PART NUMBER: VESD1-SIP **DESCRIPTION:** dc-dc converter

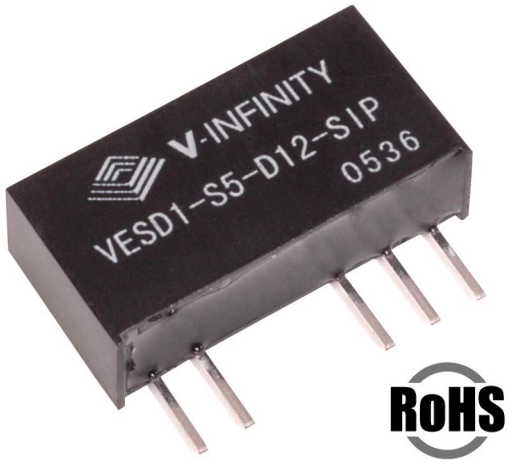
description

Designed to convert fixed voltages into an isolated voltage, the VESD1-SIP series is well suited for providing board-mount local supplies in a wide range of applications, including mixed analog/digital circuits, test & measurement equip., process/machine controls, datacom/telecom fields, etc...

The semi-regulated output can be followed by 3-terminal regulators to provide output protection, in addition to output regulation.

features

- **isolated 1 W output**
- **temperature range: -40°C~+85°C**
- **unregulated**
- **high efficiency to 80%**
- **dual voltage output**
- **small footprint**
- **SIP package style**
- **industry standard pinout**
- **UL94-V0 package**
- **no heatsink required**
- **3K Vdc isolation**
- **power density 0.85 W/cm³**
- **no external component required**
- **low cost**



MODEL	Input Voltage		Output	Output Current			Package	
	Nominal	Range	Voltage	Max.	Min.	Efficiency	Style	UL60950
VESD1-S5-D5-SIP	5 Vdc	4.5~5.5 Vdc	±5 Vdc	±100 mA	±10 mA	72%	SIP	YES
VESD1-S5-D9-SIP	5 Vdc	4.5~5.5 Vdc	±9 Vdc	±56 mA	±6 mA	75%	SIP	YES
VESD1-S5-D12-SIP	5 Vdc	4.5~5.5 Vdc	±12 Vdc	±42 mA	±5 mA	78%	SIP	YES
VESD1-S5-D15-SIP	5 Vdc	4.5~5.5 Vdc	±15 Vdc	±33 mA	±4 mA	79%	SIP	YES
VESD1-S12-D5-SIP	12 Vdc	10.8~13.2 Vdc	±5 Vdc	±100 mA	±10 mA	74%	SIP	YES
VESD1-S12-D9-SIP	12 Vdc	10.8~13.2 Vdc	±9 Vdc	±56 mA	±6 mA	76%	SIP	YES
VESD1-S12-D12-SIP	12 Vdc	10.8~13.2 Vdc	±12 Vdc	±42 mA	±5 mA	79%	SIP	YES
VESD1-S12-D15-SIP	12 Vdc	10.8~13.2 Vdc	±15 Vdc	±33 mA	±4 mA	80%	SIP	YES
VESD1-S15-D5-SIP	15 Vdc	13.5~16.5 Vdc	±5 Vdc	±100 mA	±10 mA	74%	SIP	NO
VESD1-S15-D9-SIP	15 Vdc	13.5~16.5 Vdc	±9 Vdc	±56 mA	±6A	75%	SIP	NO
VESD1-S15-D12-SIP	15 Vdc	13.5~16.5 Vdc	±12 Vdc	±42 mA	±5 mA	79%	SIP	NO
VESD1-S15-D15-SIP	15 Vdc	13.5~16.5 Vdc	±15 Vdc	±33 mA	±4 mA	79%	SIP	NO
VESD1-S24-D5-SIP	24 Vdc	21.6~26.4 Vdc	±5 Vdc	±100 mA	±10 mA	74%	SIP	YES
VESD1-S24-D9-SIP	24 Vdc	21.6~26.4 Vdc	±9 Vdc	±56 mA	±6 mA	76%	SIP	YES
VESD1-S24-D12-SIP	24 Vdc	21.6~26.4 Vdc	±12 Vdc	±42 mA	±5 mA	80%	SIP	YES
VESD1-S24-D15-SIP	24 Vdc	21.6~26.4 Vdc	±15 Vdc	±33 mA	±4 mA	81%	SIP	YES

PART NUMBER: VESD1-SIP **DESCRIPTION:** dc-dc converter

OUTPUT

item	test conditions	min.	typ.	max.	units
output power		0.1		1	W
line regulation	for Vin change of 1%			1.2	%
load regulation	10% to 100% full load		10	15	%
output voltage accuracy	see tolerance envelope graph				
temperature drift	@ 100% load			0.03	%/°C
output ripple	20 MHz bandwidth		100	150	mVp-p
switching frequency	full load, nominal input	83	100	125	KHz

GENERAL

short circuit protection	<1 second
temperature rise at full load	25°C Max, 15°C typ.
cooling	free air convection
operating temperature range	-40°C to +85°C
storage temperature range	-55°C to +125°C
soldering temperature	300°C (1.5mm from case for 10 sec.)
storage humidity range	<95%
case material	plastic (UL94-V0)
safety[2]	approved to UL60950 (E222736)
MTBF	>3,500,000 hrs.
burn-in	full load at +85°C, for 4 hours at no-load and 4 hours at full load.

ISOLATION SPECIFICATIONS

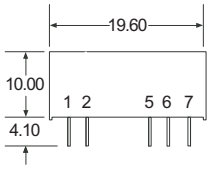
item	test conditions	min.	typ.	max	units
isolation voltage	tested for 1 min.	3000			Vdc
insulation resistance	test at 500 Vdc	1000			M Ω

NOTE:

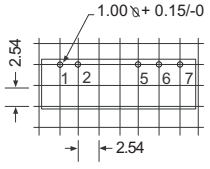
1. All specifications measured at TA=25°C, humidity <75%, nominal input voltage and rated output load unless otherwise specified.
2. See table on page 1 for available models

DIMENSIONS (mm)

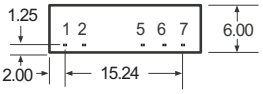
Side View



Layout



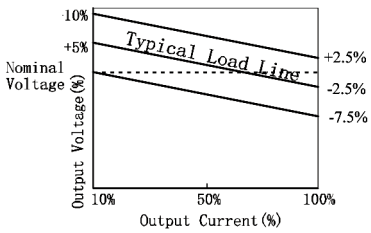
Bottom View



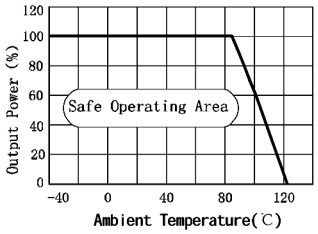
Pin	Function
1	+Vin
2	-Vin
5	-Vout
6	COM
7	+Vout

TYPICAL CHARACTERISTICS

Tolerance Envelope Graph



Temperature Derating Graph



All Pins on a 2.54mm pitch; all pin diameters are 0.50mm; all dimensions in mm.

PART NUMBER: VESD1-SIP

DESCRIPTION: dc-dc converter

APPLICATION NOTES:

- Input filtering

To reduce the reflected ripple current and minimize EMI, especially when the converter input is more than 2" away from the DC source, it is recommended to connect a low ESR electrolytic capacitor between Vin and Gnd. The values suggested are as shown in Table 1. If additional filtering is required, the capacitance may be increased, or expanded to an LC network as shown in Figure 1.

TABLE 1

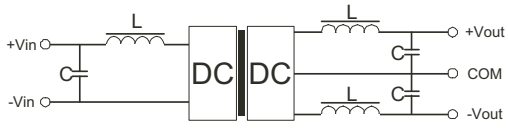
Input Voltage	External Input Capacitance
5 V	4.7 µF
12 V	2.2 µF
15 V	2.2 µF
24 V	1.0 µF

- Output filtering

An output capacitor is needed to meet output ripple requirements as shown in Table 2.Output capacitance may be increased for additional filtering, but should not exeed 10µF or expanded to an LC network as in Figure 1.

TABLE 2

Vout	External Ouput Capacitance
5 V	10 µF
9 V	4.7 µF
12 V	2.2 µF
15 V	1 µF
24 V	0.47 µF



<Figure 1>

- Minimum loading

The converter needs a minimum of 10% loading to maintain output regulation. Operation under no-load conditions will not cause immediate damages but may reduce reliability, and cause performance not to meet specifications.

- Regulation

With a semi-regulated design, the converter's output voltage varies with load current and will change proportionally to the input voltage. If regulated output is needed, an external regulator can be used as shown in Figure 2.

- Protection

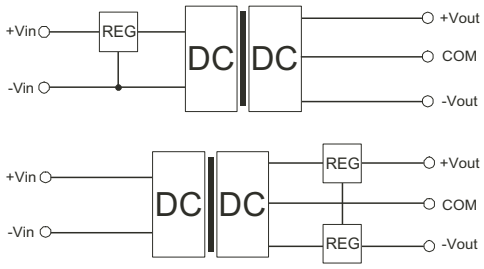
The converter has minimal protection against input over-voltage or output over-load, and may be permanently damaged if exposed to these conditions. An input clamping device can be used for input voltage limiting. An input fuse or an output fuse also be used to protect against over-loading.

- Dual outputs used as a single output

The +Vout and -Vout can be used to obtain a single output that is the sum of the two outputs. In this case, the COM pin shouldn't be used.

- External Regulator

An external 3-terminal regulator can be connected to the output of the converter to achieve full regulation. Make sure the converter's output voltage provides sufficient head room for the regulator. An additional benefit is that the built-in protection features in the regulator, such as OCP, OTP, etc, will protect the converter also. In a complimentory supply, a negative output regulator must be used to achieve the negative regulated output.



<Figure 2>