

# VN-15W Series

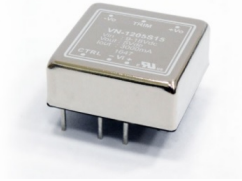
15W 2:1 Regulated Single & Dual output



electronic powersolutions

## 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. Dual(balanced load): $\pm 0.5\%$ , max.
Load Regulation (Io=0% to 100%)	Single: $\pm 0.5\%$ , max. Dual(balanced load): $\pm 1\%$ , max.
Cross Regulation (Dual Output) (1)	$\pm 5\%$ , max.
Ripple & Noise (20MHz bandwidth) (2)	100mVpk-pk, max.
	3.3V output 3.9V
	5V output 6.2V
Over Voltage Protection ( Zener diode clamp)	12V output 15V
	15V output 18V
	$\pm 5$ V output $\pm 6.2$ V
	$\pm 12$ V output $\pm 15$ V
	$\pm 15$ V output $\pm 18$ V
Over Load Protection	150% of FL, typ.
Short Circuit Protection	Indefinite(hiccup) (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 (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)	20mA <sub>pk-pk</sub> , typ.
Remote On/Off (Positive logic) (6)	ON: 3.0 ~ 12Vdc or open circuit OFF: 0 ~ 1.2Vdc or Short circuit pin 2 and pin 3 OFF idle current: 5mA, typ.

ENVIRONMENTAL SPECIFICATIONS	
Operating Ambient Temperature	-40°C ~ +85°C(See Derating Curve) -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)	1600Vdc
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 IEC/EN 60950-1, 62368-1
Safety Approvals	UL/cUL 60950-1, 62368-1 IEC/EN 60950-1, 62368-1

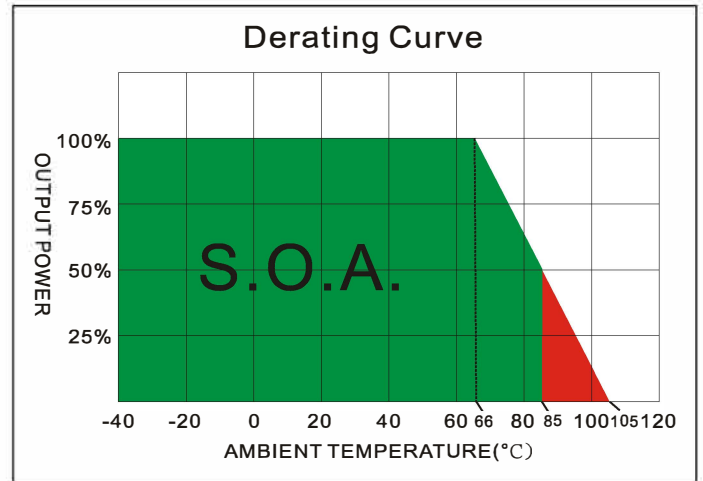
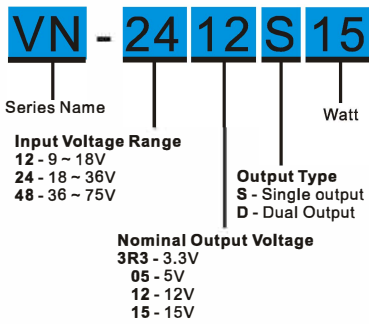
EMC CHARACTERISTICS		
Radiated Emissions	EN55032	CLASS A
Conducted Emissions (8)	EN55032	CLASS A
ESD	IEC61000-4-2	Perf. Criteria A
RS	IEC61000-4-3	Perf. Criteria A
EFT (9)	IEC61000-4-4	Perf. Criteria A
Surge (9)	IEC61000-4-5	Perf. Criteria A
CS	IEC61000-4-6	Perf. Criteria A
PFMF	IEC61000-4-8	Perf. Criteria 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"x0.41"

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)	36Vdc, max.
12 Models	50Vdc, max.
24 Models	100Vdc, max.
48 Models	
Soldering Temperature (1.5mm from case 10sec max.)	260°C, max.

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

### PART NUMBER STRUCTURE



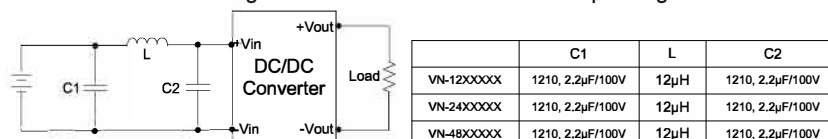
### MODEL SELECTION GUIDE

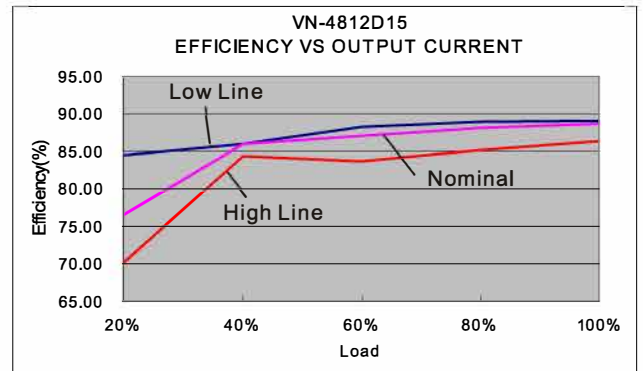
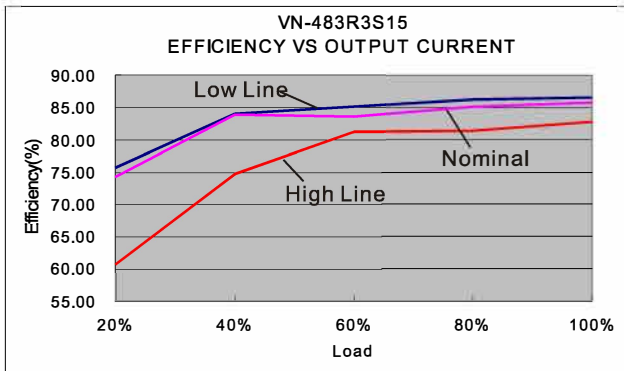
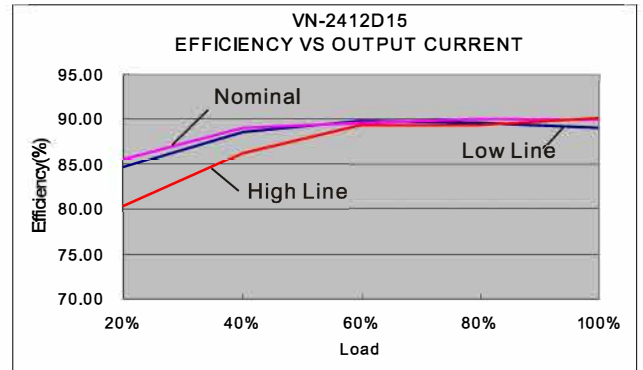
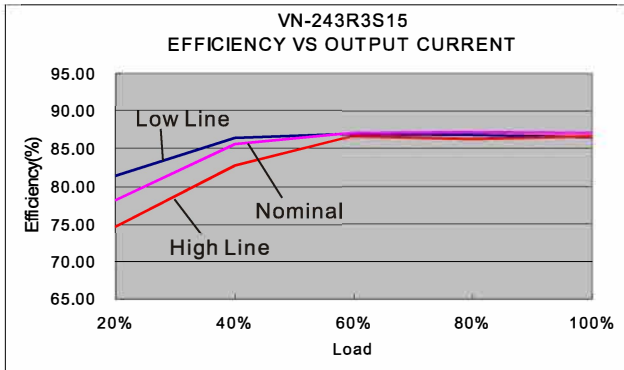
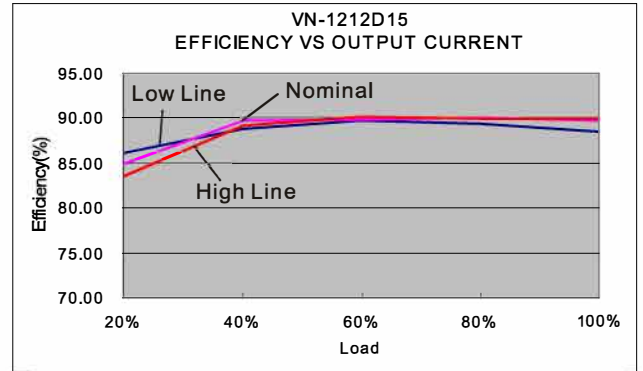
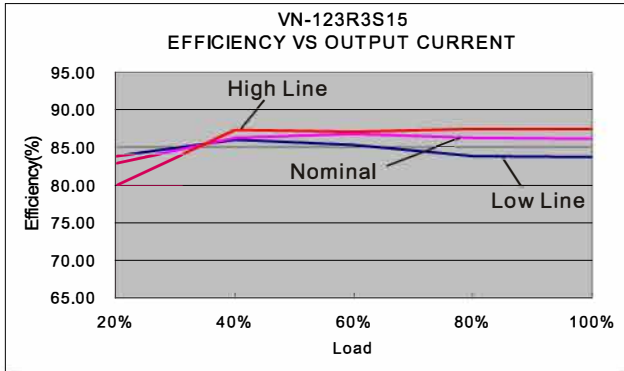
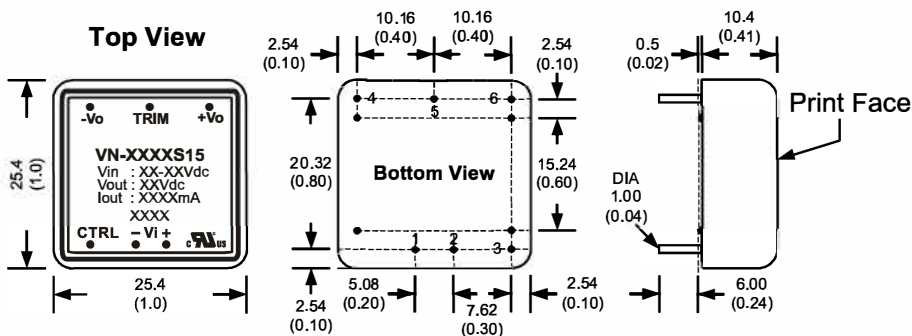
MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current		OUTPUT Voltage (Vdc)	OUTPUT Current		EFFICIENCY @FL (% , typ.)	Capacitor Load @FL (µF, max.)
		No-Load (mA, max.)	Full Load (mA, typ.)		Min. load (mA)	Full load (mA)		
VN-123R3S15	9-18	20	1310	3.3	0	4000	85	1000
VN-1205S15	9-18	20	1471	5	0	3000	86	1000
VN-1212S15	9-18	20	1494	12	0	1300	88	330
VN-1215S15	9-18	20	1420	15	0	1000	89	220
VN-243R3S15	18-36	15	647	3.3	0	4000	86	1000
VN-2405S15	18-36	15	727	5	0	3000	87	1000
VN-2412S15	18-36	15	747	12	0	1300	88	330
VN-2415S15	18-36	15	710	15	0	1000	89	220
VN-483R3S15	36-75	10	327	3.3	0	4000	85	1000
VN-4805S15	36-75	10	368	5	0	3000	86	1000
VN-4812S15	36-75	10	374	12	0	1300	88	330
VN-4815S15	36-75	10	359	15	0	1000	88	220
VN-1205D15	9-18	20	1488	±5	0	±1500	85	±470
VN-1212D15	9-18	20	1420	±12	0	±625	89	±220
VN-1215D15	9-18	20	1437	±15	0	±500	89	±100
VN-2405D15	18-36	15	744	±5	0	±1500	85	±470
VN-2412D15	18-36	15	718	±12	0	±625	88	±220
VN-2415D15	18-36	15	710	±15	0	±500	89	±100
VN-4805D15	36-75	10	377	±5	0	±1500	84	±470
VN-4812D15	36-75	10	363	±12	0	±625	87	±220
VN-4815D15	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 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

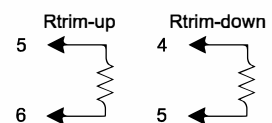


**VN - 15W 2:1 Regulated Single & Dual output**

**MECHANICAL SPECIFICATIONS**

**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)



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:  $\pm 0.1$  (  $\pm 0.004$  )