



CHB100-110S SERIES 100 WATT 3:1 INPUT ISOLATED DC-DC CONVERTER

Features

- Efficiency Up to 89%
- Fixed Switching Frequency
- Regulated Outputs
- Remote On/Off
- Low No Load Input Power
- Fully Protected (OTP/OCP/OVP/UVLO)
- 3000Vac I/O Isolation
- Operating Case Temperature -40 to +100°C
- Half Brick Size Meet Industrial Standard
2.28"x2.40"x0.50"
- LVD Approval
- EN 50155 Compliant with External Circuits
- Shock & Vibration EN 50155 (EN 61373) Compliant
- Fire & Smoke EN 45545-2 Compliant
- 3000m 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		
CHB100-110S12	66-160 VDC	12 VDC	0 mA	8.3 A	5 mA	1050 mA	86.5	8300µF
CHB100-110S15	66-160 VDC	15 VDC	0 mA	6.7 A	5 mA	1040 mA	87.5	4170µF
CHB100-110S24	66-160 VDC	24 VDC	0 mA	4.17 A	5 mA	1040 mA	87	4170µF
CHB100-110S48	66-160 VDC	48 VDC	0 mA	2.08 A	5 mA	1020 mA	89	1500µF

NOTE:

1. Nominal input voltage 110 VDC.
2. An external input capacitor 47µF for all models are recommended to reduce input ripple voltage.
3. Require a 47µF aluminum capacitor connected between +Vout and -Vout for 48Vout models.
4. 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
CHB100-	II	O	XX	L	-Y (Option)
CHB100	110 : 110 VDC	S : Single	12 : 12VDC 15 : 15VDC 24 : 24VDC 48 : 48VDC	None : Positive	None : M3x0.5 Mounting Inserts -C : Clear Mounting Insert (3.2mm DIA.)

Part Number Example:

CHB100-110S12-C: Half Brick, 100W, 3:1 66-160Vdc Input, Single 12Vdc Output, Positive 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 max.	All			180	V _{dc}
Operating Case Temperature	At the center part of base plate with derating	All	-40		100	°C
Storage Temperature		All	-55		105	°C

INPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Operating Input Voltage		All	66	110	160	V _{dc}
Input Under Voltage Lockout						
Turn-On Voltage Threshold		All	60	62	64	V _{dc}
Turn-Off Voltage Threshold		All	54	56	58	V _{dc}
Lockout Hysteresis Voltage		All		6		V _{dc}
Maximum Input Current	V _{in} =66V, Full load	All		1.785		A
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		50		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			±0.03	%/°C
Output Voltage Ripple and Noise (5Hz to 20MHz bandwidth)						
Peak-to-Peak	Full load, 10uF aluminum solid capacitor (for 48Vout 47uF Aluminum capacitor)and 1uF ceramic capacitors	12V _o			150	mV
		15V _o			150	
		24V _o			240	
		48V _o			480	
		5V _o			60	
RMS.		12V _o			60	mV
		24V _o			100	
		48V _o			200	
Output Current Range	V _{in} = 66 to 160V		See Model Number Table			A
Over Current Protection	Hiccup mode. Auto recovery	All	110	130	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	%

EFFICIENCY

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



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DYNAMIC CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units	
Output Voltage Current Transient							
Error Band	25% step load change $d_i/d_t=0.1A/us$ (within 1% V_{out} nominal)	All				±10	%
Recovery Time						500	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} , Remote on	All				10	ms
Turn-On Delay Time, From Input	$V_{in_min.}$ to 10% V_{o_set} , Power up	All				25	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_{ac}
	1 Minute; input to case (base plate)					1500	V_{ac}
	1 Minute; output to case (base plate)					500	V_{ac}
Isolation Resistance	Input to output	All	1000			MΩ	
Isolation Capacitance	Input to output	All	500			pF	

FEATURE CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units	
Switching Frequency	Pulse width modulation (PWM), fixed	All	225	250	275	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			1.8	V
Logic High (Module On)	$V_{on/off}$ at $I_{on/off}=0.0uA$, Pin open=on	All	Open Circuit				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	1.5		5	mA	
Over Temperature Shutdown	Temperature at the center part of base plate, non-latching	All				105	°C
Over Temperature Recovery						90	

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	All				830	K hours
Weight		All				95	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	3000m Operating Altitude, 12000m Transport Altitude						
Thermal Shock	MIL-STD-810F						
Fire & Smoke	EN 45545-2 Compliant						



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

EMI	Meets EN 55011 (with external filter) Meets EN 55032 (with external filter) EN 50155 Compliant (with external filter)	Class A Class B
ESD	EN 61000-4-2 Contactr ±6kV EN 61000-4-2 Air ±8kV	Perf. Criteria A Perf. Criteria A
Radiated Immunity	EN 61000-4-3 10V/m	Perf. Criteria A
Fast Transient	EN 61000-4-4 ±2 kV, external components required	Perf. Criteria A
Surge	EN 61000-4-5 ±1kV, external components required	Perf. Criteria A
Conducted immunity	EN 61000-4-6 10Vr.m.s	Perf. Criteria A
Interruptions of Voltage Supply	EN 50155 Class S3: 20ms with external hold up circuit	Perf. Criteria A
Supply Change Over	EN 50155 Class C2: 30ms with external hold up circuit	Perf. Criteria B
Application Note Link		CHB100-110S 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 OT4 Temperature: -40°C Duration: 2 hrs	Pass
Dry Heat Test	13.4.5	EN 60068-2-2	Class OT4 Temperature: 70°C Dry heat thermal test Cycle A	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: 55°C and - 55°C Humidity: 90~96% RH Duration: 48 hrs	Pass
Random Vibration Test	13.4.11	EN 61373	Temperature: 25°C±10°C Humidity: 50% ±25% RH Frequency range: 5 ~ 150 Hz X axis: 0.44 m/s^2 Y axis: 0.69 m/s^2 Z axis: 0.98 m/s^2 Duration: 10 min / axis	Pass
Simulated Long Life Test at Increased Random Vibration Levels	13.4.11	EN 61373	Temperature: 25°C±10°C Humidity: 50% ±25% RH Frequency range: 5 ~ 150 Hz X axis: 2.5 m/s^2 Y axis: 3.96 m/s^2 Z axis: 5.72 m/s^2 Duration: 5 hrs / axis	Pass
Shock Test	13.4.11	EN 61373	Temperature: 25°C±10°C Humidity: 50% ±25% RH a. Test Condition 1 (±X axes) Units are non-operating. Pulse shape: Half-sine waveform Impact acceleration: 50 m/s ² Pulse duration: 30 ms Number of shocks / Orientation: 6 shocks (3 shocks for ±X axis) b. Test Condition 2 (±Y and ±Z axes) Units are non-operating. Pulse shape : Half-sine waveform Impact acceleration : 30 m/s ² Pulse duration : 30 ms Number of shocks : 12 shocks (3 shocks for each ±axis) Orientation : ±Y and ±Z axes	Pass



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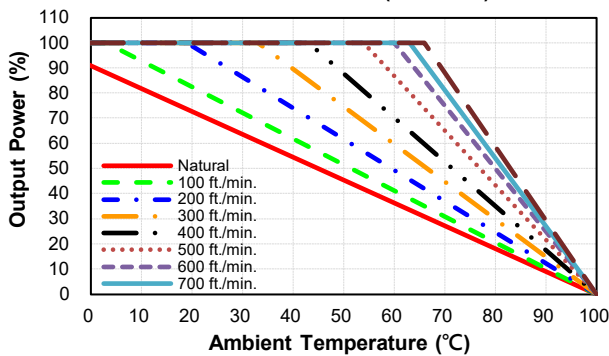
EN45545-2 Fire & Smoke Test Conditions

Item		Standard	Hazard Level
R22	Oxygen Index Test	EN 45545-2: 2013 EN ISO 4589-2: 2006	HL1, HL2, HL3
	Smoke Density Test	EN 45545-2: 2013 EN ISO 5659-2: 2013	HL1, HL2, HL3
	Smoke Toxicity Test	EN 45545-2: 2013 NF X70-100: 2006	HL1, HL2, HL3
R23	Oxygen Index Test	EN 45545-2: 2013 EN ISO 4589-2: 2006	HL1, HL2, HL3
	Smoke Density Test	EN 45545-2: 2013 EN ISO 5659-2: 2013	HL1, HL2, HL3
	Smoke Toxicity Test	EN 45545-2: 2013 NF X70-100: 2006	HL1, HL2, HL3
R24	Oxygen Index Test	EN 45545-2: 2013 EN ISO 4589-2	HL1, HL2, HL3
R25	Glow - Wire Test	EN 45545-2:2013 EN 60695-2-11:2001	HL1, HL2, HL3
R26	Vertical Flame Test	EN 45545-2: 2013 EN 60695-11-10: 2013	HL1, HL2, HL3

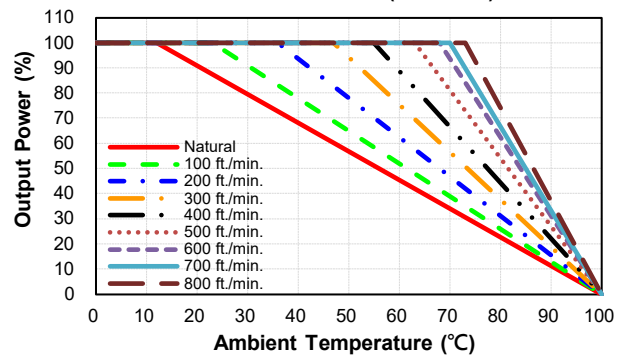
CHARACTERISTIC CURVE

Power Derating Curve

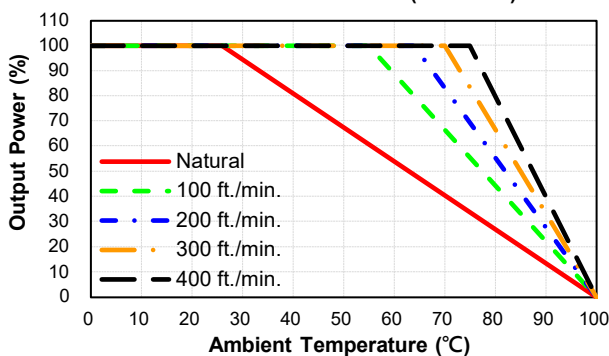
CHB100-110S12,15,24 Derating Curve without Heatsink (Vin=110V)



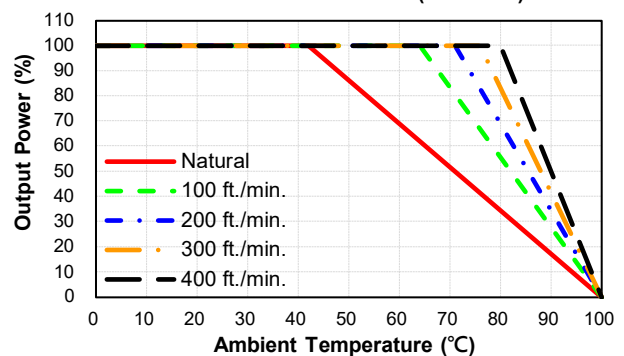
CHB100-110S48 Derating Curve without Heatsink (Vin=110V)



CHB100-110S12,15,24 Derating Curve with Heatsink HBT127 (Vin=110V)



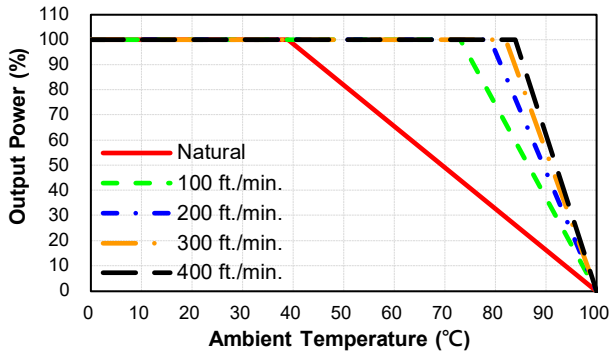
CHB100-110S48 Derating Curve with Heatsink HBT127 (Vin=110V)



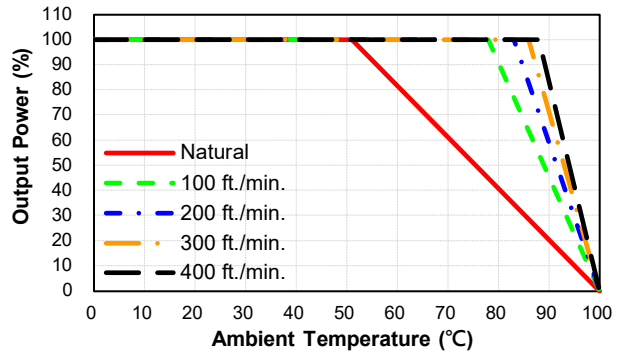


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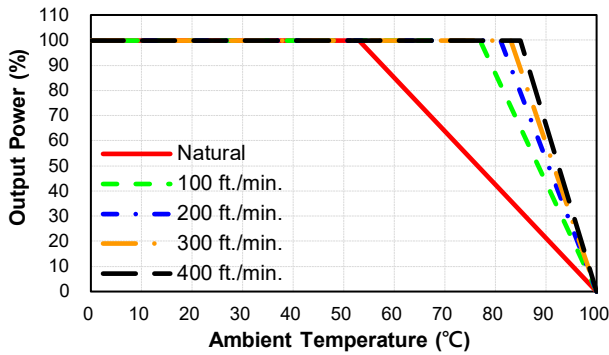
CHB100-110S12,15,24 Derating Curve with Heatsink HBL210 (Vin=110V)



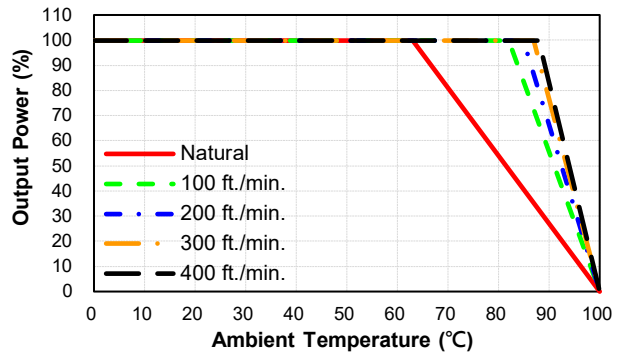
CHB100-110S48 Derating Curve with Heatsink HBL210 (Vin=110V)



CHB100-110S12,15,24 Derating Curve with Heatsink HBT254 (Vin=110V)

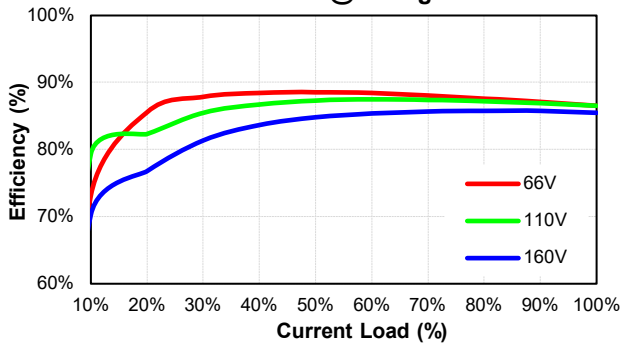


CHB100-110S48 Derating Curve with Heatsink HBT254 (Vin=110V)

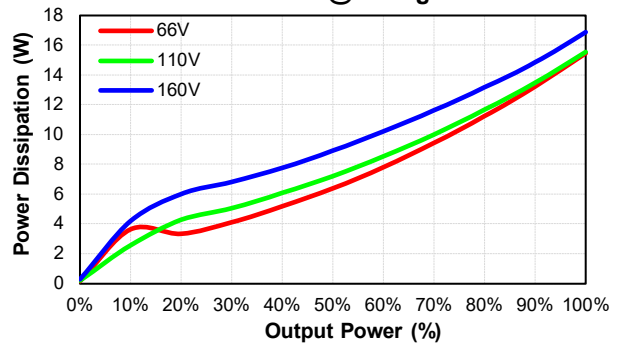


Performance Data

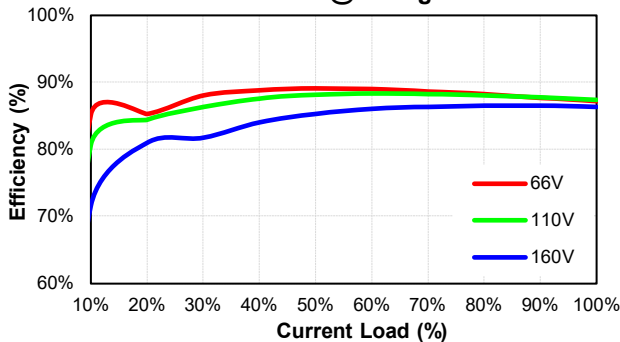
CHB100-110S12 Eff Vs Io @25 Deg. C



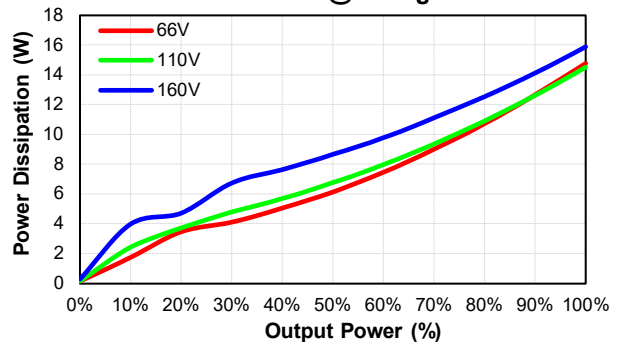
CHB100-110S12 Pd Vs Po @25 Deg. C



CHB100-110S15 Eff Vs Io @25 Deg. C



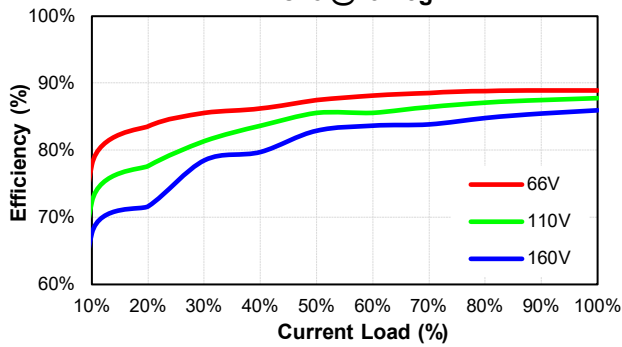
CHB100-110S15 Pd Vs Po @25 Deg. C



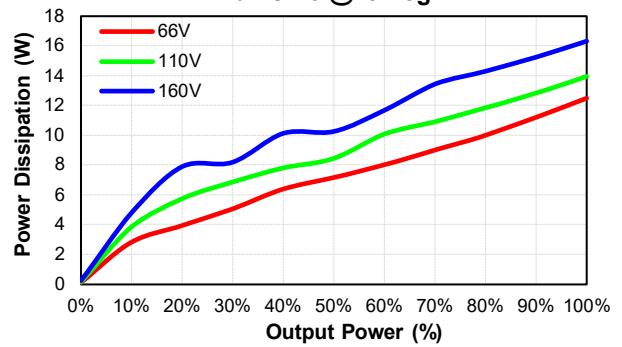


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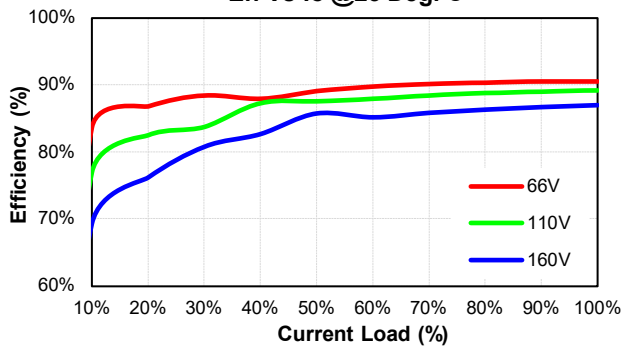
CHB100-110S24
Eff Vs Io @25 Deg. C



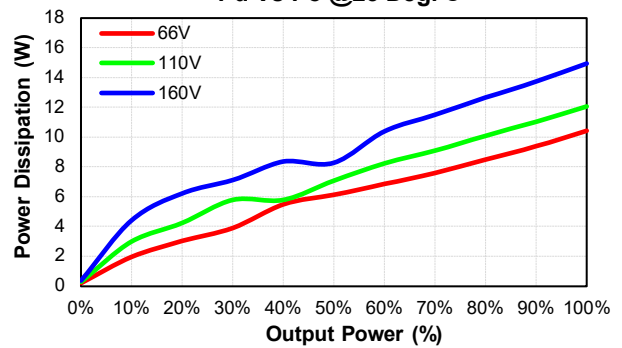
CHB100-110S24
Pd Vs Po @25 Deg. C



CHB100-110S48
Eff Vs Io @25 Deg. C



CHB100-110S48
Pd Vs Po @25 Deg. C





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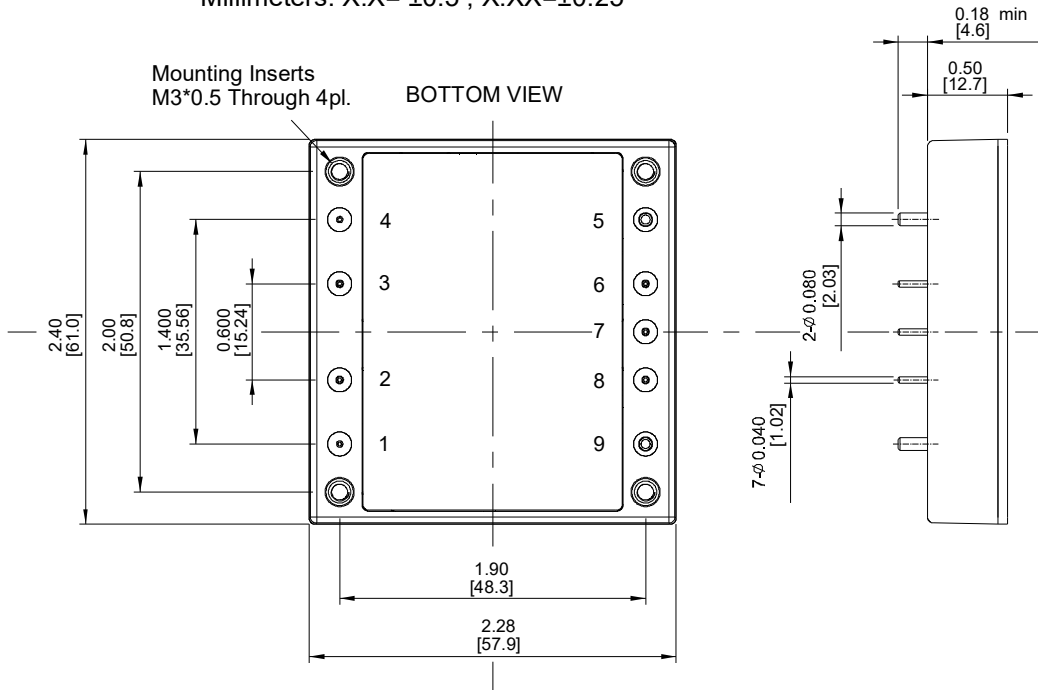
MECHANICAL SPECIFICATION

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	NC
4	-V Input
5	-V Output
6	-Sense
7	Trim
8	+Sense
9	+V Output

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