



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°C
- 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



MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT		INPUT CURRENT		% EFF. (1)	CAPACITOR LOAD MAX.
			MIN.	MAX.	NO LOAD	FULL LOAD		
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	M3x0.5 Mounting None : 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



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TECHNICAL SPECIFICATIONS

(All specifications are typical at nominal input, full load at 25°C 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	°C
Storage Temperature		All	-55		125	°C

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 ² t)	As per ETS300 132-2	All			0.1	A ² s
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°C	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°C to 100°C	All			±0.02	%/°C
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.	Full load, 10uF aluminum solid and 1uF ceramic capacitors (for 5V: 47uF T521 KO CAP. <55mR and 1uF ceramic capacitor)	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 ≤ max. rated power, I _o ≤ I _{o,max.}	All	-10		+10	%
Output Voltage Remote Sense Range	P _o ≤ max. rated power, I _o ≤ I _{o,max.} % of nominal V _o	All			+10	%
Over Voltage Protection	Limited voltage, % of nominal V _o	All	115	125	140	%



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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	°C
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°C	48Vo Others	900		K hours	
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					



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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 ± 8 kV, Contact ± 6 kV	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, ± 2 kV, external components required	Perf. Criteria A
Surge	EN 61000-4-5 Level 4: Line to earth, ± 4 kV, Line to line, ± 2 kV, 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°C Duration: 2 hrs	Pass
Dry Heat Test	13.4.5	EN 60068-2-2	Class OT6 & ST0 Temperature: 85°C Duration: 6 hrs	Pass
Low Temperature Storage Test	13.4.6	EN 60068-2-1	Temperature: -40°C Duration: 16 hrs	Pass
Cyclic Damp Heat Test	13.4.7	EN 60068-2-30	Temperature: 25°C - 55°C 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	\pm Vertical: 50 m/s^2 \pm Transverse: 50 m/s^2 \pm Longitudinal: 50 m/s^2 Duration: 30ms x18 (Each axis 3 shocks)	Pass



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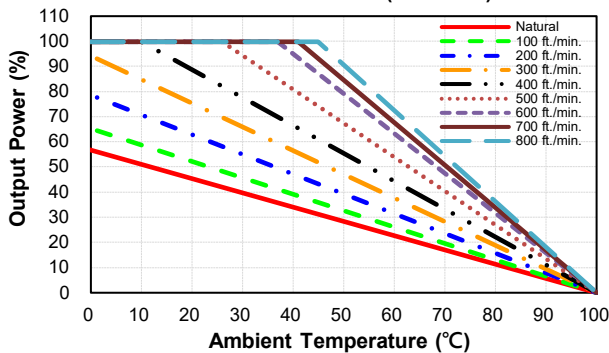
EN45545-2 Fire & Smoke Test Conditions

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

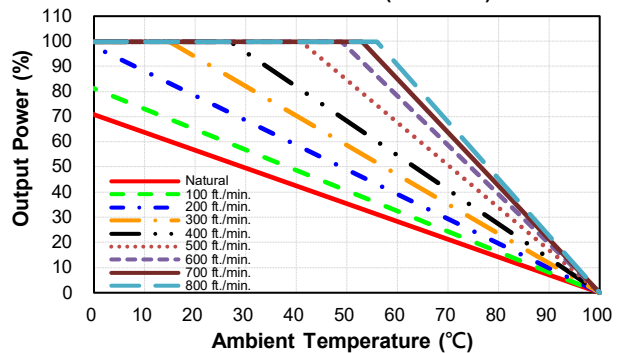
CHARACTERISTIC CURVE

Power Derating Curve

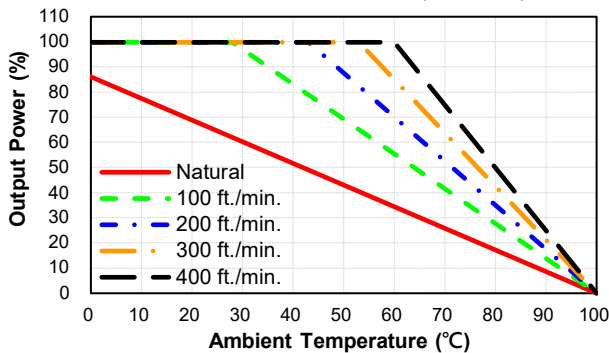
CHB200W-110S05,24,28 Derating Curve without Heatsink (Vin=110V)



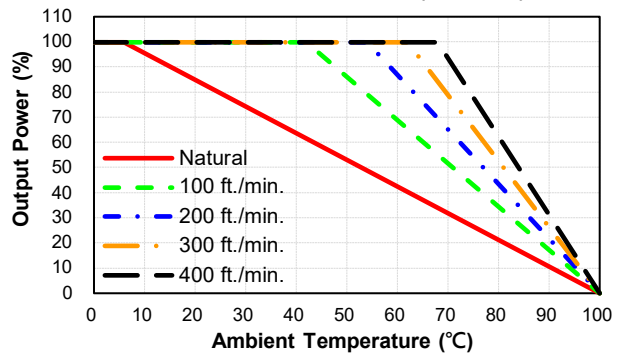
CHB200W-110S12,48 Derating Curve without Heatsink (Vin=110V)



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



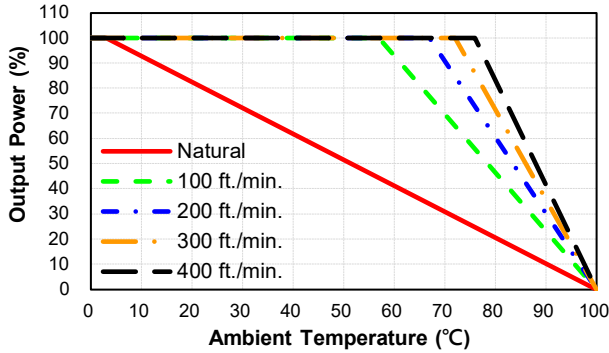
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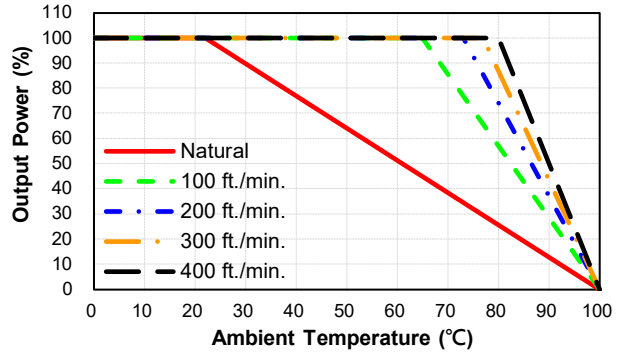


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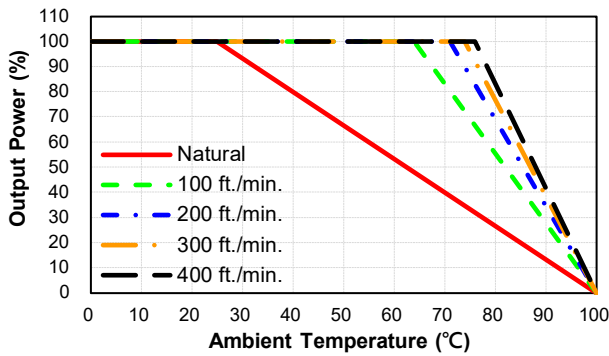
CHB200W-110S05,24,28 Derating Curve with Heatsink HBL210 (Vin=110V)



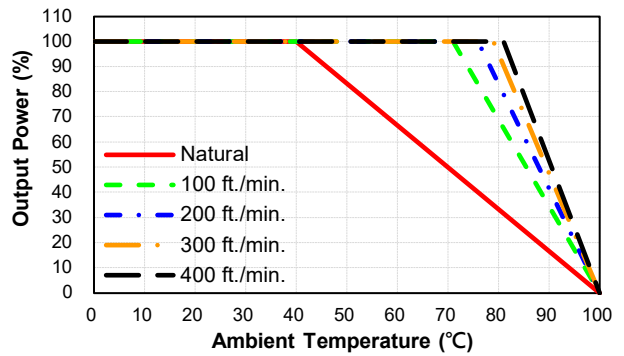
CHB200W-110S12,48 Derating Curve with Heatsink HBL210 (Vin=110V)



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

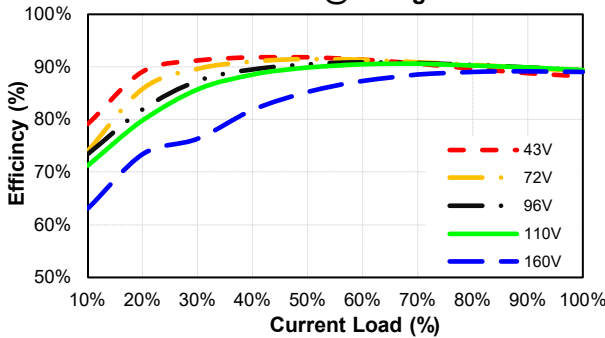


CHB200W-110S12,48 Derating Curve with Heatsink HBT254 (Vin=110V)

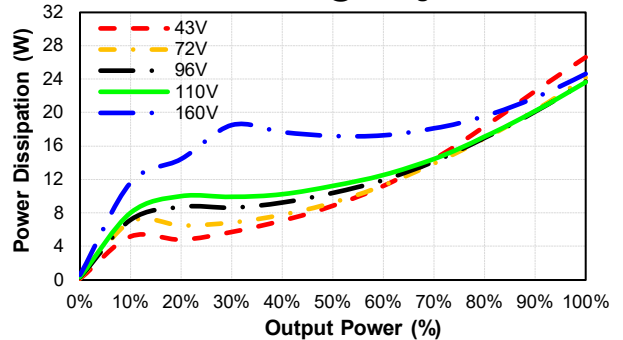


Performance Data

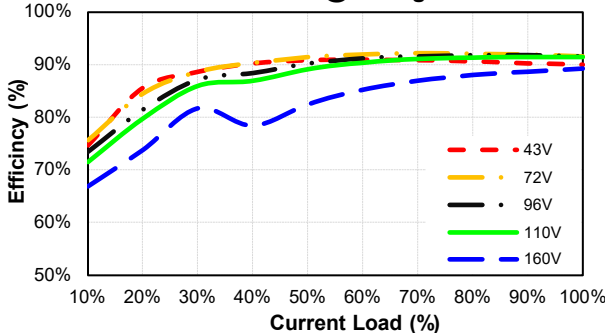
CHB200W-110S05 Eff Vs Io @25 Deg. C



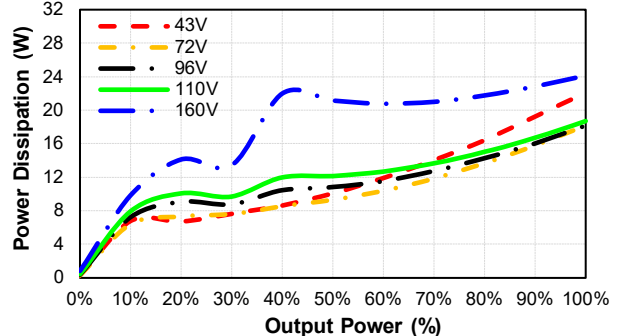
CHB200W-110S05 Pd Vs Po @25 Deg. C



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



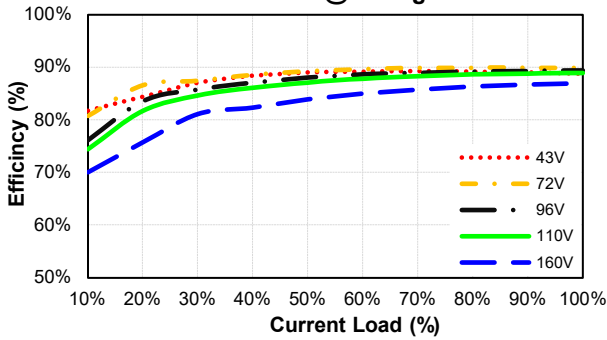
CHB200W-110S12 Pd Vs Po @25 Deg. C



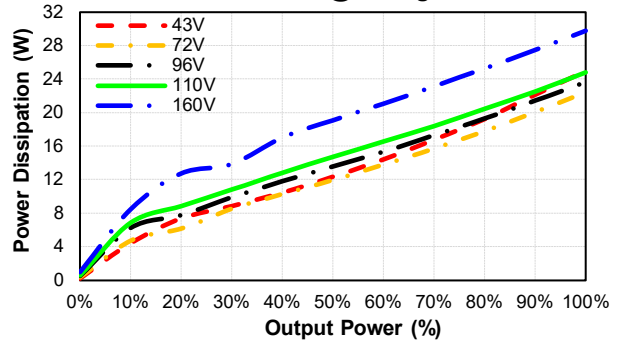


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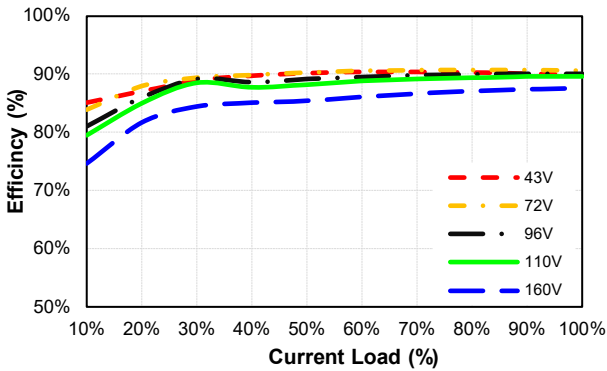
CHB200W-110S24
Eff Vs Io @25 Deg. C



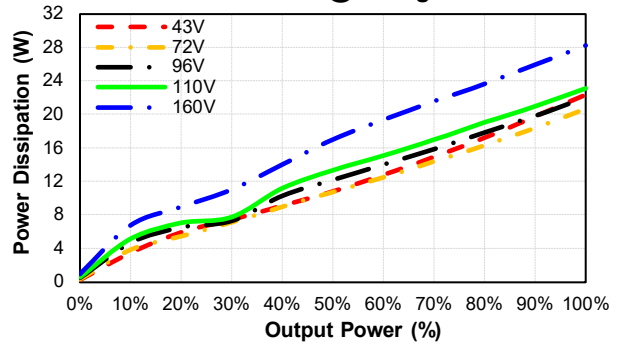
CHB200W-110S24
Pd Vs Po @25 Deg. C



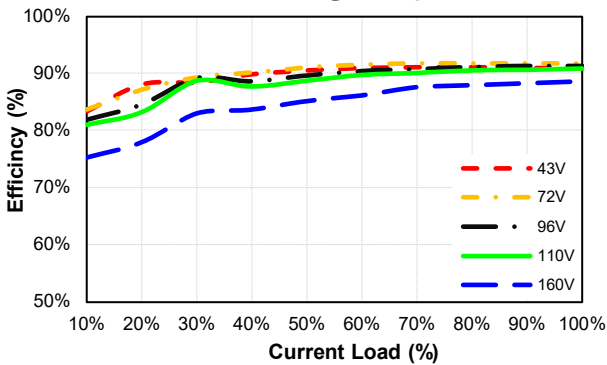
CHB200W-110S28
Eff Vs Io @25 Deg. C



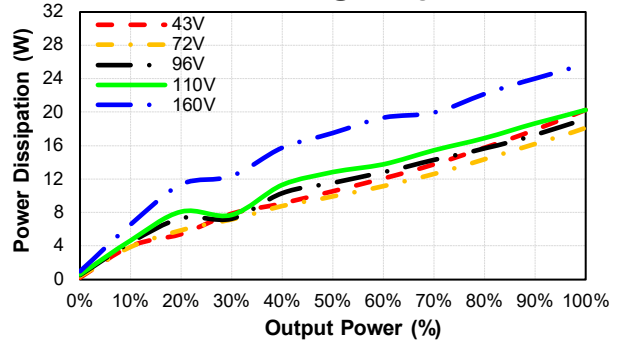
CHB200W-110S28
Pd Vs Po @25 Deg. C



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



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





CHB200W-110S Series

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

