PQ7DV5

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

■ Features

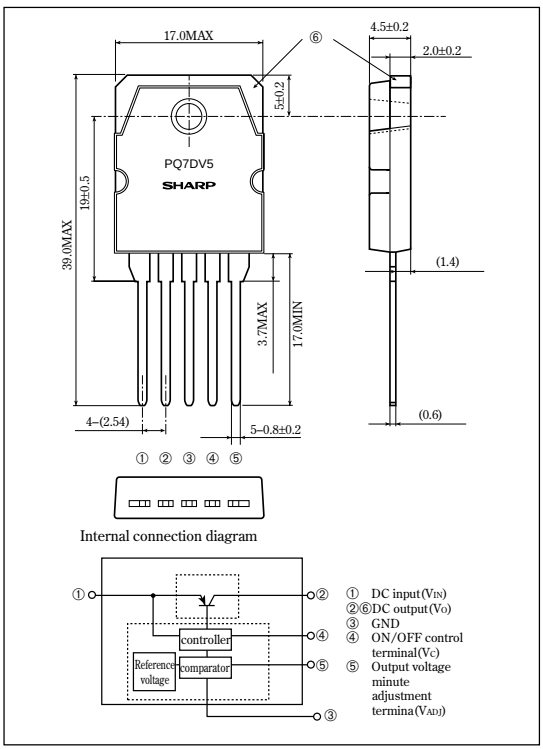
- TO-3P package
- Low power-loss (Dropout voltage: MAX. 0.5V at Io=5A)
- Variable output type (1.5V to 7V)
- Minimum input voltage: 3.0V
- High output current type (5A)
- Reference voltage precision: ±2.0%
- Built-in ON/OFF control function
- Built-in overcurrent protection, overheat protection function

■ Applications

- Power supplies for various electronic equipment such as personal computers

■ Outline Dimensions

(Unit : mm)



■ Absolute Maximum Ratings

(Ta=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<=Tj<=50°C.

• Please refer to the chapter " Handling Precautions ".

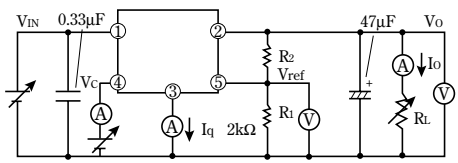
■ Electrical Characteristics

(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	Refer to Fig. 2	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

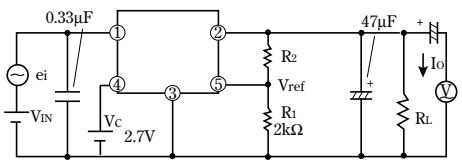
※3 In case of opening control terminal ④, output voltage turns on.

Fig. 1 Test Circuit



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

Fig. 2 Test Circuit for Ripple Rejection



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

Fig. 3 Power Dissipation vs. Ambient Temperature

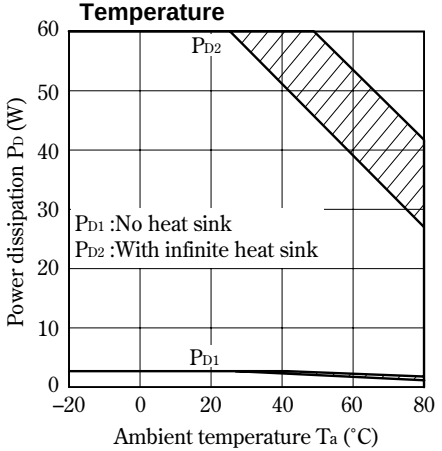
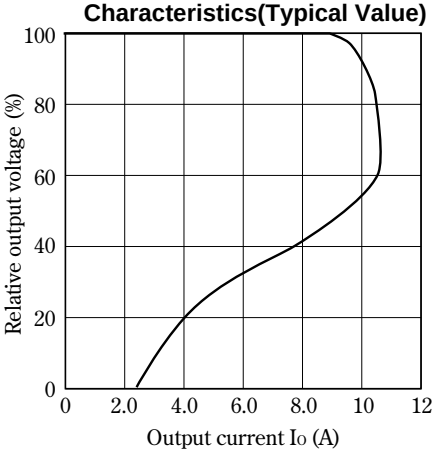


Fig. 4 Overcurrent Protection Characteristics(Typical Value)



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

Fig. 5 Reference Voltage Deviation vs. Junction Temperature

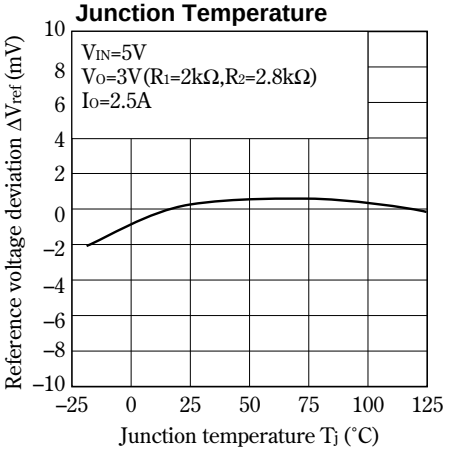


Fig. 6 Output Voltage vs. Input Voltage

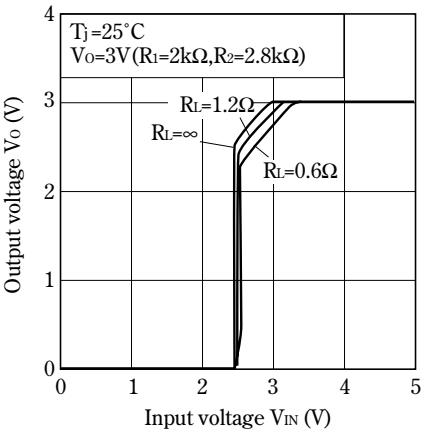


Fig. 7 Circuit Operating Current vs. Input Voltage

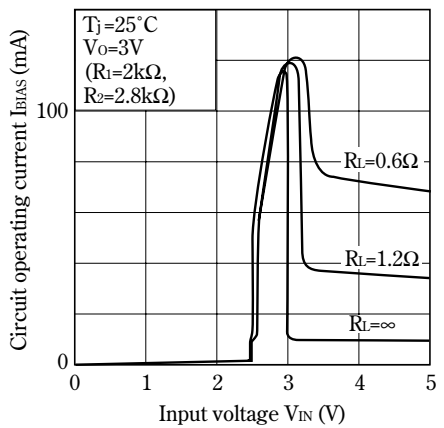


Fig. 8 Dropout Voltage vs. Junction Temperature

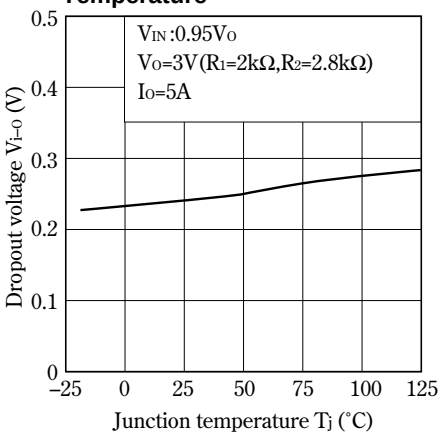


Fig. 9 Quiescent Current vs. Junction Temperature

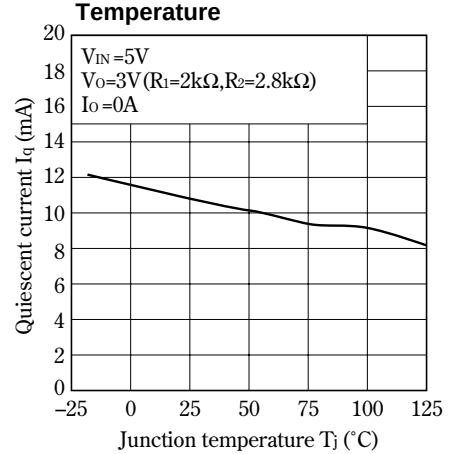


Fig.10 Ripple Rejection vs. Input Ripple Frequency

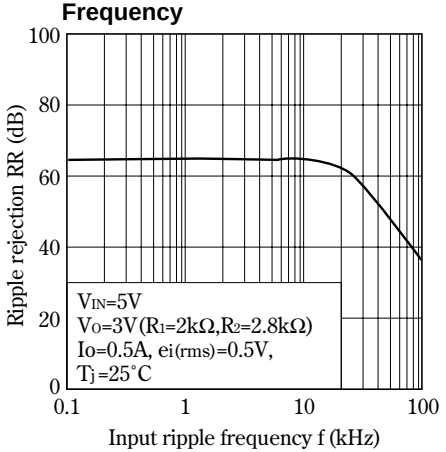
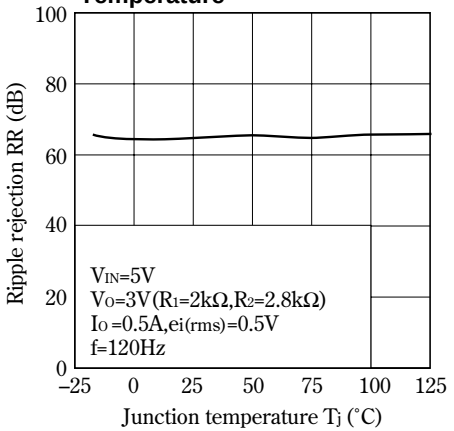
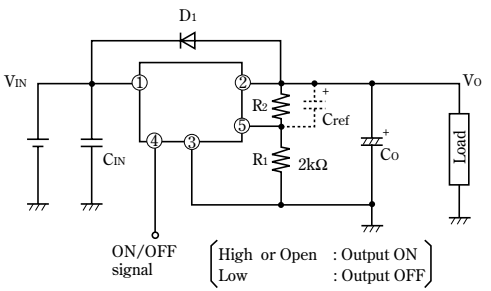


Fig.11 Ripple Rejection vs. Junction Temperature



■ 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×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= 0.33µ ,CO= 47µ, 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:
$V_O = V_{ref} \times (1 + R_2/R_1)$
(V_{ref} is 1.25V TYP)
The standard value of R1 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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  --- Alarm equipment
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