VBW-2W Series

2W 4:1 Regulated Single & Dual output

Features

- 9 Pin SIL
- Wide 4:1 Input Range
- Full SMD Technology
- 1500 VDC Isolation
- Continuous Short Circuit Protection
- Efficiency up to 85%
- -40°C ~ 75°C Operation Temperature Range
- Remote on/off Control

The VBW series is a family of cost effective 2W single & dual output DC-DC converters. These converters combine non-conductive black plastic package in a 9-pin SIL compatible case with high performance features such as 1500 VDC input/output isolation voltage, continuous short circuit protection with automatic restart and high line / load regulation. Wide range devices operate over 4:1 input voltage range providing stable output voltage. Devices are encapsulated using flame retardant resin. Input voltages of 24 and 48 with output voltage of 3.3, 5, 12, 15,±5,±12,±15 Vdc. High performance features include high efficiency operation up to 85% and output voltage accuracy of ±1% maximum.

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

OUTPUT SPECIFICATIONS

Voltage Accuracy		±1%,max.
Output Current		See table,max.
Line Regulation		±0.5%,max.
Load Regulation (1)	(From 10% to 100% Loading)	±0.5%,max.
	(From 0% to 100% Loading) Vout=12V and 15V	±0.5%,max.
	Vout=3.3V and 5V	±1.0%,max.
Cross Regulation (Dual Output) (2)		±5%
Ripple & Noise (20 Mhz bandwidth)(3)		50mVpk-pk,max.
Short Circuit Protection		Indefinite(hiccup) (Automatic Recovery)
Temperature Coefficient		±0.02%/°C
Capacitive Load(4)		See table,max.
Transient Recovery Time (5)		300μs, typ.
Transient Response Deviation(5)		±3%, max.

INPUT SPECIFICATIONS

Voltage Range	See table
Start up Time(Nominal Vin and constant resistive load)	10mS, typ.
Input Current (No Load)	See table, max.
Input Current (Full Load)	See table, typ.
Input Filter	Capacitor
Input Reflected Ripple Current(6)	20mA pk-pk, typ.
Remote on/off	
ON:	0 ~ 0.6Vdc or open circuit
OFF:	2.7~15.0Vdc
Off stand by input current(Nominal Vin)	5mA max.

ABSOLUTE MAXIMUM RATINGS(7)

These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.

Input Surge Voltage(100ms max)	
24 Models	50Vdc,max.
48 Models	100Vdc,max.
Soldering Temperature (1.5mm from case 10sec max.)	260°C,max.

PHYSICAL SPECIFICATIONS

Case Material	Non conductive black plastic
Potting Material	Epoxy (UL94 V-0 rated)
Pin Material	C5191R-H Solder-coated
Weight	6.5g,typ
Dimensions	1.02"x0.36"x0.49"

GENERAL SPECIFICATIONS

Efficiency	See table,typ.
I/O Isolation Voltage (60sec)	1500Vdc
I/O Isolation Capacity	500 pF,max.
I/O Isolation Resistance	1000M Ohm,min.
Switching Frequency	250kHz,typ
Humidity	95%relH
Reliability Calculated MTBF(MIL-HDBK-217 F)	>1.212Mhrs@ 25°C
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

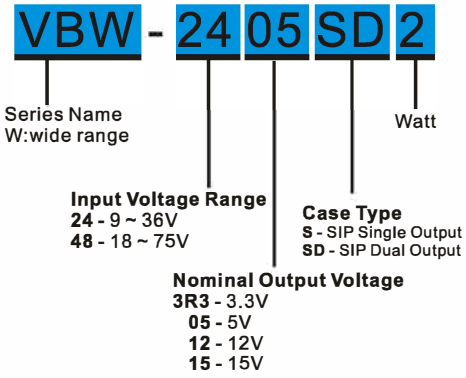
ENVIRONMENT SPECIFICATIONS

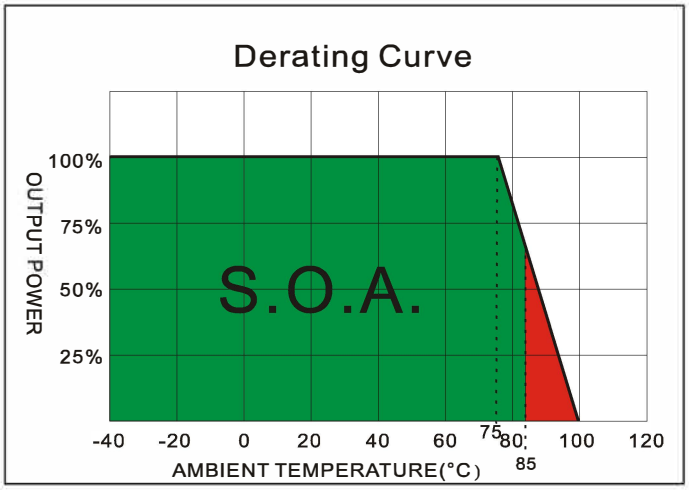
Operating Temperature	-40°C ~ +85°C(See Derating Curve) -40°C ~ +75°C(For 100% load)
Maximum Case Temperature	100°C
Storage Temperature	-40°C~125°C
Cooling	Nature Convection

EMC CHARACTERISTICS

Conducted Emissions (8)	EN55032	CLASS A
Radiated Emissions	EN55032	CLASS A
ESD	IEC 61000-4-2	Perf. Criteria A
RS	IEC 61000-4-3	Perf. Criteria A
EFT(9)	IEC 61000-4-4	Perf. Criteria A
Surge(9)	IEC 61000-4-5	Perf. Criteria B
CS	IEC 61000-4-6	Perf. Criteria A
PFMF	IEC 61000-4-8	Perf. Criteria A

PART NUMBER STRUCTURE





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 Min. load (mA)	OUTPUT Current Full load (mA)	EFFICIENCY @FL (%, typ.)	Capacitor Load @FL (uF, max.)
VBW-243R3S2	9-36	10	92	3.3	0	500	75	2200uF
VBW-2405S2	9-36	10	103	5	0	400	81	1000uF
VBW-2412S2	9-36	10	100	12	0	165	84	165uF
VBW-2415S2	9-36	10	98	15	0	135	85	100uF
VBW-483R3S2	18-75	5	46	3.3	0	500	75	2200uF
VBW-4805S2	18-75	5	53	5	0	400	80	1000uF
VBW-4812S2	18-75	5	50	12	0	165	84	165uF
VBW-4815S2	18-75	5	50	15	0	135	84	100uF
VBW-2405SD2	9-36	10	103	±5	0	±200	81	±470uF
VBW-2412SD2	9-36	10	101	±12	0	±85	83	±100uF
VBW-2415SD2	9-36	15	102	±15	0	±65	82	±47uF
VBW-4805SD2	18-75	5	53	±5	0	±200	80	±470uF
VBW-4812SD2	18-75	5	52	±12	0	±85	81	±100uF
VBW-4815SD2	18-75	5	50	±15	0	±65	84	±47uF

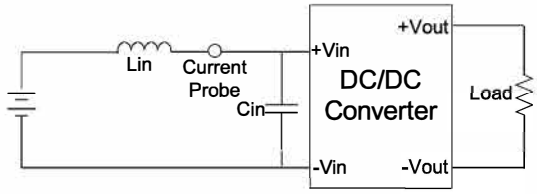
NOTE

1. Operation at no load condition will not damage the product ; however, it will not meet all specifications.
2. One load is 25% to 100% load, the other load is 100% load, the output voltage variable rate is within ±5%.
3. Operation at lower load and no load may have bigger ripple and noise.
4. Test by minimal Vin and constant resistive load.
5. Test by normal Vin and 100%-25% load,25% load step change;If the output voltage is 3.3V then the Transient Response Deviation is ±5%.
6. Measured Input reflected ripple current with a simulated source inductance of 12μH and a source capacitor Cin(47μF, ESR<1.0Ω at 100KHz).
7. Exceeding the absolute ratings of the unit could cause damage. It's not allowed for continuous operating ratings.
S. Input filter components are be required to help meet conducted emission class A, which application refer to the EMI Filter of design & feature configuration.
9. An external filter capacitor is required if the module has to meet IEC61000-4-4 and IEC61000-4-5. The filter capacitor suggest: Nippon - chemi - con KY series, 220μF/100V.

TEST CONFIGURATIONS

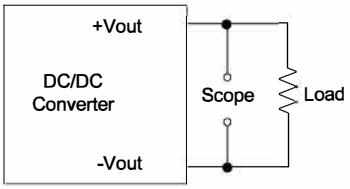
Input Reflected Ripple Current Test Step

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.



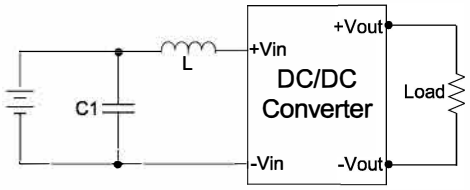
Output Ripple & Noise Measurement Test

The Scope measurement bandwidth is 20MHz.



EMI Filter

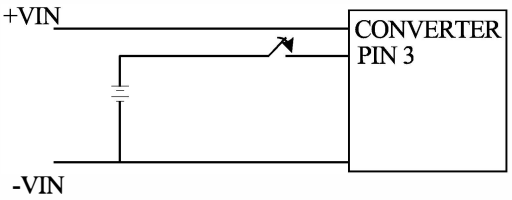
Input filter components (C1, L) are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.

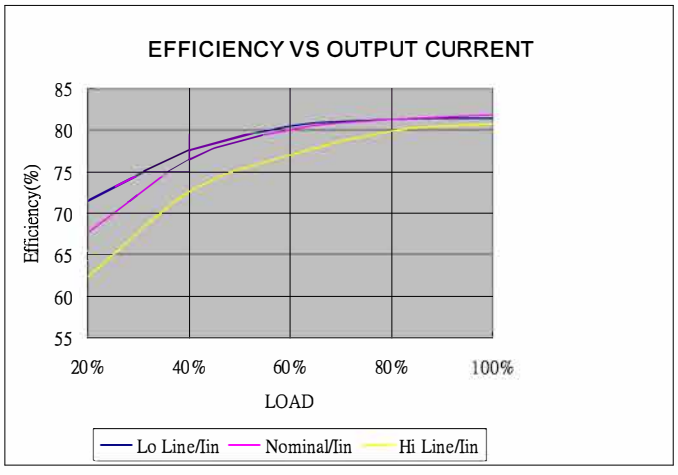


	C1	L
VBW-24XXXXX	2.2uF/100V * 2PCS	6.8uH
VBW-48XXXXX	1.0uF/100V	56uH

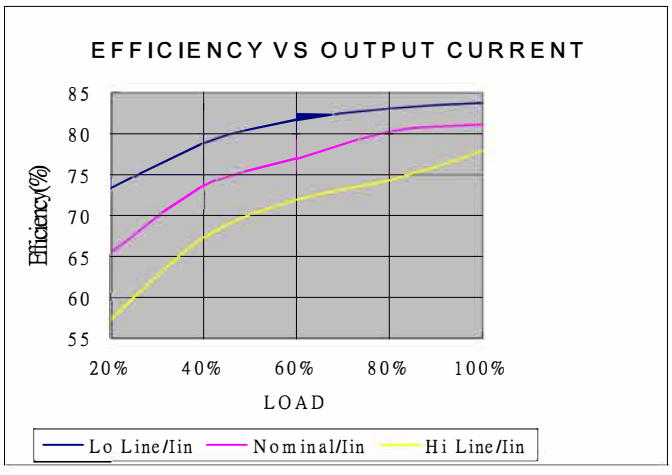
CTRL Module ON / OFF

ON: 0~0.6Vdc or open circuit
OFF: 2.7Vdc~15.0Vdc



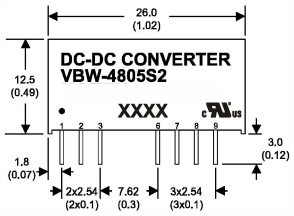


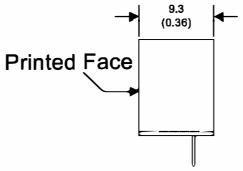
24 Models

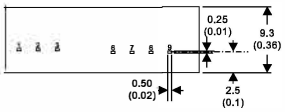


48 Models

MECHANICAL SPECIFICATIONS







9 Pin SIL Package

Non-Conductive Plastic

All dimensions are typical in millimeters (inches).
1. Pin diameter: 0.5 ±0.05 (0.04 ±0.002)
2. Pin pitch and length tolerance: ±0.35 (±0.014)
3. Case Tolerance: ±0.5 (±0.02)

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	N.C	Common
8	N.C.	N.C.
9	-V Output	-V Output

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DRAWING: APPROVED:

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