



CHB300W-110S SERIES

198-300 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"
- CB Test Certificate IEC 60950-1 (Except 3.3Vout)
- UL 60950-1 2nd (Basic Insulation) Approval
(Except 3.3Vout)
- EN 50155 Compliant with External Circuits
- Shock & Vibration EN 50155 (EN 61373) Compliant
- Fire & Smoke EN 45545-2 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		
CHB300W-110S3V3	43-160 VDC	3.3 VDC	0 mA	60 A	10 mA	2093 mA	86	60000uF
CHB300W-110S05	43-160 VDC	5 VDC	0 mA	60 A	10 mA	3099 mA	88	60000uF
CHB300W-110S12	43-160 VDC	12 VDC	0 mA	25 A	10 mA	3030 mA	90	25000uF
CHB300W-110S24	43-160 VDC	24 VDC	0 mA	12.5 A	10 mA	3064 mA	89	12500uF
CHB300W-110S28	43-160 VDC	28 VDC	0 mA	10.7 A	10 mA	3064 mA	89	10700uF
CHB300W-110S48	43-160 VDC	48 VDC	0 mA	6.25 A	10 mA	2997 mA	91	4700uF

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
CHB300W-	II	O	XX	L	-Y (Option)
CHB300W	110 : 110 VDC	S : Single	3V3 : 3.3VDC 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:

CHB300W-110S12N-C: Half Brick, 198-300W, 4:1 43-160Vdc Input, Single 12Vdc Output, Negative Logic, Clear Mounting Insert



CHB300W-110S Series

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	Vo=3.3V		5500		mA
		Others		8000		
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 3.3V & 5V: 47uF T521 KO CAP. <55mR and 1uF ceramic capacitor)	3.3Vo			120	mV
		5Vo			120	
		12Vo			150	
		24Vo			240	
		28Vo			280	
		48Vo			480	
RMS.		3.3Vo			60	mV
		5Vo			60	
		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



CHB300W-110S Series

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Output Voltage Trim Range	$P_o \leq \text{max. rated power, } I_o \leq I_{o_max.}$	All	-10		+10	%
Output Voltage Remote Sense Range	$P_o \leq \text{max. rated power, } I_o \leq I_{o_max.}$ % 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)	All		3000		
	Output to case (base plate)	All		20000		

FEATURE CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	Pulse width modulation (PWM), fixed	3.3Vo Others	225 270	250 300	275 330	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		



CHB300W-110S Series

GENERAL SPECIFICATIONS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	$I_o=100\%$ of I_{o_max} ; MIL-HDBK - 217F_Note 1, GB, 25°C	48Vo Others		900 600		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					
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 $\pm 8kV$, Contact $\pm 6kV$	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, $\pm 2kV$, external components required	Perf. Criteria A
Surge	EN 61000-4-5	Level 4: Line to earth, $\pm 4kV$, Line to line, $\pm 2kV$, 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		CHB300W-110S Series App Notes	
Packaging Information Link		Packaging Information	



CHB300W-110S Series

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	±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

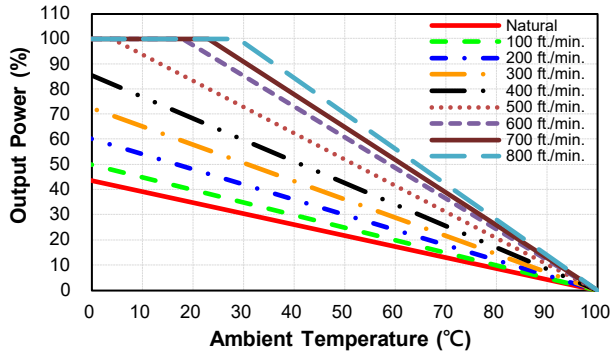


CHB300W-110S Series

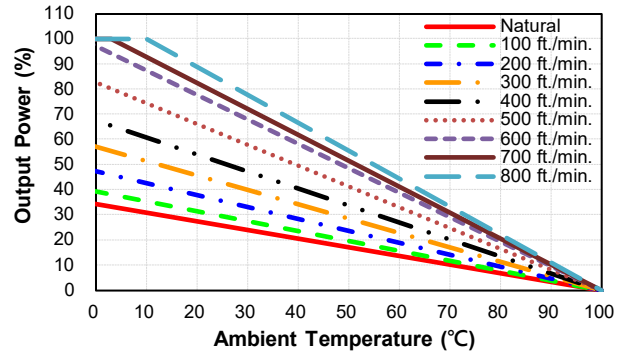
CHARACTERISTIC CURVE

Power Derating Curve

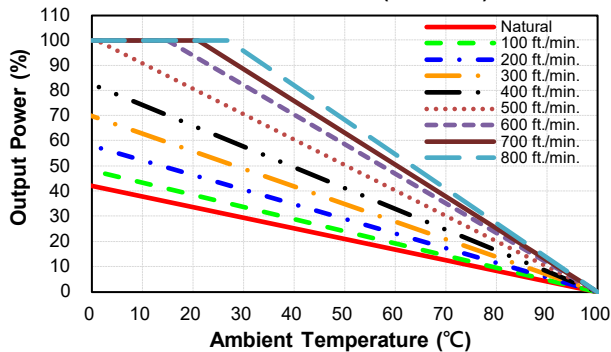
CHB300W-110S3V3 Derating Curve
without Heatsink (Vin=110V)



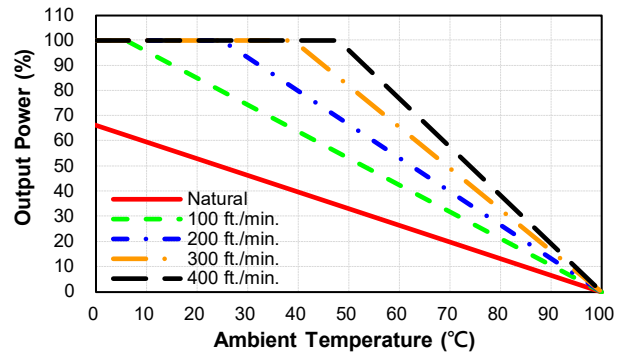
CHB300W-110S05,24,28 Derating Curve
without Heatsink (Vin=110V)



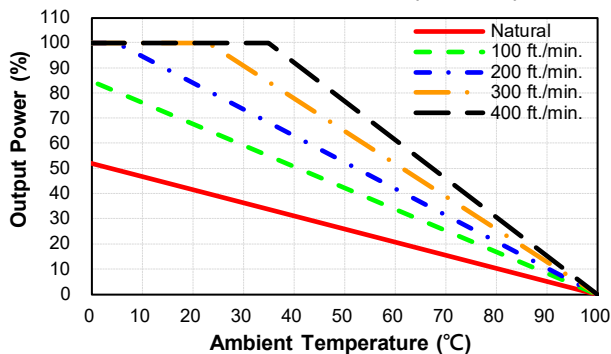
CHB300W-110S12,48 Derating Curve
without Heatsink (Vin=110V)



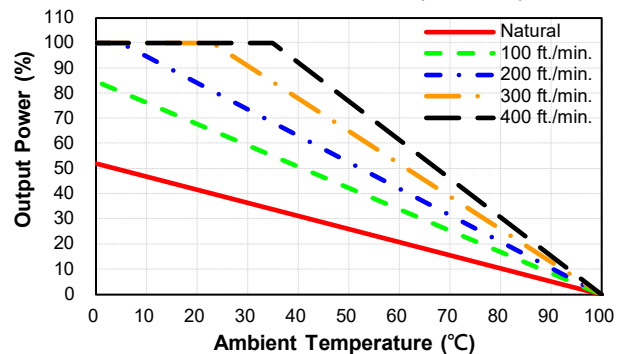
CHB300W-110S3V3 Derating Curve
with Heatsink HBT127 (Vin=110V)



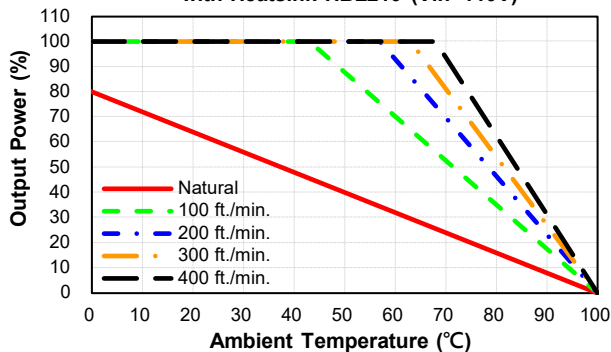
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with Heatsink HBT127 (Vin=110V)



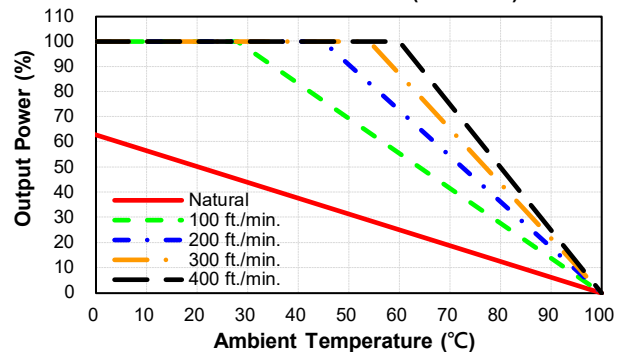
CHB300W-110S12,48 Derating Curve
with Heatsink HBT127 (Vin=110V)



CHB300W-110S3V3 Derating Curve
with Heatsink HBL210 (Vin=110V)



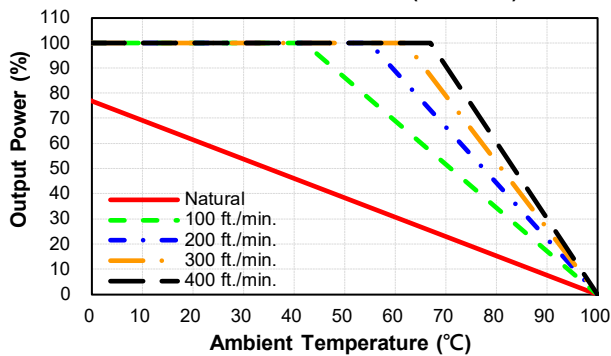
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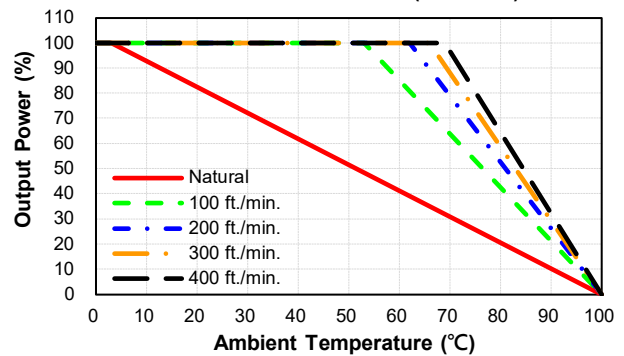


CHB300W-110S Series

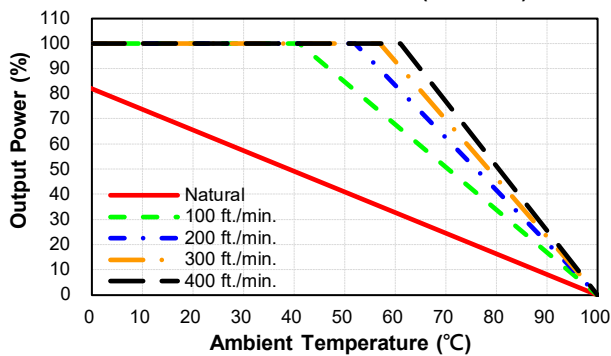
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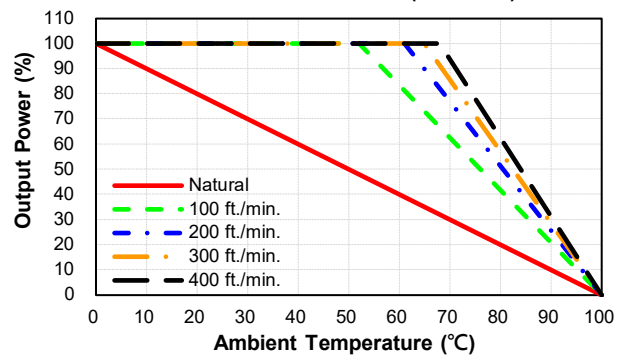
CHB300W-110S3V3 Derating Curve
with Heatsink HBT254 (Vin=110V)



CHB300W-110S05,24,28 Derating Curve
with Heatsink HBT254 (Vin=110V)

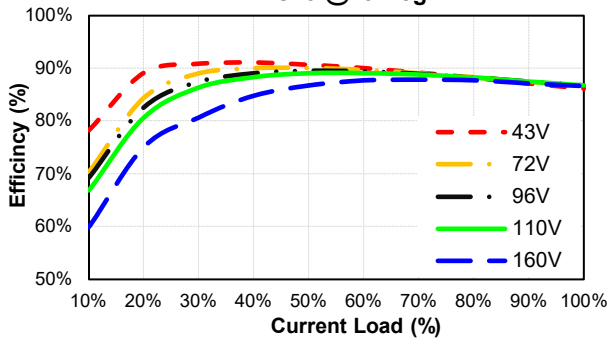


CHB300W-110S12,48 Derating Curve
with Heatsink HBT254 (Vin=110V)

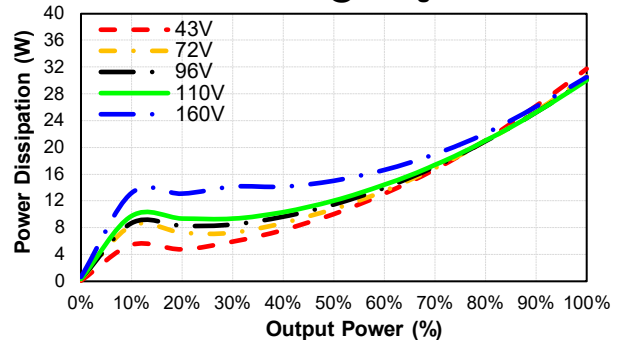


Performance Data

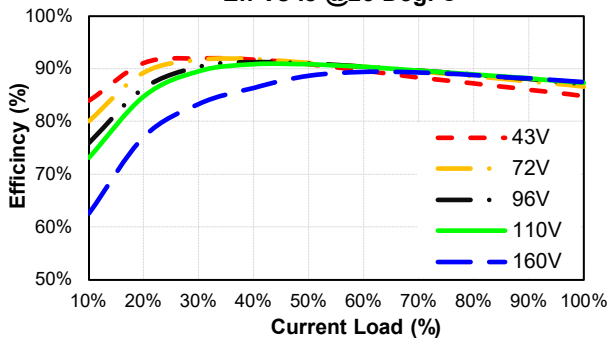
CHB300W-110S3V3
Eff Vs Io @25 Deg. C



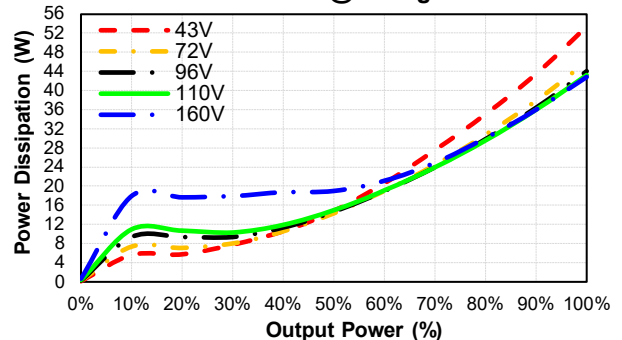
CHB300W-110S3V3
Pd Vs Po @25 Deg. C



CHB300W-110S05
Eff Vs Io @25 Deg. C



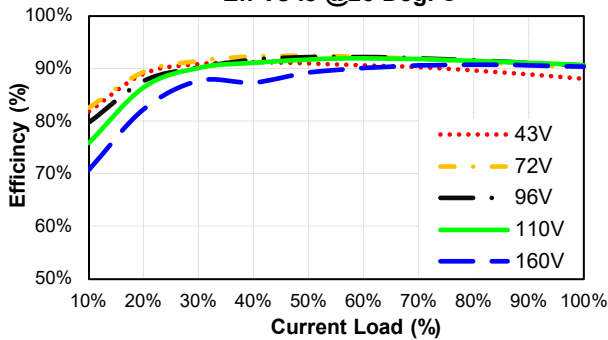
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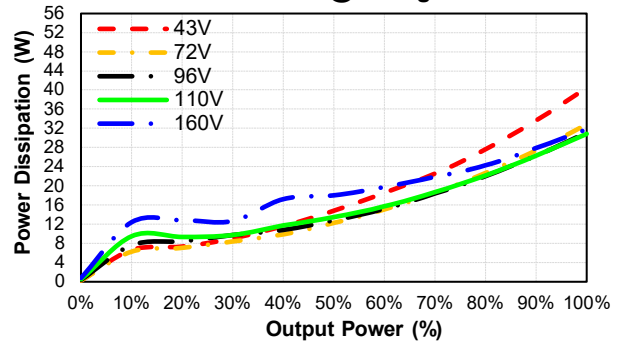


CHB300W-110S Series

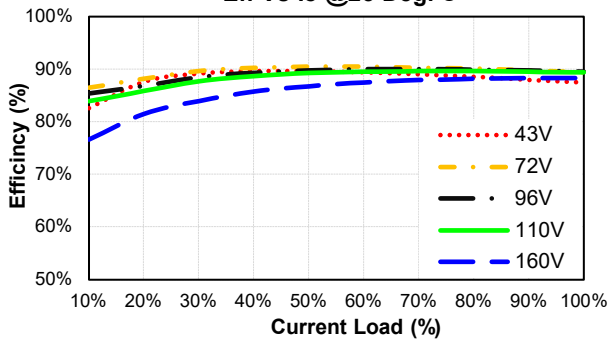
CHB300W-110S12
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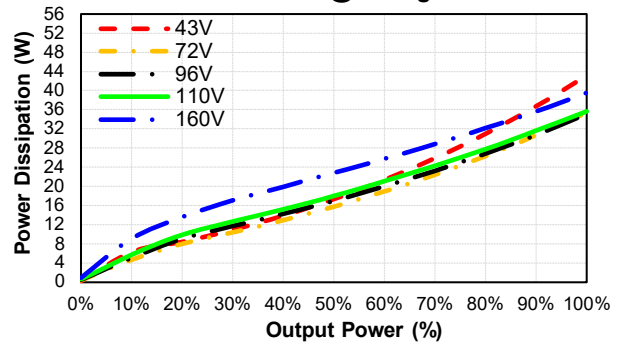
CHB300W-110S12
Pd Vs Po @25 Deg. C



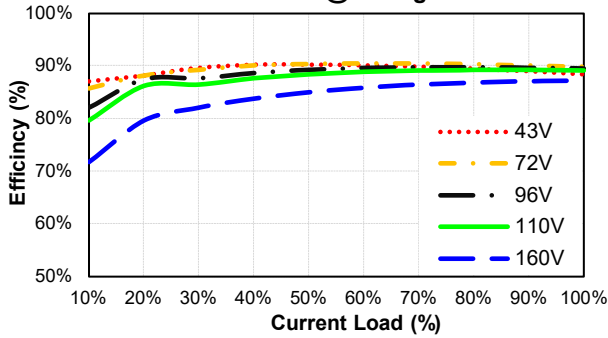
CHB300W-110S24
Eff Vs Io @25 Deg. C



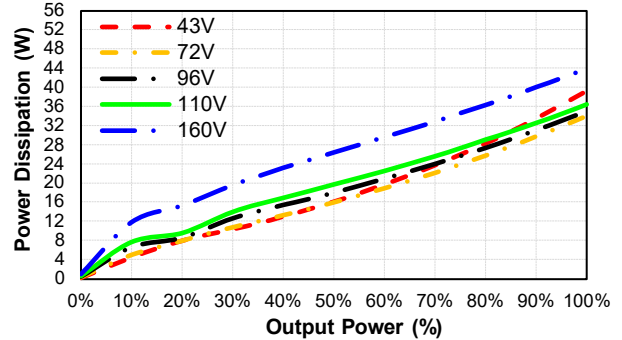
CHB300W-110S24
Pd Vs Po @25 Deg. C



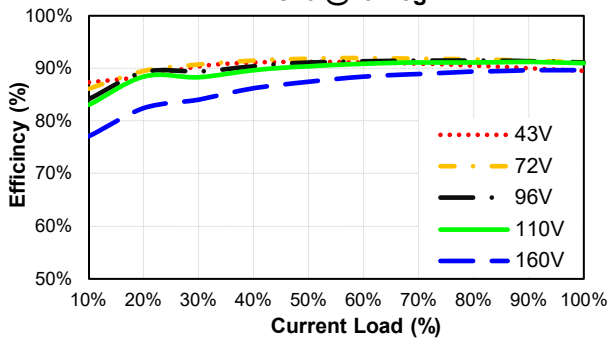
CHB300W-110S28
Eff Vs Io @25 Deg. C



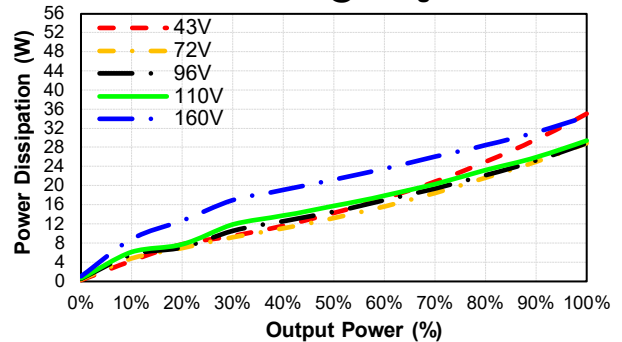
CHB300W-110S28
Pd Vs Po @25 Deg. C



CHB300W-110S48
Eff Vs Io @25 Deg. C



CHB300W-110S48
Pd Vs Po @25 Deg. C





CHB300W-110S Series

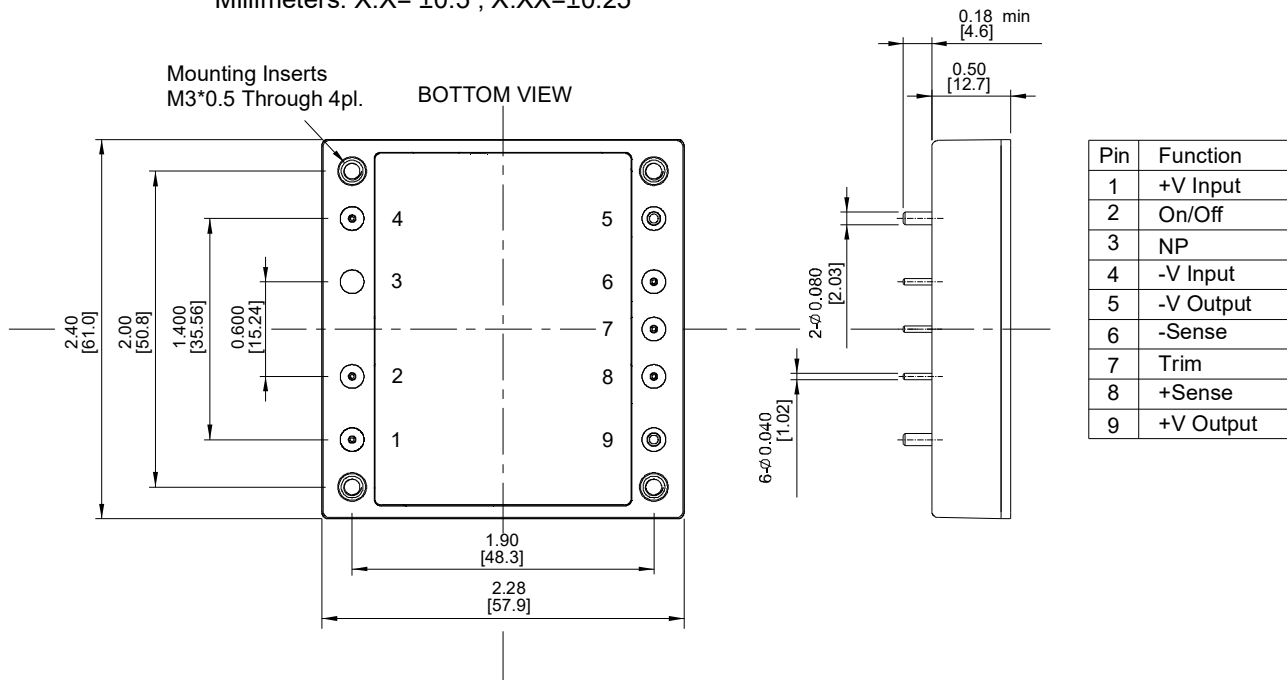
MECHANICAL SPECIFICATION

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



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