CHB150W SERIES
99-150 WATT 4:1 INPUT ISOLATED DC-DC CONVERTER

Features

- Efficiency Up to 91%
- Fixed Switching Frequency
- Regulated Outputs
- Remote On/Off
- Fully Protected (OTP/OCP/OVP/UVLO)
- 1500Vdc I/O Isolation
- Operating Case Temperature -40 to +105℃
- Half Brick Size Meet Industrial Standard 2.28”x2.4”x0.5”
- UL 60950-1 Approval (Except 28&48V_{out})
- Safety Meets IEC/EN/UL 62368 -1
- Meets EN 55032 with External Circuits
- Shock & Vibration Miil-STD-810F Compliant
- 2000m Operating Altitude

E176177

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT		INPUT CURRENT		% EFF.	CAPACITOR LOAD MAX.
			MIN.	MAX.	NO LOAD	FULL LOAD	(2)	
CHB150W-24S3V3	9-36 VDC	3.3 VDC	0 mA	30 A	200 mA	4741 mA	87	30000uF
CHB150W-24S05	9-36 VDC	5 VDC	0 mA	30 A	200 mA	7184 mA	87	30000uF
CHB150W-24S12	9-36 VDC	12 VDC	0 mA	12.5 A	100 mA	7102 mA	88	12500μF
CHB150W-24S15	9-36 VDC	15 VDC	0 mA	10 A	100 mA	7184 mA	87	10000μF
CHB150W-24S24	9-36 VDC	24 VDC	0 mA	6.5 A	100 mA	7386 mA	88	1800uF
CHB150W-24S28	9-36 VDC	28 VDC	0 mA	5.4 A	100 mA	7325 mA	86	1800uF
CHB150W-24S48	9-36 VDC	48 VDC	0 mA	3.12 A	200 mA	7428 mA	84	1000uF
CHB150W-48S3V3	18-75 VDC	3.3 VDC	0 mA	30 A	100 mA	2344 mA	88	30000uF
CHB150W-48S05	18-75 VDC	5 VDC	0 mA	30 A	100 mA	3472 mA	90	30000uF
CHB150W-48S12	18-75 VDC	12 VDC	0 mA	12.5 A	50 mA	3434 mA	91	12500μF
CHB150W-48S15	18-75 VDC	15 VDC	0 mA	10 A	50 mA	3472 mA	90	10000μF
CHB150W-48S24	18-75 VDC	24 VDC	0 mA	6.5 A	50 mA	3611 mA	90	2200uF
CHB150W-48S28	18-75 VDC	28 VDC	0 mA	5.4 A	50 mA	3580 mA	88	2200uF
CHB150W-48S48	18-75 VDC	48 VDC	0 mA	3.12 A	100 mA	3633 mA	86	1000uF

NOTE:

1. Nominal input voltage 24, 48VDC.
2. Measured at nominal input voltage.

PART NUMBER

Series	Nominal Input Voltage	Number of Outputs	Nominal Output Voltage	Remote On/Off Logic	Mounting Inserts
CHB150W-	II	O	XX	L	-Y (Option)
CHB150W	24：24 VDC 48：48 VDC	S：Single	3V3：3.3VDC 05：5.0VDC 12：12VDC 15：15 VDC 24：24VDC 28：28VDC 48：48VDC	None：Positive N：Negative	None：M3x0.5 Mounting Inserts -C：Clear Mounting Insert (3.2mm DIA.)

Part Number Example:

CHB150W-48S12N-C: Half Brick, 150W, 4:1 18-75Vdc Input, Single 12Vdc Output, Negative Logic, Clear Mounting Insert

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	24Vin 48Vin	-0.3 -0.3		36 75	V_{dc}
Input Surge Voltage	100ms max.	24Vin 48Vin			50 100	V_{dc}
Operating Ambient Temperature	At the center part of case plate (with derating)	All	-40		100	℃
Maximum Case Temperature		All			110	℃
Storage Temperature		All	-55		105	℃

INPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Operating Input Voltage		24Vin 48Vin	9 18	24 48	36 75	V_{dc}
Input Under Voltage Lockout						
Turn-On Voltage Threshold		24Vin 48Vin	8 16.5	8.5 17	8.8 17.5	V_{dc}
Turn-Off Voltage Threshold		24Vin 48Vin	7.7 15.5	8 16	8.3 16.5	V_{dc}
Lockout Hysteresis Voltage		24Vin 48Vin		0.6 0.9		V_{dc}
Maximum Input Current	V_{in}=9V, Full load V_{in}=18V, Full load	24Vin 48Vin		20 10		A
No-Load Input Current	V_{in}=24, 48V, I_o=0A	See Model Number Table				mA
Input Filter	Pi filter	All				
Inrush Current (I^2t)	As per ETS300 132-2	All			0.1	A^2s
Input Reflected Ripple Current	P-P thru 12uH inductor, 5Hz to 20MHz	All		30		mA

OUTPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Voltage Set Point Accuracy	V_{in}=24, 48V, Full load, T_c=25℃	3.3 & 48Vo Others	-1.5 -1.0		+1.5 +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 105℃	All			±0.03	%/℃
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)	3.3&5Vo 12&15Vo 24Vo 28Vo 48Vo			100 150 240 280 480	mV
RMS		3.3&5Vo 12&15Vo 24Vo 28Vo 48Vo			40 60 100 100 200	

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Output Current Range	V_{in}= 9 to 36V, 18 to 75V	See Model Number Table				A
Over Current Protection	Hiccup mode. Auto recovery	All	110	125	140	%
Over Voltage Protection	Limited voltage	All	115	125	140	%
Short Circuit Protection		All	Continuous, Auto Recovery			
External Load Capacitance	Full load (resistive)	See Model Number Table				uF
Output Voltage Trim Range	$P_o \leqq$ max. rated power, $I_o \leqq I_{o\_max.}$	All	-10		+10	%

EFFICIENCY

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
100% Load	V_{in}=24V, 48V	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			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		10		ms
Output Voltage Rise Time	10%V_{o_set} to 90%V_{o_set}	All		10		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 1 Minute; input to case 1 Minute; output to case	All			1500 1500 1500	V_{dc}
Isolation Resistance	Input to output	All	10			MΩ
Isolation Capacitance	Input to output Input to case Output to case	All		1000 1000 NC		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	3.5		75	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		75	V
Logic Low (Module On)	$V_{on/off}$ at $I_{on/off}$=1.0mA	All	0		1.8	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		5	10	mA
Over Temperature Shutdown	Temperature at the center part of case, non-latching	All		110		℃
Over Temperature Recovery		All		100		℃

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℃	3.3Vo 05Vo 12Vo 15Vo 24Vo 28Vo 48Vo		465 340 425 550 365 490 525		K hours
Weight		All		112		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 Compliant					
Humidity	95% RH max. Non Condensing					
Altitude	2000m Operating altitude, 12000m Transport altitude					
Thermal Shock	MIL-STD-810F					

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

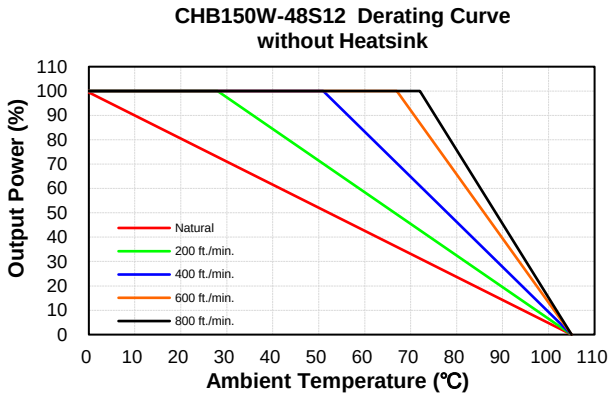
EMI	Meets EN 55032 Compliant (with external filter)	Class A
ESD	EN 61000-4-2 Level 2: Contact ±4kV	Perf. Criteria A
Radiated Immunity	EN 61000-4-3 Level 2: 80~1000MHz, 3V/m	Perf. Criteria A
Fast Transient	EN 61000-4-4 Level 1: On power input port, ±0.5kV, external input capacitor required	Perf. Criteria A
Surge	EN 61000-4-5 Level 1: Line to line, ±0.5kV	Perf. Criteria A
Conducted Immunity	EN 61000-4-6 Level 2: 0.15~80MHz, 3V	Perf. Criteria A
Power Frequency Magnetic Field	EN 61000-4-8 Level 1: 50Hz, 1A/m	
Application Note Link		CHB150W Series App Notes
Packaging Information Link		Packaging Information

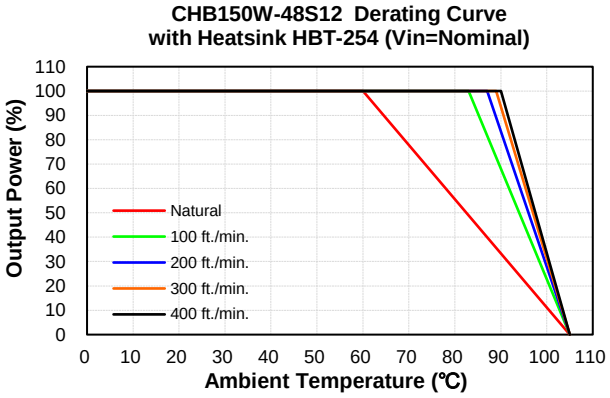
EN 45545-2 Fire & Smoke Test Conditions.

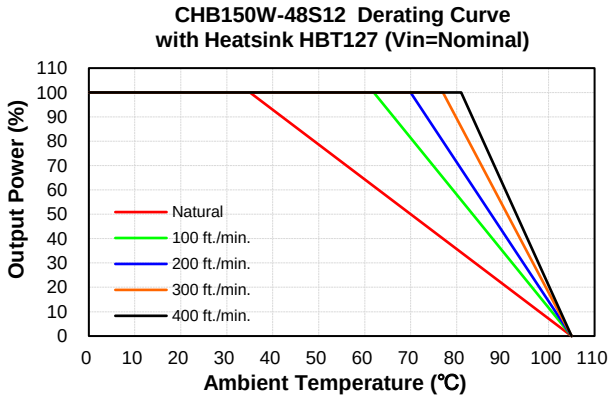
Item		Standard	Hazard Level
R22	Oxygen Index Test	EN 45545-2: 2013 EN ISO 4589-2: 2006	HL1, HL2, HL3
	Smoke Density Test	EN 45545-2: 2013 EN ISO 5659-2: 2013	HL1, HL2, HL3
	Smoke Toxicity Test	EN 45545-2: 2013 NF X70-100: 2006	HL1, HL2, HL3
R23	Oxygen Index Test	EN 45545-2: 2013 EN ISO 4589-2: 2006	HL1,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







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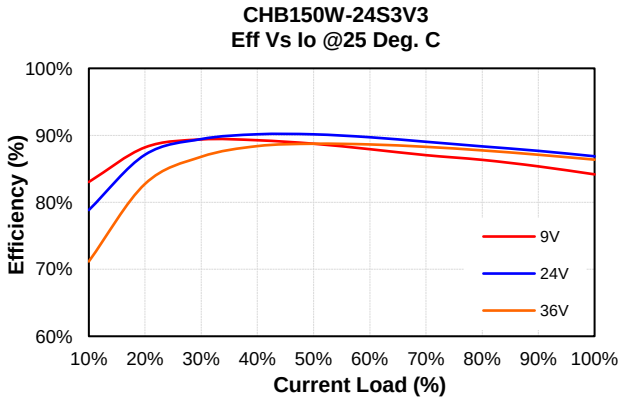
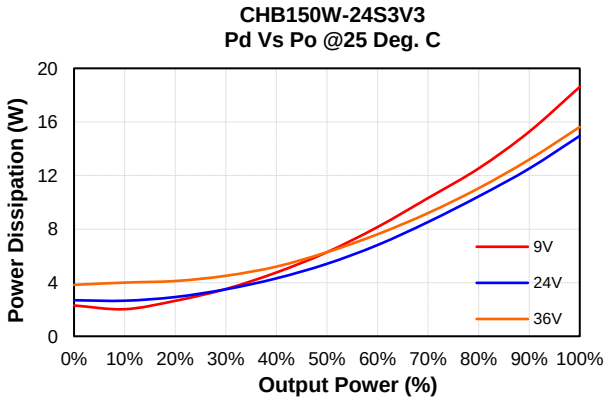
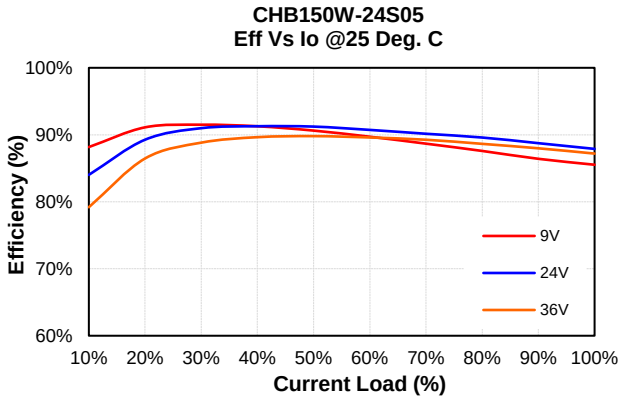
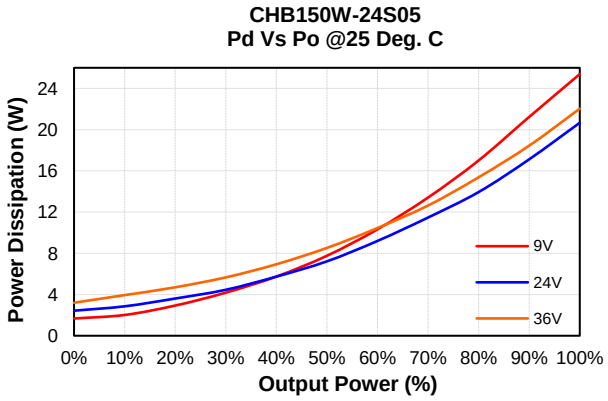
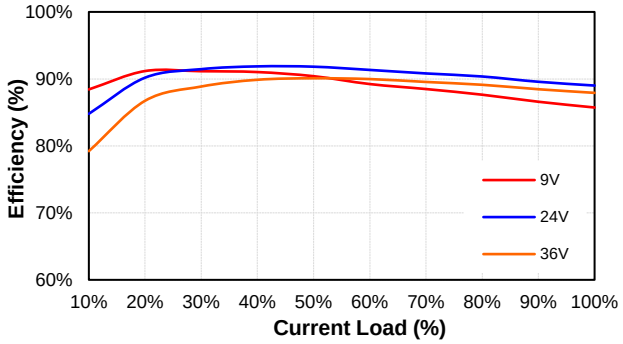








CHB150W-24S12
Eff Vs Io @25 Deg. C



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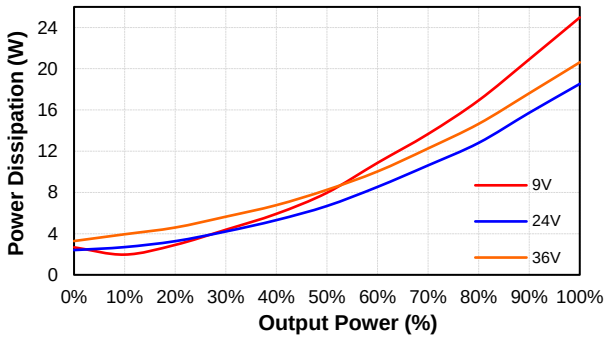

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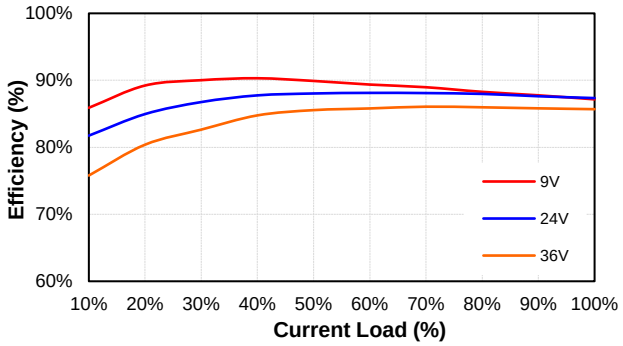

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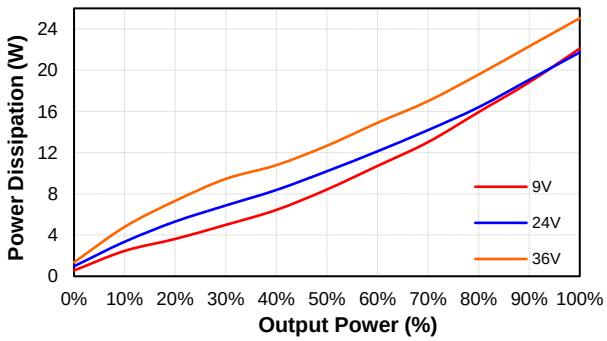

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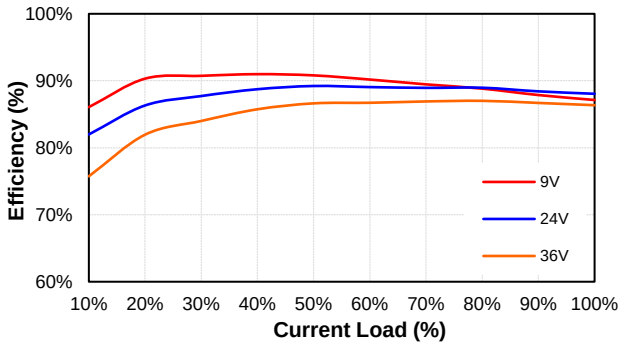

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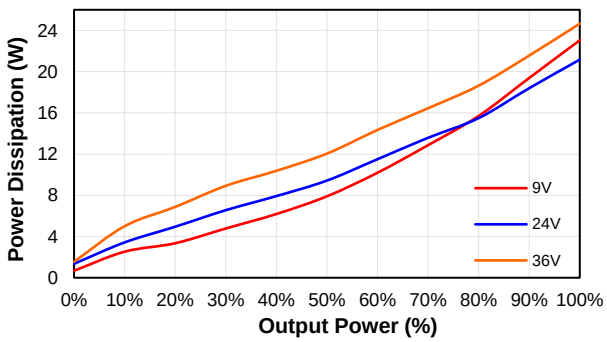

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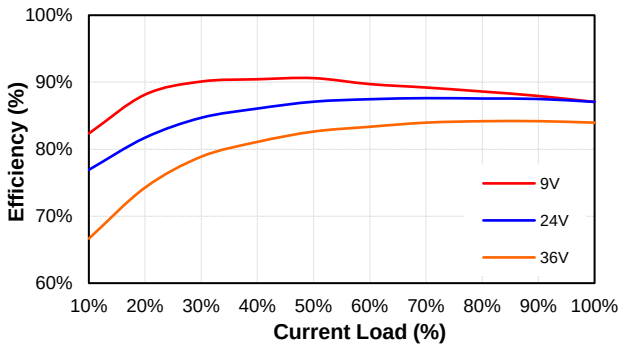

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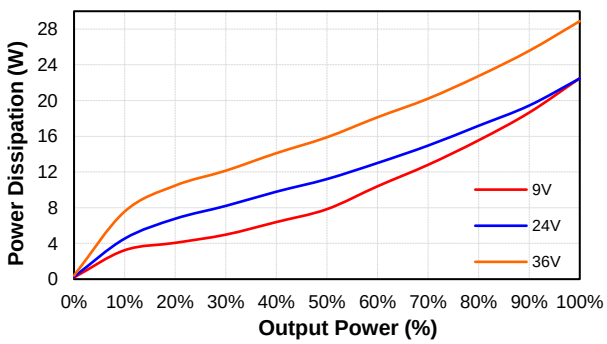

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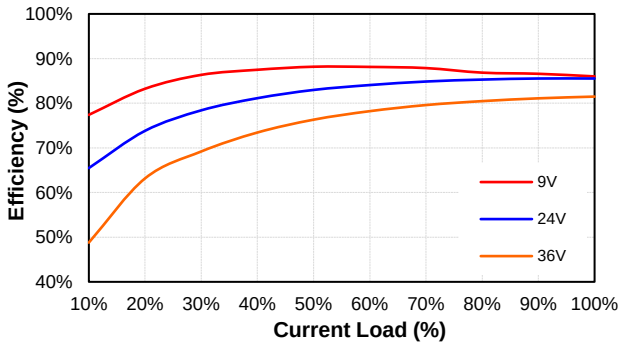

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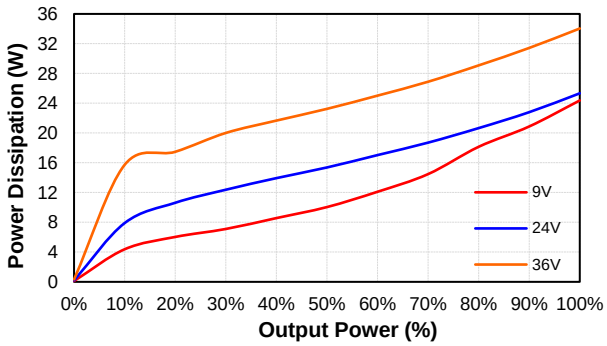

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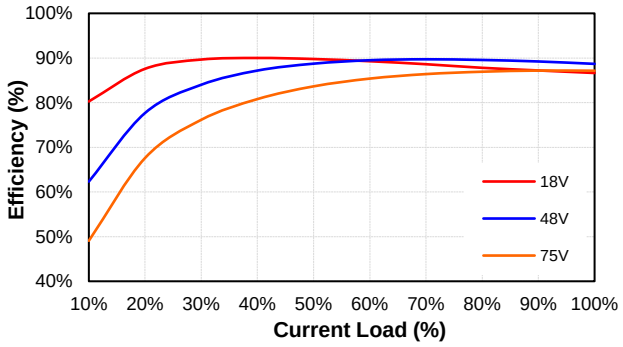

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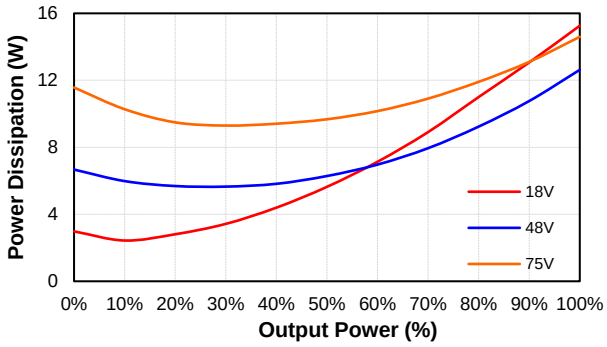

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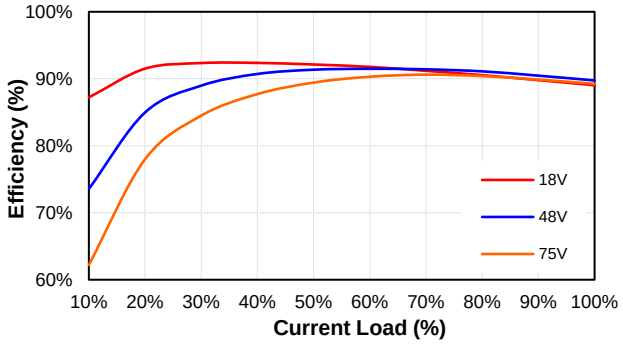

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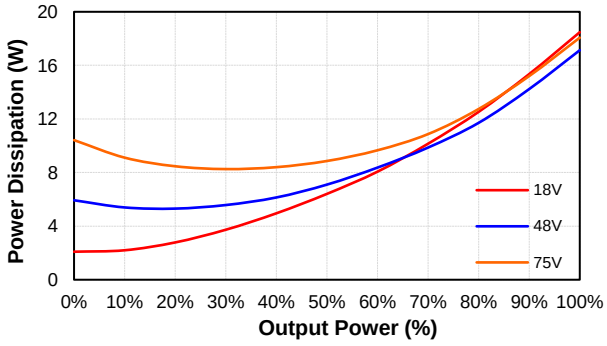

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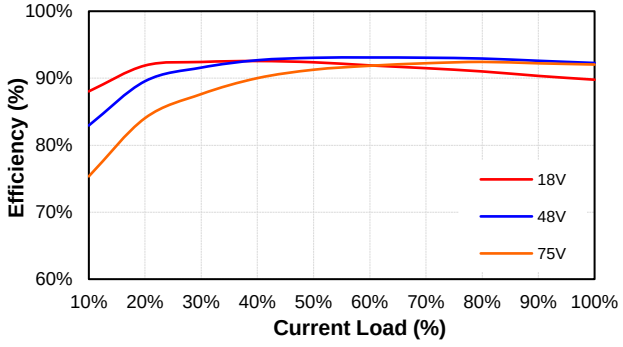

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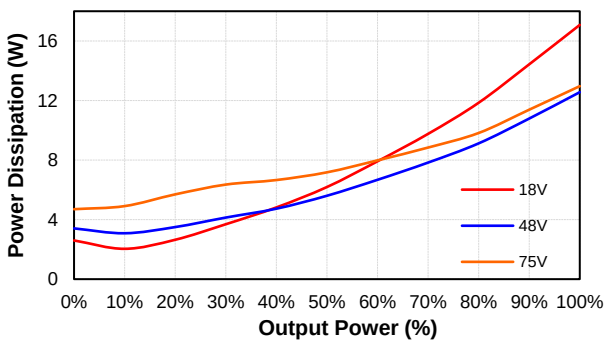

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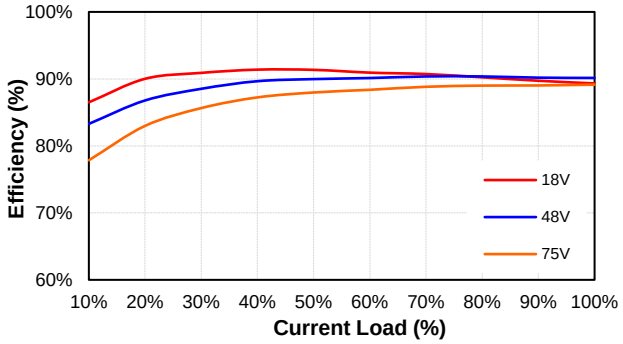

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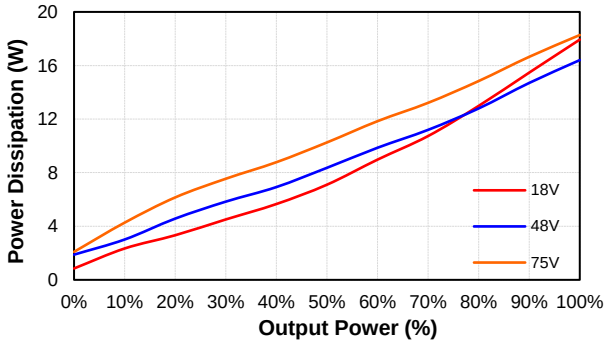

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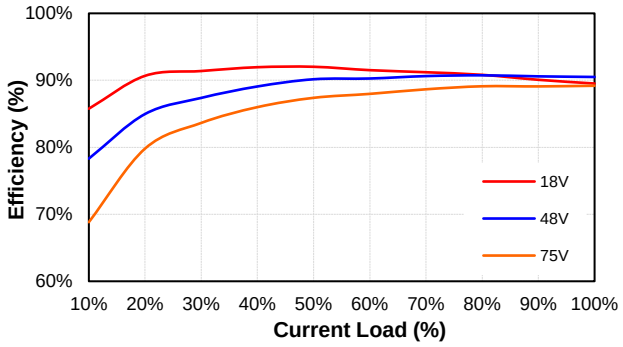

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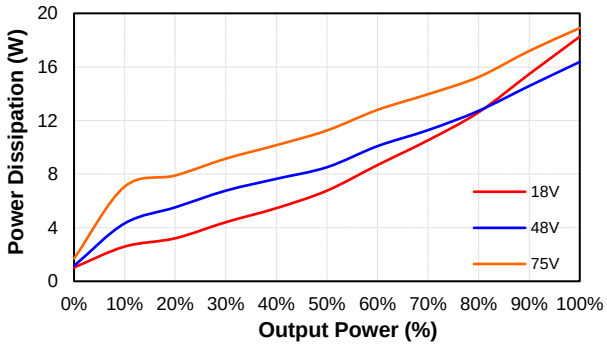

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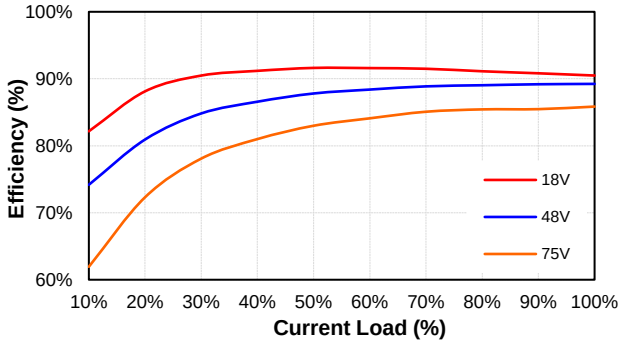

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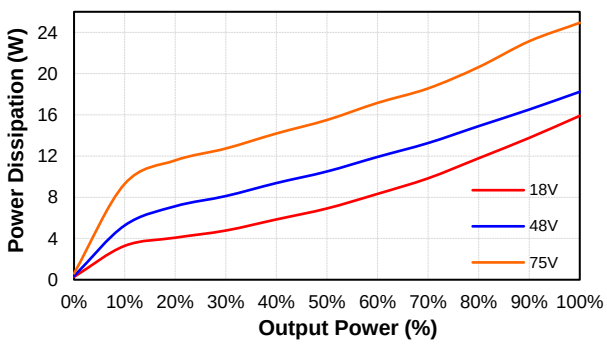
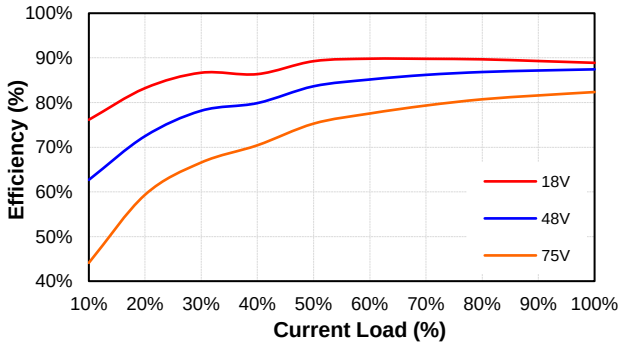
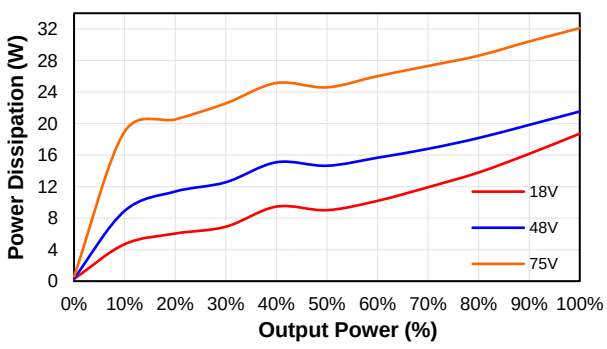


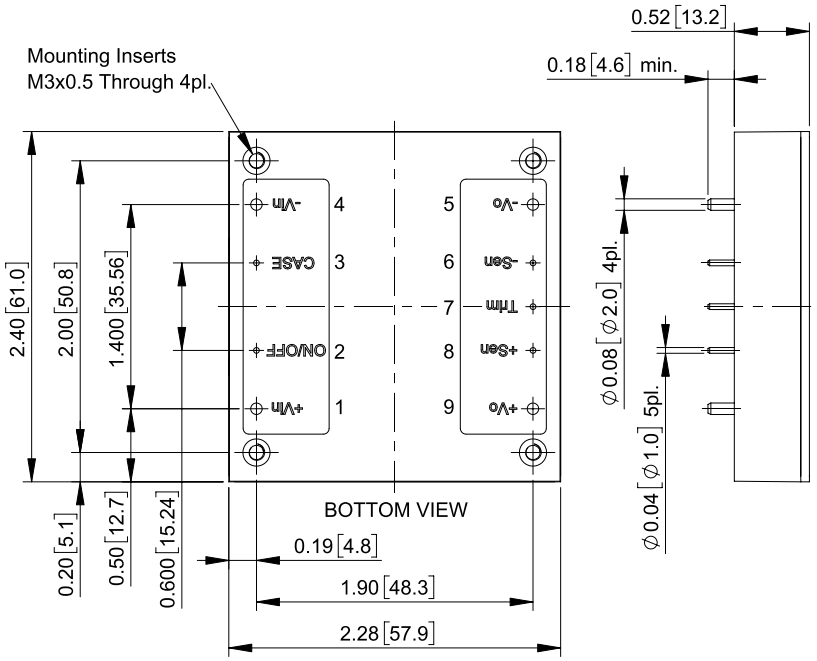
CHB150W-48S48
Eff Vs Io @25 Deg. C



CHB150W-48S48
Pd Vs Po @25 Deg. C



MECHANICAL SPECIFICATION



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

Pin Connection

Pin	Function
1	+V Input
2	On/Off
3	CASE
4	-V Input
5	-V Output
6	-Sense
7	Trim
8	+Sense
9	+V Output

Note:Pin Size is ∅0.04±0.004 Inch [∅1.0±0.1 mm]
Pin Size is ∅0.08±0.004 Inch [∅2.0±0.1 mm]

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