



# CHASSIS MOUNT CHB300-300S SERIES 300 WATT 2:1 INPUT 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
- UL60950-1 2<sup>nd</sup> (Reinforce Insulation) Approval for DC Modules
- EN50155 for EMC, Environmental and Characteristic
- Shock & Vibration EN50155 (EN61373) Compliant
- Fire & Smoke EN45545-2 Compliant
- Build-In EMI Filter
- Chassis Mount, Baseplate Cooled
- Safety Meets IEC/EN/UL 62368-1



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).

## 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	+WW
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 <sub>dc</sub>
Input Surge Voltage	100ms max.	All			500	V <sub>dc</sub>
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 <sub>dc</sub>
Input Under Voltage Lockout						
Turn-On Voltage Threshold	Full load	All	165	170	175	V <sub>dc</sub>
Turn-Off Voltage Threshold	Full load	All	155.5	160.5	165.5	V <sub>dc</sub>
Lockout Hysteresis Voltage	Full load	All		9.5		V <sub>dc</sub>
Maximum Input Current	V <sub>in</sub> =180V, Full load	All		2		A
No-Load Input Current	V <sub>in</sub> =180V, I <sub>o</sub> =0A		See Model Number Table			mA

### OUTPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Voltage Set Point Accuracy	V <sub>in</sub> =110V, Full load, T <sub>c</sub> =25°C	All	-1.0		+1.0	%
Output Voltage Regulation						
Load Regulation	Full load to no load	05V <sub>o</sub>			±0.5	%
		3V3V <sub>o</sub>				
		Others			±0.2	
Line Regulation	V <sub>in</sub> =High line to low line, full load	All			±0.2	%
Temperature Coefficient	T <sub>c</sub> =-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 <sub>o</sub>			120	mV
		12V <sub>o</sub>			150	
		24V <sub>o</sub>			200	
		28V <sub>o</sub>			200	
		48V <sub>o</sub>			300	
RMS.	Full load, 1uF ceramic capacitors	5V <sub>o</sub>			60	mV
		12V <sub>o</sub>			80	
		24V <sub>o</sub>			100	
		28V <sub>o</sub>			100	
		48V <sub>o</sub>			150	
Output Current Range	V <sub>in</sub> = 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 <sub>o</sub> ≤ max. rated power, I <sub>o</sub> ≤ I <sub>o_max</sub>	All	-20		+10	%
Output Voltage Remote Sense Range	P <sub>o</sub> ≤ max. rated power, I <sub>o</sub> ≤ I <sub>o_max</sub> . % of nominal V <sub>o</sub>	All			+10	%
Over Voltage Protection	Limited voltage, % of nominal V <sub>o</sub>	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 <sub>o</sub> =100% of I <sub>o_max</sub> ; 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	EN45545-2 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	<a href="#">CHB300-300S CMFC(D) Series App Notes</a>					
Packaging Information Link	<a href="#">Packaging Information</a>					

## 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 516.5-1	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



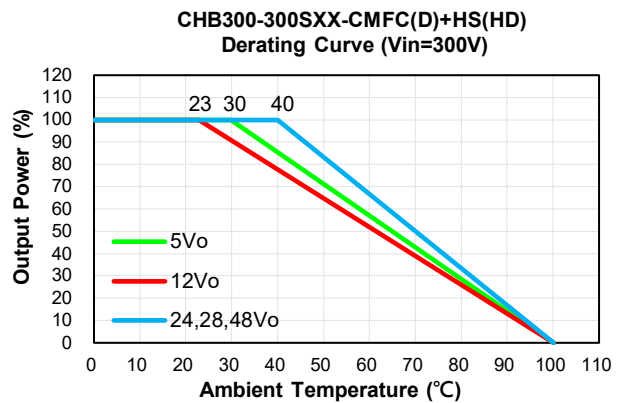
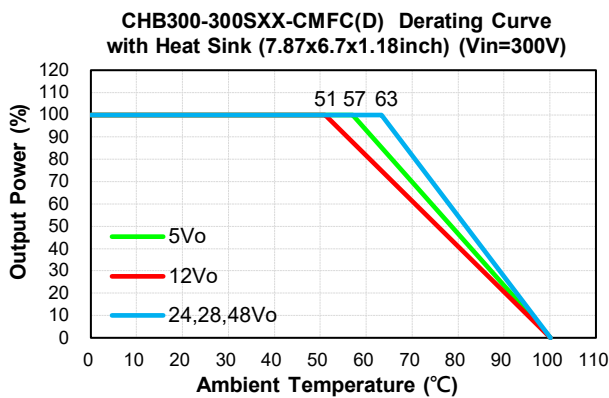
# CHB300-300S CMFC(D) Series

## EN45545-2 Fire & Smoke Test Conditions

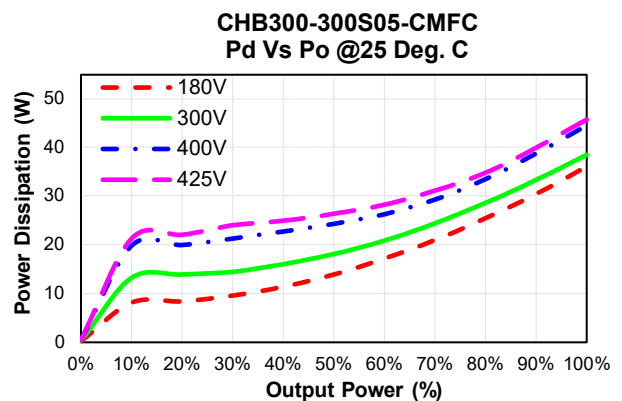
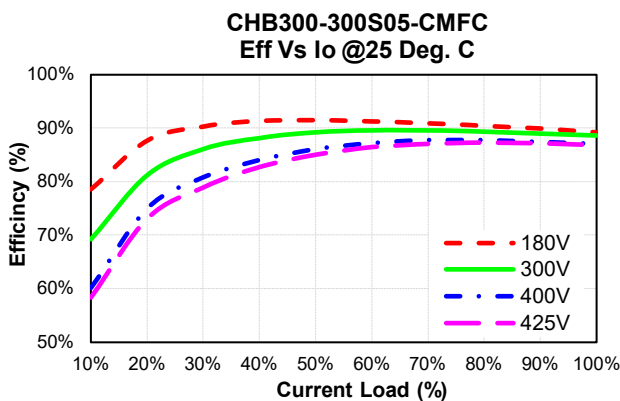
Item		Standard	Hazard Level
R22	Oxygen Index Test	EN 45545-2: 2013 EN ISO 4589-2: 2006	HL1, HL2, HL3
	Smoke Density Test	EN 45545-2: 2013 EN ISO 5659-2: 2013	HL1, HL2, HL3
	Smoke Toxicity Test	EN 45545-2: 2013 NF X70-100: 2006	HL1, HL2, HL3
R23	Oxygen Index Test	EN 45545-2: 2013 EN ISO 4589-2: 2006	HL1,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

### Power Derating Curve



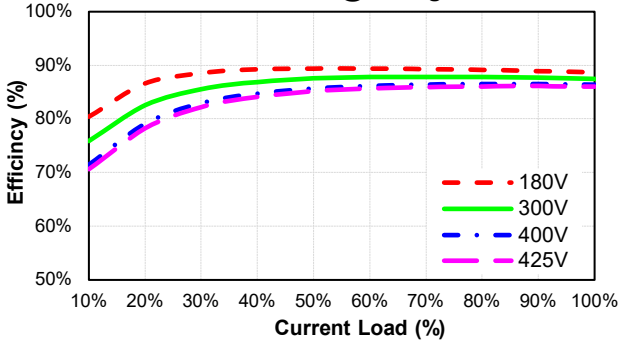
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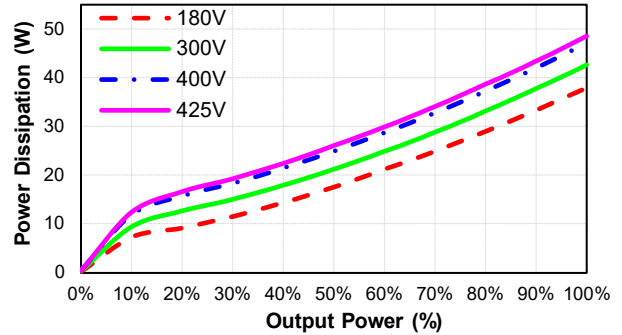


# CHB300-300S CMFC(D) Series

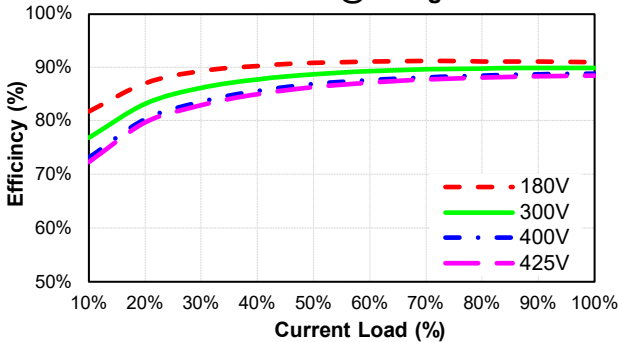
**CHB300-300S12-CMFC**  
Eff Vs Io @25 Deg. C



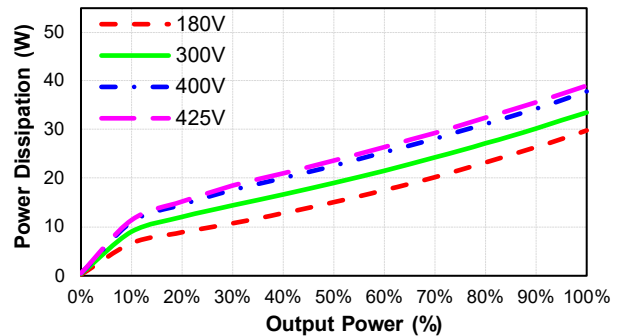
**CHB300-300S12-CMFC**  
Pd Vs Po @25 Deg. C



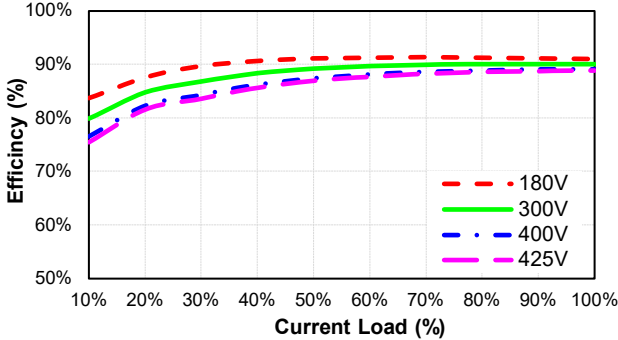
**CHB300-300S24-CMFC**  
Eff Vs Io @25 Deg. C



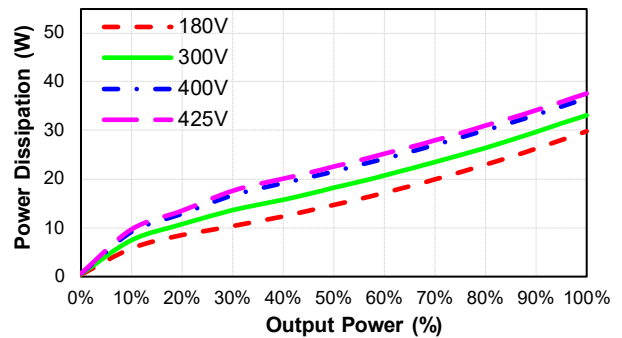
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Pd Vs Po @25 Deg. C



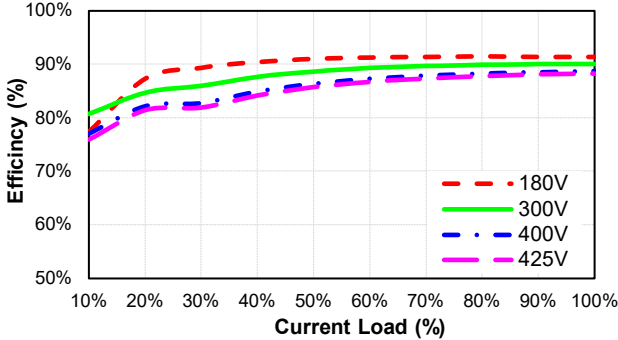
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Eff Vs Io @25 Deg. C



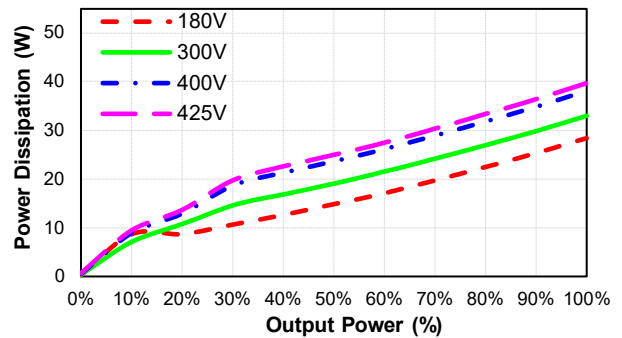
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**CHB300-300S48-CMFC**  
Eff Vs Io @25 Deg. C



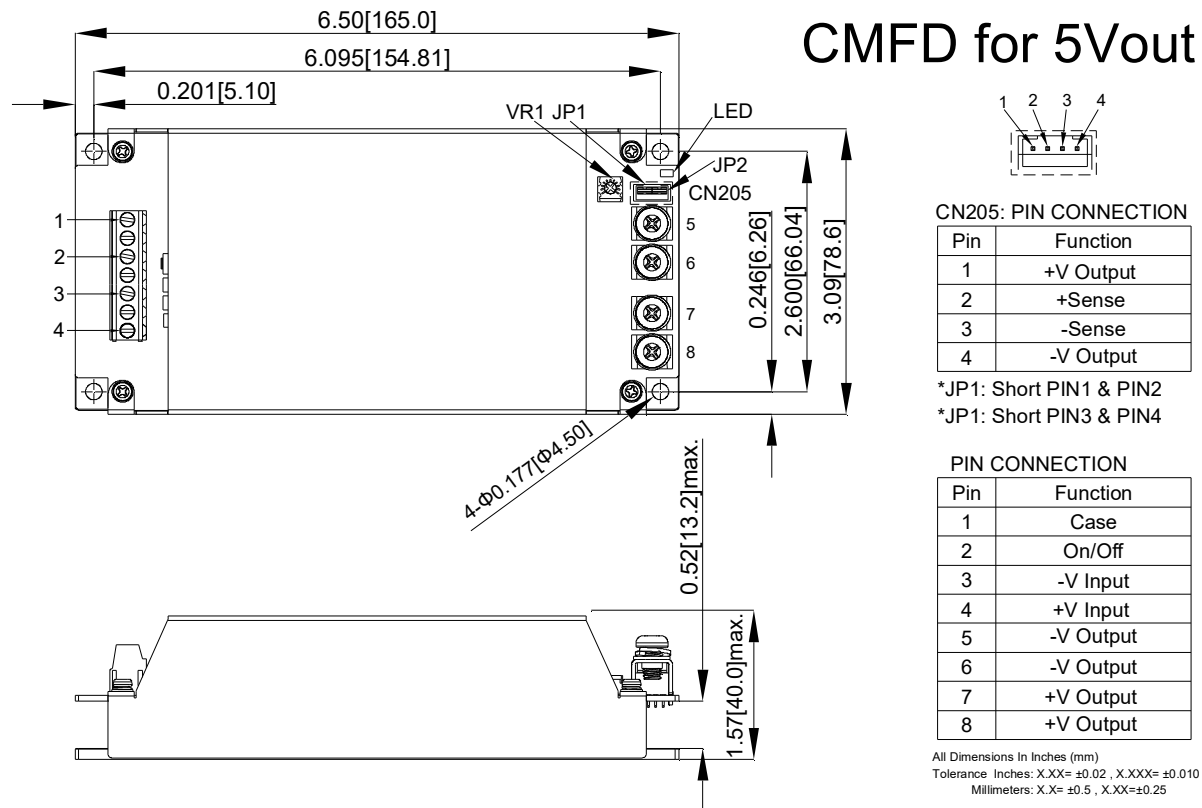
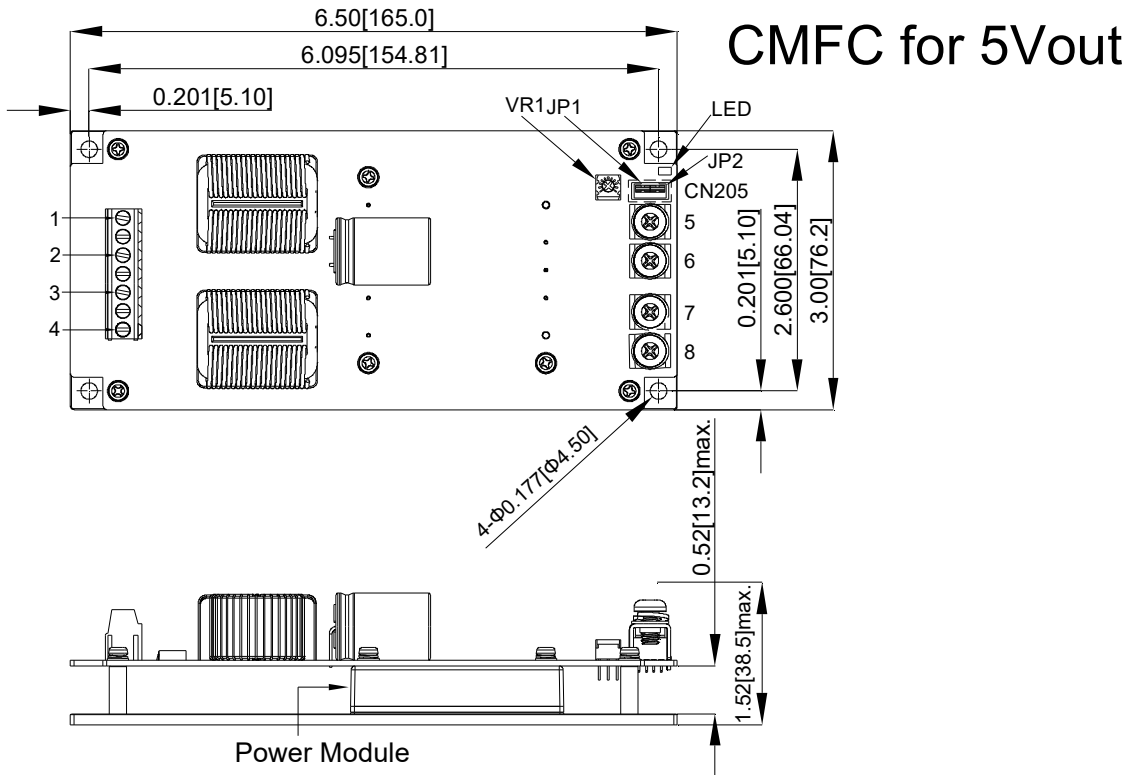
**CHB300-300S48-CMFC**  
Pd Vs Po @25 Deg. C





# CHB300-300S CMFC(D) Series

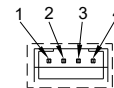
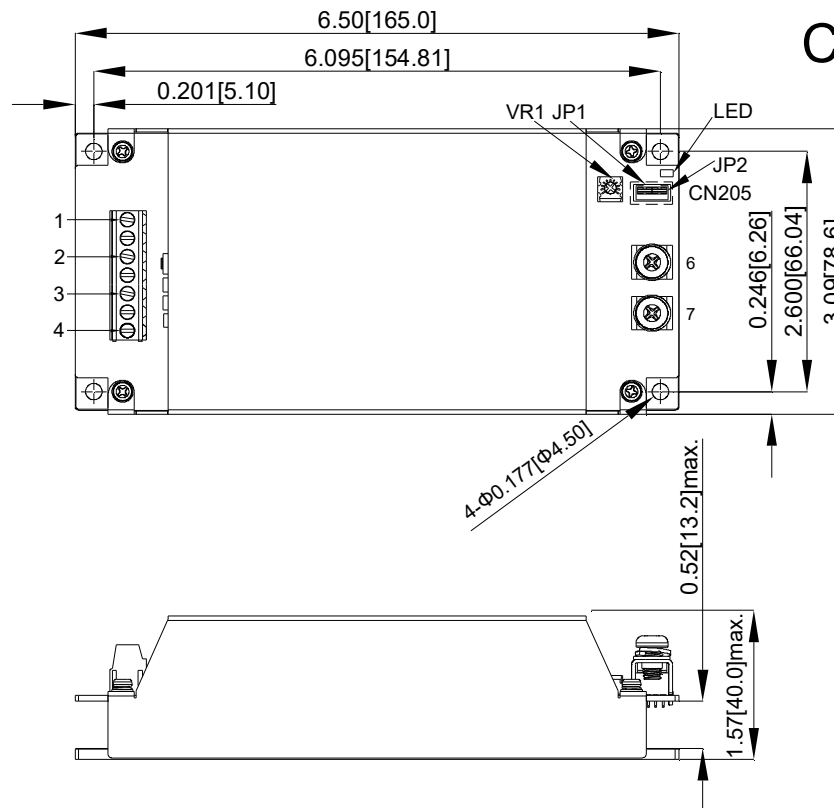
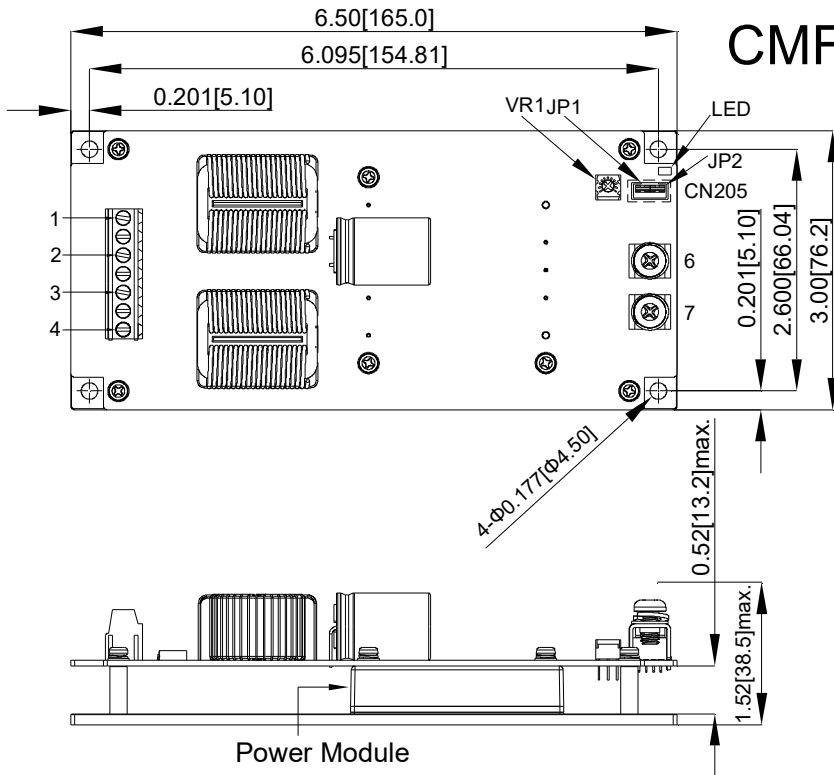
## MECHANICAL SPECIFICATION





# CHB300-300S CMFC(D) Series

## MECHANICAL SPECIFICATION



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

All Dimensions In Inches (mm)  
 Tolerance Inches: X.XX= ±0.02, X.XXX= ±0.010  
 Millimeters: X.X= ±0.5, X.XX= ±0.25

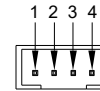
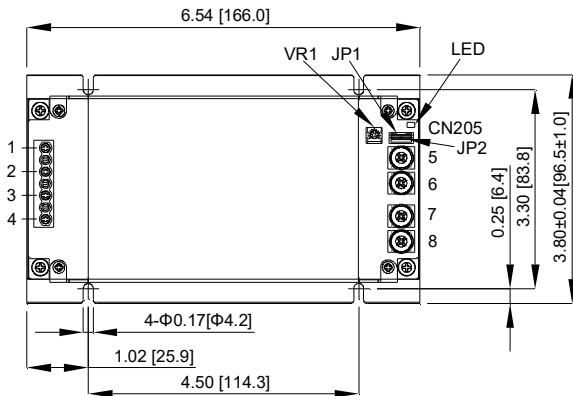




# CHB300-300S CMFC(D) Series

## MECHANICAL SPECIFICATION

### CMFD for 5Vout+HS



CN205 : PIN CONNECTION

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

\* JP1 : Short PIN1 & PIN2

\* JP2 : Short PIN3 & PIN4

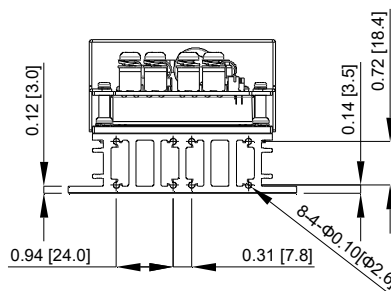
PIN CONNECTION

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

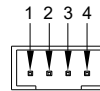
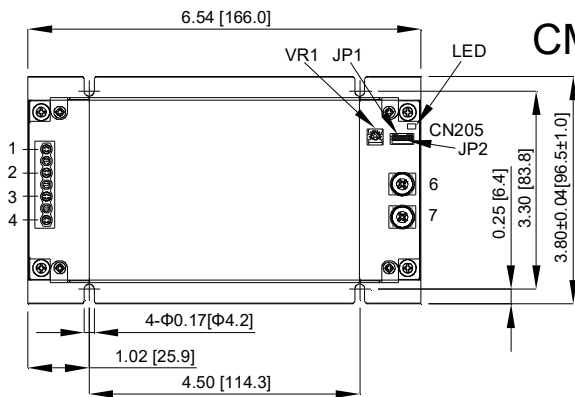
All Dimensions in Inches(mm)

Tolerance Inches: x.xx=±0.02, x.xxx=±0.010

Millimeters: x.x=±0.5, x.xx=±0.25



### CMFD for Others+HS



CN205 : PIN CONNECTION

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

\* JP1 : Short PIN1 & PIN2

\* JP2 : Short PIN3 & PIN4

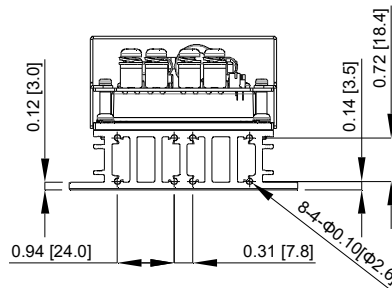
PIN CONNECTION

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

All Dimensions in Inches(mm)

Tolerance Inches: x.xx=±0.02, x.xxx=±0.010

Millimeters: x.x=±0.5, x.xx=±0.25

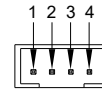
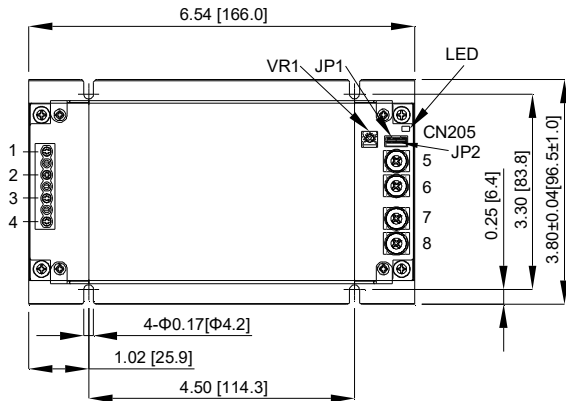




# CHB300-300S CMFC(D) Series

## MECHANICAL SPECIFICATION

### CMFD for 5Vout+HD



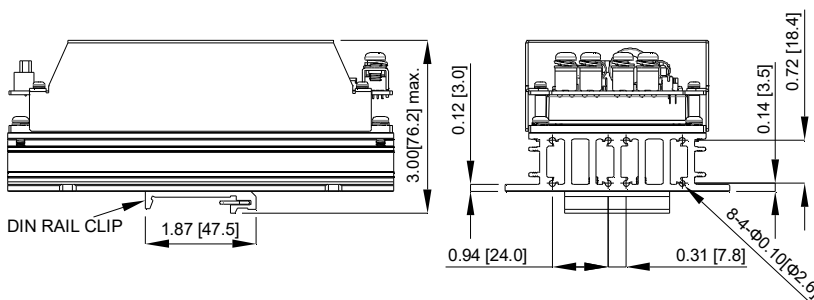
CN205 : PIN CONNECTION

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

\* JP1 : Short PIN1 & PIN2  
\* JP2 : Short PIN3 & PIN4

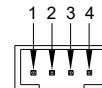
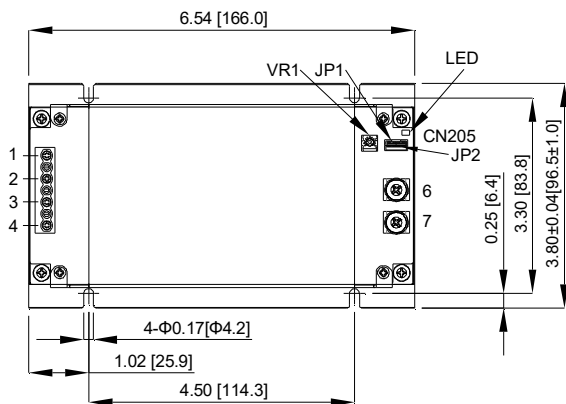
PIN CONNECTION

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



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

### CMFD for Others+HD



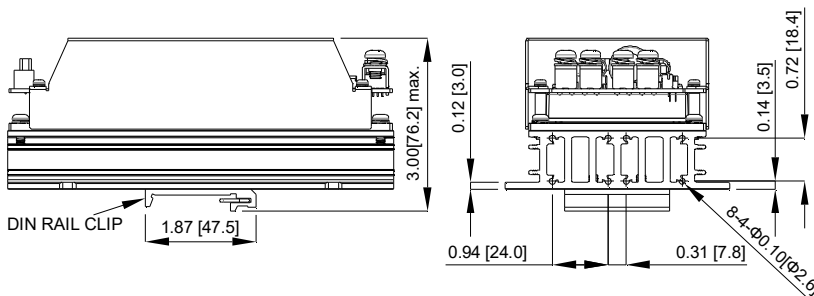
CN205 : PIN CONNECTION

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



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