



CHB300-300S CMFC(D) SERIES 300 WATT 2:1 INPUT ISOLATED DC-DC CONVERTERS

Features

- Efficiency Up to 90%
- Fixed Switching Frequency
- Regulated Outputs
- Remote On/Off
- Low No Load Power Consumption
- Fully Protected (OTP/OCP/OVP/UVLO)
- 3000Vac I/O Isolation
- Operating Case Temperature -40 to +100°C
- UL 60950-1 2nd (Reinforce Insulation) Approval for DC Modules
- EN 50155 for EMC, Environmental and Characteristic
- Shock & Vibration EN 50155 (EN 61373) Compliant
- Fire & Smoke EN 45545-2 Compliant
- Safety Meets IEC/EN/UL 62368-1
- Build-In EMI Filter
- Chassis Mount, Baseplate Cooled



| MODEL NUMBER | INPUT VOLTAGE | OUTPUT VOLTAGE | OUTPUT CURRENT | | INPUT CURRENT | | % EFF. | CAPACITOR LOAD MAX. |
|--|---------------|----------------|----------------|--------|---------------|-----------|--------|---------------------|
| | | | MIN. | MAX. | NO LOAD | FULL LOAD | | |
| CHB300-300S05□-CMFC CHB300-300S05□-CMFD | 180-425 VDC | 5 VDC | 0 mA | 60 A | 10 mA | 1130 mA | 88.5 | 10000uF |
| CHB300-300S12□-CMFC CHB300-300S12□-CMFD | 180-425 VDC | 12 VDC | 0 mA | 25 A | 10 mA | 1140 mA | 87.5 | 10000uF |
| CHB300-300S24□-CMFC CHB300-300S24□-CMFD | 180-425 VDC | 24 VDC | 0 mA | 12.5 A | 10 mA | 1110 mA | 90 | 6000uF |
| CHB300-300S28□-CMFC CHB300-300S28□-CMFD | 180-425 VDC | 28 VDC | 0 mA | 10.7 A | 10 mA | 1110 mA | 90 | 6000uF |
| CHB300-300S48□-CMFC CHB300-300S48□-CMFD | 180-425 VDC | 48 VDC | 0 mA | 6.25 A | 10 mA | 1110 mA | 90 | 3000µF |

NOTE:

1. Nominal Input Voltage 300 VDC
2. □ = N or none
3. VR1 is Used for Output Voltage Adjustment.
4. Refer to Application Note for Thermal Resistance and Derating Information.
5. TVS is Included for Input Surge Voltage Protection.
6. Recommend an External Fuse for Input Reverse Polarity Protection (Shunt Diode is Included Inside).
7. Connector CN205 wafer with TAIWAN KING PIN TERMINAL P110I series and mate with JST housing PH series or equivalent.
8. Input connectors PIN1~4 use DINKLE 166-04P5 series or equivalent suitable electric wire: 18~12AWG(IEC 0.5~4mm2).
9. Output connectors PIN5~8 use M5 terminal screw.

PART NUMBER

| Series | Nominal Input Voltage | Number of Outputs | Nominal Output Voltage | Remote On/Off Logic | Chassis Mount Type | | Heatsink |
|---------|-----------------------|-------------------|---|---------------------------------|---|--|---|
| CHB300- | II | O | XX | L | -YYY | Z | +WWW |
| CHB300 | 300 : 300 VDC | S : Single | 05 : 5VDC 12 : 12VDC 24 : 24VDC 28 : 28VDC 48 : 48VDC | None : Positive N : Negative | Chassis CMF : Mount Built in Filter | C : Open Frame D : With Cover | None : Blank HS : Heatsink HD : Heatsink+ Din Rail |

Part Number Example:

CHB300-300S12N-CMFC: Chassis Mount, 300W, 2:1 180-425Vdc Input, Single 12Vdc Output, Negative Logic, Open Frame



CHB300-300S CMFC(D) 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 | | 425 | V _{dc} |
| Input Surge Voltage | 100ms max. | All | | | 500 | V _{dc} |
| Operating Case Temperature | At the center part of base plate | All | -40 | | 100 | °C |
| Storage Temperature | | All | -40 | | 105 | °C |

INPUT CHARACTERISTICS

| PARAMETER | NOTES and CONDITIONS | Device | Min. | Typ. | Max. | Units |
|-----------------------------|---|------------------------|-------|-------|-------|-----------------|
| Operating Input Voltage | | All | 180 | 300 | 425 | V _{dc} |
| Input Under Voltage Lockout | | | | | | |
| Turn-On Voltage Threshold | Full load | All | 165 | 170 | 175 | V _{dc} |
| Turn-Off Voltage Threshold | Full load | All | 155.5 | 160.5 | 165.5 | V _{dc} |
| Lockout Hysteresis Voltage | Full load | All | | 9.5 | | V _{dc} |
| Maximum Input Current | V _{in} =180V, Full load | All | | 2 | | A |
| No-Load Input Current | V _{in} =180V, I _o =0A | See Model Number Table | | | | 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 | 05V _o | | | ±0.5 | % |
| | | 3V3V _o | | | | |
| | | Others | | | ±0.2 | |
| Line Regulation | V _{in} =High line to low line, full load | All | | | ±0.2 | % |
| Temperature Coefficient | T _c =-40°C to 105°C | All | | | ±0.02 | %/°C |
| Output Voltage Ripple and Noise (5Hz to 20MHz Bandwidth) | | | | | | |
| Peak-to-Peak | Full load, 1uF ceramic capacitors | 5V _o | | | 120 | mV |
| | | 12V _o | | | 150 | |
| | | 24V _o | | | 200 | |
| | | 28V _o | | | 200 | |
| | | 48V _o | | | 300 | |
| RMS. | Full load, 1uF ceramic capacitors | 5V _o | | | 60 | mV |
| | | 12V _o | | | 80 | |
| | | 24V _o | | | 100 | |
| | | 28V _o | | | 100 | |
| | | 48V _o | | | 150 | |
| Output Current Range | V _{in} = 180 to 425V | See Model Number Table | | | | A |
| Over Current Protection | Hiccup mode. Auto recovery | All | 105 | 120 | 140 | % |
| Short Circuit Protection | Hiccup mode. Auto recovery | 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 | -20 | | +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 | % |



CHB300-300S CMFC(D) Series

EFFICIENCY

| PARAMETER | NOTES and CONDITIONS | Device | Min. | Typ. | Max. | Units |
|-----------|----------------------|------------------------|------|------|------|-------|
| 100% Load | $V_{in}=300V$ | 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 | | 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 | | 300 | | ms |
| Turn-On Delay Time, From Input | $V_{in_min.}$ to 10% V_{o_set} , Power up | All | | 300 | | ms |
| Output Voltage Rise Time | 10% V_{o_set} to 90% V_{o_set} | All | | 50 | | 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) | All | | | 2500 | V_{ac} |
| | 1 minute; output to case (base plate) | All | | | 500 | V_{ac} |
| Isolation Resistance | Input to output | All | 100 | | | $M\Omega$ |
| Isolation Capacitance | Input to output | 05Vo | | NC | | pF |
| | | 12Vo | | NC | | |
| | | 24Vo | | NC | | |
| | | 28Vo | | NC | | |
| | | 48Vo | | NC | | |
| | Input to case (base plate) | 05Vo | | 6000 | | |
| | | 12Vo | | 5500 | | |
| | | 24Vo | | 4800 | | |
| | | 28Vo | | 4800 | | |
| | | 48Vo | | 5500 | | |
| | Output to case (base plate) | 05Vo | | 6600 | | |
| | | 12Vo | | 6600 | | |
| | | 24Vo | | 6600 | | |
| | | 28Vo | | 6600 | | |
| | | 48Vo | | 6600 | | |

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 $I_{on/off}=0.0uA$, Pin open=off | All | 0 | | 1.2 or Open Circuit | V |
| Logic High (Module On) | $V_{on/off}$ at $I_{on/off}=1.0mA$ | All | 3.5 | | 12 | V |
| On/Off Control, Negative Remote On/Off Logic, Refer to -Vin Pin | | | | | | |
| Logic High (Module Off) | $V_{on/off}$ at $I_{on/off}=1.0mA$ | All | 3.5 | | 12 | V |
| Logic Low (Module On) | $V_{on/off}$ at $I_{on/off}=0.0uA$, Pin open=on | All | 0 | | 1.2 or Open Circuit | V |
| On/Off Current (for Both Remote On/Off Logic) | $I_{on/off}$ at $V_{on/off}=3.5-12V$ | All | 0.3 | | 2.1 | mA |
| Off Converter Input Current | Shutdown input idle current | All | | 3 | 5 | mA |



CHB300-300S CMFC(D) Series

| PARAMETER | NOTES and CONDITIONS | Device | Min. | Typ. | Max. | Units |
|---------------------------|--|--------|------|------|------|-------|
| Over Temperature Shutdown | Temperature at the center part of base plate, non-latching (DC Module) | 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 | 05Vo | | 360 | | K hours |
| | | 12Vo | | 443 | | |
| | | 24Vo | | 569 | | |
| | | 28Vo | | 537 | | |
| | | 48Vo | | 550 | | |
| Weight | | -CMFC | | 331 | | grams |
| | | -CMFD | | 383 | | |
| | | -CMFD+HS | | 834 | | |
| | | -CMFD+HD | | 855 | | |
| Base plate Material | Aluminum | | | | | |
| Potting Material | UL 94V-0 (DC Module) | | | | | |
| Shock/Vibration | Meets EN 50155 (EN 61373) | | | | | |
| Humidity | 95% RH max. Non condensing | | | | | |
| Altitude | 2000m Operating altitude, 12000m Transport altitude | | | | | |
| Thermal Shock | MIL-STD-810F | | | | | |
| Fire & Smoke | EN 45545-2 Compliant | | | | | |
| EMI | EN 55032 (EN 55022) Compliant | | | | | 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 | | | | | Perf. Criteria A |
| Surge | EN 61000-4-5 Level 4: Line to Earth, ±4kV, Line to line, ±2kV | | | | | Perf. Criteria A |
| Conducted Immunity | EN 61000-4-6 Level 3: 0.15~80MHz, 10V | | | | | Perf. Criteria A |
| Application Note Link | CHB300-300S CMFC(D) Series App Notes | | | | | |
| Packaging Information Link | Packaging Information | | | | | |

Immunity to Environmental Conditions.

| Phenomenon | Reference Clause(s) | Reference Standard | Test Conditions | Result |
|-------------------------------|--|--------------------|---|-------------------------------|
| Vibration Test | MIL-STD-810F Table 514.5C-VIII Figure 514.5C-6 | MIL-STD-810F | Unit are non-operating Vibration Waveform: Random Vibration Frequency: 15 ~ 2000 Hz Total Grms: 4.01997 grms Vibration axis: X · Y · Z axis Duration: 1hr/axis | Vibration Test |
| Shock Test | MIL-STD-810F 516.5 Table 516.5-I | MIL-STD-810F | Wave form: Sawtooth wave Test Category: Crash hazard test for ground equipment Duration: 10 ms Peak Acceleration: 75 G Cross-over Frequency: 80 Hz No. of Shock: Each axis 3 times Shock Direction: ±X, ±Y, ±Z axis | Shock Test |
| Thermal Shock Cycling Test | MIL-STD-810F 503.4 Figure 503.4-1 | MIL-STD-810F | Temperature : -40°C to 105°C Humidity: 95%RH Duration: 8hrs/ 3 times cycling & 4hrs dwell time | Thermal Shock Cycling Test |
| Thermal Humidity Cycling Test | MIL-STD-810F Notice 3 Method 507.4 | MIL-STD-810F | Temperature: 60°C to 30°C Humidity: 95%RH Duration: 240 hrs | Thermal Humidity Cycling Test |



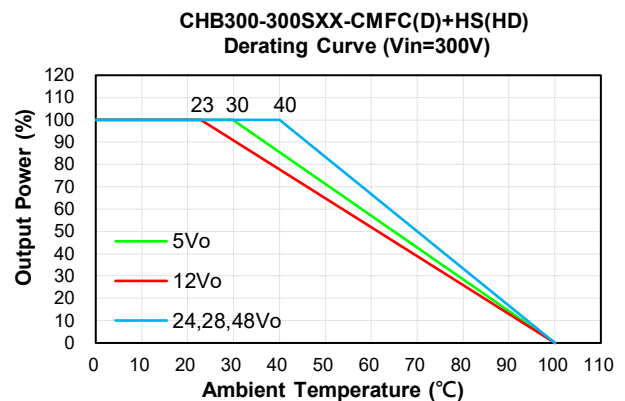
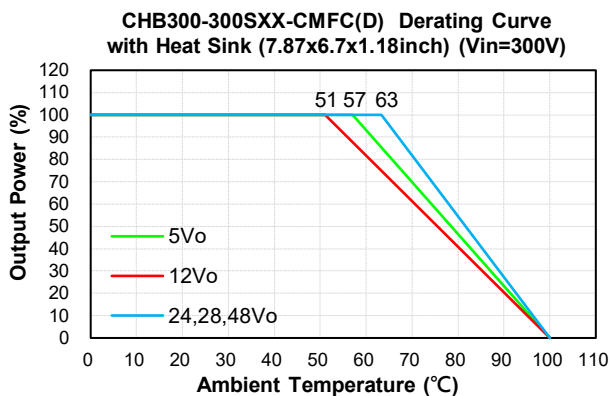
CHB300-300S CMFC(D) Series

EN 45545-2 Fire & Smoke Test Conditions

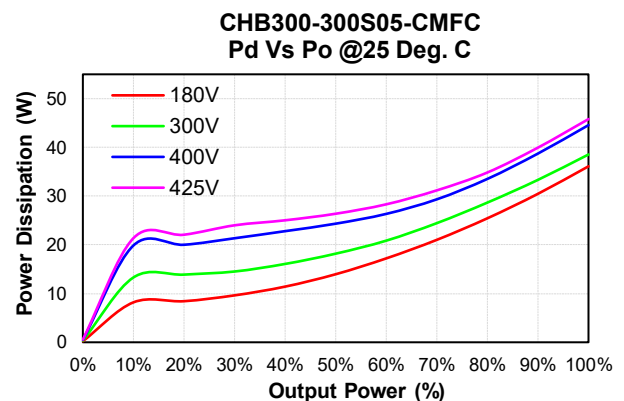
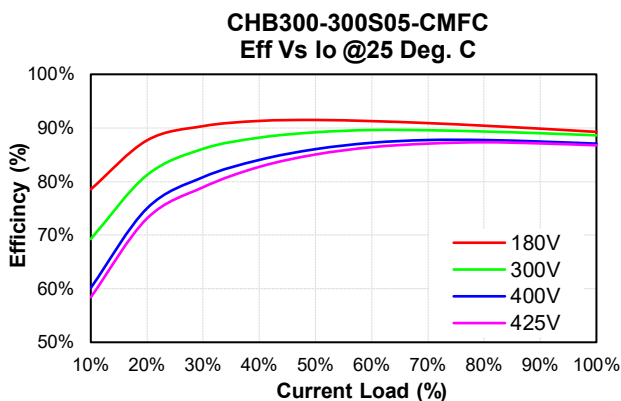
| Item | | Standard | Hazard Level |
|------|---------------------|---|---------------|
| R22 | Oxygen Index Test | EN 45545-2: 2013+A1:2015 EN ISO 4589-2: 2017 | HL1, HL2, HL3 |
| | Smoke Density Test | EN 45545-2: 2013+A1:2015 EN ISO 5659-2: 2017 | HL1, HL2, HL3 |
| | Smoke Toxicity Test | EN 45545-2: 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: 2013 | 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 | EN 45545-2: 2013 EN ISO 4589-2 | HL1, HL2, HL3 |
| R25 | Glow - Wire Test | EN 45545-2+A1:2016 EN 60695-2-11:2014 | HL1, HL2, HL3 |
| R26 | Vertical Flame Test | EN 45545-2: 2013 EN 60695-11-10: 2013 | HL1, HL2, HL3 |

CHARACTERISTIC CURVE

Power Derating Curve



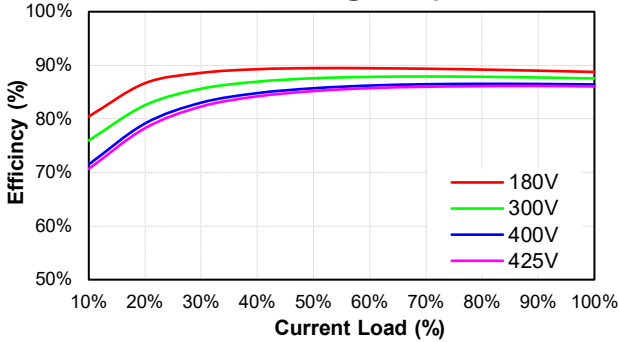
Performance Data



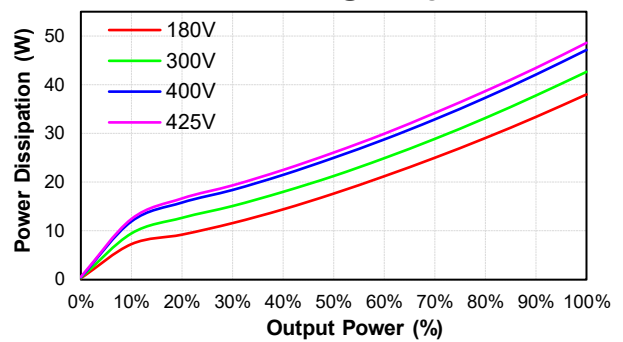


CHB300-300S CMFC(D) Series

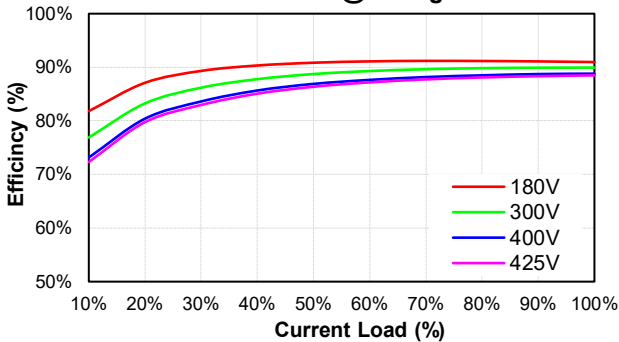
CHB300-300S12-CMFC
Eff Vs Io @25 Deg. C



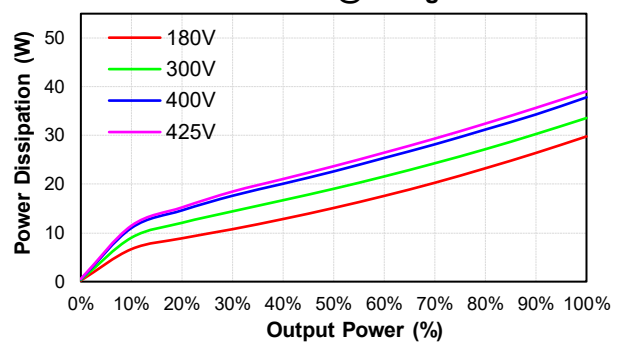
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Pd Vs Po @25 Deg. C



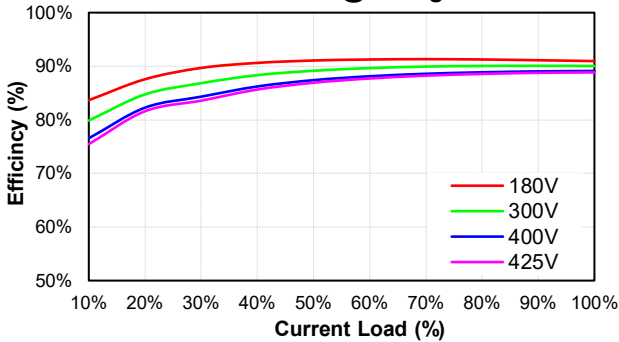
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Eff Vs Io @25 Deg. C



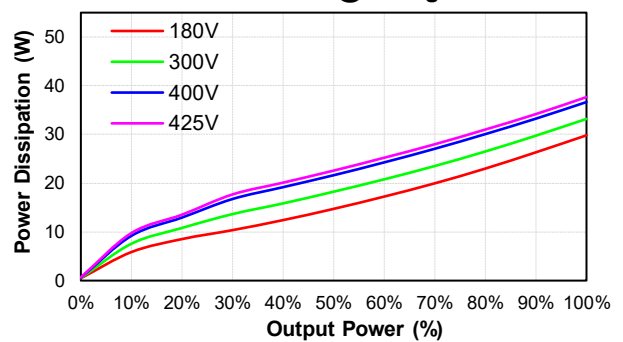
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Pd Vs Po @25 Deg. C



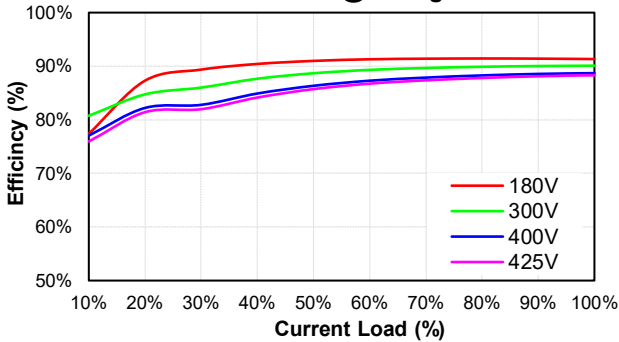
CHB300-300S28-CMFC
Eff Vs Io @25 Deg. C



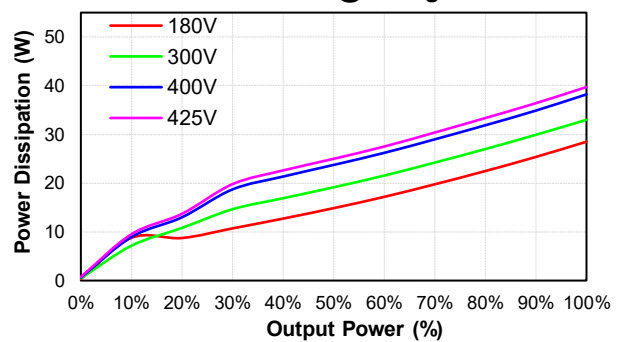
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Pd Vs Po @25 Deg. C



CHB300-300S48-CMFC
Eff Vs Io @25 Deg. C



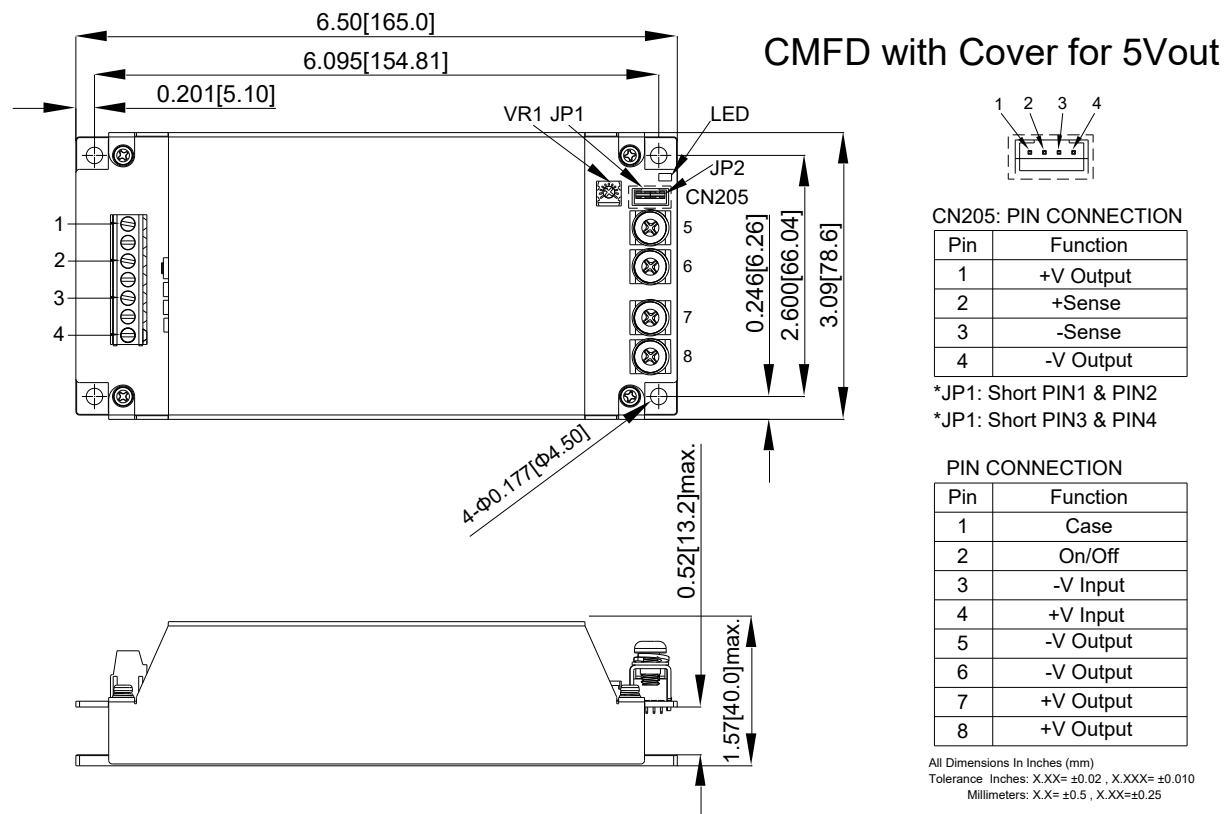
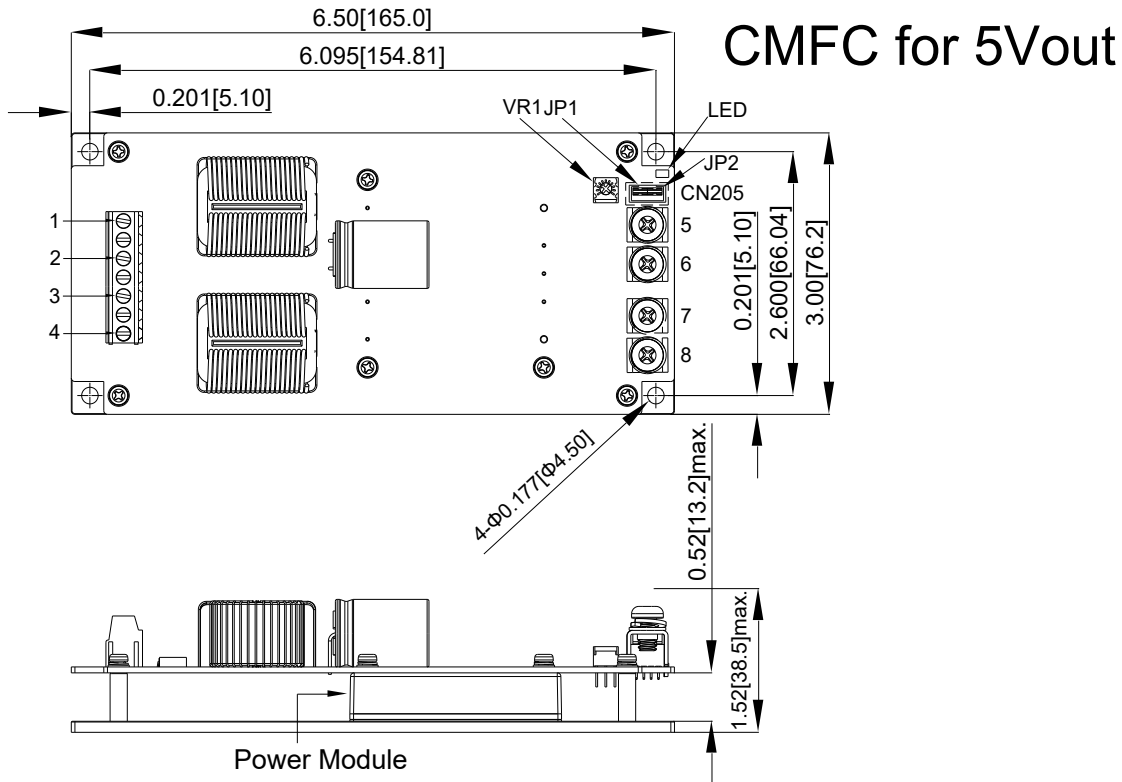
CHB300-300S48-CMFC
Pd Vs Po @25 Deg. C





CHB300-300S CMFC(D) Series

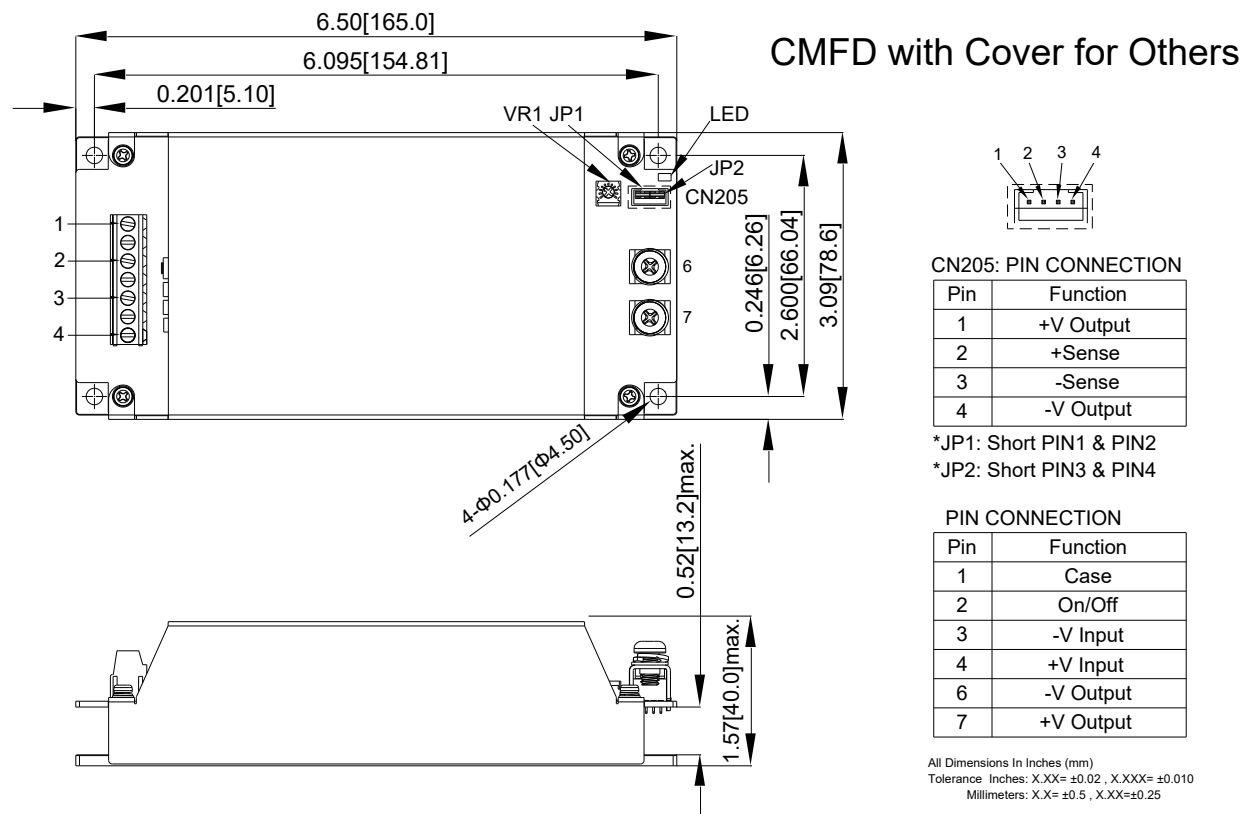
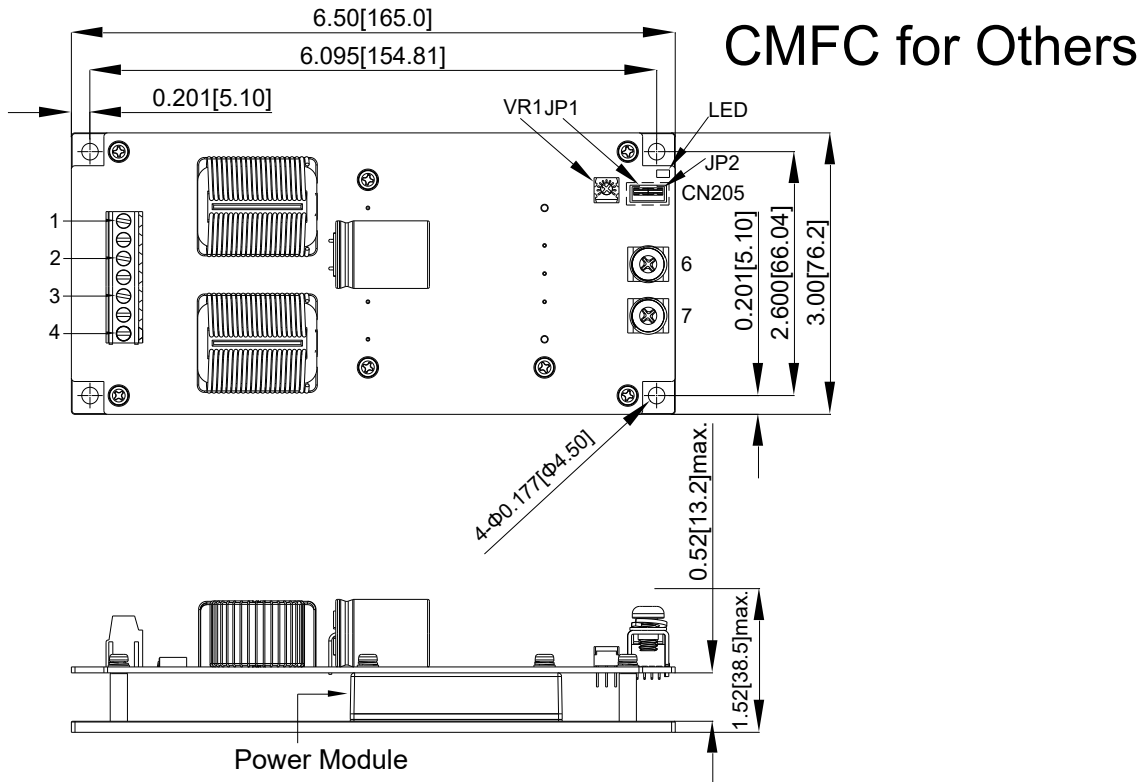
MECHANICAL SPECIFICATION





CHB300-300S CMFC(D) Series

MECHANICAL SPECIFICATION

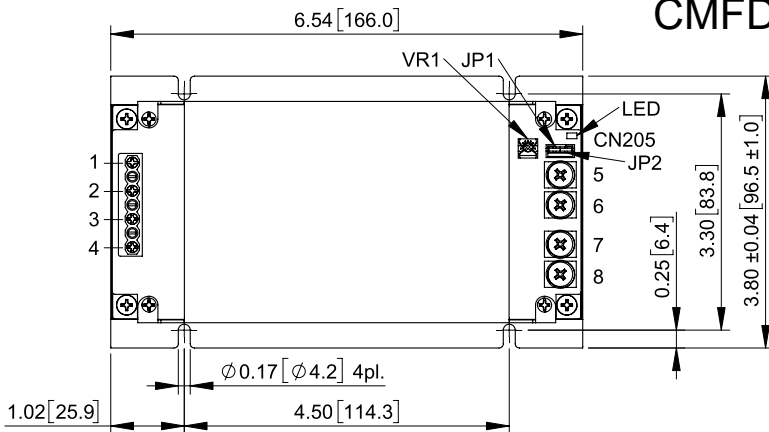




CHB300-300S CMFC(D) Series

MECHANICAL SPECIFICATION

CMFD with Cover for 5Vout+HS

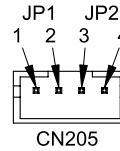


All Dimensions in Inches[mm]
 Tolerance Inches: x.xx=±0.02, x.xxx=±0.010
 Millimeters: x.x=±0.5, x.xx=±0.25

CN205 Pin Connection

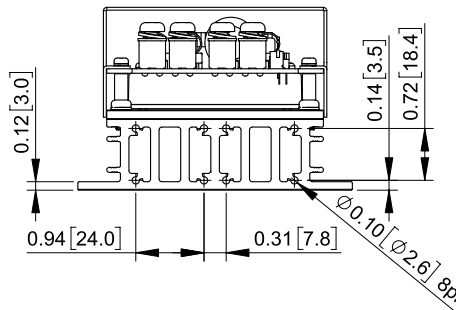
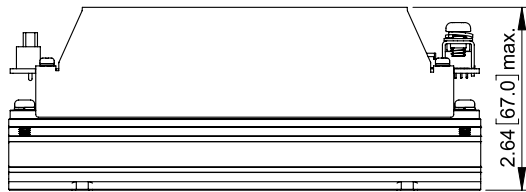
| Pin | Function |
|-----|-----------|
| 1 | +V Output |
| 2 | +Sense |
| 3 | -Sense |
| 4 | -V Output |

* JP1 : Short Pin1 & Pin2
 * JP2 : Short Pin3 & Pin4

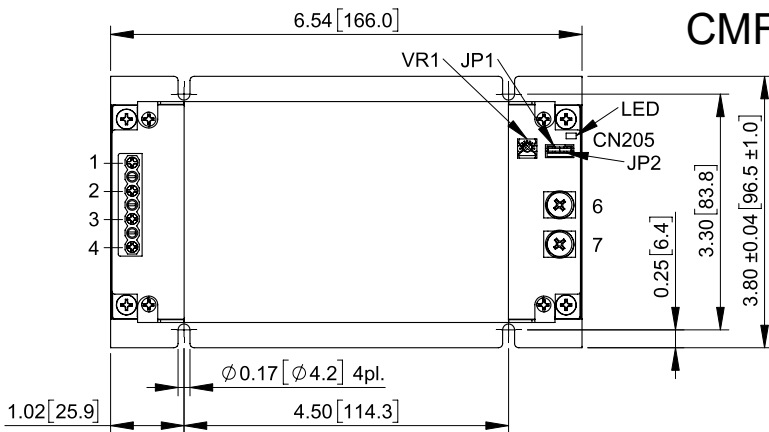


Pin Connection

| Pin | Function |
|-----|-----------|
| 1 | Case |
| 2 | On/Off |
| 3 | -V Input |
| 4 | +V Input |
| 5 | -V Output |
| 6 | -V Output |
| 7 | +V Output |
| 8 | +V Output |



CMFD with Cover for Others+HS

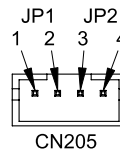


All Dimensions in Inches[mm]
 Tolerance Inches: x.xx=±0.02, x.xxx=±0.010
 Millimeters: x.x=±0.5, x.xx=±0.25

CN205 Pin Connection

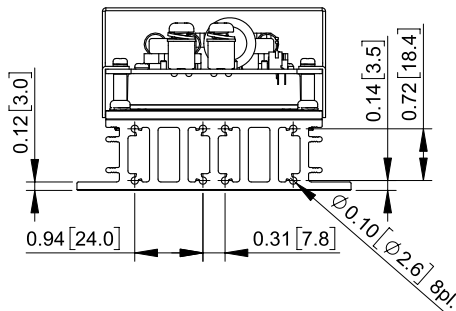
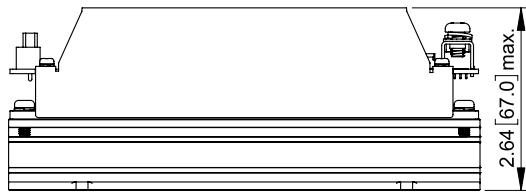
| Pin | Function |
|-----|-----------|
| 1 | +V Output |
| 2 | +Sense |
| 3 | -Sense |
| 4 | -V Output |

* JP1 : Short Pin1 & Pin2
 * JP2 : Short Pin3 & Pin4



Pin Connection

| Pin | Function |
|-----|-----------|
| 1 | Case |
| 2 | On/Off |
| 3 | -V Input |
| 4 | +V Input |
| 6 | -V Output |
| 7 | +V Output |

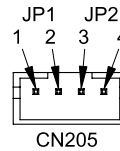
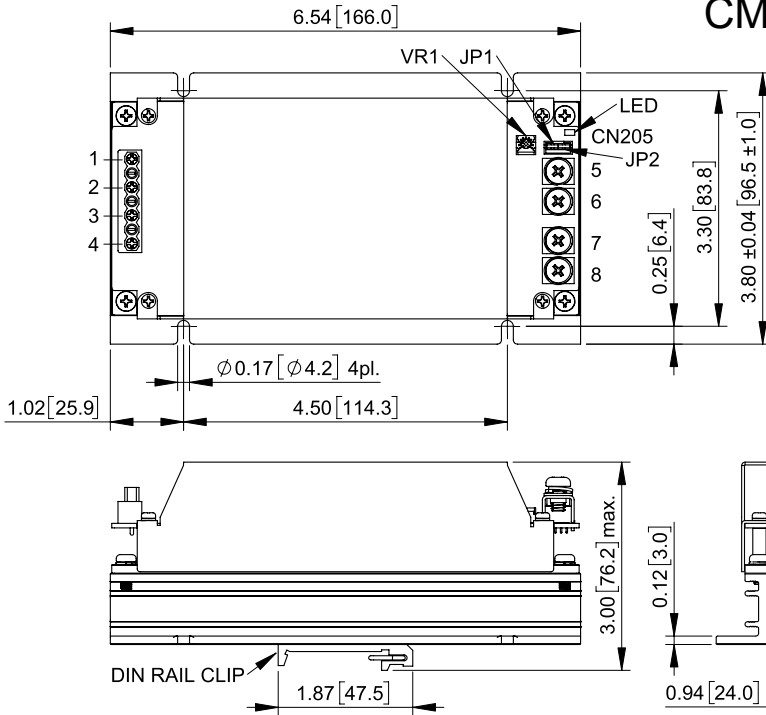




CHB300-300S CMFC(D) Series

MECHANICAL SPECIFICATION

CMFD with Cover for 5Vout+HD



All Dimensions in Inches[mm]
 Tolerance Inches: x.xx=±0.02, x.xxx=±0.010
 Millimeters: x.x=±0.5, x.xx=±0.25

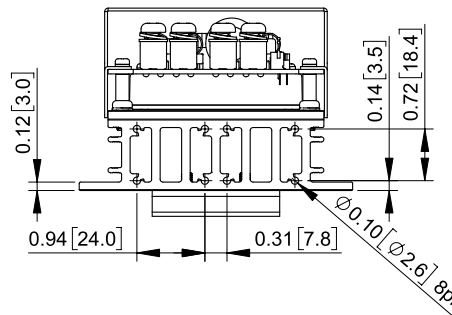
CN205 Pin Connection

| Pin | Function |
|-----|-----------|
| 1 | +V Output |
| 2 | +Sense |
| 3 | -Sense |
| 4 | -V Output |

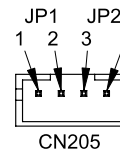
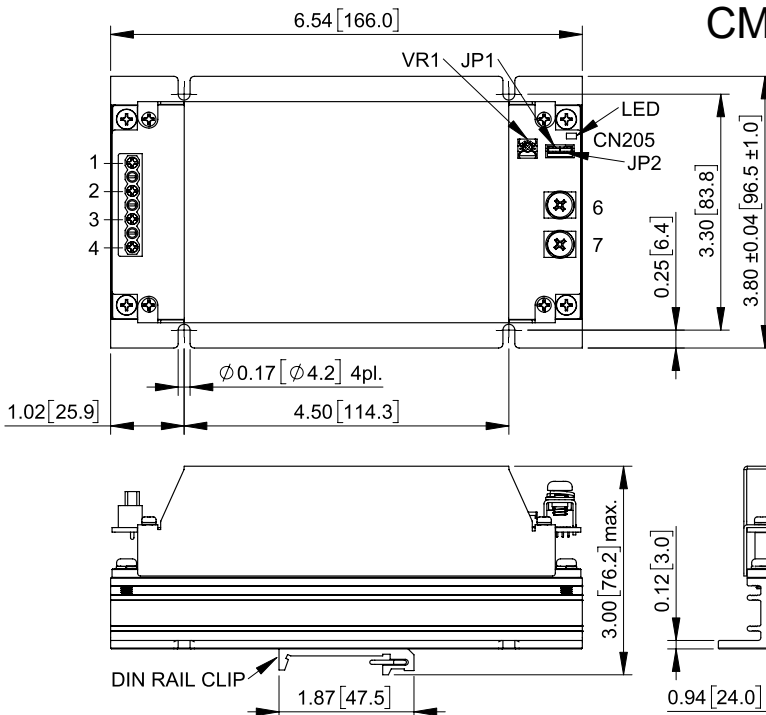
* JP1 : Short Pin1 & Pin2
 * JP2 : Short Pin3 & Pin4

Pin Connection

| Pin | Function |
|-----|-----------|
| 1 | Case |
| 2 | On/Off |
| 3 | -V Input |
| 4 | +V Input |
| 5 | -V Output |
| 6 | -V Output |
| 7 | +V Output |
| 8 | +V Output |



CMFD with Cover for Others+HD



All Dimensions in Inches[mm]
 Tolerance Inches: x.xx=±0.02, x.xxx=±0.010
 Millimeters: x.x=±0.5, x.xx=±0.25

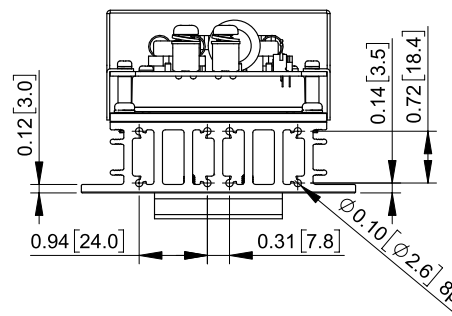
CN205 Pin Connection

| Pin | Function |
|-----|-----------|
| 1 | +V Output |
| 2 | +Sense |
| 3 | -Sense |
| 4 | -V Output |

* JP1 : Short Pin1 & Pin2
 * JP2 : Short Pin3 & Pin4

Pin Connection

| Pin | Function |
|-----|-----------|
| 1 | Case |
| 2 | On/Off |
| 3 | -V Input |
| 4 | +V Input |
| 6 | -V Output |
| 7 | +V Output |



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