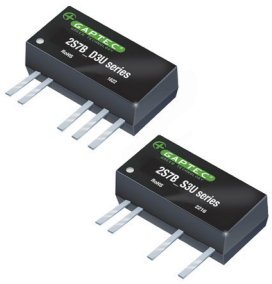
GAPTEC®
GREEN TECHNOLOGY

2S7B_3UP Series

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



DC-DC Converter 2 Watt

- High Efficiency up to 89%
- 3000VDC Isolation
- SIP Package
- Internal SMD construction
- No Heat sink Required
- High power density
- Temperature Range: -40°C to +105°C
- No external component required
- Industry Standard Pinout
- RoHS Compliance

UL-60950-1 (E347551)

The 2S7B_3UP 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%);
2) Where isolation is necessary between input and output (isolation voltage ≤ 3000VDC);
3) Where the output voltage regulation and the ripple & noise of the output voltage is not strictly required.

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

Common specifications

Short circuit protection*:	2S7B_0524S3U/2S7B_0524D3U/ 2S7B_24xxS3U/2S7B_24xxD3U: 1s Others: Continuous, automatic recovery
Temperature rise at full load:	25°C MAX, 15°C TYP
Cooling:	Free air convection
Operation temperature range:	-40°C – +105°C
Storage temperature range:	-55°C – +125°C
Pin welding resistance 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 2S7B_0524S3U/2S7B_0524D3U/2S7B_24xxS3U/2S7B_24xxD3U models.

Input specifications

Item	Test condition	Min	Typ	Max	Units
Input current (full load / no load)	• 5VDC input • 12VDC input • 15VDC input • 24VDC input		506/35 208/20 159/15 104/10	-/60 -/50 -/35 -/30	mA mA mA mA
Reflected ripple current			15		mA
Input surge voltage (1sec. max.)	• 5VDC input • 12VDC input • 15VDC input • 24VDC input	-0.7 -0.7 -0.7 -0.7		9 18 21 30	VDC VDC VDC VDC
Input filter	Capacitance				
Hot plug	Unavailable				

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Tested for 1 minute and 1mA max	3000			VDC
Isolation resistance	Test at 500VDC	1000			MΩ
Isolation capacitance	Input/Output, 100KHz/0.1V • 2S7B_2415D3UP, 2S7B_2424S3UP • Others	 50 20			 pF pF

Output specifications

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

*Test ripple and noise by "parallel cable" method. See detailed instructions.

EMC specifications

EMI	CE		CISPR22/EN55022 CLASS B (External Circuit Refer to EMI recommended circuit)
EMI	RE		CISPR22/EN55022 CLASS B (External Circuit Refer to EMI recommended circuit)
EMS	ESD	• 2S7B_S • 2S7B_D	• IEC/EN61000-4-2 Contact ±8KV perf. Criteria B • IEC/EN61000-4-2 Contact ±6KV perf. Criteria B

Example:
2S7B_0505D3UP
2 = 2Watt; S7 = SIP7; B= Pinning; 5Vin; 5Vout; D =Dual Output;
3 = 3kVDC; U = Unregulated Output; P = Short circuit protection

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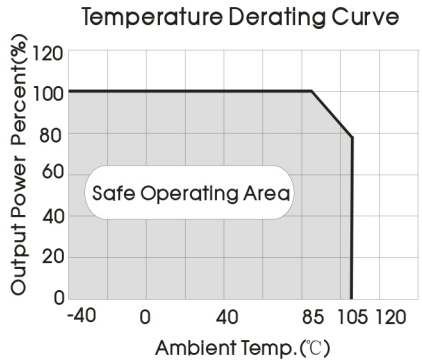
Specifications subject to change without notice.

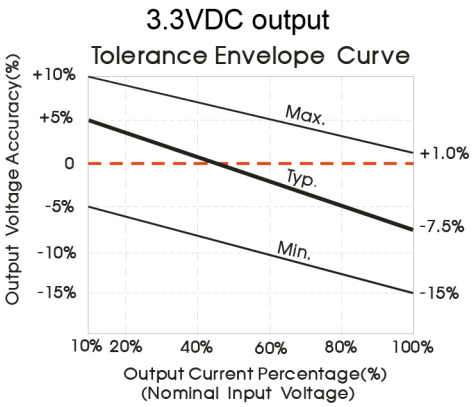
2S7B_3UP Series

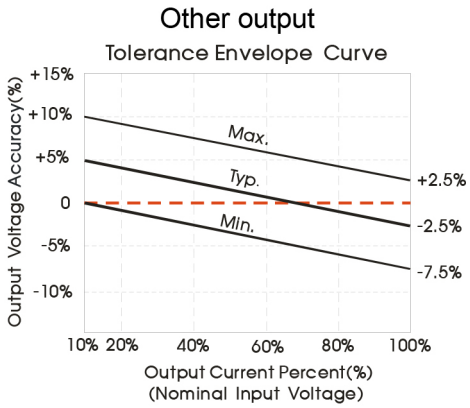
2W - Single/Dual Output DC-DC Converter - Fixed Input - Isolated & Unregulated

Part Number	Input Voltage [V]	Output Voltage [VDC]	Output Current [mA]	Max. capacitive load [µF]	Efficiency [%, typ]
2S7B_0503S3UP	5	3.3	400	220	79
2S7B_0505S3UP	5	5	400	220	82
2S7B_0509S3UP	5	9	222	220	82
2S7B_0512S3UP	5	12	167	220	82
2S7B_0515S3UP	5	15	133	220	83
2S7B_0524S3U	5	24	83	220	84
2S7B_1205S3UP	12	5	400	220	82
2S7B_1209S3UP	12	9	222	220	81
2S7B_1212S3UP	12	12	167	220	84
2S7B_1215S3UP	12	15	133	220	85
2S7B_1224S3UP	12	24	83	220	86
2S7B_1505S3UP	15	5	400	220	80
2S7B_1509S3UP	15	9	222	220	80
2S7B_1512S3UP	15	12	167	220	81
2S7B_2405S3U	24	5	400	220	80
2S7B_2409S3U	24	9	222	220	86
2S7B_2412S3U	24	12	167	220	84
2S7B_2415S3U	24	15	133	220	86
2S7B_2418S3U	24	18	111	220	86
2S7B_2424S3U	24	24	83	220	86
2S7B_0503D3UP	5	±3.3	±303	100	72
2S7B_0505D3UP	5	±5	±200	100	80
2S7B_0509D3UP	5	±9	±111	100	84
2S7B_0512D3UP	5	±12	±83	100	83
2S7B_0515D3UP	5	±15	±67	100	82
2S7B_0524D3U	5	±24	±42	100	84
2S7B_1203D3UP	12	±3.3	±303	100	75
2S7B_1205D3UP	12	±5	±200	100	80
2S7B_1209D3UP	12	±9	±111	100	84
2S7B_1212D3UP	12	±12	±83	100	84
2S7B_1215D3UP	12	±15	±67	100	84
2S7B_1515D3UP	15	±15	±67	100	84
2S7B_2405D3U	24	±5	±200	100	80
2S7B_2409D3U	24	±9	±2111	100	84
2S7B_2412D3U	24	±12	±83	100	84
2S7B_2415D3U	24	±15	±67	100	84

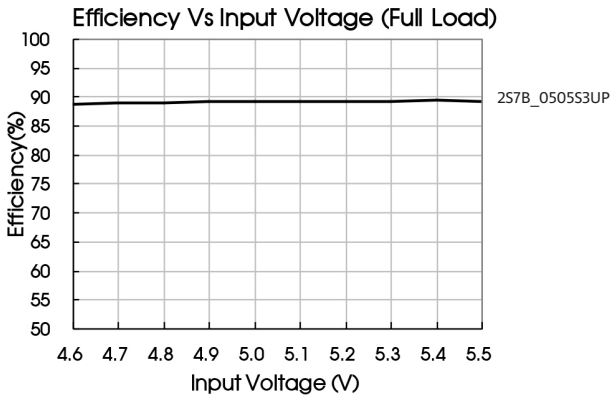
Typical characteristics

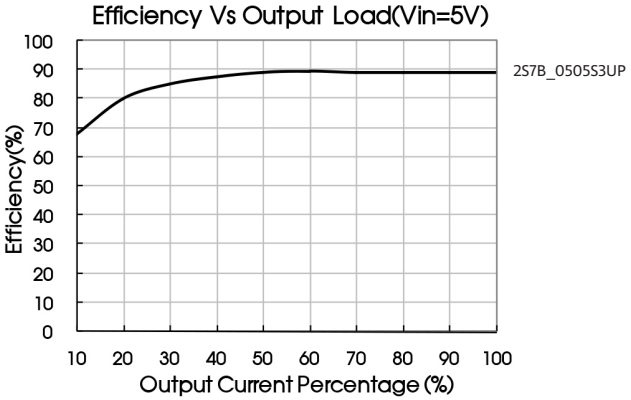


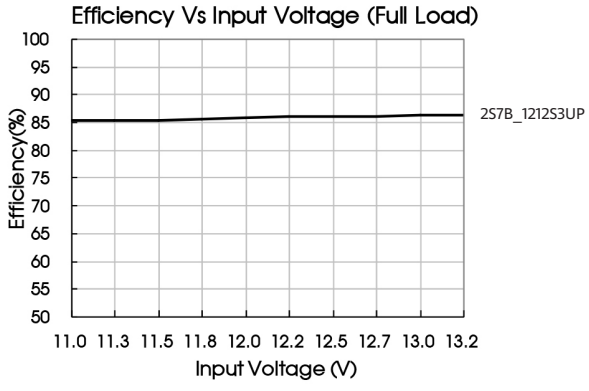


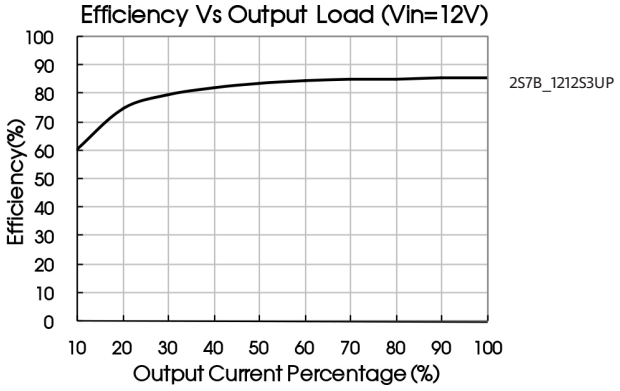


Efficiency curves









Typical application

If it is required to further reduce input and output ripple, a filter capacitor can be connected to the input and output terminals, see Fig.1. Moreover, choosing suitable filter capacitor is very important , start-up problems may be caused by too large capacitance. To ensured the modules running well, the recommended capacitive load values as shown in Table 1.

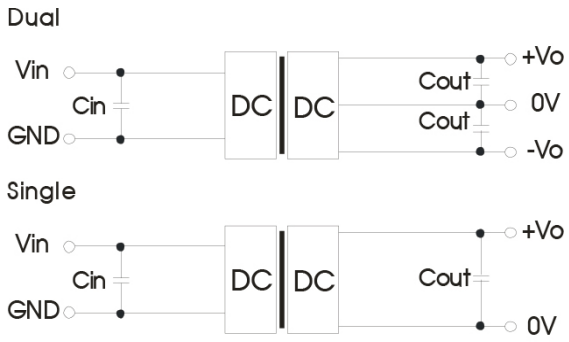


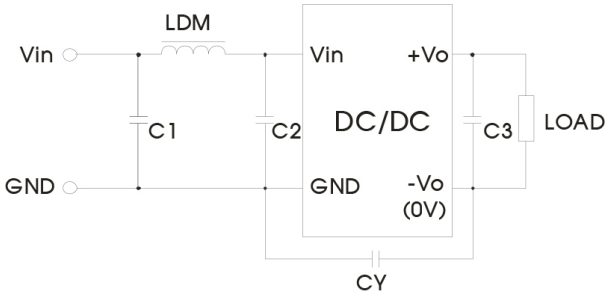
Figure 1

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
12/15	2.2	9/12	2.2	±12	1
24	1	15/18/24	1	±15/±24	0.47

The capacitive loads of positive and negative outputs are the same.

Table 1

EMC typical recommended circuit (Class B)

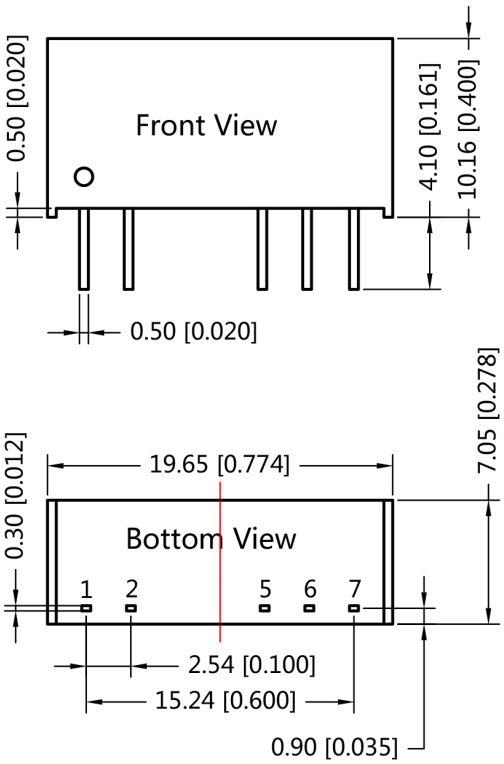


Input voltage (VDC)		5/12/15	24
EMI	C1/C2	4.7µF/50V	
EMI	CY	–	1nF/3KV
EMI	C3	Refer to the Cout in Fig. 1	
EMI	LDM	6.8µH	

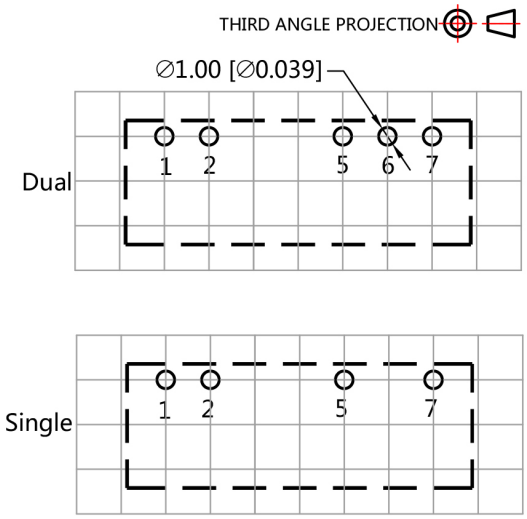
Note:
1. 24V input series, is subject to CY (CY : 1nF/3KV).
2. It is not needed to add the component in the peripheral circuit when parameter with the symbol of „–".

Output load requirements
To ensure the module work efficiently and reliably, during the operation, the min. output load should be no less than 10% of the full load. If the
actual output power is low, please connect a resister to the output terminal in parallel, with a recommenced resistance which is 10% of the rated power, and derating is required during operation.

Mechanical dimensions



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



Note : Grid 2.54*2.54mm

Pin-Out		
Pin	Single	Dual
1	Vin	Vin
2	GND	GND
5	0V	-Vo
6	No Pin	0V
7	+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 , 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.