

# PQ7DV5

Variable Output Type, High Output Current (5A) Type Low Power-loss Voltage Regulators

## ■ Features

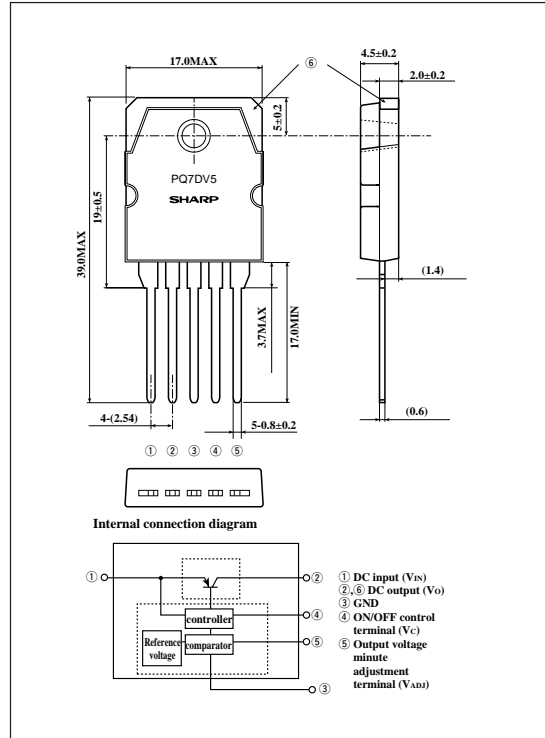
- TO-3P package
- Low power-loss (Dropout voltage:MAX. 0.5V at Io=5A)
- Variable output type (1.5V to 7V)
- Minimum input voltage : 3.0V
- High output current type (5A)
- Reference voltage precision : ±2.0%
- Built-in ON/OFF control function
- Built-in overcurrent protection, overheat protection function

## ■ Applications

- Power supplies for various electronic equipment such as personal computers

## ■ Outline Dimensions

(Unit : mm)



## ■ Absolute Mximum Ratings

(Ta=25°C)

| Parameter                                   | Symbol           | Rating      | Unit |
|---|------------------|-------------|------|
| *1 Input voltage                            | V <sub>IN</sub>  | 10          | V    |
| *1 ON/OFF control terminal voltage          | V <sub>C</sub>   | 10          | V    |
| *1 Output adjustment terminal voltage       | V <sub>ADJ</sub> | 5           | V    |
| Output current                              | I <sub>O</sub>   | 5.0         | A    |
| Power dissipation (No heat sink)            | P <sub>D1</sub>  | 2.2         | W    |
| Power dissipation (With infinite heat sink) | P <sub>D2</sub>  | 60          | 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> | 26(For 10s) | °C   |

\*1 All are open except GND and applicable terminals.

\*2 Overheat protection may operate at 125<T<sub>J</sub><150°C.

· Please refer to the chapter " Handling Precautions ".



" In the absence of confirmation by device specification sheets, SHARP takes no responsibility for any defects that may occur in equipment using any SHARP devices shown in catalogs, data books, etc. Contact SHARP in order to obtain the latest version of the device specification sheets before using any SHARP's device. "

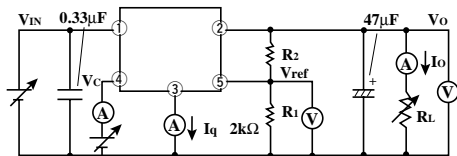
■ Electrical Characteristics

(Unless otherwise specified, conditions shall be  $V_{IN}=5V$ ,  $I_O=2.5A$ ,  $V_O=3V$  [ $R_1=2k\Omega$ ]  $T_a=25^\circ C$ )

| Parameter                                    | Symbol       | Conditions               | NIN.  | TYP.       | MAX.  | Unit          |
|--|--------------|--------------------------|-------|------------|-------|---------------|
| Input voltage                                | $V_{IN}$     | -                        | 3     | -          | 10    | V             |
| Output voltage                               | $V_O$        | -                        | 1.5   | -          | 7     | V             |
| Reference voltage                            | $V_{ref}$    | -                        | 1.225 | 1.25       | 1.275 | V             |
| Load regulation                              | $R_{egL}$    | $I_O=5mA$ to $5.0A$      | -     | 0.5        | 2.0   | %             |
| Line regulation                              | $R_{egI}$    | $V_{IN}=4$ to $10V$      | -     | 0.5        | 2.5   | %             |
| Temperature coefficient of reference voltage | $T_C V_O$    | $T_j=0$ to $125^\circ C$ | -     | $\pm 0.01$ | -     | $\%/^\circ C$ |
| Ripple rejection                             | RR           | -                        | 45    | 55         | -     | dB            |
| Dropout voltage                              | $V_{i-o}$    | $V_{IN}=3V$ , $I_O=5A$   | -     | -          | 0.5   | V             |
| <sup>*3</sup> ON-state voltage for control   | $V_{C(ON)}$  | -                        | 2.0   | -          | -     | V             |
| ON-state current for control                 | $I_{C(ON)}$  | $V_C=2.7V$               | -     | -          | 20    | $\mu A$       |
| OFF-state voltage for control                | $V_{C(OFF)}$ | -                        | -     | -          | 0.8   | V             |
| OFF-state current for control                | $I_{C(OFF)}$ | $V_C=0.4V$               | -     | -          | -0.4  | mA            |
| Quiescent current                            | $I_q$        | $I_O=0A$                 | -     | -          | 17    | mA            |

<sup>\*3</sup> In case of opening control terminal ④, output voltage turns on.

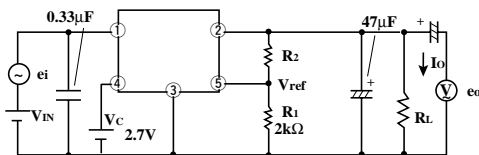
Fig.1 Test Circuit



$$V_o = V_{ref} \times (1 + R_2/R_1) \approx 1.25 \times (1 + R_2/R_1)$$

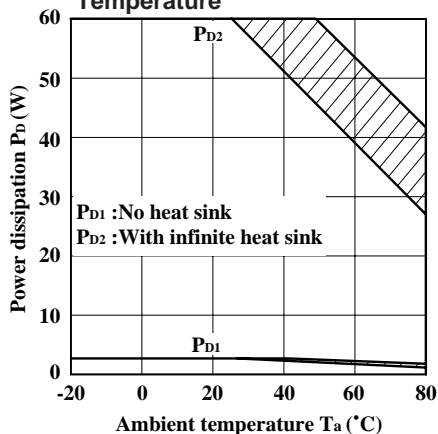
[ $R_1=2k\Omega$ ,  $V_{ref} \approx 1.25V$ ]

Fig.2 Test Circuit for Ripple Rejection



$f=120Hz$  (sine wave)  
 $e_i=0.5V_{rms}$   
 $V_{IN}=5V$   
 $V_O=3V$  ( $R_1=2k\Omega$ )  
 $I_O=0.5A$   
 $RR=20 \log (e_i/e_o)$

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)

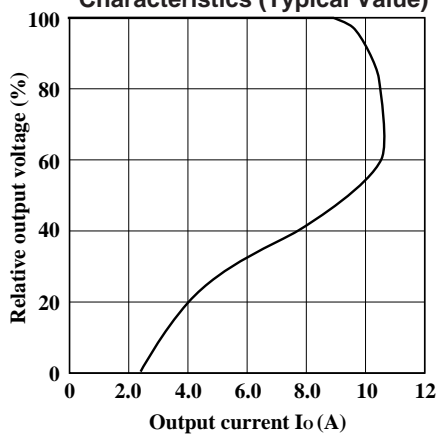


Fig.5 Reference Voltage Deviation vs. Junction Temperature

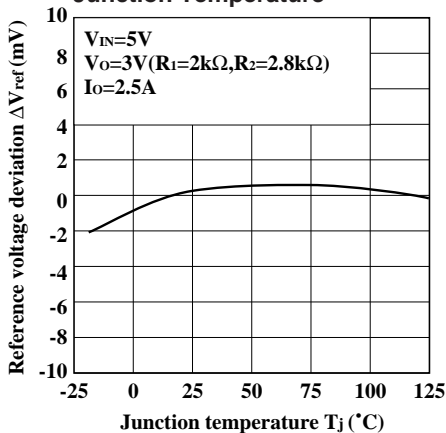


Fig.6 Output Voltage vs. Input Voltage

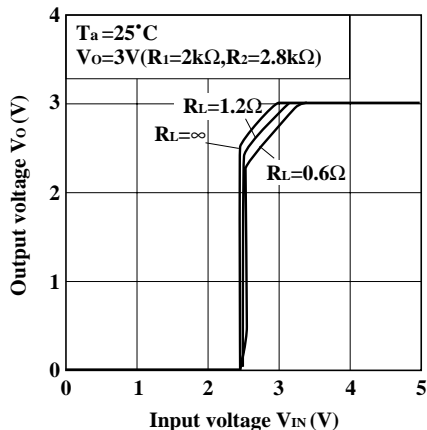


Fig.7 Circuit Operating Current vs. Input Voltage

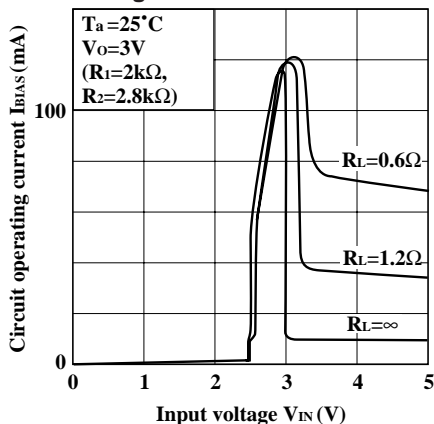


Fig.8 Dropout Voltage vs. Junction Temperature

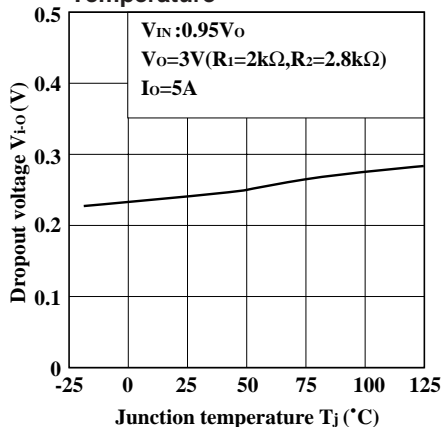


Fig.9 Quiescent Current vs. Junction Temperature

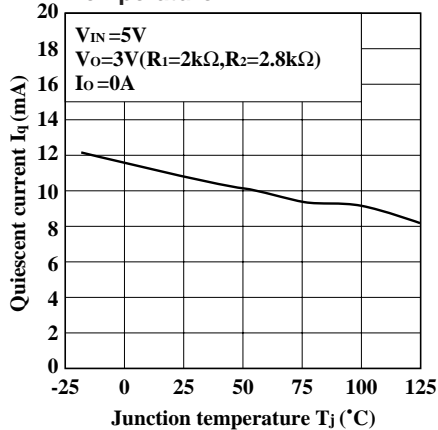


Fig.10 Ripple Rejection vs. Input Ripple Frequency

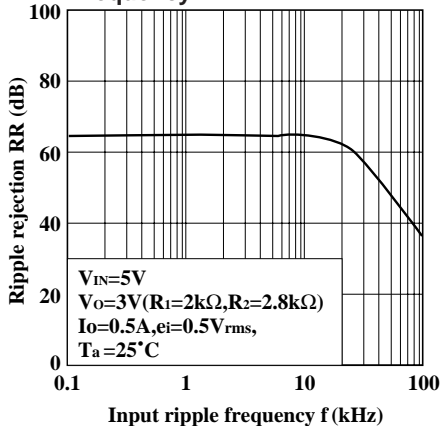
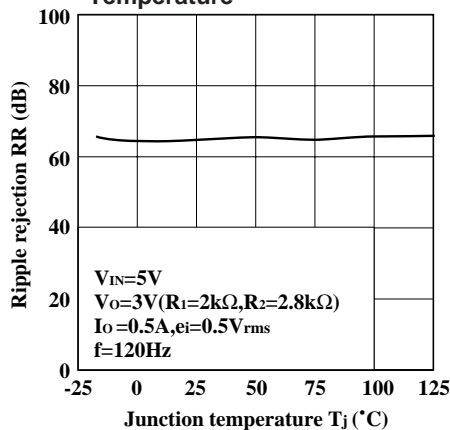
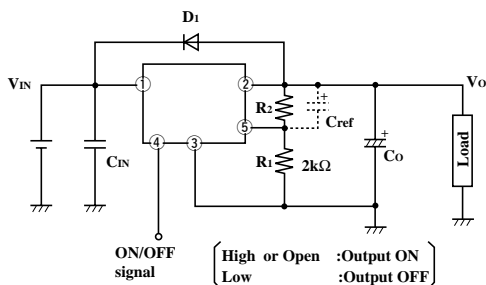


Fig.11 Ripple Rejection vs. Junction Temperature



■ Standard Connection



D1 : This device is necessary to protect the element from damage when reverse voltage may be applied to the regulator in case of input short-circuiting.

Cref : This device is necessary when it is required to enhance the ripple rejection or to delay the output start-up time\*. Otherwise, it is not necessary.

(Care must be taken since Cref may raise the gain, facilitating oscillation.)

\* The output start-up time proportional to Cref X R2.

CIN, CO : Be sure to mount the devices CIN and Co as close to the device terminal as possible so as to prevent oscillation.

The standard specification of CIN= 0.33μF ,Co= 47μF, respectively. However, adjust them as necessary after checking.

R1, R2 : These devices are necessary to set the output voltage. The output voltage VO is given by the following formula:

$$V_o = V_{ref} \times (1 + R_2/R_1)$$

(Vref is 1.25V TYP)

The standard value of R1 is 2kΩ. But value up to 10kΩ.