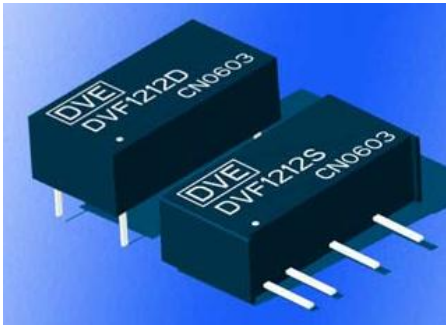




DVF Series
Isolated 1W Regulated Single Output DC-DC Converters



FEATURES

- Efficiency up to 73%
- Small Footprint
- SIP/DIP Package
- Single Output Voltage
- 1kVDC Isolation
- Fixed Input Voltage
- Regulated Output Voltage
- Temperature Range -40°C to 85°C
- Industry Standard Pinout
- UL 94V-0 Package Material
- No Heatsink required
- No External Component Required
- PCB Mounting
- Fully Encapsulated
- MTTF>3,500,000 hours

APPLICATIONS

The DVF Series are specially designed for applications where a single power supply is highly 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 $\leq \pm 5\%$);
- 2) Where isolation is necessary between input and output (isolation voltage =1000VDC);
- 3) Where the regulation of the output voltage and the output ripple and noise are demanded.

SELECTION GUIDE						
	Nominal Input Voltage (V)	Rated Output Voltage (V)	Output Current		Efficiency (% Typ)	Package Style
			Min (mA)	Max (mA)		
Order Code	(V)	(V)	(mA)	(mA)	(%, Typ)	
DVF0505S/D	5	5	20	200	68	SIP/DIP
DVF0509S/D	5	9	12	111	70	SIP/DIP
DVF0512S/D	5	12	9	83	71	SIP/DIP
DVF0515S/D	5	15	7	67	72	SIP/DIP
DVF1205S/D	12	5	15	150	69	SIP/DIP
DVF1209S/D	12	9	12	111	71	SIP/DIP
DVF1212S/D	12	12	9	83	72	SIP/DIP
DVF1215S/D	12	15	7	67	72	SIP/DIP
DVF2405S/D	24	5	15	150	70	SIP/DIP
DVF2409S/D	24	9	12	111	72	SIP/DIP
DVF2412S/D	24	12	9	83	73	SIP/DIP
DVF2415S/D	24	15	7	67	73	SIP/DIP

INPUT CHARACTERISTICS					
Parameter	Conditions	MIN	TYP	MAX	Units
Voltage Range	All DVF05 Types	4.75	5	5.25	VDC
	All DVF12 Types	11.4	12	12.6	
	All DVF24 Types	22.8	24	25.2	

OUTPUT CHARACTERISTICS					
Parameter	Conditions	MIN	TYP	MAX	Units
Output Power		0.1		1	W
Output Voltage Accuracy	100% full load			± 3	%
Line Regulation	For V_{IN} change of $\pm 5\%$			0.25	%
Load Regulation	10% to 100% full Load			1	%
Temperature Drift	100% full load			0.03	%/°C
Temperature Rise	Full load		15	25	°C
Ripple	B/W=20Hz to 300kHz		10	20	mV p-p

ABSOLUTE MAXIMUM RATINGS	
Short-circuit protection	1 second
Internal power dissipation	10% nominal power(typical)
Lead temperature 1.5mm from case for 10 seconds	300°C

1 All specifications measured at $T_A=25^\circ\text{C}$, humidity<75%, nominal input voltage and rated output load unless otherwise specified.

2 See below recommended circuits for more details.



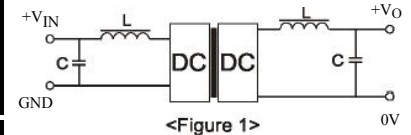
DVF Series Isolated 1W Regulated Single Output DC-DC Converters



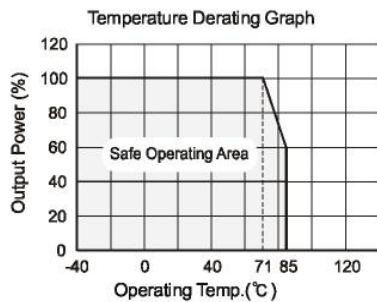
ISOLATION CHARACTERISTICS					
Parameter	Conditions	MIN	TYP	MAX	Units
Isolation Test Voltage	Flash Test for 1 minute	1000			VDC
Resistance	Viso=500VDC	1			GΩ

GENERAL CHARACTERISTICS					
Parameter	Conditions	MIN	TYP	MAX	Units
Switching Frequency	Full load, nominal input voltage		100		kHz

ENVIRONMENTAL					
Parameter	Conditions	MIN	TYP	MAX	Units
Operation		-40		85	°C
Storage temperature		-55		125	°C
Storage humidity				95	%
Cooling	Free air convection				



TYPICAL CHARACTERISTICS



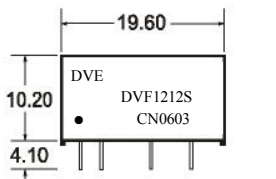
Overload Protection

Under normal operating conditions, the output circuit of these products has no protection against over-current and short-circuits. The simplest method is to connect a self-recovery fuse in series at the input end or add a circuit breaker to the circuit.

When the environment temperature is higher than 70°C, the product output power should be less than 60% of the rated power.

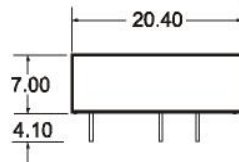
OUTLINE DIMENSIONS & RECOMMENDED FOOTPRINT

DVF****S Package

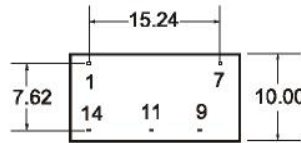


Side View

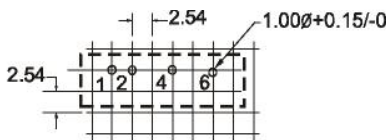
DVF****D Package



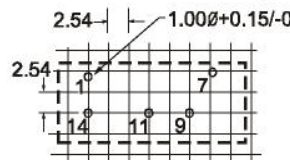
Bottom View



DVF****S Footprint



DVF****D Footprint



External Capacitor Table

V _{IN}	External capacitor	V _{OUT}	External capacitor
5VDC	4.7μF	5VDC	10μF
12VDC	2.2μF	9VDC	4.7μF
24VDC	1μF	12VDC	2.2μF
48VDC		15VDC	1μF

FOOTPRINT DETAILS

DVF****S Series

PIN	
1	V _{IN}
2	GND
4	0V
6	+V _O

DVF****D Series

PIN	
1	GND
7	NC
9	+V _O
11	0V
14	V _{IN}

Note: All Pins on a 2.54mm pitch; All Pin diameters are 0.50 mm; all dimensions in mm.

APPLICATION NOTE

Filtering

In some circuits which are sensitive to noise and ripple, a filtering capacitor may be added to the DC/DC output end and input end to reduce the noise and ripple. However, the capacitance of the output filter capacitor must be proper. If the capacitance is too big, a startup problem might arise. For every channel of output, provided the safe and reliable operation is ensured, the greatest capacitance of its filter capacitor refer to the **external capacitor table**. To get an extremely low ripple, an "LC" filtering network may be connected to the input and output ends of the DC/DC converter, which may produce a more significant filtering effect. It should also be noted that the inductance and the frequency of the "LC" filtering network should be staggered with the DC/DC frequency to avoid mutual interference (see figure 1).

Requirement On Output Load

To ensure this module can operate efficiently and reliably, a minimum load is specified for this kind of DC/DC converter in addition to a maximum load (namely full load). During operation, make sure the specified range of input voltage is not exceeded, the minimum output load is **not less than 10%** of the full load, and that this product should never be operated under no load! If the actual output power is very small, please connect a resistor with proper resistance at the output end in parallel to increase the load, or use products with a lower rated output power.