CHB200W12-72S CMFD SERIES
200 WATT 12:1 INPUT ISOLATED DC-DC CONVERTERS

Features

- Efficiency Up to 89.5%
- Fixed Switching Frequency
- Regulated Outputs
- Remote On/Off
- Fully Protected (OTP/OCP/OVP/UVLO)
- 3000Vac I/O Isolation
- Operating Case Temperature -40 to +95℃
- UL 62368-1 2nd (Reinforce Insulation) Approval for DC Modules
- EN 50155 for EMC Characteristic
- Shock & Vibration EN 50155 (EN 61373) Compliant
- Fire & Smoke EN 45545-2 Compliant
- 5000m Operating Altitude
- 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	(1)	(2)	
CHB200W12-72S12□-CMFD	14-160 VDC	12 VDC	0 mA	16.7 A	50 mA	3086 mA	89.5	89.5	9000uF
CHB200W12-72S15□-CMFD	14-160 VDC	15 VDC	0 mA	13.5 A	50 mA	3086 mA	89.5	88.5	8000uF
CHB200W12-72S24□-CMFD	14-160 VDC	24 VDC	0 mA	8.4 A	50 mA	3156 mA	88	88	8000uF
CHB200W12-72S48□-CMFD	14-160 VDC	48 VDC	0 mA	4.2 A	50 mA	3121 mA	88.5	88.5	2000uF

NOTE:

1. Nominal Input Voltage 72 VDC.
2. Measured at 110 Vin.
3. □ = N or none
4. VR is Used for Output Voltage Adjustment.
5. Refer to Application Note for Thermal Resistance and Derating Information.
6. TVS is Included for Input Surge Voltage Protection.
7. Recommend an External Fuse for Input Reverse Polarity Protection (shunt diode is included inside).
8. CN203 wafer with TAIWAN KING PIN TERMINAL P110I series and mate with JST housing PH series or equivalent.
9. Input connectors Pin1~7 : DINKLE EK500V-07P series or equivalent, suitable electric wire: 24~12AWG.
10. Output connectors Pin8~9 :P-831N DINKLE M5 Terminal Screw suitable electric wire: 4AWG MAX.

PART NUMBER

Series	Nominal Input Voltage	Number of Outputs	Nominal Output Voltage	Remote On/Off Logic	Chassis Mount Type	Heatsink
CHB200W12-	III	O	XX	L	-YYY	+WW
CHB200W12	72：72 VDC	S：Single	12：12VDC 15：15VDC 24：24VDC 48：48VDC	None：Positive N：Negative	CMFD：Chassis Mount Built in Filter With Cover	None：Blank HS：Heatsink HD：Heatsink+Din Rail

Part Number Example:

CHB200W12-72S12-CMFD: Chassis Mount, 200W, 12:1 14-160Vdc Input, Single 12Vdc Output, Positive Logic, With Cover

TECHNICAL SPECIFICATIONS

(All specifications are typical at nominal input, full load at 25℃ 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		95	℃
Storage Temperature		All	-40		105	℃

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	Full load	All	12.5	13	13.5	V_{dc}
Turn-Off Voltage Threshold	Full load	All	11	11.5	12	V_{dc}
Lockout Hysteresis Voltage	Full load	All		1.5		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

OUTPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Voltage Set Point Accuracy	V_{in}=72V, Full load, T_c=25℃	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℃ to 100℃	All			±0.02	%/℃
Output Voltage Ripple and Noise (5Hz to 20MHz bandwidth)						
Peak-to-Peak	Full load, 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 (resistive)	See Model Number Table				uF
Output Voltage Trim Range	P_o≦max. rated power, I_o ≦ $I_{o\_max.}$	All	-15		+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	%

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 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		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)				3000 4200	V_{ac} V_{dc}
	1 Minute; output to case (base plate)				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)	12Vo 15Vo 24Vo 48Vo		9220 9460 9000 10070		
	Output to case (base plate)	All		46000		

FEATURE CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	Pulse width Modulation (PWM), fixed	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
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		100		℃
Over Temperature Recovery		All		95		℃

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℃	12Vo 15Vo 24Vo 48Vo		347 435 499 472		K hours
Weight		-CMFD -CMFD+HS -CMFD+HD		430 874 896		grams
Base plate Material	Aluminum					
Potting Material	UL 94V-0 (DC Module)					
Shock/Vibration	EN 61373 Compliant					

GENERAL SPECIFICATIONS

Humidity	95% RH max. Non condensing	
Altitude	5000m Operating altitude, 12000m Transport altitude	
Thermal Shock	MIL-STD-810F	
Fire & Smoke	EN 45545-2 Compliant	
EMI	Meets EN 55032 & EN 50155 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, ±2 kV (EN 50155) Level 1: Line to earth, ±0.5kV (EN 55035)	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 S2: 10ms interruptions	Perf. Criteria A
Supply Change Over	EN 50155 Class C2: During a supply break of 30 ms,	Perf. Criteria A
Power Frequency Magnetic Field immunity	EN 61000-4-8 50/60Hz, 1A/m (r.m.s.)	Perf. Criteria A
Application Note Link		CHB200W12-72S CMFD Series App Notes
Packaging Information Link		Packaging Information

Immunity to Environmental Conditions.

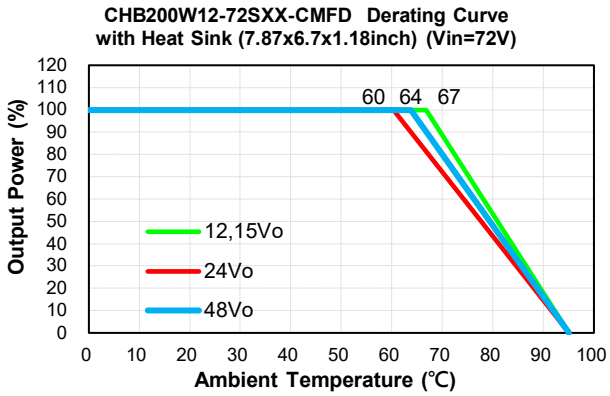
Phenomenon	EN 50155; 2017 Reference Clause(s)	Reference Standard	Test Conditions	Result
Low Temperature Start-up test	13.4.4	EN 60068-2-1	Class OT6 Temperature: -40℃ Duration: 2 hrs	Pass
Dry Heat Test	13.4.5	EN 60068-2-2	Class OT6 & Cycle A (ST0) Temperature: 85℃ Duration: 6 hrs	Pass
Low Temperature Storage Test	13.4.6	EN 60068-2-1	Temperature: -40℃ Duration: 16 hrs	Pass
Cyclic Damp Heat Test	13.4.7	EN 60068-2-30	Temperature: +55℃ and +25℃ Humidity: 90% RH Duration: 48 hrs	Pass
Random Vibration Test	13.4.11	EN 61373	Temperature: 20℃ ±3℃ Humidity: 66%±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℃±3℃ Humidity: 66%±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℃±3℃ Humidity: 66%±5% RH Frequency range: 5 ~ 150 Hz ±Vertical: 50 m/s^2 ±Transverse: 50 m/s^2 ±Longitudinal: 50 m/s^2 Duration: 30ms x18 (Each axis 3 shocks)	Pass

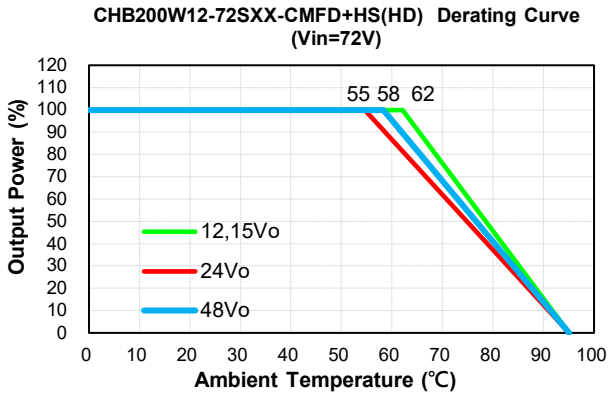
EN 45545-2 Fire & Smoke Test Conditions.

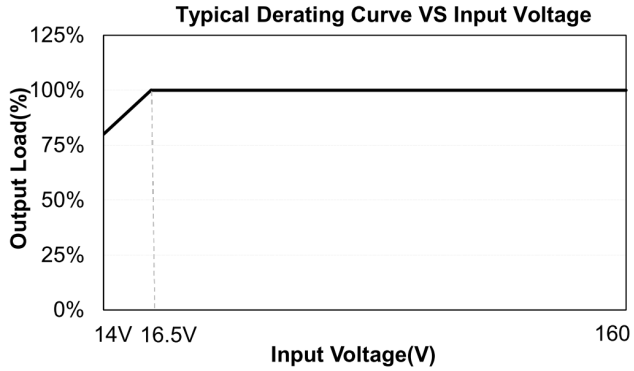
Item		Standard	Hazard Level
R22	Oxygen Index Test	EN 45545-2: 2013 EN ISO 4589-2: 2006	HL1, HL2, HL3
	Smoke Density Test	EN 45545-2: 2013 EN ISO 5659-2: 2013	HL1, HL2, HL3
	Smoke Toxicity Test	EN 45545-2: 2013 NF X70-100: 2006	HL1, HL2, HL3
R23	Oxygen Index Test	EN 45545-2: 2013 EN ISO 4589-2: 2006	HL1, 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

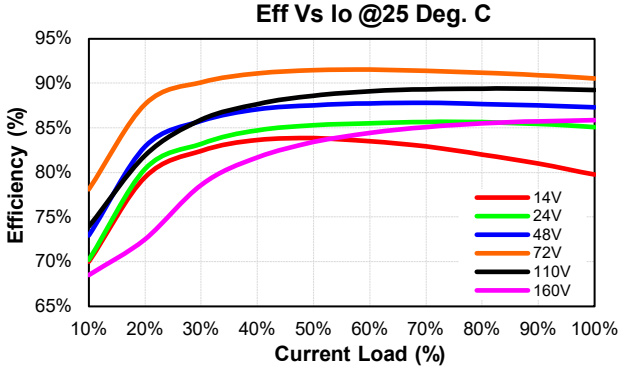




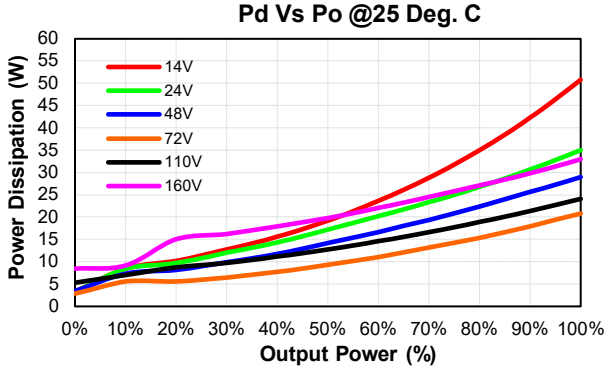


Performance Data

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



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



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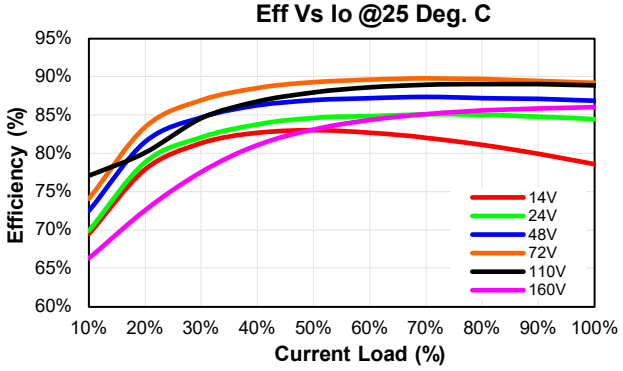

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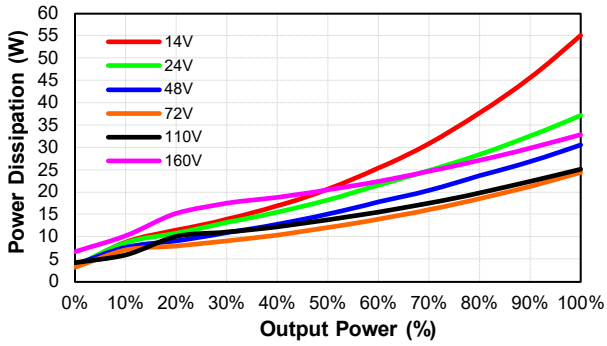

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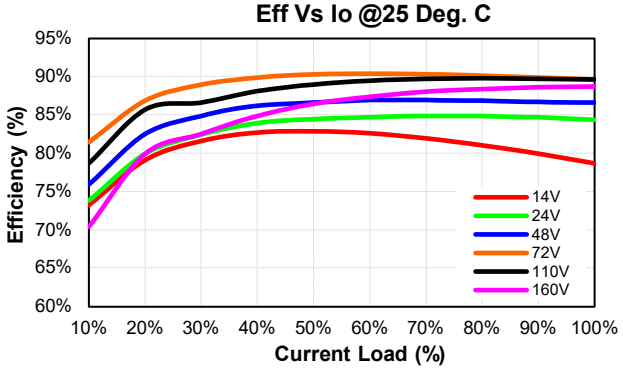
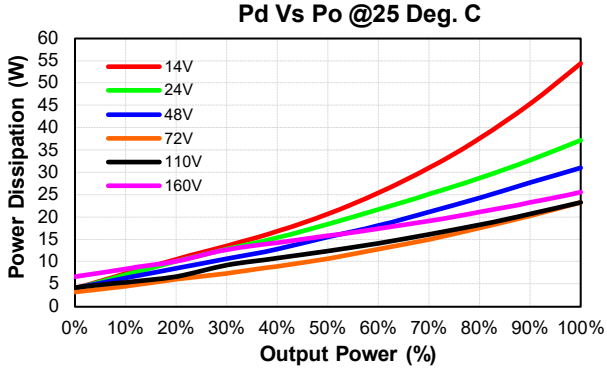


CHB200W12-72S24-CMFD
Pd Vs Po @25 Deg. C



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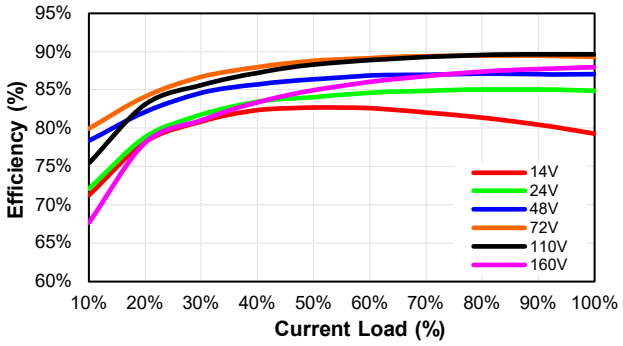

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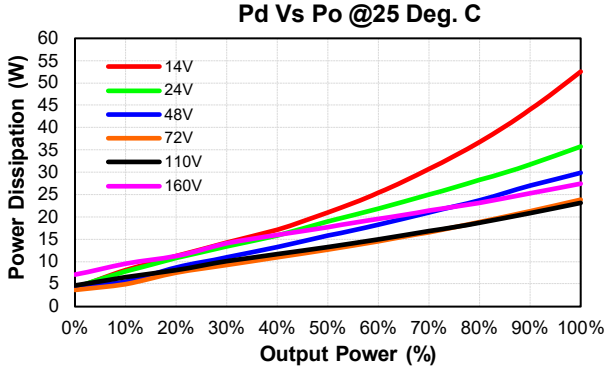
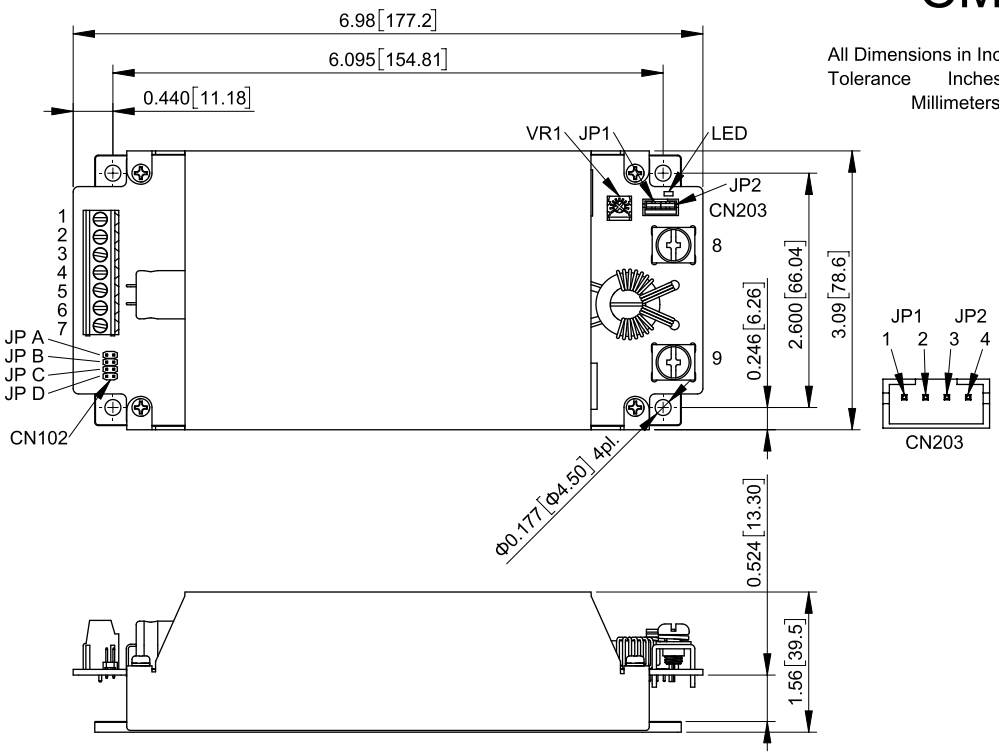


MECHANICAL SPECIFICATION

CMFD



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

CN203
Pin Connection

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

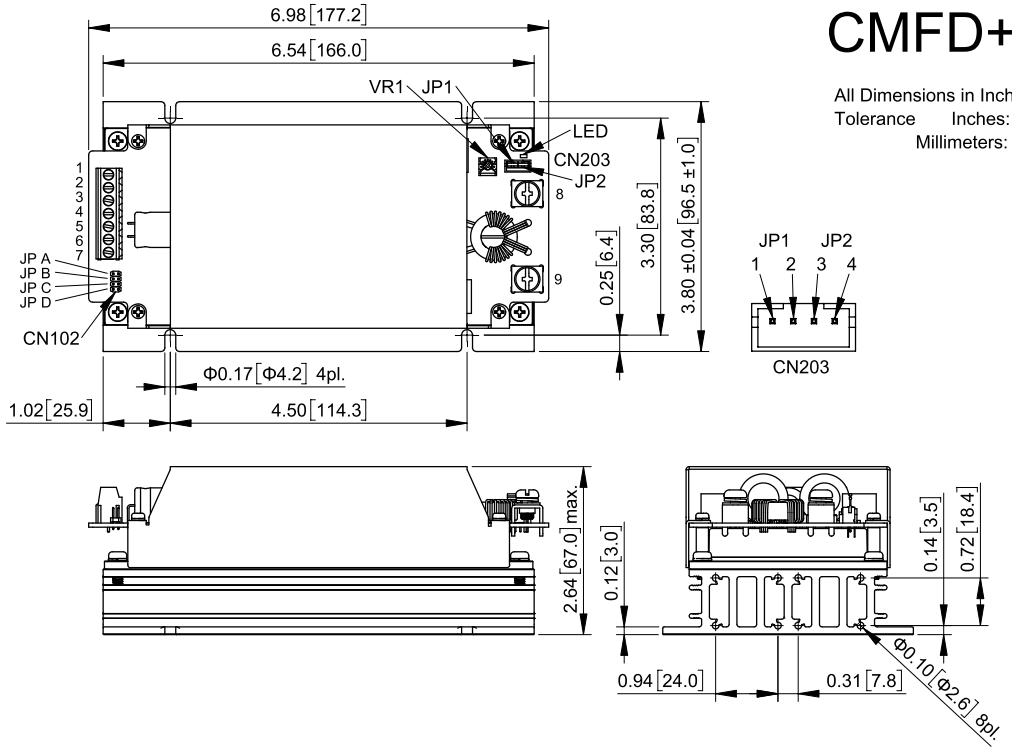
* JP1 : Short Pin1 & Pin2
* JP2 : Short Pin3 & Pin4

Pin Connection

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

MECHANICAL SPECIFICATION

CMFD+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

CN203
Pin Connection

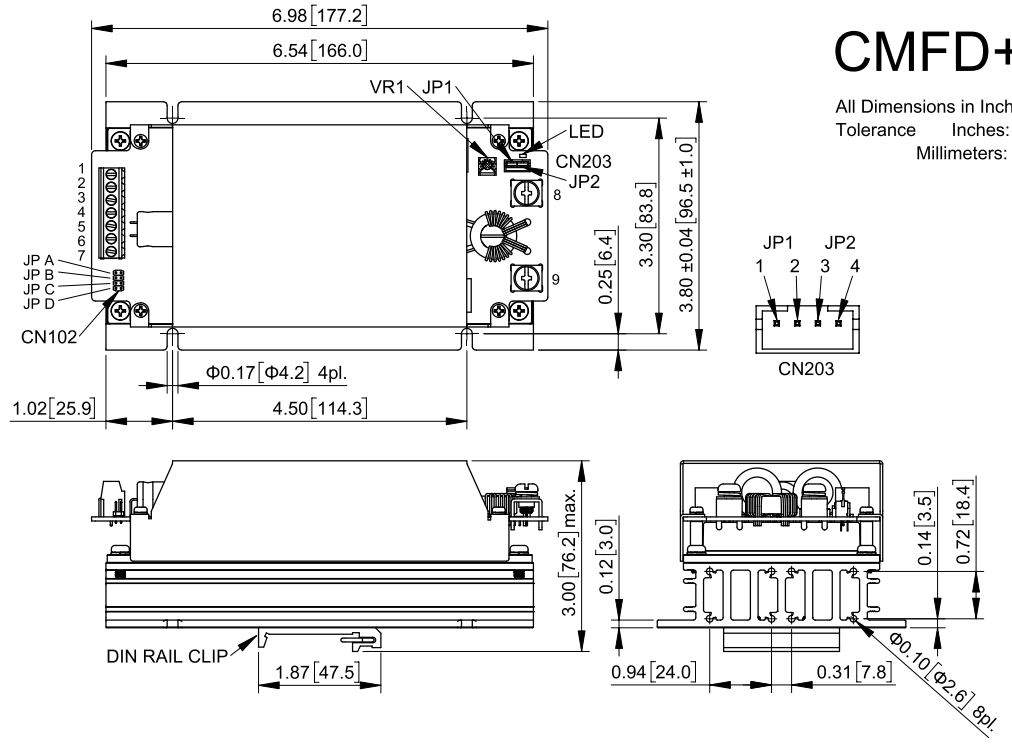
Pin	Function
1	+V Output
2	+Sense
3	-Sense
4	-V Output

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

Pin Connection

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

CMFD+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

CN203
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	Bus
4	-V Input
5	-V Input
6	+V Input
7	+V Input
8	-V Output
9	+V Output

CINCON Electronics Co. Ltd.
Add: 14F, No. 306, Sec.4, Hsin Yi Rd., Taipei, Taiwan
Tel: 886-2-27086210
Fax: 886-2-27029852
E-mail: sales@cincon.com.tw
Web: www.cincon.com