GAPTEC®
GREEN TECHNOLOGY

1S4E_S1U series

1W - Single Output - Fixed Input - Isolated & Unregulated
MINIATURE SIP PACKAGE

DC-DC Converter 1 Watt

- Efficiency up to 83%
- Small Footprint
- Miniature SIP package
- Single output voltage
- 1kVDC Isolation
- Temperature Range: -40°C~+85°C
- Industry standard pinout
- UL94-V0 package
- RoHS compliance
- EMI complies with EN55022 Class B
- Low ripple and noise

The 1S4E_S1U series are specially designed for applications where a single power supply is 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 fixed (voltage variation ≤ ± 10%);
2) Where isolation is necessary between input and output (isolation voltage = 1500VDC)
3) Where the regulation of the output voltage and the output ripple and noise are not demanding.

Such as: purely digital circuits, ordinary low frequency analog circuits and IGBT power device driven circuits, etc.

Common specifications

Short circuit protection:	1 second
Maximum case temperature:	100°C
Cooling:	Nature convection
Operation temperature range:	-40°C~+85°C
Storage temperature range:	-40°C ~+125°C
Storage humidity range:	< 95%
Soldering temperature:	260°C MAX, 1.5mm from case for 10 sec
Safety standard:	IEC 60950-1
Case material:	Plastic [UL94-V0]
Pin material:	0.5mm Alloy42 solder-coated
Potting material:	Epoxy [UL94-V0]
MTBF (MIL-HDBK-217-F):	>1.121 Mhours
Weight:	1.5g
Dimensions:	0.46x0.24x0.40 inch

Input specifications

Item	Test condition	Min	Typ	Max	Units
Input voltage range				±10	%
Input surge voltage	• 3.3V models • 5V models • 12V models • 15V models • 24V models • 48V models			6 7 15 18 28 54	VDC VDC VDC VDC VDC VDC
Input filter	Capacitor				
Reflected ripple current*			20		mApk-pk

* Measured with a simulated source inductance of 12μH.

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Tested for 1 minute	1000			VDC
Isolation capacitance			60		pF
Isolation resistance				1000	MΩ

Output specifications

Item	Test condition	Min	Typ	Max	Units
Output voltage accuracy				±3	%
Line regulation	For Vin change of 1%			1.2	%
Load regulation	10% to 100% full load			15	%
Temperature drift	100% full load			±0.02	%/°C
Ripple & noise	20MHz Bandwidth			100	mVp-p
Switching frequency	Full load, nominal input		80		KHz

EMC specifications

CE*	EN55032	CLASS B
RE	EN55032	CLASS B
ESD	IEC 61000-4-2	Perfect criteria A
RS	IEC 61000-4-3	Perfect criteria A
EFT**	IEC 61000-4-4	Perfect criteria A
Surge**	IEC 61000-4-5	Perfect criteria A
ESD	IEC 61000-4-6	Perfect criteria A
ESD	IEC 61000-4-8	Perfect criteria A

* Input filter components are required to help meet conducted emissions Class B, which application refer to the EMI filter of design & feature configuration.
** An external filter capacitor is required if the module has to meet IEC 61000-4-4 and IEC 61000-4-5.

Example:
1S4E_0505S1U
1= 1Watt; S4= SIP4; E= Pinning; 5Vin; 5Vout; S= Single Output;
1= 1kVDC; U= Unregulated Output

Note:
1. All specifications measured at TA = 25°C, humidity < 75%, nominal input voltage and rated output load unless otherwise specified.
2. Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.
3. Operation under no-oad conditions will not mdamage these devices, however they may not meet all listed specifications.

GAPTEC-Electronic GmbH & Co. KG
sales@gaptec-electronic.com – www.gaptec-electronic.com

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Part Number	Input Voltage [V]	Input current [mA] no load (max)	Input current [mA] full load (typ)	Output Voltage [VDC]	Output current [mA]	Efficiency [%, typ]	Capacitor load* [µF, max]
1S4E_0303S1U	3.3	25	421	3.3	303	72	220
1S4E_0305S1U	3.3	25	394	5	200	77	220
1S4E_0307S1U	3.3	25	384	7.2	138.9	79	220
1S4E_0309S1U	3.3	30	404	9	111.1	75	220
1S4E_0312S1U	3.3	45	473	12	100	77	220
1S4E_0315S1U	3.3	35	384	15	66.6	79	220
1S4E_0318S1U	3.3	35	399	18	55.5	76	220
1S4E_0324S1U	3.3	53	461	24	50	79	220
1S4E_0503S1U	5	20	257	3.3	303	78	220
1S4E_0505S1U	5	25	247	5	200	81	220
1S4E_0507S1U	5	16	241	7.2	138.9	83	220
1S4E_0509S1U	5	26	250	9	111.1	80	220
1S4E_0512S1U	5	25	300	12	100	80	220
1S4E_0515S1U	5	35	244	15	66.6	82	220
1S4E_0518S1U	5	25	247	18	55.5	81	220
1S4E_0524S1U	5	35	289	24	50	83	220
1S4E_1203S1U	12	15	107	3.3	303	78	220
1S4E_1205S1U	12	16	105	5	200	79	220
1S4E_1207S1U	12	16	100	7.2	138.9	83	220
1S4E_1209S1U	12	15	107	9	111.1	78	220
1S4E_1212S1U	12	15	125	12	100	80	220
1S4E_1215S1U	12	15	105	15	66.6	79	220
1S4E_1218S1U	12	20	104	18	55.5	80	220
1S4E_1224S1U	12	25	123	24	50	71	220
1S4E_1503S1U	15	15	89	3.3	303	75	220
1S4E_1505S1U	15	9	82	5	200	81	220
1S4E_1507S1U	15	12	88	7.2	138.9	76	220
1S4E_1509S1U	15	10	90	9	111.1	74	220
1S4E_1512S1U	15	13	100	12	100	80	220
1S4E_1515S1U	15	15	84	15	66.6	79	220
1S4E_1518S1U	15	12	85	18	55.5	78	220
1S4E_1524S1U	15	10	99	24	50	81	220
1S4E_2403S1U	24	8	54	3.3	303	77	220
1S4E_2405S1U	24	8	52	5	200	80	220
1S4E_2407S1U	24	10	54	7.2	138.9	77	220
1S4E_2409S1U	24	7	54	9	111.1	77	220
1S4E_2412S1U	24	8	62	12	100	80	220
1S4E_2415S1U	24	8	51	15	66.6	81	220
1S4E_2418S1U	24	8	52	18	55.5	80	220
1S4E_2424S1U	24	9	60	24	50	83	220
1S4E_4803S1U	48	6	29	3.3	303	73	220
1S4E_4805S1U	48	6	28	5	200	74	220
1S4E_4807S1U	48	7	27	7.2	138.9	77	220
1S4E_4809S1U	48	5	27	9	111.1	78	220
1S4E_4812S1U	48	5	32	12	100	77	220
1S4E_4815S1U	48	5	27	15	66.6	76	220
1S4E_4818S1U	48	8	28	18	55.5	75	220
1S4E_4824S1U	48	8	31	24	50	80	220

* Tested by minimal Vin and constant resistive load.

GAPTEC-Electronic GmbH & Co. KG
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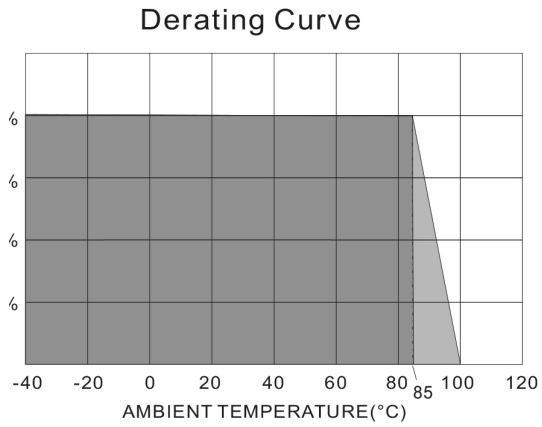
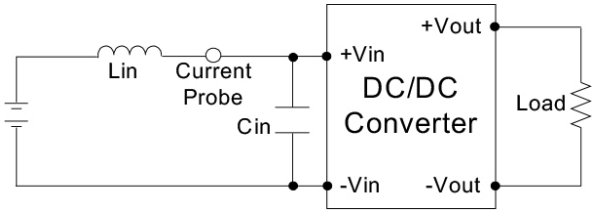
Typical characteristics

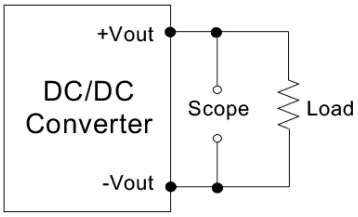


Test configurations

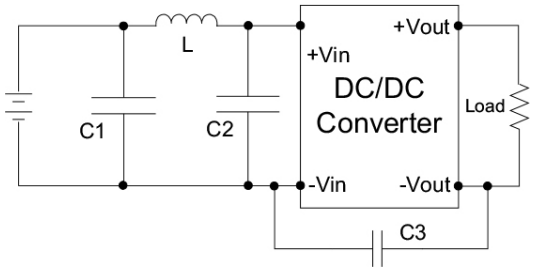
Input reflected ripple current test step
Input reflected ripple current is measured through a source inductor Lin (12µH) and a source capacitor Cin (47µF, ESR<1.0Ω at 100KHz) at nominal input and full load.



Output ripple & noise measurement test
The scope measuremnet bandwidth is 20MHz.



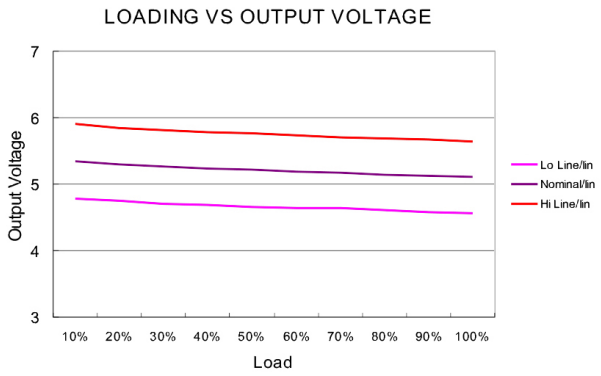
EMI filter
Input filter components (C1, L, C2, C3) are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.



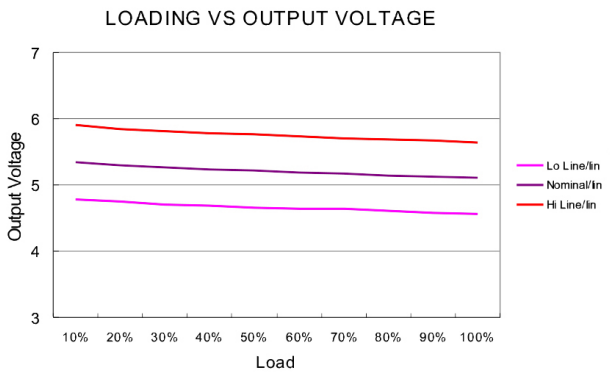
	C1	L	C2	C3
1S4E_03xx_S1U	1210, 2.2µF/100V	18µH		
1S4E_05xx_S1U	1210, 2.2µF/100V	18µH		
1S4E_12xx_S1U	1210, 2.2µF/100V	18µH		
1S4E_15xx_S1U	1210, 2.2µF/100V	18µH		
1S4E_24xx_S1U	1210, 2.2µF/100V	18µH	1210, 2.2µF/100V	1206, 470pF/2KV
1S4E_48xx_S1U	Electrolytic capacitor, 10µF/100V	18µH	1210, 2.2µF/100V	1206, 470pF/2KV

Loading vs. input

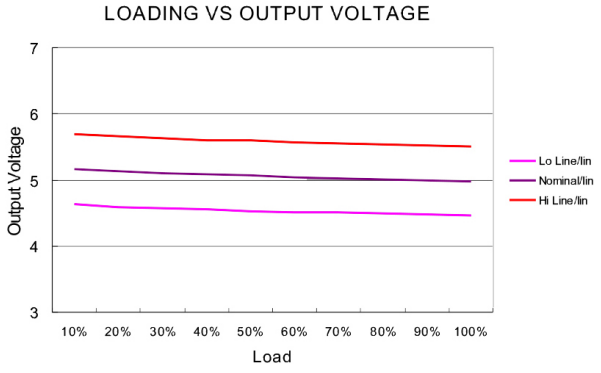
05 models



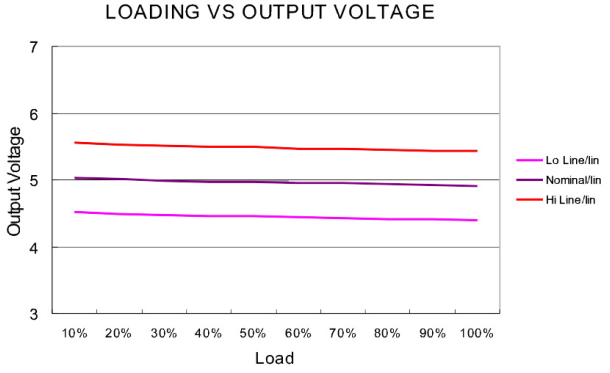
12 models



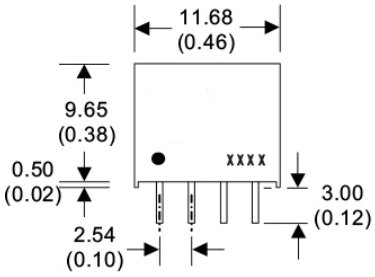
24 models

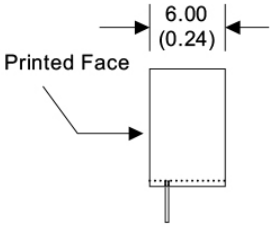


48 models

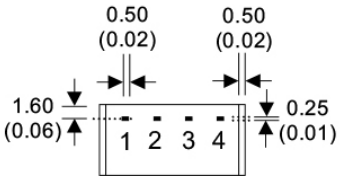


Mechanical dimensions





Pin connections	
PIN	SINGLE
1	-Vin
2	+Vin
3	-Vout
4	+Vout



Note:
The thickness of 48V input voltage model is 7.50mm (0.29inch)

Unit: mm[inch]
Pin diameter: 0.5mm ± 0.35mm [0.02inch ± 0.002inch]
Pin pitch and length tolerance: ± 0.35mm [± 0.014inch]
Case tolerances: ± 0.5mm[± 0.02inch]