V·INFINITY

VFSD2-SIP Series DC-DC Converter

Rev. 06-2006

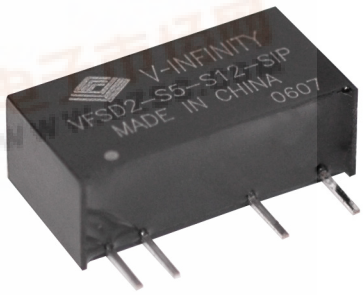
Description

Designed to convert fixed voltages into an isolated voltage, the VFSD2-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 2 W output
- Temperature range: -40°C~+85°C
- Unregulated
- High efficiency to 81%
- Single voltage output
- Small footprint
- SIP package style
- Industry standard pinout
- UL94-V0 package
- No heatsink required
- 3K Vdc isolation
- Power density 1.42 W/cm³
- No external component required
- Low cost



RoHS

Model Number	Input Voltage Nominal	Input Voltage Range	Output Voltage	Output Current Max.	Output Current Min.	Efficiency	Package Style
VFSD2-S5-S5-SIP	5 Vdc	4.5~5.5 Vdc	5 Vdc	400 mA	40 mA	80%	SIP
VFSD2-S5-S9-SIP	5 Vdc	4.5~5.5 Vdc	9 Vdc	222 mA	22.2 mA	81%	SIP
VFSD2-S5-S12-SIP	5 Vdc	4.5~5.5 Vdc	12 Vdc	167 mA	16.7 mA	82%	SIP
VFSD2-S5-S15-SIP	5 Vdc	4.5~5.5 Vdc	15 Vdc	133 mA	13.3 mA	84%	SIP
VFSD2-S12-S5-SIP	12 Vdc	10.8~13.2 Vdc	5 Vdc	400 mA	40 mA	80%	SIP
VFSD2-S12-S9-SIP	12 Vdc	10.8~13.2 Vdc	9 Vdc	222 mA	22.2 mA	83%	SIP
VFSD2-S12-S12-SIP	12 Vdc	10.8~13.2 Vdc	12 Vdc	167 mA	16.7 mA	84%	SIP
VFSD2-S12-S15-SIP	12 Vdc	10.8~13.2 Vdc	15 Vdc	133 mA	13.3 mA	85%	SIP
VFSD2-S24-S5-SIP	24 Vdc	21.6~26.4 Vdc	5 Vdc	400 mA	40 mA	81%	SIP
VFSD2-S24-S9-SIP	24 Vdc	21.6~26.4 Vdc	9 Vdc	222 mA	22.2 mA	84%	SIP
VFSD2-S24-S12-SIP	24 Vdc	21.6~26.4 Vdc	12 Vdc	167 mA	16.7 mA	85%	SIP
VFSD2-S24-S15-SIP	24 Vdc	21.6~26.4 Vdc	15 Vdc	133 mA	13.3 mA	86%	SIP

Output Specifications

Item	Test conditions	Min.	Typ.	Max.	Units
Output power		0.2		2	W
Line Regulation	For Vin change of 1%, full load			1.2	%
Load Regulation	10% to 100% full load, nominal line		10	15	%
Output voltage accuracy	See tolerance envelope graph				
Temperature drift	100% load			0.03	%/°C
Output ripple	20 MHz Bandwidth		75	150	mVp-p
Switching frequency	Full load, nominal input		75	100	KHz

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General Specifications

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	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.

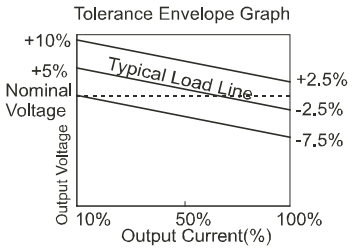
Isolation Specifications

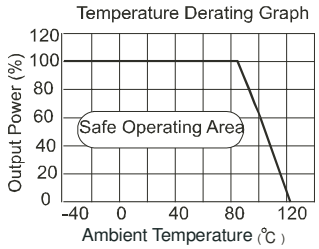
Item	Test Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	Tested for 1 min.	3000			Vdc
Insulation Resistance	Test at 500 Vdc	1000			MΩ

Note:

1. All specifications measured at TA=25°C, humidity <75%, nominal input voltage and rated output load unless otherwise specified.

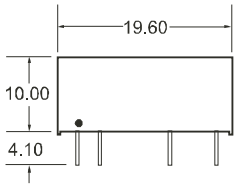
Typical Characteristics





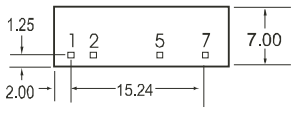
Outline Dimensions & Recommended Layout Pattern

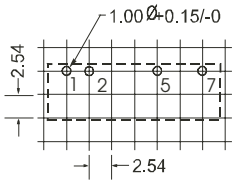
Side View



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

Bottom View





Note: All Pins on a 2 54mm pitch; All Pin diameters are 0 50 mm; all dimensions in mm

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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
24 V	1.0 µF

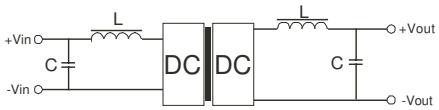
- Output filtering

  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	4.7 µF
9 V	2.2 µF
12 V	1.0 µF
15 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

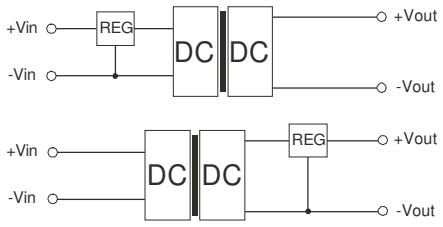
  With a semi-regulated design, the converter's output voltage varies with load current and will change proportionally to the input voltage. If regulated output is needed, an external regulator can be used as shown in Figure 2.

- 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 can also be used to protect against over-loading.

- 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>