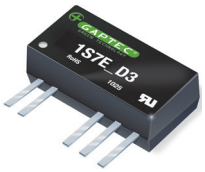
GAPTEC®
GREEN TECHNOLOGY



1S7E_3UP Series

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

DC-DC Converter 1 Watt

- Miniature SIP package
- Conversion efficiency high up to 81%
- 3000VDC isolation voltage
- Internal SMD construction
- Operating temperature: -40°C to +105°C
- Industry standard pinout
- RoHS compliance
- Short circuit protection (SCP)
- EN60950, UL60950 approval

The 1S7E_3UP series is specially designed for applications where an isolated voltage is required in a distributed power supply system.

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 regulation of the output voltage and the output ripple noise are not demanding

Such as: pure digital circuits, low frequency analog circuits and relay-driven circuits, etc.

SHORT CIRCUIT PROTECTED SCP

100% RoHS compliant 6/6

c UL us
UL-60950-1 (E347551)

CE

Common specifications

Short circuit protection*:	Continuous, Auto-recovery 1sec for the following models: 1S7E_0524S3UP /1S7E_0524D3UP 1S7E_24xxS3UP / 1S7E_24xxD3UP
Temperature rise at full load:	30°C MAX, 20°C TYP
Cooling:	Free air convection
Operation temperature range:	-40°C~+105°C Derating if the temperature ≥85°C
Storage temperature range:	-55°C ~+125°C
Casing temperature rise:	25°C TYP, Ta=25°C
Lead temperature:	300°C MAX, 1.5mm from case for 10 sec
Storage humidity range:	< 95%
Package material:	Plastic [UL94-V0]
MTBF (MIL-HDFK-217F@25°C):	>3,500 Khours
Weight:	2.4g

*Supply voltage must be discontinued at the end of short circuit duration for the models 1S7E_0524S3UP/1S7E_0524D3UP and 1S7E_24xxS3UP/ 1S7E_24xxD3UP models.

Input specifications

Item	Test condition	Min	Typ	Max	Units
Input current (Full load/no load)	• 3.3V Input • 5V input • 9V input • 12V input • 15V input • 24V input		415/25 274/20 139/20 114/15 84/10 58/7	–/70 –/60 –/55 –/50 –/35 –/30	mA mA mA mA mA mA
Surge voltage (1sec. max.)	• 3.3V Input • 5V input • 9V input • 12V input • 15V input • 24V input	-0.7 -0.7 -0.7 -0.7 -0.7 -0.7		5 9 12 18 21 30	VDC VDC VDC VDC VDC VDC
Input filter	Capacitor filter				
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	100KHz/0.1V		20		pF

Output specifications

Item	Test condition	Min	Typ	Max	Units
Output voltage accuracy	Follow the tolerance envelope graph				
Line regulation	For Vin change of ±1% • 3.3VDC output • other output		±1.1	±1.5	%
Load regulation	10% to 100% load • 3.3VDC output • 5VDC output • 9VDC output • 12VDC output • 15VDC output • 24VDC output		 18 12 9 8 7 6		 % % % % % %
Temperature drift	100% full load • 3.3 / 5 / 9 / 12VDC • 15 / 24VDC			±0.03	%/°C
Ripple & Noise*	20MHz Bandwidth		100	200	mVp-p
Switching frequency	Full load, nominal input		100		KHz

EMC specifications

EMI	Conducted disturbance	CISPR22/EN55022 CLASS B (see EMC typical recommended circuit)	
EMI	Radiated emission	CISPR22/EN55022 CLASS B (see EMC typical recommended circuit)	
EMS	Electrostatic discharge		
	• 1S7E_S3	IEC/EN61000-4-2	Contact ±6KV perf. Criteria B
	• 1S7E_D3	IEC/EN61000-4-2	Contact ±8KV perf. Criteria B

Example:
1S7E_0505D3UP
1 = 1Watt; S7 = SIP7; E = series; 5Vin; 5Vout; D = Dual Output;
3 = 3kVDC; U = Unregulated Output; P = Short Circuit Protection

Note:
1. Operation under minimum load will not damage the converter; However, they may not meet all specification listed, and that will reduce the life of product.
2. All specifications measured at Ta = 25°C, humidity <75%, nominal input voltage and rated output load unless otherwise specified.
3. In this datasheet, all the test methods of indications are based on corporate standards.
4. Only typical models listed, other models may be different, please contact our technical person for more details.

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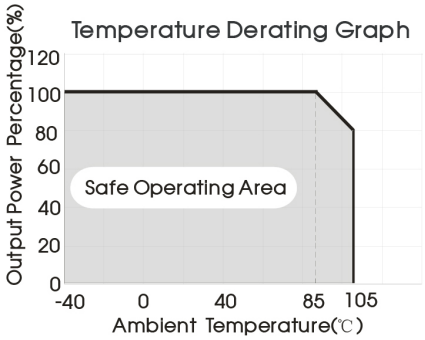
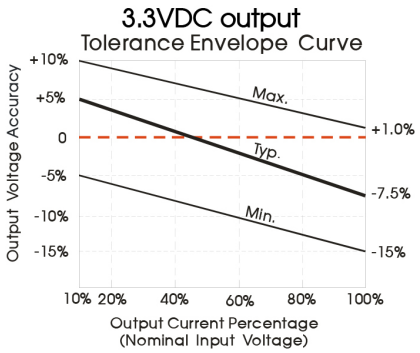
1S7E_3UP Series

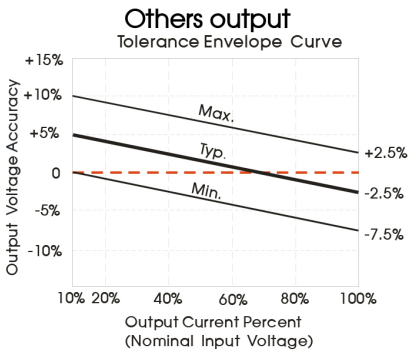
1W - Single/Dual Output DC-DC Converter - Fixed Input - Isolated & Unregulated

Part Number	Input Voltage [V]	Output Voltage [VDC]	Current [mA]	Efficiency [%, typ]	Max. capacitive load [µF]	Certification
1S7E_0303S3UP	3.3	3.3	303	73	220	–
1S7E_0305S3UP	3.3	5	200	78	220	–
1S7E_0324S3UP	3.3	24	42	78	220	–
1S7E_0503S3UP	5	3.3	303	73	220	–
1S7E_0505S3UP	5	5	200	80	220	UL/CE
1S7E_0509S3UP	5	9	111	80	220	UL/CE
1S7E_0512S3UP	5	12	83	80	220	UL/CE
1S7E_0515S3UP	5	15	67	81	220	UL/CE
1S7E_0524S3U	5	24	42	81	220	UL/CE
1S7E_0909S3UP	9	9	111	80	220	–
1S7E_1203S3UP	12	3.3	303	75	220	–
1S7E_1205S3UP	12	5	200	80	220	UL/CE
1S7E_1209S3UP	12	9	111	80	220	UL/CE
1S7E_1212S3UP	12	12	83	80	220	UL/CE
1S7E_1215S3UP	12	15	67	81	220	UL/CE
1S7E_1224S3UP	12	24	42	81	220	UL/CE
1S7E_1505S3UP	15	5	200	80	220	CE
1S7E_1509S3UP	15	9	111	80	220	–
1S7E_1512S3UP	15	12	83	80	220	–
1S7E_1515S3UP	15	15	67	81	220	CE
1S7E_2403S3U	24	3.3	303	75	220	–
1S7E_2405S3U	24	5	200	79	220	UL/CE
1S7E_2409S3U	24	9	111	80	220	UL/CE
1S7E_2412S3U	24	12	83	81	220	UL/CE
1S7E_2415S3U	24	15	67	81	220	UL/CE
1S7E_2424S3U	24	24	42	81	220	UL/CE
1S7E_0312D3UP	3.3	±12	±42	76	100	–
1S7E_0505D3UP	5	±5	±100	80	100	UL/CE
1S7E_0509D3UP	5	±9	±56	80	100	UL/CE
1S7E_0512D3UP	5	±12	±42	80	100	UL/CE
1S7E_0515D3UP	5	±15	±33	81	100	UL/CE
1S7E_0524D3U	5	±24	±21	81	100	UL/CE
1S7E_0909D3UP	9	±9	±56	80	100	–
1S7E_1205D3UP	12	±5	±100	80	100	UL/CE
1S7E_1212D3UP	12	±12	±42	81	100	UL/CE
1S7E_1215D3UP	12	±15	±33	81	100	UL/CE
1S7E_1224D3UP	12	±24	±21	80	100	UL/CE
1S7E_1505D3UP	15	±5	±100	80	100	–
1S7E_1515D3UP	15	±15	±33	81	100	–
1S7E_2405D3U	24	±5	±100	80	100	UL/CE
1S7E_2409D3U	24	±9	±56	80	100	UL/CE
1S7E_2412D3U	24	±12	±42	81	100	UL/CE
1S7E_2415D3U	24	±15	±33	79	100	UL/CE
1S7E_2424D3U	24	±24	±21	80	100	UL/CE

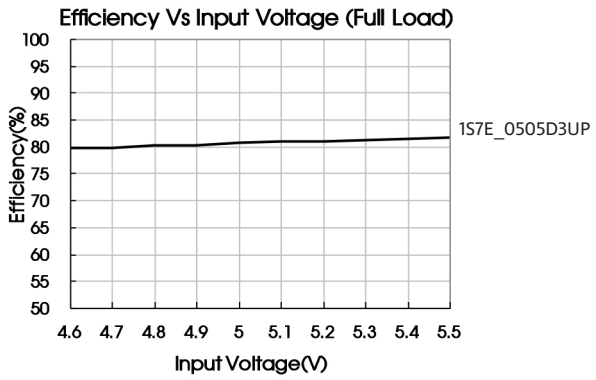
Typical characteristics

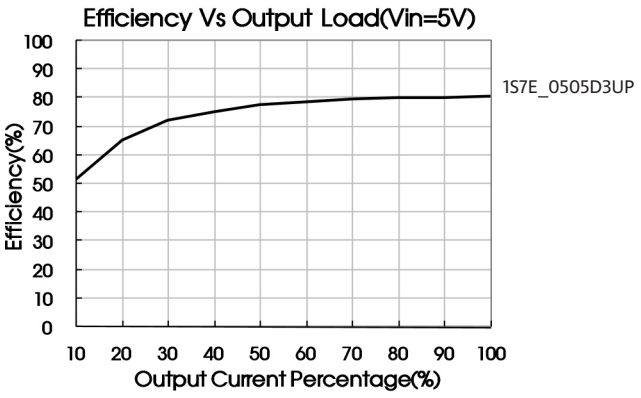


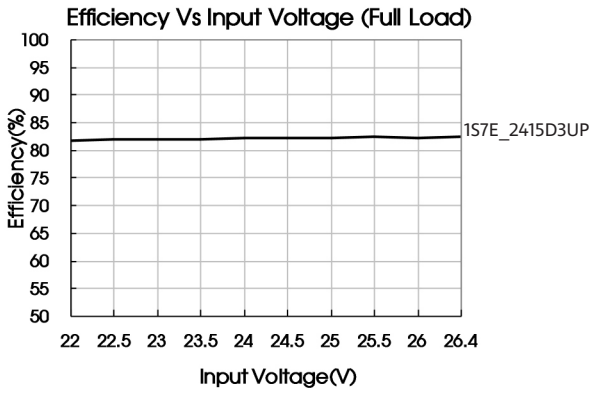


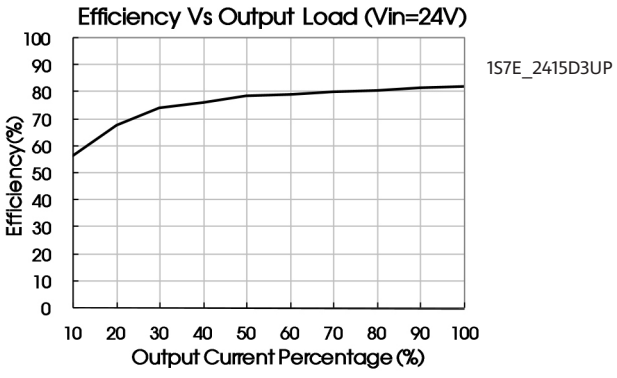


Efficiency









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.

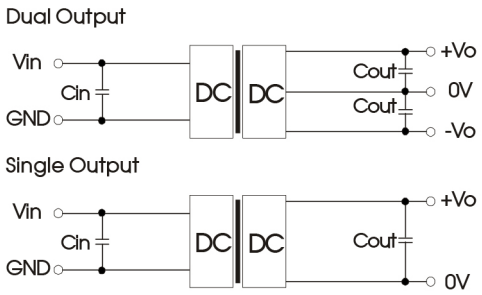
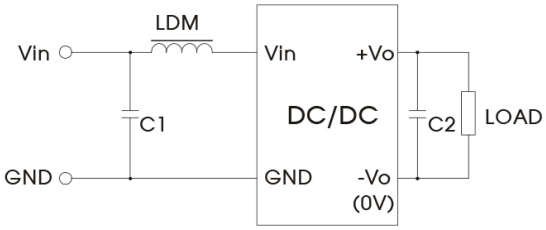


Figure 1

Vin (VDC)	Cin (µF)	Single output (VDC)	Cout (µF)	Dual output (VDC)	Cout (µF)
5	4.7	5	10	±5	4.7
12	2.2	9	4.7	±9	2.2
15	2.2	12	2.2	±12	1
24	1	15	1	±15	0.47

Recommended capacitive load value table (Table 1)

EMX typical recommended circuit (CLASS B)



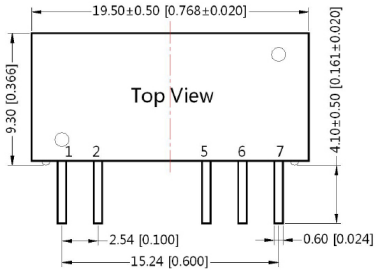
Output load requirements:
In order to ensure the converter can work reliably with high efficiency, the minimum load should not less than 10% rated load when it is used. If the needed power is indeed small, please parallel a resistor on t the output side (The sum of the efficient power and resistor consumption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

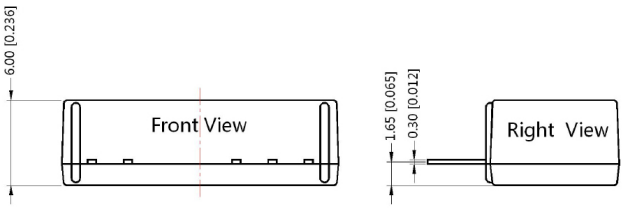
Input voltage(VDC)		3.3/5/9/12/15/24
EMI	C1	4.7µF /50V
EMI	C2	Refer to the Cout in Fig.3
EMI	LDM	6.8µH

Note: It is not needed to add the component in the peripheral circuit when
parameter with the symbol of „--“

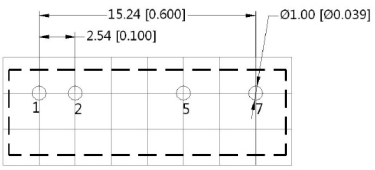
Mechanical dimensions

THIRD ANGLE PROJECTION

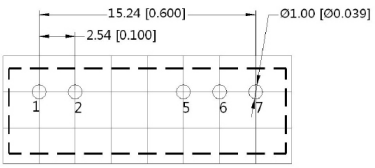




1S7E_S3



1S7E_D3



Note: Grid 2.54*2.54mm

Pin-Out		
Pin	1S7E_S3UP	1S7E_D3UP
1	Vin	Vin
2	GND	GND
5	0V	-Vo
6	No Pin	0V
7	+Vo	+Vo

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