# PQ150VB01FZ/PQ150VB02FZ

Variable Output Low Power-Loss Voltage Regulator (Built-in Overheart Shutdown function, Output ON/OFF control function)

## ■ Features

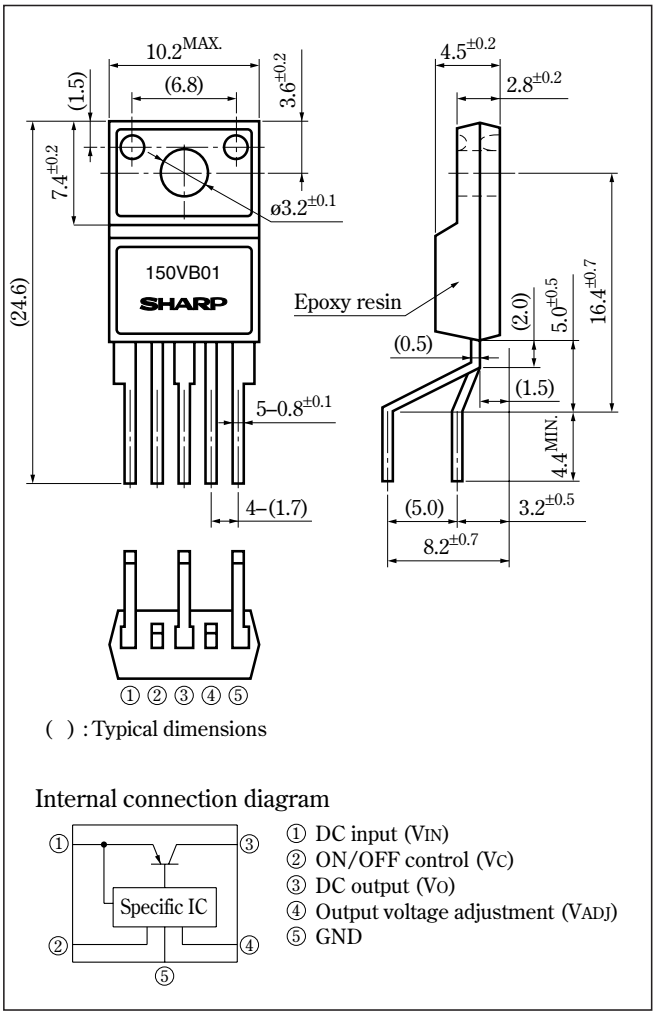
- Low power-loss
  (Dropout voltage: MAX. 0.5V at Io=0.5A)
- Overheat shut-down function
- Variable output voltage (setting range: 1.5 to 15V)
- Compact resin mold package
  (Equivalent to TO-220)
- With built-in overcurrent protection
- Reference voltage precision: ±2.0%

## ■ Applications

- Series power supply for TVs and VTRs
- Power supplies for equipment
- CRT displays

## ■ Outline Dimensions

(Unit : mm)




( ) : Typical dimensions

Internal connection diagram




① DC input (VIN)
② ON/OFF control (VC)
③ DC output (VO)
④ Output voltage adjustment (VADJ)
⑤ GND

## ■ Absolute Maximum Ratings

(Ta=25°C)

| Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|
| *1 Input voltage | | $V_{IN}$ | 17 | V |
| *1 ON/OFF control terminal voltage | | $V_C$ | 17 | V |
| *1 Output adjustment terminal voltage | | $V_{ADJ}$ | 5 | V |
| Output current | PQ150VB01FZ | $I_O$ | 1 | A |
| | PQ150VB02FZ | | 2 | |
| *2 Power dissipation | | $P_{D1}$ | 1.25 | W |
| | | $P_{D2}$ | 12.5 | W |
| *3 Junction temperature | | $T_j$ | 150 | °C |
| Operating temperature | | $T_{opr}$ | –40 to + 85 | °C |
| Storage temperature | | $T_{stg}$ | –40 to +150 | °C |
| Soldering temperature | | $T_{sol}$ | 260 (10s) | °C |

*1 All are open except GND and applicable terminals
*2 Overheat shut-down function operates at Tj≥110°C

• Please refer to the chapter " Handling Precautions ".

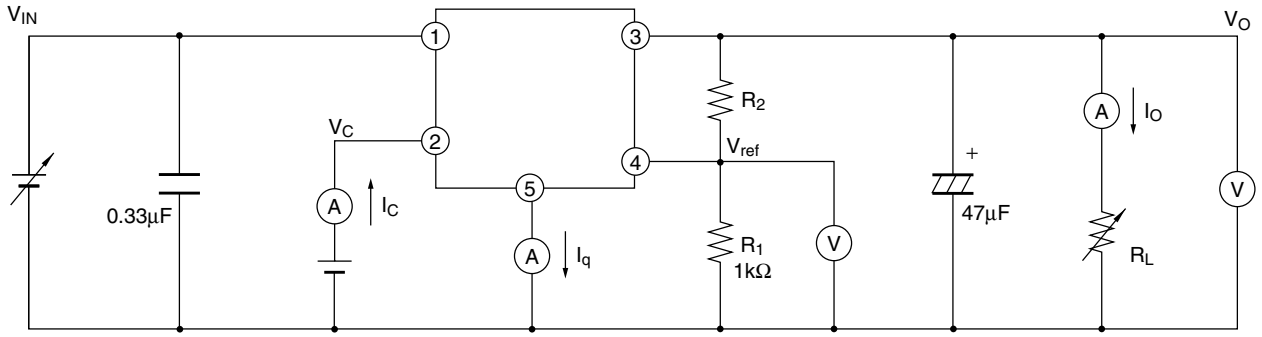
## ■ Electrical Characteristics

(Unless otherwise specified, condition shall be $V_{IN}$=5V, $V_O$=3V, $I_O$=0.5A[**PQ150VB01FZ**], 1A[**PQ150VB02FZ**], $R_L$=1kΩ, $V_C$=2.7V, Ta=25°C)

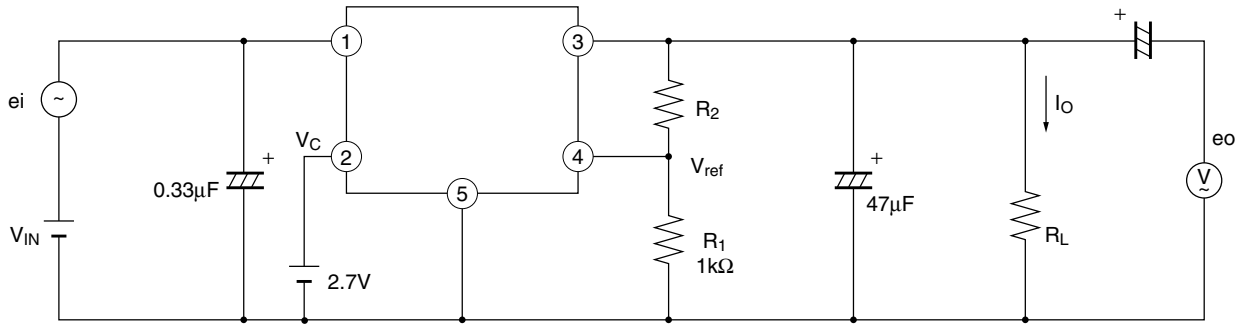
| Parameter | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|---|---|---|---|---|---|---|
| Minimum operating supply voltage | $V_{IN}$ | — | 2.35 | — | — | V |
| Output voltage | $V_O$ | — | 1.5 | — | 15 | V |
| Load regulation | RegL | ※3 | — | 0.3 | 1.0 | % |
| Line regulation | RegI | $V_{IN}$=4 to 10V,Io=5mA | — | 0.5 | 1.0 | % |
| Ripple rejection | RR | — | 45 | 55 | — | dB |
| Reference voltage | $V_{ref}$ | — | 1.215 | 1.24 | 1.265 | V |
| Reference voltage temperature coefficient | $T_CV_{ref}$ | Tj=0 to 110°C,Io=5mA | — | ±1.0 | — | % |
| Dropout voltage | $V_{I-O}$ | ※4 Io=0.5A(PQ150VB01FZ),Io=2A(PQ150VB02FZ) | — | — | 0.5 | V |
| ※5 ON-state voltage for control | $V_{C\ (ON)}$ | — | 2.0 | — | — | V |
| ON-state current for control | $I_{C\ (ON)}$ | $V_C$=2.7V | — | — | 200 | µA |
| OFF-state voltage for control | $V_{C\ (OFF)}$ | — | — | — | 0.8 | V |
| OFF-state current for control | $I_{C\ (OFF)}$ | $V_C$=0.4V | — | — | 2 | µA |
| Quiescent current | $I_q$ | Io=0 | — | — | 5 | mA |
| Output OFF-state consumption current | $I_{qs}$ | Io=0A, $V_C$=0.4V | — | — | 5 | µA |
| Overheating shutdown temperature | $T_{SD}$ | — | 110 | 130 | 150 | °C |

※3 PQ150VB01FZ : Io=5mA to 1A,PQ150VB02FZ : Io=5mA to 2A
※4 Input voltage shall be the value when output voltage is 95% in comparison with the initial value
※5 In case of opening ON/OFF control terminal ②, output voltage turns off

### Fig.1 Test Circuit

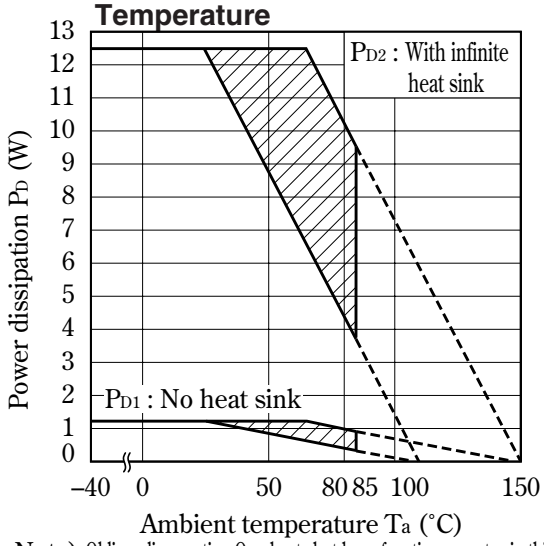



### Fig.2 Test Circuit for Ripple Rejection




f=120Hz(sine wave)
ei(rms)=0.5V
$V_O$=3V($R_1$=1kΩ)
$V_{IN}$=5V
$I_O$=0.5A
RR=20log(ei(rms)/eo(rms))

**Fig.3 Power Dissipation vs. Ambient Temperature**




Note) Oblique line portion:Overheat shutdown function operates in this area

**Fig.4 Overcurrent Protection Characteristics (Typical Value) (PQ150VB01FZ)**

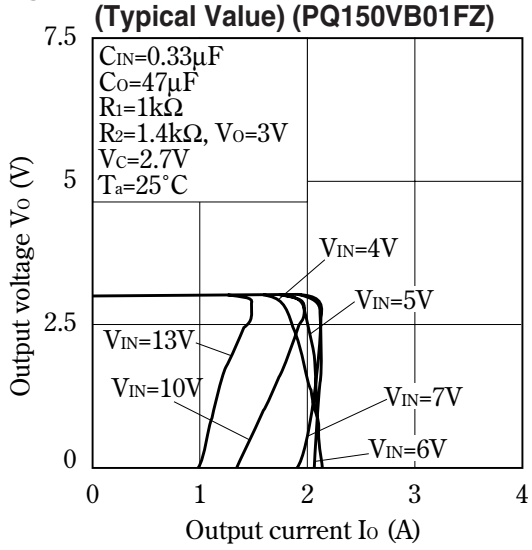



**Fig.5 Overcurrent Protection Characteristics (Typical Value) (PQ150VB02FZ)**

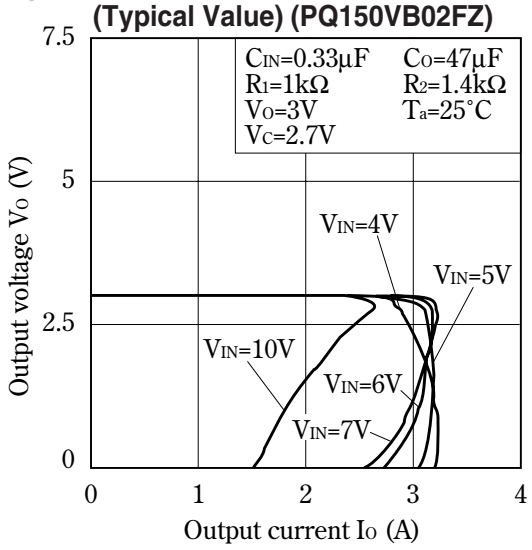



**Fig.6 Reference Voltage Fluctuation vs. Junction Temperature (PQ150VB01FZ)**

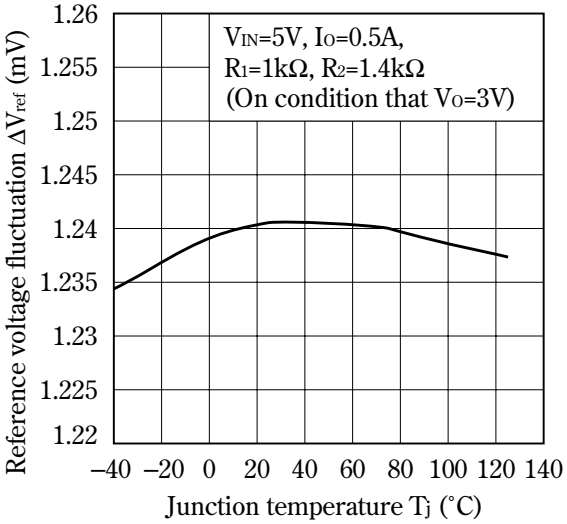



**Fig.7 Reference Voltage Fluctuation vs. Junction Temperature (PQ150VB02FZ)**

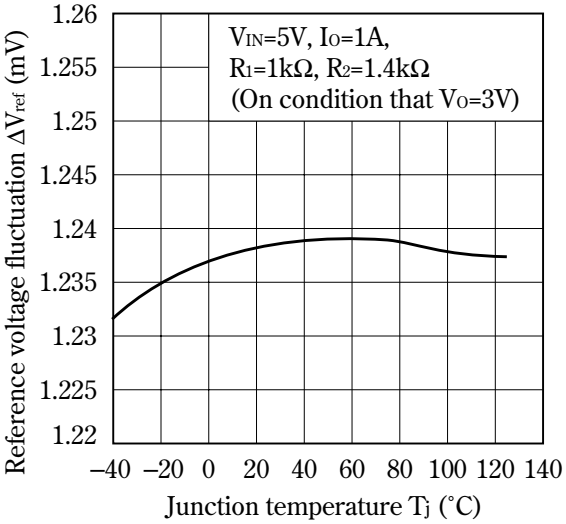


**Fig.8 Output Voltage vs. Input Voltage (PQ150VB01FZ)**

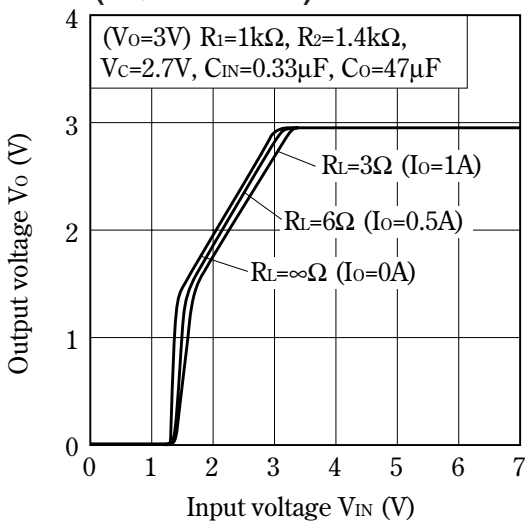



**Fig.9 Output Voltage vs. Input Voltage (PQ150VB02FZ)**

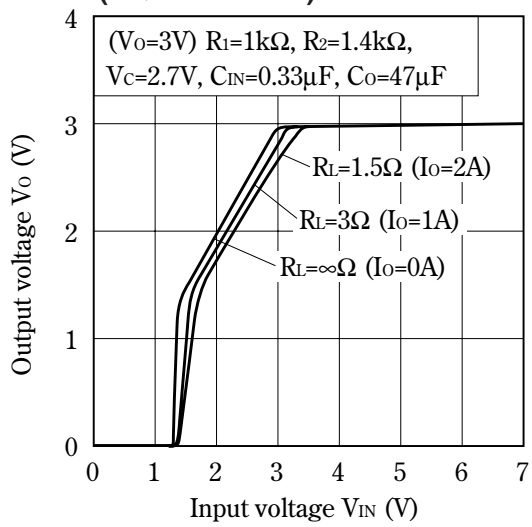



**Fig.10 Circuit Operating Current vs. Input Voltage (PQ150VB01FZ)**

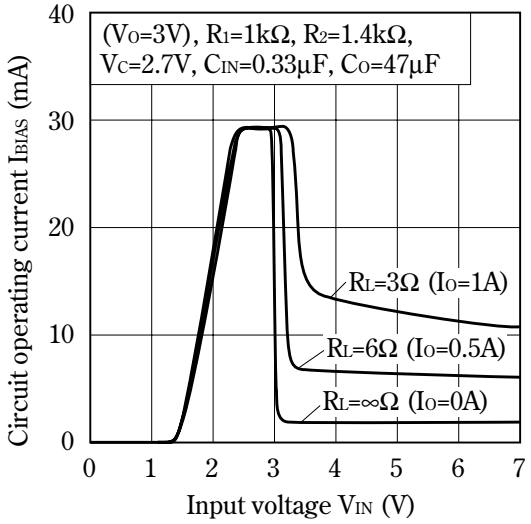



**Fig.11 Circuit Operating Current vs. Input Voltage (PQ150VB02FZ)**

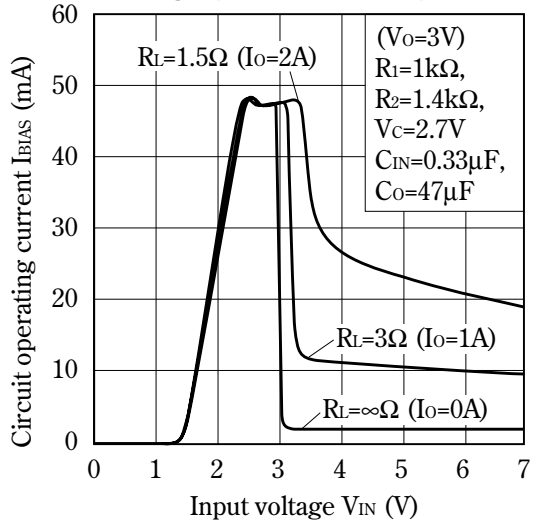



**Fig.12 Dropout Voltage vs. Junction Temperature (PQ150VB01FZ)**

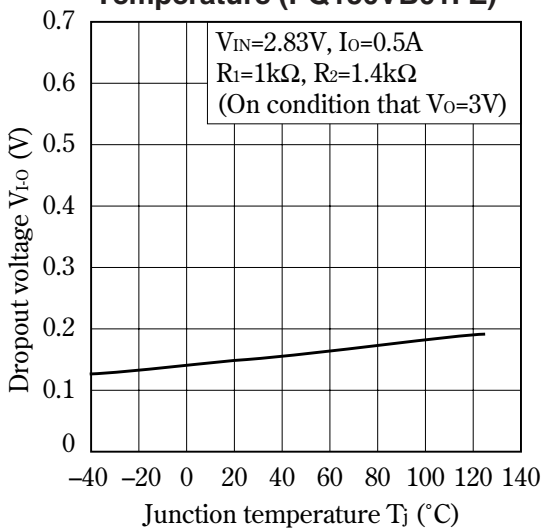



**Fig.13 Dropout Voltage vs. Junction Temperature (PQ150VB02FZ)**

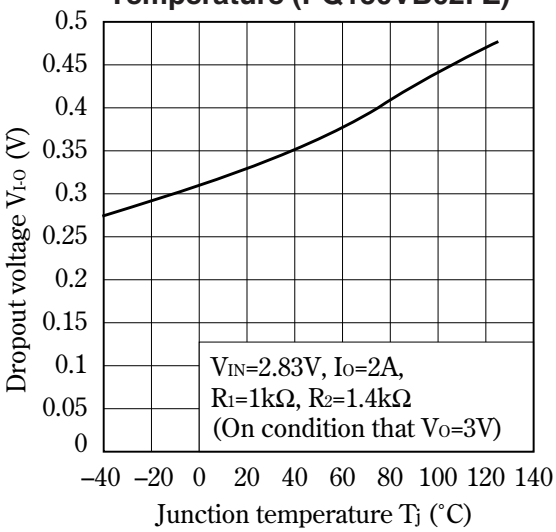


**Fig.14 Quiescent Current vs. Junction Temperature (PQ150VB01FZ)**

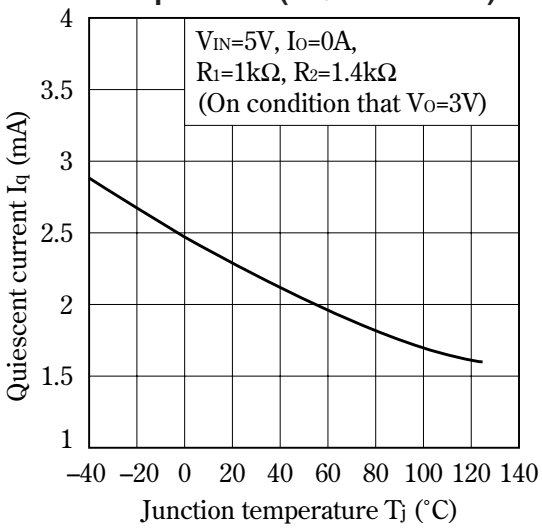



**Fig.15 Quiescent Current vs. Junction Temperature (PQ150VB02FZ)**

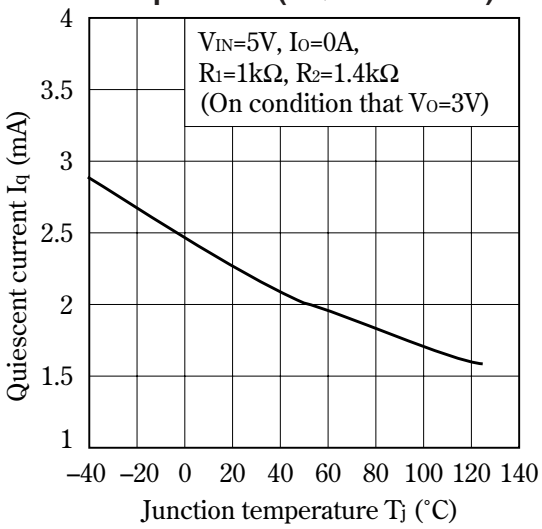



**Fig.16 Ripple Rejection vs. Input Ripple Frequency**

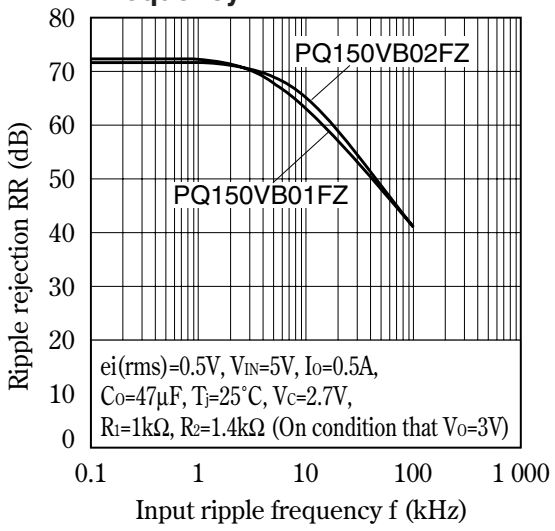
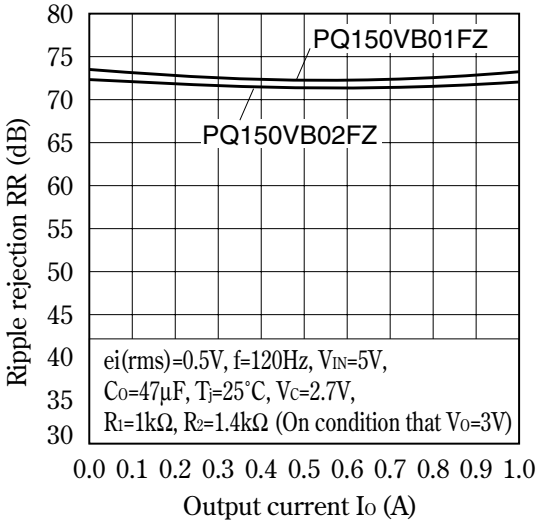
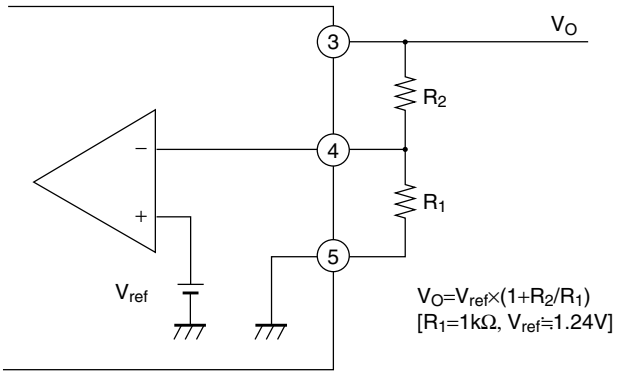



**Fig.17 Ripple Rejection vs. output Current**

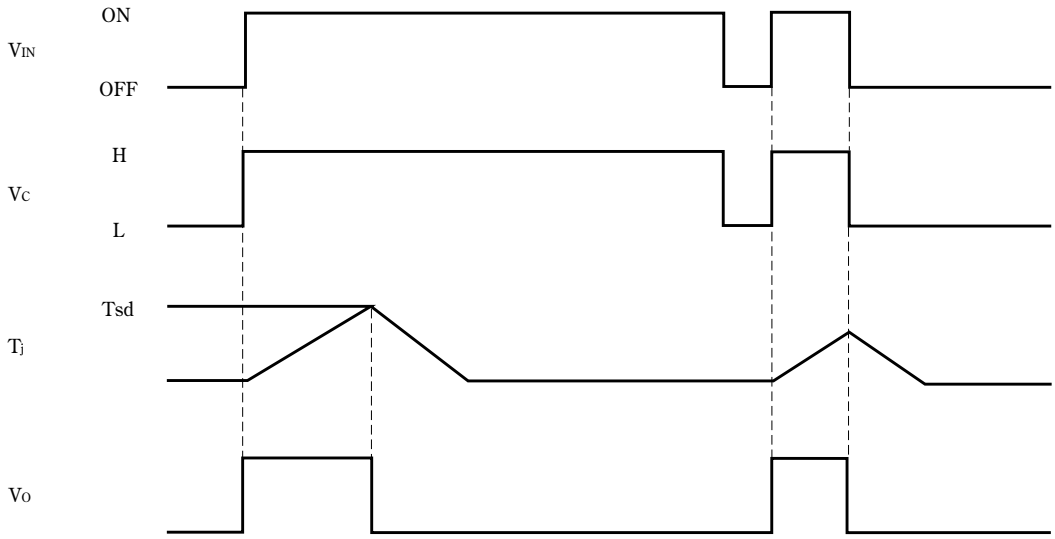


## ■ Setting of Output Voltage

Output voltage is able to set from 1.5V to 25V when resistors $R_1$ and $R_2$ are attached to ③, ④, ⑤ terminals. As for the external resistors to set output voltage, refer to the figure below.




## ■ Overheat Shut-down Characteristics (Typical Value)




※Tsd:Overheat shut-down temperature (Tj≥110°C)

(1) Overheat shut-down operates at Tj=Tsd and output OFF-state is maintained.
(2) OFF-state is kept untill $V_{IN}$ is once turned off or $V_C$ is turned down to the "L" level.

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