

# VA-D01 Series

1W Unregulated Dual Separate output



## Features

- 8 Pin DIL Package
- 1000 VDC Isolation
- Up to 3000 VDC Isolation
- Low Ripple and Noise
- Efficiency up to 83%
- -40 ~ 85°C Operation Temperature Range
- Non-Conductive Black Plastic Case
- EMI Complies With EN55022 Class B



The VA series is a family of cost effective 1W dual separate output DC-DC converters. These converters achieve low cost and ultra-miniature DIP 8 pin size. Devices are encapsulated using flame retardant resin. The models operate from input voltage of 3.3, 5, 12, 15, 24 Vdc with output voltage of 3.3, 5, 7.2, 9, 12, 15, 18, 24 Vdc. High performance features include 1000Vdc~3000Vdc input/output isolation, high efficiency operation and output voltage accuracy of  $\pm 3\%$  maximum. Standard features include an input range of  $\pm 10\%$  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                |                                                                      |
|--------------------------------------|----------------------------------------------------------------------|
| Voltage accuracy                     | $\pm 3\%$                                                            |
| Line regulation                      | $\pm 1.2\%$ / Per 1% Vin Change                                      |
| Load regulation                      | (From 20% to 100% Load) $\pm 10\%$<br>(Output 3.3V Model) $\pm 15\%$ |
| Ripple & noise (20 MHz bandwidth)(1) | 100mVpk-pk                                                           |
| Temperature coefficient              | $\pm 0.02\%/^{\circ}\text{C}$                                        |
| Capacitor load(2)                    | See table                                                            |

| INPUT SPECIFICATIONS              |                       |
|-----------------------------------|-----------------------|
| Voltage Range                     | $\pm 10\%$            |
| Max. Input Current                | See table             |
| No-Load Input Current             | See table             |
| Input Filter                      | Capacitors            |
| Input Reflected Ripple Current(3) | 20mA <sub>pk-pk</sub> |

| PHYSICAL SPECIFICATIONS |                                             |
|-------------------------|---------------------------------------------|
| Case Material           | Non-conductive Black Plastic(UL94V-0 rated) |
| Pin Material            | $\Phi 0.5\text{mm}$ Brass Solder-coated     |
| Potting Material        | Epoxy (UL94V-0 rated)                       |
| Weight                  | 1.8g                                        |
| Dimensions              | 0.50"x0.40"x0.27"                           |

| ENVIRONMENT SPECIFICATIONS |                                 |
|----------------------------|---------------------------------|
| Operating Temperature      | -40°C~85°C (See Derating Curve) |
| Maximum Case Temperature   | 100°C                           |
| Storage Temperature        | -40°C~125°C                     |
| Cooling                    | Nature Convection               |

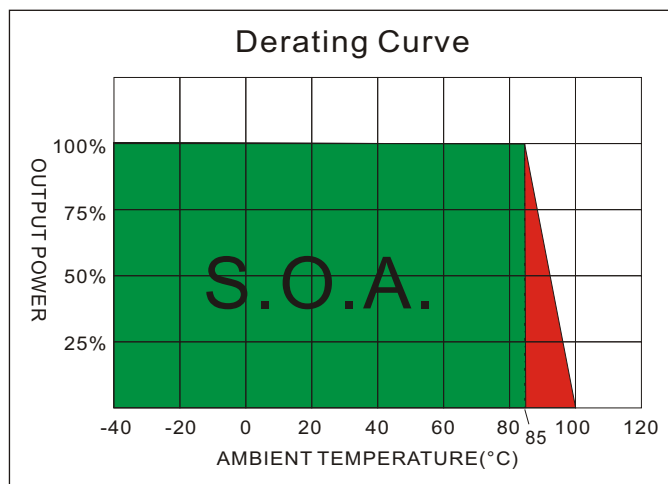
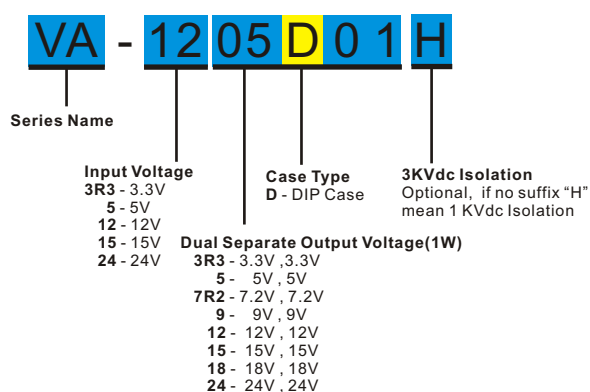
| GENERAL SPECIFICATIONS                      |                |
|---------------------------------------------|----------------|
| Efficiency                                  | See table      |
| I/O Isolation Voltage(60 sec)               |                |
| Input/Output1&Output2                       | 1000~3000Vdc   |
| Output1/Output2                             | 1000Vdc        |
| I/O Isolation Capacitance                   | 60 pF Typ.     |
| I/O Isolation Resistance                    | 1000M Ohm      |
| Switching Frequency                         | Variable 80kHz |
| Humidity                                    | 95% rel H      |
| Reliability Calculated MTBF(MIL-HDBK-217 F) | >1.121 Mhrs    |
| Safety Standard : (designed to meet)        | IEC 60950-1    |

| 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)                                                                                           |              |
| 3.3 Models                                                                                                           | 5 Vdc ,max.  |
| 5 Models                                                                                                             | 7 Vdc ,max.  |
| 12 Models                                                                                                            | 15 Vdc ,max. |
| 15 Models                                                                                                            | 18 Vdc ,max. |
| 24 Models                                                                                                            | 28 Vdc ,max. |
| Soldering Temperature                                                                                                | 260°C ,max.  |
| (1.5mm from case 10 sec. 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 |

## VA - 1W Unregulated Dual Separate output

### PART NUMBER STRUCTURE



## MODEL SELECTION GUIDE

| MODEL NUMBER | INPUT                  | INPUT Current   |                   | OUTPUT                          |                                  | EFFICIENCY<br>@FL(%) | Capacitor<br>Load(uF) |
|--------------|------------------------|-----------------|-------------------|---------------------------------|----------------------------------|----------------------|-----------------------|
|              | Voltage Range<br>(Vdc) | No-Load<br>(mA) | Full Load<br>(mA) | Voltage(Vdc)<br>Output1 Output2 | Full load(mA)<br>Output1 Output2 |                      |                       |
| VA-3R3R3D01  | 3.3                    | 20              | 399               | 3.3 , 3.3                       | 152 , 152                        | 76                   | 100                   |
| VA-3R305D01  | 3.3                    | 25              | 433               | 5 , 5                           | 100 , 100                        | 70                   | 100                   |
| VA-3R37R2D01 | 3.3                    | 25              | 433               | 7.2 , 7.2                       | 69 , 69                          | 70                   | 100                   |
| VA-3R309D01  | 3.3                    | 30              | 410               | 9 , 9                           | 56 , 56                          | 74                   | 100                   |
| VA-3R312D01  | 3.3                    | 38              | 478               | 12 , 12                         | 50 , 50                          | 76                   | 100                   |
| VA-3R315D01  | 3.3                    | 30              | 404               | 15 , 15                         | 33 , 33                          | 75                   | 100                   |
| VA-3R318D01  | 3.3                    | 30              | 399               | 18 , 18                         | 28 , 28                          | 76                   | 100                   |
| VA-3R324D01  | 3.3                    | 30              | 472               | 24 , 24                         | 25 , 25                          | 77                   | 100                   |
| VA-053R3D01  | 5                      | 15              | 299               | 3.3 , 3.3                       | 152 , 152                        | 67                   | 100                   |
| VA-0505D01   | 5                      | 20              | 247               | 5 , 5                           | 100 , 100                        | 81                   | 100                   |
| VA-057R2D01  | 5                      | 16              | 260               | 7.2 , 7.2                       | 69 , 69                          | 77                   | 100                   |
| VA-0509D01   | 5                      | 15              | 253               | 9 , 9                           | 56 , 56                          | 79                   | 100                   |
| VA-0512D01   | 5                      | 20              | 300               | 12 , 12                         | 50 , 50                          | 80                   | 100                   |
| VA-0515D01   | 5                      | 20              | 247               | 15 , 15                         | 33 , 33                          | 81                   | 100                   |
| VA-0518D01   | 5                      | 20              | 247               | 18 , 18                         | 28 , 28                          | 81                   | 100                   |
| VA-0524D01   | 5                      | 25              | 320               | 24 , 24                         | 25 , 25                          | 75                   | 100                   |
| VA-123R3D01  | 12                     | 15              | 111               | 3.3 , 3.3                       | 152 , 152                        | 75                   | 100                   |
| VA-1205D01   | 12                     | 10              | 111               | 5 , 5                           | 100 , 100                        | 75                   | 100                   |
| VA-127R2D01  | 12                     | 10              | 107               | 7.2 , 7.2                       | 69 , 69                          | 78                   | 100                   |
| VA-1209D01   | 12                     | 10              | 105               | 9 , 9                           | 56 , 56                          | 79                   | 100                   |
| VA-1212D01   | 12                     | 15              | 125               | 12 , 12                         | 50 , 50                          | 80                   | 100                   |
| VA-1215D01   | 12                     | 13              | 104               | 15 , 15                         | 33 , 33                          | 80                   | 100                   |
| VA-1218D01   | 12                     | 20              | 107               | 18 , 18                         | 28 , 28                          | 78                   | 100                   |
| VA-1224D01   | 12                     | 20              | 128               | 24 , 24                         | 25 , 25                          | 78                   | 100                   |
| VA-153R3D01  | 15                     | 20              | 89                | 3.3 , 3.3                       | 152 , 152                        | 75                   | 100                   |
| VA-1505D01   | 15                     | 20              | 88                | 5 , 5                           | 100 , 100                        | 76                   | 100                   |
| VA-157R2D01  | 15                     | 20              | 88                | 7.2 , 7.2                       | 69 , 69                          | 76                   | 100                   |
| VA-1509D01   | 15                     | 15              | 88                | 9 , 9                           | 56 , 56                          | 76                   | 100                   |
| VA-1512D01   | 15                     | 15              | 107               | 12 , 12                         | 50 , 50                          | 75                   | 100                   |
| VA-1515D01   | 15                     | 15              | 89                | 15 , 15                         | 33 , 33                          | 75                   | 100                   |
| VA-1518D01   | 15                     | 20              | 87                | 18 , 18                         | 28 , 28                          | 77                   | 100                   |
| VA-1524D01   | 15                     | 20              | 104               | 24 , 24                         | 25 , 25                          | 77                   | 100                   |

Suffix "H" means 3 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

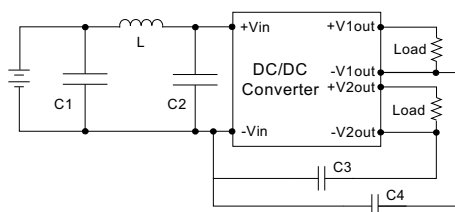
# VA - 1W Unregulated Dual Separate output

| MODEL NUMBER | INPUT         | INPUT Current |           | OUTPUT       |         | OUTPUT Current | EFFICIENCY<br>@FL(%) | Capacitor<br>Load(uF) |
|--------------|---------------|---------------|-----------|--------------|---------|----------------|----------------------|-----------------------|
|              | Voltage Range | No-Load       | Full Load | Voltage(Vdc) |         | Full load(mA)  |                      |                       |
|              | (Vdc)         | (mA)          | (mA)      | Output1      | Output2 | Output1        | Output2              |                       |
| VA-243R3D01  | 24            | 5             | 53        | 3.3          | 3.3     | 152            | 152                  | 100                   |
| VA-2405D01   | 24            | 8             | 50        | 5            | 5       | 100            | 100                  | 100                   |
| VA-247R2D01  | 24            | 5             | 53        | 7.2          | 7.2     | 69             | 69                   | 100                   |
| VA-2409D01   | 24            | 8             | 54        | 9            | 9       | 56             | 56                   | 100                   |
| VA-2412D01   | 24            | 6             | 63        | 12           | 12      | 50             | 50                   | 100                   |
| VA-2415D01   | 24            | 6             | 54        | 15           | 15      | 33             | 33                   | 100                   |
| VA-2418D01   | 24            | 13            | 56        | 18           | 18      | 28             | 28                   | 100                   |
| VA-2424D01   | 24            | 5             | 65        | 24           | 24      | 25             | 25                   | 100                   |

Suffix "H" means 3 KVdc isolation

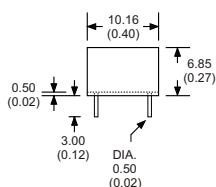
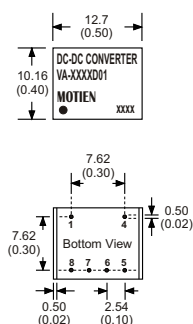
## NOTE

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 12uH.
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 filter capacitor Motien suggest: Nippon - chemi - con KY series, 470uF/100V.



|             | C1               | L    | C2               | C3              | C4              |
|-------------|------------------|------|------------------|-----------------|-----------------|
| VA-3R3XXXXX | 1210, 2.2uF/100V | 18uH |                  |                 |                 |
| VA-05XXXXXX | 1210, 2.2uF/100V | 18uH |                  |                 |                 |
| VA-12XXXXXX | 1210, 2.2uF/100V | 18uH |                  |                 |                 |
| VA-15XXXXXX | 1210, 2.2uF/100V | 18uH |                  |                 |                 |
| VA-24XXXXXX | 1210, 2.2uF/100V | 18uH | 1210, 2.2uF/100V | 1206, 470pF/2KV | 1206, 470pF/2KV |

## MECHANICAL SPECIFICATIONS



## 8 Pin DIL 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 )
- (The Pin Connection of high isolation one is the same with normal one.)

## PIN CONNECTIONS

| PIN NUMBER | Dual Separate |
|------------|---------------|
| 1          | -V Input      |
| 4          | +V Input      |
| 5          | +V1 Output    |
| 6          | -V1 Output    |
| 7          | +V2 Output    |
| 8          | -V2 Output    |