

VBW-9W Series



9W 4:1 Regulated Single & Dual output

Features

- Highest Power Density In 8 Pin SIP Package
- Wide 4:1 Input Voltage Range
- Smallest Footprint 9W Converter
- -40°C ~+ 85°C Operation Temperature Range
- Efficiency Up To 89%
- Indefinite Short-Circuit Protection
- I/O Isolation 1600VDC
- Remote On/Off Control
- Fully RoHS Compliant



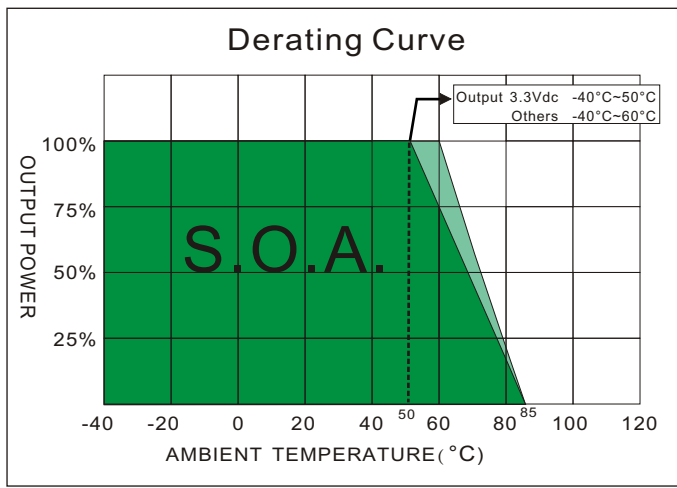
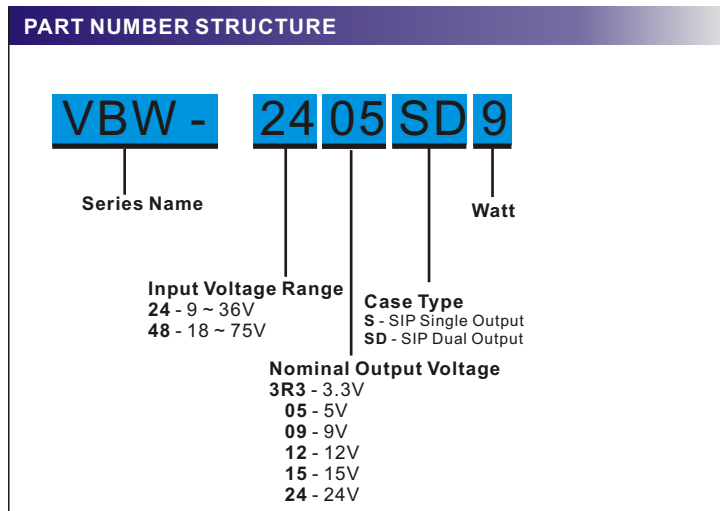
The VBW-9W series is a family of high performed 9W single & dual output DC-DC converters. These converters are built in copper package in a 8-pin SIP miniature compact case with high performance features wide range devices operate over 4:1 input voltage range providing stable output voltage which is much smaller than package of DIP 24 - Same power rating but only 43% of the traditional volume. Devices are encapsulated using flame retardant resin.

Input voltages are 24 Vdc and 48 Vdc with output voltage of 3.3 , 5 , 9 , 12 , 15 , 24 , ±5 , ±12 , ±15 Vdc. Featuring new PWM construction , no minimum load required and precise 1% output voltage accuracy.

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

OUTPUT SPECIFICATIONS		GENERAL SPECIFICATIONS	
Voltage Accuracy	±1%, max.	Efficiency	See table, typ.
Output Current	See table, max.	I/O Isolation Voltage (60sec)	
Line Regulation	±0.2%, max.	Input/Output	1600Vdc
Load Regulation	Single output : ±0.5%, max.	Case/Input & Output	1000Vdc
(From 0% to 100% Load)	3.3V : ±1.0%, max.	I/O Isolation Resistance	1GΩ, min.
(Balance load)Dual output : ±1.0%, max.		I/O Isolation Capacity	50pF, max.
Cross Regulation (Dual Output) (1)	±5%, max.	Switching Frequency	24Vin models : 400kHz, typ. 48Vin models : 500kHz, typ.
Ripple & Noise (20MHz bandwidth)(2)	75mVpk-pk, max.	Humidity	5-95% rel H
Over Voltage Protection	130%, typ.	Reliability Calculated MTBF (MIL-HDBK-217 F)	>900 Khrs
Over Load Protection	180%, typ.	Safety Approvals	UL/cUL 60950-1, 62368-1 IEC/EN 60950-1, 62368-1
Short Circuit Protection	Indefinite (Automatic Recovery)		
Temperature Coefficient	±0.02%/°C		
Capacitive Load(3)	See table, max.		
Transient Recovery Time (4)	250µs, typ.		
Transient Response Deviation(4)	±3%, max.		
	Output 3.3V&5V : ±5%, max.		
INPUT SPECIFICATIONS		PHYSICAL SPECIFICATIONS	
Voltage Range	See table	Case Material	Copper
Start up Time(Nominal Vin and constant resistive load)	50ms, typ.	Potting Material	Epoxy (UL94V-0 rated)
Input Filter	Capacitor	Pin Material	C5191R-H Solder-coated
Input Current (No-Load)	See table, max.	Weight	7.3g, typ.
Input Current (Full-Load)	See table, typ.	Dimensions	0.86"x0.38"x0.44"
Input Reflected Ripple Current(5)	30mApk-pk, max.		
Remote on/off			
ON:	Open or high impedance		
OFF:	2-4mA input current (via 1KΩ).		
Off stand by input current(Nominal Vin)	2.5mA, typ.		
Under voltage lockout			
24V Module ON / OFF	8.9Vdc / 7.0Vdc, typ.		
48V Module ON / OFF	16.0Vdc / 14.0Vdc, typ.		
ABSOLUTE MAXIMUM RATINGS(6)		ENVIRONMENT SPECIFICATIONS	
These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.		Operating Temperature	-40°C ~ +85°C(See Derating Curve) 3.3V : -40°C ~ +50°C(For 100% load) Others : -40°C ~ +60°C(For 100% load)
Input Surge Voltage(100ms max)		Maximum Case Temperature	100°C
24 Models	50Vdc, max.	Storage Temperature	- 55°C~125°C
48 Models	100Vdc, max.	Cooling(7)	Nature Convection
Soldering Temperature	260°C, max.		
(1.5mm from case 10sec max.)			
		EMC CHARACTERISTICS	
		Radiated Emissions (8)	EN55032 CLASS A
		Conducted Emissions (8)	EN55032 CLASS A
		ESD	IEC61000-4-2 Perf. Criteria B
		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

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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)		
VBW-243R3S9	9-36	9	335	3.3	0	2000	82	2600
VBW-2405S9	9-36	9	392	5	0	1600	85	1300
VBW-2409S9	9-36	9	426	9	0	1000	88	800
VBW-2412S9	9-36	9	426	12	0	750	88	560
VBW-2415S9	9-36	9	421	15	0	600	89	560
VBW-2424S9	9-36	9	421	24	0	375	89	200
VBW-2405SD9	9-36	9	392	±5	0	±800	85	±800
VBW-2412SD9	9-36	9	426	±12	0	±375	88	±390
VBW-2415SD9	9-36	9	431	±15	0	±300	87	±200
VBW-483R3S9	18-75	5	168	3.3	0	2000	82	2600
VBW-4805S9	18-75	5	196	5	0	1600	85	1300
VBW-4809S9	18-75	5	216	9	0	1000	87	800
VBW-4812S9	18-75	5	213	12	0	750	88	560
VBW-4815S9	18-75	5	211	15	0	600	89	560
VBW-4824S9	18-75	5	211	24	0	375	89	200
VBW-4805SD9	18-75	5	196	±5	0	±800	85	±800
VBW-4812SD9	18-75	5	216	±12	0	±375	87	±390
VBW-4815SD9	18-75	5	216	±15	0	±300	87	±200

NOTE

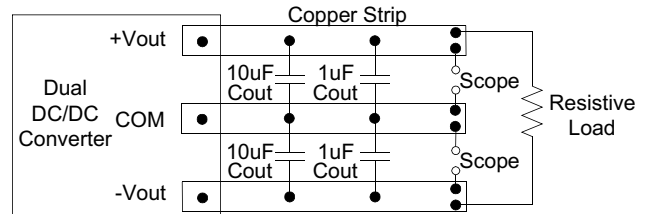
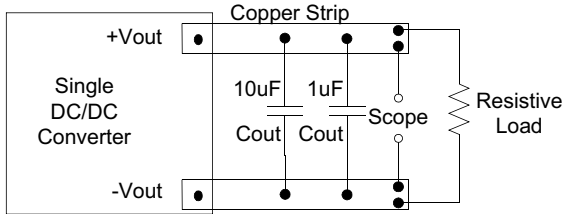
- One load is 25% to 100% load, the other load is 100% load, the output voltage variable rate is within ±5%.
- Measured with a 1µF ceramic capacitor and a 10µF electrolytic capacitor.
- Test by minimal Vin and constant resistive load.
- Test by normal Vin and 100%-25% load, 25% load step change.
- Measured with a simulated source inductance of 12µH and a source capacitor Cin(47µF, ESR<1.0Ω at 100KHz).
- Exceeding the absolute ratings of the unit could cause damage. It's not allowed for continuous operating ratings.
- "Nature Convection" is usually about 30-65 LFM but not equal to still air (0 LFM).
- EMI filter components are used to help meet radiated & conducted emissions, Which application refer to the EMI Filter of test configurations.
- An external filter capacitor & TVS is required if the module has to meet IEC61000-4-4 and IEC61000-4-5.
The filter capacitor Motien suggest: 24Vin models : Nippon - chemi - con KY series, 330µF/100V and a TVS,3KW,70V.
48Vin models : Nippon - chemi - con KY series, 330µF/100V and a TVS,3KW,120V.
- Operation at no load condition will not damage the product ; however, it will not meet all specifications.

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

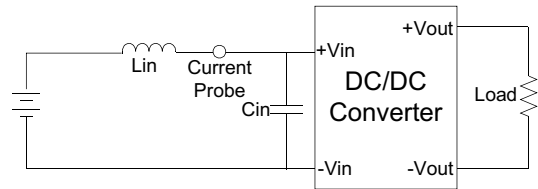
Output Ripple & Noise Measurement Test

To reduce ripple and noise, it's recommended to connect a 1.0uF ceramic disk capacitor and a 10uF electrolytic capacitor to output.



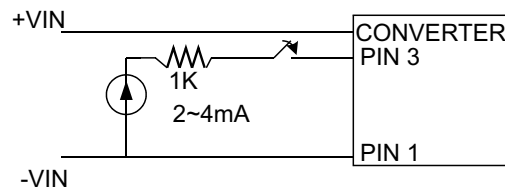
Input Reflected Ripple Current Test

Input reflected ripple current is measured with a source inductor L_{in} (12 μ H) and a source capacitor C_{in} (47 μ F, ESR<1.0 Ω at 100KHz) at nominal input and full load.



Remote ON / OFF Test Step

Input current (2~4mA) via 1K Ω to Pin3, converter OFF. open or high impedance, converter ON.

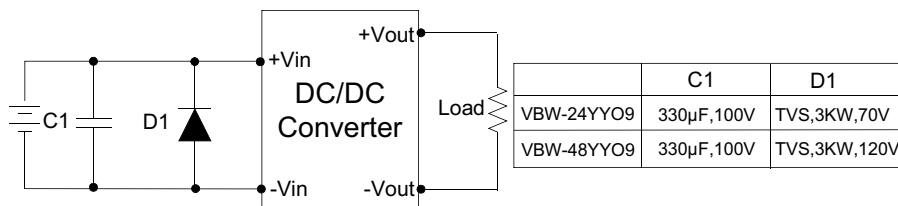


EFT & Surge Test Countermeasures

The filter capacitor Motien suggest:

24Vin models : Nippon - chemi - con KY series, 330uF/100V and a TVS,3KW,70V.

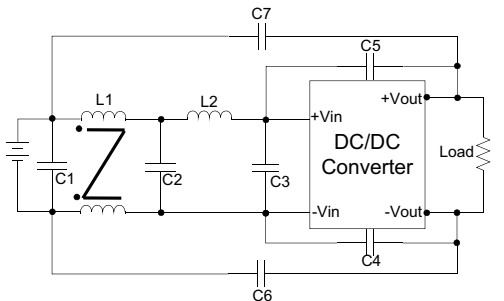
48Vin models : Nippon - chemi - con KY series, 330uF/100V and a TVS,3KW,120V.



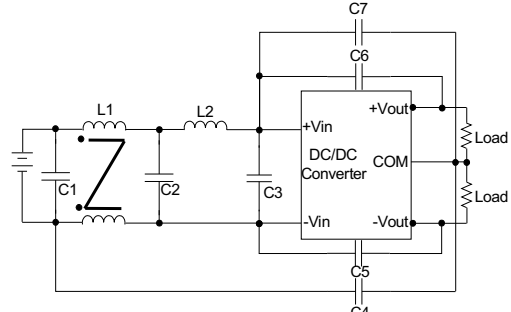
TEST CONFIGURATIONS

EMI Filter

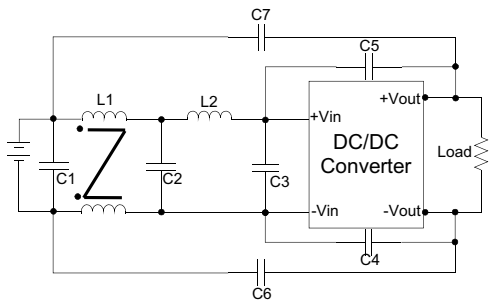
Input filter components (C1,C2,C3,C4,C5,C6,C7,L1,L2) are used to meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.



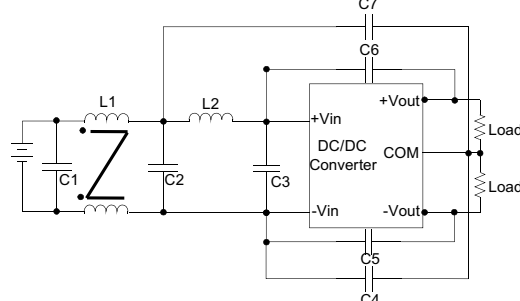
Models	C1,C2,C3	C4,C5,C6,C7	L1	L2
24Vin Single	1210 10uF/35V	1808 220pF/3kV	20uH	20uH



Models	C1,C2,C3	C4,C5,C6	C7	L1	L2
24Vin Dual	1210 10uF/35V	1808 220pF/3kV	1808 1000pF/3kV	20uH	20uH

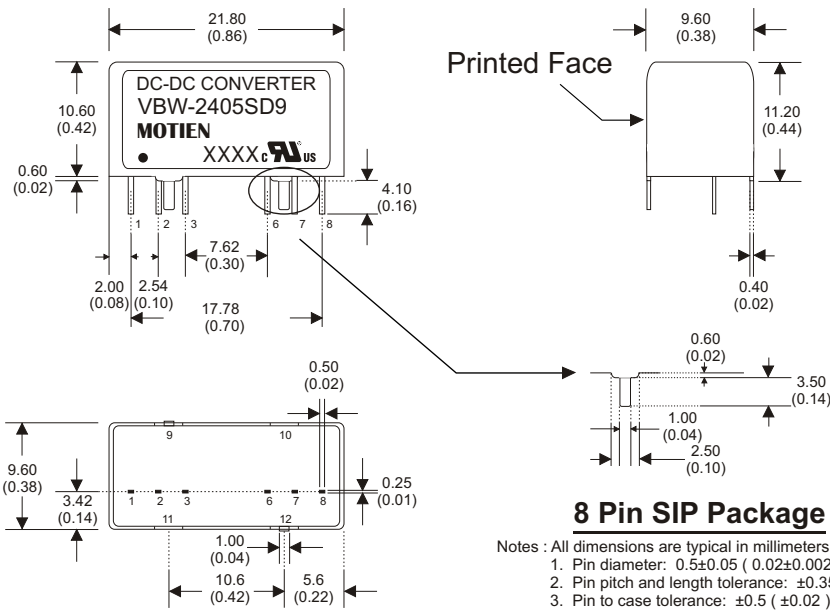


Models	C1,C2,C3	C4,C5,C6,C7	L1	L2
48Vin Single	1210 4.7uF/100V	1808 1000pF/3kV	132.8uH	10uH



Models	C1,C2,C3	C5,C6	C4,C7	L1	L2
48Vin Dual	1210 4.7uF/100V	1808 1000pF/3kV	1808 220pF/3kV	132.8uH	10uH

MECHANICAL SPECIFICATIONS



8 Pin SIP 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. Pin to case tolerance: ±0.5 (±0.02)
 4. Case Tolerance: ±0.5 (±0.02)
 5. Stand-off tolerance: ±0.1 (±0.004)

PIN CONNECTIONS

PIN NUMBER	SINGLE	DUAL
1	-V Input	-V Input
2	+V Input	+V Input
3	Remote On/Off	Remote On/Off
6	+V Output	+V Output
7	-V Output	Common
8	N.C	-V Output
9	Case	Case
10	Stand Off	Stand Off
11	Stand Off	Stand Off
12	Case	Case