CHB200W-110S SERIES
200 WATT 4:1 INPUT ISOLATED DC-DC CONVERTER

Features

- Efficiency Up to 91%
- Fixed Switching Frequency
- Regulated Outputs
- Remote On/Off
- Low No Load Power Consumption
- Fully Protected (OTP/OCP/OVP/UVLO)
- 3000Vdc I/O Isolation
- Operating Case Temperature -40 to +100℃
- Half-Brick Size Meet Industrial Standard 2.28"x2.40"x0.50"
- UL 60950-1 2nd (Basic Insulation) Approval
- EN 50155 Compliant with External Circuits
- Shock & Vibration EN 50155 (EN 61373) Compliant
- Fire & Smoke EN45545-2 Compliant
- 5000m Operating Altitude
- Safety Meets IEC/EN/UL 62368-1



E176177

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT		INPUT CURRENT		% EFF.	CAPACITOR LOAD MAX.
			MIN.	MAX.	NO LOAD	FULL LOAD	(1)	
CHB200W-110S05	43-160 VDC	5 VDC	0 mA	40 A	10 mA	2043 mA	89	40000uF
CHB200W-110S12	43-160 VDC	12 VDC	0 mA	16.7A	10 mA	2002 mA	91	16700uF
CHB200W-110S24	43-160 VDC	24 VDC	0 mA	8.3A	10 mA	2034 mA	89	8300uF
CHB200W-110S28	43-160 VDC	28 VDC	0 mA	7.14A	10 mA	2042 mA	89	7140uF
CHB200W-110S48	43-160 VDC	48 VDC	0 mA	4.2 A	10 mA	2014 mA	91	3000uF

NOTE:

1. Nominal Input Voltage 110 VDC.
2. An External Input Capacitor 220uF for All Models are Recommended to Reduce Input Ripple Voltage.
3. To Meet EN50155 and RIA12 refer to Application Note.

PART NUMBER

Series	Nominal Input Voltage	Number of Outputs	Nominal Output Voltage	Remote On/Off Logic	Mounting Inserts
CHB200W-	II	O	XX	L	-Y (Option)
CHB200W	110：110 VDC	S：Single	05：05VDC 12：12VDC 24：24VDC 28：28VDC 48：48VDC	None：Positive N：Negative	None：M3x0.5 Mounting Inserts -C：Clear Mounting Insert (3.2mm DIA.)

Part Number Example:

CHB200W-110S12N-C: Half Brick, 200W, 4:1 43-160Vdc Input, Single 12Vdc Output, Negative Logic, Clear Mounting Insert

TECHNICAL SPECIFICATIONS

(All specifications are typical at nominal input, full load at 25℃ unless otherwise noted.)

ABSOLUTE MAXIMUM RATINGS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Input Voltage	Continuous	All	-0.3		160	V_{dc}
Input Surge Voltage	100ms	All			200	V_{dc}
Operating Case Temperature	At the center part of base plate (with derating)	All	-40		100	℃
Storage Temperature		All	-55		125	℃

INPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Operating Input Voltage		All	43	110	160	V_{dc}
Input Under Voltage Lockout						
Turn-On Voltage Threshold		All	40	42	43	V_{dc}
Turn-Off Voltage Threshold		All	37	39	40	V_{dc}
Lockout Hysteresis Voltage		All		3		V_{dc}
Maximum Input Current	V_{in}=43V, Full load	All		5500		mA
No-Load Input Current	V_{in}=110V, I_o=0A	See Model Number Table				mA
Input Filter	Pi filter	All				
Inrush Current (I^2t)	As per ETS300 132-2	All			0.1	A^2s
Input Reflected Ripple Current	P-P thru 12uH inductor, 5Hz to 20MHz	All		40		mA

OUTPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Voltage Set Point Accuracy	V_{in}=110V, Full load, T_c=25℃	All	-1.0		+1.0	%
Output Voltage Regulation						
Load Regulation	Full load to no load	All			±0.2	%
Line Regulation	V_{in}=High line to low line, full load	All			±0.2	%
Temperature Coefficient	T_c=-40℃ to 100℃	All			±0.02	%/℃
Output Voltage Ripple and Noise (5Hz to 20MHz bandwidth)						
Peak-to-Peak	Full load, 10uF aluminum solid and 1uF ceramic capacitors (for 5V: 47uF T521 KO CAP. <55mR and 1uF ceramic capacitor)	5Vo			120	mV
		12Vo			150	
		24Vo			240	
		28Vo			280	
		48Vo			480	
RMS.		5Vo			60	mV
		12Vo			80	
		24Vo			120	
		28Vo			140	
		48Vo			220	
Output Current Range	V_{in}= 43 to 160V	See Model Number Table				A
Over Current Protection	Hiccup mode. Auto recovery	All	110	125	160	%
Short Circuit Protection		All	Continuous, Auto Recovery			
External Load Capacitance	Full load (resistive)	See Model Number Table				uF
Output Voltage Trim Range	$P_o \leqq$ max. rated power, $I_o \leqq I_{o_max.}$	All	-10		+10	%
Output Voltage Remote Sense Range	$P_o \leqq$ max. rated power, $I_o \leqq I_{o_max.}$ % of nominal V_o	All			+10	%
Over Voltage Protection	Limited voltage, % of nominal V_o	All	115	125	140	%

EFFICIENCY

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
100% Load	V_{in}=110V	See Model Number Table				%

DYNAMIC CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Output Voltage Current Transient						
Error Band	75% to 100% of $I_{o_max.}$ step load change di/dt=0.1A/us (within 1% V_{out} nominal)	All			±5	%
Recovery Time					250	us
Turn-On Delay and Rise Time	Full load (constant resistive load)					
Turn-On Delay Time, From On/Off Control	$V_{on/off}$ to 10%V_{o_set}	All		20		ms
Turn-On Delay Time, From Input	$V_{in_min.}$ to 10%V_{o_set}	All		20		ms
Output Voltage Rise Time	10%V_{o_set} to 90%V_{o_set}	All		15		ms

ISOLATION CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Isolation Voltage (100% factory Hi-Pot tested @2sec.)	1 Minute; input to output	All			3000	V_{dc}
	1 Minute; input to case (base plate)				3000	
	1 Minute; output to case (base plate)				500	V_{ac}
Isolation Resistance	Input to output	All	100			MΩ
Isolation Capacitance	Input to output	All		3000		pF
	Input to case (base plate)			3000		
	Output to case (base plate)			20000		

FEATURE CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	Pulse width modulation (PWM), fixed	All	270	300	330	KHz
On/Off Control, Positive Remote On/Off Logic, Refer to -Vin Pin						
Logic Low (Module Off)	$V_{on/off}$ at $I_{on/off}$=1.0mA	All	0		1.2	V
Logic High (Module On)	$V_{on/off}$ at $I_{on/off}$=0.0uA, Pin open=on	All	3.5		160	V
On/Off Control, Negative Remote On/Off Logic, Refer to -Vin Pin						
Logic High (Module Off)	$V_{on/off}$ at $I_{on/off}$=0.0uA, Pin open=off	All	3.5		160	V
Logic Low (Module On)	$V_{on/off}$ at $I_{on/off}$=1.0mA	All	0		1.2	V
On/Off Current (for Both Remote On/Off Logic)	$I_{on/off}$ at $V_{on/off}$=0V	All		0.3	1	mA
Leakage Current (for Both Remote On/Off Logic)	Logic high, $V_{on/off}$=15V	All			30	uA
Off Converter Input Current	Shutdown input idle current	All		3	5	mA
Over Temperature Shutdown	Temperature at the center part of base plate, non-latching	All		110		℃
Over Temperature Recovery				100		

GENERAL SPECIFICATIONS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	I_o=100% of $I_{o_max.}$; MIL-HDBK - 217F_Notice 1, GB, 25℃	48Vo		900		K hours
		Others		600		
Weight		All		114		grams
Case Material	Plastic, DAP, UL 94V-0					
Base plate Material	Aluminum					
Potting Material	UL 94V-0					
Pin Material	Base: Copper Plating: Nickel with Matte Tin					

GENERAL SPECIFICATIONS

Shock/Vibration	MIL-STD-810F/EN 61373 Compliant
Humidity	95% RH max. Non Condensing
Altitude	5000m Operating Altitude, 12000m Transport Altitude
Thermal Shock	MIL-STD-810F
Fire & Smoke	EN 45545-2 Compliant

EMC SPECIFICATIONS (External components required, please refer to application note.)

EMI	EN 50155 Compliant (with external filter)		Class A
ESD	EN 61000-4-2	Level 3: Air ±8kV, Contact ±6kV	Perf. Criteria A
Radiated Immunity	EN 61000-4-3	Level 3: 80~1000MHz, 20V/m	Perf. Criteria A
Fast Transient	EN 61000-4-4	Level 3: On power input port, ±2kV, external components required	Perf. Criteria A
Surge	EN 61000-4-5	Level 4: Line to earth, ±4kV, Line to line, ±2kV, external components required	Perf. Criteria A
Conducted Immunity	EN 61000-4-6	Level 3: 0.15~80MHz, 10V	Perf. Criteria A
Interruptions of Voltage Supply	EN 50155	Class S3: 20ms interruptions, external hold up circuit and capacitor required	Perf. Criteria A
Supply Change Over	EN 50155	Class C2: During a supply break of 30ms, external hold up circuit and capacitor required	Perf. Criteria A
Application Note Link			CHB200W-110S Series App Notes
Packaging Information Link			Packaging Information

Immunity to Environmental Conditions

Phenomenon	EN50155; 2017 Reference Clause(s)	Reference Standard	Test Conditions	Result
Low Temperature Start-up test	13.4.4	EN 60068-2-1	Class OT6 Temperature: -40℃ Duration: 2 hrs	Pass
Dry Heat Test	13.4.5	EN 60068-2-2	Class OT6 & ST0 Temperature: 85℃ Duration: 6 hrs	Pass
Low Temperature Storage Test	13.4.6	EN 60068-2-1	Temperature: -40℃ Duration: 16 hrs	Pass
Cyclic Damp Heat Test	13.4.7	EN 60068-2-30	Temperature: 25℃ - 55℃ Humidity: 90% RH Duration: 48 hrs	Pass
Random Vibration Test	13.4.11	EN 61373	Frequency range: 5 ~ 150 Hz Vertical: 1.01 m/s^2 Transverse: 1.01 m/s^2 Longitudinal: 1.01 m/s^2 Duration: 10 min / axis	Pass
Simulated Long Life Test at Increased Random Vibration Levels	13.4.11	EN 61373	Frequency range: 5 ~ 150 Hz Vertical: 5.72 m/s^2 Transverse: 5.72 m/s^2 Longitudinal: 5.72 m/s^2 Duration: 5 hrs / axis	Pass
Shock Test	13.4.11	EN 61373	±Vertical: 50 m/s^2 ±Transverse: 50 m/s^2 ±Longitudinal: 50 m/s^2 Duration: 30ms x18 (Each axis 3 shocks)	Pass

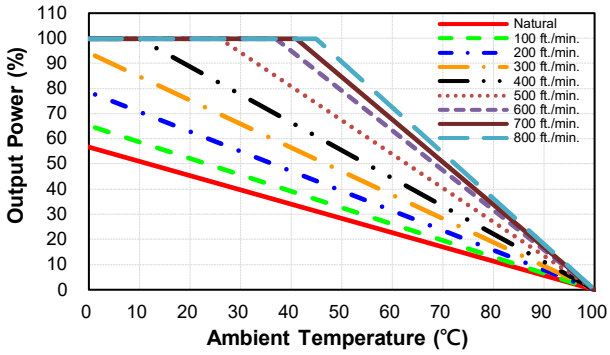
EN45545-2 Fire & Smoke Test Conditions

Item		Standard	Hazard Level
R22	Oxygen Index Test	EN 45545-2: 2013+A1:2015 EN ISO 4589-2: 2017	HL1, HL2, HL3
	Smoke Density Test	EN 45545-2: 2013+A1:2015 EN ISO 5659-2: 2017	HL1, HL2, HL3
	Smoke Toxicity Test	EN 45545-2: 2013+A1:2015 NF X70-100-1 and -2: 2006	HL1, HL2, HL3
R23	Oxygen Index Test	EN 45545-2: 2013+A1:2015 EN ISO 4589-2: 2017	HL1, HL2, HL3
	Smoke Density Test	EN 45545-2: 2013+A1:2015 EN ISO 5659-2: 2017	HL1, HL2, HL3
	Smoke Toxicity Test	EN 45545-2: 2013+A1:2015 NF X70-100-1 and -2: 2006	HL1, HL2, HL3
R24	Oxygen Index Test	EN45545-2: 2013 EN ISO 4589-2	HL1, HL2, HL3
R25	Glow - Wire Test	EN 45545-2:2013+A1:2016 EN 60695-2-11:2014	HL1, HL2, HL3
R26	Vertical Flame Test	EN 45545-2: 2013+A1:2015 EN 60695-11-10: 2013	HL1, HL2, HL3

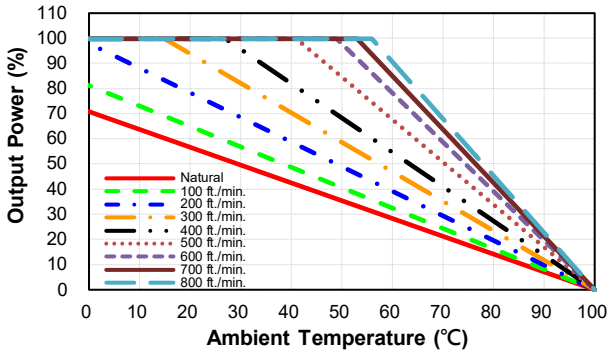
CHARACTERISTIC CURVE

Power Derating Curve

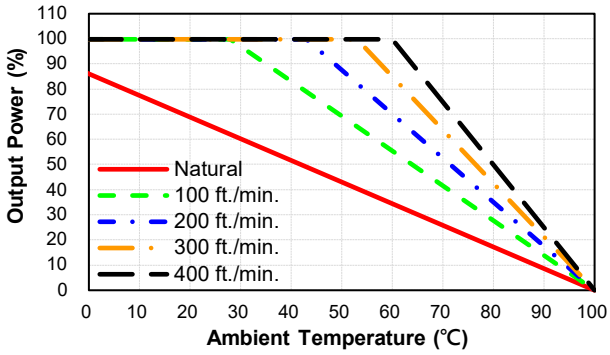
CHB200W-110S05,24,28 Derating Curve
without Heatsink (Vin=110V)



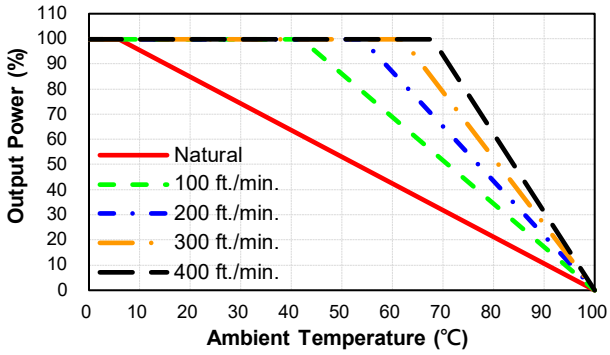
CHB200W-110S12,48 Derating Curve
without Heatsink (Vin=110V)



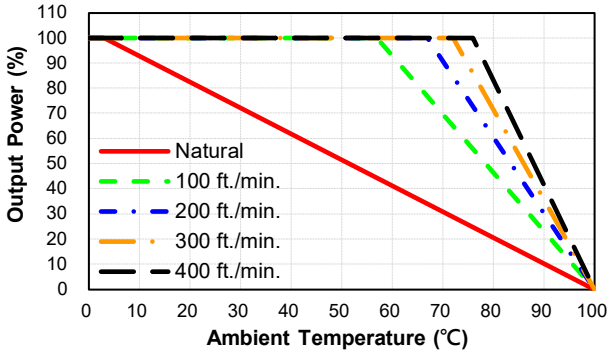
CHB200W-110S05,24,28 Derating Curve
with Heatsink HBT127 (Vin=110V)



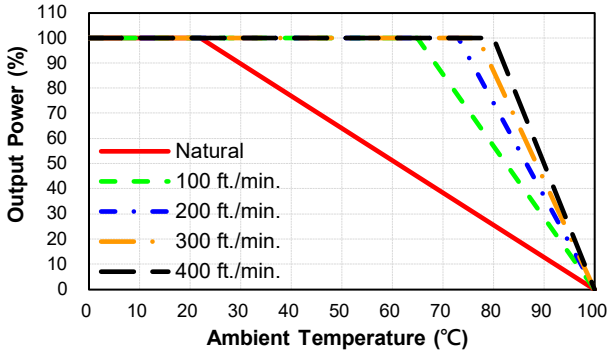
CHB200W-110S12,48 Derating Curve
with Heatsink HBT127 (Vin=110V)



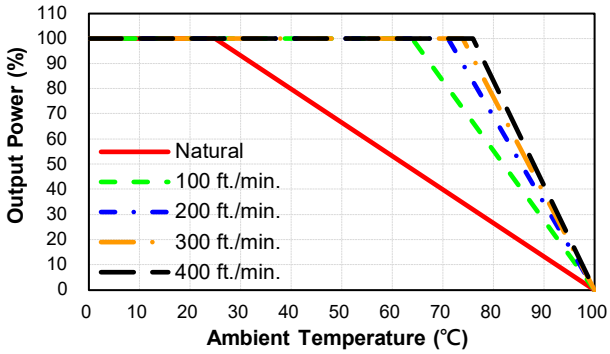
CHB200W-110S05,24,28 Derating Curve
with Heatsink HBL210 (Vin=110V)



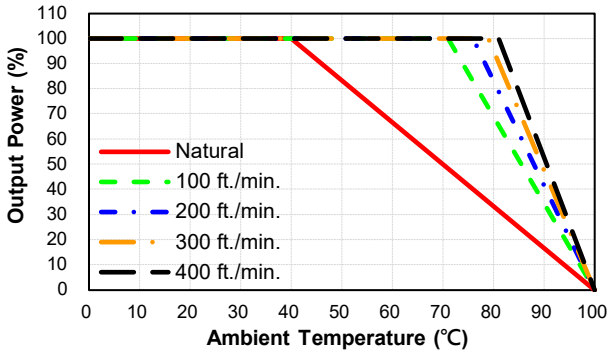
CHB200W-110S12,48 Derating Curve
with Heatsink HBL210 (Vin=110V)



CHB200W-110S05,24,28 Derating Curve
with Heatsink HBT254 (Vin=110V)

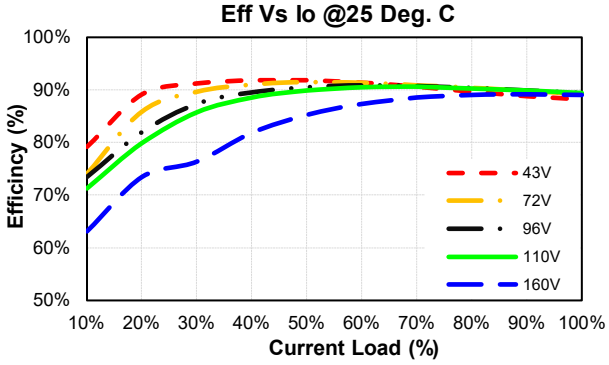


CHB200W-110S12,48 Derating Curve
with Heatsink HBT254 (Vin=110V)

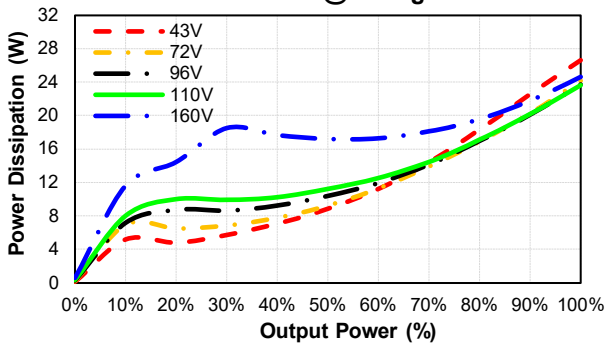


Performance Data

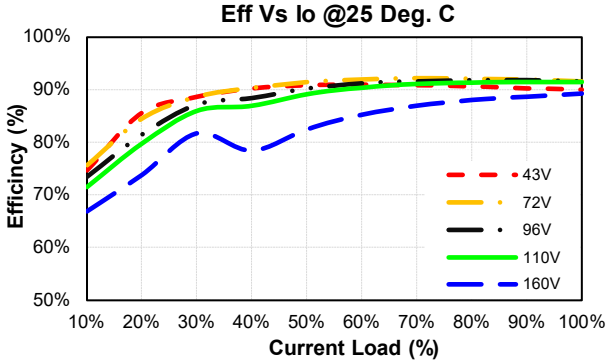
CHB200W-110S05
Eff Vs Io @25 Deg. C



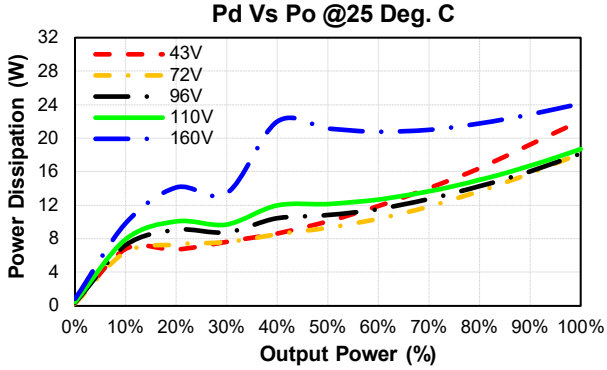
CHB200W-110S05
Pd Vs Po @25 Deg. C



CHB200W-110S12
Eff Vs Io @25 Deg. C

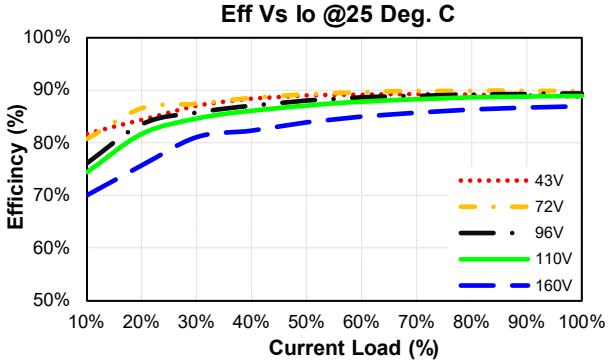


CHB200W-110S12
Pd Vs Po @25 Deg. C

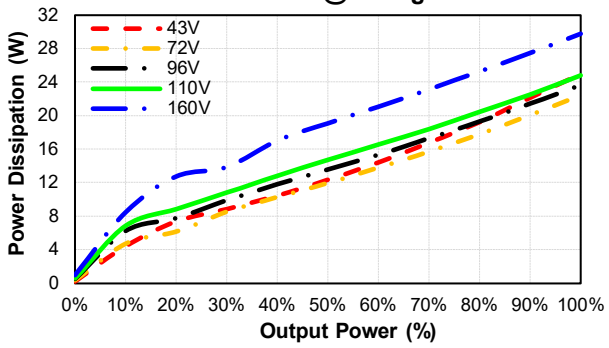


CHB200W-110S Series

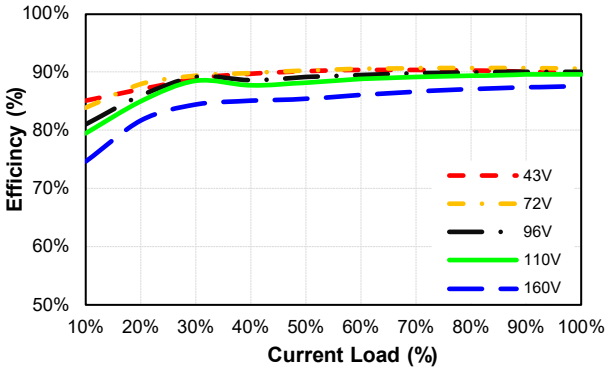
CHB200W-110S24
Eff Vs Io @25 Deg. C



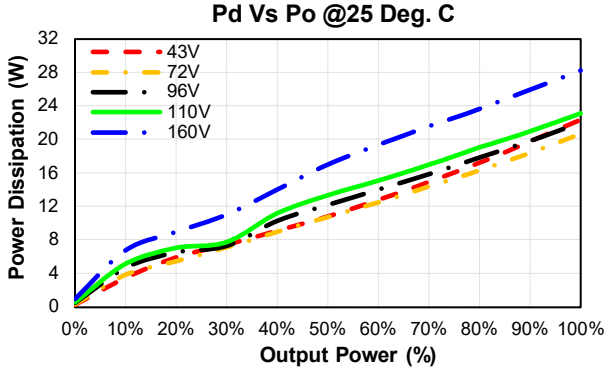
CHB200W-110S24
Pd Vs Po @25 Deg. C



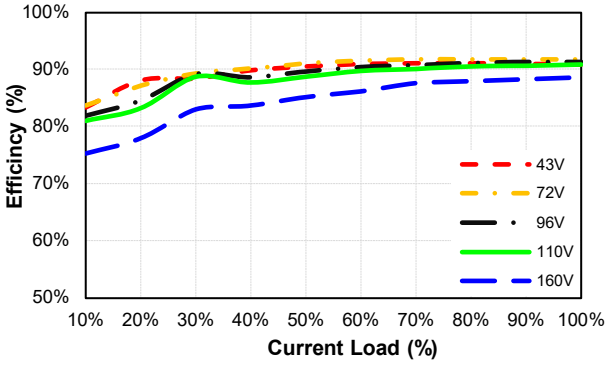
CHB200W-110S28
Eff Vs Io @25 Deg. C



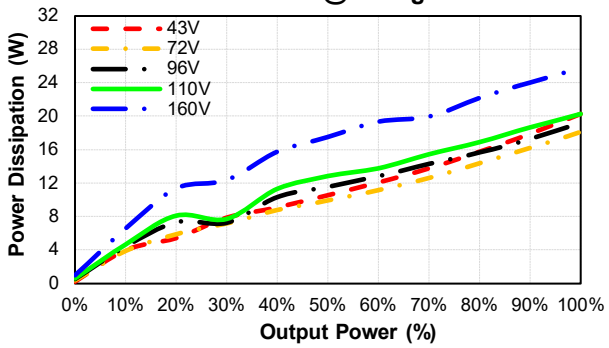
CHB200W-110S28
Pd Vs Po @25 Deg. C



CHB200W-110S48
Eff Vs Io @25 Deg. C



CHB200W-110S48
Pd Vs Po @25 Deg. C



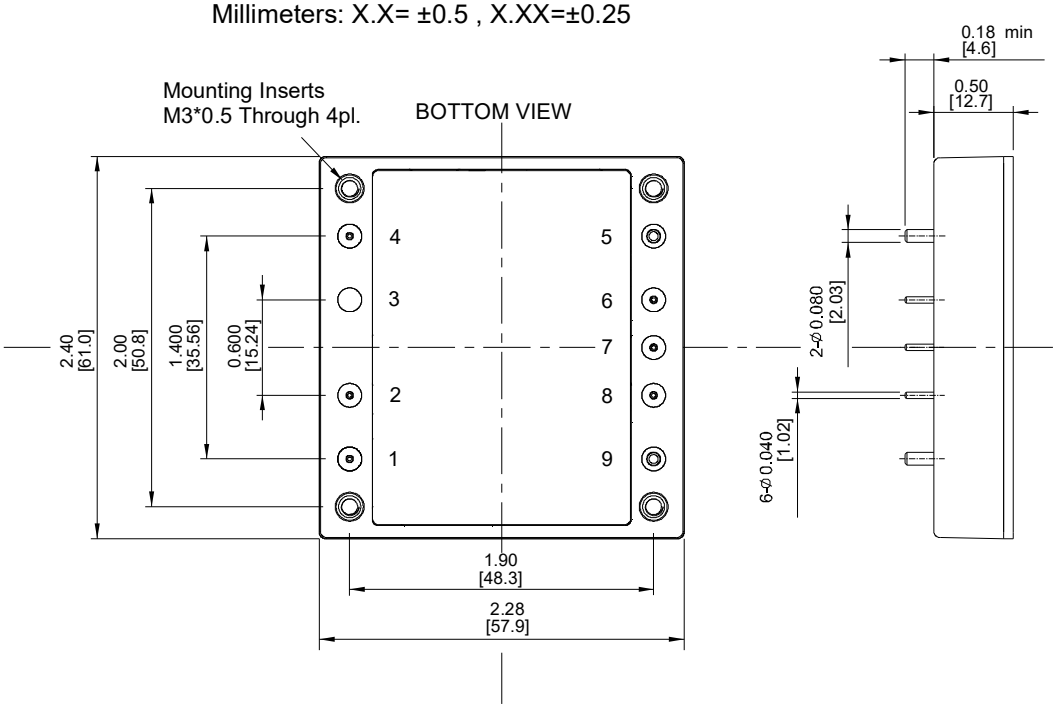
MECHANICAL SPECIFICATION

CASE HB

All Dimensions In Inches(mm)

Tolerances Inches: X.XX= ±0.02 , X.XXX= ±0.010

Millimeters: X.X= ±0.5 , X.XX=±0.25



Pin	Function
1	+V Input
2	On/Off
3	NP
4	-V Input
5	-V Output
6	-Sense
7	Trim
8	+Sense
9	+V Output

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