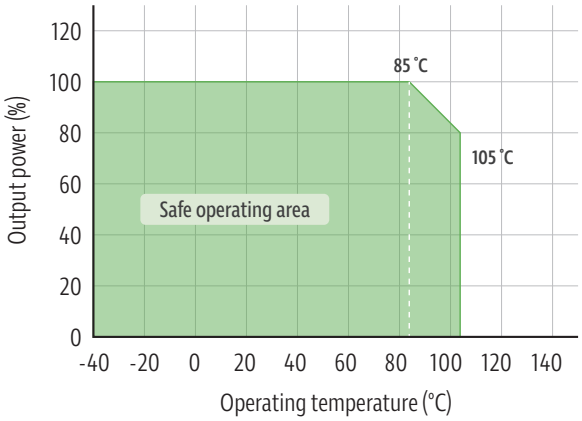


Figure 1

Output regulation curve

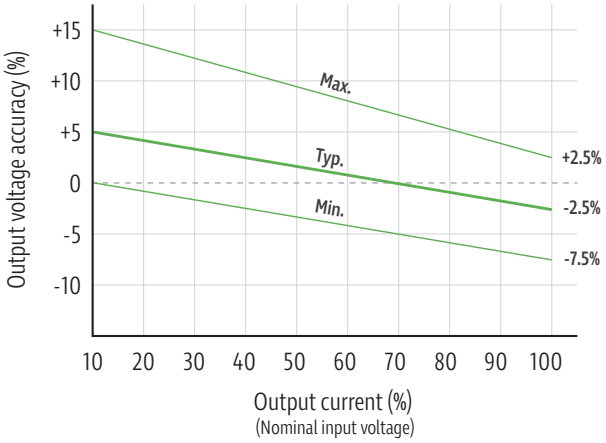


Figure 1-1

Output regulation curve

3.3V output

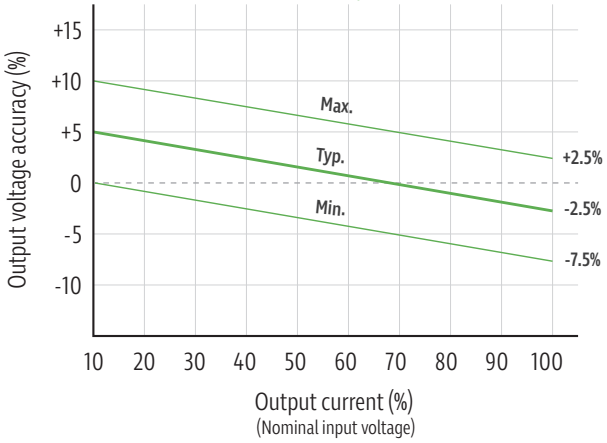
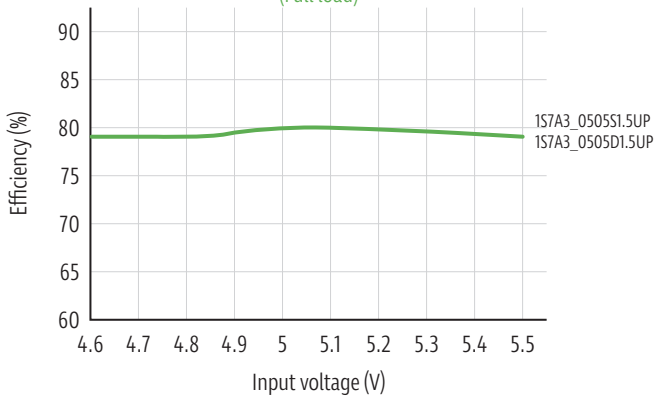


Figure 1-2

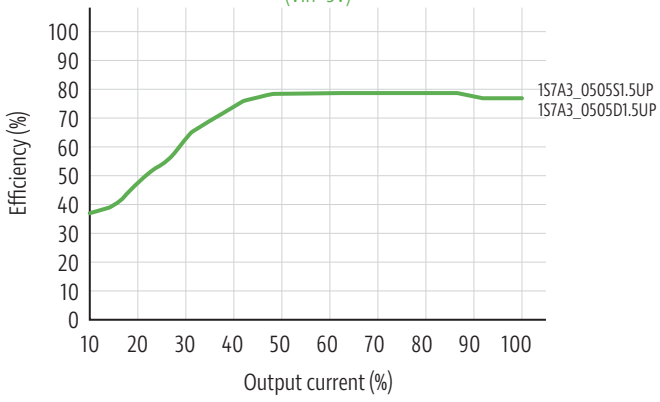
Efficiency vs input voltage

(Full load)



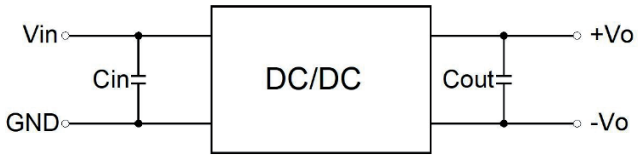
Efficiency vs output load

(Vin=5V)



Typical circuit design and application

Single



Recommended Capacitive Load Value Table

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

Single

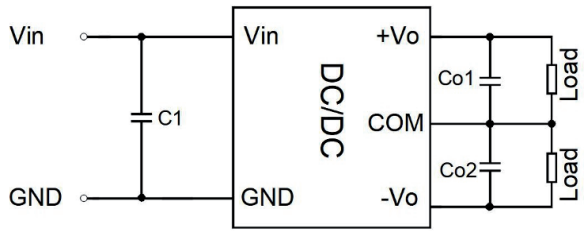


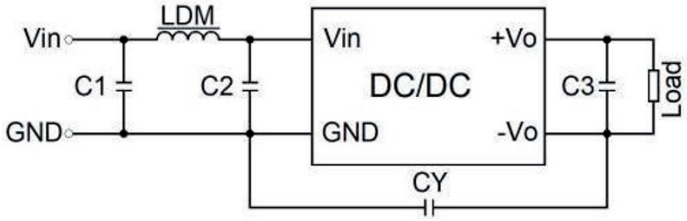
Figure 3

Recommended Capacitive Load Value Table

Vin	Cin	Vo	Co1, Co2
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

Recommended EMC circuit diagram

Dual



EMI Recommended Parameter Table

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

Dual

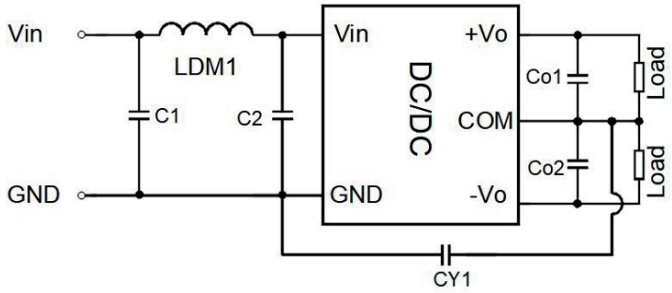


Figure 4

EMI Recommended Parameter Table

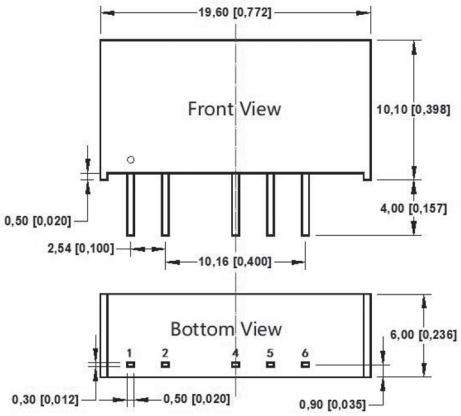
EMI	C1, C2	4.7μF / 50V
EMI	Co1, Co2	Refer to the parameter in figure 3
EMI	CY	1000pF / 3kV
EMI	LDM	6.8μH

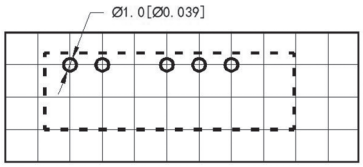
1. Typical applications
To further reduce input and output ripple, a capacitor filtering network can be connected at the input and output terminals.The application circuit is shown in Figure 3.However, care should be taken to select a suitable filter capacitor. If the capacitance is too large, it is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