PQ30RV31

Variable Output Low Power-Loss Voltage Regulator

■ Features

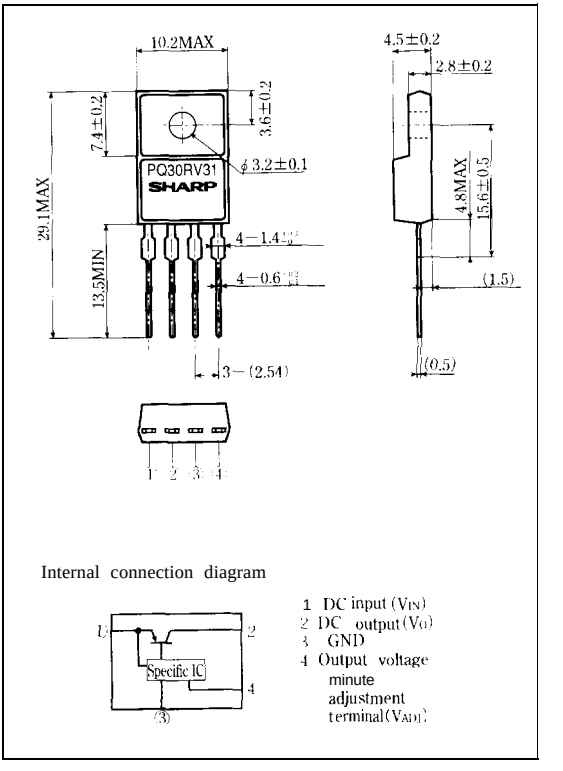
- Maximum output current: 3A
- Compact resin full-mold package.
- Low power-loss (Dropout voltage: MAX. 0.5V)
- Variable output voltage (setting range :1.5 to 30V)
- Built-in ON/OFF control function.

■ 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_a=25°C)

Parameter	Symbol	Rating	Unit
*1 Input voltage	V_{IN}	35	V
*1 Output adjustment terminal voltage	V_{ADJ}	7	V
Output current	10	3	A
Power dissipation (No heat sink)	P_{D1}	2.0	W
Power dissipation (With infinite heat sink)	P_{D2}	20	W
*2 Junction temperature	T_j	150	°C
Operating temperature	T_{opr}	−20 to +80	°C
Storage temperature	T_{stg}	−40 to +150	°C
Soldering temperature	T_{sol}	260 (For 10s)	°C

*1 All are open except GND and applicable terminals.
*2 Overheat protection function may operate at 125 ≤ Tj ≤ 150 °C

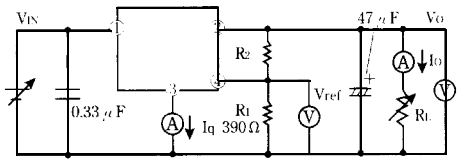
Please refer to the chapter "Handling Precautions"

■ Electrical Characteristics (Unless otherwise specified, condition shall be V_{IN}=12V, V_O=10V, I_O=1.5A, R_1=390Ω, T_a=25℃)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input voltage	V_{IN}		4.5		35	v
output voltage	V()		1.5		30	V
Load regulation	$R_{eg}L$	I_O=5mA to 3A		0.5	2.0	%
Line regulation	$R_{eg}I$	V_{IN}=11 to 21V, I_O=0.5mA		0.5	2.5	%
Ripple rejection	RR	Refer to Fig. 2	45	70		dB
Reference voltage	V_{ref}		1.225	1.25	1.275	V
Temperature coefficient of reference voltage	T_cV_{ref}	T_j=0 to 125℃, I_O=5mA		±1.0		%／C
Dropout voltage	V_{I-O}	*3, I()=3A		0.3	1.0	v
		*‘, I_O=2A		0.2	0.5	
Quiescent current	I_q	I_O=0			7	mA

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

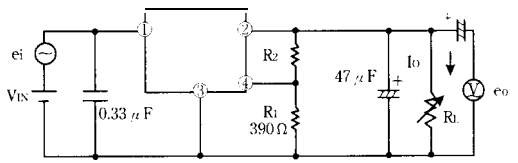
Fig. 1 Test Circuit



$$V_O = V_{ref} \times \left(1 + \frac{R_2}{R_1}\right) \fallingdotseq 1.25 \times \left(1 + \frac{R_2}{R_1}\right)$$

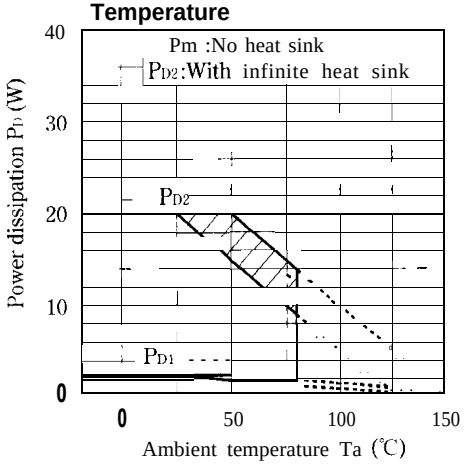
【R_1=390Ω, V_{ref}≒1.25V】

Fig. 2 Test Circuit of Ripple Rejection



I_O=0.5A, V_{IN}=12V, V_O=10V
f=120Hz (sine wave)
e_i=0.5Vrms
RR=20 log (e_i/e_o)

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)

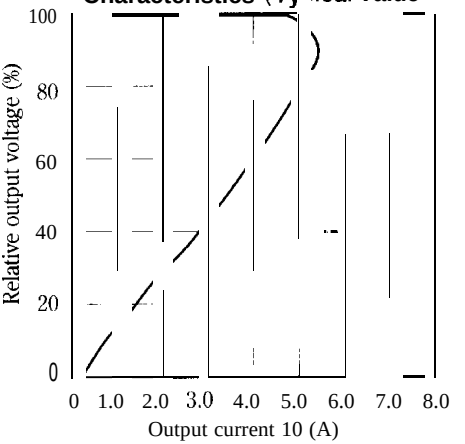


Fig. 5 Output Voltage Adjustment Characteristics (Typical value)

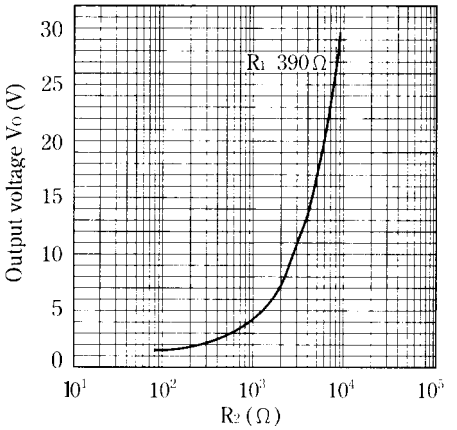


Fig. 6 Output Voltage vs. Input Voltage

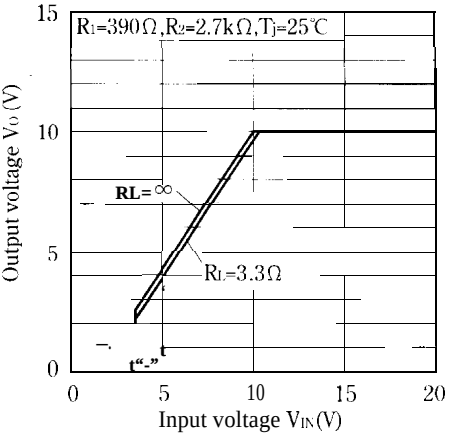


Fig. 7 Dropout Voltage vs. Junction Temperature

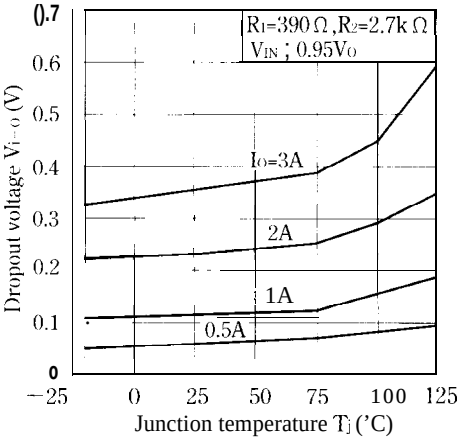


Fig. 8 Ripple Rejection vs. Input Ripple Frequency

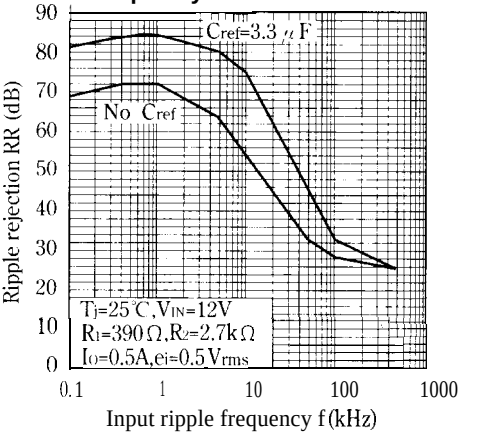


Fig. 9 Ripple Rejection vs. Output Current

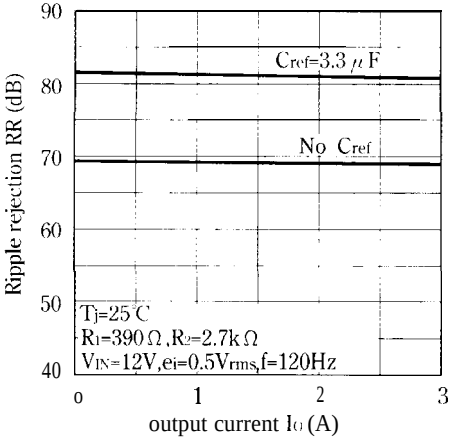


Fig.10 Output Peak Current vs. Dropout Voltage (Typical)

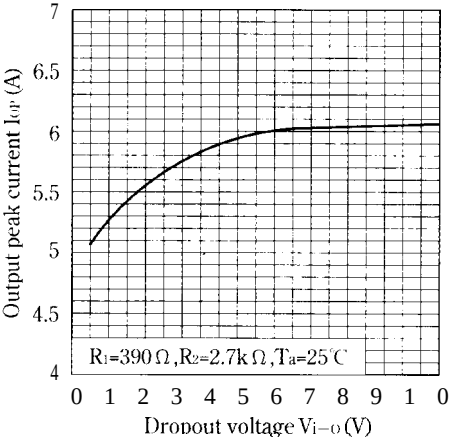
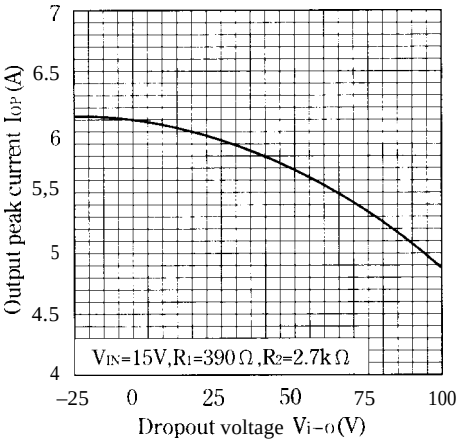
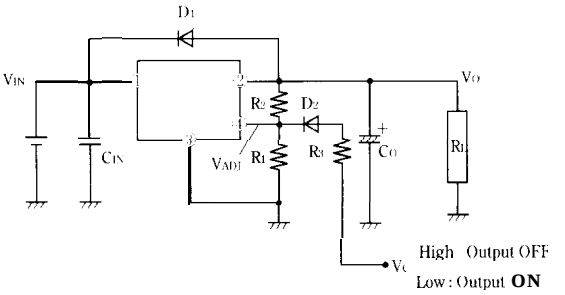
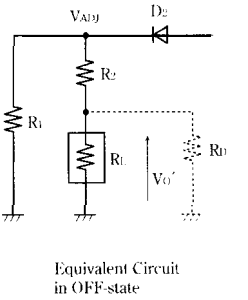


Fig. 8 Ripple Rejection vs. Input Ripple Frequency



■ ON/OFF Operation





Equivalent Circuit in OFF-state

. 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 then 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.

● $V_O' = V_{ADJ} \times R_L / (R_1 + R_2)$

occurs at the load. OFF-state equivalent circuit R_1 up to 10k Ω is allowed. Select as high value of RI. and R_2 as possible in this range. In some case, as output voltage is getting lower (VO $<$ 1V), impedance of load resistance rises. In such condition, it is sometime impossible to obtain the minimum value of Vo'. So add the dummy resistance indicated by R_D in the figure to the circuit parallel to the load.