



CHM150 Series Application Note V11 June 2026

ISOLATED DC-DC CONVERTER CHM150 SERIES APPLICATION NOTE



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1. Introduction

The CHM150 series of medical DC-DC converters offers 150 watts of output power at single output voltages of 12, 15, 24VDC with industry standard half-brick. The series features a 2:1 input voltage range of 18 to 36VDC (24VDC nominal), high efficiency of up to 91.5%, and very low no load power consumption, making it an ideal solution for energy critical systems.

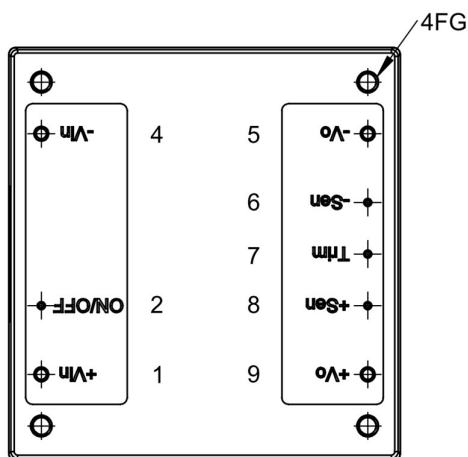
Compliant with IEC/UL 60601-1 3rd edition for 2 x MOPP, EN/IEC 60601-1-2, EN 55032, EN 55035; isolation voltage 5000VAC; very low leakage current <10uA; design meets CF rated medical applications; allowing case operating temperature range of -40°C to 100°C. An optional heat sink is available to extend the full power range of the unit.

The standard control functions include remote **on/off** (positive or negative) and +10% to -20% adjustable output voltage.

Fully protected against input UVLO (under voltage lock out), output over-current, output over-voltage, over-temperature and continuous short circuit conditions.

CHM150 series is designed primarily for medical applications, but is also suitable for distributed power architectures, telecommunications, battery operated equipment, and industrial applications.

2. Pin Function Description



No	Label	Function	Description	Reference
1	+Vin	+V Input	Positive Supply Input	Section 7.1/7.2
2	ON/OFF	Remote On/Off	External Remote On/Off Control	Section 6.5
4	-Vin	-V Input	Negative Supply Input	Section 7.1/7.2
5	-Vo	-V Output	Negative Power Output	Section 7.3/7.4
6	-Sen	-Sense	Negative Output Remote Sense	Section 6.6
7	Trim	Trim	External Output Voltage Adjustment	Section 6.7
8	+Sen	+Sense	Positive Output Remote Sense	Section 6.6
9	+Vo	+V Output	Positive Power Output	Section 7.3/7.4
	--	Mounting Insert	Mounting Insert (FG)	Section 9.5

Note:

1. Base plate can be connected to FG through M3 threaded mounting insert. Recommended torque 3Kgf-cm.
2. When using metal screws in medical applications, adequate clearance and creepage distances must be maintained. Alternatively, plastic screws may be used for mounting.
3. For the -C version, when mounting from the bottom, it is recommended to use M3 screws (head diameter: 5.5 mm max., head height: 2.15 mm max.) with nylon washers (U-5 PINGOOD or equivalent).

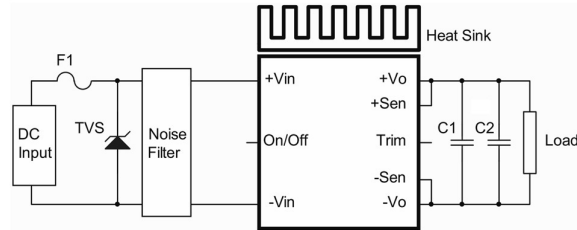


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3. Connection for Standard Use

The connection for standard use is shown below. External output capacitors (C1, C2) are recommended to reduce output ripple and noise, 10uF and 1uF ceramic capacitors for all models.



Symbol	Component	Reference
F1, TVS	Input fuse, TVS	Section 10.1
C1, C2	External capacitor on the output side	Section 7.3/7.4
Noise Filter	External input noise filter	Section 10.2
Remote On/Off	External Remote On/Off control	Section 6.5
Trim	External output voltage adjustment	Section 6.7
Heat Sink	External heat sink	Section 9.2/9.3/9.4/9.5
+Sense/-Sense	--	Section 6.6

Where:

V_{FL} is the output voltage at full load

V_{NL} is the output voltage at no load

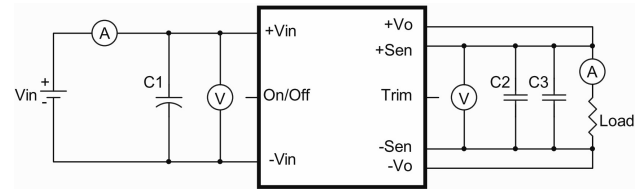
The value of line regulation is defined as:

$$Line\ reg. = \frac{V_{HL} - V_{LL}}{V_{LL}} \times 100\%$$

Where:

V_{HL} is the output voltage of maximum input voltage at full load

V_{LL} is the output voltage of minimum input voltage at full load



CHM150 Series Test Setup

C1: None

C2: 10uF/1210 ceramic capacitor

C3: 1uF/1210 ceramic capacitor

4. Test Set-Up

The basic test set-up to measure parameters such as efficiency and load regulation is shown below. When testing the modules under any transient conditions, please ensure that the transient response of the source is sufficient to power the equipment under test. We can calculate:

- Efficiency
- Load regulation and line regulation

The value of efficiency is defined as:

$$\eta = \frac{V_o \times I_o}{V_{in} \times I_{in}} \times 100\%$$

Where:

V_o is output voltage

I_o is output current

V_{in} is input voltage

I_{in} is input current

The value of load regulation is defined as:

$$Load\ reg. = \frac{V_{FL} - V_{NL}}{V_{NL}} \times 100\%$$

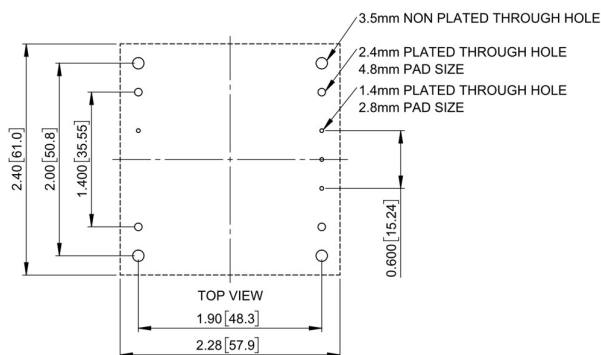


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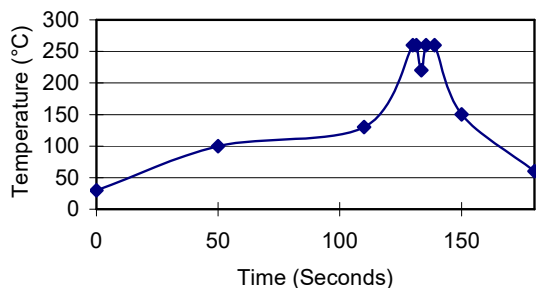
5. Recommend Layout, PCB Footprint and Soldering Information

The system designer or end user must ensure that metal and other components in the vicinity of the converter meet the spacing requirements for which the system is approved. Low resistance and inductance PCB layout traces are the norm and should be used where possible. Due consideration must also be given to proper low-impedance tracks between the power module and the input and output grounds. The recommended footprints and soldering profiles are shown below. For the -C version, the pad size near each non-plated through hole must be less than 1 mm.



Note: Dimensions are in inches [millimeters]

Lead Free Wave Soldering Profile



Hand Soldering Information:

Hand soldering is the least preferred method because the amount of solder applied, the time the soldering iron is held on the joint, the temperature of the iron, and the temperature of the solder joint are variable. The recommended hand soldering guideline is listed in following table.

Hand-Soldering Guideline

Parameter	Single-side Circuit board	Double-side Circuit board	Multi-layers Circuit board
Soldering Iron Wattage	90W	90W	90W
Tip Temp.	385+/-10°C	420+/-10°C	420+/-10°C
Soldering Time	2~6 Seconds	4~10 Seconds	4~10 Seconds

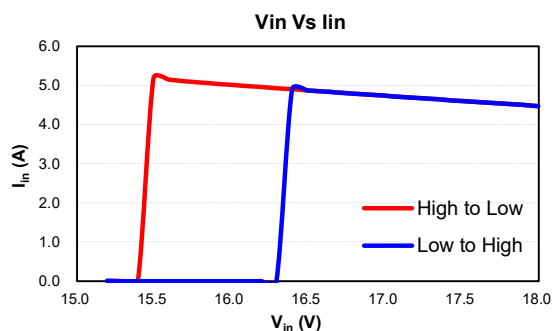
The suggested soldering process must keep the power module's internal temperature below the critical temperature of 217°C continuously.

Clean the soldered side of the module with a brush, prevent liquid from getting into the module. Do not clean by soaking the module into liquid. Do not allow solvent to come in contact with product labels or resin case as this may changed the color of the resin case or cause deletion of the letters printed on the product label. After cleaning, dry the modules well.

6. Features and Functions

6.1 UVLO (Under Voltage Lock Out)

Input under voltage lockout is standard on the CHM150 series unit. The unit will shut down when the input voltage drops below a lower threshold, and the unit will operate when the input voltage goes above the upper threshold.



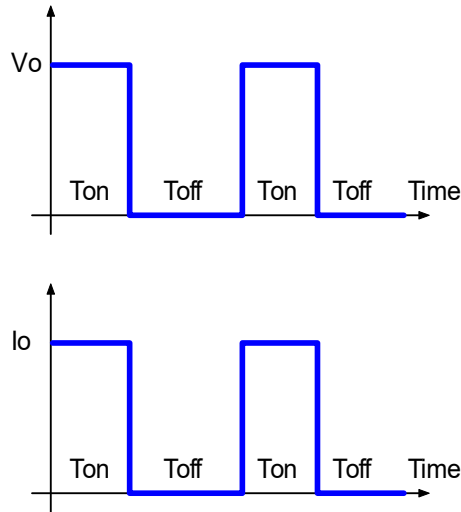


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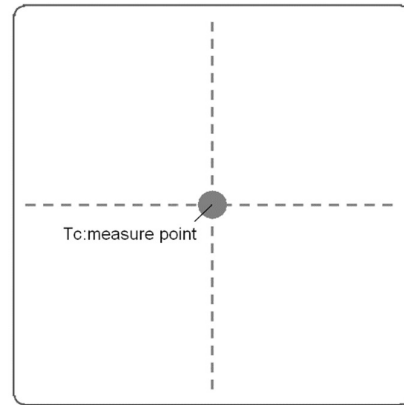
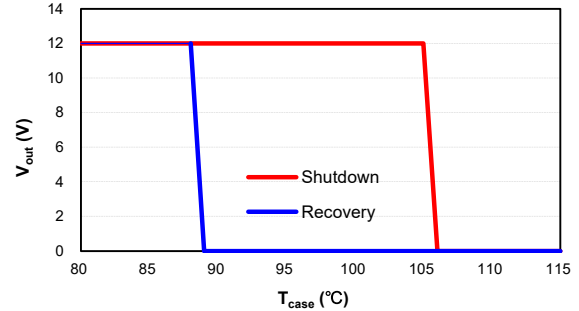
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6.2 Over Current / Short Circuit Protection

All models have internal over current and continuous short circuit protection. The unit operates normally once the fault condition is removed. At the point of current limit inception, the converter will go into hiccup mode protection.



Over Temperature Protection



6.3 Output Over Voltage Protection

The output over voltage protection consists of circuitry that internally limits the output voltage. If more accurate output over voltage protection is required, then an external circuit can be used via the remote **on/off** pin.

Note:

Please note that the device inside the power supply might fail when a voltage more than the rated output voltage is applied to the output pin. This could happen when the customer tests the over voltage protection of the unit. OVP can be tested by using the **trim up** function. Consult us for more information.

6.4 Over Temperature Protection

These modules have an over temperature protection circuit to safeguard against thermal damage. Shutdown occurs when the maximum case reference temperature is exceeded. The module will restart when the case temperature falls below the over-temperature recovery threshold. Please measure the case temperature at the center of the aluminum base plate.



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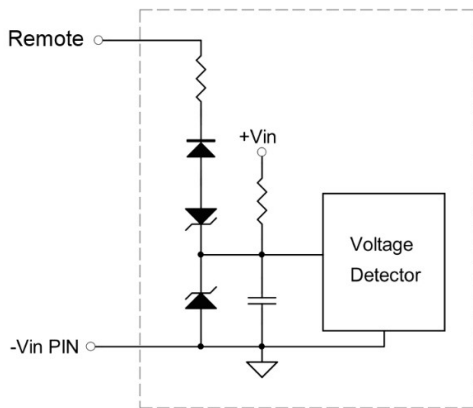
6.5 Remote On/Off

The CHM150 series allows electronic **on/off** control via the remote **on/off** feature. All models are available with “positive logic” and “negative logic” (optional) versions. The converter turns on when the remote **on/off** pin is high ($>3.5V_{dc}$ to $36V_{dc}$ or open circuit). Setting the pin low (0 to $<1.2V_{dc}$) turns the converter off. The signal level of the remote **on/off** input is defined with respect to ground. If the remote **on/off** pin is not used, leave the pin open (the converter will be on).

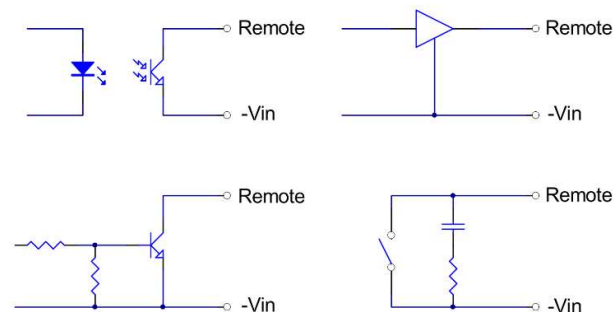
Models with part number suffix “N” are the “negative logic” remote **on/off** version. The unit turns off when the remote **on/off** pin is high ($>3.5V_{dc}$ to $36V_{dc}$ or open circuit). The converter turns on when the remote **on/off** pin is low (0 to $<1.2V_{dc}$). Note that the converter is off by default.

Logic State (Pin 2)	Negative Logic	Positive Logic
Logic Low	Module on	Module off
Logic High	Module off	Module on

The converter remote **on/off** circuit is built into the input side. The ground reference for the input side remote **on/off** circuit is the $-V_{in}$ pin. The internal connection is shown below.



Connection examples are shown below.



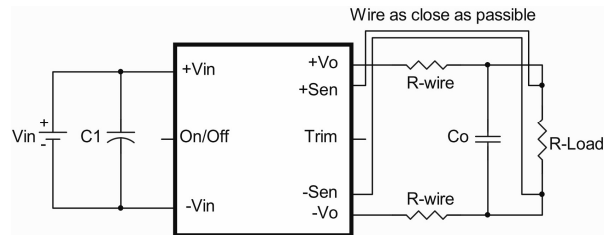
Remote On/Off Connection Examples

6.6 Output Remote Sensing

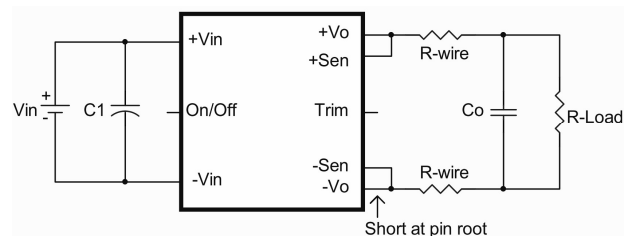
The CHM150 series converter has the capability to remotely sense both lines of its output. This feature moves the effective output voltage regulation point from the output of the unit to the point of connection of the remote sense pins. This feature automatically adjusts the real output voltage of the CHM150 series in order to compensate for voltage drops in distribution and maintain a regulated voltage at the point of load. The remote-sense voltage range is:

$$[(+V_{out}) - (-V_{out})] - [(+Sense) - (-Sense)] \leq 10\% \text{ of } V_{o_nominal}$$

When remote sense is in use, the sense should be connected by twisted-pair wire or shield wire. If the sensing patterns short, heavy current flows and the pattern may be damaged. Output voltage might become unstable due to impedance of wiring and load conditions when the length of wire exceeds 400mm. This is shown in the schematic below.



If the remote sense feature is not to be used, the sense pins should be connected locally. The $+Sense$ pin should be connected to the $+V_{out}$ pin at the module and the $-Sense$ pin should be connected to the $-V_{out}$ pin at the module. Keep wire between $+Sense$ and $+V_{out}$ and between $-Sense$ and $-V_{out}$ as short as possible. Loop wiring should be avoided. The converter might become unstable because of noise coming from poor wiring. This is shown in the schematic below.



Note:

Although the output voltage can be varied (increased or decreased) by both remote sense and trim, the maximum variation for the output voltage is the larger of the two values, not the sum of the values. The output power delivered by the module is defined as the voltage at the output terminals multiplied by the output current.



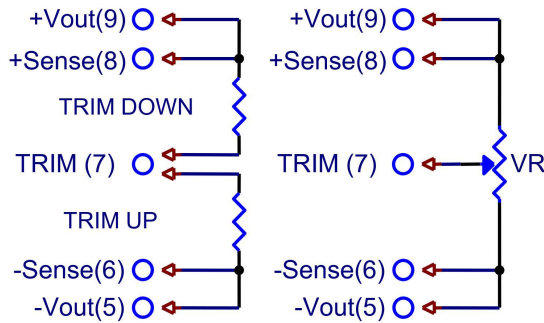
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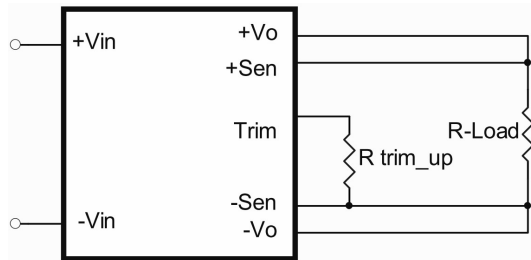
Using remote sense and trim can cause the output voltage to increase and consequently increase the power output of the module if output current remains unchanged. Always ensure that the output power of the module remains at or below the maximum rated power. Also be aware that if $V_{o,set}$ is below nominal value, $P_{out,max.}$ will also decrease accordingly because $I_{o,max.}$ is an absolute limit. Thus, $P_{out,max.} = V_{o,set} \times I_{o,max.}$ is also an absolute limit.

6.7 Output Voltage Adjustment

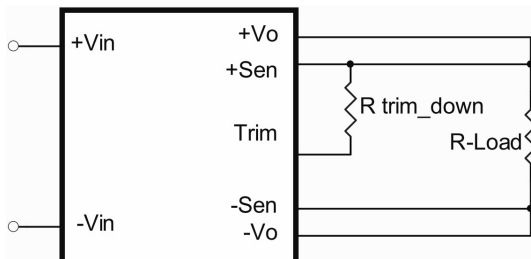
Output may be externally trimmed (+10% to -20%) with a fixed resistor or an external trim pot as shown (optional). Model specific formulas for calculating trim resistors are available upon request as a separate document.



In order to trim the voltage up or down, one needs to connect the trim resistor either between the trim pin and -Sense for trim-up or between the trim pin and +Sense for trim-down. The output voltage trim range is +10% to -20%. This is shown:



Trim-up Voltage Setup



Trim-down Voltage Setup

The CHM150-24S12 value of R_{trim_up} defined as:

$$R_{trim_up} = \frac{67.773}{2.396 \times (V_o - V_{o,nom})} - 3.9 \text{ (K}\Omega\text{)}$$

The CHM150-24S15 value of R_{trim_up} defined as:

$$R_{trim_up} = \frac{93.5}{2.4 \times (V_o - V_{o,nom})} - 3 \text{ (K}\Omega\text{)}$$

The CHM150-24S24 value of R_{trim_up} defined as:

$$R_{trim_up} = \frac{151.129}{2.32 \times (V_o - V_{o,nom})} - 3.9 \text{ (K}\Omega\text{)}$$

Where:

R_{trim_up} is the external resistor in K Ω

$V_{o,nom}$ is the nominal output voltage

V_o is the desired output voltage

For example, to trim up the output voltage of 12V module (CHM150-24S12) by 5% to 12.6V, R_{trim_up} is calculated as follows:

$$R_{trim_up} = \frac{67.773}{2.396 \times (12.6 - 12)} - 3.9 = 43.24 \text{ (K}\Omega\text{)}$$

The typical value of R_{trim_up}

Trim up (%)	12V	15V	24V
	R_{trim_up} (K Ω)		
1%	231.82	256.72	267.52
2%	113.96	126.86	131.81
3%	74.67	83.57	86.57
4%	55.03	61.93	63.96
5%	43.24	48.94	50.38
6%	35.39	40.29	41.34
7%	29.77	34.10	34.87
8%	25.56	29.47	30.03
9%	22.29	25.86	26.26
10%	19.67	22.97	23.24

The CHM150-24S12 value of R_{trim_down} defined as:

$$R_{trim_down} = \frac{168.1}{2.396 \times (V_{o,nom} - V_o)} - 12.1 \text{ (K}\Omega\text{)}$$

The CHM150-24S15 value of R_{trim_down} defined as:

$$R_{trim_down} = \frac{302.5}{2.4 \times (V_{o,nom} - V_o)} - 14 \text{ (K}\Omega\text{)}$$

The CHM150-24S24 value of R_{trim_down} defined as:

$$R_{trim_down} = \frac{912.025}{2.32 \times (V_{o,nom} - V_o)} - 23 \text{ (K}\Omega\text{)}$$



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Where:

R_{trim_down} is the external resistor in $K\Omega$

$V_{o, nom}$ is the nominal output voltage

V_o is the desired output voltage

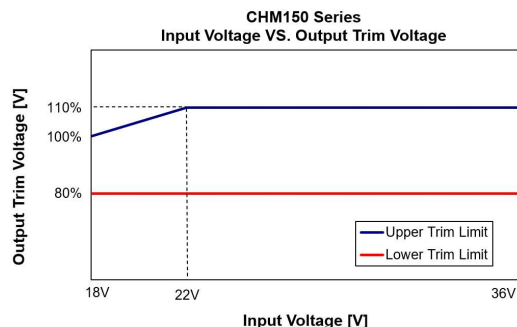
For example, to trim down the output voltage of 12V module (CHM150-24S12) by 5% to 11.4V, R_{trim_down} is calculated as follows:

$$R_{trim_down} = \frac{168.1}{2.396 \times (12 - 11.4)} - 12.1 = 104.83 (K\Omega)$$

The typical value of R_{trim_down}

Trim down (%)	12V	15V	24V
	$R_{trim_down} (K\Omega)$		
1%	572.55	826.28	1614.98
2%	280.23	406.14	795.99
3%	182.78	266.09	522.99
4%	134.06	196.07	386.49
5%	104.83	154.06	304.60
6%	85.34	126.05	250.00
7%	71.42	106.04	211.00
8%	60.98	91.03	181.75
9%	52.86	79.36	159.00
10%	46.37	70.03	140.80
11%	41.05	62.39	125.91
12%	36.62	56.02	113.50
13%	32.87	50.64	103.00
14%	29.66	46.02	94.00
15%	26.88	42.02	86.20
16%	24.44	38.52	79.37
17%	22.29	35.43	73.35
18%	20.38	32.68	68.00
19%	18.67	30.23	63.21
20%	17.13	28.01	58.90

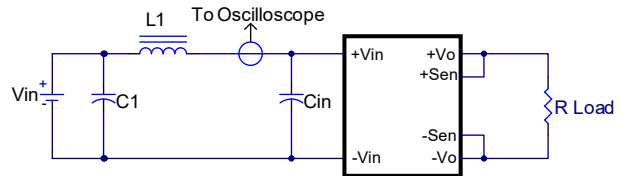
CHM150 series input range and output trim voltage curve are shown below.



7. Input / Output Considerations

7.1 Input Capacitance at the Power Module

The converters must be connected to low AC source impedance. To avoid problems with loop stability, source inductance should be low. Also, the input capacitors (C_{in}) should be placed close to the converter input pins to decouple distribution inductance. However, the external input capacitors are chosen for suitable ripple handling capability. Low ESR capacitors are a good choice. Circuit as shown below represents typical measurement methods for reflected ripple current. $C1$ and $L1$ simulate a typical DC source impedance. The input reflected-ripple current is measured with a current probe on an oscilloscope with a simulated source inductance ($L1$).



$L1$: 12uH

$C1$: None

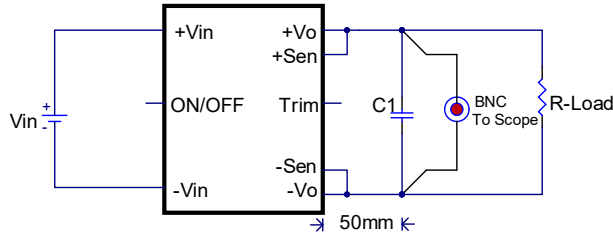
C_{in} : 220uF/100V aluminum capacitor



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7.2 Output Ripple and Noise



Note:

C1: 10uF ceramic capacitor

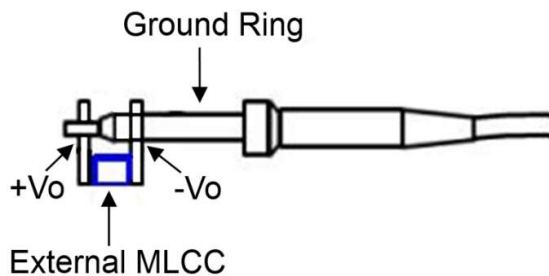
C2: 1uF ceramic capacitor

Output ripple and noise are measured with 10uF and 1uF ceramic capacitors across output. A 20 MHz bandwidth oscilloscope is normally used for the measurement.

The conventional ground clip on an oscilloscope probe should never be used in this kind of measurement. This clip, when placed in a field of radiated high frequency energy, acts as an antenna or inductive pickup loop, creating an extraneous voltage that is not part of the output noise of the converter.



Another method is shown below if a coaxial cable or BNC connector is unavailable. The noise pickup is eliminated by pressing scope probe ground ring directly against the $-V_{out}$ terminal while the tip contacts the $+V_{out}$ terminal. This makes the shortest possible connection across the output terminals.



7.3 Output Capacitance

The CHM150 series converters provide unconditional stability with or without external capacitors. For good transient response, low ESR output capacitors should be located close to the point of load ($<100\text{mm}$). PCB design emphasizes low resistance and inductance tracks in consideration of high current applications. Output capacitors with their associated ESR values have an impact on loop stability and bandwidth. Cincon's converters are designed to work with load capacitance; see technical specifications.



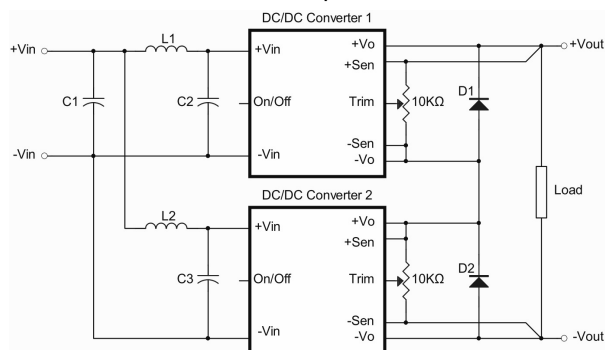
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8. Series and Parallel Operation

8.1 Series Operation

Series operation is possible by connecting the outputs of two or more units, as shown below. The output current in series connection should be lower than the lowest rated current in each power module.



Simple Series Operation Connect Circuit

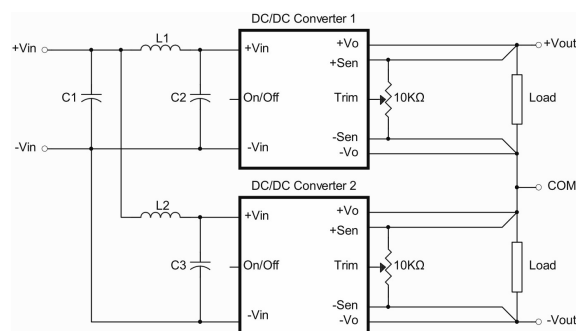
L1, L2: 1.0uH

C1, C2, C3: 470uF/100V ESR<0.04Ω

Note:

1. If the impedance of the input line is high, the capacitance of C1, C2, C3 must be higher than the values listed above. When the ambient temperature is below -20°C, use more than two of the recommended capacitors in parallel.
2. Recommend Schottky diode (D1, D2) be connected across the output of each series connected converter, so that if one converter shuts down for any reason, then the output stage won't be thermally overstressed. Without this external diode, the output stage of the shutdown converter could carry the load current provided by the other series converters, with its MOSFETs conducting through the body diodes. The MOSFETs could then be overstressed and fail. The external diode should be rated to handle the full load current for as long as the application is expected to run with any unit shut down.

Series for $\pm$ output operation is possible by connecting the outputs of two units as shown in the schematic below.



Simple $\pm$ Output Operation Connect Circuit

L1, L2: 1.0uH

C1, C2, C3: 470uF/100V ESR<0.04Ω

Note:

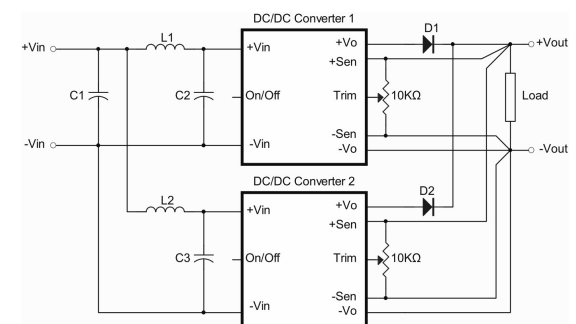
If the impedance of the input line is high, the capacitance of C1, C2, C3 must be higher than the values listed above. When the ambient temperature is below -20°C, use more than two of the recommended capacitors in parallel.

8.2 Parallel Operation

The CHM150 series parallel operation is not possible.

8.3 Redundant Operation

Parallel for redundancy operation is possible by connecting the units as shown in the schematic below. The current of each converter becomes unbalanced by a slight difference in output voltage. Make sure that the output voltage of units of equal value and the output current from each power supply do not exceed the rated current. Suggest using an external potentiometer to adjust the output voltage of each power supply.



Simple Redundant Operation Connect Circuit

L1, L2: 1.0uH

C1, C2, C3: 470uF/100V ESR<0.04Ω

Note:

If the impedance of the input line is high, the capacitance of C1, C2, C3 must be higher than the values listed above. When the ambient temperature is below -20°C, use more than two of the recommended capacitors in parallel.



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9. Thermal Design

9.1 Operating Temperature Range

The CHM150 series converters can be operated within a wide case temperature range of -40°C to 100°C. The derating curves must be considered when ascertaining the maximum power that can be drawn from the converter. The maximum power drawn from models is influenced by usual factors, such as:

- Input voltage range
- Output load current
- Forced air or natural convection
- Heat sink optional

9.2 Convection Requirements for Cooling

To predict the approximate cooling needed for the half-brick module, refer to the power derating curves in **Section 9.4**. These derating curves are approximations of the ambient temperatures and airflows required to keep the power module temperature below its maximum rating. Once the module is assembled in the actual system, the module's temperature should be monitored to ensure it does not exceed 100°C as measured at the center of the top of the case (thus verifying proper cooling).

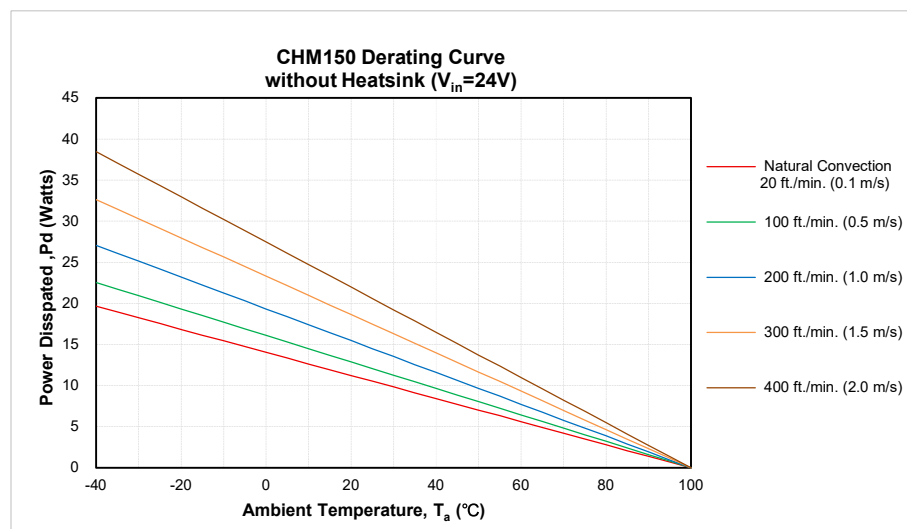
9.3 Thermal Considerations

The power module operates in a variety of thermal environments; however, sufficient cooling should be provided to help ensure reliable operation of the unit. Heat is removed by conduction, convection, and radiation to the surrounding environment. The example is presented in **Section 9.4**. The power output of the module should not be allowed to exceed rated power ($V_{o_set} \times I_{o_max.}$).

9.4 Power Derating

The operating case temperature range of the CHM150 series is -40°C to +100°C. Proper derating or cooling is required when operating the CHM150 series. Under any operating condition, the maximum case temperature should not exceed 100 °C.

The following curve is the derating curve of the CHM150 series without heatsink.



AIR FLOW RATE	TYPICAL R _{ca}
Natural Convection 20ft./min. (0.1m/s)	7.12 °C/W
100 ft./min. (0.5m/s)	6.21 °C/W
200 ft./min. (1.0m/s)	5.17 °C/W
300 ft./min. (1.5m/s)	4.29 °C/W
400 ft./min. (2.0m/s)	3.64 °C/W



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Example:

The CHM150-24S12 operates at nominal line voltage, an output current of 12.5A, and a maximum ambient temperature of 35°C.

Solution:

Given: $V_{in}=24V_{dc}$, $V_o=12V_{dc}$, $I_o=12.5A$

Determine power dissipation (P_d): $P_d = P_i - P_o = P_o(1-\eta)/\eta$, $P_d = 12 \times 12.5 \times (1-0.915)/0.915 = 13.93\text{Watts}$

Determine airflow: Given: $P_d = 13.93\text{W}$ and $T_a = 35^\circ\text{C}$

Check power derating curve: Minimum airflow=300 ft./min.

Verify:

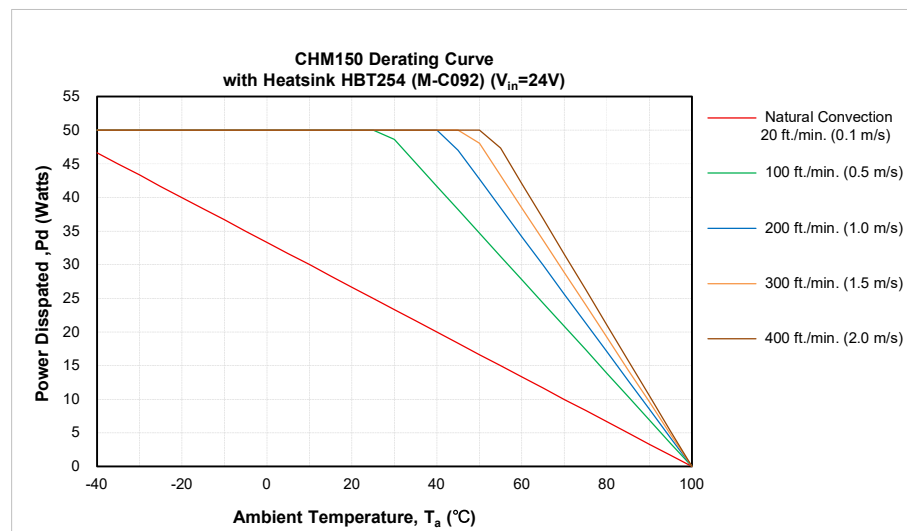
Maximum temperature rise is $\Delta T = P_d \times R_{ca} = 13.93 \times 4.29 = 59.76^\circ\text{C}$

Maximum case temperature is $T_c = T_a + \Delta T = 94.76^\circ\text{C} < 100^\circ\text{C}$

Where:

The R_{ca} is thermal resistance from case to ambient environment

T_a is ambient temperature and T_c is case temperature



AIR FLOW RATE	TYPICAL R_{ca}
Natural Convection 20ft./min. (0.1m/s)	3.0 °C/W
100 ft./min. (0.5m/s)	1.44 °C/W
200 ft./min. (1.0m/s)	1.17 °C/W
300 ft./min. (1.5m/s)	1.04 °C/W
400 ft./min. (2.0m/s)	0.95 °C/W

Example with heatsink HBT254 (M-C092):

The CHM150-24S12 operating at nominal line voltage, an output current of 12.5A, and a maximum ambient temperature of 70°C.

Solution:

Given: $V_{in}=24V_{dc}$, $V_o=12V_{dc}$, $I_o=12.5A$

Determine power dissipation (P_d): $P_d = P_i - P_o = P_o(1-\eta)/\eta$, $P_d = 12 \times 12.5 \times (1-0.915)/0.915 = 13.93\text{Watts}$

Determine airflow: Given: $P_d = 13.93\text{W}$ and $T_a = 70^\circ\text{C}$

Check above power de-rating curve: Minimum airflow=100 ft./min.

Verify:

Maximum temperature rise is $\Delta T = P_d \times R_{ca} = 13.93 \times 1.44 = 20.06^\circ\text{C}$

Maximum case temperature is $T_c = T_a + \Delta T = 90.06^\circ\text{C} < 100^\circ\text{C}$

Where:

The R_{ca} is thermal resistance from case to ambient environment

T_a is ambient temperature and T_c is case temperature



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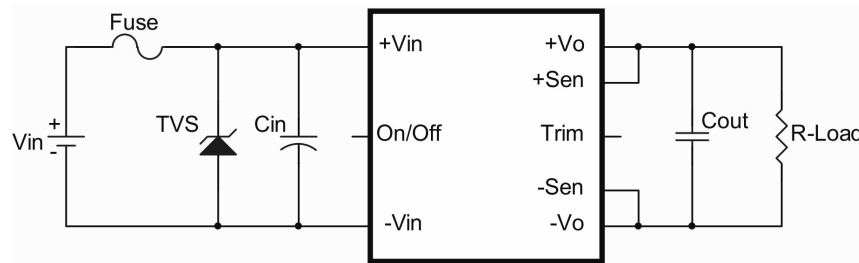
9.5 Half Brick Heat Sinks

Heat sinks assembly [refer to Datasheet-Thermal](#)

10. Safety & EMC

10.1 Input Fusing and Safety Considerations

The CHM150 series converters have no internal fuse. In order to achieve maximum safety and system protection, always use an input line fuse. We recommend a 15A time-delay fuse for all models. In addition, the circuit should include a transient voltage suppressor (TVS) diode across the input terminals to protect the unit against surge and spike voltages and input reverse voltage, as shown.



The external input capacitor (Cin) and transient voltage suppressor diode (TVS) are required if CHM150 series has to meet EN 61000-4-4, EN 61000-4-5.

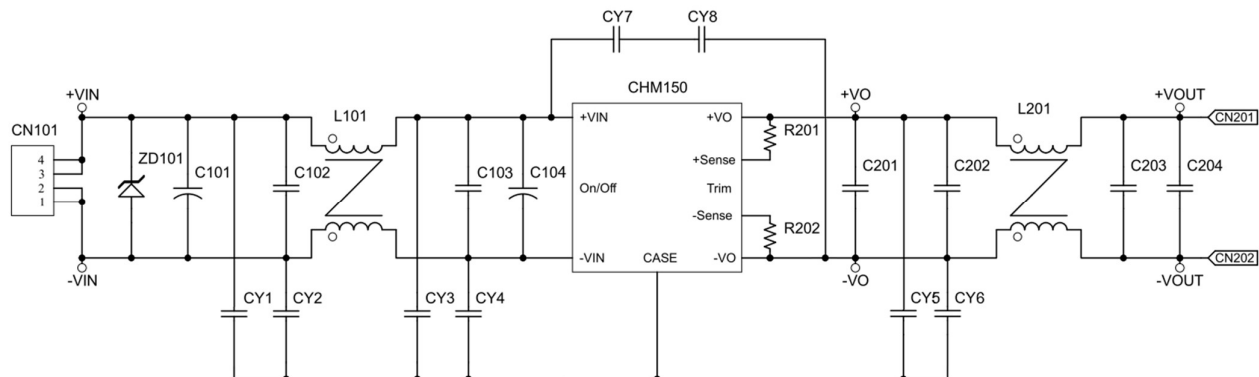
Cin: 220uF/100V (Chemi-Con KY series) aluminum capacitor is recommended.

TVS: SMDJ40A (LITTELFUSE) transient voltage suppressor is recommended.

10.2 EMC Considerations

EMI Test standard: EN 60601-1-2, EN 55032, EN/IEC 61204-3, EN/IEC 61000-6-4, FCC Part 15B, ICES-003 Issue 7
Conducted & Radiated Emission

Test Condition: Input Voltage: 24V_{dc}, Output Load: Full Load





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Components Value:

CHM150-24S12, 24S15:

ZD101	C101	C102	C103	C104	C202 C203	CY1, CY2 CY4, CY5 CY6	CY7 CY8	L101	L201
SMDJ40A	470uF/100V	0.01uF/2KV	4.7uF/100V	220uF/100V	10uF/50V	33pF Y1 Cap.	68pF Y1 Cap.	0.72mH (CMK-05)	0.12mH (CMK-07)

CHM150-24S24:

ZD101	C101	C102	C103	C104	C202 C203	CY1, CY2 CY4, CY5 CY6	CY7 CY8	L101	L201
SMDJ40A	470uF/100V	0.01uF/2KV	4.7uF/100V	220uF/100V	10uF/50V	33pF Y1 Cap.	100pF Y1 Cap	0.72mH (CMK-05)	0.52mH (CMK-06)

Note:

C101: 470uF/100V Nichicon PW(M) series aluminum capacitor or equivalent

C104: 220uF/100V Chemi-Con KY series aluminum capacitor or equivalent

C102, C103: 1812 ceramic capacitors

C202, C203: 1210 ceramic capacitors

C201, C204, CY3: NC

R201, R202: 0R



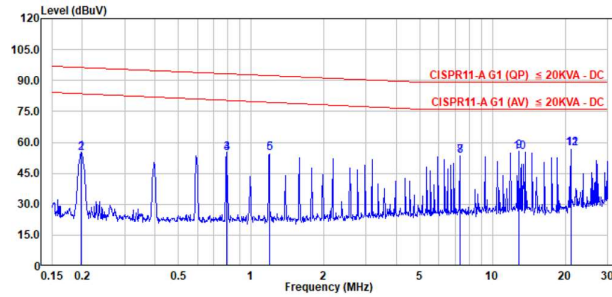
CHM150 Series

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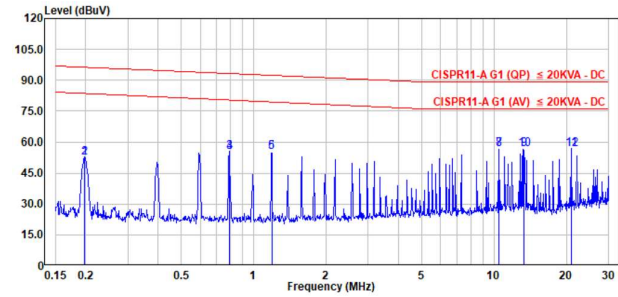
Conducted Emission (EN 60601-1-2)

CHM150-24S12

Line

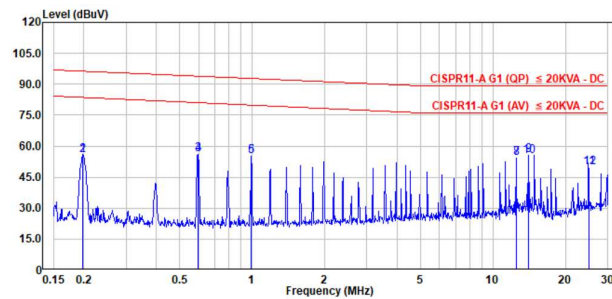


Neutral

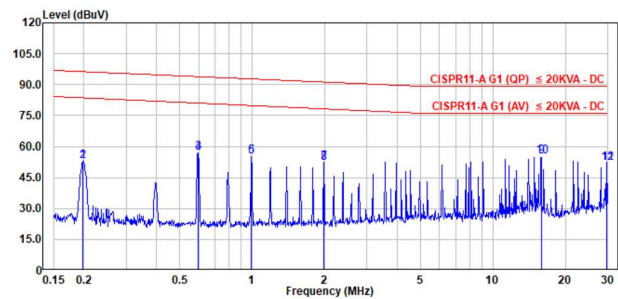


CHM150-24S15

Line

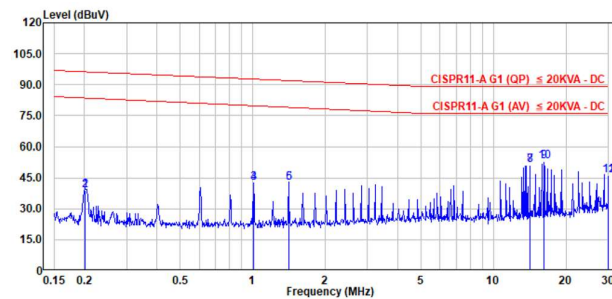


Neutral

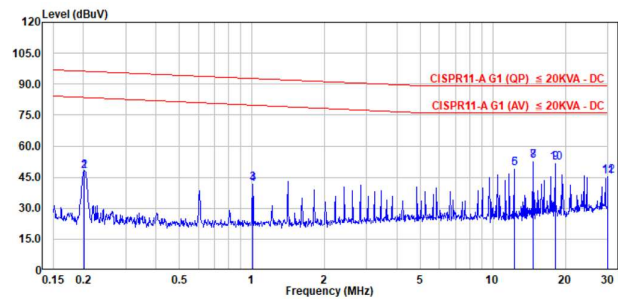


CHM150-24S24

Line



Neutral





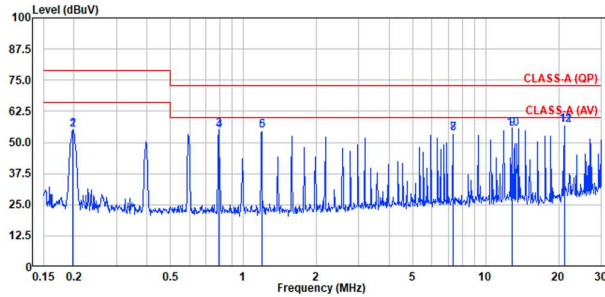
CHM150 Series

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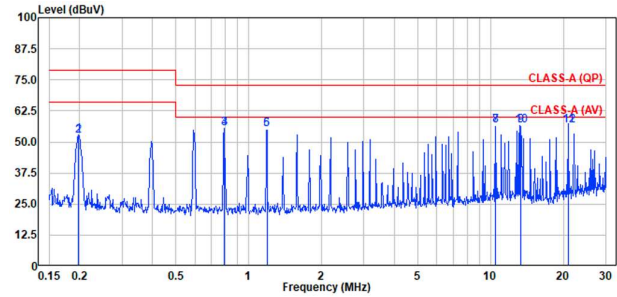
Conducted Emission (EN 55032)

CHM150-24S12

Line

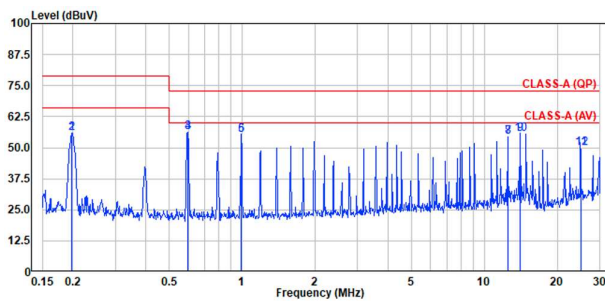


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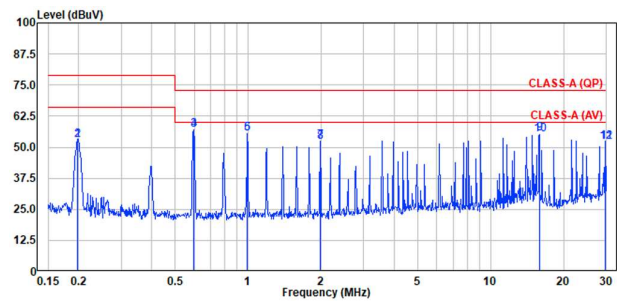


CHM150-24S15

Line

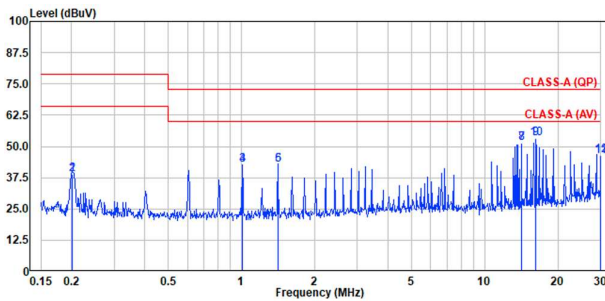


Neutral

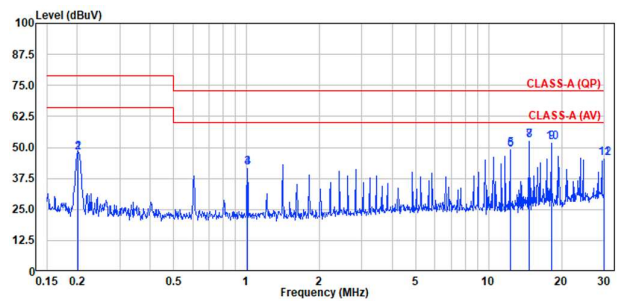


CHM150-24S24

Line



Neutral





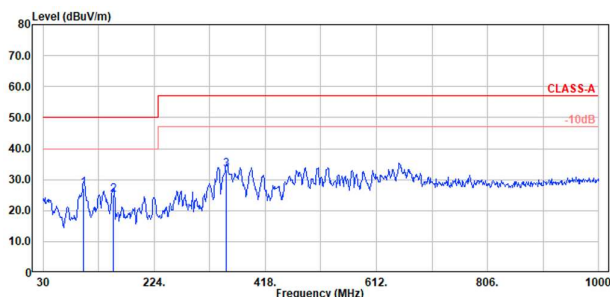
CHM150 Series

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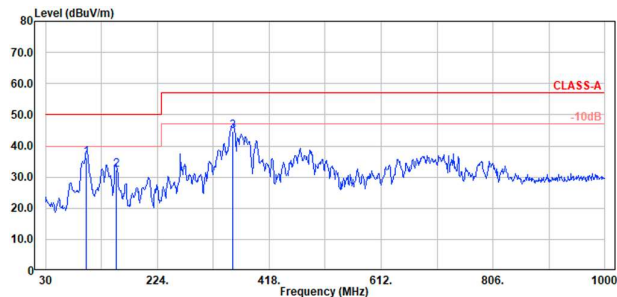
Radiated Emission (EN 60601-1-2 / EN 55032)

CHM150-24S12

Vertical

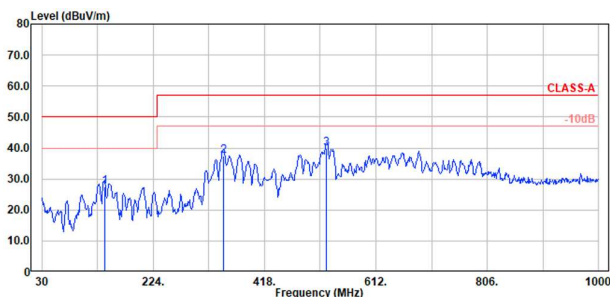


Horizontal

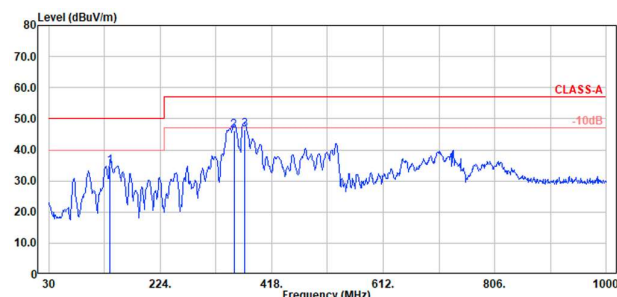


CHM150-24S15

Vertical

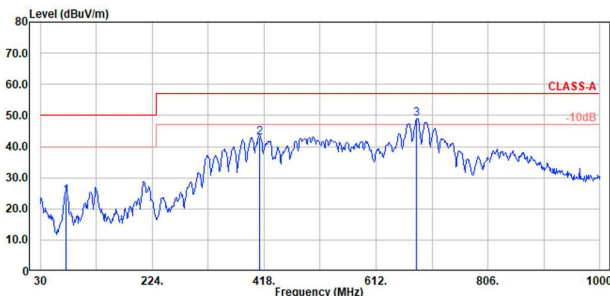


Horizontal

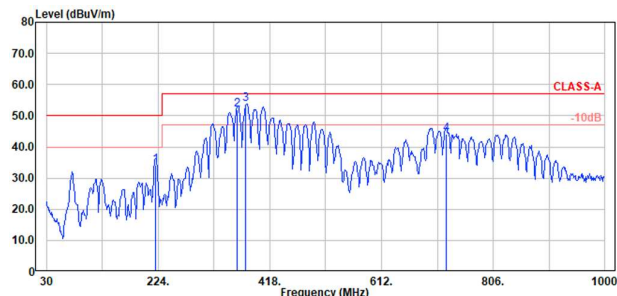


CHM150-24S24

Vertical



Horizontal



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