



Size: 2.40in x 2.28in x 0.50in  
(61mm x 57.9mm x 12.7mm)

**FEATURES**

- Ultra Wide 10:1 Input Voltage Range
- No Minimum Load Required
- Low Standby Power Consumption
- Power Inputs Meets Railway 24V, 36V, 48V, 72V, 96V, and 110V System
- RoHS II & REACH Compliant
- Compliance to EN50155 and EN45545-2 Railway Standard
- Remote Control
- IEC60950-1, UL60950-1, and EN60950-1 Safety Approvals

**APPLICATIONS**

- Railway System
- Wireless Network
- Telecom/Datacom
- Industry Control System
- Distributed Power Architectures
- Semiconductor Equipment

**DESCRIPTION**

The DCHBU200 series of DC/DC half-brick converters offers up to 200 watts of output power in a 2.40in x 2.28in x 0.50in package. This series consists of single output models with an ultra-wide 10:1 input voltage range and no minimum required load. Each model in this series is RoHS II & REACH compliant, EN50155 and EN45545-2 railway standard compliance, and low standby power consumption. This series has IEC-60950-1, UL60950-1, and EN60950-1 safety approvals.

**MODEL SELECTION TABLE**

Model Number	Input Voltage Range	Output Voltage	Output Current @Full Load	Ripple & Noise	No Load Input Current	Maximum Capacitive Load	Efficiency	Output Power
DCHBU200-72S05	72VDC (16~160VDC)	5VDC	40A	75mVp-p	TBD	TBD	90%	Up to 200W
DCHBU200-72S12		12VDC	16.8A	100mVp-p	TBD	TBD	91%	
DCHBU200-72S15		15VDC	13.4A	100mVp-p	20mA	10600µF	88%	
DCHBU200-72S24		24VDC	8.4A	150mVp-p	TBD	TBD	91%	
DCHBU200-72S28		28VDC	7.2A	150mVp-p	TBD	TBD	91%	
DCHBU200-72S48		48VDC	4.2A	200mVp-p	TBD	TBD	90%	
DCHBU200-72S53		53VDC	3.8A	200mVp-p	TBD	TBD	90%	

**SPECIFICATIONS**

All specifications are based on 25°C, Nominal Input Voltage, and Full Load unless otherwise noted.  
We reserve the right to change specifications based on technological advances.

SPECIFICATION	TEST CONDITIONS		Min	Typ	Max	Unit
<b>INPUT SPECIFICATIONS</b>						
Input Voltage Range	72Vin Nominal, 15VDC Output <sup>(1)</sup>		16	72	160	VDC
Start-Up Voltage					16	VDC
Shutdown Voltage			10	11	12	VDC
Input Transient Voltage	100mS, Max.	15VDC Model	12			VDC
		Others	14.4			VDC
Input Surge Voltage	1 Second, Max.				185	VDC
Input Filter <sup>(1)</sup>			Pi Type			
<b>OUTPUT SPECIFICATIONS</b>						
Output Voltage			See Table			
Voltage Accuracy			-1.0		+1.0	%
Line Regulation	Low Line to High Line at Full Load		-0.1		+0.1	%
Load Regulation	No Load to Full Load		-0.1		+0.1	%
Voltage Adjustability	Single Output		-20		+10	%
Remote Sense <sup>(2)</sup>	% of Vout(nom).				10	%
Output Power			See Table			
Output Current			See Table			
Maximum Capacitive Load			TBD			
Ripple & Noise (20MHz Bandwidth)	(With External MLCC (TBD))		5Vout	75		mVp-p
	With a 1µF/25V X7R MLCC and a 22µF/25V POS-CAP		12Vout, 15Vout	100		
	(With External MLCC (TBD))		24Vout, 28Vout	150		
	(With External MLCC (TBD))		48Vout, 53Vout	200		
Transient Response Recovery Time	25% Load Step Change			250		µS
Start-Up Time	Constant Resistive Load		Power Up	130	160	ms
			Remote ON/OFF	130	160	
Temperature Coefficient			-0.02		+0.02	

**SPECIFICATIONS**

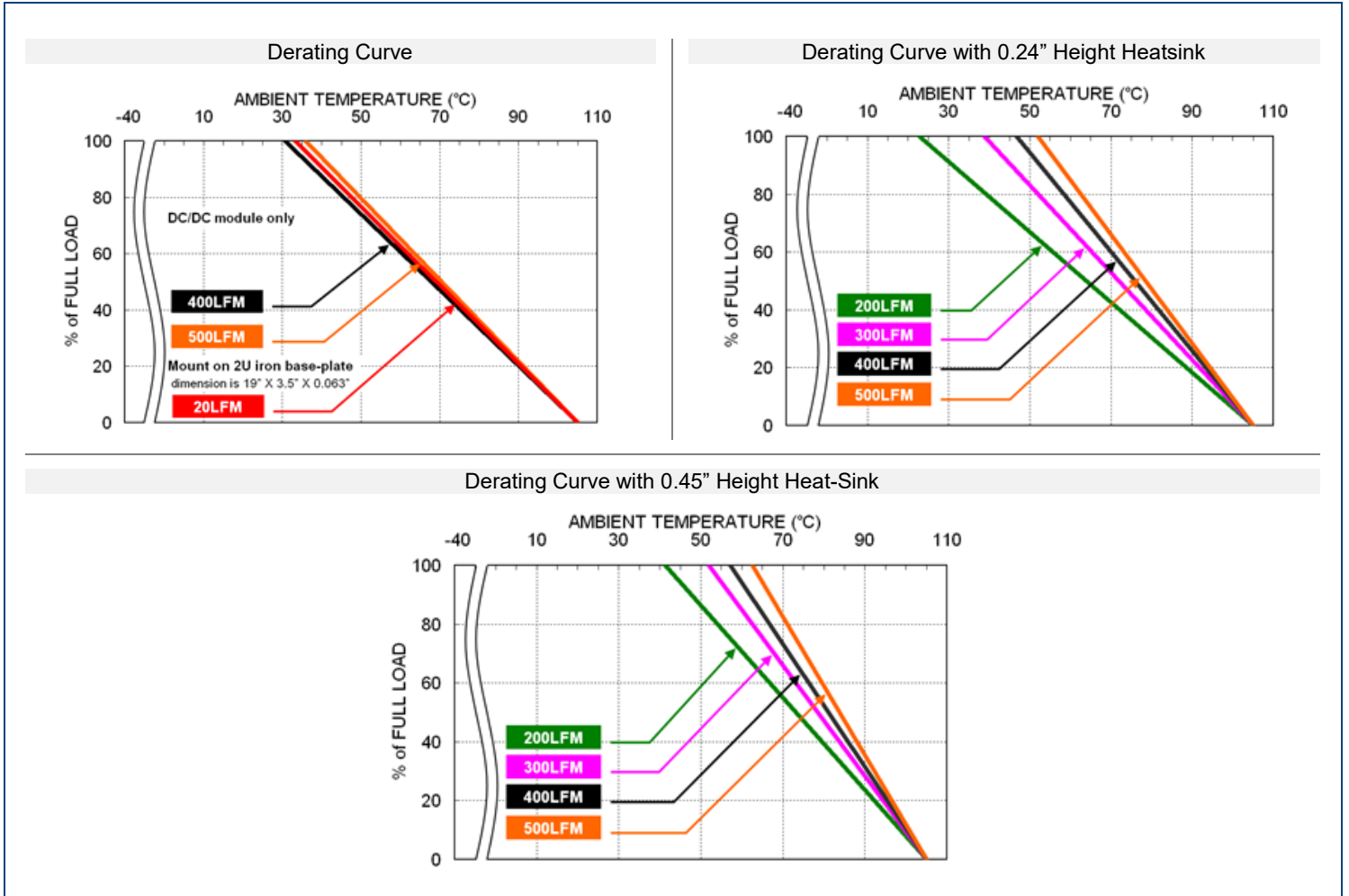
All specifications are based on 25°C, Nominal Input Voltage, and Full Load unless otherwise noted.  
We reserve the right to change specifications based on technological advances.

SPECIFICATION	TEST CONDITIONS	Min	Typ	Max	Unit
<b>REMOTE ON/OFF CONTROL<sup>(3)</sup></b>					
Positive Logic	DC/DC ON	Open or 3~12VDC			
	DC/DC OFF	Short or 0~1.2VDC			
Input Current of CTRL Pin		0.5		1	mA
Remote OFF Input Current			5		mA
<b>PROTECTION</b>					
Short Circuit Protection		Continuous, Automatic Recovery			
Over Load Protection	% of Iout rated; Hiccup Mode	120		150	%
Over Voltage Protection	% of Vout(nom); Hiccup Mode	115		130	%
Over Temperature Protection			110		°C
<b>ENVIRONMENTAL SPECIFICATIONS</b>					
Operating Base-Plate Temperature	With Derating	-40		+105	°C
Storage Temperature Range		-55		+125	°C
Thermal Impedance <sup>(4)</sup>	Module without Assembly Option		6.1		°C/W
	Only Mount on the Iron Base-Plate		2.8		
	0.24" Height Heat-Sink Type		5.1		
	0.45" Height Heat-Sink Type		4.6		
Relative Humidity		5		95	%RH
Thermal Shock		EN61373, MIL-STD-810F			
Vibration		EN61373, MIL-STD-810F			
MTBF	MIL-HDBK-217F, Full Load		TBD		
<b>GENERAL SPECIFICATIONS</b>					
Efficiency		See Table			
Switching Frequency		180	200	220	kHz
Isolation Voltage (Reinforced Insulation)	1 Minute	Input to Output	3000		VAC
		Input (Output) to Base-Plate	1500		
Isolation Resistance	500VDC	1			GΩ
Isolation Capacitance			1000		pF
<b>PHYSICAL SPECIFICATIONS</b>					
Weight		4.02oz (114g)			
Dimensions (L x W x H)		2.40in x 2.28in x 0.50in (61mm x 57.9mm x 12.7mm)			
Case Material		Aluminum Base-Plate with Plastic Case			
Potting Material		Silicone (UL94 V-0)			
<b>SAFETY CHARACTERISTICS</b>					
Safety Approvals		IEC60950-1, UL60950-1 <sup>(9)</sup> , EN60950-1			
EMI <sup>(6)</sup>		EN55011, EN55022 Class A, Class B			
ESD	EN61000-4-2	Air ±8kV Contact ±6kV			Perf. Criteria A
Radiated Immunity	EN61000-4-3	20 V/m			Perf. Criteria A
Fast Transient <sup>(7)</sup>	EN61000-4-4	±2kV			Perf. Criteria A
Surge <sup>(7)</sup>	EN61000-4-5	EN55024: ±2kV EN50155: ±2kV			Perf. Criteria A
Conducted Immunity	EN61000-4-6	10Vr.m.s.			Perf. Criteria A
Power Frequency Magnetic Field	EN61000-4-8	100A/m Continuous; 1000A/m 1 Second			Perf. Criteria A

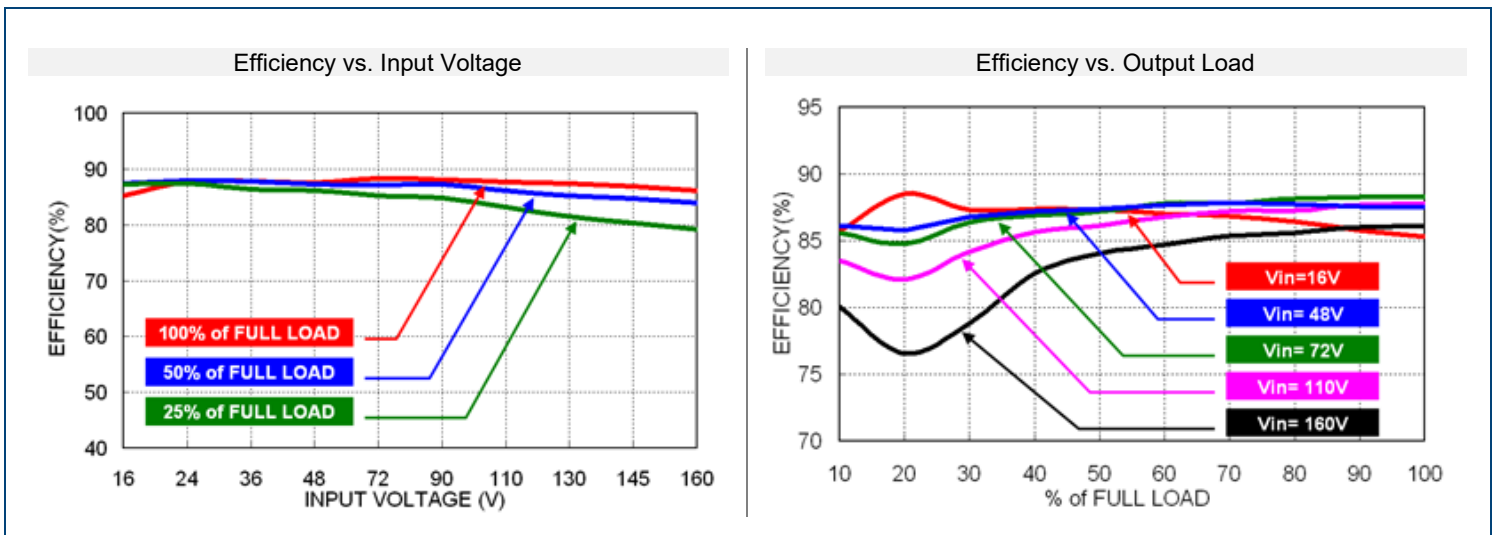
**NOTES**

- It is necessary to equip the external input capacitors at the input of the module. The capacitors should connect as close as possible to the input terminals ensuring module stability. External C<sub>in</sub> is Ruby-con BXF series, 100µF/250V.
  - If remote sense is not being used, SENSE pins should connect to corresponding polarity Vout pins.
  - Referred to -Vin pin
  - Input Source Impedance: The power module will operate as specifications without external components, assuming that the source voltage has very low impedance and reasonable input voltage regulation. Highly inductive source impedances can affect the stability of the power module. Since real-world voltage source has finite impedance, performance can be improved by adding external filter capacitor. Recommended external capacitor is TBD.
  - A. Iron base-plate dimension is 19" x 3.5" x 0.063" (height is E1 standard 2U)  
B. Heat sink is optional and P/N: 7G-0021A-F, 7G-0022A-F, 7G-0023A-F, 7G-0024A-F. Please refer to heat-sink selection guide.
  - Standard modules meet EMI Class A or Class B with external components. Contact factory for more information.
  - An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5. Recommended external capacitor is TBD.
  - BASE-PLATE GROUNDING: When four screw bolts to shield plane, the EMI could be reduced.
  - This product is Listed to applicable standards and requirements by UL.
- CAUTION:** This power module is not internally fused. An input line fuse must always be used.  
\*Due to advances in technology, specifications subject to change without notice.

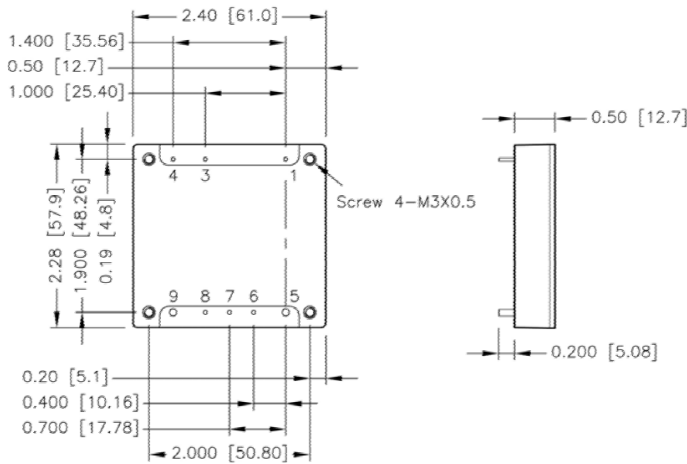
DERATING CURVES



EFFICIENCY CURVES



MECHANICAL DRAWINGS

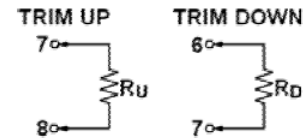


BOTTOM VIEW

PIN CONNECTION		
PIN	DEFINE	DIAMETER
1	-Vin	0.04 Inch
3	Ctrl	0.04 Inch
4	+Vin	0.04 Inch
5	-Vout	0.08 Inch
6	-Sense	0.04 Inch
7	Trim	0.04 Inch
8	+Sense	0.04 Inch
9	+Vout	0.08 Inch

**EXTERNAL OUTPUT TRIMMING**

Output can be externally trimmed by using the method shown below.



$$R_U = \left( \frac{V_{OUT} (100 + \Delta\%)}{1.225 \Delta\%} - \frac{(100 + 2\Delta\%)}{\Delta\%} \right) k\Omega$$

$$R_D = \left( \frac{100}{\Delta\%} - 2 \right) k\Omega$$

**Notes:**

All dimensions in inch [mm]

Tolerance: x.xx±0.02 [x.x±0.5]

x.xxx±0.01 [x.xx±0.25]

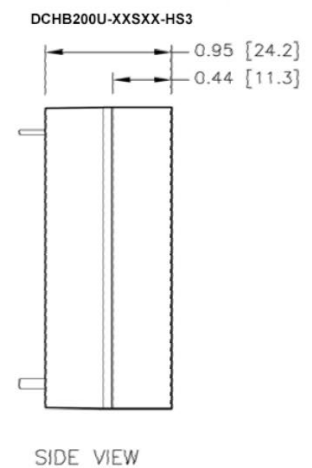
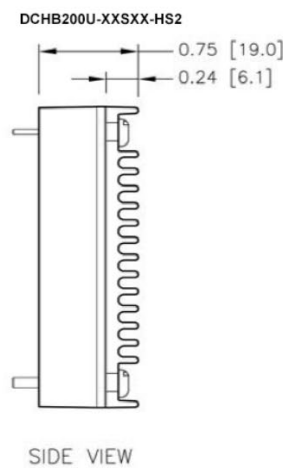
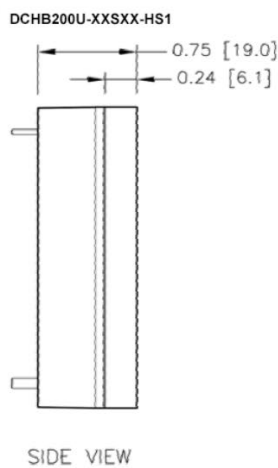
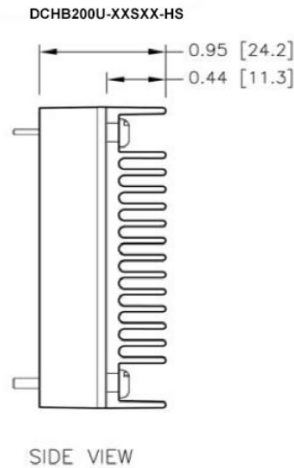
Pin pitch tolerance ±0.01 [0.25]

Pin dimension tolerance ±0.004 [0.1]

Mounting screws should always be used.

The screw locked torque: MAX 3.5kgf-cm/0.34N-m

HEAT SINK TYPE OPTIONS



**Note:**

All dimensions in inch [mm]

Tolerance: x.xx±0.02 [x.x±0.5]

RECOMMENDED PAD LAYOUT

**Notes:**  
 All dimensions in inch [mm]  
 Pad size (lead free recommended)  
 Through Hole 1, 3, 4, 6, 7, 8:  $\Phi 0.051$  [1.30]  
 Through Hole 5, 9:  $\Phi 0.091$  [2.30]  
 Through Hole of Mounting:  $\Phi 0.126$  [3.20]  
 Top View Pad 1, 3, 4, 6, 7, 8:  $\Phi 0.064$  [1.63]  
 Top View Pad 5, 9:  $\Phi 0.113$  [2.88]  
 Top View Pad of Mounting:  $\Phi 0.157$  [4.00]  
 Bottom View Pad 1, 3, 4, 6, 7, 8:  $\Phi 0.102$  [2.60]  
 Bottom View Pad 5, 9:  $\Phi 0.181$  [4.60]  
 Bottom View Pad of Mounting:  $\Phi 0.252$  [6.40]

OUTPUT VOLTAGE ADJUSTMENT

Output voltage is adjustable for 10% trim up or -20% trim down of nominal output voltage by connecting an external resistor between the Trim pin and either the +Sense or -Sense pins.  
 With an external resistor between the Trim and -Sense pin, the output voltage set point decreases.  
 With an external resistor between the Trim and +Sense pin, the output voltage set point increases.  
 Maximum output deviation is +10% inclusive of remote sense.  
 The external Trim resistor needs to be at least 1/8 of rated power.

**Trim Up Equation**

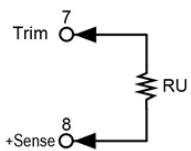
$$R_U = \left( \frac{V_{OUT}(100 + \Delta\%)}{1.225\Delta\%} - \frac{100 + 2\Delta\%}{\Delta\%} \right) k\Omega$$

**Trim Down Equation**

$$R_D = \left( \frac{100}{\Delta\%} - 2 \right) k\Omega$$

External Output Trimming: Output can be externally trimmed by using the method shown below.

Trim-Up

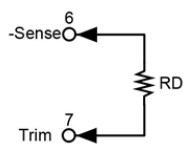


15V Model

$\Delta V$ (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	15.15	15.30	15.45	15.60	15.75	15.90	16.05	16.20	16.35	16.50
RU (k $\Omega$ )	1134.735	572.490	385.075	291.367	235.143	197.660	170.886	150.806	135.188	122.694

Other Models  
TBD

Trim Down



15V Model

$\Delta V$ (%)	1	2	3	4	5	6	7	8	9	10
RD (k $\Omega$ )	98.000	48.000	31.333	23.000	18.000	14.667	12.286	10.500	9.111	8.000
$\Delta V$ (%)	11	12	13	14	15	16	17	18	19	20
RD (k $\Omega$ )	7.091	6.333	5.692	5.143	4.667	4.250	3.882	3.556	3.263	3.000

Other Models  
TBD

MODEL NUMBER SETUP

DCHBU	200	-	72	S	24	-	P	HS
Series Name	Output Power		Input Voltage	Output Quantity	Ouput Voltage		Ctrl and Pin Options	Assembly Option
	<b>200:</b> 200 Watts		<b>72:</b> 16~144VDC	<b>S:</b> Single	<b>05:</b> 5VDC <b>12:</b> 12VDC <b>15:</b> 15VDC <b>24:</b> 24VDC <b>28:</b> 28VDC <b>48:</b> 48VDC <b>53:</b> 53VDC		<b>None:</b> Negative Logic <b>P:</b> Positive Logic	<b>None:</b> None <b>HS:</b> Height: 45" 7G-0021A-F <b>HS1:</b> Height: 24" 7G-0022A-F <b>HS2:</b> Height: 24" 7G-0023A-F <b>HS3:</b> Height: 45" 7G-0024A-F <b>TH:</b> Through Hole (No Thread) <sup>(1)</sup>

NOTES

1. The module can't equip Heat sink with TH option.

COMPANY INFORMATION

Wall Industries, Inc. has created custom and modified units for over 50 years. Our in-house research and development engineers will provide a solution that exceeds your performance requirements on-time and on budget. Our ISO9001 certification is just one example of our commitment to producing a high quality, well-documented product for our customers.

Our past projects demonstrate our commitment to you, our customer. Wall Industries, Inc. has a reputation for working closely with its customers to ensure each solution meets or exceeds form, fit and function requirements. We will continue to provide ongoing support for your project above and beyond the design and production phases. Give us a call today to discuss your future projects.

Contact **Wall Industries** for further information:

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