

# VN-15W Series

15W 2:1 Regulated Single & Dual output



## Features

- Wide 2:1 Input Range
- Full SMD Technology
- Soft Start
- No Minimum Load Required
- Efficiency up to 89%
- Adjustable Output Voltage
- Remote On/Off Control (CTRL)
- Over Load Protection
- Over Voltage Protection
- 1600 VDC Isolation
- Operating Temperature Range -40 ~ 85°C max.



The VN series is a family of compact and high power density 15W single & dual output DC-DC converters. The compact nickel-coated copper package in an 1"x1" case reduces the size of 50% from conventional 2"x1", superior Line / Load Regulation with over current & over voltage protection. Input voltages of 12, 24 and 48 with output voltage of 3.3, 5, 12, 15,  $\pm 5$ ,  $\pm 12$ ,  $\pm 15$ Vdc. High performance features include high efficiency operation up to 89% and output voltage accuracy of  $\pm 1\%$  maximum with adjustable output.

ALL SPECIFICATIONS ARE TYPICAL AT 25°C, NOMINAL INPUT AND FULL LOAD UNLESS OTHERWISE NOTED.

| OUTPUT SPECIFICATIONS                           |                                                                                                                                                                        |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Output Voltage Accuracy                         | $\pm 1\%$ , max.                                                                                                                                                       |
| Output Voltage Adjustability (Trim)             | Single output: $\pm 10\%$ , max.                                                                                                                                       |
| Output Current                                  | See table, max.                                                                                                                                                        |
| Line Regulation                                 | Single: $\pm 0.2\%$ , max.<br>Dual(balanced load): $\pm 0.5\%$ , max.                                                                                                  |
| Load Regulation ( $I_o=0\%$ to 100%)            | Single: $\pm 0.5\%$ , max.<br>Dual(balanced load): $\pm 1\%$ , max.                                                                                                    |
| Cross Regulation (Dual Output) (1)              | $\pm 5\%$ , max.                                                                                                                                                       |
| Ripple & Noise (20MHz bandwidth) (2)            | 100mVpk-pk, max.                                                                                                                                                       |
| Over Voltage Protection<br>( Zener diode clamp) | 3.3V output 3.9V<br>5V output 6.2V<br>12V output 15V<br>15V output 18V<br>$\pm 5$ V output $\pm 6.2$ V<br>$\pm 12$ V output $\pm 15$ V<br>$\pm 15$ V output $\pm 18$ V |
| Over Load Protection                            | 150% of FL, typ.                                                                                                                                                       |
| Short Circuit Protection                        | Indefinite(hiccup)<br>(Automatic Recovery)                                                                                                                             |
| Temperature Coefficient                         | $\pm 0.02\%/^{\circ}\text{C}$                                                                                                                                          |
| Capacitive Load (3)                             | See table, max.                                                                                                                                                        |
| Transient Recovery Time (4)                     | 250 $\mu\text{s}$ , typ.                                                                                                                                               |
| Transient Response Deviation (4)                | $\pm 3\%$ , max.                                                                                                                                                       |

| INPUT SPECIFICATIONS                                       |                                                                                                                    |
|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| Input Voltage Range                                        | See table                                                                                                          |
| Start up Time<br>(Nominal Vin and constant resistive load) | 20mS, typ.                                                                                                         |
| Input Filter                                               | Pi Type                                                                                                            |
| Input Current (No-Load)                                    | See table, max.                                                                                                    |
| Input Current (Full-Load)                                  | See table, typ.                                                                                                    |
| Input Reflected Ripple Current (5)                         | 20mApk-pk, typ.                                                                                                    |
| Remote On/Off (Positive logic) (6)                         | ON: 3.0 ~ 12Vdc or open circuit<br>OFF: 0 ~ 1.2Vdc or Short circuit pin 2 and pin 3<br>OFF idle current: 5mA, typ. |

| ENVIRONMENTAL SPECIFICATIONS  |                                                                   |
|-------------------------------|-------------------------------------------------------------------|
| Operating Ambient Temperature | -40°C ~ +85°C(See Derating Curve)<br>-40°C ~ +66°C(For 100% load) |
| Maximum Case Temperature      | 105°C                                                             |
| Storage Temperature           | -55°C ~ +125°C                                                    |
| Cooling (7)                   | Nature Convection                                                 |

| GENERAL SPECIFICATIONS                      |                                                    |
|---------------------------------------------|----------------------------------------------------|
| Efficiency                                  | See table, typ.                                    |
| I/O Isolation Voltage (60sec)               |                                                    |
| Input / Output                              | 1600Vdc                                            |
| Case / Input & Output                       | 1600Vdc                                            |
| Isolation Resistance                        | 1000M $\Omega$ , min.                              |
| Isolation Capacitance                       | 1200pF, max.                                       |
| Switching Frequency                         | 375kHz, typ.                                       |
| Humidity                                    | 95% rel H                                          |
| Reliability Calculated MTBF(MIL-HDBK-217 F) | >560khrs                                           |
| Safety Standard                             | UL/cUL 60950-1, 62368-1<br>IEC/EN 60950-1, 62368-1 |
| Safety Approvals                            | UL/cUL 60950-1, 62368-1<br>IEC/EN 60950-1, 62368-1 |

| EMC CHARACTERISTICS     |              |                  |
|-------------------------|--------------|------------------|
| Radiated Emissions      | EN55032      | CLASS A          |
| Conducted Emissions (8) | EN55032      | CLASS A          |
| ESD                     | IEC61000-4-2 | Perf. Criteria A |
| RS                      | IEC61000-4-3 | Perf. Criteria A |
| EFT (9)                 | IEC61000-4-4 | Perf. Criteria A |
| Surge (9)               | IEC61000-4-5 | Perf. Criteria A |
| CS                      | IEC61000-4-6 | Perf. Criteria A |
| PFMF                    | IEC61000-4-8 | Perf. Criteria A |

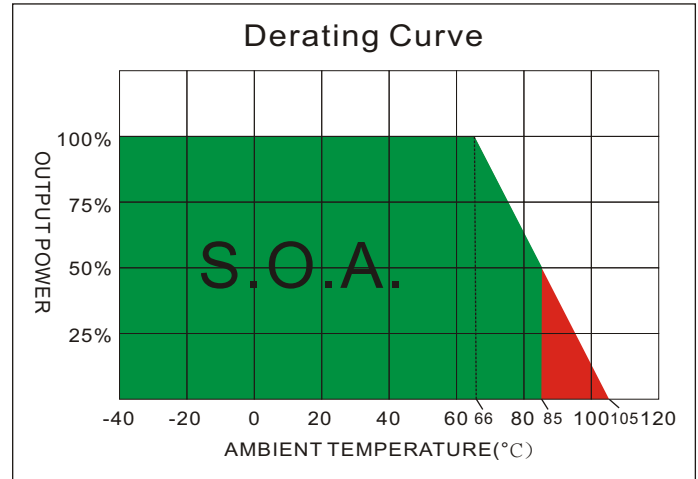
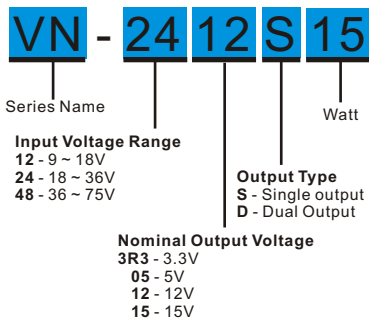
| PHYSICAL SPECIFICATIONS |                                             |
|-------------------------|---------------------------------------------|
| Case Material           | Nickel-coated Copper                        |
| Base Material           | Non-conductive Black Plastic(UL94V-0 rated) |
| Pin Material            | $\Phi 1.0\text{mm}$ Brass Solder-coated     |
| Potting Material        | Epoxy (UL94V-0 rated)                       |
| Weight                  | 18.1g                                       |
| Dimensions              | 1.00"x1.00"x0.40"                           |

| ABSOLUTE SPECIFICATIONS (10)                                                                                         |              |
|----------------------------------------------------------------------------------------------------------------------|--------------|
| These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability. |              |
| Input Surge Voltage (100mS)                                                                                          |              |
| 12 Models                                                                                                            | 36Vdc, max.  |
| 24 Models                                                                                                            | 50Vdc, max.  |
| 48 Models                                                                                                            | 100Vdc, max. |
| Soldering Temperature<br>(1.5mm from case 10sec max.)                                                                | 260°C, max.  |

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## VN - 15W 2:1 Regulated Single & Dual output

### PART NUMBER STRUCTURE



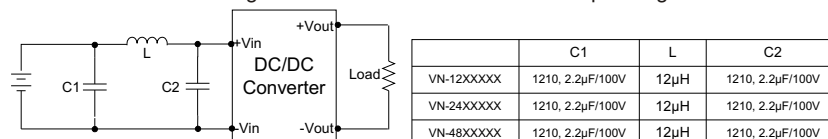
### MODEL SELECTION GUIDE

| MODEL NUMBER | INPUT Voltage Range (Vdc) | INPUT Current      |                      | OUTPUT Voltage (Vdc) | OUTPUT Current |                | EFFICIENCY @FL (% , typ.) | Capacitor Load @FL (μF, max.) |
|--------------|---------------------------|--------------------|----------------------|----------------------|----------------|----------------|---------------------------|-------------------------------|
|              |                           | No-Load (mA, max.) | Full Load (mA, typ.) |                      | Min. load (mA) | Full load (mA) |                           |                               |
| VN-123R3S15  | 9-18                      | 20                 | 1310                 | 3.3                  | 0              | 4000           | 85                        | 1000                          |
| VN-1205S 15  | 9-18                      | 20                 | 1471                 | 5                    | 0              | 3000           | 86                        | 1000                          |
| VN-1212S 15  | 9-18                      | 20                 | 1494                 | 12                   | 0              | 1300           | 88                        | 330                           |
| VN-1215S 15  | 9-18                      | 20                 | 1420                 | 15                   | 0              | 1000           | 89                        | 220                           |
| VN-243R3S15  | 18-36                     | 15                 | 647                  | 3.3                  | 0              | 4000           | 86                        | 1000                          |
| VN-2405S 15  | 18-36                     | 15                 | 727                  | 5                    | 0              | 3000           | 87                        | 1000                          |
| VN-2412S 15  | 18-36                     | 15                 | 747                  | 12                   | 0              | 1300           | 88                        | 330                           |
| VN-2415S 15  | 18-36                     | 15                 | 710                  | 15                   | 0              | 1000           | 89                        | 220                           |
| VN-483R3S15  | 36-75                     | 10                 | 327                  | 3.3                  | 0              | 4000           | 85                        | 1000                          |
| VN-4805S 15  | 36-75                     | 10                 | 368                  | 5                    | 0              | 3000           | 86                        | 1000                          |
| VN-4812S 15  | 36-75                     | 10                 | 374                  | 12                   | 0              | 1300           | 88                        | 330                           |
| VN-4815S 15  | 36-75                     | 10                 | 359                  | 15                   | 0              | 1000           | 88                        | 220                           |
| VN-1205D 15  | 9-18                      | 20                 | 1488                 | ±5                   | 0              | ±1500          | 85                        | ±470                          |
| VN-1212D 15  | 9-18                      | 20                 | 1420                 | ±12                  | 0              | ±625           | 89                        | ±220                          |
| VN-1215D 15  | 9-18                      | 20                 | 1437                 | ±15                  | 0              | ±500           | 89                        | ±100                          |
| VN-2405D 15  | 18-36                     | 15                 | 744                  | ±5                   | 0              | ±1500          | 85                        | ±470                          |
| VN-2412D 15  | 18-36                     | 15                 | 718                  | ±12                  | 0              | ±625           | 88                        | ±220                          |
| VN-2415D 15  | 18-36                     | 15                 | 710                  | ±15                  | 0              | ±500           | 89                        | ±100                          |
| VN-4805D 15  | 36-75                     | 10                 | 377                  | ±5                   | 0              | ±1500          | 84                        | ±470                          |
| VN-4812D 15  | 36-75                     | 10                 | 363                  | ±12                  | 0              | ±625           | 87                        | ±220                          |
| VN-4815D 15  | 36-75                     | 10                 | 359                  | ±15                  | 0              | ±500           | 88                        | ±100                          |

### NOTE

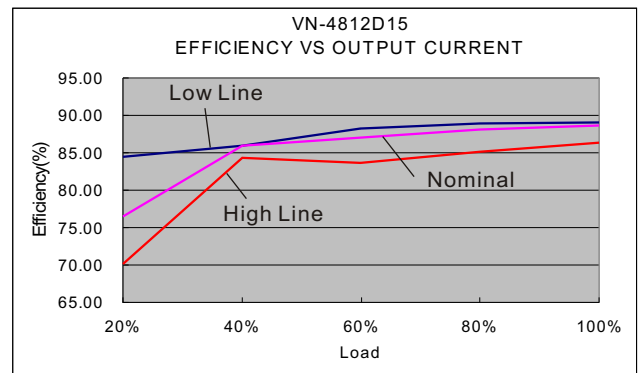
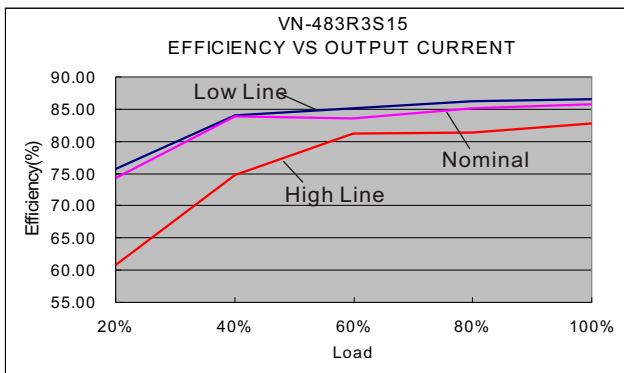
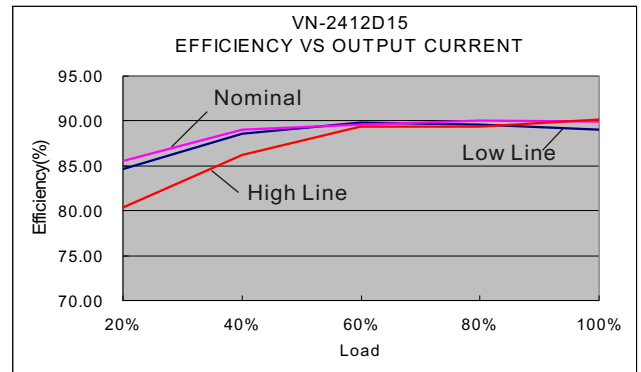
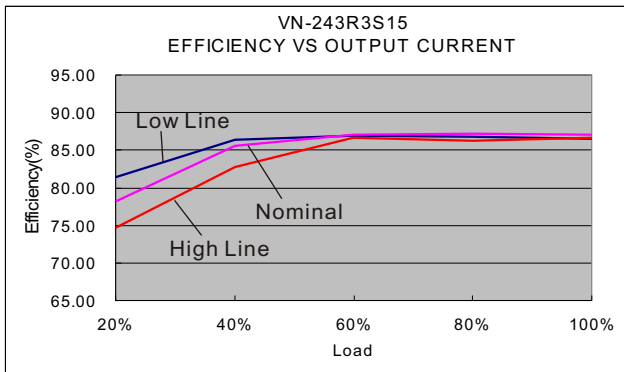
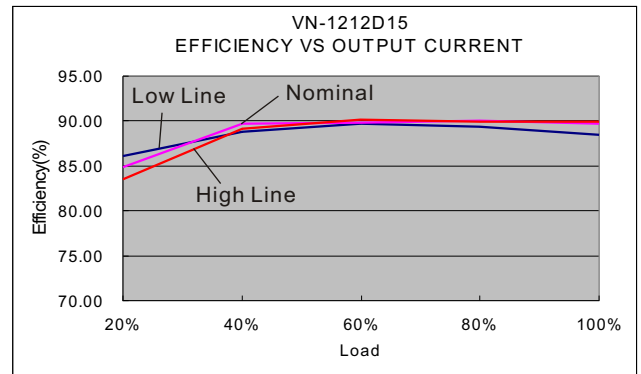
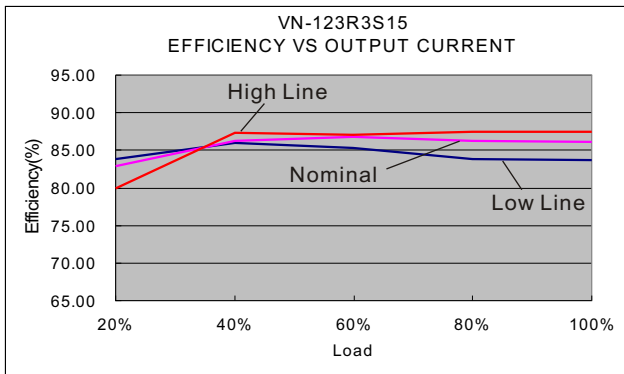
- One load is 25% to 100% load, the other load is 100% load, the output voltage variable rate is within ±5%.
- Measured with a 1.0μF ceramic capacitor and 10μF tantalum capacitor.
- Tested by minimal Vin and constant resistive load.
- Tested by normal Vin and 25% load step change (75%-50%-25% of Io).
- Measured with a simulated source inductance of 12μH and a source capacitor Cin(47μF, ESR<1.0Ω at 100KHz).
- The remote on/off control pin is referenced to -Vin(pin2).
- Nature Convection" is usually about 30-65 LFM but is not equal to still air (0 LFM).
- Input filter components (C1, C2, L) are used to 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.
- 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, 220μF/100V.
- Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.

### EMI Filter

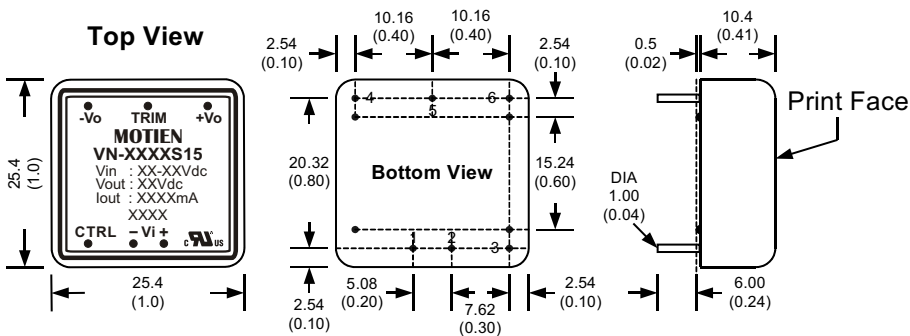


The models listed above is just for standard type. If you need the special specification product, please contact our service member by telephone presented in shortform cover or e-mail to : sales@motien.com.tw

## VN - 15W 2:1 Regulated Single & Dual output



### MECHANICAL SPECIFICATIONS



All dimensions are typical in millimeters ( inches ).

1. Pin diameter:  $1.0 \pm 0.05$  (  $0.04 \pm 0.002$  )
2. Pin pitch and length tolerance:  $\pm 0.35$  (  $\pm 0.014$  )
3. Case Tolerance:  $\pm 0.5$  (  $\pm 0.02$  )
4. Stand-off tolerance:  $\pm 0.1$  (  $\pm 0.004$  )

### PIN CONNECTIONS

| PIN NUMBER | SINGLE | DUAL  |
|------------|--------|-------|
| 1          | +Vin   | +Vin  |
| 2          | -Vin   | -Vin  |
| 3          | CTRL   | CTRL  |
| 4          | +Vout  | +Vout |
| 5          | Trim   | Com   |
| 6          | -Vout  | -Vout |

### EXTERNAL OUTPUT TRIMMING

Output can be externally trimmed by using the method as below. (single output models only )

