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PQ150VB01FZ/PQ150VB02FZ

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

■ Features

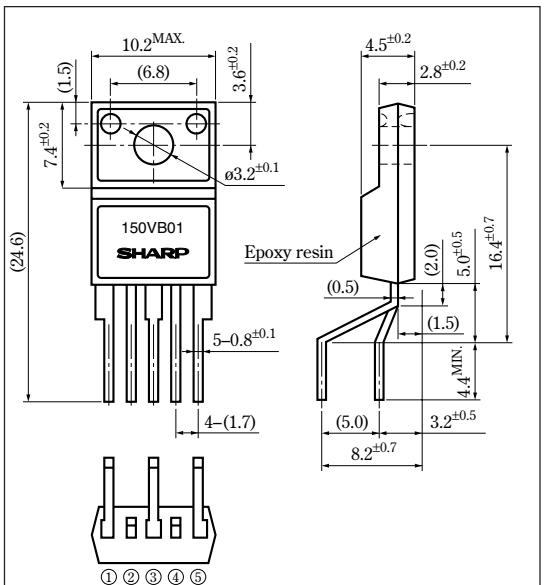
- Low power-loss
  (Dropout voltage: MAX. 0.5V at I_O=0.5A)
- Overheat shut-down function
- Variable output voltage (setting range: 1.5 to 15V)
- Compact resin mold package
  (Equivalent to TO-220)
- With built-in overcurrent protection
- Reference voltage precision: ±2.0%

■ Applications

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

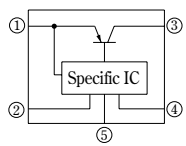
■ Outline Dimensions

(Unit : mm)



( ) : Typical dimensions

Internal connection diagram



① DC input (V_{IN})
② ON/OFF control (V_C)
③ DC output (V_O)
④ Output voltage adjustment (V_{ADJ})
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	$R_{eg}L$	※3	—	0.3	1.0	%
Line regulation	$R_{eg}I$	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_CV_{ref}	Tj=0 to 110°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	°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

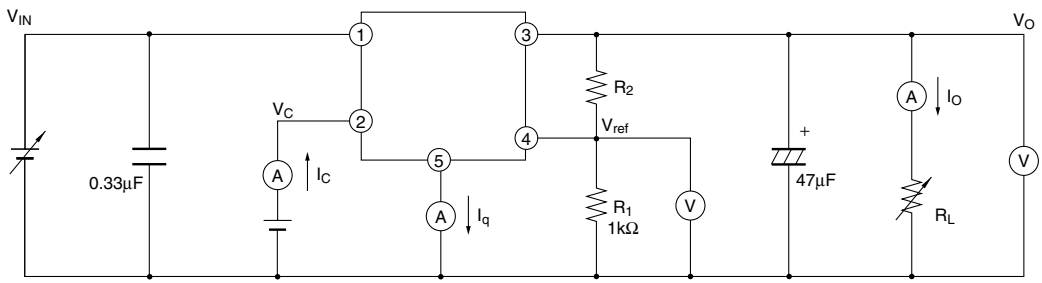
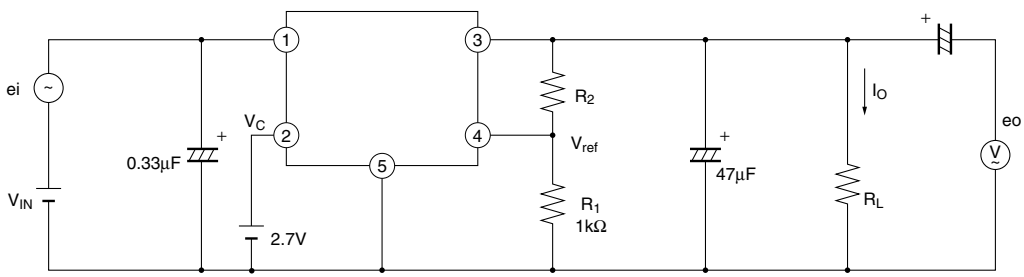
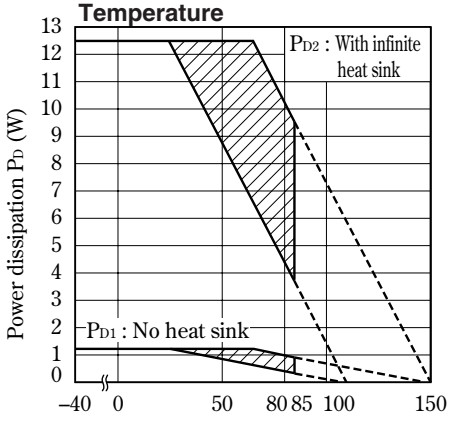


Fig.2 Test Circuit for Ripple Rejection



f=120Hz(sine wave)
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)

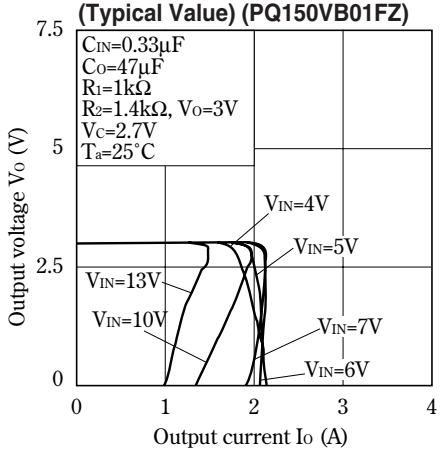


Fig.5 Overcurrent Protection Characteristics (Typical Value) (PQ150VB02FZ)

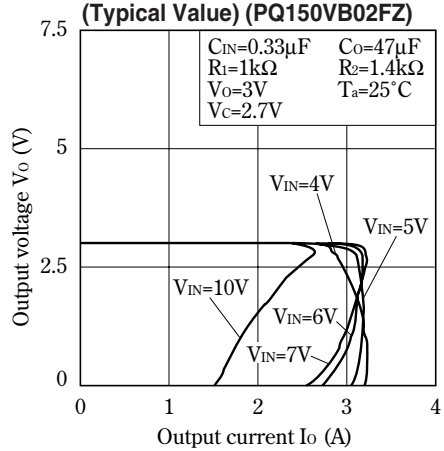


Fig.6 Reference Voltage Fluctuation vs. Junction Temperature (PQ150VB01FZ)

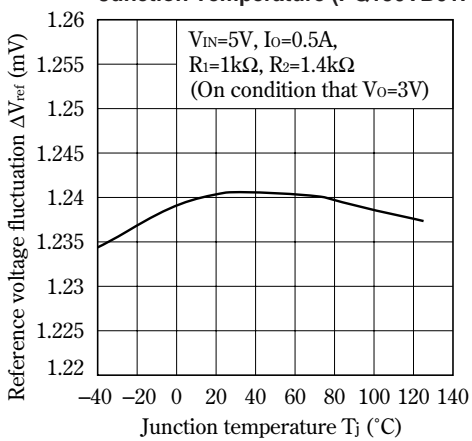


Fig.7 Reference Voltage Fluctuation vs. Junction Temperature (PQ150VB02FZ)

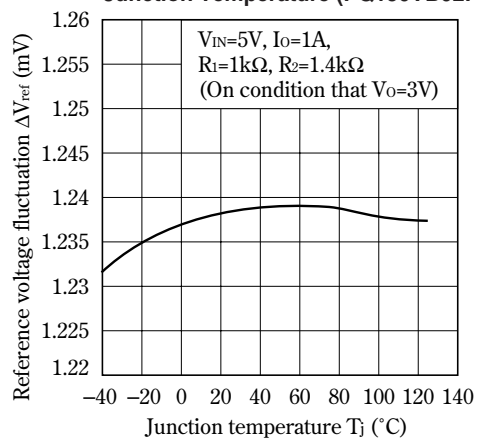


Fig.8 Output Voltage vs. Input Voltage (PQ150VB01FZ)

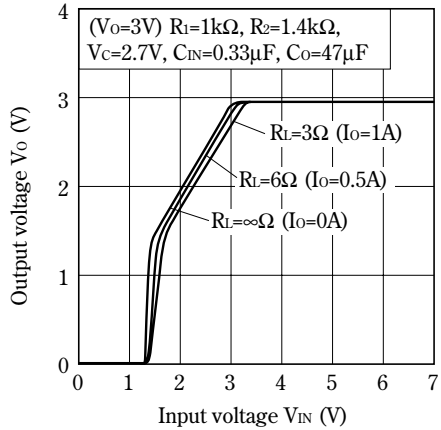


Fig.9 Output Voltage vs. Input Voltage (PQ150VB02FZ)

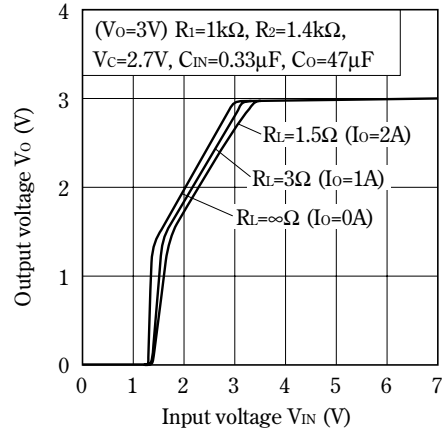


Fig.10 Circuit Operating Current vs. Input Voltage (PQ150VB01FZ)

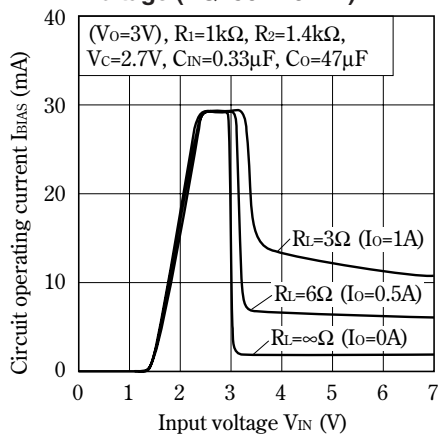


Fig.11 Circuit Operating Current vs. Input Voltage (PQ150VB02FZ)

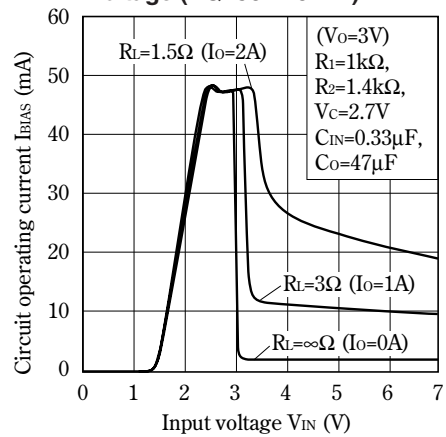


Fig.12 Dropout Voltage vs. Junction Temperature (PQ150VB01FZ)

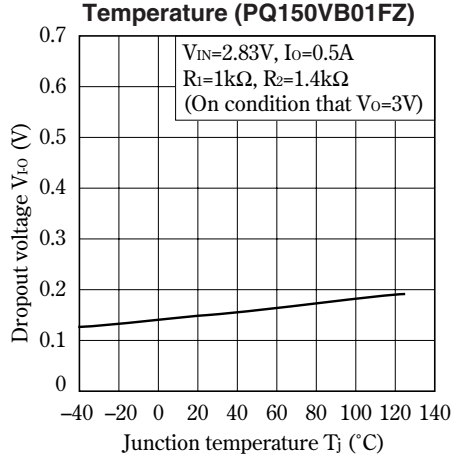


Fig.13 Dropout Voltage vs. Junction Temperature (PQ150VB02FZ)

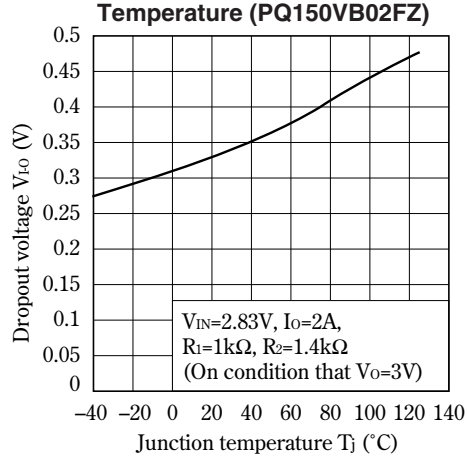


Fig.14 Quiescent Current vs. Junction Temperature (PQ150VB01FZ)

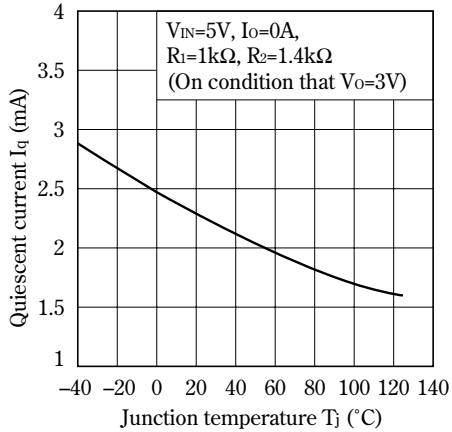


Fig.15 Quiescent Current vs. Junction Temperature (PQ150VB02FZ)

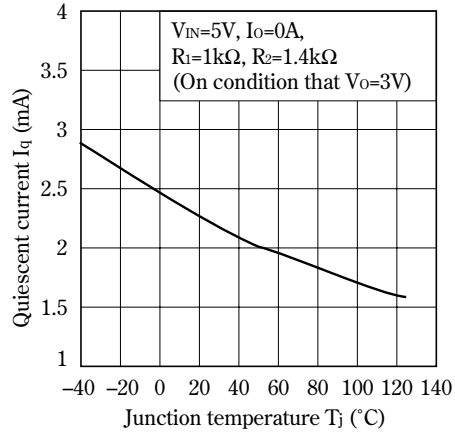


Fig.16 Ripple Rejection vs. Input Ripple Frequency

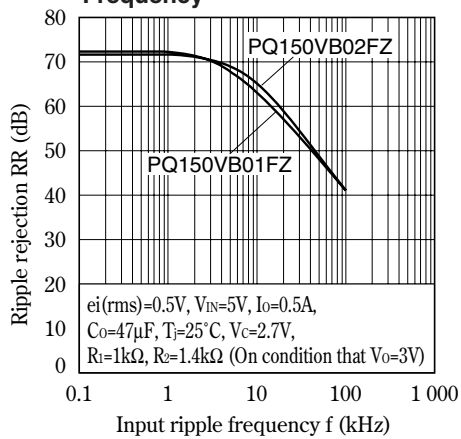
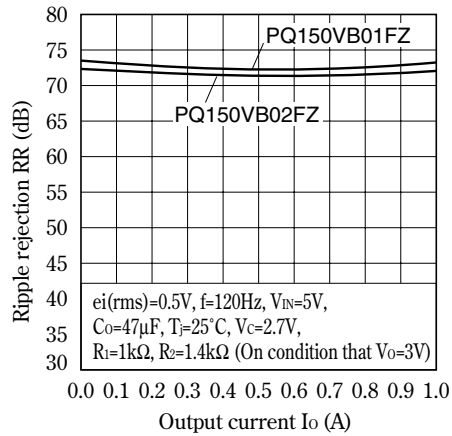
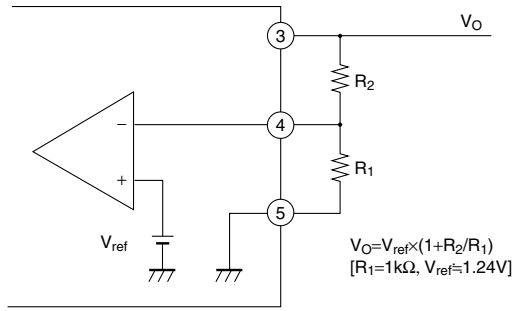


Fig.17 Ripple Rejection vs. output Current

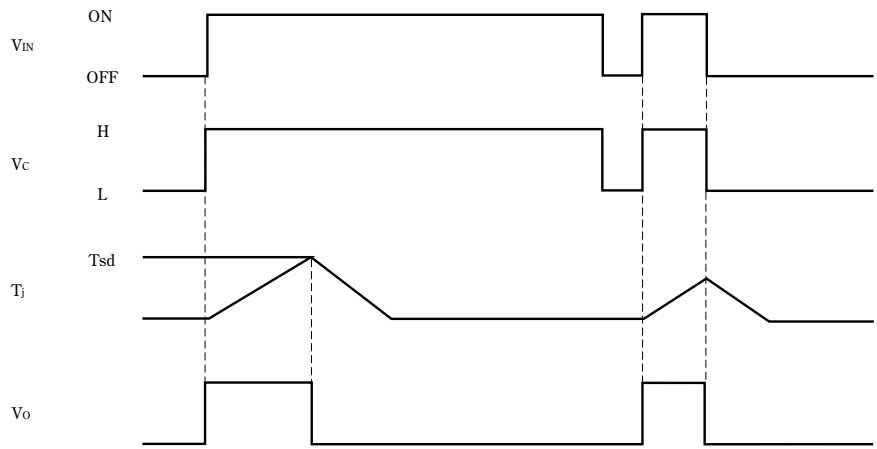


■ Setting of Output Voltage

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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