

Absolute Maximum Ratings

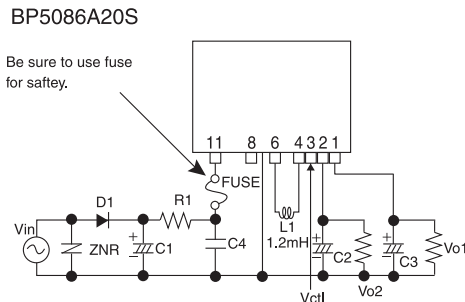
Parameter	Symbol	Limits	Unit
Input voltage	V_i	190	V
Operating temperature range	T_{opr}	-20 to +80	°C
Storage temperature range	T_{stg}	-20 to +105	°C
Maximum surface temperature	T_{cmax}	105	°C
ESD endurance	V_{surge}	2	kV
Maximum output current	I_{oMAX}	160	mA

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	V_i	113	141	190	V	DC(80 to 134VAC)
Output voltage1	V_{o1}	3.7	4.3	4.6	V	$V_i=113V, I_{o1}=1mA$
Output current1	I_{o1}	—	—	1.0	mA	$V_i=113V$
Output voltage2	V_{o2}	19.3	20.4	21.5	V	
Output current2	I_{o2}	—	—	160	mA	
Line regulation	V_{r2}	—	0.05	0.15	V	$V_i=113$ to 190V * 1
Load regulation	V_{l2}	—	0.07	0.20	V	$I_{o}=0$ to 100mA * 2
Output ripple voltage	V_{p2}	—	0.05	0.151	Vp-p	* 3
Control OFF voltage	$V_{ctl(H)}$	2.0	—	0.0	V	Open collector input, V_{o2} : OFF
Control ON voltage	$V_{ctl(L)}$	—	—	0.6	V	Open collector input, V_{o2} : ON
Output voltage when OFF	$V_{o(off)}$	—	0	0.01	V	$V_{ctl}=5V$
Power conversion efficiency	η	78	82	—	%	$V_i=141V, I_{o2}=160mA$ * 4

- * 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



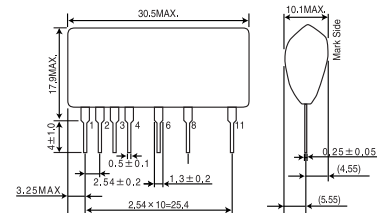
Pin No.	Function
1	Output1 Vo(4V)
2	Output2 Vo(20V)
3	20V Output control terminal
4	Choke coil connect
5	Not used
6	Choke coil connect
7	Not used
8	COMMON
9	Not used
10	Not used
11	Input terminal Vi(141VDC)

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.

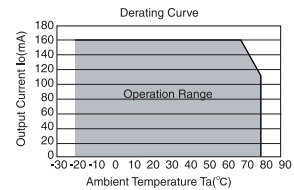
External components setting

- FUSE:** Fuse Please make sure to use quick acting fuse 1A
- C1:** Capacitor for input voltage smoothing Capacitance : 22 μ F to 47 μ F Rated voltage : 200V or higher Ripple current is 0.19Arms above.
- C2:** Capacitor for output voltage smoothing Capacitance : 100 μ F to 470 μ F Rated voltage : 50V or higher, ESR is 0.4 Ω max. Ripple current is 0.41Arms above. Output ripple voltage is influenced. Please evaluate it in the actual set.
- C3:** Capacitor for input voltage smoothing Capacitance : 1 μ F to 4.7 μ F Rated voltage : 10V or higher
- C4:** For noise terminal voltage reduction Capacitance : 0.1 μ F to 0.22 μ F 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 Please use the one that is hard to be magnetic saturated even in the high temperature.
- D1:** Rectifier diode 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.)
- R1:** For noise terminal voltage reduction 10 to 22 1/4W Reduce the noise terminal voltage. Please set it, if necessary. The constant value should be evaluated in set.
- ZNR:** Varistor Varistor must be used. It protects this part from lightning surge and static electricity.

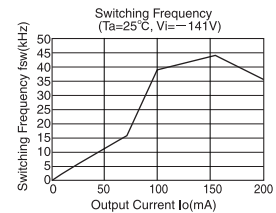
Dimension (Unit : mm)



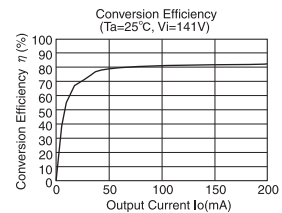
Derating Curve



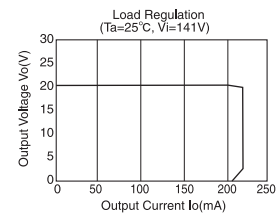
Switching Frequency



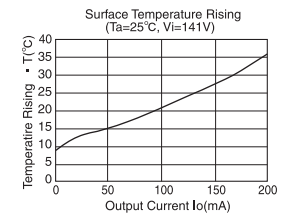
Conversion Efficiency



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 Cl₂, H₂S, NH₃, SO₂, and NO₂
 - [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.

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In case of export from Japan, please confirm if it applies to "objective" criteria or an "informed" (by MITI clause) on the basis of "catch all controls for Non-Proliferation of Weapons of Mass Destruction.