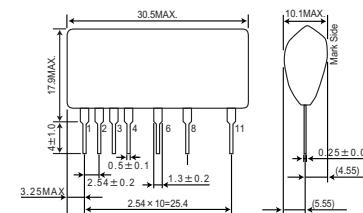


## ● Absolute Maximum Ratings

Parameter	Symbol	Limits	Unit
Input voltage	Vi	190	V
Operating temperature range	Topr	-20 ~ +80	°C
Storage temperature range	Tstg	-20 ~ +105	°C
Maximum surface temperature	Tcmax	105	°C
ESD endurance	Vsurge	2	kV
Maximum output current	IoMAX	160	mA <sub>pk</sub>

## ● Dimension (Unit : mm)



## ● Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	Vi	113	141	190	V	DC(80~134VAC)
Output voltage1	Vo1	3.7	4.3	4.6	V	Vi=113V, Io1=1mA
Output current1	Io1	—	—	1.0	mA	Vi=113V
Output voltage2	Vo2	19.3	20.4	21.5	V	
Output current2	Io2	—	—	160	mA	
Line regulation	Vr2	—	0.05	0.15	V	Vi=113~190V
Load regulation	VI2	—	0.07	0.20	V	Io=0~100mA
Output ripple voltage	Vp2	—	0.05	0.15	V <sub>p-p</sub>	
Control OFF voltage	Vctl(H)	2.0	—	10.0	V	Open collector input, Vo2 : OFF
Control ON voltage	Vctl(L)	—	—	0.6	V	Open collector input, Vo2 : ON
Output voltage when OFF	Vo(off)	—	0	0.01	V	Vctl=5V
Power conversion efficiency	η	78	82	—	%	Vi=141V, Io2=160mA

\*1 Fluctuating value of output voltage for fluctuation of input voltage.

\*2 Fluctuating value of output voltage for fluctuation of output current.

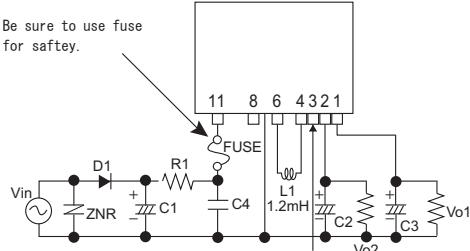
\*3 Measured at PEAK-TO-PEAK and BAND-WIDTH:20MHz of ripple current, and spike noise is not included.

\*4  $\eta = \frac{V_{o2} \times I_{o2}}{V_{in} \times I_{in}} \times 100\%$ 

## ● Application circuit

## BP5086A20S

Be sure to use fuse for safety.



Pin No.	Function
1	Output1 Vo(4V)
2	Output2 Vo(20V)
3	20V Output control terminal
4	Choke coil connect
5	Not used
6	Choke coil connect
7	Not used
8	COMMON
9	Not used
10	Not used
11	Input terminal Vi(141VDC)

For actual usage, Please kindly evaluate and confirm our part mounted in your product, Especially, Please make sure to confirm the load current does not exceed Max. rated current by using the current probe.

## External components setting

## FUSE: Fuse

Please make sure to use quick acting fuse 1A

## C1: Capacitor for input voltage smoothing

Capacitance : 22μF~47μF Rated voltage : 200V or higher Ripple current is 0.19Arms above.

## C2: Capacitor for output voltage smoothing

Capacitance : 100μF~470μF Rated voltage : 50V or higher, ESR is 0.4Ω max. Ripple current is 0.41Arms above.

## C3: Capacitor for input voltage smoothing

Output ripple voltage is influenced. Please evaluate it in the actual set. Capacitance : 1μF~4.7μF Rated voltage : 10V or higher

## C4: For noise terminal voltage reduction

Capacitance : 0.1μF~0.22μF Rated voltage : 200V or higher Film capacitor or ceramic capacitor. Reduce the noise terminal voltage. The constant value should be evaluated in the set.

## L1: Choke coil

L : 1.2mH Allowable current : 0.41A or higher

## D1: Rectifier diode

Please use the one that is hard to be magnetic saturated even in the high temperature.

## R1: For noise terminal voltage reduction

In the absolute maximum ratings, the reverse peak voltage should be 400V or higher, the average rectifying current should be 0.5A or higher, and the peak surge current should be 20A or higher. (Full-wave rectifier can be used in our part.)

## ZNR: Varistor

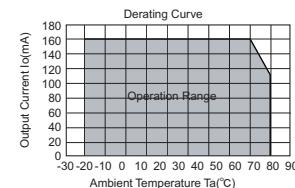
10 ~ 22 1/4W

Reduce the noise terminal voltage. Please set it, if necessary.

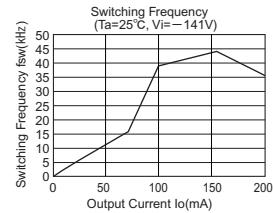
The constant value should be evaluated in set.

Varistor must be used. It protects this part from lightning surge and static electricity.

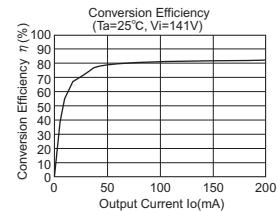
## ● Derating Curve



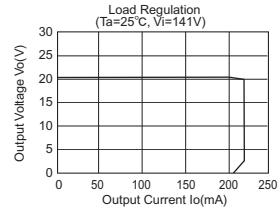
## ● Switching Frequency



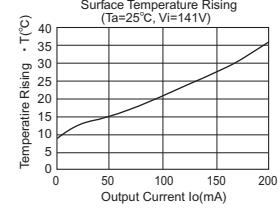
## ● Conversion Efficiency



## ● Load Regulation



## ● Surface Temperature Rising



# Precautions on Use of ROHM Power Module

## Safety Precautions

- 1) The products are designed and produced for application in ordinary electronic equipment (AV equipment, OA equipment, telecommunication equipment, home appliances, amusement equipment etc.).  
If the products are to be used in devices requiring extremely high reliability (medical equipment, transport equipment, aircraft/spacecraft, nuclear power controllers, fuel controllers, car equipment including car accessories, safety devices, etc.) and whose malfunction or operational error may endanger human life and sufficient fail-safe measures, please consult with the Company's sales staff in advance. If product malfunctions may result in serious damage, including that to human life, sufficient fail-safe measures must be taken, including the following:
  - [a] Installation of protection circuits or other protective devices to improve system safety
  - [b] Installation of redundant circuits in the case of single-circuit failure
- 2) The products are designed for use in a standard environment and not in any special environments.  
Application of the products in a special environment can deteriorate product performance. Accordingly, verification and confirmation of product performance, prior to use, is recommended if used under the following conditions:
  - [a] Use in various types of liquid, including water, oils, chemicals, and organic solvents
  - [b] Use outdoors where the products are exposed to direct sunlight, or in dusty places
  - [c] Use in places where the products are exposed to sea winds or corrosive gases, including Cl<sub>2</sub>, H<sub>2</sub>S, NH<sub>3</sub>, SO<sub>2</sub>, and NO<sub>2</sub>
  - [d] Use in places where the products are exposed to static electricity or electromagnetic waves
  - [e] Use in proximity to heat-producing components, plastic cords, or other flammable items
  - [f] Use involving sealing or coating the products with resin or other coating materials
  - [g] Use involving unclean solder or use of water or water-soluble cleaning agents for cleaning after soldering
  - [h] Use of the products in places subject to dew condensation
- 3) The products are not radiation resistant.
- 4) The Company is not responsible for any problems resulting from use of the products under conditions not recommended herein.
- 5) The Company should be notified of any product safety issues. Moreover, product safety issues should be periodically monitored by the customer.

## Precautions Regarding Application Example and External Circuits

- 1) If change is made to the constant of an external circuit, allow a sufficient margin due to variations of the characteristics of the products and external components, including transient characteristics, as well as static characteristics. Please be informed that the Company has not conducted investigations on whether or not particular changes in the application examples or external circuits would result in the infringement of patent rights of a third party.
- 2) The application examples, their constants, and other types of information contained herein are applicable only when the products are used in accordance with standard methods.  
Therefore, if mass production is intended, sufficient consideration to external conditions must be made.

## Prohibitions Regarding Industrial Property

- 1) These Specifications contain information related to the Company's industrial property. Any use of them other than pertaining to the usage of appropriate products is not permitted. Duplication of these Specifications and its disclosure to a third party without the Company's permission is prohibited.
- 2) Information and data on products, including application examples, contained in these specifications are simply for reference; the Company does not guarantee any industrial property rights, intellectual property rights, or any other rights of a third party regarding this information or data. Accordingly, the Company does not bear any responsibility for:
  - [a] infringement of the intellectual property rights of a third party
  - [b] any problems incurred by the use of the products listed herein.
- 3) The Company prohibits the purchaser of its products to exercise or use the intellectual property rights, industrial property rights, or any other rights that either belong to or are controlled by the Company, other than the right to use, sell, or dispose of the products.