V·INFINITY

VESD2-DIP Series Dc-Dc Converter

Rev. 01-2006

Description

Designed to convert fixed voltages into an isolated voltage, the VESD2-DIP 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 82%**
- **Dual voltage output**
- **Small footprint**
- **DIP 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
VESD2-S5-D5-DIP	5 Vdc	4.5~5.5 Vdc	±5 Vdc	±200 mA	±20 mA	82%	DIP
VESD2-S5-D9-DIP	5 Vdc	4.5~5.5 Vdc	±9 Vdc	±111 mA	±12 mA	83%	DIP
VESD2-S5-D12-DIP	5 Vdc	4.5~5.5 Vdc	±12 Vdc	±83 mA	±9 mA	85%	DIP
VESD2-S5-D15-DIP	5 Vdc	4.5~5.5 Vdc	±15 Vdc	±67 mA	±7 mA	85%	DIP
VESD2-S12-D5-DIP	12 Vdc	10.8~13.2 Vdc	±5 Vdc	±200 mA	±20 mA	83%	DIP
VESD2-S12-D9-DIP	12 Vdc	10.8~13.2 Vdc	±9 Vdc	±111 mA	±12 mA	84%	DIP
VESD2-S12-D12-DIP	12 Vdc	10.8~13.2 Vdc	±12 Vdc	±83 mA	±9 mA	86%	DIP
VESD2-S12-D15-DIP	12 Vdc	10.8~13.2 Vdc	±15 Vdc	±67 mA	±7 mA	86%	DIP
VESD2-S24-D5-DIP	24 Vdc	21.6~26.4 Vdc	±5 Vdc	±200 mA	±20 mA	84%	DIP
VESD2-S24-D9-DIP	24 Vdc	21.6~26.4 Vdc	±9 Vdc	±111 mA	±12 mA	85%	DIP
VESD2-S24-D12-DIP	24 Vdc	21.6~26.4 Vdc	±12 Vdc	±83 mA	±9 mA	87%	DIP
VESD2-S24-D15-DIP	24 Vdc	21.6~26.4 Vdc	±15 Vdc	±67 mA	±7 mA	87%	DIP

Output Specifications

Item	Test conditions	Min.	Typ.	Max.	Units
Output power		0.2		2	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		50	75	mVp-p
Switching frequency	Full load, nominal input		75K		Hz

Note:

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

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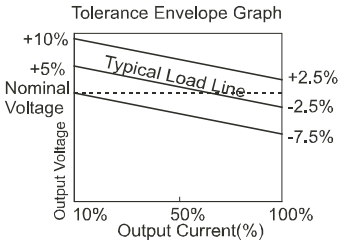
General Specifications

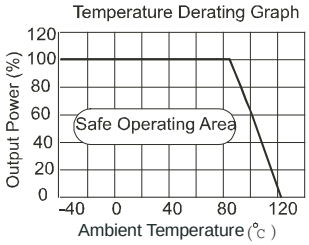
Short circuit protection	<1 second
Temperature rise at full load	25°C Max, 15°C Typ.
Cooling	Free air convection
Operating temperature range	-40°C to +85°C
Storage temperature range	-55°C to +125°C
Soldering temperature	300°C (1.5mm from case for 10 sec.)
Storage humidity range	<95%
Case material	Plastic (UL94-V0)
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

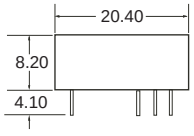
Typical Characteristics



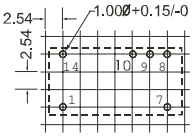


Outline Dimensions & Recommended Layout Pattern

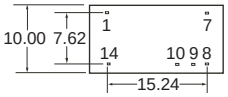
Side View



Layout



Bottom View



Pin	Function
1	-Vin
7	NC
8	+Vout
9	COM
10	-Vout
14	+Vin

Note: All Pins on a 2.54mm pitch; all pin diameters are 0.50mm; 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

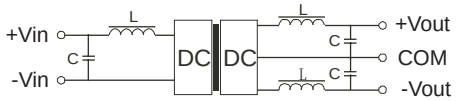
- Output filtering

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

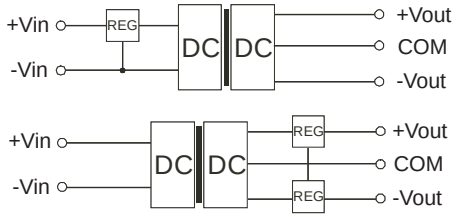
The converter has minimal protection against input over-voltage or output over-load, and may be permanently damaged if exposed to these conditions. An input clamping device can be used for input voltage limiting. An input fuse or an output fuse can also be used to protect against over-loading.

- 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>