

VF-2W Series

2W Regulated Single output



Features

- 12 Pin SIL Package
- 1000 VDC Isolation
- Up to 5200 VDC Isolation
- Continuous Short Circuit Protection
- Efficiency up to 72%
- -25 ~ 71°C Operation Temperature Range



The VF series is a family of cost effective 2W single output DC-DC converters. These converters combine miniature package in a 12-pin SIL compatible case with high performance features such as 1000 VDC~5200 VDC input/output isolation voltage, continuous short circuit protection with automatic restart and high line / load regulation. Devices are encapsulated using flame retardant resin. Input voltages of 5, 12, 24 with output voltage of 3.3, 5, 7.2, 9, 12, 15, 18, 24 Vdc. High performance features include high efficiency operation up to 72% and output voltage accuracy of $\pm 2\%$ maximum. Standard features include an input range of $\pm 10\%$ tolerance and low output noise and ripple.

All specifications typical at $T_a = 25^\circ\text{C}$, nominal input voltage and full load unless otherwise specified

OUTPUT SPECIFICATIONS	
Output Voltage accuracy	$\pm 2\%$, max.
Line regulation	$\pm 0.5\%$, max.
Load regulation	(From 0% to 100% Load) $\pm 0.5\%$, max. (Output 3.3V Model) $\pm 1.5\%$, max.
Ripple & noise (20 MHz bandwidth)(1)	75mVpk-pk, max.
Short Circuit Protection	Indefinite(Automatic Recovery)
Temperature coefficient	$\pm 0.02\%/^\circ\text{C}$
Capacitor load(2)	See table, max.

INPUT SPECIFICATIONS	
Input Voltage Range	$\pm 10\%$
Input Current (No Load)	See table, max.
Input Current (Full Load)	See table, typ.
Input Filter	Capacitor
Input Reflected Ripple Current(3)	20mA _{pk-pk} , typ.

GENERAL SPECIFICATIONS	
Efficiency	See table, typ.
I/O Isolation Voltage(60sec)	1000~5200Vdc
Input/Output	1000~5200Vdc
I/O Isolation Capacitance	60 pF Typ.
I/O Isolation Resistance	1000M Ω , min.
Switching Frequency	50kHz typ.
Humidity	95% rel H
Reliability Calculated MTBF(MIL-HDBK-217 F)	>1.12 Mhrs
Safety Standard : (designed to meet)	IEC 60950-1

PHYSICAL SPECIFICATIONS	
Case Material	Non-conductive Black Plastic(UL94V-0 rated)
Pin Material	0.5mm Alloy42 Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight	7.0g
Dimensions	1.26"x0.32"x0.57"

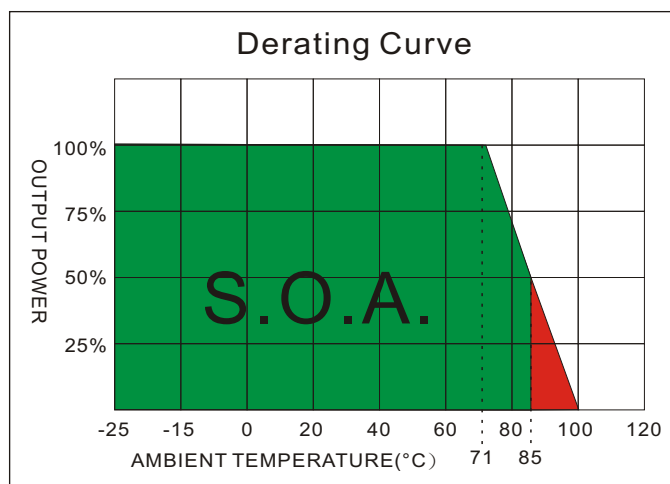
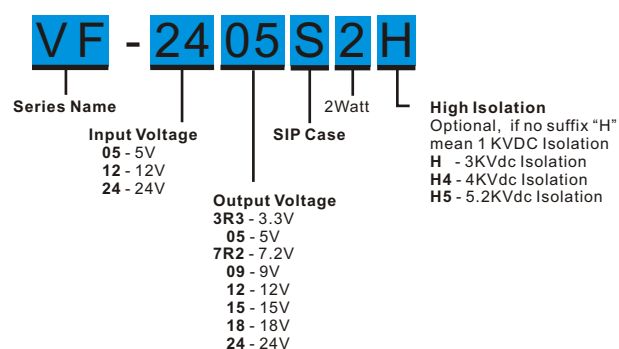
ENVIRONMENT SPECIFICATIONS	
Operating Temperature	-25°C ~ +85°C(See Derating Curve) -25°C ~ +71°C(For 100% load)
Maximum Case Temperature	100°C
Storage Temperature	-40°C~125°C
Cooling	Nature Convection

ABSOLUTE MAXIMUM RATINGS(4)	
These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.	
Input Surge Voltage(100mS)	
5 Models	7 Vdc, max.
12 Models	15 Vdc, max.
24 Models	28 Vdc, max.
Soldering Temperature	260°C, max.
(1.5mm from case 10sec max.)	

EMC SPECIFICATIONS		
Radiated Emissions	EN55032	CLASS B
Conducted Emissions (6)	EN55032	CLASS B
ESD	IEC 61000-4-2	Perf. Criteria A
RS	IEC 61000-4-3	Perf. Criteria A
EFT (7)	IEC 61000-4-4	Perf. Criteria A
Surge (7)	IEC 61000-4-5	Perf. Criteria A
CS	IEC 61000-4-6	Perf. Criteria A
PFMF	IEC 61000-4-8	Perf. Criteria A

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PART NUMBER STRUCTURE



MODEL SELECTION GUIDE

MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current		OUTPUT Voltage (Vdc)	OUTPUT Current	EFFICIENCY @FL (% .typ.)	Capacitor Load @LF (μF .max.)
		No-Load (mA .max.)	Full Load (mA .typ.)		Full load (mA)		
VF-053R3S2	5	68	559	3.3	500	59	330
VF-0505S2	5	45	588	5	400	68	330
VF-057R2S2	5	90	625	7.2	277.7	64	330
VF-0509S2	5	75	563	9	222.2	71	330
VF-0512S2	5	80	597	12	166.6	67	330
VF-0515S2	5	95	571	15	133.3	70	330
VF-0518S2	5	95	580	18	111.1	69	330
VF-0524S2	5	76	597	24	83.3	67	330
VF-123R3S2	12	30	250	3.3	500	55	330
VF-1205S2	12	20	249	5	400	67	330
VF-127R2S2	12	30	253	7.2	277.7	66	330
VF-1209S2	12	45	253	9	222.2	66	330
VF-1212S2	12	45	249	12	166.6	67	330
VF-1215S2	12	45	245	15	133.3	68	330
VF-1218S2	12	50	256	18	111.1	65	330
VF-1224S2	12	35	231	24	83.3	72	330
VF-243R3S2	24	25	127	3.3	500	54	330
VF-2405S2	24	25	132	5	400	63	330
VF-247R2S2	24	22	123	7.2	277.7	68	330
VF-2409S2	24	20	117	9	222.2	71	330
VF-2412S2	24	20	119	12	166.6	70	330
VF-2415S2	24	25	124	15	133.3	67	330
VF-2418S2	24	20	117	18	111.1	71	330
VF-2424S2	24	20	116	24	83.3	72	330

Suffix "H" means 3 KVdc isolation

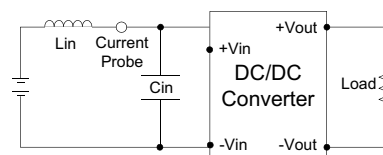
Suffix "H4" means 4 KVdc isolation

Suffix "H5" means 5.2 KVdc isolation

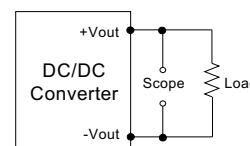
TEST CONFIGURATIONS

Input Reflected Ripple Current Test Step

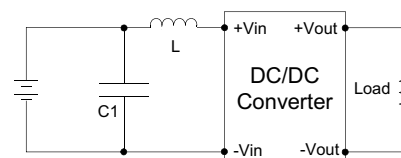
Input reflected ripple current is measured through a source inductor $L_{in}(12\mu H)$ and a source capacitor $C_{in}(47\mu F, ESR < 1.0\Omega \text{ at } 100\text{KHz})$ at nominal input and full load.

**Output Ripple & Noise Measurement Test**

The Scope measurement bandwidth is 20MHz .

**EMI Filter**

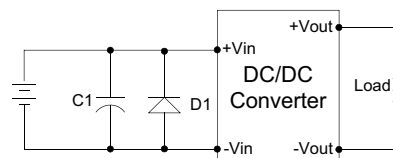
Input filter components ($C1, L$) are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.



	C1	L
VF-05XXXXXX	220 μF /100V	12 μH
VF-12XXXXXX	220 μF /100V	12 μH
VF-24XXXXXX	220 μF /100V	12 μH

EFT/Surge Filter

Input filter components ($C1, D1$) are used to help meet IEC 61000-4-4 and IEC 61000-4-5 .

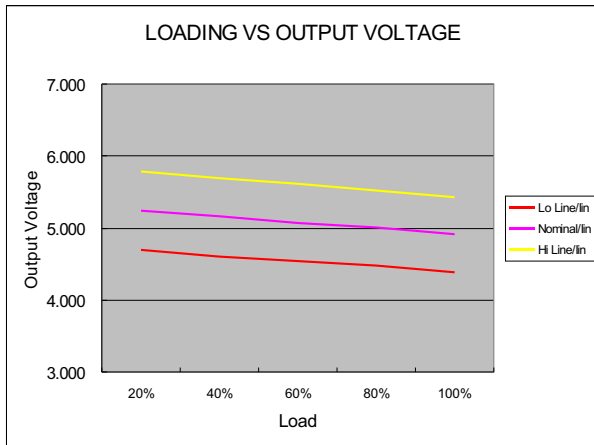


	C1	D1
VF-05XXXXXXXX	1000 μF , 50V	SMAJ9A
VF-12XXXXXXXX		SMAJ14A
VF-24XXXXXXXX		SMAJ26A

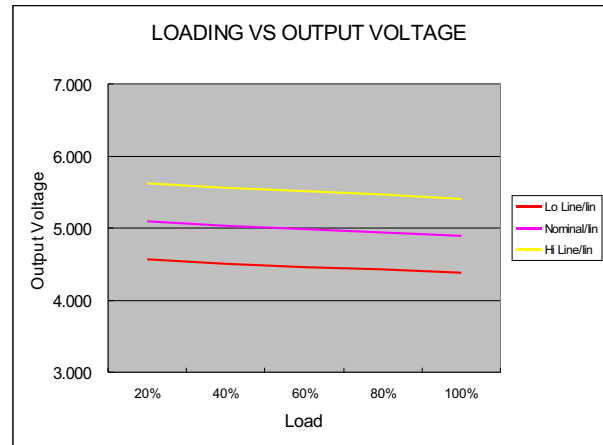
NOTE

1. Ripple/Noise measured with 20MHz bandwidth.
2. Tested by minimal V_{in} and constant resistive load.
3. Measured Input reflected ripple current with a simulated source inductance of 12 μH .
4. Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.
5. Operation under no-load conditions will not damage these devices, however they may not meet all listed specifications.
6. Input filter components are required to help meet conducted emission class B, which application refer to the EMI Filter of design & feature configuration.
7. An external filter capacitor is required if the module has to meet IEC61000-4-4 and IEC61000-4-5
The VF-Series recommended an aluminum electrolytic capacitor and TVS to connect in parallel.
Which application refer to the EFT/Surge Filter of design & feature configuration.

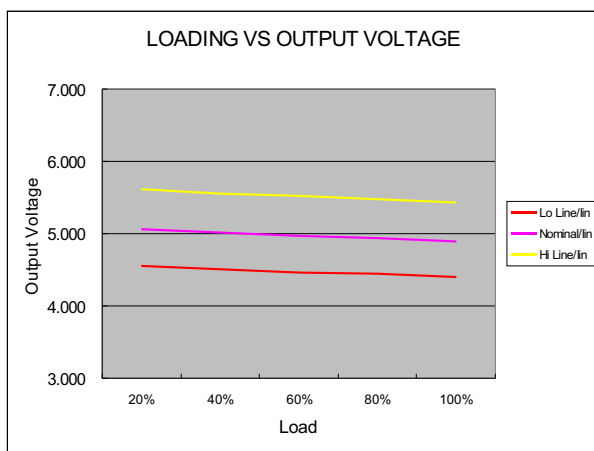
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05 Models

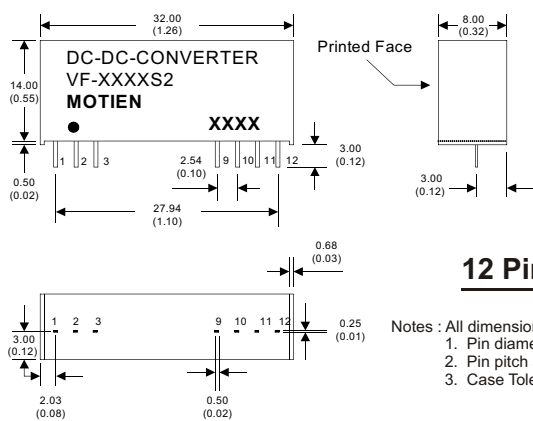


12 Models



24 Models

MECHANICAL SPECIFICATIONS



PIN CONNECTIONS

PIN NUMBER	SINGLE	SINGLE-H
1	+V Input	+V Input
2	N.C.	-V Input
3	N.C.	N.C.
9	N.C.	N.C.
10	-V Output	-V Output
11	+V Output	+V Output
12	-V Input	N.C.