1S7A2_1.5UP series

1W - Single/Dual Output DC-DC converter - Fixed Input - Isolated & Unregulated

DC-DC Converter 1 Watt

- **Isolated & unregulated output**
- **1 Watt output power**
- **Up to 86% efficiency**
- **Compact SIP7 housing**
- **No external components required**
- **1500VDC isolation**
- **Operating temperature: -40°C up to +105°C**
- **Plastic case meets UL94 V-0 standard**

Introducing our new compact and cost-efficient 1S7A2_1.5UP series, designed for simplicity and reliability! With a 1W unregulated output and an efficiency of up to 86%, this power module delivers dependable performance in a space-saving SIP7 housing. Its robust design includes 1500VDC isolation and an operating temperature range of -40°C to +105°C, ensuring reliable operation in even the most demanding environments. No external components are required, streamlining your design process, while the durable plastic case meets the UL94 V-0 standard, providing flame resistance for enhanced safety. This power module is compact, efficient, and easy to implement.

SHORT CIRCUIT PROTECTED

100% RoHS compliant 6/6

Common specifications

Short circuit protection	Continuous short-circuit protection, self-recovery
Switching frequency	260kHz (typ.)
Operating temperature	-40°C - +105°C (with derating)
Storage temperature	-55°C - +125°C
Shell temperature rise during work	25°C (typ.) within temperature derating curve
Relative humidity	5%~95% (non condensing)
Case material	Black flame-retardant heat-resistant Plastic (UL94 V-0)
Pin withstand solder temperature	300°C (max.) distance to case 1.5mm, 10s
MTBF (MIL-HDBK-217F@25°C)	3,500,000 hrs
Packing dimension	19.5 x 10 x 6 mm
Weight	2.5g (typ.)

Output specifications

Item	Operating condition	Min	Typ	Max	Units
Output power		0.1		1	W
Output voltage accuracy	Nominal input, full load		±2	±5	%
Load regulation (10% ~ 100% nominal load)	3.3VDC output Other output	15 10		20 15	%
Line voltage regulation (input voltage change ±1%)	3.3VDC output Other output			±1.5 ±1.2	%
Ripple & noise* (nominal input, full load, 20MHz bandwidth)	Other output 24VDC output		75 100	100 120	mVp-p
Temperature drift coefficient	100% Full Load			±0.03	%/°C

NOTE: *Ripple & noise tested by twisted-pair method,

Input specifications

Item	Operating condition	Min	Typ	Max	Units
Input overshoot voltage (1 second, max.)	3.3VDC Input 5VDC Input 12VDC Input 15VDC Input 24VDC Input	-0.7 -0.7 -0.7 -0.7 -0.7		7 9 18 21 30	VDC
Input filter	Capacitor filter				

Isolation specifications

Item	Operating conditions	Min	Typ	Max	Units
Isolation voltage	Test 1 minute, leakage current <0.5mA		1500		VDC
Isolation capacitor	Input/output, 100kHz/0.1V		20		pF

Example:
1S7A2_0512S1.5UP
1 = 1Watt; S7 = SIP; A2 = Pinning; 05 = 5Vin; 12 = 12Vout;
S = Single Output; 1.5 = 1.5kVDC isolation; U = Unregulated Output;
P = Short circuit protection

1. This product cannot be used in parallel, and do not support hot-plugging;
2. If the product works below the minimum required load, it cannot guarantee that the product performance meets all performance indicators in this datasheet;
3. All index testing methods in this datasheet are based on our company's corporate standards
4. The product specification may be changed at any time without prior notice.

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Product Selection Guide

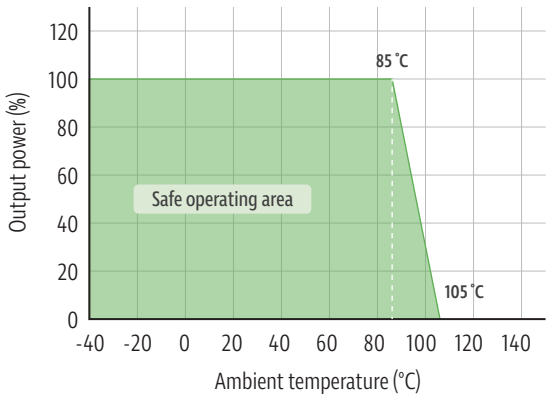
Approval	Part number	Input Voltage Nominal (VDC)	Output Voltage (Vo/Io) (VDC)	Output Current (Vo/Io) Max./ Min (mA)	Input Current(mA) Nominal Voltage Full load (typ.)	Input Current(mA) Nominal Voltage No load (typ.)	Max. Capacitive Load (uF)	Ripple & Noise Max. (mVp-p)	Efficiency (%) full load, nominal input voltage (typ.)
	1S7A2_0303S1.5UP	3.3	3.3	303/30	370	8	2400	75/30	74/78
	1S7A2_0305S1.5UP	3.3	5	200/20	358	8	2400	75/30	79/83
	1S7A2_0312S1.5UP	3.3	12	84/9	340	10	560	75/30	81/85
	1S7A2_0315S1.5UP	3.3	15	67/7	345	20	560	75/30	79/83
	1S7A2_0324S1.5UP	3.3	24	42/4	360	20	220	100/50	79/83
	1S7A2_0503S1.5UP	5	3.3	303/30	250	8	2400	75/30	76/80
	1S7A2_0505S1.5UP	5	5	200/20	225	8	2400	75/30	81/85
	1S7A2_0509S1.5UP	5	9	111/12	227	10	1000	75/30	81/85
	1S7A2_0512S1.5UP	5	12	84/9	220	10	560	75/30	81/85
	1S7A2_0515S1.5UP	5	15	67/7	220	18	560	100/50	81/85
	1S7A2_0524S1.5UP	5	24	42/4	266	18	220	75/30	80/84
	1S7A2_0909S1.5UP	9	9	111/12	128	10	1000	75/30	80/84
	1S7A2_0912S1.5UP	9	12	84/9	120	10	560	75/30	81/85
	1S7A2_0915S1.5UP	9	15	67/7	120	10	560	75/30	81/85
	1S7A2_1203S1.5UP	12	3.3	303/30	98	10	2400	75/30	80/82
	1S7A2_1205S1.5UP	12	5	200/20	96	10	2400	75/30	84/86
	1S7A2_1209S1.5UP	12	9	111/12	92	10	1000	75/30	84/86
	1S7A2_1212S1.5UP	12	12	84/9	90	10	560	75/30	84/86
	1S7A2_1215S1.5UP	12	15	67/7	90	10	560	75/30	84/86
	1S7A2_1224S1.5UP	12	24	42/4	92	10	220	100/50	83/85
	1S7A2_1505S1.5UP	15	5	200/20	78	10	2400	75/30	79/83
	1S7A2_1512S1.5UP	15	12	84/9	76	10	1000	75/30	80/82
	1S7A2_1515S1.5UP	15	15	67/7	76	10	560	75/30	84/86
	1S7A2_2403S1.5UP	24	3.3	303/30	48	8	2400	75/30	79/83
	1S7A2_2405S1.5UP	24	5	200/20	47	8	2400	75/30	80/82
	1S7A2_2409S1.5UP	24	9	111/12	48	8	1000	75/30	84/86
	1S7A2_2412S1.5UP	24	12	84/9	48	8	560	75/30	84/86
	1S7A2_2415S1.5UP	24	15	67/7	48	8	560	75/30	84/86
	1S7A2_2424S1.5UP	24	24	42/4	49	8	220	100/50	84/86

Product Selection Guide

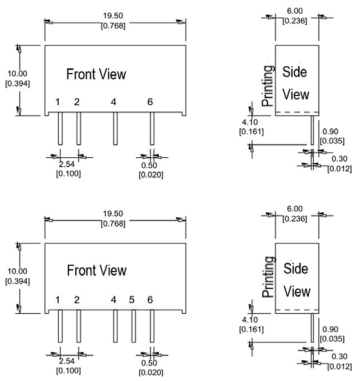
Approval	Part number	Input Voltage Nominal (VDC)	Output Voltage (Vo/Io) (VDC)	Output Current (Vo/Io) Max./ Min (mA)	Input Current(mA) Nominal Voltage Full load (typ.)	Input Current(mA) Nominal Voltage No load (typ.)	Max. Capacitive Load (uF)	Ripple & Noise Max. (mVp-p)	Efficiency (%) full load, nominal input voltage (typ.)
	1S7A2_0503D1.5UP	5	±3.3	±152/±15	250	8	1200	75/30	74/78
	1S7A2_0505D1.5UP	5	±5	±100/±10	225	8	1200	75/30	79/83
	1S7A2_0509D1.5UP	5	±9	±56/±6	227	10	470	75/30	81/85
	1S7A2_0512D1.5UP	5	±12	±42/±5	220	10	220	75/30	81/85
	1S7A2_0515D1.5UP	5	±15	±34/±4	220	18	220	75/30	81/85
	1S7A2_0524D1.5UP	5	±24	±21/±2	266	18	100	100/50	79/83
	1S7A2_1203D1.5UP	12	±3.3	±152/±15	98	10	1200	75/30	79/83
	1S7A2_1205D1.5UP	12	±5	±100/±10	96	10	1200	75/30	80/82
	1S7A2_1209D1.5UP	12	±9	±56/±6	92	10	470	75/30	84/86
	1S7A2_1212D1.5UP	12	±12	±42/±5	90	10	220	75/30	84/86
	1S7A2_1215D1.5UP	12	±15	±34/±4	90	10	220	75/30	84/86
	1S7A2_1224D1.5UP	12	±24	±21/±2	92	10	100	100/50	84/86
	1S7A2_1505D1.5UP	15	±5	±100/±10	78	10	1200	75/30	84/86
	1S7A2_1509D1.5UP	15	±9	±56/±6	76	10	1200	75/30	84/86
	1S7A2_1512D1.5UP	15	±12	±42/±5	76	10	470	75/30	84/86
	1S7A2_1515D1.5UP	15	±15	±34/±4	78	10	220	75/30	79/83
	1S7A2_2405D1.5UP	24	±5	±100/±10	48	8	1200	75/30	79/83
	1S7A2_2409D1.5UP	24	±9	±56/±6	47	8	470	75/30	80/82
	1S7A2_2412D1.5UP	24	±12	±42/±5	48	8	220	75/30	84/86
	1S7A2_2415D1.5UP	24	±15	±34/±4	48	8	220	75/30	84/86
	1S7A2_2424D1.5UP	24	±24	±21/±2	48	8	100	100/50	84/86

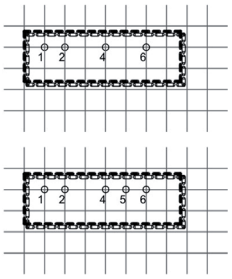
Product characteristic curve

Temperature derating graph



Mechanical dimensions





Printed board vertical view

Lattic spacing: 2.54mm (0. 1inch)

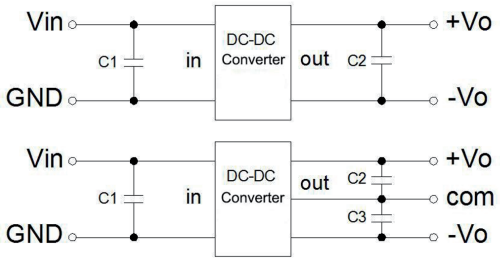
Pin Function	1	2	3	4	5	6
Single (S)	+Vin	GND	--	-Vo	--	+Vo
Dual (D)	+Vin	GND	--	-Vo	COM	+Vo

Note: if the definition of pin is not in accordance with the selection guide, please refer to the label on actual item.

Design and application circuit recommended

1. Output load requirements
a. In order to ensure the converter can work reliably with high efficiency, the minimum load should not less than 10% rated load when it is used. If the needed power is indeed small, please parallel a resistor at the output side, the resistance equal to 10% nominal load.
b. The maximum capacitive load is tested under nominal input full load, and cannot exceed the maximum capacitive load of output terminal under operation, otherwise it will cause it difficult to start up and damage the product.

2. Recommended circuit
In order to ensure the input/output ripple and noise decreased, capacitor filter net could be connected to input and output terminal, application circuit as below photo
1. Choosing suitable filter capacitor is very important, start-up problems may be caused by too large capacitance. To ensure the modules running safely and reliably, the recommended capacitive load values as shown in Table 1. (But for the actual output power of application circuit is less than 0.5W, suggest not to connect external capacitor)



Vin (VDC)	C1 (μF)	Vout (VDC)	C2 (μF)	Vout (VDC)	C2, C3 (μF)
3.3/5	4.7	3.3/5	10	±3.3/±5	4.7
12	2.2	9	4.7	±9	2.2
15	1	12	2.2	±12	1
24	1	15	1	±15	0.47
		24	0.47	±24	0.22

Output regulated voltage and over voltage protection circuit

The simplest device to protect output regulated voltage, over voltage and over current is to cascade a linear regulator with overheat protection at input or output terminal, and connect a capacitor filter net(see below picture), filter capacitive value recommended see table 1, Linear regulator is chosen according to the actual voltage, current needed in working.