

PQ150VB01FZ/PQ150VB02FZ

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

Features

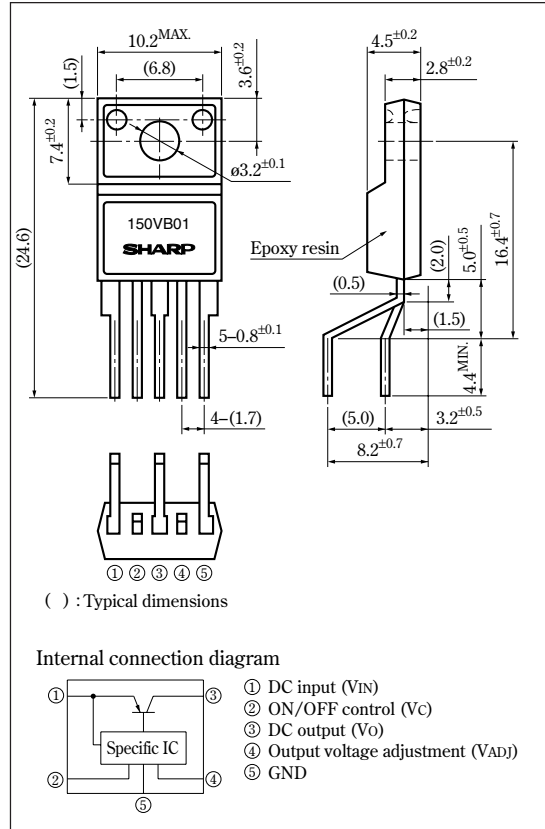
- Low power-loss
(Dropout voltage: MAX. 0.5V at $I_o=0.5A$)
- Overheat shut-down function
- Variable output voltage (setting range: 1.5 to 15V)
- Compact resin mold package
(Equivalent to TO-220)
- With built-in overcurrent protection
- Reference voltage precision: $\pm 2.0\%$

Applications

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

Outline Dimensions

(Unit : mm)



Absolute Maximum Ratings

($T_a=25^\circ C$)

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	1	A
	PQ150VB02FZ	2	
*2 Power dissipation	P_{D1}	1.25	W
	P_{D2}	12.5	W
*3 Junction temperature	T_j	150	$^\circ C$
Operating temperature	T_{opr}	-40 to + 85	$^\circ C$
Storage temperature	T_{stg}	-40 to +150	$^\circ C$
Soldering temperature	T_{sol}	260 (10s)	$^\circ C$

*1 All are open except GND and applicable terminals
*2 Overheat shut-down function operates at $T_j \geq 110^\circ C$

• Please refer to the chapter " Handling Precautions ".

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Electrical Characteristics

(Unless otherwise specified, condition shall be $V_{IN}=5V$, $V_O=3V$, $I_O=0.5A$ [PQ150VB01FZ], $1A$ [PQ150VB02FZ], $R_I=1k\Omega$, $V_C=2.7V$, $T_a=25^\circ C$)

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	R_{egL}	*3	—	0.3	1.0	%
Line regulation	R_{egI}	$V_{IN}=4$ to $10V, I_O=5mA$	—	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	$T_C V_{ref}$	$T_j=0$ to $110^\circ C, I_O=5mA$	—	± 1.0	—	%
Dropout voltage	V_{I-O}	*4 $I_O=0.5A$ (PQ150VB01FZ), $I_O=2A$ (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	$I_O=0$	—	—	5	mA
Output OFF-state consumption current	I_{qs}	$I_O=0A, V_C=0.4V$	—	—	5	μA
Overheating shutdown temperature	T_{SD}	—	110	130	150	$^\circ C$

*3 PQ150VB01FZ : $I_O=5mA$ to $1A$, PQ150VB02FZ : $I_O=5mA$ 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

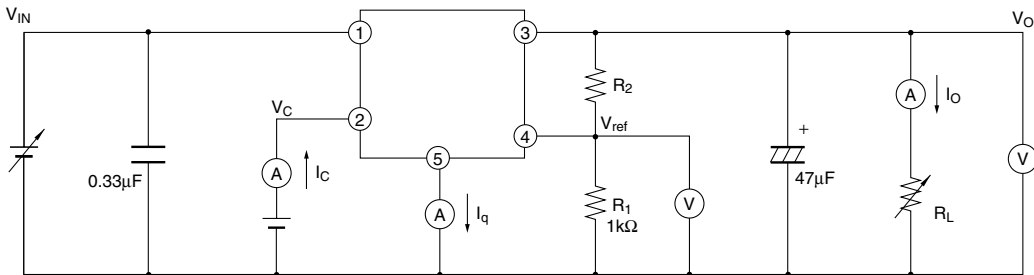
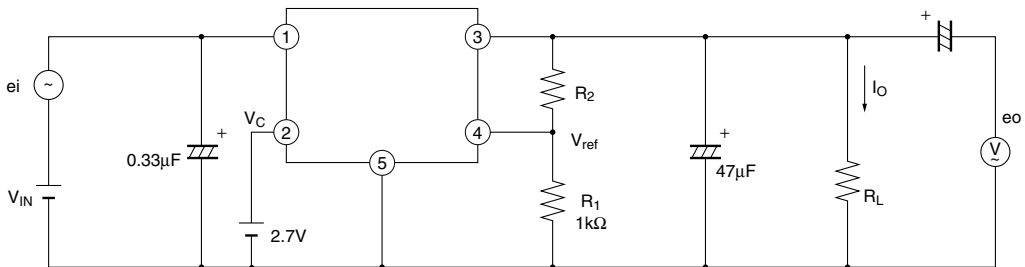
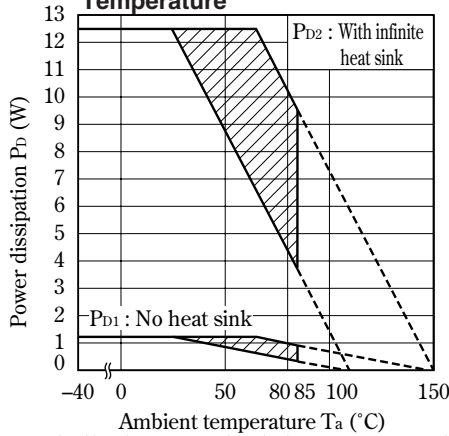


Fig.2 Test Circuit for Ripple Rejection



$f=120Hz$ (sine wave)
 $e_i(rms)=0.5V$
 $V_O=3V(R_1=1k\Omega)$
 $V_{IN}=5V$
 $I_O=0.5A$
 $RR=20\log(e_i(rms)/e_o(rms))$

Fig.3 Power Dissipation vs. Ambient Temperature



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

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

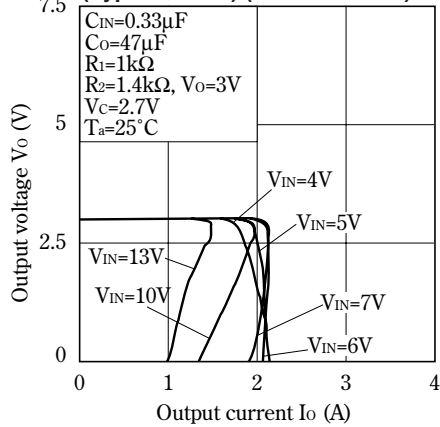


Fig.5 Overcurrent Protection Characteristics (Typical Value) (PQ150VB02FZ)

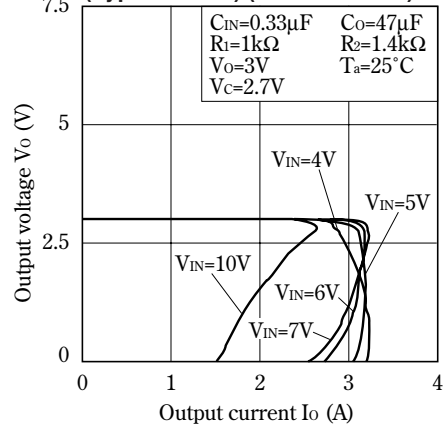


Fig.6 Reference Voltage Fluctuation vs. Junction Temperature (PQ150VB01FZ)

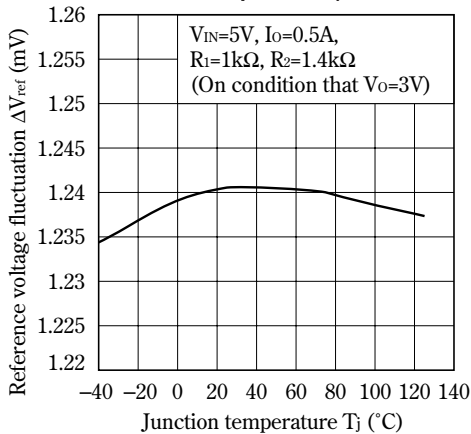


Fig.7 Reference Voltage Fluctuation vs. Junction Temperature (PQ150VB02FZ)

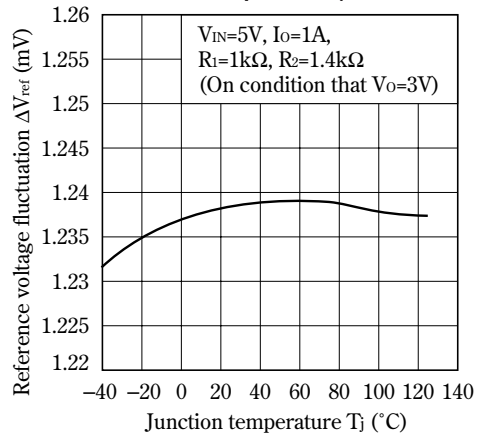


Fig.8 Output Voltage vs. Input Voltage (PQ150VB01FZ)

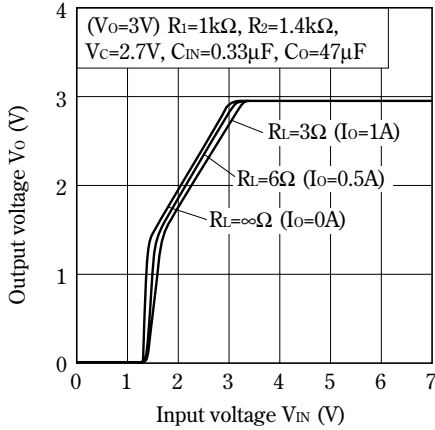


Fig.9 Output Voltage vs. Input Voltage (PQ150VB02FZ)

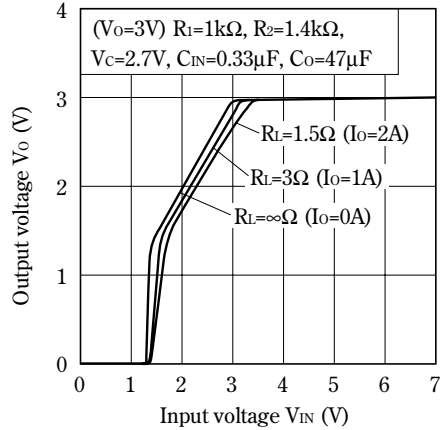


Fig.10 Circuit Operating Current vs. Input Voltage (PQ150VB01FZ)

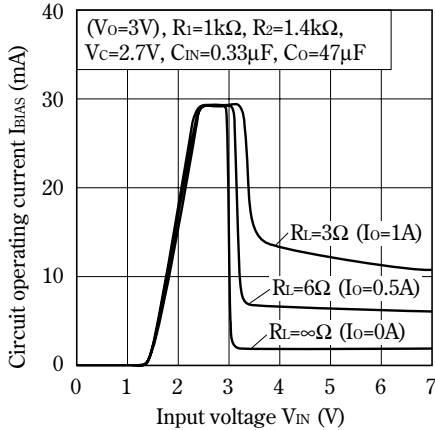


Fig.11 Circuit Operating Current vs. Input Voltage (PQ150VB02FZ)

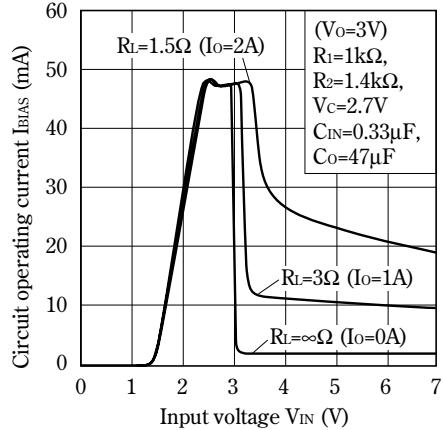


Fig.12 Dropout Voltage vs. Junction Temperature (PQ150VB01FZ)

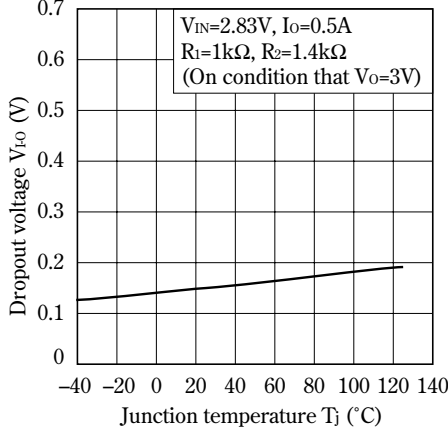


Fig.13 Dropout Voltage vs. Junction Temperature (PQ150VB02FZ)

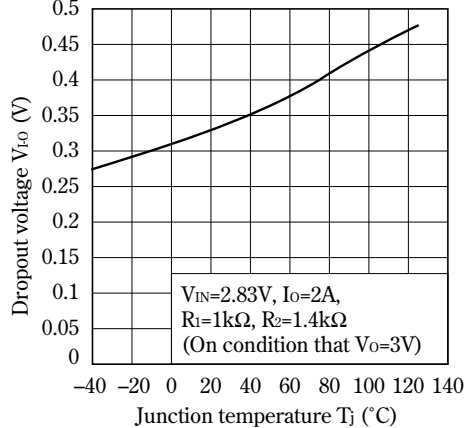


Fig.14 Quiescent Current vs. Junction Temperature (PQ150VB01FZ)

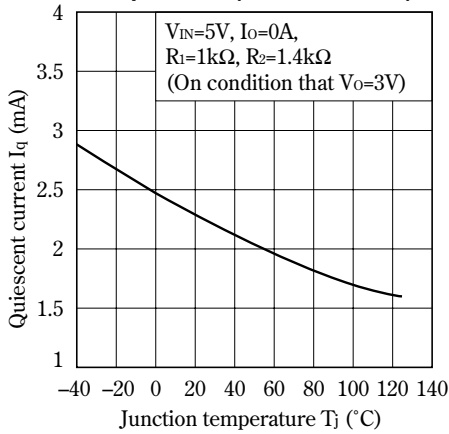


Fig.15 Quiescent Current vs. Junction Temperature (PQ150VB02FZ)

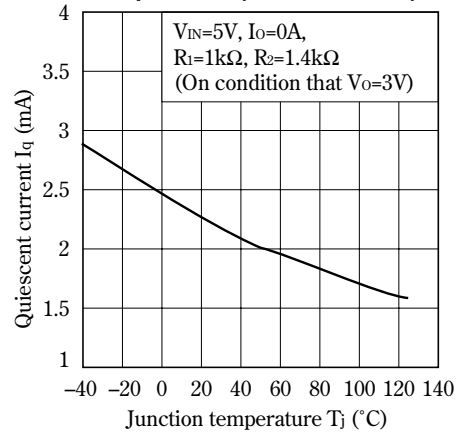


Fig.16 Ripple Rejection vs. Input Ripple Frequency

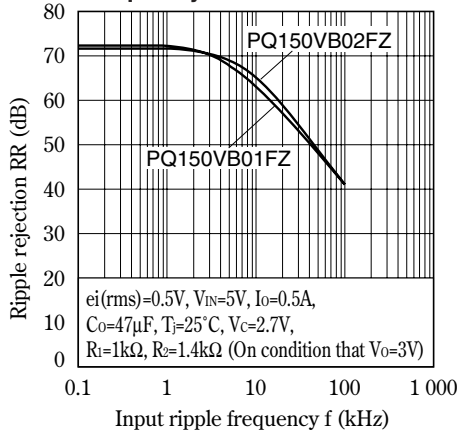
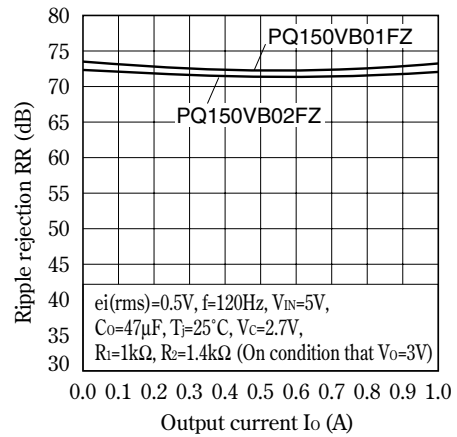
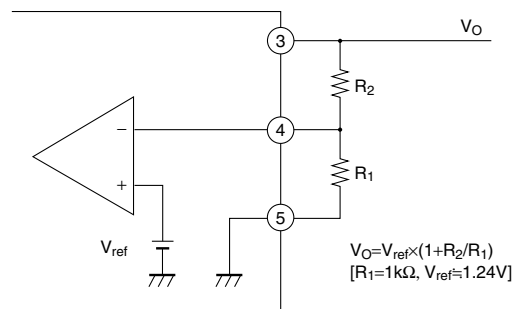


Fig.17 Ripple Rejection vs. output Current

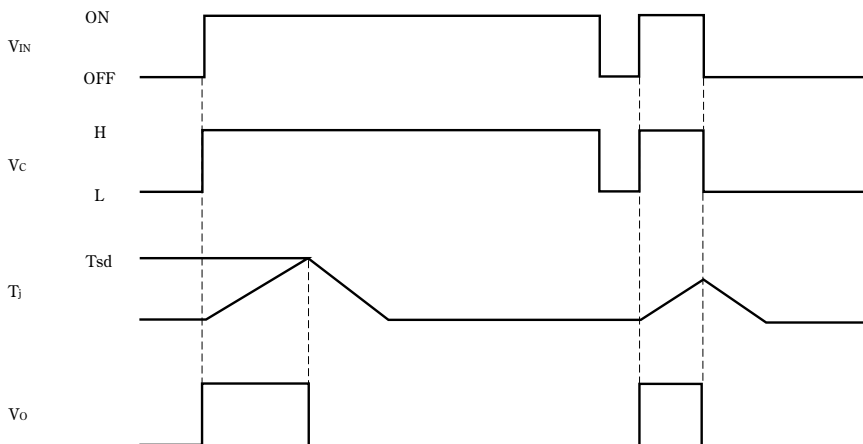


■ Setting of Output Voltage

Output voltage is able to set from 1.5V to 25V when resistors R₁ and R₂ 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 ($T_j \geq 110^\circ\text{C}$)

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

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