# 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: ±1.0%)
- Overcurrent, overheat protection functions

## ■ Applications

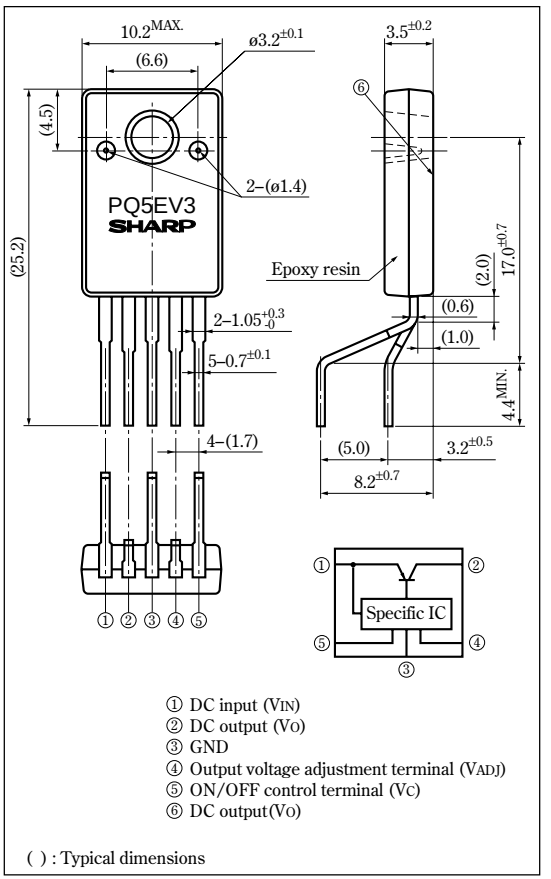
- Personal computers
- Power supplies for various electronic equipment such as AV or OA

## ■ Absolute Maximum Ratings (Ta=25°C)

| Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|
| ※1 Input voltage | | $V_{IN}$ | 7 | V |
| Dropout voltage | | $V_{I-O}$ | 4 | V |
| ※1 ON/OFF control terminal voltage | | $V_C$ | 7 | V |
| ※1 Output adjustment terminal voltage | | $V_{ADJ}$ | 5 | V |
| Output current | PQ5EV3 | $I_O$ | 3.5 | A |
| | PQ5EV5 | | 5.0 | |
| | PQ5EV7 | | 7.5 | |
| ※2 Power dissipation | | $P_{D1}$ | 1.6 | W |
| | | $P_{D2}$ | 45 | W |
| ※3 Junction temperature | | $T_j$ | 150 | ˚C |
| Operating temperature | | $T_{opr}$ | −20 to +80 | ˚C |
| Storage temperature | | $T_{stg}$ | −40 to +150 | ˚C |
| ※4 Soldering temperature | | $T_{sol}$ | 260 (10s) | ˚C |

※1 All are open except GND and applicable terminals
※2 $P_{D1}$:No heat sink, $P_{D2}$:With infinite heat sink
※3 Overheat protection may operate at the condition $T_j$=125˚C to 150˚C

## ■ Outline Dimensions (Unit : mm)




• Please refer to the chapter " Handling Precautions ".

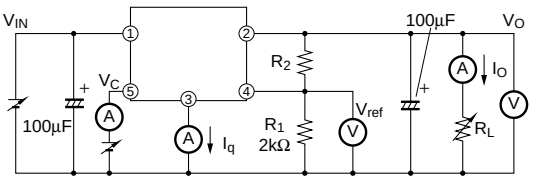
## ■ Electrical Characteristics

(Unless otherwise specified, $V_{IN}$=5V, ※4,$V_O$=3V ($R_1$=2kΩ) , Ta=25˚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 | $R_{eg}L$ | $I_O$=5mA to rating | – | 0.1 | 0.5 | % |
| Line regulation | $R_{eg}I$ | $V_{IN}$=4 to 7V, $I_O$=5mA | – | 0.05 | 0.1 | % |
| Reference voltage temperature coefficient | $T_CV_{ref}$ | $T_j$=0 to 125˚C | – | ±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 | 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 | – | 10 | 15 | mA |

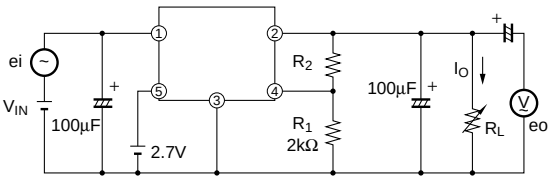
※4 **PQ5EV3**:$I_O$=1.75A, **PQ5EV5**:$I_O$=2.5A, **PQ5EV7**:$I_O$=3.75A
※5 **PQ5EV3**:$I_O$=3.5A, **PQ5EV5**:$I_O$=5A, **PQ5EV7**:$I_O$=7.5A. Input voltage shall be the value when output voltage is 95% in comparison with the initial value
※6 In case of opening control terminal ⑤, output voltage turns on.

### Fig.1 Test Circuit



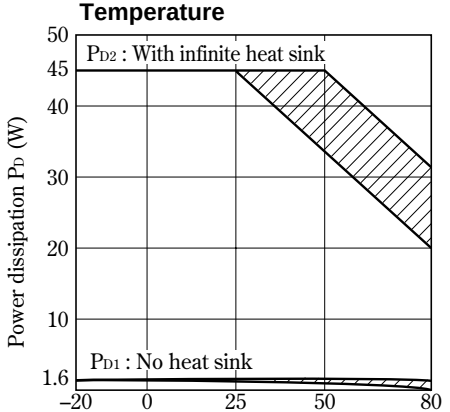

$V_O=V_{ref}\times(1+R_2/R_1)$
[$R_1$=2kΩ, $V_{ref}$≒1.24V]

### Fig.2 Test Circuit for Ripple Rejection




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

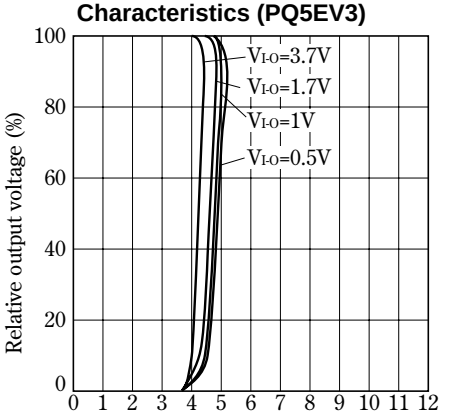


**Fig.5 Overcurrent Protection Characteristics (PQ5EV5)**

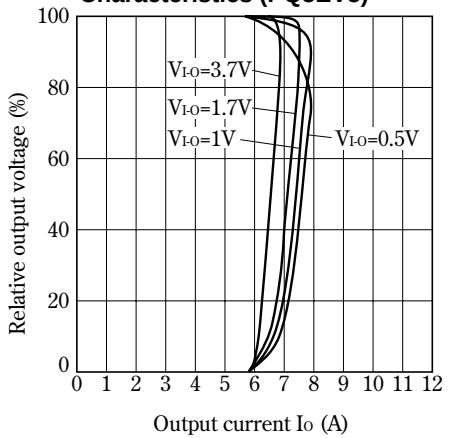



**Fig.6 Overcurrent Protection Characteristics (PQ5EV7)**

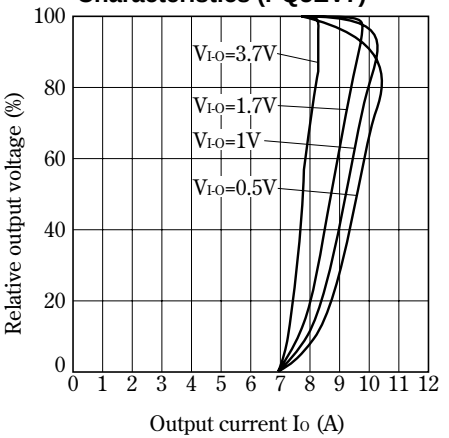



**Fig.7 Reference Voltage Fluctuation vs. Junction Temperature**

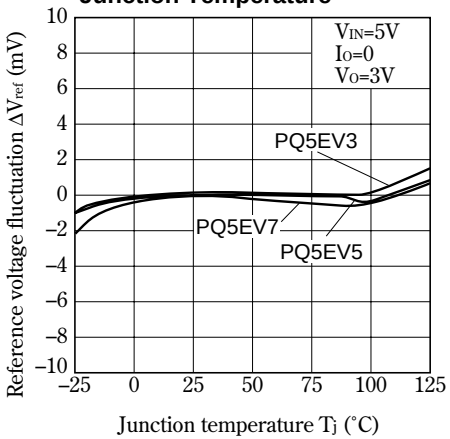



**Fig.8 Output Voltage vs. Input Voltage (PQ5EV3)**

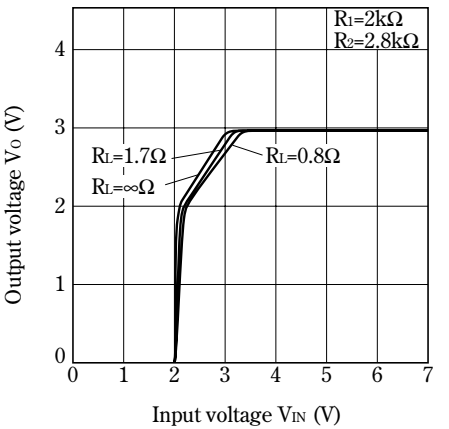



**Fig.9 Output Voltage vs. Input Voltage (PQ5EV5)**

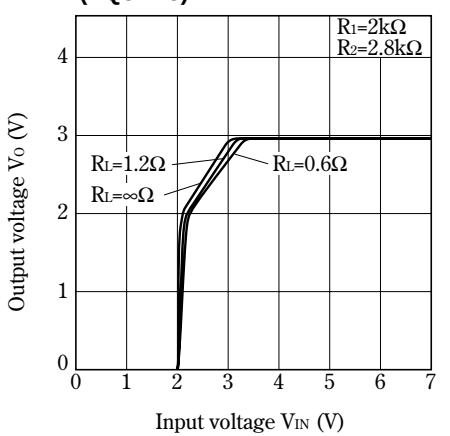



**Fig.10 Output Voltage vs. Input Voltage (PQ5EV7)**

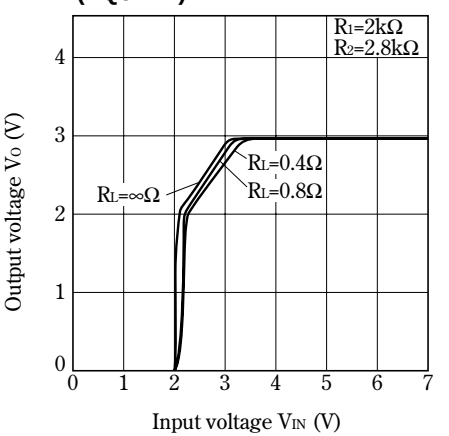


**Fig.11 Circuit Operating Current vs. Input Voltage (PQ5EV3)**

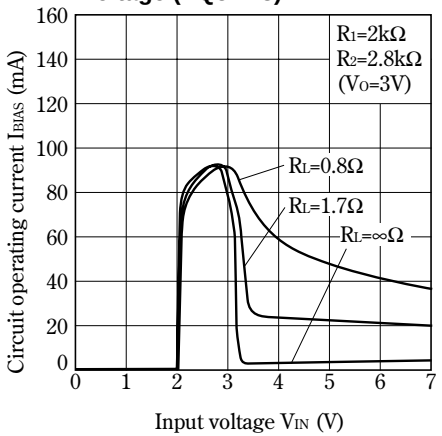



**Fig.12 Circuit Operating Current vs. Input Voltage (PQ5EV5)**

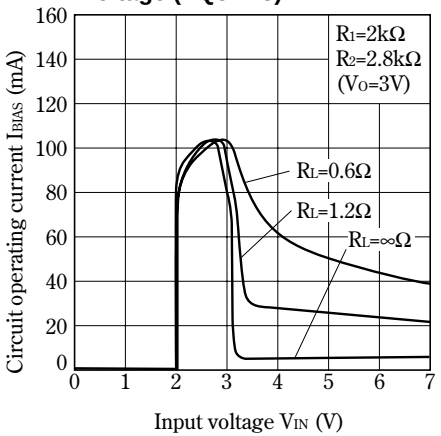



**Fig.13 Circuit Operating Current vs. Input Voltage (PQ5EV7)**

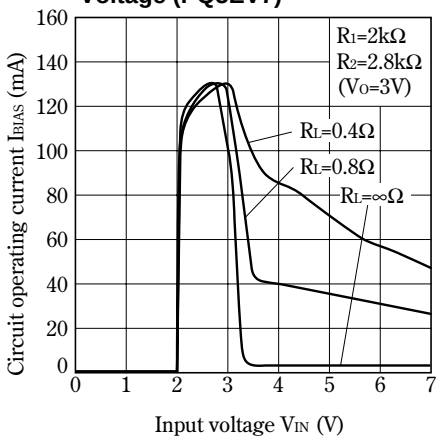



**Fig.14 Dropout Voltage vs. Junction Temperature**

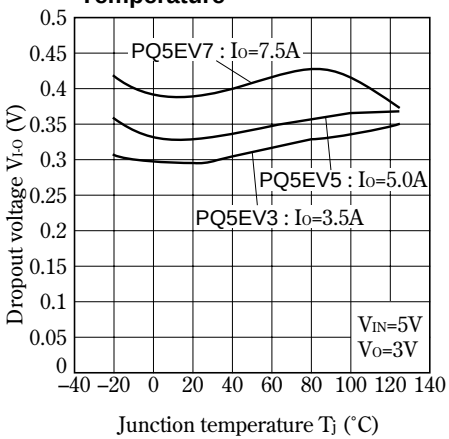



**Fig.15 ON-OFF Threshold Voltage vs. Junction Temperature**

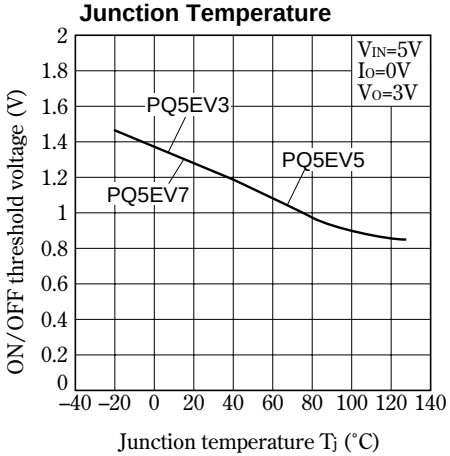



**Fig.16 Quiescent Current vs. Junctiion Temperature**

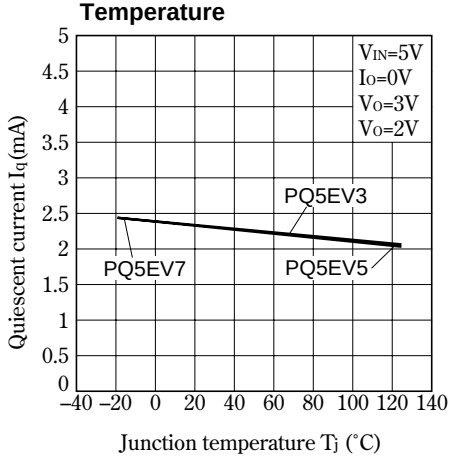


**Fig.17 Ripple Rejection vs. Input Ripple Frequency**

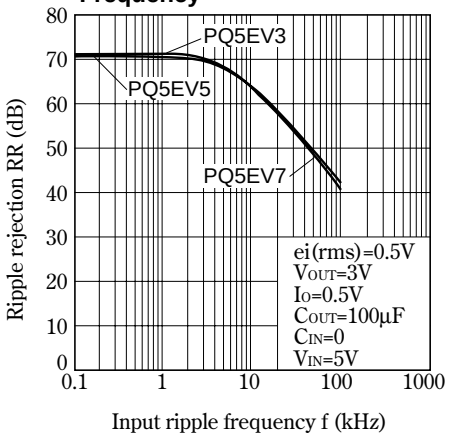



**Fig.18 Output Voltage Adjustment Characteristics**

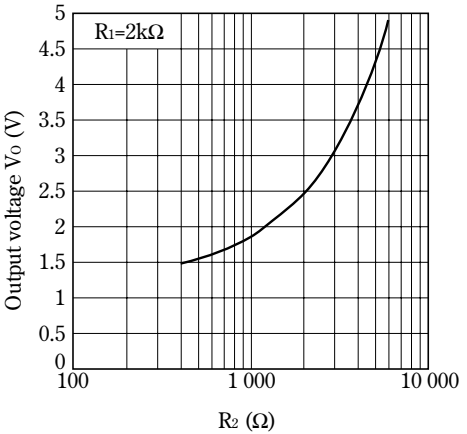
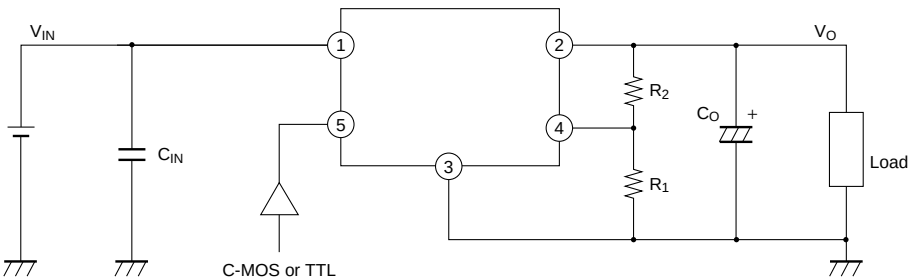
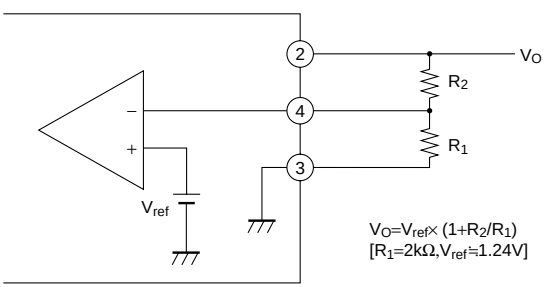



**Fig.19 External Connection**




## ■ 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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