CHM150 SERIES
150 WATT 2:1 INPUT MEDICAL ISOLATED DC-DC CONVERTER

Features

- Efficiency up to 91.5%
- Fixed Switching Frequency
- Regulated Outputs
- Remote On/Off
- Low No Load Power Consumption
- Fully Protected (OTP/OCP/OVP/UVLO)
- 5000V_{ac} I/O Isolation for 250V_{ac} Working Voltage
- Operating Case Temperature -40 to +100℃
- EN 60601-1-2, EN 55032, EN 55035 Approval
- IEC/UL 60601-1 3rd 2 MOPP Approval
- Design Meets CF Rated Medical Applications
- 5000m Operating Altitude
- Half-Brick Size Meet Industrial Standard

E252331

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT		INPUT CURRENT		% EFF.	CAPACITOR LOAD MAX.
			MIN.	MAX.	NO LOAD	FULL LOAD		
CHM150-24S12	18-36 VDC	12 VDC	0 mA	12.5 A	10 mA	6831 mA	91.5	20000 μF
CHM150-24S15	18-36 VDC	15 VDC	0 mA	10.0 A	10 mA	6831 mA	91.5	15400 μF
CHM150-24S24	18-36 VDC	24 VDC	0 mA	6.25 A	10 mA	6868 mA	91	6250 μF

NOTE:
1. Measured at nominal input voltage 24VDC.

PART NUMBER

Series	Nominal Input Voltage	Number of Outputs	Nominal Output Voltage	Remote On/Off Logic
CHM150-	II	O	XX	
CHM150	24: 24VDC	S：Single	12：12VDC 15：15VDC 24：24VDC	None：Positive N：Negative

Part Number Example:
CHM150-24S12N: Half-Brick, 150W, 2:1 18-36V_{dc} Input, Single 12V_{dc} Output, Negative Logic

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		36	V_{dc}
Input Surge Voltage	100ms max.	All			50	V_{dc}
Operating Case Temperature	At the center part of base plate (with derating)	All	-40		100	℃
Storage Temperature		All	-55		125	℃

INPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Operating Input Voltage		All	18	24	36	V_{dc}
Input Under Voltage Lockout						
Turn-On Voltage Threshold	Full Load	All	15.6	16.5	17.5	V_{dc}
Turn-Off Voltage Threshold	Full Load	All	14.6	15.5	16.5	V_{dc}
Lockout Hysteresis Voltage	Full Load	All		1		V_{dc}
Maximum Input Current	V_{in}=22V, Full load V_{in}=18V, 80% Load	All		8		A
No-Load Input Current	V_{in}=24V, 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}=24V, 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, 10uF and 1uF ceramic capacitors	12&15Vo 24Vo			150 240	mV
RMS		12&15Vo 24Vo			60 100	mV
Output Current Range	V_{in}=18 to 22V V_{in}=22 to 36V	See Power Derating Curve See Model Number Table				A
Over Current Protection	Hiccup mode. Auto recovery	All	110	140	160	%
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	-20		+10	%
Output Voltage Remote Sense Range	$P_o \leqq$ max. rated power, $I_o \leqq I_{o\_max.}$ % of nominal V_o	All			+10	%
Over Voltage Protection	Limited voltage, % of nominal V_o	All	115	125	140	%

EFFICIENCY

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
100% Load	V_{in}=24V	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_i/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		1.5		ms
Turn-On Delay Time, From Input	$V_{in\_min.}$ to 10%$V_{o\_set,}$ Power up	All		3		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 (base plate) 1 Minute; output to case (base plate)	All			5000 2500 2500	V_{ac}
Isolation Resistance	Input to output	All	1000			MΩ
Isolation Capacitance	Input to output (100KHz, 0.25V)	All			80	pF
Leakage Current	Touch Current	All			10	uA
Creepage	Input to output	All	8			mm
Clearance	Input to output	All	8			mm

FEATURE CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	Output ripple frequency	All	185	200	215	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		36	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		36	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		0.4	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		1.5	3	mA
Over Temperature Shutdown	Temperature at the center part of case, non-latching	All		105		℃
Over Temperature Recovery		All		88		℃

GENERAL SPECIFICATIONS

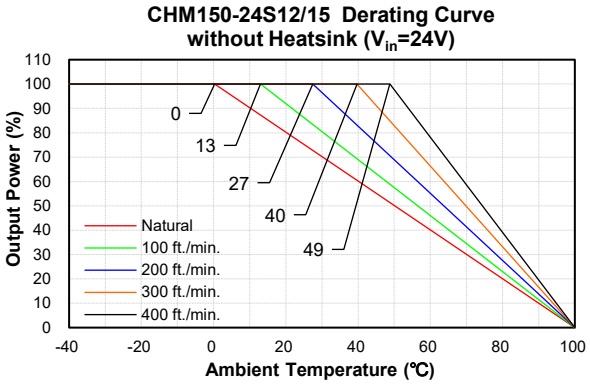
PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	I_o=100% of $I_{o\_max.}$ MIL-HDBK - 217F_Notice 1, GB, 25℃	12Vo 15Vo 24Vo		1346 1391 1725		k hours
Weight		All		128		grams
Case Material	Plastic, DAP, UL 94V-0					
Base plate Material	Aluminum					
Potting Material	UL 94V-0					
Pin Material	Base: Copper Plating: Nickel with Matte Tin					
Safety	IEC 60601-1, ANSI/AAMI ES 60601-1					
Shock/Vibration	MIL-STD-810F					
Humidity	95% RH max. Non-condensing					
Altitude	5000m Operating altitude, 12000m Transport altitude					
Thermal Shock	MIL-STD-810F					

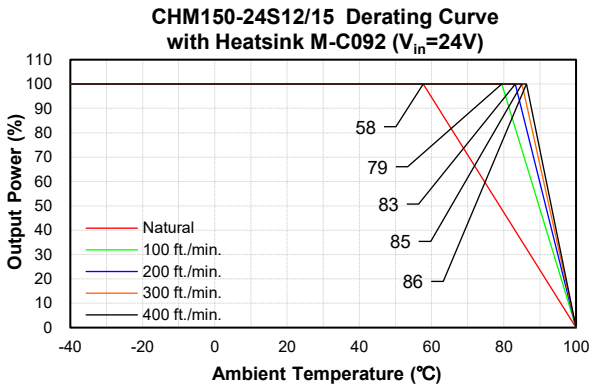
EMC SPECIFICATIONS (External components required, please refer to application note.)

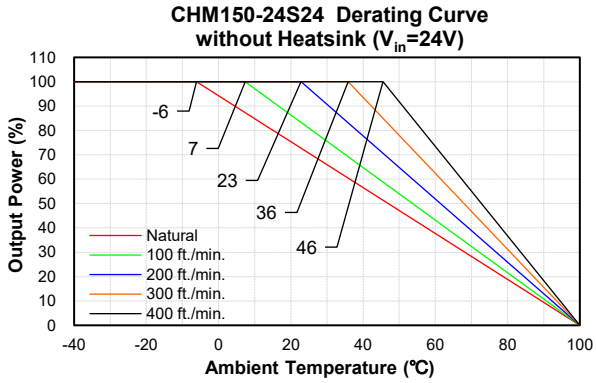
EMI	EN 60601-1-2, EN 55032, EN/IEC 61204-3, FCC Part 15B, EN/IEC 61000-6-4, ICES-003 Issue 7, with external filter		Class A
EMS	EN 55035, EN/IEC 61204-3, EN/IEC 61000-6-1, EN/IEC 61000-6-2		
	EN 60601-1-2		Ed 4.1
ESD	EN 61000-4-2	Level 4: Air ±15kV, Contact ±8kV	Perf. Criteria A
Radiated Immunity	EN 61000-4-3	Level 3: 80MHz~2.7GHz: 10V/m	Perf. Criteria A
Fast Transient	EN 61000-4-4	Level 3: On power input port, ±2kV, with external circuit	Perf. Criteria A
Surge	EN 61000-4-5	Level 4: Line to line, ±2kV, with external circuit	Perf. Criteria A
Conducted Immunity	EN 61000-4-6	Level 2: 0.15~80MHz, 3V (EN 60601-1-2), Level 3: 0.15~80MHz, 10V (EN/IEC 61204-3)	Perf. Criteria A
Power Frequency Magnetic Field	EN 61000-4-8	Level 4: 50Hz & 60Hz 30A/m	Perf. Criteria A
Proximity Magnetic Fields	EN 61000-4-39	30kHz, 8A/m≧2sec, Continuous wave 134.2kHz, 65A/m≧2sec, Plus modulation 2.1kHz 13.56MHz, 7.5A/m≧2sec, Plus modulation 50kHz	Perf. Criteria A
Application Note Link			CHM150 Series App Notes
Packaging Information Link			Packaging Information

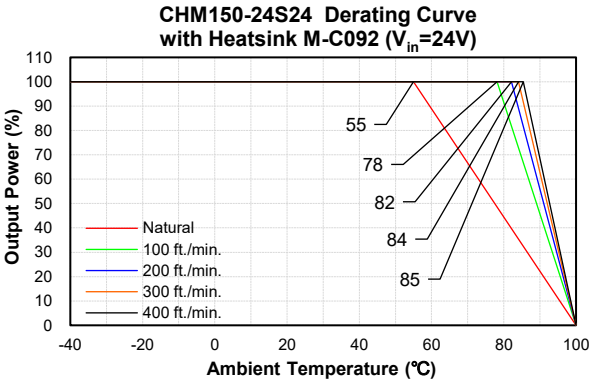
CHARACTERISTIC CURVE

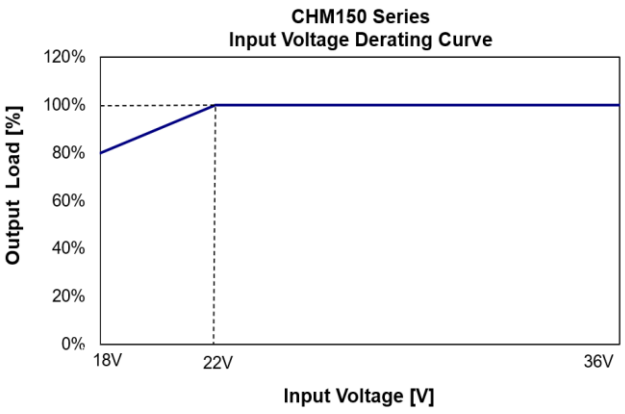
Power Derating Curve





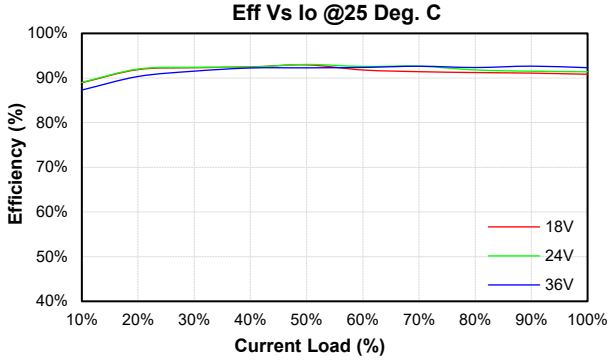




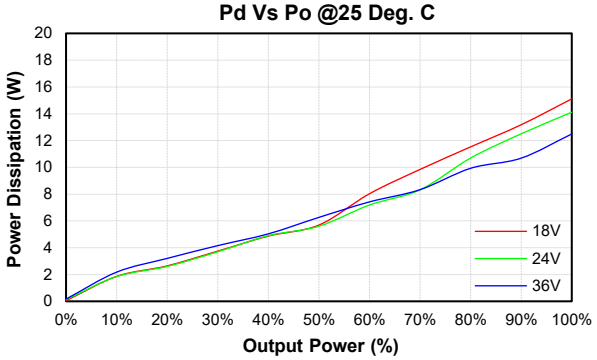


Performance Data

CHM150-24S12
Eff Vs Io @25 Deg. C



CHM150-24S12
Pd Vs Po @25 Deg. C



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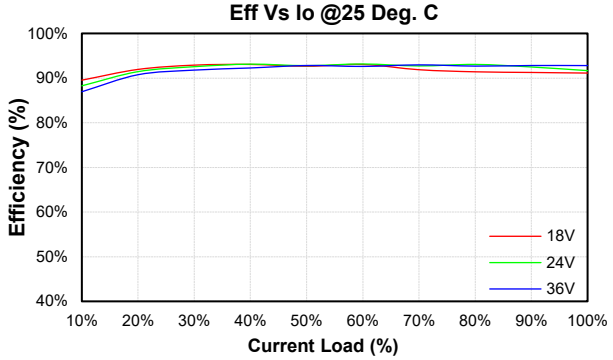

CHM150-24S15
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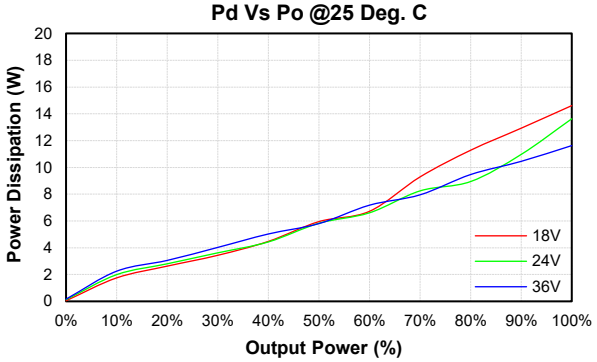
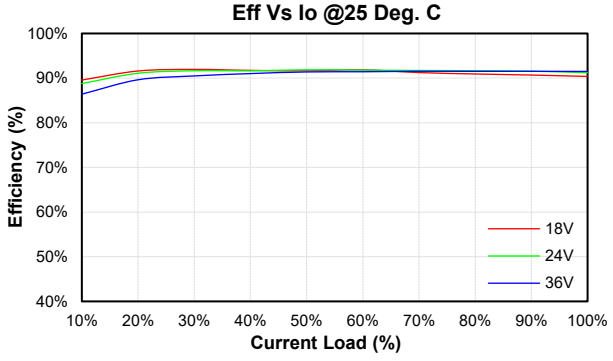
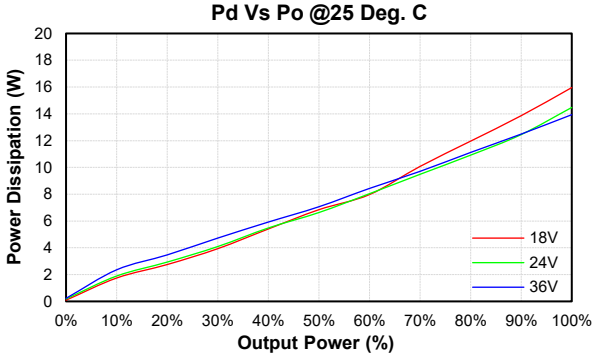
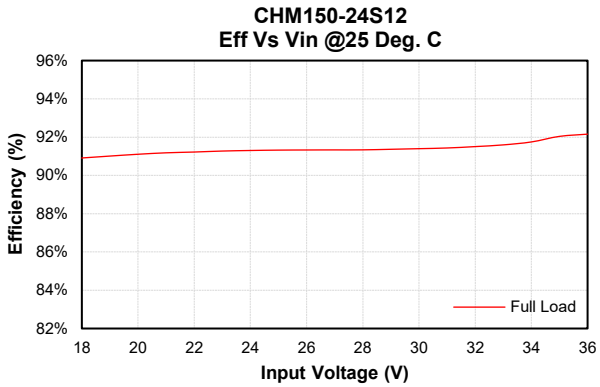


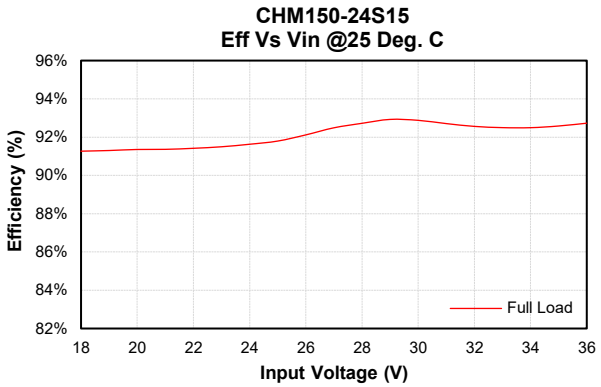
CHM150-24S24
Eff Vs Io @25 Deg. C

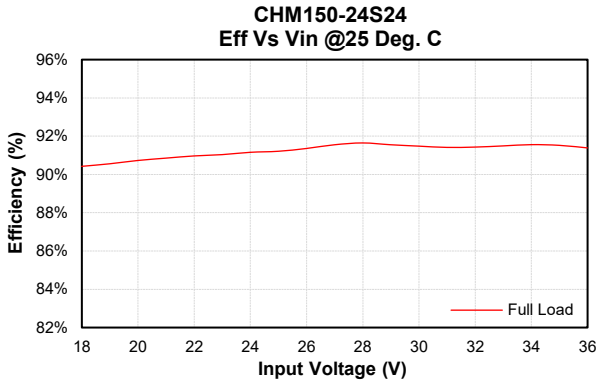


CHM150-24S24
Pd Vs Po @25 Deg. C

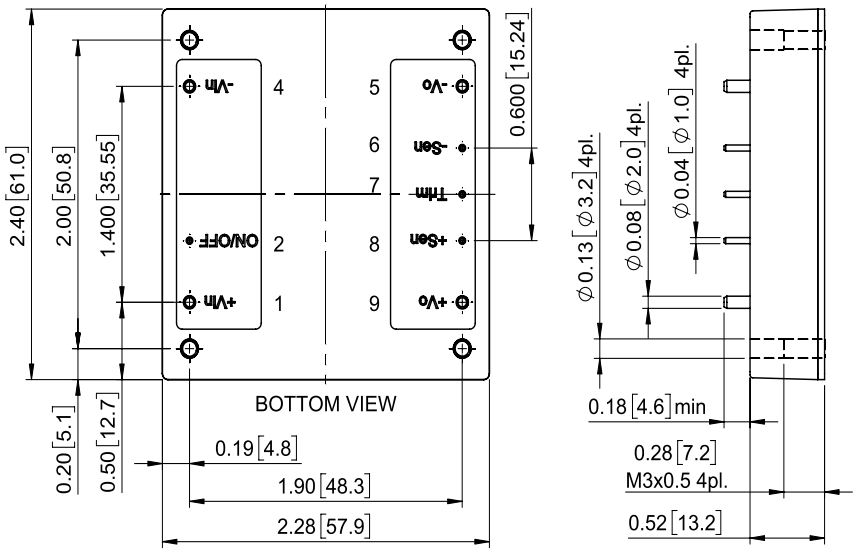



CHM150-24S12
Eff Vs Vin @25 Deg. C
Efficiency (%)
96%
94%
92%
90%
88%
86%
84%
82%
18 20 22 24 26 28 30 32 34 36
Input Voltage (V)
Full Load


CHM150-24S15
Eff Vs Vin @25 Deg. C
Efficiency (%)
96%
94%
92%
90%
88%
86%
84%
82%
18 20 22 24 26 28 30 32 34 36
Input Voltage (V)
Full Load


CHM150-24S24
Eff Vs Vin @25 Deg. C
Efficiency (%)
96%
94%
92%
90%
88%
86%
84%
82%
18 20 22 24 26 28 30 32 34 36
Input Voltage (V)
Full Load

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
4	-V Input
5	-V Output
6	-Sense
7	Trim
8	+Sense
9	+V Output

Note:Pin Size is Ø0.04±0.004 Inch [Ø1.0±0.1 mm]
Pin Size is Ø0.08±0.004 Inch [Ø2.0±0.1 mm]

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