SERIES: VHB200W | **DESCRIPTION:** DC-DC CONVERTER

FEATURES

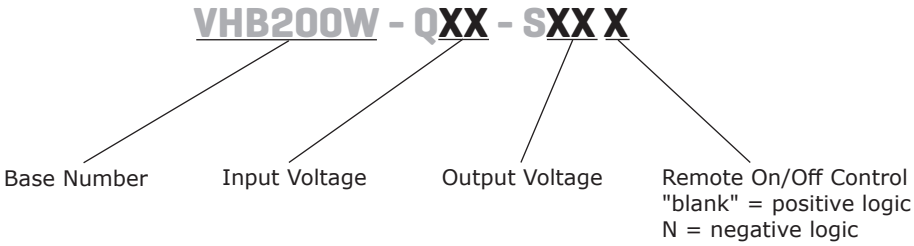
- up to 200 W isolated output
- industry standard half brick package
- 4:1 input range (10~36 V, 18~75 V)
- single output from 3.3~48 V
- 1,500 V isolation
- over current, over temperature, over voltage, and short circuit protections
- remote on/off
- efficiency up to 89%



MODEL	input voltage range (Vdc)	output voltage (Vdc)	output current max (A)	output power max (W)	ripple and noise[1] max (mVp-p)	efficiency typ (%)
VHB200W-Q24-S3R3	10 ~ 36	3.3	50.0	165	100	87
VHB200W-Q24-S5	10 ~ 36	5	40.0	200	100	87
VHB200W-Q24-S12	10 ~ 36	12	16.7	200	150	86
VHB200W-Q24-S15	10 ~ 36	15	13.3	200	150	86
VHB200W-Q24-S24	10 ~ 36	24	8.3	200	240	87
VHB200W-Q24-S28	10 ~ 36	28	7.1	200	280	87
VHB200W-Q24-S48	10 ~ 36	48	4.2	200	240	86
VHB200W-Q48-S3R3	18 ~ 75	3.3	40	132	100	88
VHB200W-Q48-S5	18 ~ 75	5	40	200	100	89
VHB200W-Q48-S12	18 ~ 75	12	16.7	200	150	88
VHB200W-Q48-S15	18 ~ 75	15	13.3	200	150	88
VHB200W-Q48-S24	18 ~ 75	24	8.3	200	240	88
VHB200W-Q48-S28	18 ~ 75	28	7.1	200	280	88
VHB200W-Q48-S48	18 ~ 75	48	4.2	200	240	87

Notes: 1. ripple and noise are measured at 20 MHz BW with 10µF tantalum capacitor and 1µF ceramic capacitor across output

PART NUMBER KEY



Please read our datasheet & drawing disclaimer here.

INPUT

parameter	conditions/description		min	typ	max	units
operating input voltage			10 18	24 48	36 75	Vdc Vdc
under voltage lockout	power up	24 V input 48 V input		9.5 17.0		Vdc Vdc
	power down	24 V input 48 V input		8.5 16.0		Vdc Vdc
positive logic remote on/off[1]						
filter	Pi type					

Notes: 1. logic compatibility, open collector ref to -input
Module ON, >3.5 Vdc or open circuit
Module OFF, <1.8 Vdc

OUTPUT

parameter	conditions/description	min	typ	max	units
line regulation	measured from high line to low line			±0.2	%
load regulation	measured from full load to zero load			±0.2	%
voltage accuracy				±1.5	%
transient response	25% step load change			500	µs
adjustability[2]			±10		%
switching frequency	100% load, input voltage range		250		kHz
temperature coefficient			±0.03		%/°C

Notes: 2. trim-up: connect a resistor between the trim pin and +Sense
trim-down: connect a resistor between the trim pin and -Sense

PROTECTIONS

parameter	conditions/description	min	typ	max	units
over voltage protection	%Vo	115		140	%
short circuit protection	continuous				
current limit	% nominal output current	110		150	%
thermal shutdown case temp.			110		°C

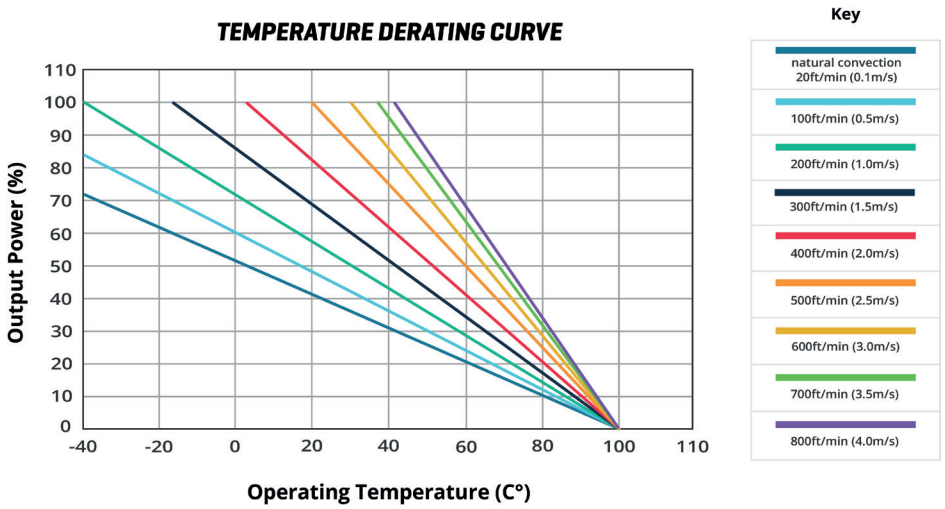
SAFETY AND COMPLIANCE

parameter	conditions/description	min	typ	max	units
isolation voltage	input to output input to case output to case	1,500 1,500 1,500			Vdc Vdc Vdc
isolation resistance		10			MΩ
isolation capacitance			1,000		pF
safety approvals	certified to 60950-1: UL				
MTBF	as per MIL-HDBK-217F (Notice 1), GB, at 25°C		600,000		hours
RoHS compliant	yes				

ENVIRONMENTAL

parameter	conditions/description	min	typ	max	units
case operating temperature	see derating curve	-40		100	°C
storage temperature		-55		105	°C
humidity	non-condensing			95	%

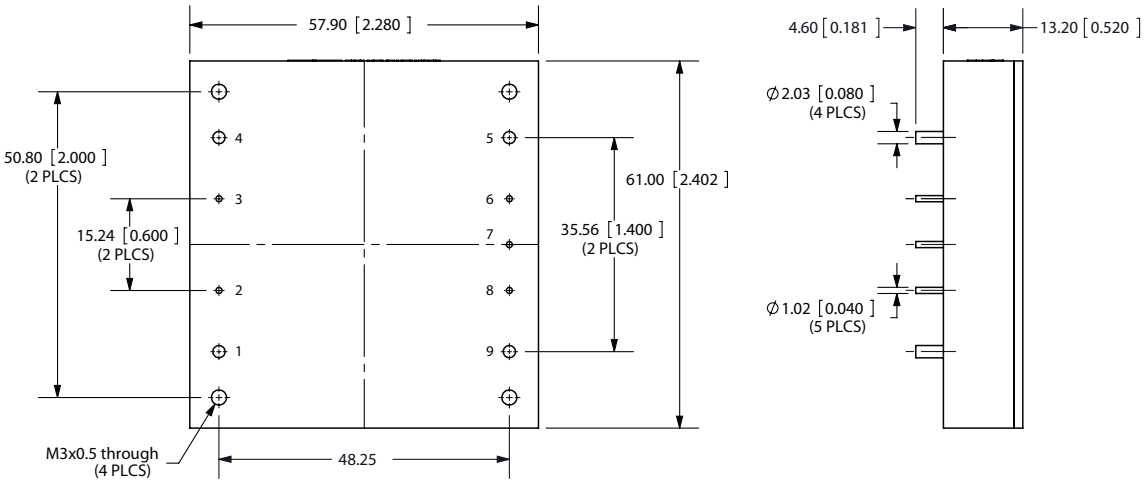
DERATING CURVE



MECHANICAL

parameter	conditions/description	min	typ	max	units
dimensions	57.9 x 61.0 x 13.2 [2.28 x 2.40 x 0.52 inch]				mm
case material	aluminum baseplate with plastic case				
weight			114		g

MECHANICAL DRAWING



Bottom View
All dimensions in mm(inches)

PIN CONNECTIONS	
PIN	FUNCTION
1	+Vin
2	On/Off
3	CASE
4	-Vin
5	-Vo
6	-S
7	TRIM
8	+S
9	+Vo

Note: All specifications measured at 25°C, nominal input voltage, and full load unless otherwise noted.

OUTPUT REMOTE SENSING

Remote sensing regulates output voltage at the point of load rather than at the module terminals, compensating for voltage drop across distribution wiring.

Figure 1

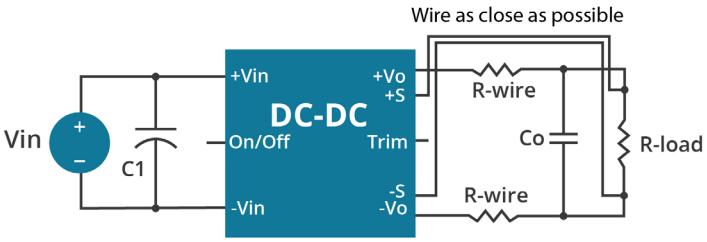


Figure 2

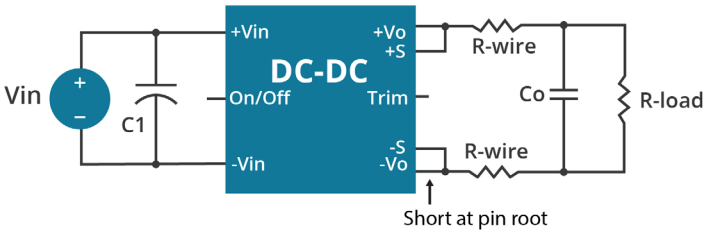


Table 1

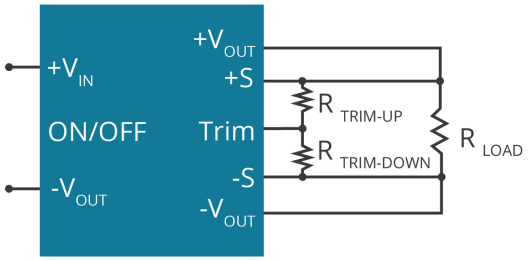
PARAMETER	VALUE
Remote-sense compensation range	[(+Vout) − (−Vout)] − [(+Sense) − (−Sense)] ≤ 10% of Vo(nominal)
Max sense wire length	400 mm
Sense wiring type	Twisted-pair or shielded wire
If sense unused	Connect +Sense to +Vout and −Sense to −Vout directly at the module; keep jumpers as short as possible; avoid loop wiring

Note: 1. If remote sense and trim are both used, the resulting output deviation is the larger of the two values, not their sum. Pout(max) = Vo(set) × Io(max) is an absolute limit — in creasing Vo via sense/trim raises output power at constant current, so verify the module stays within rated power; decreasing Vo proportionally reduces Pout(max), since Io(max) is fixed.

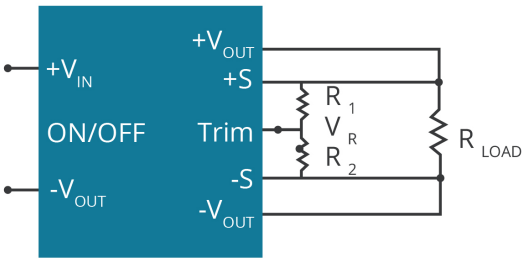
OUTPUT VOLTAGE ADJUSTMENT

Output may be trimmed ±10% via external resistor (fixed) or potentiometer (variable), connected to the Trim pin.

Method 1
Output Voltage Trim Circuit Configuration



Method 2
Output Voltage Trim Circuit Configuration with VR



$$R_{TRIM} = \left(\frac{5.11V_{NOM}\,(100 + \Delta\%)}{1.225 \times \Delta\%} - \frac{511}{\Delta\%} - 10.22 \right) (K\,\Omega)$$

Formula for Trim up
Vo: 3.3, 5, 12, 15, 24, 28V

$$R_{TRIM} = \left(\frac{511}{\Delta\%} \right) - 10.22 \quad (K\,\Omega)$$

Formula for Trim down
Vo: 3.3, 5, 12, 15, 24, 28V

$$R_{TRIM} = \left(\frac{20V_{NOM}\,(100 + \Delta\%)}{1.225 \times \Delta\%} - \frac{2000}{\Delta\%} - 40 \right) (K\,\Omega)$$

Formula for Trim up
Vo: 48V

$$R_{TRIM} = \left(\frac{2000}{\Delta\%} \right) - 40 \quad (K\,\Omega)$$

Formula for Trim down
Vo: 48V

$$V_{OUT\,(desired)}, \Delta\% = \left(\frac{V_{OUT} - V_{NOM}}{V_{NOM}} \right) \times 100$$

Formula for Trim up

$$\Delta\% = \left(\frac{V_{NOM} - V_{OUT}}{V_{NOM}} \right) \times 100$$

Formula for Trim down

Table 2
Rtrim-down — Typical Values (kΩ)

$Trim_{DOWN}$	3.3	5	12	15	24	28	48
(%)	(V)	(V)	(V)	(V)	(V)	(V)	(V)
1%	500.8	500.8	500.8	500.8	500.8	500.8	1960
5%	92	92	92	92	92	92	360
10%	40.9	40.9	40.9	40.9	40.9	40.9	160

OUTPUT VOLTAGE ADJUSTMENT (CONTINUED)

Table 3
Rtrim-up — Typical Values (kΩ)

$Trim_{DOWN}$	3.3	5	12	15	24	28	48
(%)	(V)	(V)	(V)	(V)	(V)	(V)	(V)
1%	869.1	1585.4	4534.6	5798.5	9590.3	11275.6	77111
5%	176.7	325.6	938.8	1201.6	1990	2340.4	16017.1
10%	90.1	168.1	489.3	627	1039.9	1223.5	8380.4

Table 4
Recommended Resistor Values

V_{NOM}	R_{TOP}	R_{BOTTOM}	V_{REF}
(Vdc)	(kΩ)	(kΩ)	(kΩ)
3.3	9.1	7.5	10
5	13.7	5.6	10
12	30	4.3	20
15	36	3.9	20
24	43	2.7	20
28	51	2.67	20
48	68	2.0	20

Note (28V models): Trim-down is limited to −10% as standard; trim-up is constrained by input voltage — refer to Output Voltage Trim Limits vs. Input Voltage curves before setting VR upper limits.

EMC RECOMMENDED CIRCUIT

Figure 3
Connection Circuit For Conducted EMI Class A Testing

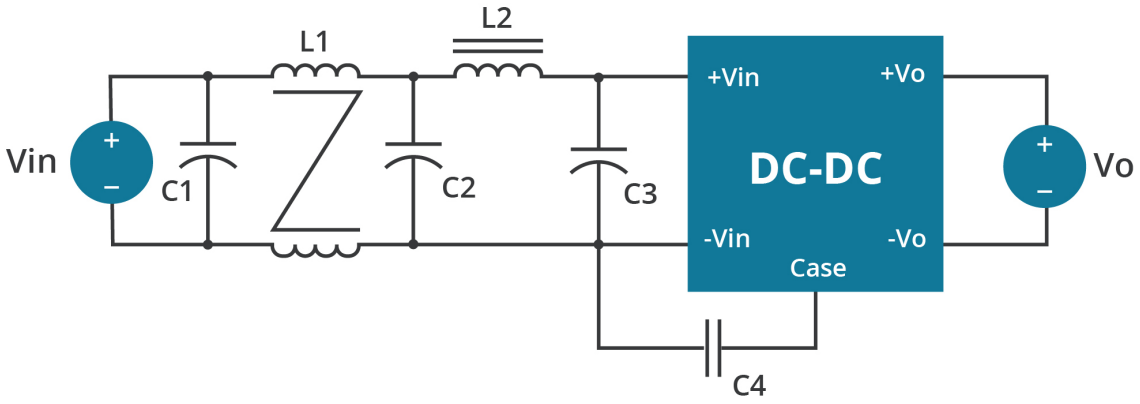


Table 5
EN 55032 Class A — Component Values by Model

MODEL	C1	C2	L1	L2
VHB200W-Q24-S3R3	47 µF/100 V	47 µF/100 V	0.5 mH	short
VHB200W-Q24-S5	82 µF/100 V	82 µF/100 V	0.5 mH	short
VHB200W-Q24-S12	120 µF/100 V	120 µF/100 V	0.5 mH	short
VHB200W-Q24-S15	47 µF/100 V	47 µF/100 V	0.5 mH	short
VHB200W-Q24-S24	100 µF/100 V	100 µF/100 V	0.5 mH	short
VHB200W-Q24-S28	100 µF/100 V	100 µF/100 V	0.5 mH	short
VHB200W-Q48-S3R3	47 µF/100 V	47 µF/100 V	0.1mH	short
VHB200W-Q48-S5	47 µF/100 V	47 µF/100 V	0.5 mH	short
VHB200W-Q48-S12	82 µF/100 V	82 µF/100 V	0.5 mH	short
VHB200W-Q48-S15	82 µF/100 V	82 µF/100 V	0.5 mH	short
VHB200W-Q48-S24	82 µF/100 V	82 µF/100 V	0.7 mH	short
VHB200W-Q48-S28	150 µF/100 V	150 µF/100 V	0.5 mH	short

EMC RECOMMENDED CIRCUIT (CONTINUED)

Figure 4
Class A circuit, 48V-output models, CY1/CY2

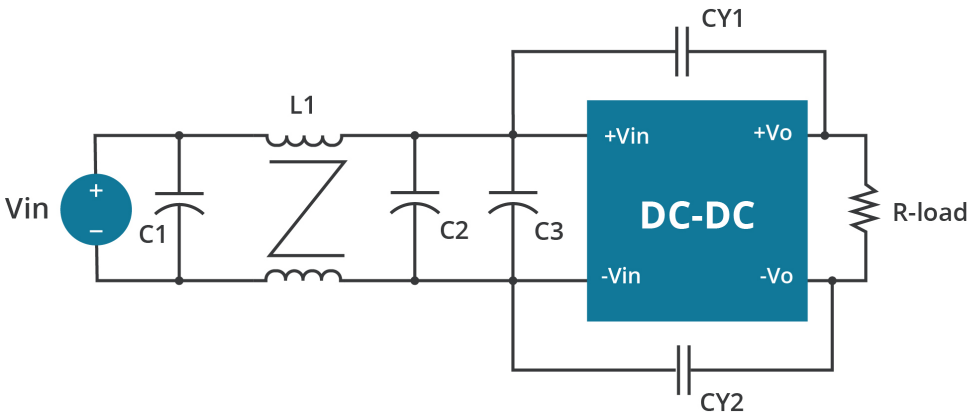


Table 6
EN 55032 Class A — 48V-Output Models (require additional C3, CY1, CY2)

MODEL	C1	C2	C3	CY1	CY2	L1
VHB200W-Q24-S48	100 µF/100 V	100 µF/100 V	100 µF/100 V	680 pF/2KV	680 pF/2KV	1.0 mH
VHB200W-Q48-S48	100 µF/100 V	100 µF/100 V	100 µF/100 V	680 pF/2KV	680 pF/2KV	1.0 mH

Note: C1, C2 = NIPPON CHEMI-CON KY series aluminum capacitors. C1/C2 correspond to input-side filter caps in the Class A test circuit (Figure, Section 10.2); L1/L2 correspond to the two series inductors in that same circuit.

Figure 5
Class B circuit, CY1–CY4

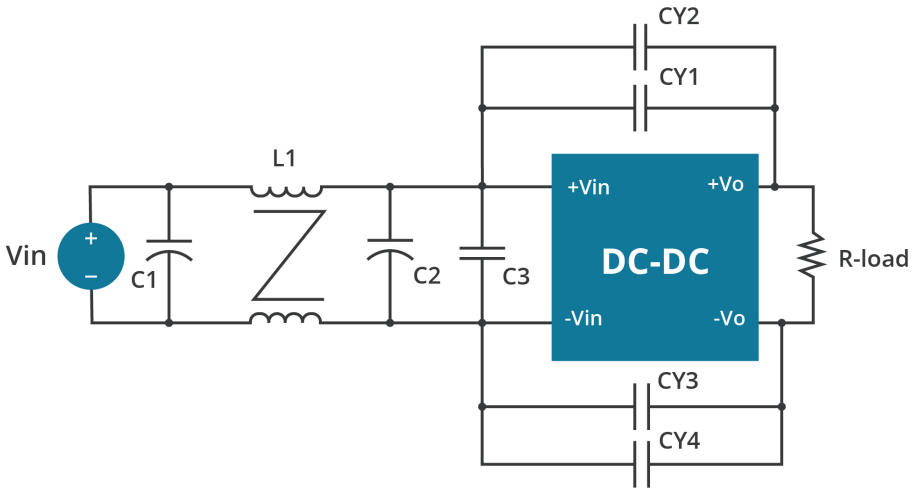


Table 7
EN 55032 Class B — Component Values by Model

MODEL	C1	C2	C3	CY1	CY2	CY3	CY4	L1
VHB200W-Q24-S24	120 µF/100 V	120 µF/100 V	10 µF/50 V	1000 pF/2KV	NC	1000 pF/2KV	NC	0.5 mH
VHB200W-Q24-S48	82 µF/100 V	82 µF/100 V	4.7 µF/100 V	1000 pF/2KV	680 pF/2KV	1000 pF/2KV	680 pF/2KV	0.45 mH
VHB200W-Q48-S12	120 µF/100 V	120 µF/100 V	4.7 µF/100 V	1000 pF/2KV	NC	680 pF/2KV	NC	0.5 mH
VHB200W-Q48-S48	82 µF/100 V	82 µF/100 V	4.7 µF/100 V	2200 pF/2KV	NC	2200 pF/2KV	680 pF/2KV	0.45 mH

Note: C1, C2 = NIPPON CHEMI-CON KY series aluminum capacitors; C3, CY1–CY4 = ceramic capacitors.

REVISION HISTORY

rev.	description	date
1.0	initial release	08/08/2008
1.01	new template applied	08/05/2011
1.02	add remote on/off control to the part number key	11/23/2011
1.03	features updated	12/20/2011
1.04	misc. updates and corrections	02/14/2012
1.05	V-Infinity branding removed	09/07/2012
1.06	updated spec	04/01/2013
1.07	company logo updated	02/09/2021
1.08	derating curve inserted	03/04/2021
1.09	company address updated	11/14/2024
1.10	datasheet updated	05/29/2025
1.11	MTBF added	05/21/2026
1.12	EMI/EMC, output remote sensing and output voltage adjustment added	07/10/2026

The revision history provided is for informational purposes only and is believed to be accurate.

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