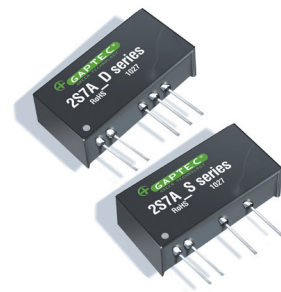


2S7A_1.5UP Series

2W - Dual/Single Output DC-DC Converter - Fixed Input - Isolated & Unregulated



DC-DC Converter 2 Watt

- + High efficiency up to 86%
- + 1.5kVDC Isolation
- + Miniature SIP package
- + High power density
- + Temperature range: -40°C ~ +105°C
- + Short circuit protection (SCP)
- + No external component required
- + Industry standard pinout
- + RoHS Compliance

The 2S7A_1.5UP series are specially designed for applications where a group of polar power supplies are isolated from the input power supply in a distributed power supply system on a circuit board.

These products apply to:

- 1) Where the voltage of the input power supply is stable (voltage variation: $\pm 10\%V_{in}$);
- 2) Where isolation between input and output is necessary (isolation voltage $\leq 1500VDC$);
- 3) Where the output voltage regulation is not strictly required.

Typical application: digit circuit condition; normal low-frequency artificial circuit condition; relay drive circuit and data switching circuit.



Common specifications

Short circuit protection*:	Continuous, automatic recovery 2S7A_24xxS1.5UP/2S7A_24xxD1.5UP 2S7A_0524S1.5UP/2S7A_0524D1.5UP
Temperature rise at full load:	25°C TYP
Cooling:	Free air convection
Operation temperature range: (Power derating above 85°C)	-40°C – +105°C
Storage temperature range:	-55°C – +125°C
Lead temperature	300°C MAX, 1.5mm from case for 10 sec
Storage humidity range:	< 95%
Case material:	Plastic [UL94-V0]
MTBF:	>3,500,000 hours
Weight:	2.4g

* Supply voltage must be discontinued at the end of short circuit duration for 2S7A_24xxS1.5UP / 2S7A_24xxD1.5UP series, and 2S7A_0524S1.5UP / 2S7A_0524D1.5UP models.

Input specifications

Item	Test condition	Min	Typ	Max	Units
Input current (full load / no load)	• 5VDC input		506/35	-/60	mA
	• 9VDC input		268/25	-/50	mA
	• 12VDC input		208/20	-/50	mA
	• 15VDC input		167/15	-/35	mA
	• 24VDC input		104/10	-/30	mA
Reflected ripple current			15		mA
Input surge voltage (1 sec. max.)	• 5VDC input	-0.7		9	VDC
	• 9VDC input	-0.7		12	VDC
	• 12VDC input	-0.7		18	VDC
	• 15VDC input	-0.7		21	VDC
	• 24VDC input	-0.7		30	VDC
Input filter	Capacitance filter				
Hot plug	Unavailable				

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Input-Output, tested for 1 minute and leakage current less than 1 mA	1500			VDC
Isolation resistance	Input/Output, test at 500VDC	1000			MΩ
Isolation capacitance	Input/Output, 100KHz/0.1V		20		pF

Output specifications

Item	Test condition	Min	Typ	Max	Units
Output voltage accuracy	See tolerance envelope graph				
Line regulation	For V_{in} change of 1%				
	• 3.3V output • others			± 1.5 ± 1.2	% %
Load regulation	10% to 100% load				
	• 3.3V output		18		%
	• 5V output		12		%
	• 9V output		9		%
	• 12V output		8		%
	• 15V output • 24V output		7 6		% %
Temperature drift	100% full load			± 0.03	%/°C
Ripple & Noise*	20MHz Bandwidth		75	200	mVp-p
Switching frequency	Full load, nominal input		100		KHz

* Ripple and noise are measured by "parallel cable" method, please see DC-DC Converter Application Notes for specific operation.

EMC specifications

EMI	CE	CISPR22/EN55022 CLASS B (External Circuit Refer to EMC recommended circuit)
EMI	RE	CISPR22/EN55022 CLASS B (External Circuit Refer to EMC recommended circuit)
EMS	ESD	• 2S7A_S1.5: IEC/EN61000-4-2 perf. Criteria B Contact $\pm 8KV$
		• 2S7A_D1.5: IEC/EN61000-4-2 perf. Criteria B Contact $\pm 6KV$

Example:

2S7A_0505D1.5UP

2 = 2Watt; S7 = SIP7; A = Pinning; 5Vin; 5Vout; D = Dual Output;

1.5 = 1.5kVDC; U = Unregulated Output; P = Short circuit protection

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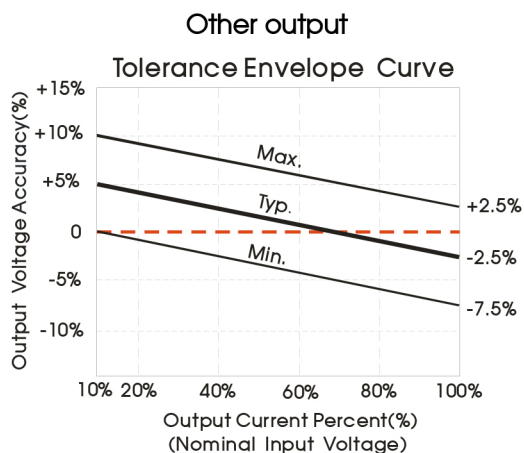
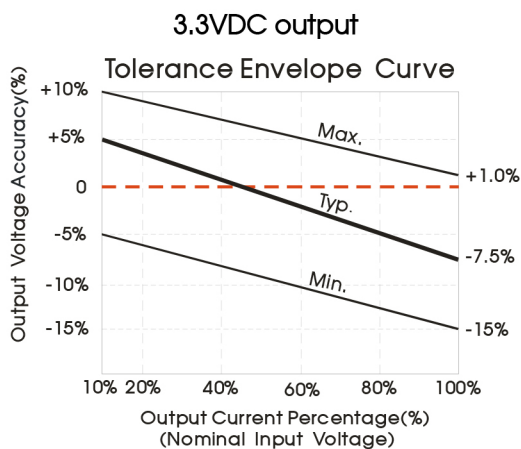
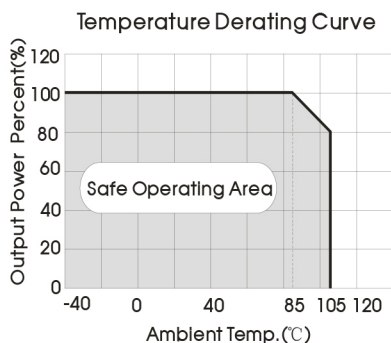
Part Number	Input Voltage [VDC]	Output Voltage [VDC]	Output current [mA]		Capacitive load* [μ F, Max.]	Efficiency [%, Typ.]
			Max	Min		
2S7A_0503S1.5UP	5	3.3	400	40	220	79
2S7A_0505S1.5UP	5	5	400	40	220	84
2S7A_0509S1.5UP	5	9	222	22	220	79
2S7A_0512S1.5UP	5	12	167	17	220	84
2S7A_0515S1.5UP	5	15	133	13	220	84
2S7A_0524S1.5UP	5	24	83	8	220	84
2S7A_0905S1.5UP	9	5	400	40	220	79
2S7A_0912S1.5UP	9	12	167	17	220	83
2S7A_1203S1.5UP	12	3.3	400	40	220	79
2S7A_1205S1.5UP	12	5	400	40	220	82
2S7A_1209S1.5UP	12	9	222	22	220	81
2S7A_1212S1.5UP	12	12	167	17	220	84
2S7A_1215S1.5UP	12	15	133	13	220	85
2S7A_1224S1.5UP	12	24	83	8	220	86
2S7A_1505S1.5UP	15	5	400	40	220	80
2S7A_1515S1.5UP	15	15	133	13	220	85
2S7A_2403S1.5UP	24	3.3	400	40	220	79
2S7A_2405S1.5UP	24	5	400	40	220	80
2S7A_2409S1.5UP	24	9	222	22	220	86
2S7A_2412S1.5UP	24	12	167	17	220	84
2S7A_2415S1.5UP	24	15	133	13	220	86
2S7A_2424S1.5UP	24	24	83	8	220	86
2S7A_0503D1.5UP	5	\pm 3.3	\pm 303	\pm 30	100	80
2S7A_0505D1.5UP	5	\pm 5	\pm 200	\pm 20	100	80
2S7A_0509D1.5UP	5	\pm 9	\pm 111	\pm 11	100	84
2S7A_0512D1.5UP	5	\pm 12	\pm 83	\pm 8	100	84
2S7A_0515D1.5UP	5	\pm 15	\pm 67	\pm 7	100	82
2S7A_0524D1.5UP	5	\pm 24	\pm 42	\pm 4	100	84
2S7A_1205D1.5UP	12	\pm 5	\pm 200	\pm 20	100	80
2S7A_1209D1.5UP	12	\pm 9	\pm 111	\pm 11	100	84
2S7A_1212D1.5UP	12	\pm 12	\pm 83	\pm 8	100	84
2S7A_1215D1.5UP	12	\pm 15	\pm 67	\pm 7	100	84
2S7A_1224D1.5UP	12	\pm 24	\pm 42	\pm 4	100	84
2S7A_1505D1.5UP	15	\pm 5	\pm 200	\pm 20	100	80
2S7A_1515D1.5UP	15	\pm 15	\pm 67	\pm 7	100	84
2S7A_2403D1.5UP	24	\pm 3.3	\pm 200	\pm 20	100	80
2S7A_2405D1.5UP	24	\pm 5	\pm 200	\pm 20	100	80
2S7A_1209D1.5UP	24	\pm 9	\pm 111	\pm 11	100	86
2S7A_2412D1.5UP	24	\pm 12	\pm 83	\pm 8	100	84
2S7A_2415D1.5UP	24	\pm 15	\pm 67	\pm 7	100	84
2S7A_2424D1.5UP	24	\pm 24	\pm 42	\pm 4	100	84

* For each output

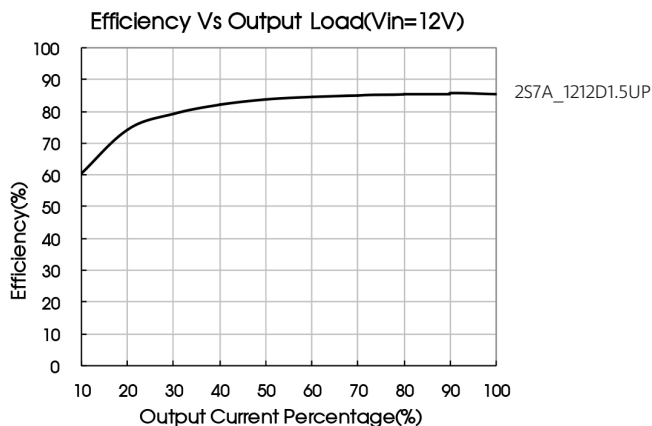
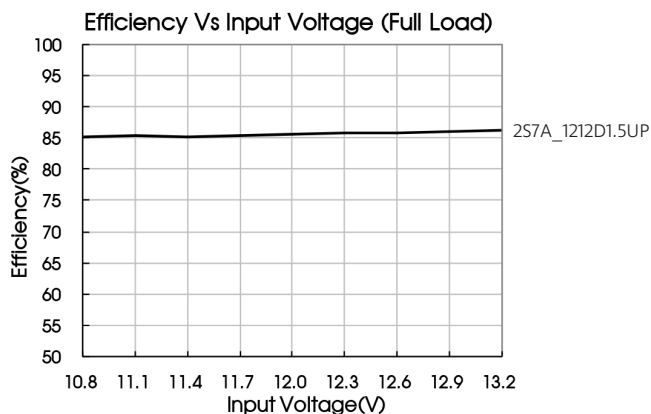
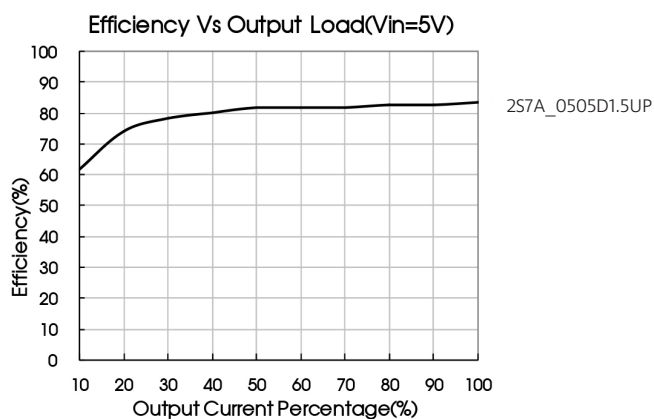
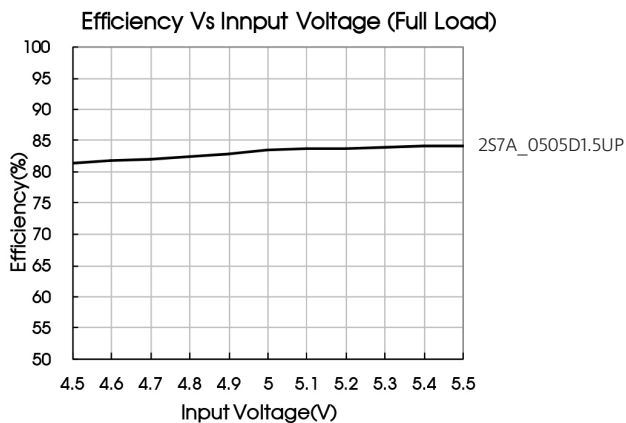
2S7A_1.5UP Series

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Typical characteristics



Efficiency



2S7A_1.5UP Series

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Typical application circuit

If it is required to further reduce input and output ripple, a filter capacitor may be connected to the input and output terminals, see Fig.3.

Moreover, choosing a suitable filter capacitor is very important, start-up problems may be caused if the capacitance is too large. Under the condition of safe and reliable operation, the recommended capacitive load values are shown in Table 1.

Dual Output



Single Output



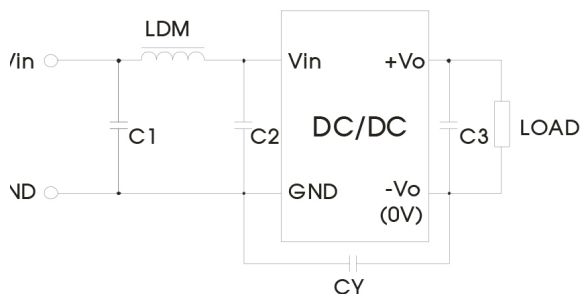
Vin (VDC)	Cin (μF)	Single Vout (VDC)	Cout (μF)	Dual Vout (VDC)	Cout* (μF)
5	4.7	3.3/5	10	±3.3/±5	4.7
9/12	2.2	9/12	2.2	±9/±12	1
15	2.2	15/24	1	±15/±24	0.47
24	1	-	-	-	-

* For each output. It's not recommended to connect any external capacitor in the application field with less than 0.5 watt output.

Table 1

Figure 1

EMC recommended circuit



Input voltage (VDC)		5/9/12/15	24
EMI	C1/C2	4.7μF /50V	
	CY	-	1nF/2KV
	C3	Refer to the Cout in Fig.1	
	LDM	6.8μH	

Note: 1. 24V input series is subject to CY (CY : 1nF/2KV).
2. It is not needed to add the component in the peripheral circuit when

Output load requirements

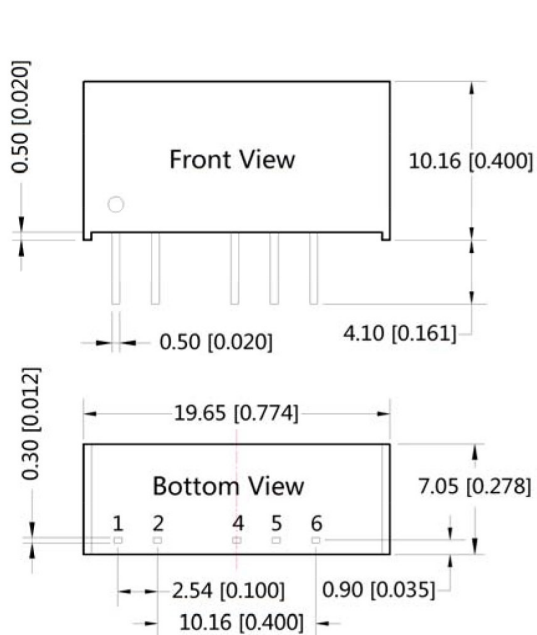
When using, the minimum load of the module output should not be less than 10% of the nominal load. In order to meet the performance parameters of this datasheet, please connect a 10% dummy load in parallel at the output end, the dummy load is generally a resistor. Please note that the resistor needs to be used in derating.

2S7A_1.5UP Series

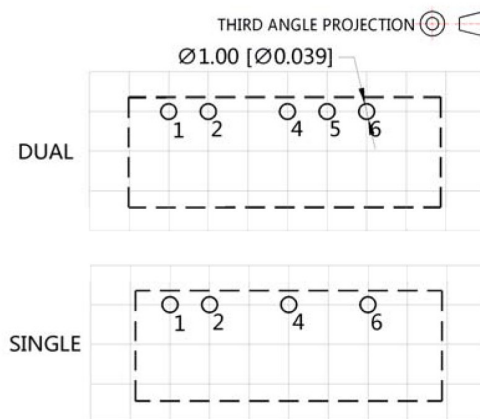
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Mechanical dimensions

Recommended footprint



Note:
 Unit: mm[inch]
 Pin section tolerances: $\pm 0.10\text{mm}$ [$\pm 0.004\text{inch}$]
 General tolerances: $\pm 0.25\text{mm}$ [$\pm 0.010\text{inch}$]



Note : Grid 2.54*2.54mm

Pin-Out		
Pin	Single	Dual
1	Vin	Vin
2	GND	GND
4	0V	-Vo
5	No Pin	0V
6	+Vo	+Vo

Note:

1. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
2. The maximum capacitive load offered were tested at nominal input voltage and full load;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of $T_a=25^\circ\text{C}$, humidity < 75% with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on our Company's corporate standards;
5. The performance parameters of the product models listed in this manual are as above, but some parameters of non-standard model products may exceed the requirements mentioned above. Please contact our technicians directly for specific information;
6. We can provide product customization service;
7. Specifications are subject to change without prior notice.