

**CHVM2 Series****SPECIFICATIONS**

## 1. Scope of application

This specification applies to DC input, medium to high voltage output DC/DC converter CHVM2 Series.

## 2. Model Name and Rated

Model Name	Rated Input Voltage	Rated Output
CHVM2R6-12-0470PW	DC 12V	+470V , 5.6mA (Load resistance 83.3kΩ min)
CHVM2R6-12-0470NW		-470V , 5.6mA (Load resistance 83.3kΩ min)
CHVM2-12-1000PW		+1000V , 2.0mA (Load resistance 500kΩ min)
CHVM2-12-1000NW		-1000V , 2.0mA (Load resistance 500kΩ min)
CHVM2-12-1500PW		+1500V , 1.3mA (Load resistance 1150kΩ min)
CHVM2-12-1500NW		-1500V , 1.3mA (Load resistance 1150kΩ min)
CHVM2-12-2000PW		+2000V , 1.0mA (Load resistance 2000kΩ min)
CHVM2-12-2000NW		-2000V , 1.0mA (Load resistance 2000kΩ min)

Unless otherwise specified in this specification, the input is the rated input, the output is the rated output, and the ambient temperature is 25± 5°C. This product is RoHS compliant.

## 3. Environmental conditions.

## 3-1. Temperature Range

Operating Temperature Range	-10°C ~ +60°C (Derating required for temp.50deg or higher)
Storage Temperature Range	-25°C ~ +85°C

## 3-2. Humidity Range

Operating Humidity Range	20 ~ 95%RH
Storage Humidity Range	(However, maximum wet bulb temperature 35°C,no condensation.)

## 4. Specifications/Standards

Model Name	Output Voltage	Output Current
CHVM2R6-12-0470PW	0 ~ +470V	0 ~5.6mA(Load resistance 83.3kΩ min)
CHVM2R6-12-0470NW	0 ~ -470V	
CHVM2-12-1000PW	0 ~ +1000V	0 ~2.0mA(Load resistance 500kΩ min)
CHVM2-12-1000NW	0 ~ -1000V	
CHVM2-12-1500PW	0 ~ +1500V	0 ~1.3mA(Load resistance 1150kΩ min)
CHVM2-12-1500NW	0 ~ -1500V	
CHVM2-12-2000PW	0 ~ +2000V	0 ~1.0mA(Load resistance 2000kΩ min)
CHVM2-12-2000NW	0 ~ -2000V	

The residual voltage at Vcont voltage = 0V is within 0.5% of the rated output voltage at rated input and rated load.

4-1. Input Conditions

Model Name	Input Voltage	Input Current
CHVM2R6-12-0470PW	DC 10.8 ~ 13.2V (Rated:DC 12.0V)	390mA typ
CHVM2R6-12-0470NW		390mA typ
CHVM2-12-1000PW	DC 10.8 ~ 16.5V (Rated:DC 12.0V)	280mA typ
CHVM2-12-1000NW		280mA typ
CHVM2-12-1500PW		290mA typ
CHVM2-12-1500NW		290mA typ
CHVM2-12-2000PW		340mA typ
CHVM2-12-2000NW		340mA typ

4-2. Output characteristics and attached functions

Function	Specification	Condition
Output Voltage Setting Accuracy	±5%(max)	External Voltage 470V Type:3.76V 1k~2kV Type:4.0V
Constant Voltage Accuracy	Line Regulation	470V Type : 0.03%(typ)/0.1%(max) 1k~2kV Type : 0.03%(typ)/0.06%(max)
	Road Regulation	470V Type : 0.08%(typ)/0.3%(max) 1k~2kV Type : 0.03%(typ)/0.06%(max)
	Temperature Regulation	±0.01%/°C(typ)
Ripple/Noise	470V Type 40mVp-p(typ)/150mVp-p(max) 1k~1.5kV Type 30mVp-p(typ)/100mVp-p(max) 2kV Type 50mVp-p(typ)/150mVp-p(max)	Input Voltage Range 470V Type:10.8~13.2V 1k~2kV Type:10.8~16.5V  Load Range : 0 ~ 100%  Temp. Range : -10~+50°C  BW=20MHZ
Over Current Protection	Hold back characteristic auto resist circuit operates at 105% or more	Constant Voltage Accuracy
Over Voltage Protection	Impossible	
ON/OFF Control	Possible	

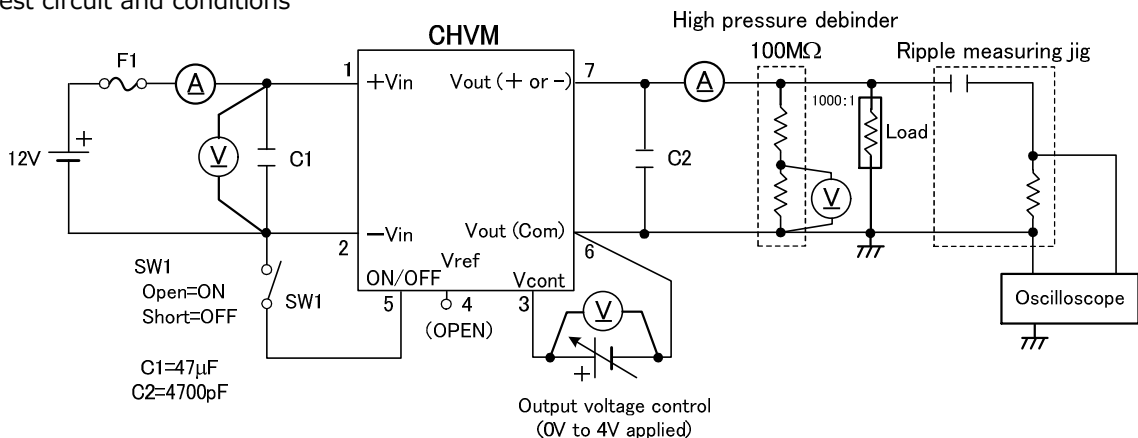
※4-4. Refer to Test Circuit and Conditions

4-3. Output Voltage Control Conditions

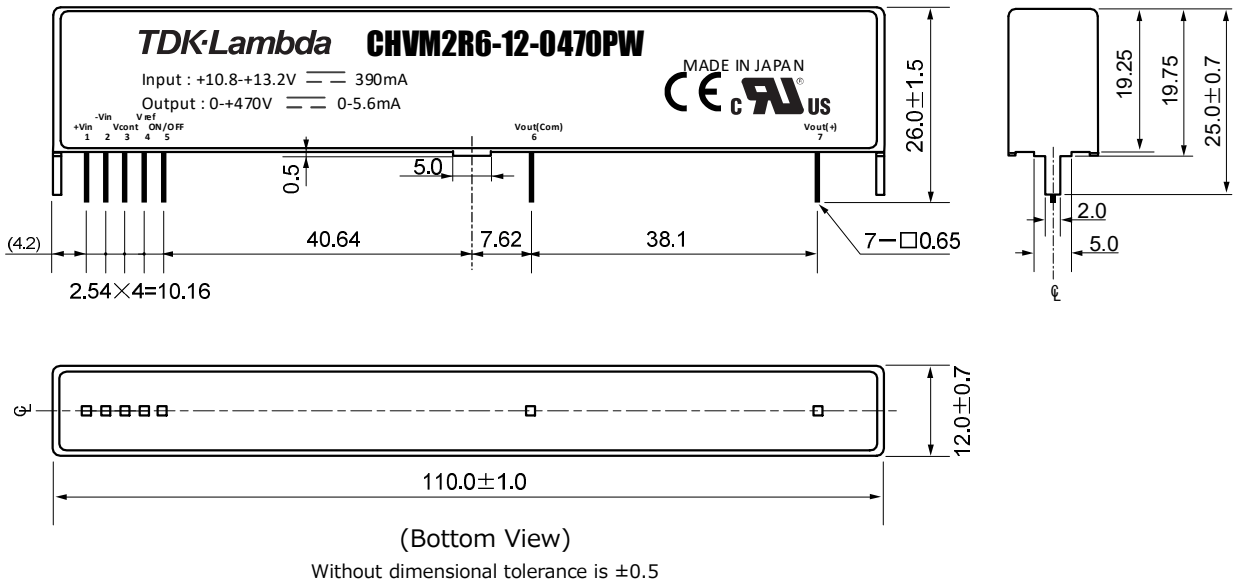
External Voltage Control and Volume Control

CHVM2 Series	
External Voltage Control	Range : 470V Type= DC 0~3.76V , 1k~2kV Type=DC 0~4.0V
External Volume Control	5.0kΩ Variable Resistor

4-4. Test circuit and conditions



5. External dimensions , Terminal description and Lot notation



Pin No	Terminal Pin Name	Function
1	+Vin	Input
2	-Vin	
3	Vcont	Output Voltage Control
4	Vref	Reference Voltage
5	ON/OFF	ON/OFF Control
6	Vout(Com)	Output
7	Vout(+ or -)	

- 1) 5-sided coating Nickel case
- 2) -Vin , Vout(Com) and Case are internally connected
- 3) Lot notation

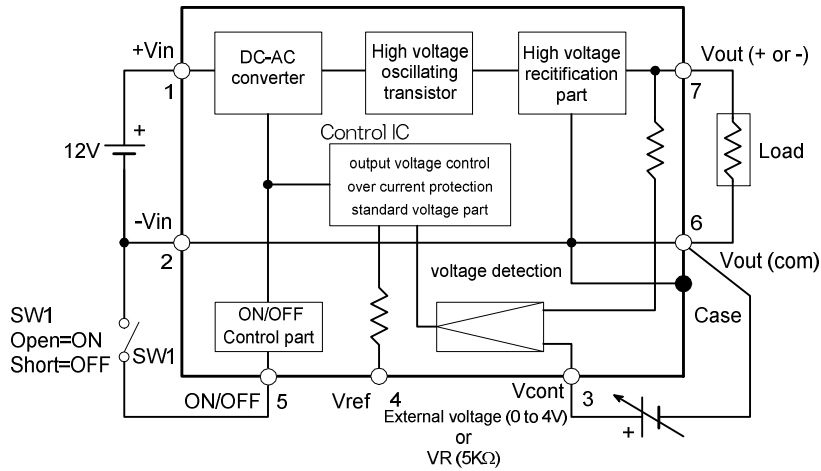
Serial label notation: 7 digits

Y: Manufacturing year notation  
 (Last two digits of the year)  
 S: Serial number  
 (Management number 5 digits)

18 02110 (2018 serial number 2110 product)  
 Y S

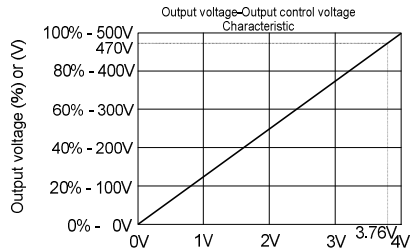
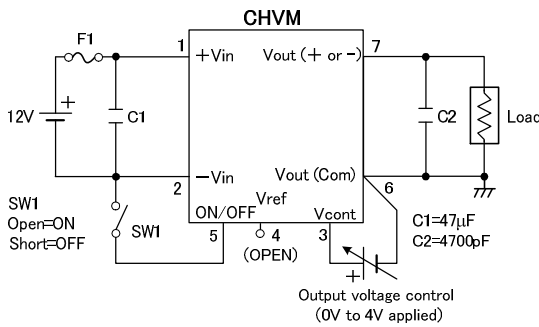
Ex.  
 1900123 (2019 serial number 123 product)  
 2000012 (2020 serial number 12 product)

6. Block diagram



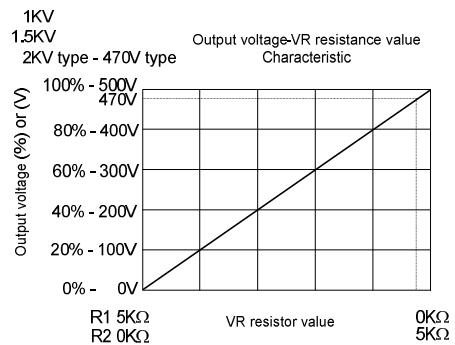
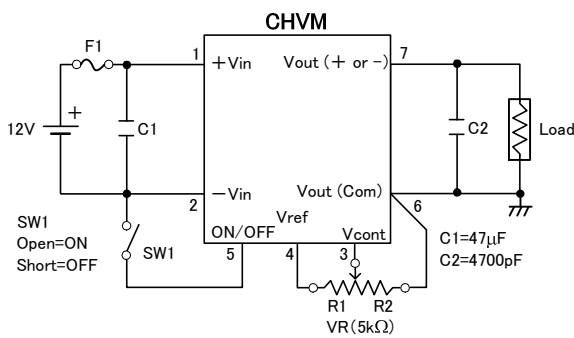
7. How to use

7-1. Output voltage control by external voltage



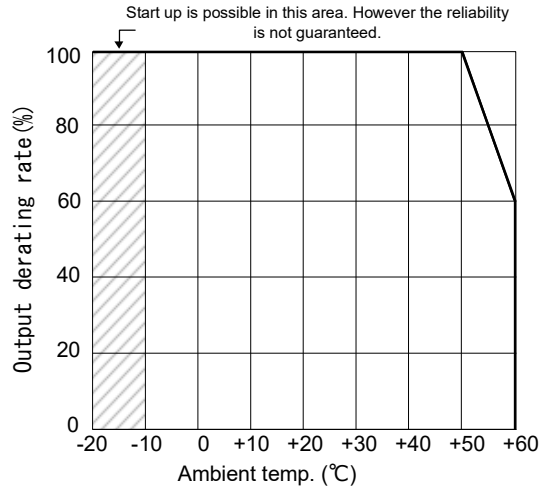
Do not apply more than 4V + 5% to the voltage applied to Vcont.

7-2. Output voltage control with variable resistor



In the output voltage vs. VR resistance value characteristic graph, the resistance values of R1 and R2 are reference values. When setting the output voltage to a fixed output with a fixed resistor, first decide R1 and R2 with the variable resistor. Use a variable resistor with good temperature characteristics. The resistance value of the variable resistor is 5.0kΩ, 4.0V is applied to the Vcont terminal, and the output voltage is set to 100%. When controlling the output voltage with a variable resistor, the tolerance of this resistance value has a large effect on the output voltage, so set the resistance value to 5.0 kΩ ± 5%.

8. Temperature Derating



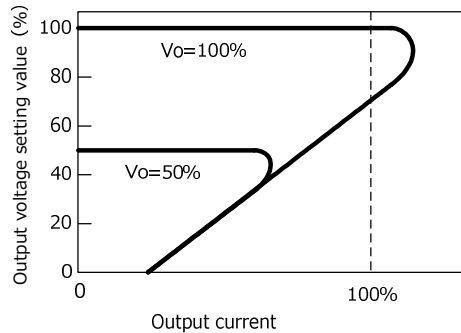
9. Over current protection

An over current protection circuit is internal as protection against over loads and load shorts.

If the over load or output is short-circuited, the output voltage will drop.

The output voltage will be automatically restored if the cause is removed.

The over current characteristic is a fold back characteristic. As the output voltage setting value decreases, the over current operation point also decreases, so be careful of the load resistance.



10. ON / OFF Control

The output voltage can be controlled externally by opening and closing the ON / OFF pin and -Vin.

Between ON/OFF Terminal (5) and -Vin(2)

Open : Output ON

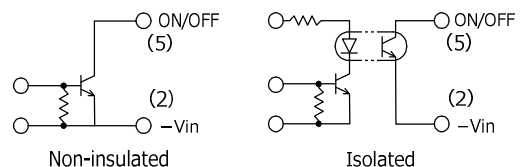
Short : Output OFF (0 to 0.4V, 1mA max)

When not using ON / OFF control, make a short.

Since chattering of the ON / OFF pin affects the output voltage, make sure there is no chattering.

The output residual voltage when the output is turned off by ON / OFF control is within 0.5%

(At the time of input / output rating).



11. Soldering conditions

Perform the soldering conditions for each part within the following conditions.

- |                   |            |       |
|-------------------|------------|-------|
| 1) Soldering iron | 340~360deg | 5sec  |
| 2) Solder dip     | 230~260deg | 10sec |

12. About cleaning

This converter cannot be washed as a whole. For unavoidable cleaning, use IPA to wash only the solder side with a hand brush.

13. Warranty

The warranty period is one year, and if the product is liable for any failure during the warranty period, we will repair or replace it free of charge.

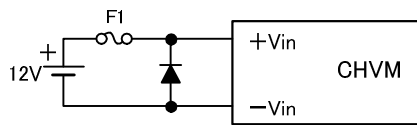
14. Other matters

14-1. If any doubt arises in this specification, it will be decided after consultation.

14-2. The test report is not attached.

14-3. Precautions for use

- 1) The output of this product cannot be used in series or in parallel.
- 2) Please avoid using the product under overload condition or short-circuiting output for a long time as it may cause malfunction.
- 3) The output voltage is controlled by the external control voltage (Vcont terminal). Consider the fluctuation rate and ripple noise of the Vcont pin as they are reflected in the output voltage.
- 4) Since high voltage is generated in this converter, consider the high voltage output and the creepage and clearance of the case and low voltage part when mounting.
- 5) Be careful of the input reverse connection.  
Reverse connection of input voltage may damage the converter. If there is a possibility of reverse connection, connect a fuse and diode to the input terminal as shown below.

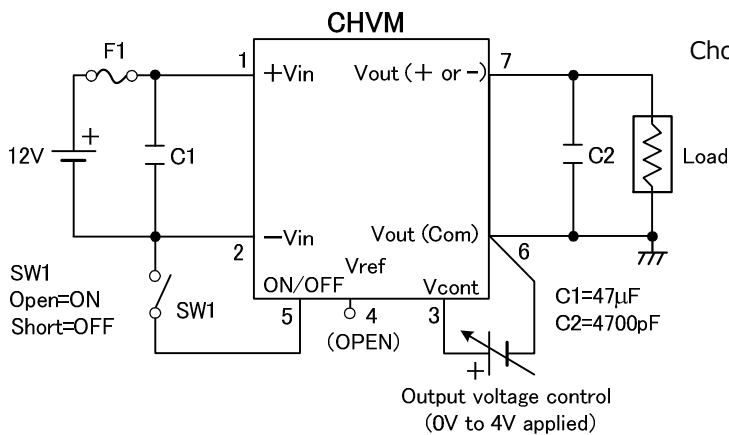


- 6) The CHVM series does not have a built-in fuse.  
Be sure to attach externally to improve safety.  
Please use a fuse.

15. Safety standard

The CHVM series has attained the UL62368-1, CSA62368-1, UL60950-1, CSA60950-1 certification and CE marked.

When using the CHVM series as a Recognized certified product please mount an input fuse as shown below. CE marking (low voltage directive, RoHS directive)



- Choose a fuse(F1) from below:
- UL Listed products
  - DC250V, Rated current 2A type