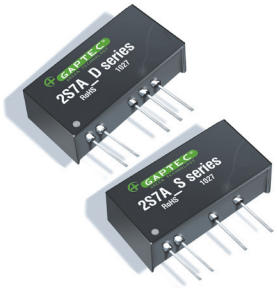
GAPTEC®
GREEN TECHNOLOGY

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

SHORT CIRCUIT PROTECTED

100% RoHS compliant 6/6

c UL us
UL-60950-1 (E347551)

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: ±10%Vin);
2) Where isolation between input and output is necessary (isolation voltage ≤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 • 9VDC input • 12VDC input • 15VDC input • 24VDC input		506/35 268/25 208/20 167/15 104/10	-/60 -/50 -/50 -/35 -/30	mA mA mA mA mA
Reflected ripple current			15		mA
Input surge voltage (1 sec. max.)	• 5VDC input • 9VDC input • 12VDC input • 15VDC input • 24VDC input	-0.7 -0.7 -0.7 -0.7 -0.7		9 12 18 21 30	VDC VDC VDC VDC 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 Vin change of 1% • 3.3V output • others			±1.5 ±1.2	% %
Load regulation	10% to 100% load • 3.3V output • 5V output • 9V output • 12V ouput • 15V output • 24V output		18 12 9 8 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 • 2S7A_D1.5: IEC/EN61000-4-2 perf. Criteria B	Contact ±8KV Contact ±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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2S7A_1.5UP Series

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

Part Number	Input Voltage [VDC]	Output Voltage [VDC]	Output current [mA] Max	Output current [mA] Min	Capacitive load* [µF, Max.]	Efficiency [%, Typ.]
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	±3.3	±303	±30	100	80
2S7A_0505D1.5UP	5	±5	±200	±20	100	80
2S7A_0509D1.5UP	5	±9	±111	±11	100	84
2S7A_0512D1.5UP	5	±12	±83	±8	100	84
2S7A_0515D1.5UP	5	±15	±67	±7	100	82
2S7A_0524D1.5UP	5	±24	±42	±4	100	84
2S7A_1205D1.5UP	12	±5	±200	±20	100	80
2S7A_1209D1.5UP	12	±9	±111	±11	100	84
2S7A_1212D1.5UP	12	±12	±83	±8	100	84
2S7A_1215D1.5UP	12	±15	±67	±7	100	84
2S7A_1224D1.5UP	12	±24	±42	±4	100	84
2S7A_1505D1.5UP	15	±5	±200	±20	100	80
2S7A_1515D1.5UP	15	±15	±67	±7	100	84
2S7A_2403D1.5UP	24	±3.3	±200	±20	100	80
2S7A_2405D1.5UP	24	±5	±200	±20	100	80
2S7A_1209D1.5UP	24	±9	±111	±11	100	86
2S7A_2412D1.5UP	24	±12	±83	±8	100	84
2S7A_2415D1.5UP	24	±15	±67	±7	100	84
2S7A_2424D1.5UP	24	±24	±42	±4	100	84

* For each output

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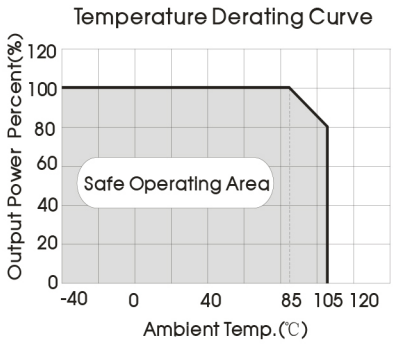
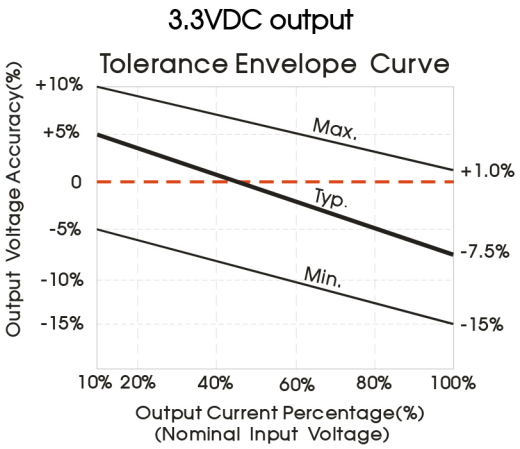
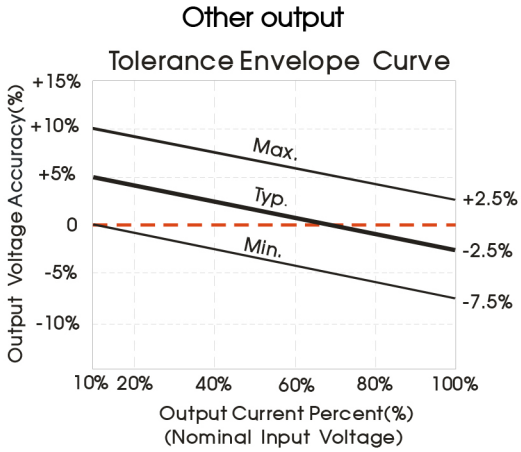
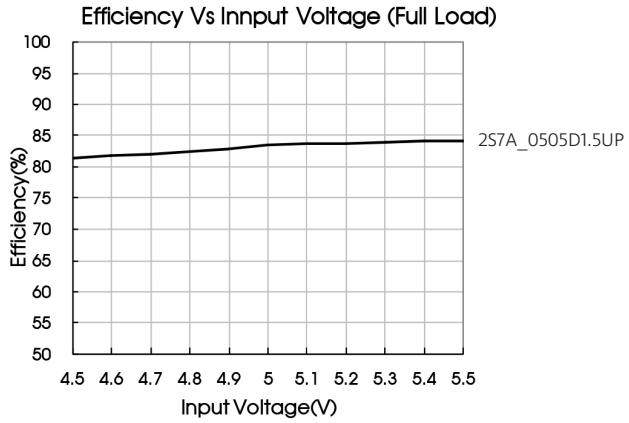
Typical characteristics

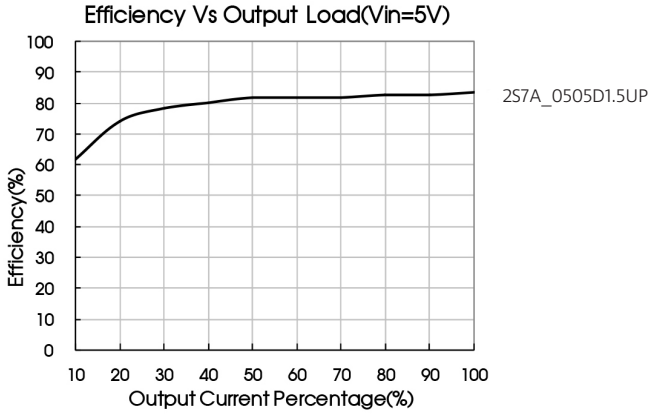


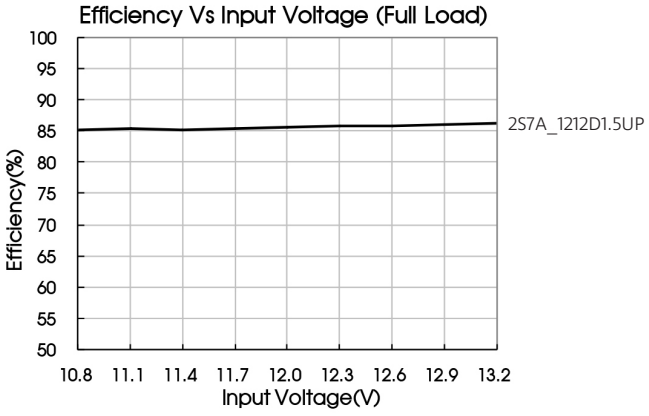


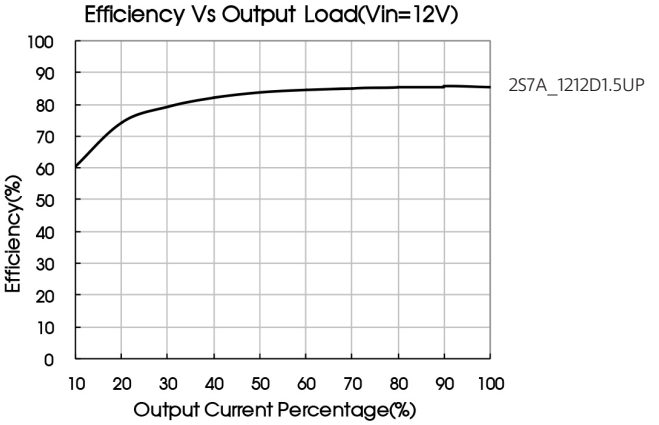


Efficiency









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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.

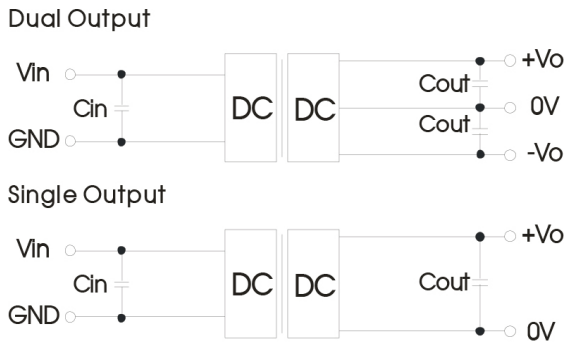


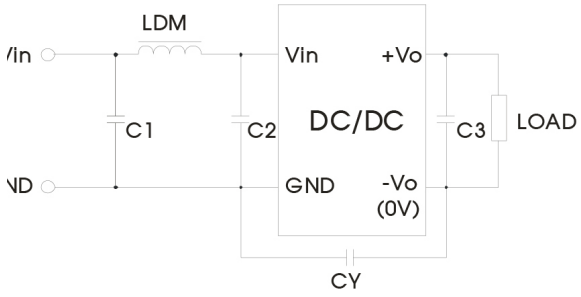
Figure 1

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

EMC recommended circuit

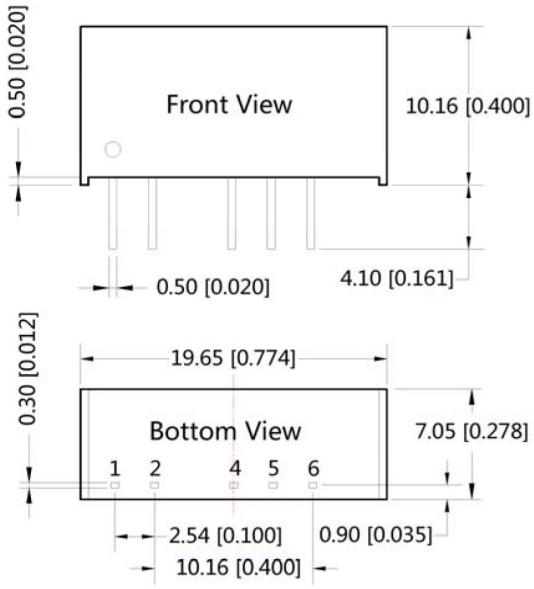


Input voltage (VDC)		5/9/12/15	24
EMI	C1/C2	4.7µF /50V	
	CY	–	1nF/2KV
	C3	Refer to the Cout in Fig.1	
	LDM	6.8µH	

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

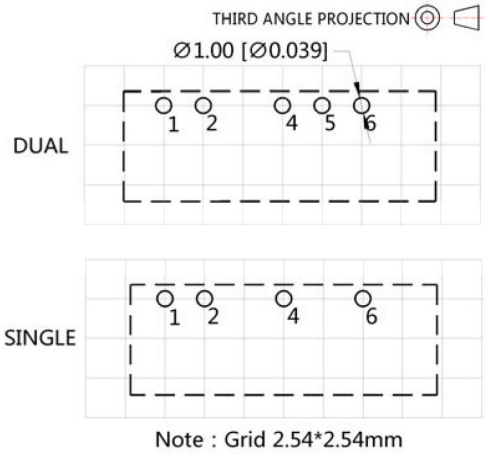
Output load requirements
When using, the minimum load of the module output should not be less than 10% of the nominal load. In order to meet the performance parameters of this datasheet, please connect a 10% dummy load in parallel at the output end, the dummy load is generally a resistor. Please note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

Mechanical dimensions



Note:
Unit: mm[inch]
Pin section tolerances: ± 0.10mm[± 0.004inch]
General tolerances: ± 0.25mm[± 0.010inch]

Recommended footprint



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 Ta=25°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.

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