



CHB200W12 SERIES 200 WATT 12:1 INPUT ISOLATED DC-DC CONVERTER

Features

- Efficiency Up to 90%
- Fixed Switching Frequency
- Regulated Outputs
- Remote On/Off
- Fully protected (OTP/OCP/OVP/UVLO)
- 3000Vac I/O Isolation
- Operating Case Temperature -40 to +100°C
- Half Brick Size Meet Industrial Standard
2.28x2.40x0.50
- CB Test Certificate IEC62368-1
- EN50155 Compliant with External Circuits
- UL62368-1 2nd (Reinforce Insulation) Approval
- Shock & Vibration EN50155 (EN61373) Compliant
- Fire & Smoke EN45545-2 Compliant
- 5000m Operating Altitude



| MODEL NUMBER | INPUT VOLTAGE | OUTPUT VOLTAGE | OUTPUT CURRENT | | INPUT CURRENT | | % EFF. | | CAPACITOR LOAD MAX. |
|-----------------|---------------|----------------|----------------|--------|---------------|-----------|--------|-----|---------------------|
| | | | MIN. | MAX. | NO LOAD | FULL LOAD | (1) | (2) | |
| CHB200W12-72S12 | 14-160 VDC | 12 VDC | 0 mA | 16.7 A | 50 mA | 3086 mA | 90 | 90 | 16700uF |
| CHB200W12-72S15 | 14-160 VDC | 15 VDC | 0 mA | 13.5 A | 50 mA | 3086 mA | 90 | 89 | 13500uF |
| CHB200W12-72S24 | 14-160 VDC | 24 VDC | 0 mA | 8.4 A | 50 mA | 3156 mA | 88 | 88 | 8000µF |
| CHB200W12-72S48 | 14-160 VDC | 48 VDC | 0 mA | 4.2 A | 50 mA | 3121 mA | 89 | 89 | 2200µF |

NOTE:

1. Nominal Input Voltage 72 VDC
2. Measured at 110Vin
3. An External Input Capacitor 100uF for All Models are Recommended to Reduce Input Ripple Voltage
4. An External Electrolytic Capacitor at least 240uF connected between BUS and -Vin is necessary

PART NUMBER

| Series | Nominal Input Voltage | Number of Outputs | Nominal Output Voltage | Remote On/Off Logic | Mounting Inserts |
|------------|-----------------------|-------------------|--|-------------------------------|--|
| CHB200W12- | II | O | XX | L | -Y (Option) |
| CHB200W12 | 72: 72 VDC | S: Single | 12: 12VDC 15: 15VDC 24: 24VDC 48: 48VDC | None: Positive N: Negative | None: M3x0.5 Mounting Inserts -C: Clear Mounting Inserts (3.2mm DIA.) |

Part Number Example:

CHB200W12-72S12N-C: Half Brick, 200W, 12:1 14-160Vdc Input, Single 12Vdc Output, Negative Logic, Clear Mounting Insert



CHB200W12 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 max. | All | | | 180 | V _{dc} |
| Operating Case Temperature | At the Center Part of Base Plate | 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 | 14 | 72 | 160 | V _{dc} |
| Input Under Voltage Lockout | | | | | | |
| Turn-On Voltage Threshold | | All | 12.5 | 13 | 13.5 | V _{dc} |
| Turn-Off Voltage Threshold | | All | 10.5 | 11 | 11.5 | V _{dc} |
| Lockout Hysteresis Voltage | | All | | 2 | | V _{dc} |
| Maximum Input Current | V _{in} =16.5V, Full Load. | All | | 15 | | A |
| No-Load Input Current | V _{in} =72V, 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} =72V, 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 tantalum and 1.0uF ceramic capacitors (for V _o =48V: Full Load 10uF aluminum and 1uF ceramic capacitors). | 12Vo | | | 200 | mV |
| | | 15Vo | | | 200 | |
| | | 24Vo | | | 240 | |
| | | 48Vo | | | 240 | |
| RMS. | | 12Vo | | | 80 | mV |
| | | 15Vo | | | 60 | |
| | | 24Vo | | | 100 | |
| | | 48Vo | | | 100 | |
| Output Current Range | V _{in} = 16.5 to 160V | See Model Number Table | | | | A |
| | V _{in} = 14 to 16.5V | See Model Number Table, Full Load 10S | | | | |
| Over Current Protection | <90% V _o | All | 110 | 125 | 140 | % |
| Short Circuit Protection | Hiccup Mode. Auto Recovery. | All | Continuous, Auto Recovery. | | | |
| External Load Capacitance | Full load (Constant resistive load) | See Model Number Table | | | | uF |
| Output Voltage Trim Range | P _o ≤ max rated power, I _o ≤ I _{o,max} | All | -20 | | +15 | % |
| Output Voltage Remote Sense Range | P _o ≤ max rated power, I _o ≤ I _{o,max} % of nominal V _o | All | | | +15 | % |
| Over Voltage Protection | Limited Voltage, % of Nominal V _o | All | 117 | 125 | 140 | % |



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EFFICIENCY

| PARAMETER | NOTES and CONDITIONS | Device | Min. | Typ. | Max. | Units |
|-----------|----------------------------|------------------------|------|------|------|-------|
| 100% Load | V _{in} =72V, 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 d/d _t =0.1A/us (within 1% V _{out} nominal) | All | | | ±5 | % |
| Recovery Time | | All | | | 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} , Remote On | All | | 100 | | ms |
| Turn-On Delay Time, From Input | V _{in_min} to 10%V _{o_set} , Power Up | All | | 100 | | ms |
| Output Voltage Rise Time | 10%V _{o_set} to 90%V _{o_set} | All | | 100 | | 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 4200 | V _{ac} V _{dc} |
| | 1 minute; Input to Case (Base Plate), | All | | | 3000 4200 | V _{ac} V _{dc} |
| | 1 minute; Output to Case (Base Plate) | All | | | 500 700 | V _{ac} V _{dc} |
| Isolation Resistance | Input to Output | All | 100 | | | MΩ |
| Isolation Capacitance | Input to Output | All | | 500 | | pF |
| | Input to Case (Base Plate) | All | | None | | |
| | Output to Case (Base Plate) | All | | 2000 | | |

FEATURE CHARACTERISTICS

| PARAMETER | NOTES and CONDITIONS | Device | Min. | Typ. | Max. | Units |
|--|---|--------|------|------|------|-------|
| Switching Frequency | Output Ripple Frequency | All | 432 | 480 | 528 | 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 | | 15 | 20 | mA |
| Over Temperature Shutdown | Temperature at the Center Part of Base Plate, Non-Latching | All | | 105 | | °C |
| Over Temperature Recovery | | All | | 95 | | °C |

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 | 72S12 | | 475 | | K hours |
| | | 72S15 | | 551 | | |
| | | 72S24 | | 629 | | |
| | | 72S48 | | 572 | | |
| Weight | | All | | 105 | | grams |
| Case Material | Plastic, DAP, UL 94V-0 | | | | | |
| Base plate Material | Aluminum | | | | | |



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| | | |
|---------------------------------|--|------------------|
| Potting Material | UL 94V-0 | |
| Pin Material | Base: Copper Plating: Nickel with Matte Tin | |
| Shock/Vibration | MIL-STD-810F/EN61373 Compliant | |
| Humidity | 95% RH max. Non Condensing | |
| Altitude | 5000m Operating Altitude, 12000m Transport Altitude | |
| Thermal Shock | MIL-STD-810F | |
| Fire & Smoke | EN45545-2 Compliant | |
| EMI | Meets EN55032 & EN50155 Compliant (with external filter) | Class A |
| ESD | EN61000-4-2 Level 3: Air $\pm 8kV$, Contact $\pm 6kV$ | Perf. Criteria A |
| Radiated immunity | EN61000-4-3 Level 3: 80~1000MHz, 20V/m | Perf. Criteria A |
| Fast Transient | EN61000-4-4 Level 3: On power input port, $\pm 2kV$, external input capacitor required, | Perf. Criteria A |
| Surge | EN61000-4-5 Level 4: Line to earth, $\pm 4kV$, Line to line, $\pm 2kV$ | Perf. Criteria A |
| Conducted immunity | EN61000-4-6 Level 3: 0.15~80MHz, 10V | Perf. Criteria A |
| Interruptions of Voltage Supply | EN50155 Class S3: 20ms interruptions | Perf. Criteria A |
| Supply Change Over | EN50155 Class C2: During a supply break of 30 ms, | Perf. Criteria A |
| Application Note Link | CHB200W12-72S 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: $-40^{\circ}C$ Duration: 2 hrs | Pass |
| Dry Heat Test | 13.4.5 | EN 60068-2-2 | Class OT6 & Cycle A (ST0) Temperature: $85^{\circ}C$ Duration: 6 hrs Extended temperature: $100^{\circ}C$ Extended Duration: 10min | Pass |
| Low Temperature Storage Test | 13.4.6 | EN 60068-2-1 | Temperature: $-40^{\circ}C$ Duration: 16 hrs | Pass |
| Cyclic Damp Heat Test | 13.4.7 | EN 60068-2-30 | Temperature: $25^{\circ}C - 55^{\circ}C$ Humidity: 90% RH Duration: 48 hrs | Pass |
| Random Vibration Test | 13.4.11 | EN 61373 | Temperature: $20^{\circ}C \pm 3^{\circ}C$ Humidity: 66% $\pm 5\%$ RH 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 | Temperature: $20^{\circ}C \pm 3^{\circ}C$ Humidity: 66% $\pm 5\%$ RH 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 | Temperature: $20^{\circ}C \pm 3^{\circ}C$ Humidity: 66% $\pm 5\%$ RH Frequency range: 5 ~ 150 Hz \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 |

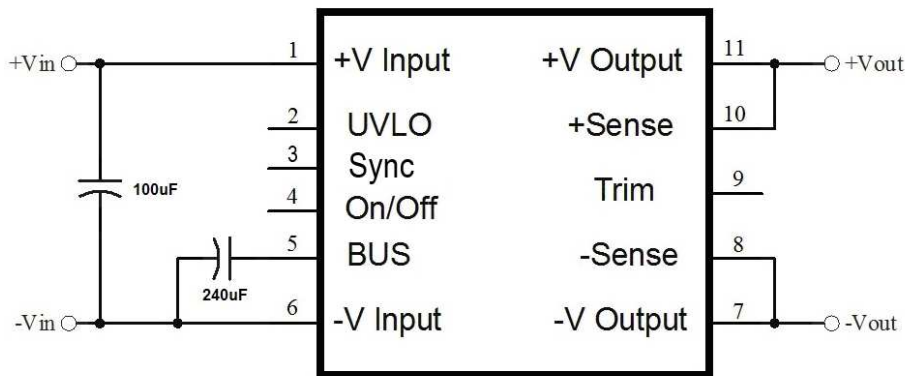


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EN45545-2 Fire & Smoke Test Conditions.

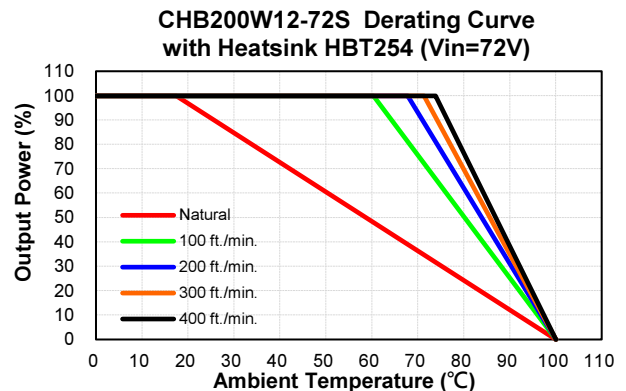
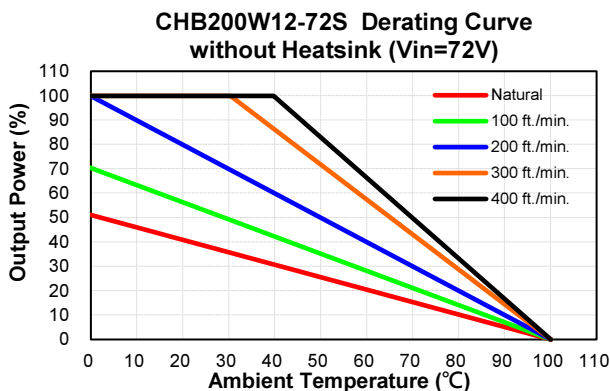
| Item | | Standard | Hazard Level |
|------|---------------------|--|---------------|
| R22 | Oxygen Index Test | EN 45545-2: 2013 EN ISO 4589-2: 2006 | HL1, HL2, HL3 |
| | Smoke Density Test | EN 45545-2: 2013 EN ISO 5659-2: 2013 | HL1, HL2 |
| | Smoke Toxicity Test | EN 45545-2: 2013 NF X70-100: 2006 | 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 | EN45545-2: 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



Simplified Application Circuit

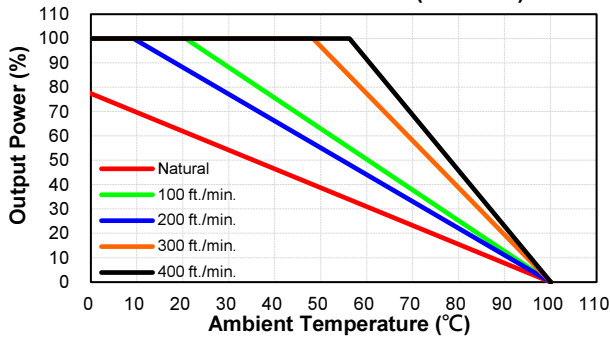
Power Derating Curve



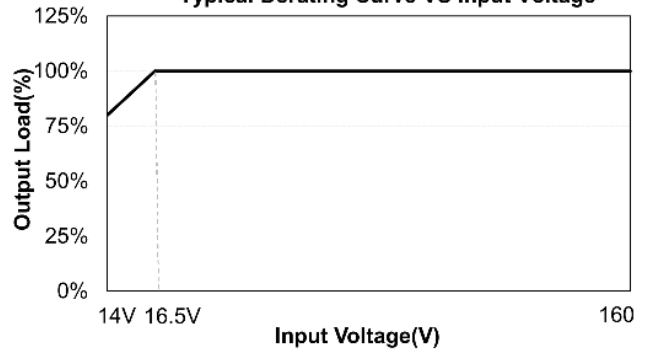


CHB200W12 Series

CHB200W12-72S Derating Curve with Heatsink HBT127 (Vin=72V)

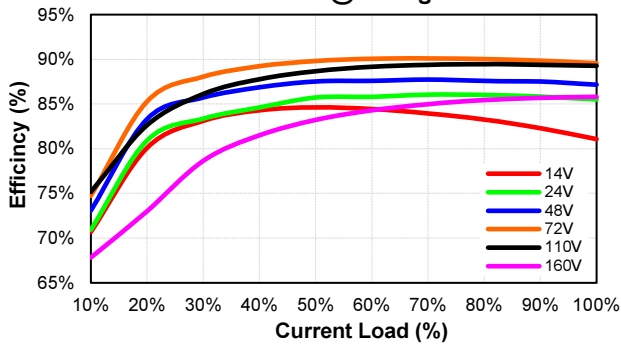


Typical Derating Curve VS Input Voltage

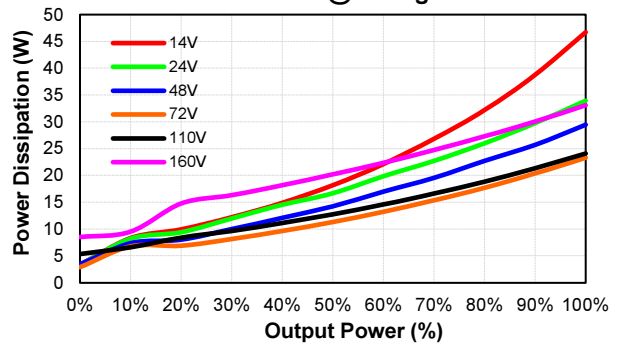


Performance Data

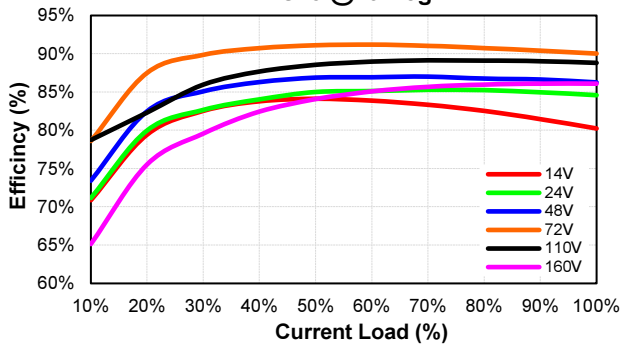
CHB200W12-72S12 Eff Vs Io @25 Deg. C



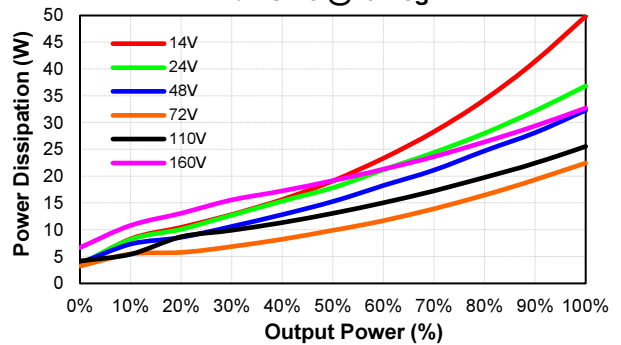
CHB200W12-72S12 Pd Vs Po @25 Deg. C



CHB200W12-72S15 Eff Vs Io @25 Deg. C



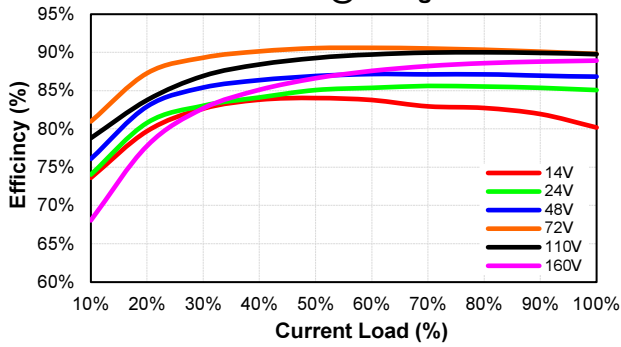
CHB200W12-72S15 Pd Vs Po @25 Deg. C



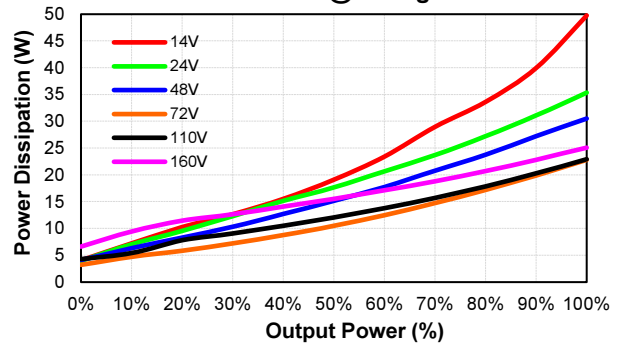


CHB200W12 Series

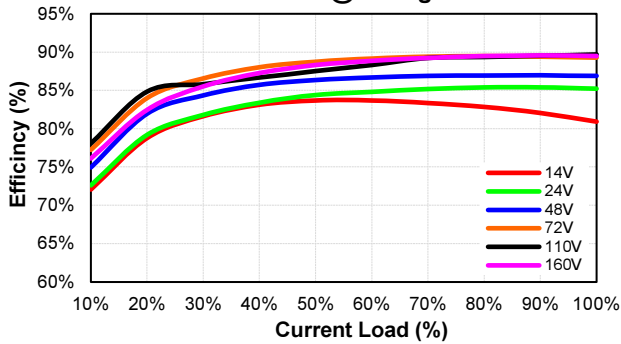
CHB200W12-72S24
Eff Vs Io @25 Deg. C



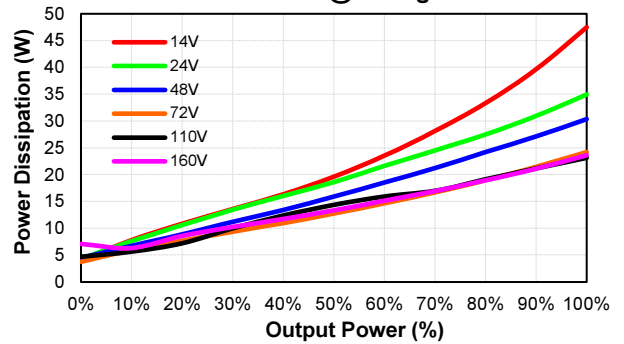
CHB200W12-72S24
Pd Vs Po @25 Deg. C



CHB200W12-72S48
Eff Vs Io @25 Deg. C



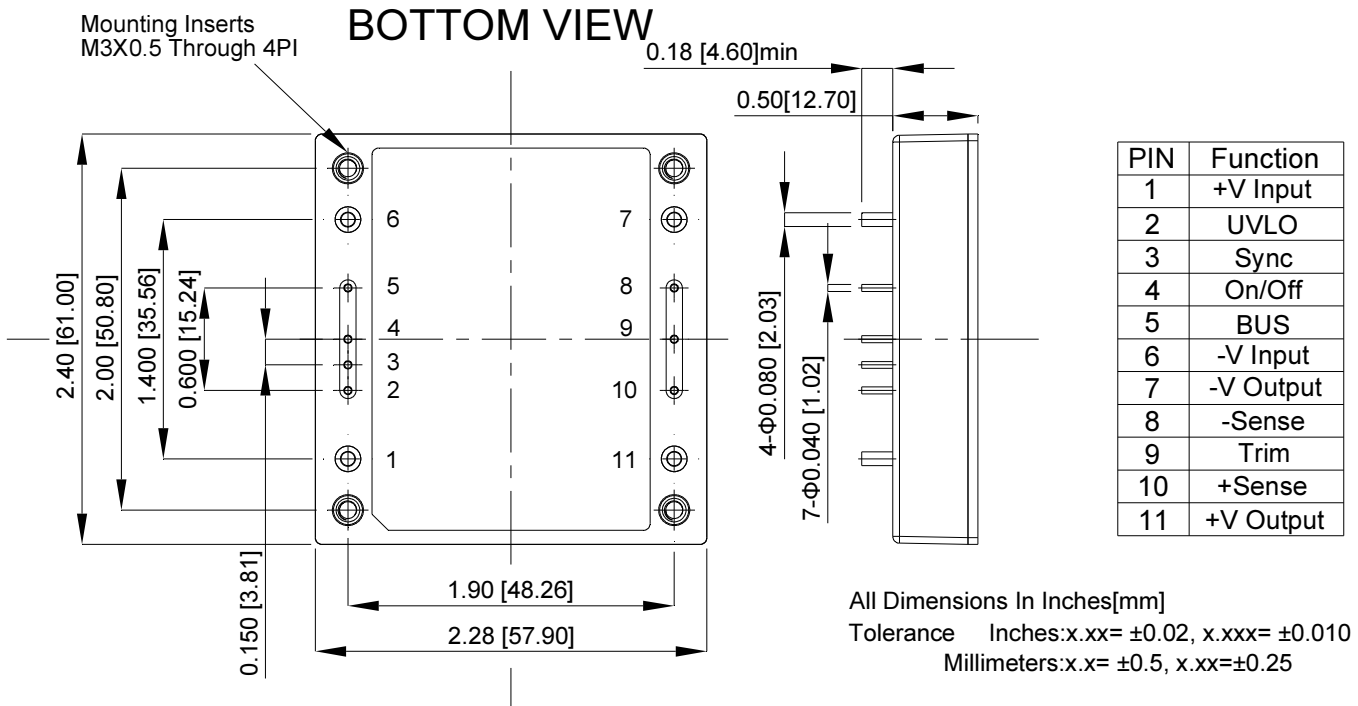
CHB200W12-72S48
Pd Vs Po @25 Deg. C





CHB200W12 Series

MECHANICAL SPECIFICATION



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