

# PQ30RV31

## Variable Output Low Power-Loss Voltage Regulator

### Features

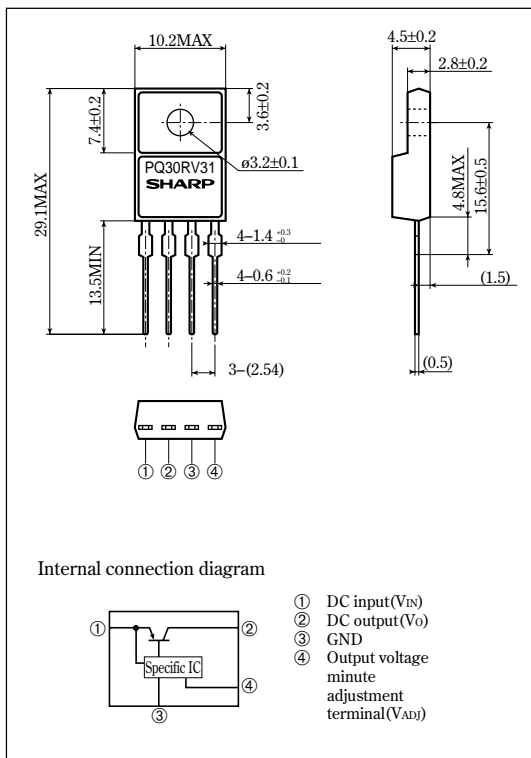
- Maximum output current: 3A
- Compact resin full-mold package
- Low power-loss (Dropout voltage: MAX.0.5V)
- Variable output voltage (setting range: 1.5 to 30V)
- Built-in ON/OFF control function.

### Applications

- Power supply for print concentration control of word processors
- Series power supply for motors and solenoid
- Series power supply for VCRs and TVs

### Outline Dimensions

(Unit : mm)



### Absolute Maximum Ratings

(T<sub>a</sub>=25°C)

Parameter	Symbol	Rating	Unit
① Input voltage	V <sub>IN</sub>	35	V
① Output adjustment terminal voltage	V <sub>ADJ</sub>	7	V
Output current	I <sub>O</sub>	3	A
Power dissipation (No heat sink)	P <sub>D1</sub>	2.0	W
Power dissipation (With infinite heat sink)	P <sub>D2</sub>	20	W
② Junction temperature	T <sub>j</sub>	150	°C
Operating temperature	T <sub>opr</sub>	-20 to +80	°C
Storage temperature	T <sub>stg</sub>	-40 to +150	°C
Soldering temperature	T <sub>sol</sub>	260 (For 10s)	°C

① All are open except GND and applicable terminals.

② Overheat protection function may operate at 125<=T<sub>j</sub><=150°C.

• Please refer to the chapter "Handling Precautions".

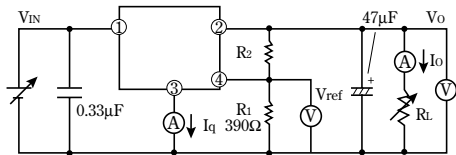
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Electrical Characteristics		(Unless otherwise specified, condition shall be VIN=12V, Vo=10V, Io=1.5A, R1=390Ω, Ta=25°C)				
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input voltage	VIN	—	4.5	—	35	V
output voltage	VO	—	1.5	—	30	V
Load regulation	RegL	Io=5mA to 3A	—	0.5	2.0	%
Line regulation	RegI	VIN=11 to 21V, Io=0.5mA	—	0.5	2.5	%
Ripple rejection	RR	Refer to Fig. 2	45	70	—	dB
Reference voltage	Vref	—	1.225	1.25	1.275	V
Temperature coefficient of reference voltage	TcVref	Tj=0 to 125°C, Io=5mA	—	±1.0	—	%/°C
Dropout voltage	VI-O	*3, Io=3A	—	0.3	1.0	V
		*3, Io=2A	—	0.2	0.5	
Quiescent current	Iq	Io=0	—	—	7	mA

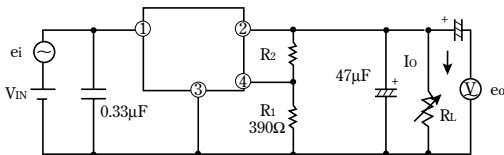
\*3 Input voltage shall be the value when output voltage is 95% in comparison with the initial value.

Fig. 1 Test Circuit



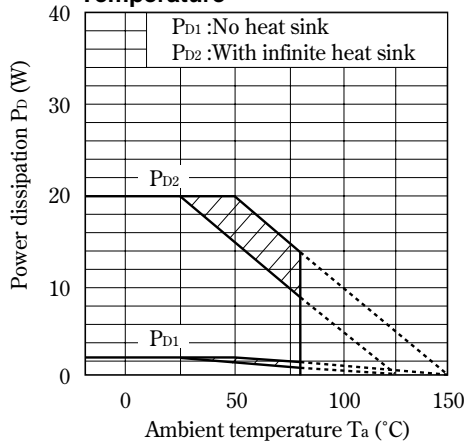
$$V_O = V_{ref} \times \left( 1 + \frac{R_2}{R_1} \right)$$
  
[R1=390Ω, Vref Nearly=1.25V]

Fig. 2 Test Circuit of Ripple Rejection



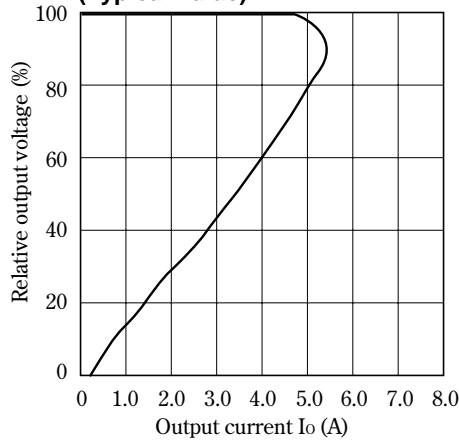
Io=0.5A, VIN=12V, Vo=10V  
f=120Hz (sine wave)  
ei(rms)=0.5Vrms  
RR=20 log (ei(rms)/eo(rms))

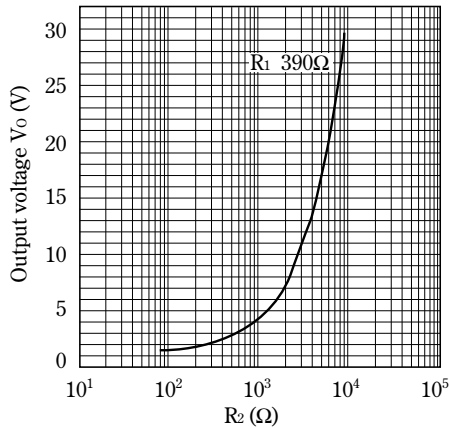
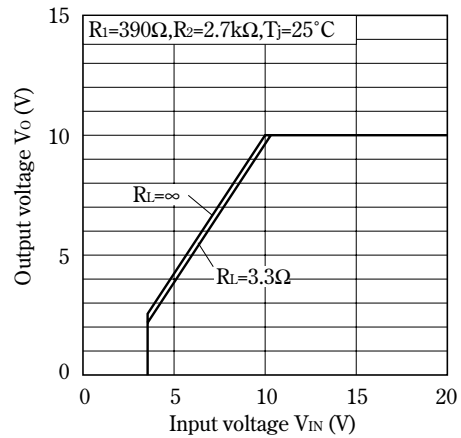
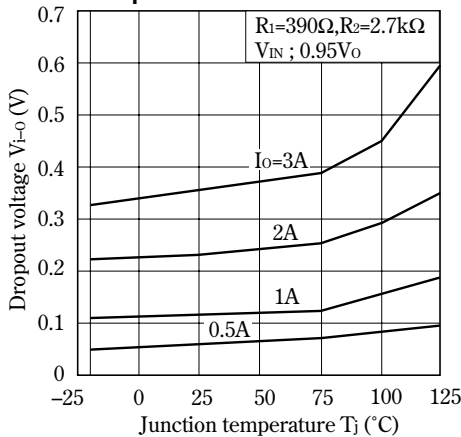
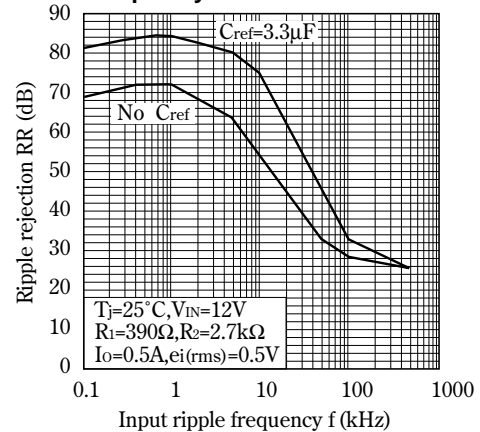
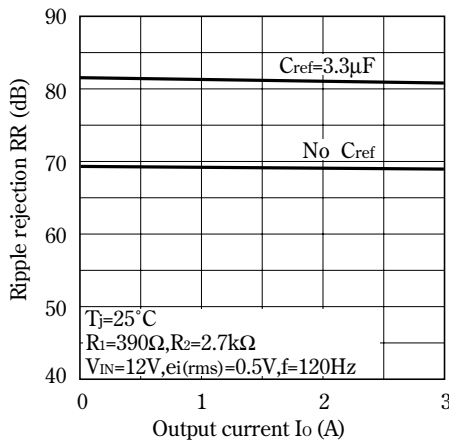
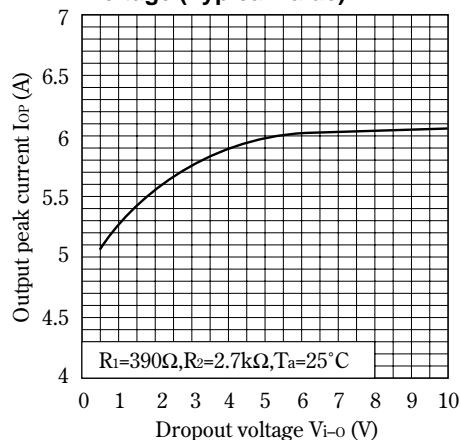
Fig. 3 Power Dissipation vs. Ambient Temperature

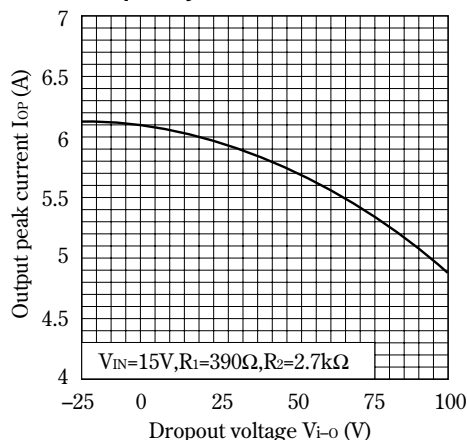


Note) Oblique line portion : Overheat protection may operate in this area.

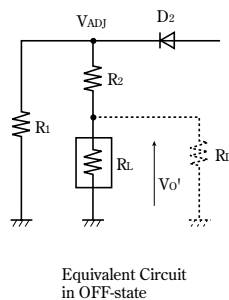
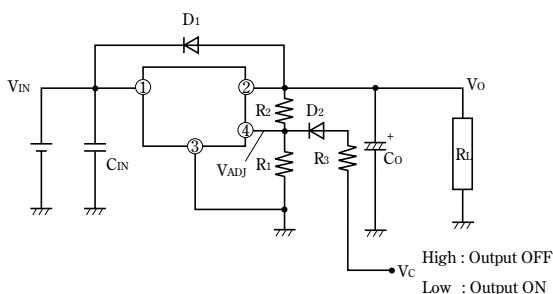
Fig. 4 Overcurrent Protection Characteristics (Typical Value)



**Fig. 5 Output Voltage Adjustment Characteristics (Typical value)****Fig. 6 Output Voltage vs. Input Voltage****Fig. 7 Dropout Voltage vs. Junction Temperature****Fig. 8 Ripple Rejection vs. Input Ripple Frequency****Fig. 9 Ripple Rejection vs. Output Current****Fig.10 Output Peak Current vs. Dropout Voltage (Typical value)**

**Fig.11 Ripple Rejection vs. Input Ripple Frequency**

## ON/OFF Operation



- ON/OFF operation is available by mounting externally  $D_2$  and  $R_3$ .
- When  $V_{ADJ}$  is forcibly raised above  $V_{REF}$  (1.25V TYP) by applying the external signal, the output is turned off (pass transistor of regulator is turned off). When the output is OFF,  $V_{ADJ}$  must be higher than  $V_{REF MAX.}$ , and at the same time must be lower than maximum rating 7V.

In OFF-state, the load current flows to  $R_L$  from  $V_{ADJ}$  through  $R_2$ . Therefore the value of  $R_2$  must be as high as possible.

- $V_O' = V_{ADJ} \times R_L / (R_L + R_2)$

occurs at the load. OFF-state equivalent circuit  $R_L$  up to 10k $\Omega$  is allowed. Select as high value of  $R_L$  and  $R_2$  as possible in this range. In some case, as output voltage is getting lower ( $V_O < 1V$ ), impedance of load resistance rises. In such condition, it is sometime impossible to obtain the minimum value of  $V_O'$ . So add the dummy resistance indicated by  $R_D$  in the figure to the circuit parallel to the load.

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