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100VAC Input/Constant Current

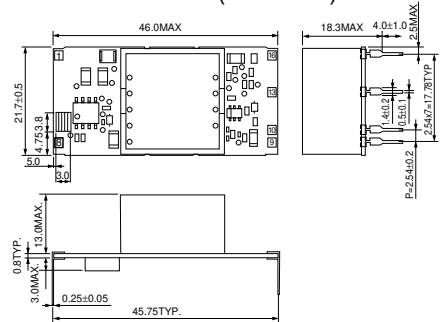
# Isolated High-power LED Driver for Illumination

## BP5845W

### Absolute Maximum Ratings

Parameter	Symbol	Limits	Units	Conditions
Input voltage	$V_i$	170	V	DC
Output voltage (limits)	$V_o$	36	V	$I_o=360\text{mA}$
Output voltage (no load)	$V_o$	39	V	$I_o=0\text{mA}$
Output current	$I_o$	378	mA	
Output control terminal voltage	VCTL	12.5	V	
Withstand voltage	BV	1.8	kV	1sec (between primary and secondary) While pin 1 and 8 are shorted and pins 9-16 a shorted, a voltage is applied between them.
Maximum surface temperature	$T_{\text{max}}$	105	$^{\circ}\text{C}$	Ambient temperature + the module self-heating $\leq T_{\text{max}}$
Operating temperature range	$T_{\text{opr}}$	-20 to +80	$^{\circ}\text{C}$	Refer to derating curve
Storage temperature range	$T_{\text{stg}}$	-25 to +85	$^{\circ}\text{C}$	

### Dimensions (Unit : mm)

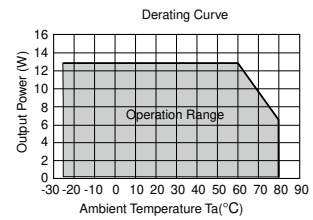


### Electrical Characteristics

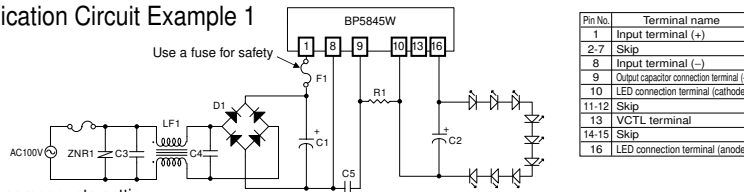
Parameter	Symbol	Spec			Units	Conditions
		Min.	Typ.	Max.		
Input voltage range	$V_i$	113	141	170	V	
Output current	$I_{o1}$	342	360	378	mA	$V_i=141\text{V}, R_1=0.78\Omega$ *1
Output voltage range	$V_o$	15.0	-	36	V	$V_i=141\text{V}, I_o=360\text{mA}$
Output ripple voltage	$V_p$	-	0.1	0.5	Vp-p	$V_i=141\text{V}, I_o=360\text{mA}$ *2
Conversion efficiency	$\eta$	83	88	-	%	$V_i=141\text{V}, V_o=36\text{V}, I_o=360\text{mA}$

NOTE 1 Maximum output current varies depending on ambient temperature. Refer to the derating curve.  
 NOTE 2 Spike noise is not included in output ripple voltage.

### Derating Curve



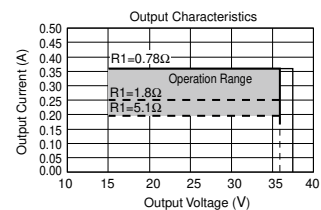
### Application Circuit Example 1



#### External components setting

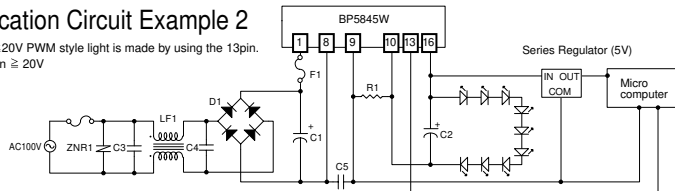
Symbol	Application	Characteristics	Recommended parts
C1	Input capacitor	22 $\mu\text{F}$ / 250V General purpose	Manufactured by RUBYCON 250YXA22M
C2	Output capacitor	100 $\mu\text{F}$ / 50V Low Impedance Item	Manufactured by NICHIKON UHD1H101M
R1	Output current setting resistor	0.78 $\Omega$ 1/4W ( $I_o=360\text{mA}$ )	Manufactured by ROHM MCR10E2HFR820, MCR30E2HF15R0 A parallel connection
C3,C4	Noise reduction capacitor	It should be installed when required, above 125V 0.1 to 0.22 $\mu\text{F}$	Manufactured by MATSUSHITA ECOE1A224KF
C5	Noise reduction capacitor	2200pF (Products with basic isolation certification)	Manufactured by TDK CS11-E2GA22MYNS
D1	Diodebridge	400V/1A	Manufactured by SHINDENGEN D1UBA80
F1	Fuse	125V/1A	
LF1	Line filter	10mH	
ZNR1	Varistor	Use a varistor. Be sure to use it to protect this product from thunder surge and the static electricity.	

### Output Characteristics



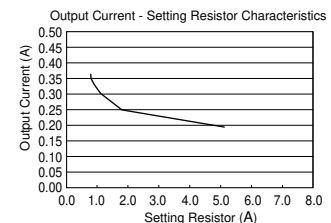
### Application Circuit Example 2

$V_{oH} \geq 20\text{V}$  PWM style light is made by using the 13pin.  
 $V_F \times n \geq 20\text{V}$



NO	Parameter	Symbol	Spec			Units	Conditions
			Min.	Typ.	Max.		
1	LED OFF Voltage	$V_{oL}$	12.7	13.4	14.1	V	$V_{oH} \geq 20\text{V}$
2	CTL Terminal H Revel	VCTL(H)	3	5	10	V	Output OFF ( $V_{oL}$ )
3	CTL Terminal L Revel	VCTL(L)	0	-	0.5 or OPEN	V	Output ON ( $V_{oH} \geq 20\text{V}$ )

### Setting current

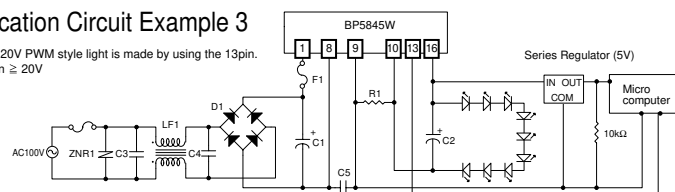


Setting resistor how to calculate  $R_1$   
 $R_1=0.1374/(0.91 \times I_o-0.151)$   
 $I_o$ : Output current

NOTE) A maximum output current is set to 360mA.  
 Operations beyond this limit are prohibited.

### Application Circuit Example 3

$V_{oH} \geq 20\text{V}$  PWM style light is made by using the 13pin.  
 $V_F \times n \geq 20\text{V}$



NO	Parameter	Symbol	Spec			Units	Conditions
			Min.	Typ.	Max.		
1	LED OFF Voltage	$V_{oL}$	12.7	13.4	14.1	V	$V_{oH} \geq 20\text{V}$
2	PWM Signal H Revel	VCTL(H)	3	5	10	V	
3	PWM Signal L Revel	VCTL(L)	0	-	0.5	V	
4	PWM Signal cycle	fosc	1	10	20	kHz	Note 3

NOTE 3 Frequency is to be decided after you confirm it with the actual opportunity.

# Power Module Usage Precautions

## Safety Precautions

- 1) The products are designed and manufactured for use in ordinary electronic equipment (i.e. AV/OA/telecommunication/amusement equipment, home appliances). Please consult with the Company's (ROHM) sales staff if intended for use in devices requiring high reliability (e.g. medical/transport/aircraft/spacecraft equipment, nuclear power/fuel controllers, automotive/safety devices) and whose malfunction may result in injury or death. In this case, failsafe measures must be taken, including the following:
  - [a] Installation of protection circuits in order to improve system safety
  - [b] Incorporation of redundant circuits in the case of single-circuit failure
- 2) The products are designed for use under normal conditions. Application in special environments can cause a deterioration in product performance. Therefore, verification and confirmation of product performance, prior to use, is recommended. The following environments are considered to be 'special':
  - [a] Outdoors, exposed to direct sunlight or dust
  - [b] In contact with liquids, such as water, oils, chemicals, or organic solvents
  - [c] In areas where exposure to the sea air or corrosive gases (i.e. Cl<sub>2</sub>, H<sub>2</sub>S, NH<sub>3</sub>, SO<sub>2</sub>, NO<sub>2</sub>) can occur
  - [d] In places where the products may be in contact with static electricity or electromagnetic waves
  - [e] In proximity to heat-producing items, plastic cords, or flammable materials
  - [f] In contact with sealing or coating products, such as resin
  - [g] In contact with unclean solder or exposed to water or water-soluble cleaning agents used after soldering
  - [h] In areas where dew condensation occurs
- 3) The products are not designed to be 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.

## Application Notes

- 1) A sufficient margin must be allowed if changes are made to the peripheral circuit due to variations in the inherent tolerances of the external components as well as transient and static characteristics. In addition, please be aware that the Company has not conducted investigations on whether or not particular changes in the example application circuits would result in patent infringement.
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  - [b] Problems arising from the use of the products listed herein
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