

The C14210-14 is the world's smallest\* surface-mount high voltage power supply module with a stabilizing circuit. Despite its compact size, the C14210-14 provides a maximum output of -1100 V at 0.4 mA with an input voltage ranging from +3 V to +5 V. The C14210-14 also offers low ripple / noise (50 mVp-p).

\* As of April, 2022 by in-company research



## FEATURES

- Compact size (W × H × D): 15 mm × 7 mm × 15 mm
- Input voltage: +3 V to +5 V
- Maximum output: -1100 V / 0.4 mA
- Low ripple: 50 mVp-p
- Surface mount type (Reflow only)

## APPLICATIONS

- For operating photomultiplier tubes
- For operating opto-semiconductor detectors

## SPECIFICATIONS

Parameter	Value	Unit
Input voltage range (V <sub>DD</sub> )	+3.0 to +5.0	V
Input current	Typ. 140 <sup>①</sup> / 235 <sup>②</sup>	mA
Specification guaranteed output voltage range	-200 to -1100	V
Output current	0.4	mA
Output voltage rise time <sup>③</sup>	150	ms
Line regulation	Typ. ±0.01	%
Load regulation	Typ. ±0.01	%
Temperature coefficient	Typ. ±0.02	%/°C
Ripple / Noise (p-p) <sup>④</sup>	Typ. 50	mV
Output voltage control	by external controlling voltage (V <sub>cont</sub> : +0.2 V to +1.1 V) by external potentiometer (10 kΩ or more)	—
Output voltage setting (absolute value)	-1000 × Controlling voltage	V
V <sub>ref</sub> output voltage <sup>⑤</sup>	Typ. +1.2	V
Operating ambient temperature <sup>⑥</sup>	0 to +50	°C
Weight	4	g
Protective functions	Output overcurrent protection / Excessive controlling voltage input	—

- NOTE:** ① V<sub>DD</sub>=+5 V, at maximum output voltage and current  
 ② V<sub>DD</sub>=+3 V, at maximum output voltage and current  
 ③ Rise time (0 %→99 %)  
 ④ 5 kHz or more  
 ⑤ Load resistance: 10 kΩ or more  
 ⑥ At ambient humidity below 80 % (no condensation)

# HIGH VOLTAGE POWER SUPPLY MODULE C14210-14

Figure 1: Dimensional outline (Unit: mm)

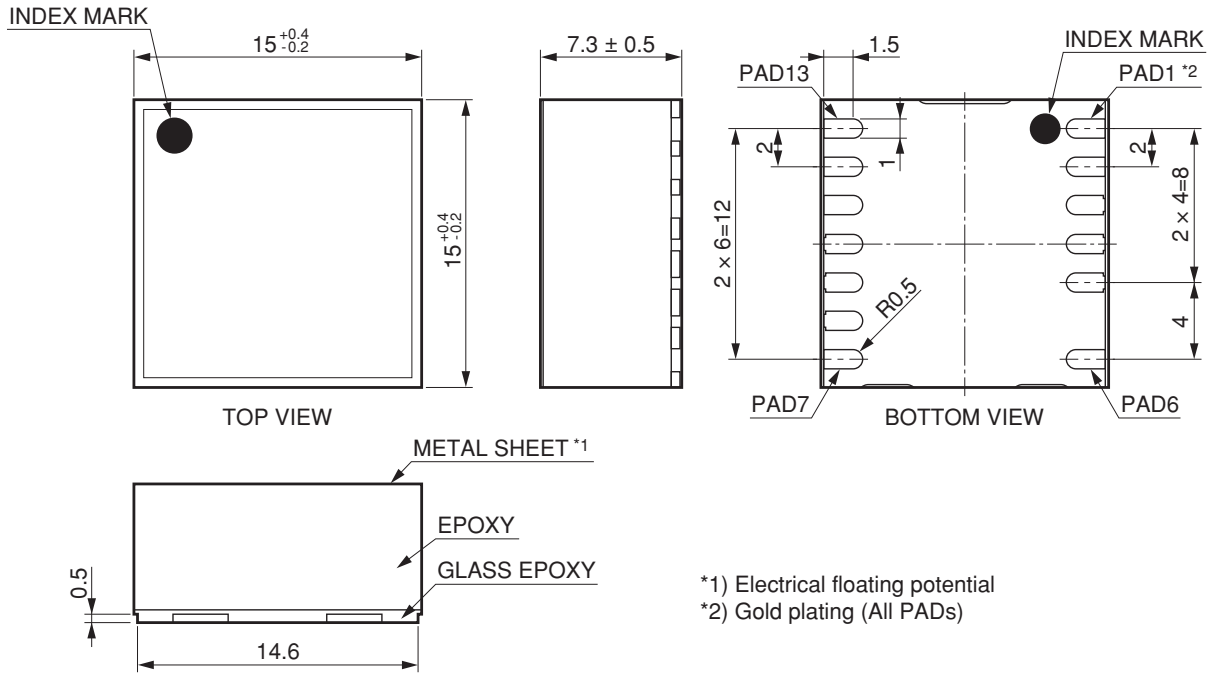


Figure 2: Pin configuration

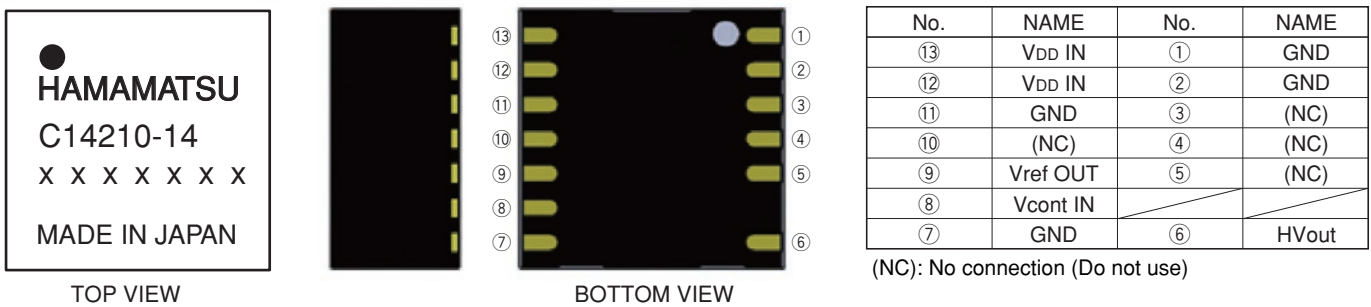


Figure 3: Block diagram

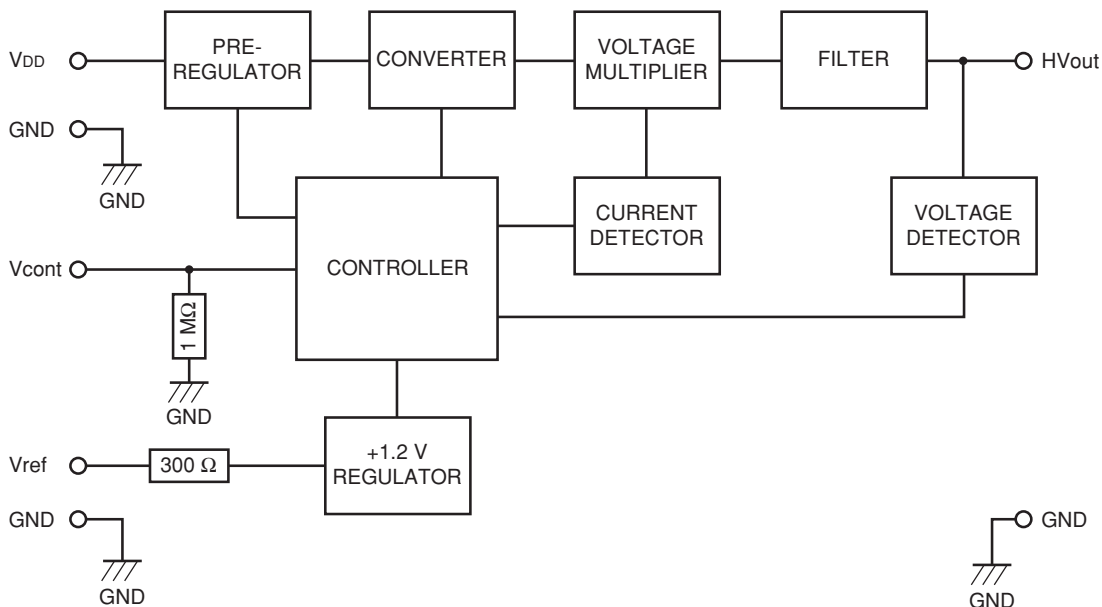


Figure 4: Ripple / Noise characteristics (Typical value)

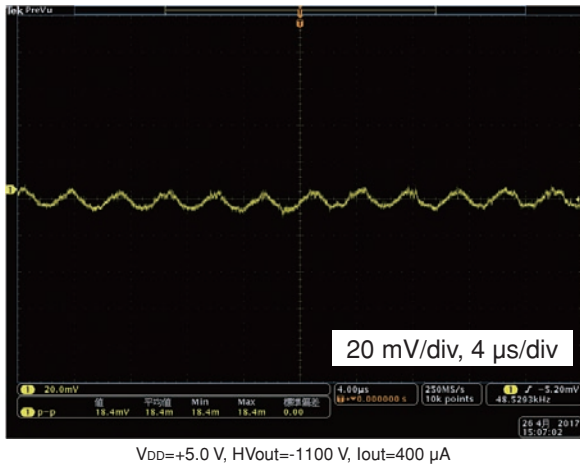


Figure 5: Voltage drooping characteristics

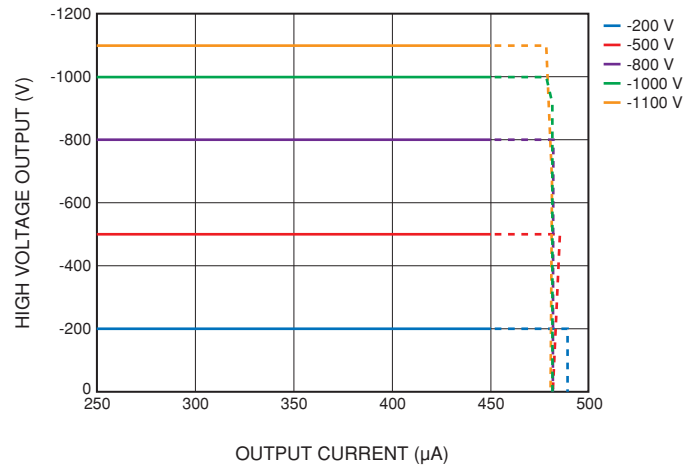
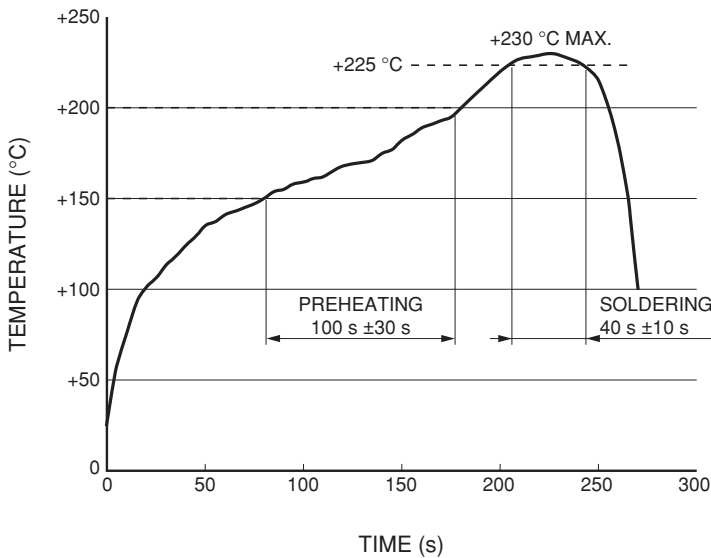
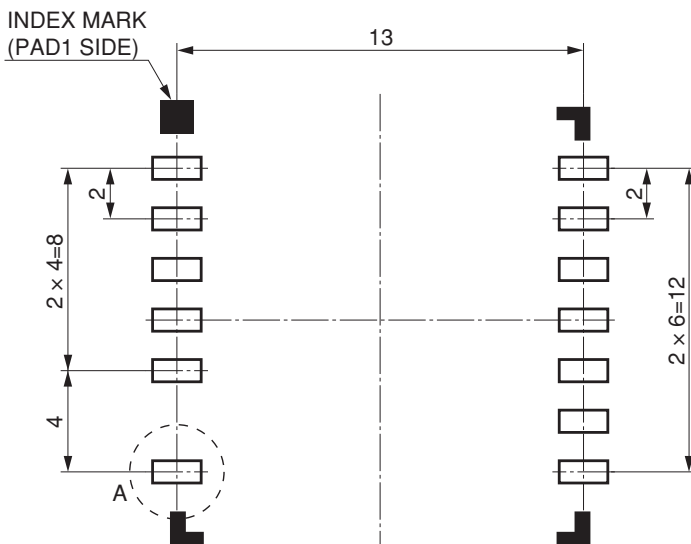


Figure 6: Recommended reflow soldering profile



- This profile is reference only. The effect that the product receives during reflow soldering varies depending on the circuit board and reflow oven that are used. Before actual soldering, check for any problems by testing out the soldering methods in advance.
- Reflow soldering only (do not allow flow soldering).  
Peak temperature: +230 °C (Maximum 50 s)  
Cycles: one time only

Figure 7: Recommended land pattern (Unit: mm)



- "A" is high voltage output terminal (PAD6).  
When designing pattern, keep the enough creepage distance of insulation.
- Keep 1 mm distance at least from other products.

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## ■ Handling precautions

- This product utilizes high-precision electronic components. Always be sure to take electrostatic discharge (ESD) prevention measures.
- When storing this product (before unpacking), keep it in a cool dark place with humidity below 60 %.
- The warranty period for soldering is 180 days after the delivery even if stored in the cool dark place.
- After unpacking, do not touch this product with bare hands. Doing so may cause high voltage leaks. If dirt or finger oil in particular gets on the solder pads, it may lead to poor soldering. If the solder pads get dirty, wipe (degrease) them off with ethanol.
- Flux residue after soldering may cause high voltage leaks. Wipe it away with ethanol as needed. When using an organic solvent or an ultrasonic cleaner to clean the printed circuit board on which this product is mounted, check in advance that it will have no adverse effects on this product. After cleaning, make sure the board is dry before supplying power.
- When using this product in an environment with humidity above 80 %, it must be coated with a moisture-proof insulating material. If this product absorbs moisture, it may cause the high voltage output to fluctuate and also lead to product failures. When insulating, check in advance that the coating material will not harm this product.
- A metal sheet is attached to the top surface (underneath the product label) of this product. This metal sheet is at electrically floating potential, but never allow this sheet to make contact with other voltages including ground potential. Doing so may cause product failures.
- The input voltage ( $V_{DD}$ ) side will be damaged by reverse-polarity voltage input, so be careful to avoid connecting the wrong wires. To provide protection against reverse-polarity voltage input, externally connect a forward-biased diode. In that case, always make sure that the external circuit will not cause a voltage drop. In addition, this product does not include any protection against internal short circuit. Install the protective circuit (e. g. fuse) before  $V_{DD}$  as necessary.
- This product is designed for reflow soldering and cannot be done for flow soldering. If you have to solder by hand for making an initial evaluation, be careful not to apply too much heat to this product and finish the soldering in as short a time as possible. Heating this product too much or allowing the soldering iron to touch portions other than the solder pads may damage this product.

## ■ Packing method

- This product is supplied 50 pcs / lot with placing on a tray (260 mm × 9 mm × 140 mm).

This product is exclusive for the use as a built-in part of a device. It is not a product designed and manufactured considering the end use. Therefore, it is inhibited to use this product alone without being built in a device or that end user build it into a device by themselves. For the use of this product, it is requested that customers (device manufactures) themselves have the responsibility to correspond to related laws and regulation.

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