TDK-Lambda

CHVM1R5 Series   SPECIFICATIONS

1. Scope of application

This specification applies to DC input, medium to high voltage output DC/DC converter CHVM1R5 Series.

2. Model Name and Rated

Model Name	Rated Input Voltage	Rated Output
CHVM1R5-12-1000P		+1000V , 1.5mA (Load resistance 666.7kΩ min)
CHVM1R5-12-1000N		-1000V , 1.5mA (Load resistance 666.7kΩ min)
CHVM1R5-12-1500P		+1500V , 1.0mA (Load resistance 1500kΩ min)
CHVM1R5-12-1500N	DC 12V	-1500V , 1.0mA (Load resistance 1500kΩ min)
CHVM1R5-12-2000P		+2000V , 0.7mA (Load resistance 2857kΩ min)
CHVM1R5-12-2000N		-2000V , 0.7mA (Load resistance 2857kΩ 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 ～ +50°C

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
CHVM1R5-12-1000P	0 ～ +1000V	0 ～1.5mA(Load resistance 666.7kΩ min)
CHVM1R5-12-1000N	0 ～ -1000V	
CHVM1R5-12-1500P	0 ～ +1500V	0 ～1.0mA(Load resistance 1500kΩ min)
CHVM1R5-12-1500N	0 ～ -1500V	
CHVM1R5-12-2000P	0 ～ +2000V	0 ～0.7mA(Load resistance 2857kΩ min)
CHVM1R5-12-2000N	0 ～ -2000V	

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

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4-1. Input Conditions

Model Name	Input Voltage	Input Current
CHVM1R5-12-1000P		220mA typ
CHVM1R5-12-1000N		220mA typ
CHVM1R5-12-1500P	DC 11.0 ～ 13.0V	230mA typ
CHVM1R5-12-1500N	(Rated:DC 12.0V)	250mA typ
CHVM1R5-12-2000P		280mA typ
CHVM1R5-12-2000N		280mA typ

4-2. Output characteristics and attached functions

| Function		Specification	Condition
Output Voltage Setting Accuracy		±2%(max)	External Voltage : 6.0V
Constant Voltage Accuracy	Line Regulation	0.01%(typ) 0.02%(max)	Input Voltage Range: 11.0～13.0V
	Road Regulation	0.02%(typ) 0.04%(max)	Load Range : 0 ～ 100%
	Temperature Regulation	70ppm/°C(typ)	Temp. Range : -10～+50°C

Ripple/Noise		1kV Type
		  5mVp-p(typ)/15mVp-p(max)
		1.5kV Type
		  7mVp-p(typ)/25mVp-p(max)
		2kV Type
		  10mVp-p(typ)/30mVp-p(max)
			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
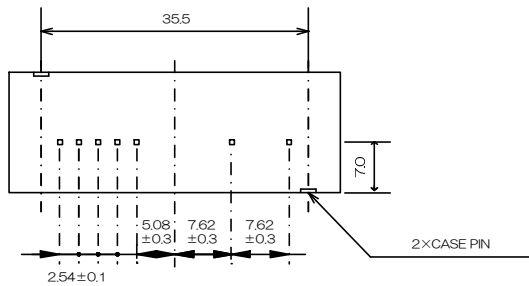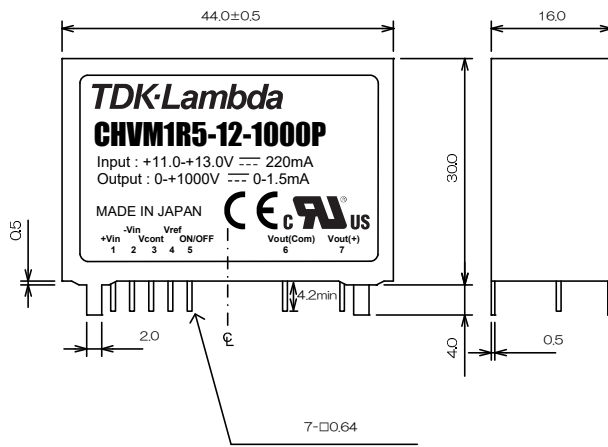
4-3. Output Voltage Control Conditions

External Voltage Control and Volume Control

	CHVM1R5 Series
External Voltage Control	Range : DC 0～6.0V
External Volume Control	5.0kΩ Variable Resistor

4-4. Test circuit and conditions

TDK-Lambda
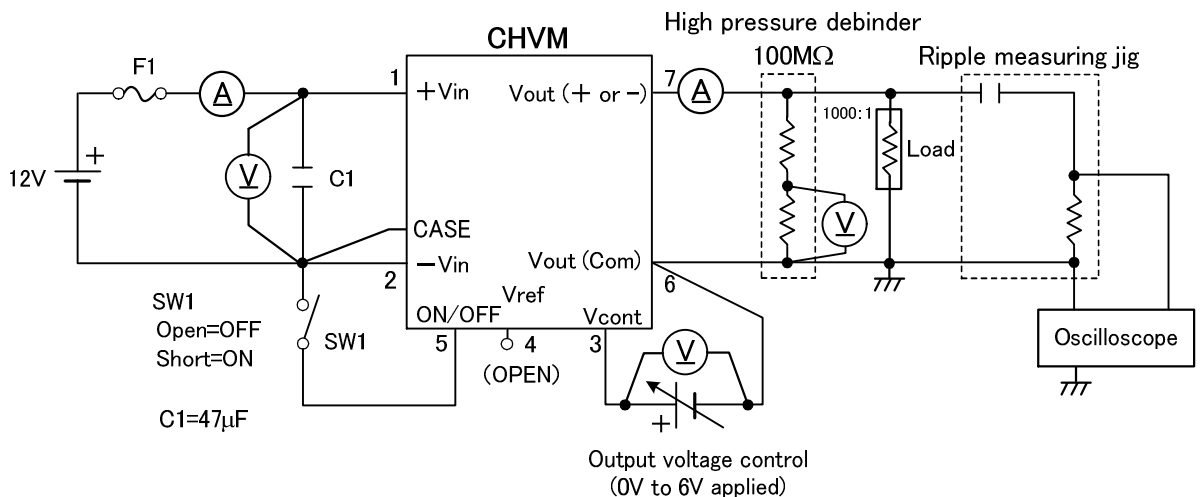
5. External dimensions,Terminal description and Lot notation

(Bottom View)

Without dimensional tolerance is ±0.5

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(+)	

1）5-sided shielded metal case

2）−Vin and Vout(Com) are internally connected

3）Lot notation

　3 digit or 4 digit alphanumeric notation

　2 0 N 2
　Y M N　Y: Year of manufacture
　　　　　　　(Last two digits of the year)

　　　　　　M: Manufacturing month
　　　　　　　(Jan～Sep=1～9、Oct=O、Nov=N、Dec=D)

　　　　　　N: Manufacturing control serial number
　　　　　　　　Indicate the lot number of the month
　　　　　　　　First Lot: No notation
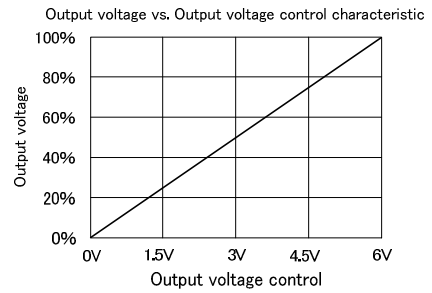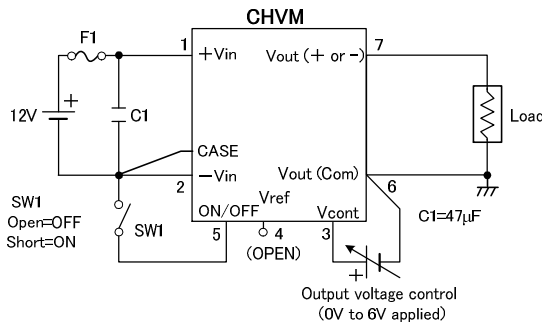　　　　　　　　After the second lot:Second,Third…

Ex.
　191: January 2019 First lot production
　20O2: October 2020 Second lot production
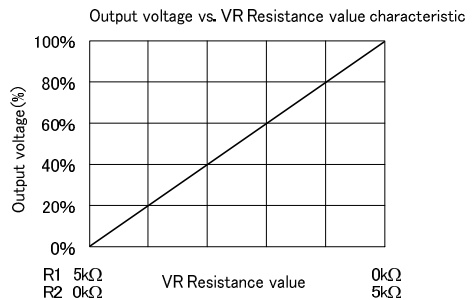
6. Block diagram
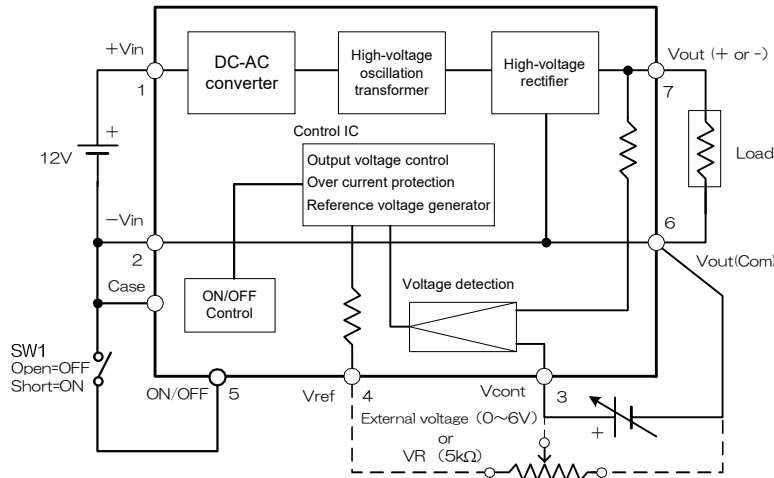
7. How to use

7-1. Output voltage control by external voltage

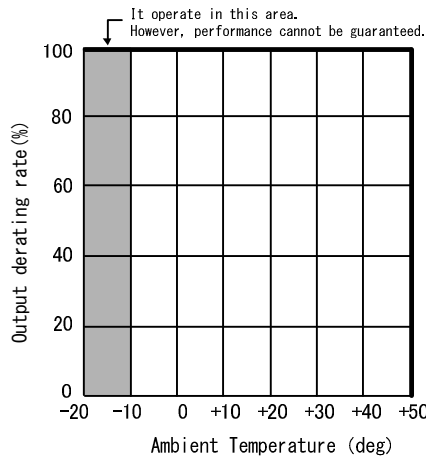Output voltage vs. Output voltage control characteristic

Do not apply more than 6V + 3% to the voltage applied to Vcont.

7-2. Output voltage control with variable resistor

Output voltage vs. VR Resistance value characteristic
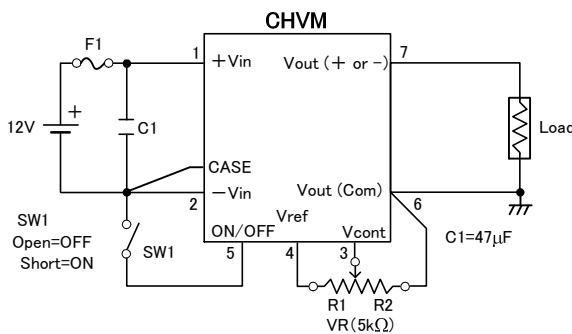
In the output voltage vs. VR resistance value characteristic graph, the resistance values of R1 and R2 are reference values. When setting the output voltage to a fixed output with a fixed resistor, first decide R1 and R2 with the variable resistor. Use a variable resistor with good temperature characteristics.

The resistance value of the variable resistor is 5.0kΩ, 6.0V 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%.

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8. Temperature Derating

It operate in this area.
However, performance cannot be guaranteed.

Output derating rate(%)

Ambient Temperature (deg)

9. Over current protection

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

If the overload 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 foldback characteristic. As the output voltage setting value decreases,

the over current operation point also decreases, so be careful of the load resistance.

Output voltage setting value (%)

Vo=100%

Vo=50%

Output current
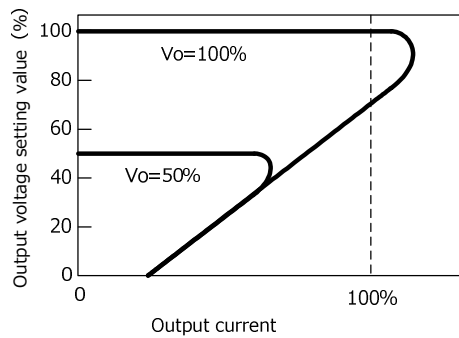
10. ON / OFF Control

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 OFF

Short : Output ON (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).

ON/OFF (5)

(2)
−Vin

Non-insulated

ON/OFF (5)

(2)
−Vin

Isolated
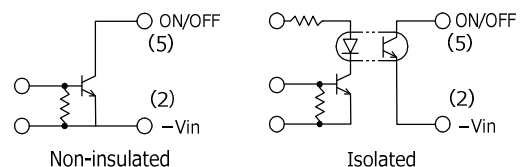
11. Soldering conditions

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.
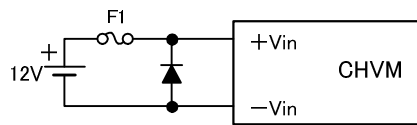

6） The CHVM series does not have a built-in fuse.
Be sure to attach externally to improve safety.
Please use a fuse.

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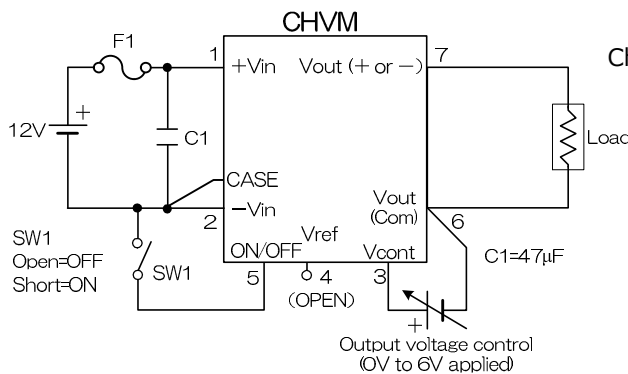
Choose a fuse(F1) from below:
・UL Listed products
・DC250V, Rated current 2A type