

# PQ5EV3/PQ5EV5/PQ5EV7

Large Output Current Type Low Power-Loss Voltage Regulator

## ■ Features

- Low power-loss (Dropout voltage: MAX.0.5V)
- Package with exposed radiation fin (Equivalent to TO-220)
- Large output current  
3.5A: PQ5EV3, 5A: PQ5EV5, 7.5A: PQ5EV7
- Variable output voltage (1.5V to 5V)
- High-precision reference voltage type  
(Reference voltage precision:  $\pm 1.0\%$ )
- Overcurrent, overheat protection functions

## ■ Applications

- Personal computers
- Power supplies for various electronic equipment such as AV or OA

## ■ Absolute Maximum Ratings

(Ta=25°C)

Parameter	Symbol	Rating	Unit
*1 Input voltage	V <sub>IN</sub>	7	V
Dropout voltage	V <sub>I-O</sub>	4	V
*1 ON/OFF control terminal voltage	V <sub>C</sub>	7	V
*1 Output adjustment terminal voltage	V <sub>ADJ</sub>	5	V
Output current	<b>PQ5EV3</b>	3.5	A
	<b>PQ5EV5</b>	5.0	
	<b>PQ5EV7</b>	7.5	
*2 Power dissipation	P <sub>D1</sub>	1.6	W
	P <sub>D2</sub>	45	W
*3 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
*4 Soldering temperature	T <sub>sol</sub>	260 (10s)	°C

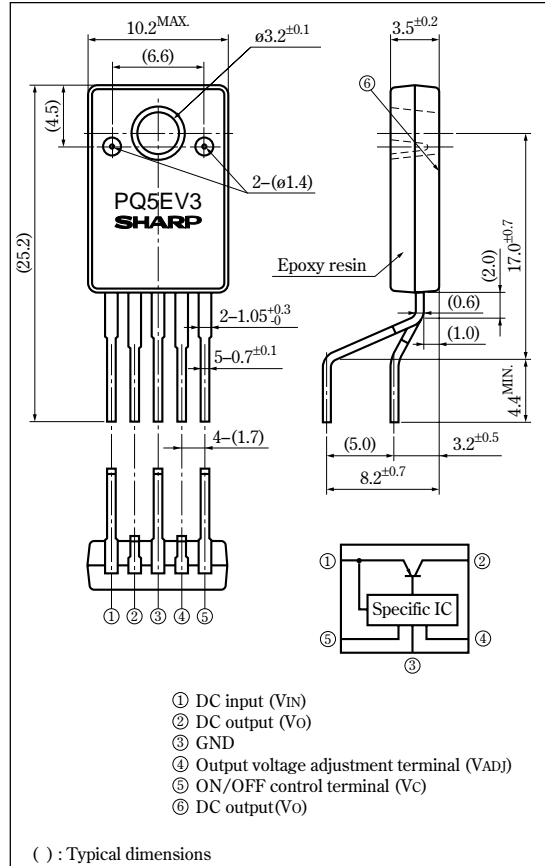
\*1 All are open except GND and applicable terminals

\*2 P<sub>D1</sub>:No heat sink, P<sub>D2</sub>:With infinite heat sink

\*3 Overheat protection may operate at the condition T<sub>J</sub>=125°C to 150°C

## ■ Outline Dimensions

(Unit : mm)



•Please refer to the chapter " Handling Precautions ".

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Electrical Characteristics

(Unless otherwise specified,  $V_{IN}=5V$ ,  $V_O=3V$  ( $R_1=2k\Omega$ ),  $T_a=25^\circ C$ )

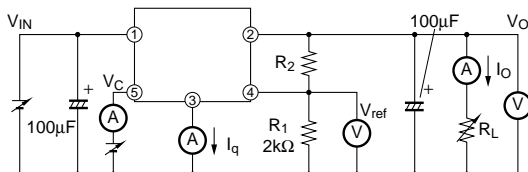
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input voltage	$V_{IN}$	—	2.35	—	7	V
Output voltage	$V_O$	—	1.5	—	5	V
Reference voltage	$V_{ref}$	—	1.2276	1.24	1.2524	V
Load regulation	$R_{egL}$	$I_o=5mA$ to rating	—	0.1	0.5	%
Line regulation	$R_{egI}$	$V_{IN}=4$ to $7V$ , $I_o=5mA$	—	0.05	0.1	%
Reference voltage temperature coefficient	$T_c V_{ref}$	$T_j=0$ to $125^\circ C$	—	$\pm 1$	—	%
Ripple Rejection	RR	Refer to Fig.2	60	70	—	dB
Dropout voltage	$V_{I-O}$	*5	—	—	0.5	V
*6 ON-state voltage for control	$V_{C(ON)}$	—	2	—	—	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	$I_q$	$I_o=0A$	—	10	15	mA

\*4 PQ5EV3: $I_o=1.75A$ , PQ5EV5: $I_o=2.5A$ , PQ5EV7: $I_o=3.75A$

\*5 PQ5EV3: $I_o=3.5A$ , PQ5EV5: $I_o=5A$ , PQ5EV7: $I_o=7.5A$ . Input voltage shall be the value when output voltage is 95% in comparison with the initial value

\*6 In case of opening control terminal ⑤, output voltage turns on.

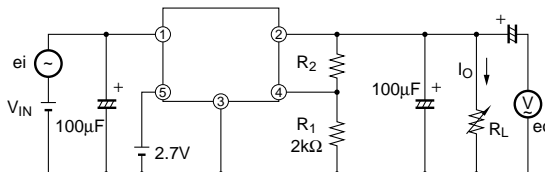
Fig.1 Test Circuit



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

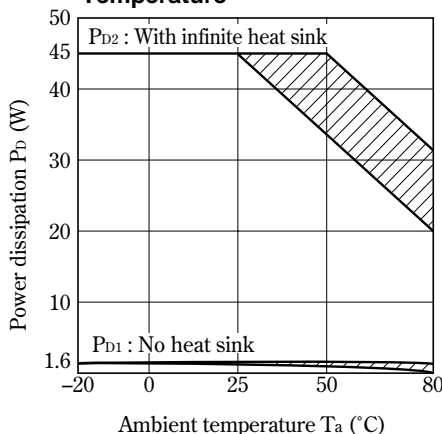
$$[R_1=2k\Omega, V_{ref}=1.24V]$$

Fig.2 Test Circuit for Ripple Rejection



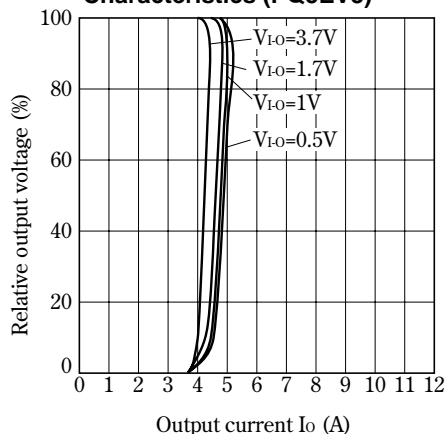
$f=120Hz$  (sine wave)  
 $e_i(rms)=0.5V$   
 $V_O=3V$  ( $R_1=2k\Omega$ )  
 $V_{IN}=5V$   
 $I_o=0.5A$   
 $RR=20\log(e_i(rms)/e_o(rms))$

Fig.3 Power Dissipation vs. Ambient Temperature

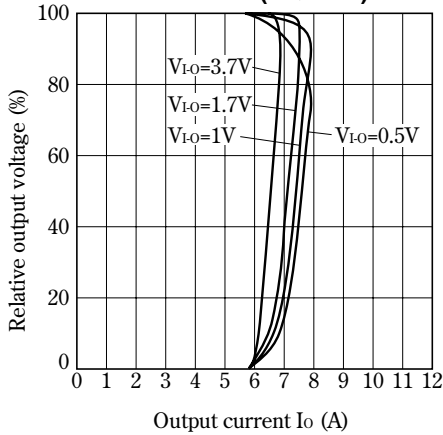


Note) Oblique line portion: Overheat protection may operate in this area

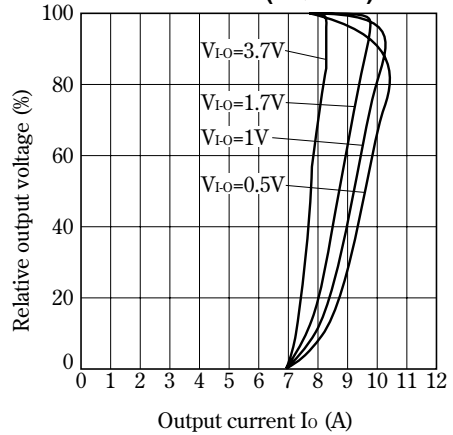
Fig.4 Overcurrent Protection Characteristics (PQ5EV3)



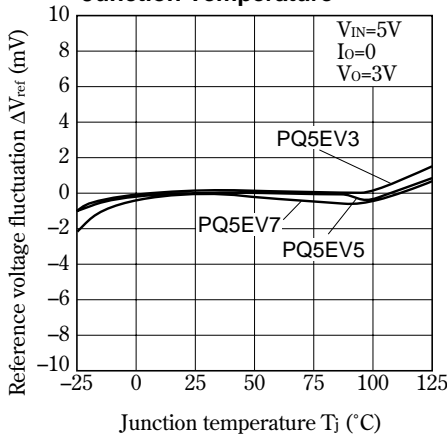
**Fig.5 Overcurrent Protection Characteristics (PQ5EV5)**



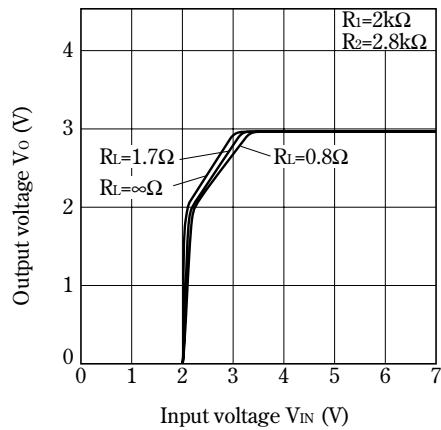
**Fig.6 Overcurrent Protection Characteristics (PQ5EV7)**



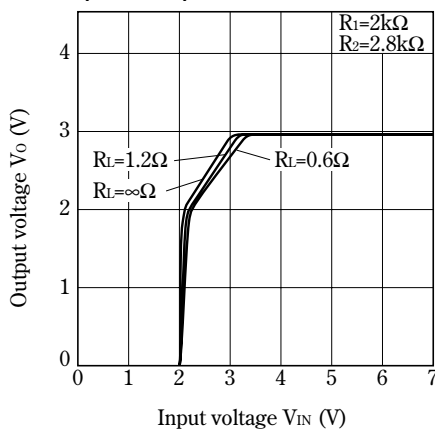
**Fig.7 Reference Voltage Fluctuation vs. Junction Temperature**



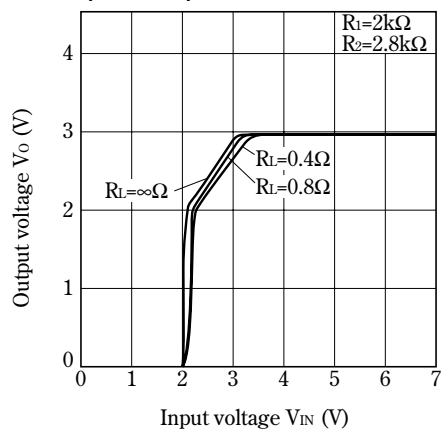
**Fig.8 Output Voltage vs. Input Voltage (PQ5EV3)**



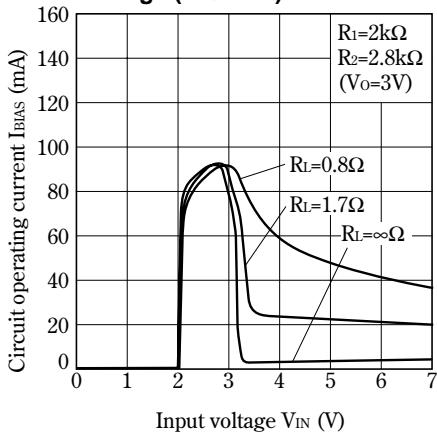
**Fig.9 Output Voltage vs. Input Voltage (PQ5EV5)**



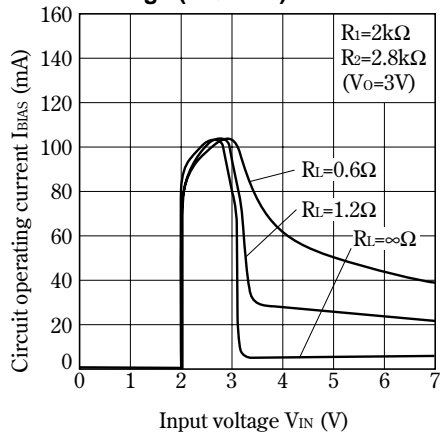
**Fig.10 Output Voltage vs. Input Voltage (PQ5EV7)**



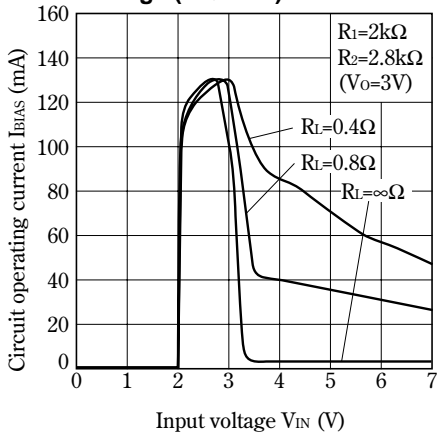
**Fig.11 Circuit Operating Current vs. Input Voltage (PQ5EV3)**



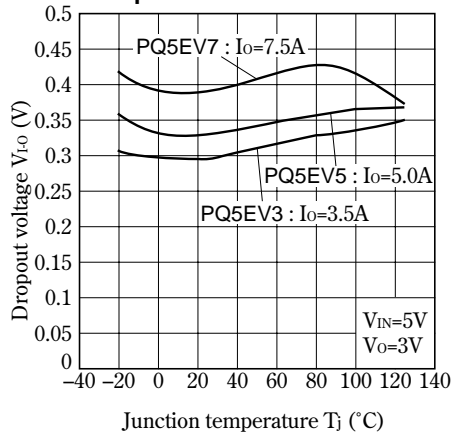
**Fig.12 Circuit Operating Current vs. Input Voltage (PQ5EV5)**



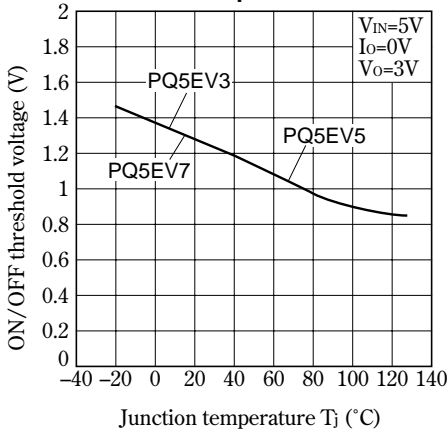
**Fig.13 Circuit Operating Current vs. Input Voltage (PQ5EV7)**



**Fig.14 Dropout Voltage vs. Junction Temperature**



**Fig.15 ON-OFF Threshold Voltage vs. Junction Temperature**



**Fig.16 Quiescent Current vs. Junction Temperature**

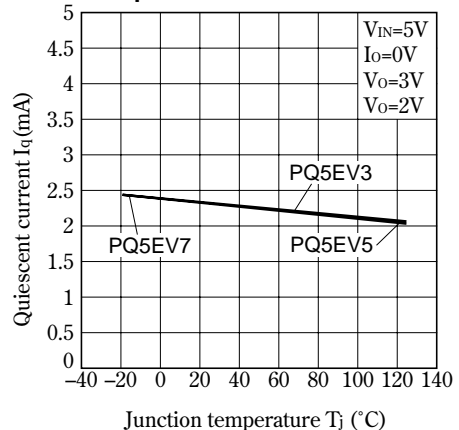


Fig.17 Ripple Rejection vs. Input Ripple Frequency

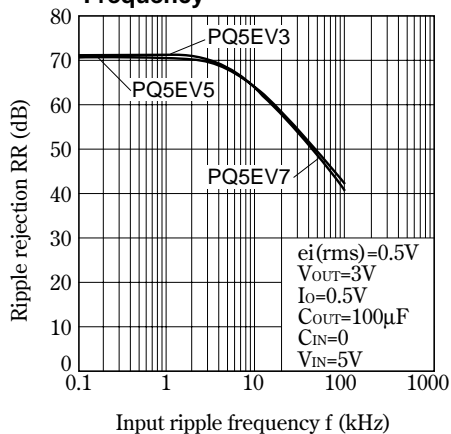


Fig.18 Output Voltage Adjustment Characteristics

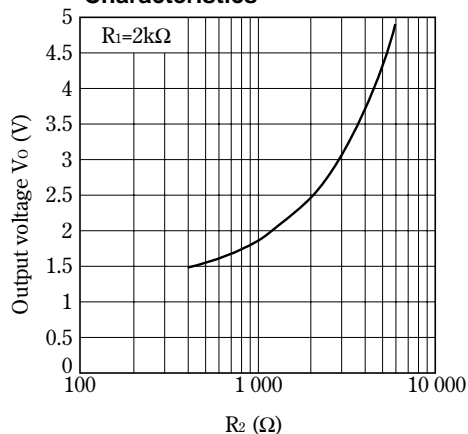
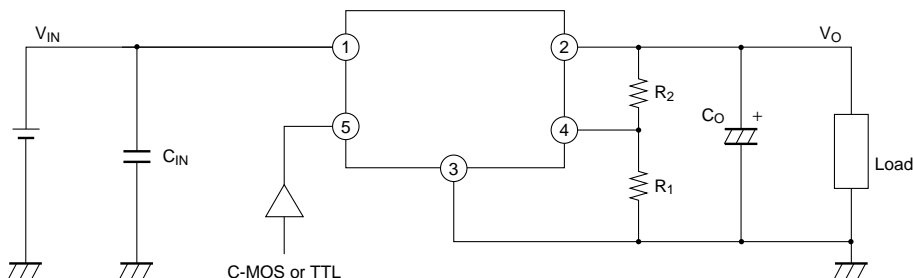
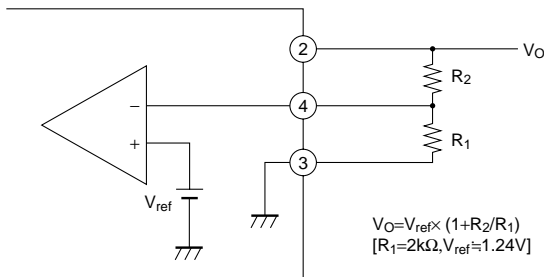


Fig.19 External Connection



■ Setting of Output Voltage

Output voltage is able to set (1.5V to 5V) when resistors  $R_1$ ,  $R_2$  are attached to ②, ③, ④ terminals. As for the external resistors to set output voltage, refer to the following figure and Fig.18.



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