PQ7DV5

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

■ Features

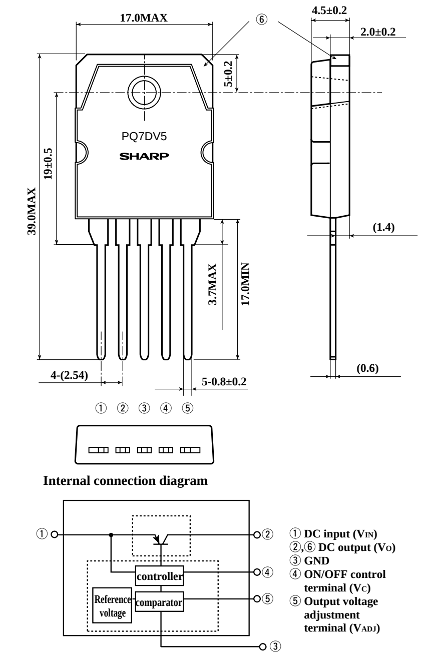
- TO-3P package
- Low power-loss (Dropout voltage:MAX. 0.5V at Io=5A)
- Variable output type (1.5V to 7V)
- Minimum input voltage : 3.0V
- High output current type (5A)
- Reference voltage precision : ±2.0%
- Built-in ON/OFF control function
- Built-in overcurrent protection, overheat protection function

■ Applications

- Power supplies for various electronic equipment such as personal computers

■ Outline Dimensions

(Unit : mm)



■ Absolute Mximum Ratings

(T_a=25˚C)

Parameter	Symbol	Rating	Unit
*1 Input voltage	V_{IN}	10	V
*1 ON/OFF control terminal voltage	V_C	10	V
*1 Output adjustment terminal voltage	V_{ADJ}	5	V
Output current	I_O	5.0	A
Power dissipation (No heat sink)	P_{D1}	2.2	W
Power dissipation (With infinite heat sink)	P_{D2}	60	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 may operate at 125<=T_j<=150˚C.

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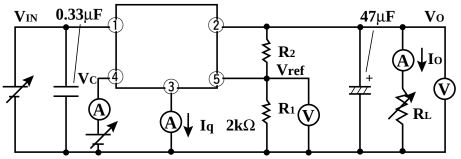
■ Electrical Characteristics

(Unless otherwise specified, conditions shall be V_{IN}=5V, I_O=2.5A, V_O=3V [R_1=2kΩ] T_a=25˚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	$R_{eg}L$	I_O=5mA to 5.0A	-	0.5	2.0	%
Line regulation	$R_{eg}I$	V_{IN}=4 to 10V	-	0.5	2.5	%
Temperature coefficient of reference voltage	T_CV_O	T_j=0 to 125˚C	-	±0.01	-	%/˚C
Ripple rejection	RR	-	45	55	-	dB
Dropout voltage	V_{i-o}	V_{IN}=3V, I_O=5A	-	-	0.5	V
*3 ON-state voltage for control	$V_{C\ (ON)}$	-	2.0	-	-	V
ON-state current for control	$I_{C\ (ON)}$	V_C=2.7V	-	-	20	µA
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

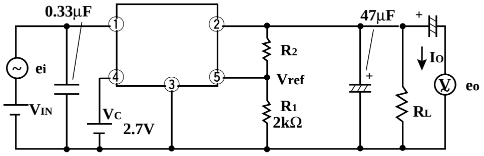
*3 In case of opening control terminal ④, output voltage turns on.

Fig.1 Test Circuit



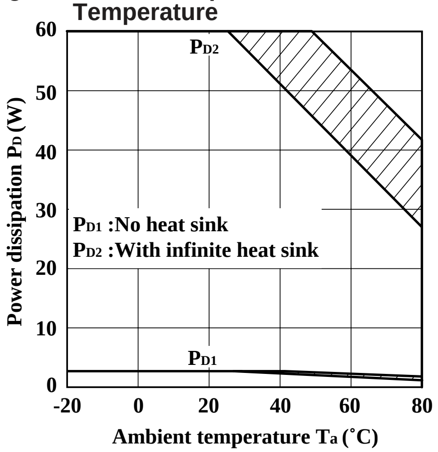
$V_o = V_{ref} \times (1+R_2/R_1)$
$\fallingdotseq 1.25 \times (1+R_2/R_1)$
[R_1=2kΩ, $V_{ref} \fallingdotseq$ 1.25V]

Fig.2 Test Circuit for Ripple Rejection



f=120Hz (sine wave)
ei=0.5Vrms
V_{IN}=5V
V_O=3V (R_1=2kΩ)
I_O=0.5A
RR=20 log (ei/eo)

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)

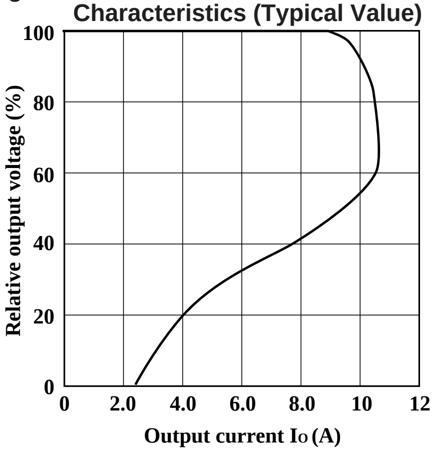


Fig.5 Reference Voltage Deviation vs. Junction Temperature

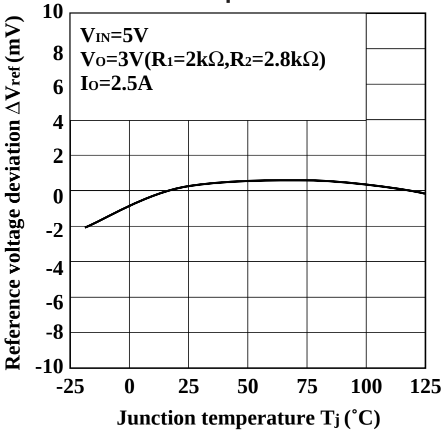


Fig.6 Output Voltage vs. Input Voltage

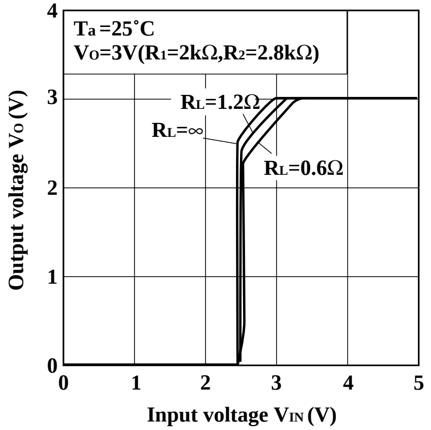


Fig.7 Circuit Operating Current vs. Input Voltage

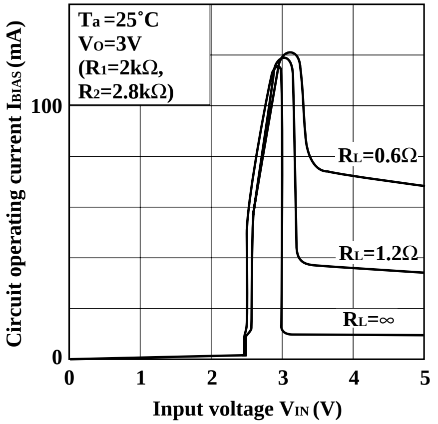


Fig.8 Dropout Voltage vs. Junction Temperature

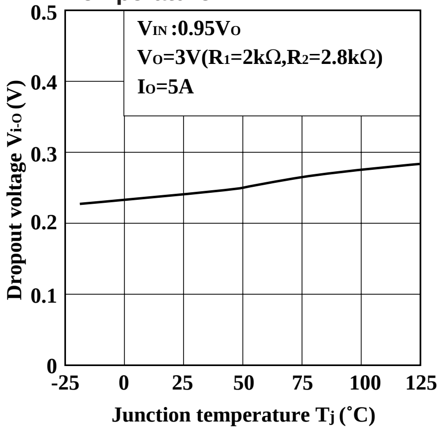


Fig.9 Quiescent Current vs. Junction Temperature

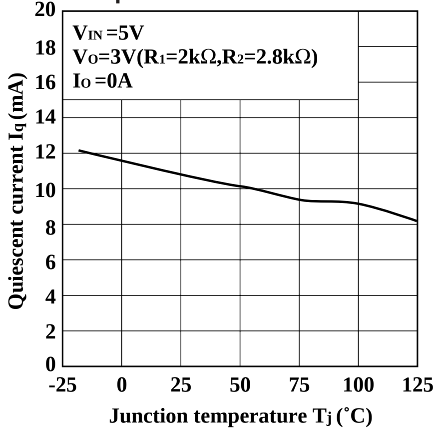


Fig.10 Ripple Rejection vs. Input Ripple Frequency

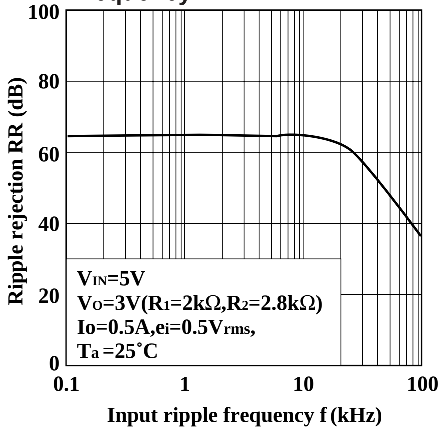
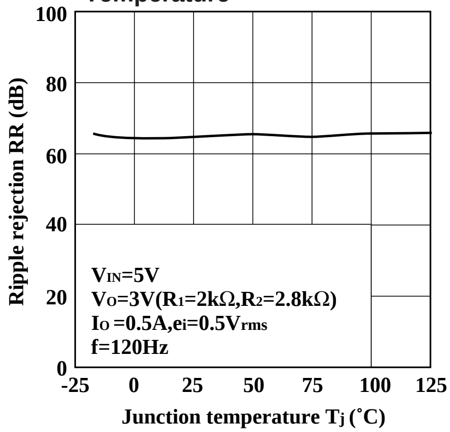
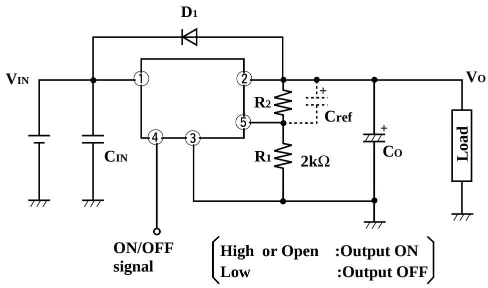


Fig.11 Ripple Rejection vs. Junction Temperature



■ Standard Connection



D_1 : 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.

C_{ref} : 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 C_{ref} may raise the gain, facilitating oscillation.)
* The output start-up time proportional to $C_{ref} \times R_2$.

C_{IN}, C_O : Be sure to mount the devices C_{IN} and C_O as close to the device terminal as possible so as to prevent oscillation.
The standard specification of C_{IN}= 0.33µF ,C_O= 47µF, respectively. However, adjust them as necessary after checking.

R_1, R_2 : These devices are necessary to set the output voltage. The output voltage V_O is given by the following formula:
$V_O=V_{ref} \times (1+R_2/R_1)$
(V_{ref} is 1.25V TYP)
The standard value of R_1 is 2Ω. But value up to 10kΩ.

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  - Office automation equipment
  - Telecommunication equipment [terminal]
  - Test and measurement equipment
  - Industrial control
  - Audio visual equipment
  - Consumer electronics

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  - Traffic signals
  - Gas leakage sensor breakers
  - Alarm equipment
  - Various safety devices, etc.

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