THIS SERIES IS NOT recommended for new design-ins
and will be discontinued at the end of 2024

Recommended alternative: 2S7B1_6UP series
Please click here for the datasheet.

2S7B_6UP series

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

DC-DC Converter 2 Watt

- Efficiency up to 84%
- 4200VAC/6000VDC isolation
- SIP package
- Reinforced insulation
- The patient leakage current: Max 2µA
- Industry standard pinout
- No external component required
- RoHS compliance
- Short circuit protection (3sec)
- EN60601-1, ANSI/AAMI ES60601-1 approved (1 x MOPP/2 x MOOP)

UL-60601-1 (E486991)

The 2S7B_6U series meet reinforced insulation requirements. It is specially designed for applications which require compact size, high isolation, low isolation capacitor and low leakage current power.

These products apply to:
1) Where the voltage of the input power supply is fixed (voltage variation ≤ ±10%)
2) Where isolation is necessary between input and output (isolation voltage ≤4200VAC or ≤6000VDC)
3) Where do not has high requirement of line regulation and the ripple & noise of the output voltage;

Such as: Medical collection and isolation, High voltage collection circuit, IGBT-driven circuits, etc.

Common specifications

Short circuit protection*:	3 sec. MAX
Temperature rise at full load:	25°C TYP (Ta = 25°C)
Cooling:	Free air convection
Operation temperature range:	-40°C – +85°C
Storage temperature range:	-55°C – +125°C
Lead temperature:	300°C MAX, 1.5mm from case for 10 sec
Storage humidity range:	< 95%
Patient leakage current:	250VAC, 50/60Hz: 2µA MAX
MTBF:	>3,500,000 hours
Transformer Creepage:	5mm
Transformer Clearance:	5mm
PCB Creepage & Clearance:	5.5mm
Case material:	Plastic [UL94-V0]
Weight:	4.2g

* Supply voltage must be discontinued at the end of short circuit duration with less than 3s.

Input specifications

Item	Test condition	Min	Typ	Max	Units
Input current (no-load/full load)	• 5VDC input • 12VDC input • 15VDC input • 24VDC input		35/520 15/217 18/171 10/106	80/- 40/- 40/- 25/-	VDC VDC VDC VDC
Input surge voltage (1sec. max.)	• 5VDC input • 12VDC input • 12VDC input • 24VDC input	-0.7 -0.7 -0.7 -0.7		9 18 21 30	VDC VDC VDC VDC
Input filter	Capacitor filter				

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Tested for 1 minute and 1mA max	4200 6000			VAC VDC
Isolation resistance	Test at 500VDC	1000			MΩ
Isolation capacitance	Input/Output, 100KHz/0.1V		5	8	pF

Output specifications

Item	Test condition	Min	Typ	Max	Units
Output voltage accuracy	See tolerance envelope curve				
Line regulation	For Vin change of ±1%			±1.2	%
Load regulation	10% to 100% load • 5VDC output • Others			 20 15	 % %
Temperature coefficient	100% full load		±0.02		%/°C
Ripple & Noise*	20MHz Bandwidth		100	150	mVp-p
Switching frequency	Full load, nominal input		100		KHz

* Ripple and noise tested with "parallel cable" method, please see DC-DC

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	IEC/EN61000-4-2 perf. Criteria B Contact ±8KV

Example:
2S7B_0505D6UP
2 = 2Watt; S7 = SIP7; B = Pinning; 0505 = 5Vin; 5Vout; D = Dual Output; 6 = 6kVDC; U = Unregulated Output; P = Short cirucit protection

Note:
1. Operation under minimum load will not damage the converter; however, they may not meet all specifications.
2. Max. Capacitive Load is tested at nominal input voltage and full load.
3. Unless otherwise noted, All specifications are measured at Ta = 25°C, humidity <75%, nominal input voltage and rated output load.
4. In this datasheet, all test methods are based on our corporate standards.
5. All characteristics are for listed models, and non-standard models may per form differently.Please contact our technical support for more detail.
6. Please contact our technical support for any specific requirement.
7. Specifications of this product are subject to changes without prior notice.

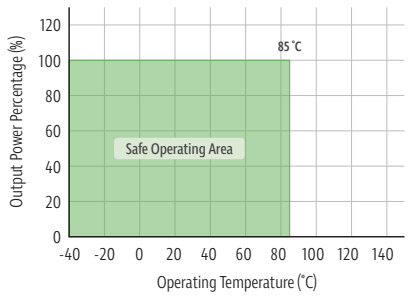
Product Selection Guide

Part Number	Input Voltage [V]	Output Voltage [VDC]	Output current [mA]	Max. capacitive load [µF]	Efficiency [%, typ]
2S7B_0505S6UP	5	5	400	470	78
2S7B_0512S6UP	5	12	167	470	78
2S7B_0515S6UP	5	15	133	470	78
2S7B_1205S6UP	12	5	400	1000	76
2S7B_1212S6UP	12	12	167	470	80
2S7B_1215S6UP	12	15	133	470	81
2S7B_1505S6UP	15	5	400	1000	77
2S7B_1515S6UP	15	15	133	470	82
2S7B_2405S6UP	24	5	400	1000	79
2S7B_2412S6UP	24	12	167	470	82
2S7B_2415S6UP	24	15	133	470	84

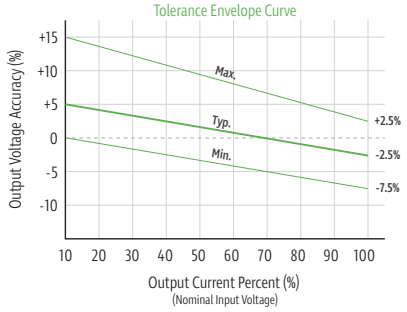
Part Number	Input Voltage [V]	Output Voltage [VDC]	Output current [mA]	Max. capacitive load [µF]	Efficiency [%, typ]
2S7B_0505D6UP	5	±5	±200	470	78
2S7B_0509D6UP	5	±9	±111	470	78
2S7B_0512D6UP	5	±12	±83	220	78
2S7B_0515D6UP	5	±15	±67	220	80
2S7B_1205D6UP	12	±5	±200	470	74
2S7B_1209D6UP	12	±9	±111	470	80
2S7B_1212D6UP	12	±12	±83	220	80
2S7B_1215D6UP	12	±15	±67	220	77
2S7B_1505D6UP	15	±5	±200	470	77
2S7B_1509D6UP	15	±9	±111	470	77
2S7B_1515D6UP	15	±15	±67	220	77
2S7B_2405D6UP	24	±5	±200	470	79
2S7B_2409D6UP	24	±9	±111	470	81
2S7B_2412D6UP	24	±12	±83	220	82
2S7B_2415D6UP	24	±15	±67	220	81

Typical characteristics

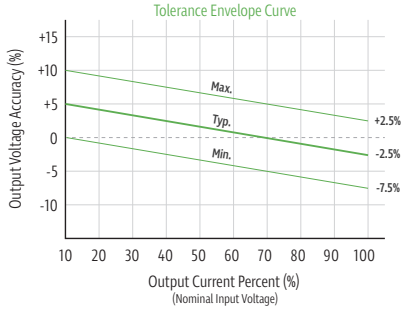
Temperature Derating Curve



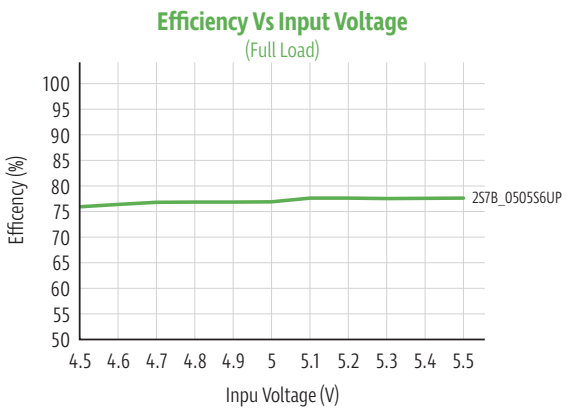
5VDC output
Tolerance Envelope Curve

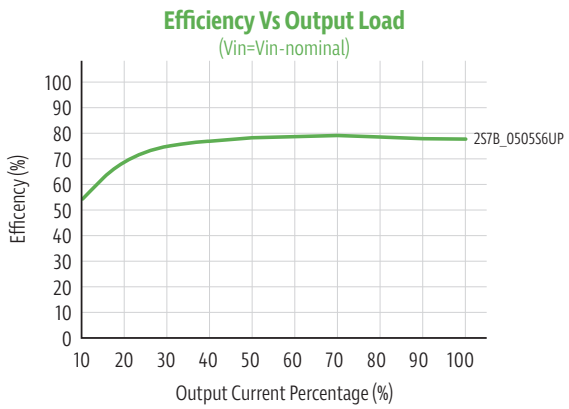


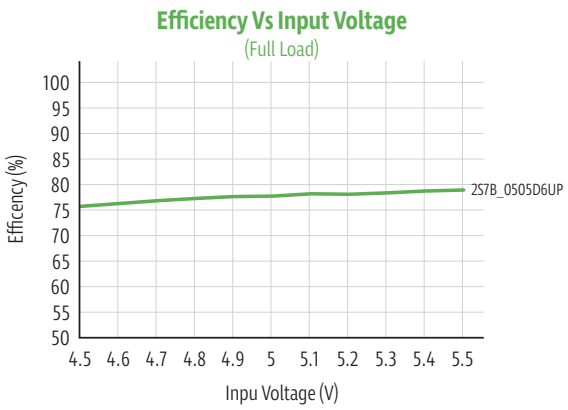
Other output
Tolerance Envelope Curve

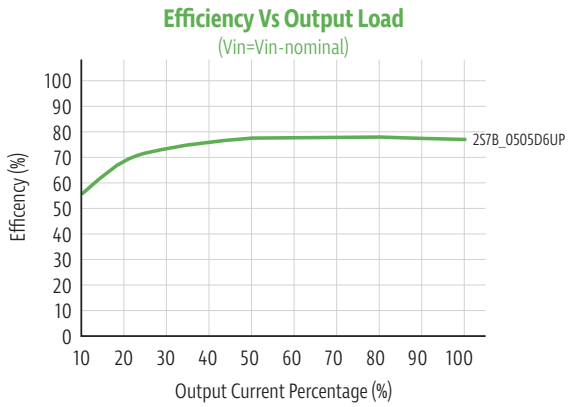


Efficiency curves









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.
The simplest device for output voltage regulation, over-voltage and over-current protection is a linear voltage regulator with overheat protection that is connected to the input or output end in series (see Fig. 2).

Recommended capacitive load value table:

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

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

Table 1

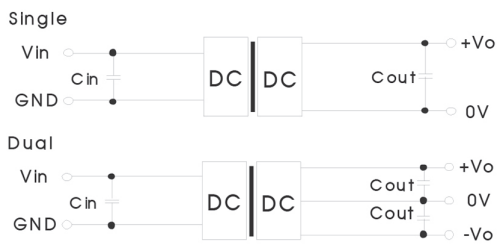


Fig. 1

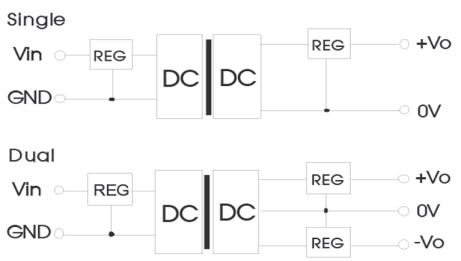
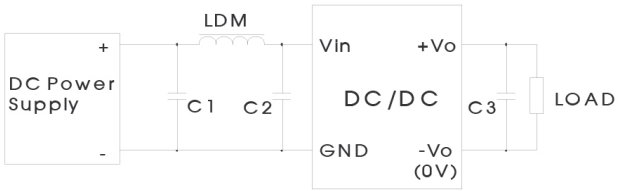


Fig. 2

EMC typical recommended circuit (CLASS B)

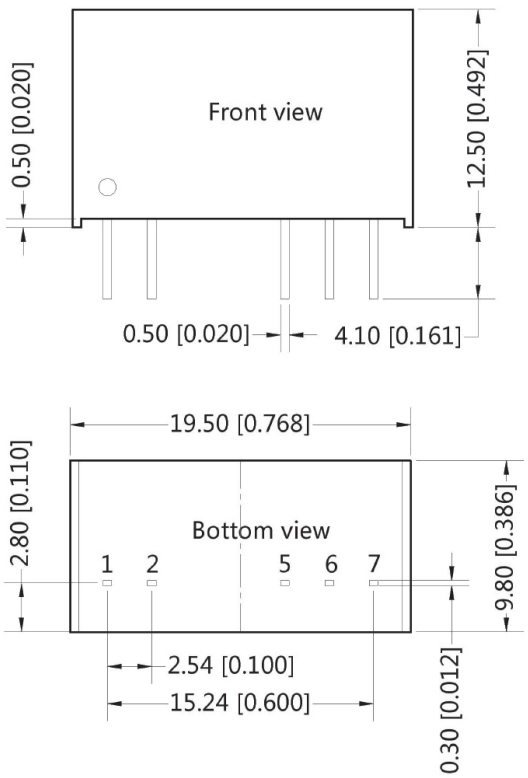


Recommended typical circuit parameters:

Input voltage		5/12	24
EMI	C1, C2	4.7µF /50V	
EMI	C3	Refer to the Cout in Typical application, fig. 1	
EMI	LDM	6.8µH	15µH

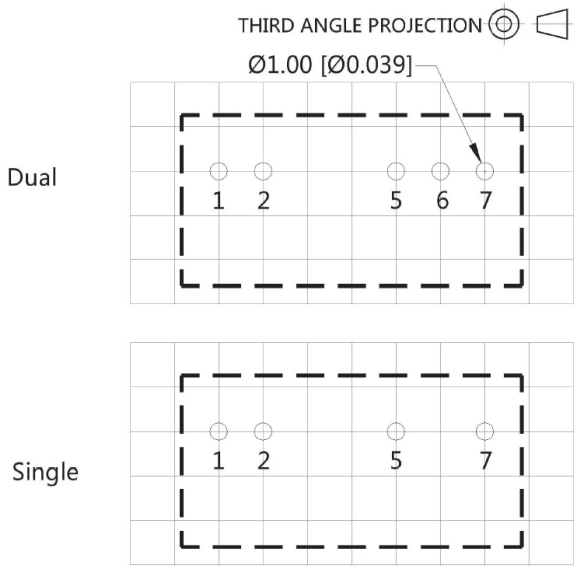
Output load requirements
In order to ensure the converter can work reliably with high efficiency, the minimum load should not less than 10% rated load when it is used. If the needed power is indeed small, please parallel a resistor on the output side (The sum of the efficient power and resistor consumption power is not less than 10%).

Mechanical dimensions



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

Recommended footprint



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

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