# VF-1.5W Series

*1.5W Regulated Single output*

MOTIEN TECHNOLOGY

## Features

- 12 Pin SIL Package
- 1000 VDC Isolation
- Up to 5200 VDC Isolation
- Continuous Short Circuit Protection
- Efficiency up to 67%
- -25 ~ 71°C Operation Temperature Range


CE

The VF series is a family of cost effective 1.5W 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 hight 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 67% and output voltage accuracy of ±2% maximum. Standard features include an input range of ±10% tolerance and low output noise and ripple.

All specifications typical at Ta=25°C, nominal input voltage and full load unless otherwise specified

### OUTPUT SPECIFICATIONS

| | | |
|---|---|---|
| Output Voltage accuracy | | ±2% ,max. |
| Line regulation | | ±0.5% ,max. |
| Load regulation | (From 0% to 100% Load) | ±0.5% ,max. |
| | (Output 3.3V Model) | ±1.5% ,max. |
| Ripple & noise (20 MHz bandwidth)(1) | | 75mVpk-pk ,max. |
| Short Circuit Protection | | Indefinite(Automatic Recovery) |
| Temperature coefficient | | ±0.02%/°C |
| Capacitor load(2) | | See table ,max. |

### INPUT SPECIFICATIONS

| | |
|---|---|
| Input Voltage Range | ±10% |
| Input Current (No Load) | See table ,max. |
| Input Current (Full Load) | See table ,typ. |
| Input Filter | Capacitor |
| Input Reflected Ripple Current(3) | 20mApk-pk ,typ. |

### GENERAL SPECIFICATIONS

| | |
|---|---|
| Efficiency | See table ,max. |
| I/O Isolation Voltage(60sec) | |
| Input/Output | 1000~5200Vdc |
| I/O Isolation Capacitance | 60 pF Typ. |
| I/O Isolation Resistance | 1000MΩ ,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 (1.5mm from case 10sec max.) | 260°C ,max. |

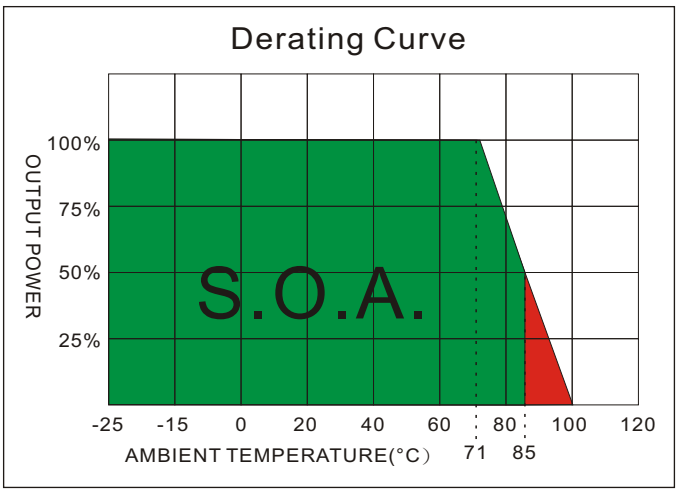
### EMC SPECIFICATIONS

| | | |
|---|---|---|
| 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 |

## PART NUMBER STRUCTURE

VF - 24 05 S 1 H

- **Series Name**
- **Input Voltage**
  - **05** - 5V
  - **12** - 12V
  - **24** - 24V
- **Output Voltage**
  - **3R3** - 3.3V
  - **05** - 5V
  - **7R2** - 7.2V
  - **09** - 9V
  - **12** - 12V
  - **15** - 15V
  - **18** - 18V
  - **24** - 24V
- **SIP Case**
- 1.5Watt
- **High Isolation**
  Optional, if no suffix "H" mean 1 KVDC Isolation
  - **H** - 3KVdc Isolation
  - **H4** - 4KVdc Isolation
  - **H5** - 5.2KVdc Isolation




# MODEL SELECTION GUIDE

| MODEL NUMBER | INPUT Voltage Range (Vdc) | INPUT Current No-Load (mA ,max.) | INPUT Current Full Load (mA ,typ.) | OUTPUT Voltage (Vdc) | OUTPUT Current Full load (mA) | EFFICIENCY @FL (% ,typ.) | Capacitor Load @LF (µF ,max.) |
|---|---|---|---|---|---|---|---|
| VF-053R3S1 | 5 | 70 | 489 | 3.3 | 400 | 54 | 220 |
| VF-0505S1 | 5 | 43 | 448 | 5 | 300 | 67 | 220 |
| VF-057R2S1 | 5 | 70 | 469 | 7.2 | 208.3 | 64 | 220 |
| VF-0509S1 | 5 | 70 | 462 | 9 | 166.6 | 65 | 220 |
| VF-0512S1 | 5 | 80 | 448 | 12 | 125 | 67 | 220 |
| VF-0515S1 | 5 | 85 | 462 | 15 | 100 | 65 | 220 |
| VF-0518S1 | 5 | 100 | 448 | 18 | 83.3 | 67 | 220 |
| VF-0524S1 | 5 | 130 | 500 | 24 | 62.5 | 60 | 220 |
| VF-123R3S1 | 12 | 70 | 200 | 3.3 | 400 | 55 | 220 |
| VF-1205S1 | 12 | 30 | 198 | 5 | 300 | 63 | 220 |
| VF-127R2S1 | 12 | 40 | 198 | 7.2 | 208.3 | 63 | 220 |
| VF-1209S1 | 12 | 40 | 195 | 9 | 166.6 | 64 | 220 |
| VF-1212S1 | 12 | 33 | 195 | 12 | 125 | 64 | 220 |
| VF-1215S1 | 12 | 36 | 189 | 15 | 100 | 66 | 220 |
| VF-1218S1 | 12 | 40 | 187 | 18 | 83.3 | 67 | 220 |
| VF-1224S1 | 12 | 55 | 187 | 24 | 62.5 | 67 | 220 |
| VF-243R3S1 | 24 | 25 | 102 | 3.3 | 400 | 54 | 220 |
| VF-2405S1 | 24 | 17 | 98 | 5 | 300 | 64 | 220 |
| VF-247R2S1 | 24 | 25 | 96 | 7.2 | 208.3 | 65 | 220 |
| VF-2409S1 | 24 | 25 | 96 | 9 | 166.6 | 65 | 220 |
| VF-2412S1 | 24 | 25 | 93 | 12 | 125 | 67 | 220 |
| VF-2415S1 | 24 | 25 | 98 | 15 | 100 | 64 | 220 |
| VF-2418S1 | 24 | 25 | 96 | 18 | 83.3 | 65 | 220 |
| VF-2424S1 | 24 | 19 | 95 | 24 | 62.5 | 66 | 220 |

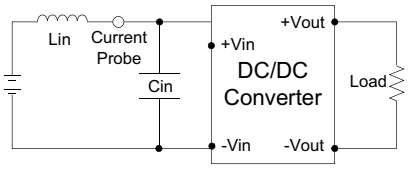
Suffix "H" means 3 KVdc isolation  Suffix "H4" means 4 KVdc isolation  Suffix "H5" means 5.2 KVdc isolation

The models listed above is just for standard type. If you need the special specification product, please contact our service member by telephone presented in shortform cover or e-mail to : sales@motien.com.tw

## TEST CONFIGURATIONS

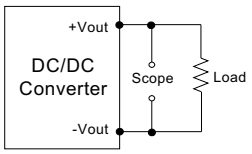
### Input Reflected Ripple Current Test Step

Input reflected ripple current is measured through a source inductor Lin(12μH) and a source capacitor Cin(47μF, ESR<1.0Ω at 100KHz) at nominal input and full load.



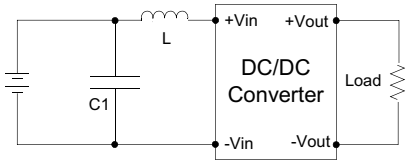

### Output Ripple & Noise Measurement Test

The Scope measurement bandwidth is 20MHz .




### EMI Filter

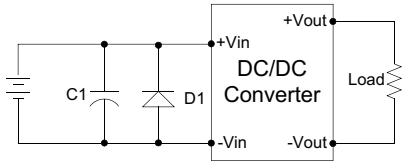
Input filter components (C1, L ) are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.




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

### 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-05XXXXXXX | 1000uF,50V | SMAJ9A |
| VF-12XXXXXXX | | SMAJ14A |
| VF-24XXXXXXX | | SMAJ26A |

## NOTE

1.Ripple/Noise measured with 20MHz bandwidth.
2.Tested by minimal Vin and constant resistive load.
3.Measured Input reflected ripple current with a simulated source inductance of 12μH.
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 be 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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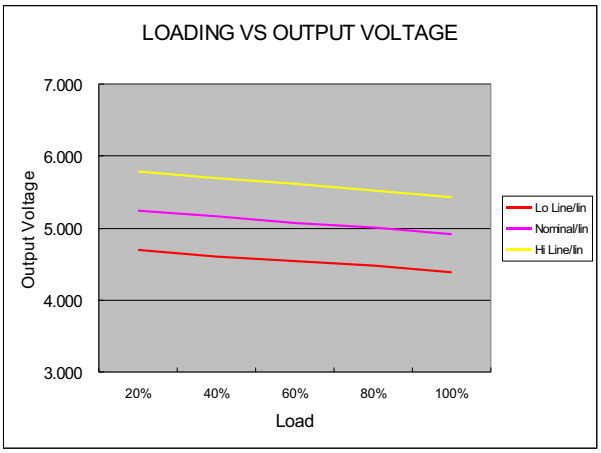
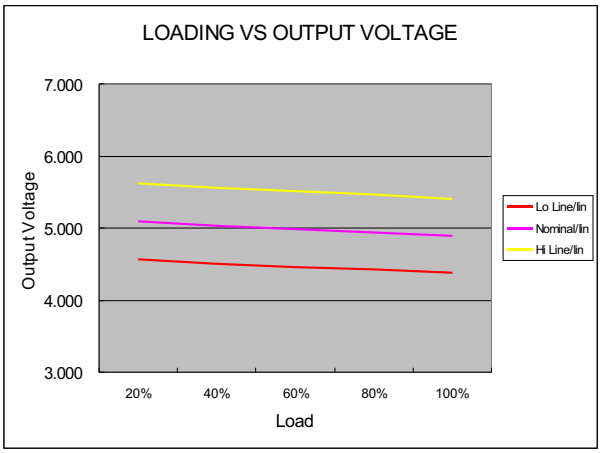
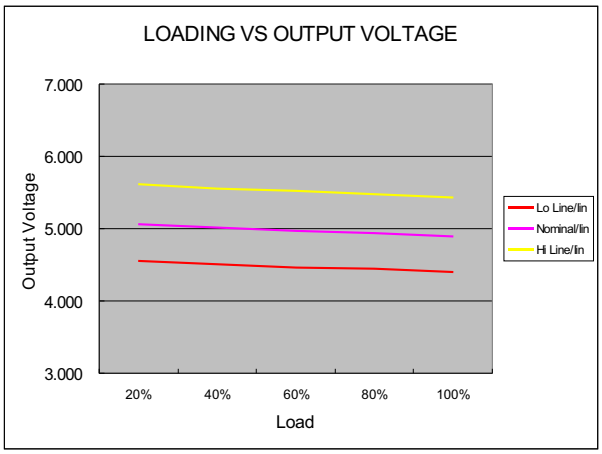



05 Models

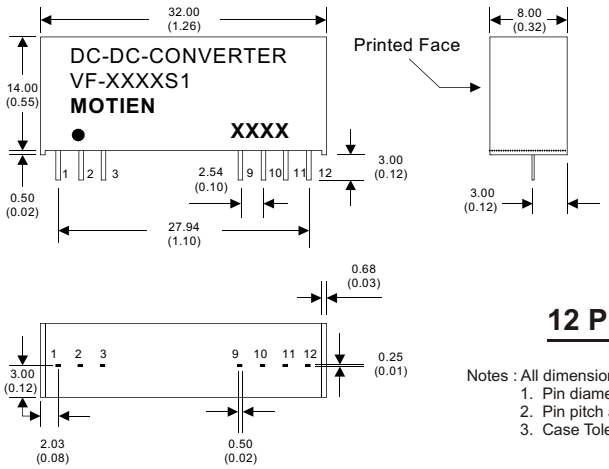



12 Models




24 Models

## MECHANICAL SPECIFICATIONS




**12 Pin SIL Package**

Notes : All dimensions are typical in millimeters ( inches ).
1. Pin diameter: 0.5±0.05 ( 0.02±0.002 )
2. Pin pitch and length tolerance: ±0.35 ( ±0.014 )
3. Case Tolerance: ±0.5 ( ±0.02 )

| 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. |

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