PQ070VK01FZ/PQ070VK02FZ

Variable Output, Low Pwer-Loss Voltage Regulators with Output ON/OFF Control Function

Features

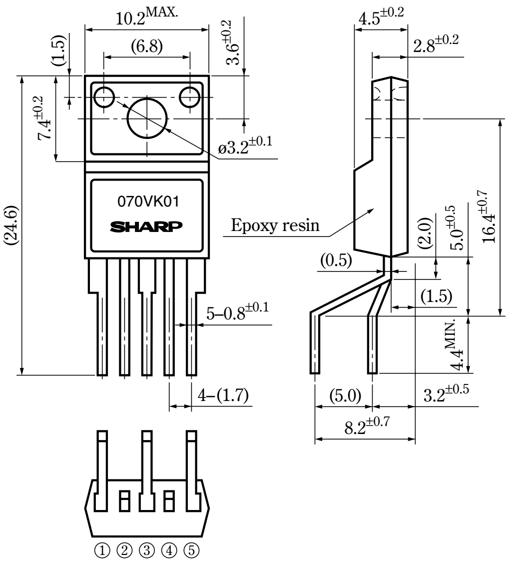
- Low voltage operation (Minimum operating voltage: 2.35V)
- Low power-loss(Dropout voltage : MAX.0.5V)
- Compact resin mold package (Equivalent to TO-220)
- Built-in ON/OFF control function
- Variable output voltage type (1.5V to7V)
- Reference Voltage precision: ±2%
- Built-in overcurrent and overheat protection functions

Applications

- Power supplies for various electronic equipment such as AV, OA equipment

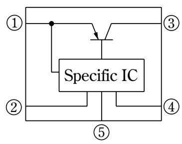
Outline Dimensions

(Unit : mm)



( ) : Typical dimensions

Internal connection diagram



① DC input (V_{IN})
② ON/OFF control terminal (Vc)
③ DC output (Vo)
④ Output voltage adjustment(V_{ADJ})
⑤ GND

Absolute Maximum Ratings

(T_a=25˚C)

Parameter		Symbol	Rating	Unit
*1 Input voltage		V_{IN}	10	V
*1 Output contorol voltage		Vc	10	V
*1 Output adjustment terminal Voltage		V_{ADJ}	5	V
Output current	PQ070VK01FZ	Io	1	A
	PQ070VK02FZ		2	
*2 Power dissipation (With infinite heat sink)		P_{D1}	1.4	W
		P_{D2}	15	
*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(For 10s)	˚C

*1 All are open except GND and applicable terminals.
*2 PD1: No heat sink, PD2: With infinite heat sink
*3 Overheat protection may operate at 125˚C<=T_j<=150˚C

• Please refer to the chapter " Handling Precautions ".

Electrical Characteristics

(Unless otherwise specified, V_{IN}=5V, V_O=3.3V, ※4, R_1=2kΩ, R_2=500Ω, V_C=2.7V, T_a=25˚C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input voltage	V_{IN}	—	2.35	—	10	V
Output voltage	V_O	—	1.5	—	7	V
Load regulation	$R_{eg}L$	※5	—	0.2	2.0	%
Line regulation	$R_{eg}I$	V_{IN}=4 to 10V, Io=5mA	—	0.2	1.0	%
Ripple rejection	RR	Refer to Fig.2	45	60	—	dB
Reference voltage	V_{ref}	—	1.225	1.25	1.275	V
Temperature coefficient of reference voltage	T_CV_{ref}	Tj=0 to 125˚C, Io=5mA	—	±1.0	—	%
Dropout voltage	V_{i-O}	※4,※6	—	—	0.5	V
Quiescent current	I_q	Io=0A	—	1	2	mA
※7 ON-state voltage for control	$V_{C(ON)}$	—	2.0	—	—	V
ON-state current for control	$I_{C(ON)}$	—	—	—	200	μA
OFF-state voltage for control	$V_{C(OFF)}$	Io=0A	—	—	0.8	V
OFF-state current for control	$I_{C(OFF)}$	Io=0A, Vc=0.4V	—	—	2.0	μA
Output OFF-state consumption current	I_{qs}	Vc=0.4V	—	—	5.0	μA

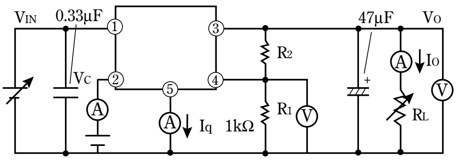
※4 PQ070VK01FZ: I_O=0.5A, PQ070VK02FZ: I_O=1A

※5 PQ070VK01FZ: I_O=5mA to 1A, PQ070VK02FZ: I_O=5mA to 2A

※6 V_{IN}=2.85V, PQ070VK01FZ(I_O=0.5A), PQ070VK02FZ(I_O=2A)

※7 In case of opening ON/OFF control terminal②, output voltage turns off.

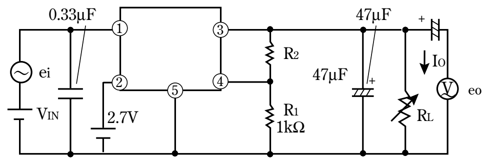
Fig.1 Test Circuit



$$V_O = V_{ref} \times \left(1 + \frac{R_2}{R_1}\right)$$

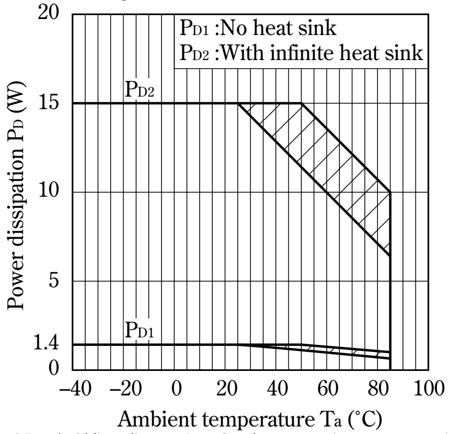
[R_1=1kΩ, V_{ref} Nearly=1.25V]

Fig.2 Test circuit of Ripple Rejection



f=120Hz(sine wave)
ei(rms)=0.5V
I_O=0.3A
RR=20 log(ei(rms)/eo(rms))
V_{IN}=5V
V_O=3.0V(R_1=1kΩ)

Fig.3 Power Dissipation vs. Ambient Temperature



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

Fig.4 Overcurrent Protection Characteristics (Typical Value) (PQ070VK01FZ)

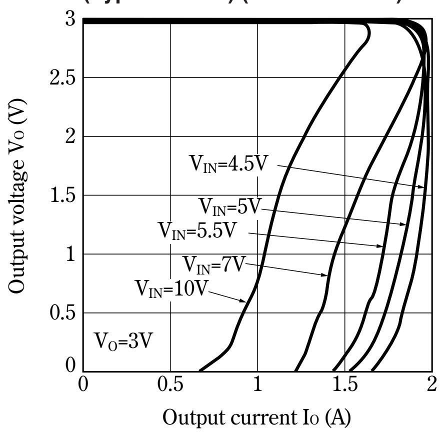


Fig.5 Reference Voltage vs. Ambient Temperature (PQ070VK01FZ)

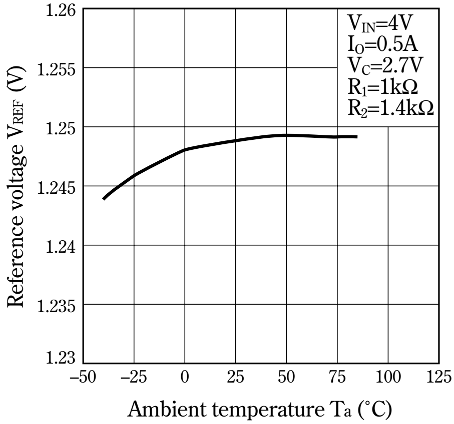


Fig.6 Output Voltage vs. Input Voltage (PQ070VK01FZ)

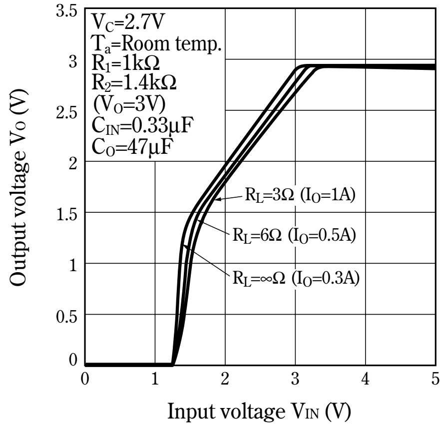


Fig.7 Circuit Operating Current vs. Input Voltage (PQ070VK01FZ)

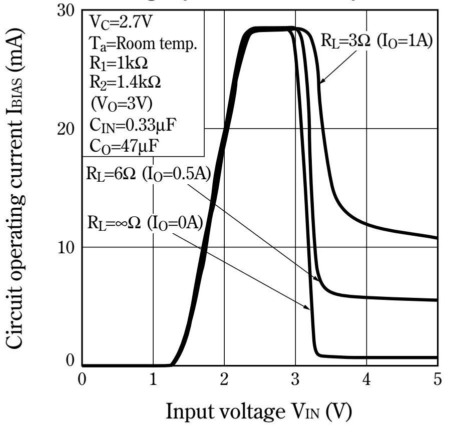


Fig.8 Dropout Voltage vs. Junction Temperature (PQ070VK01FZ)

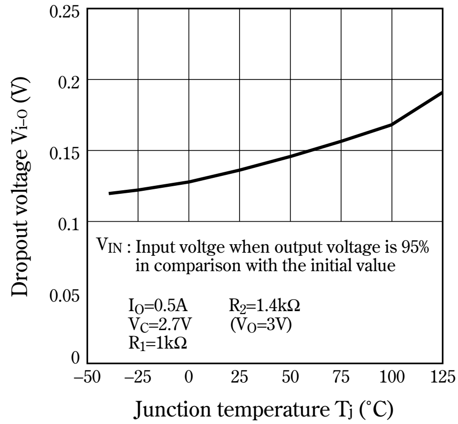


Fig.9 Quiescent Current vs. Ambient Temperature (PQ070VK01FZ)

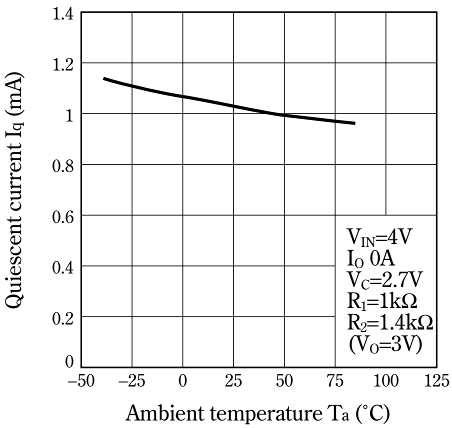


Fig.10 Ripple Rejection vs. Input Ripple Frequency (PQ070VK01FZ)

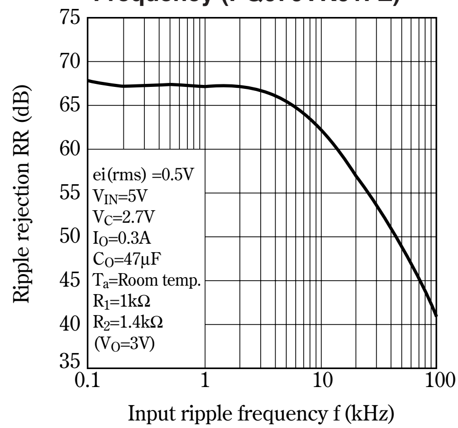


Fig.11 Ripple Rejection vs. Output Current (PQ070VK01FZ)

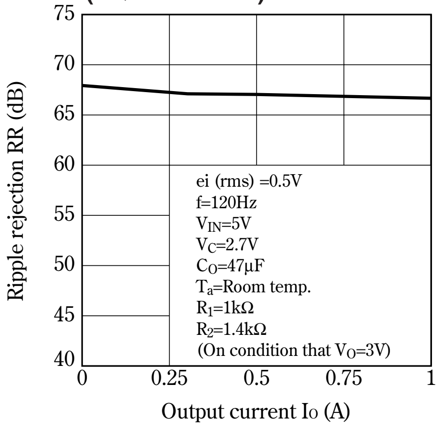


Fig.12 Overcurrent Protection Characteristics (Typical Value) (PQ070VK02FZ)

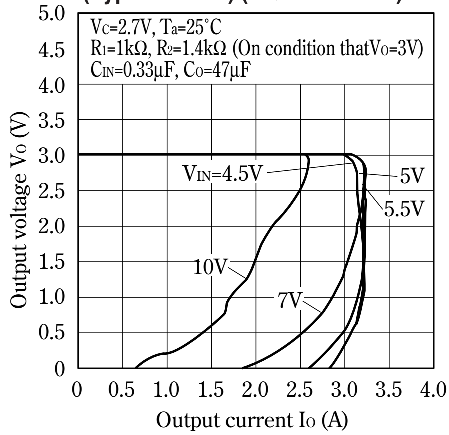


Fig.13 Reference Voltage Deviation vs. Junction Temperature (PQ070VK02FZ)

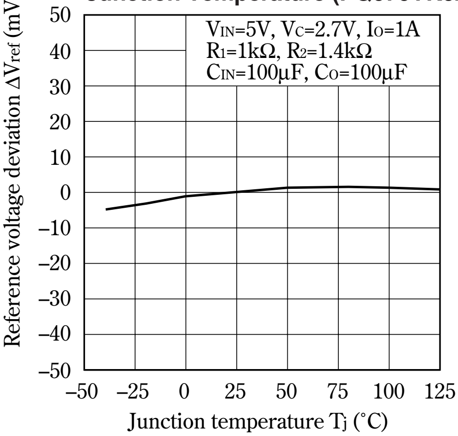


Fig.14 Output Voltage vs. Input Voltage (PQ070VK02FZ)

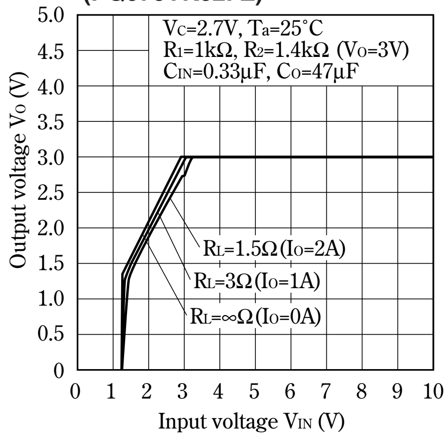


Fig.15 Circuit Operating Current vs. Input Voltage (PQ070VK02FZ)

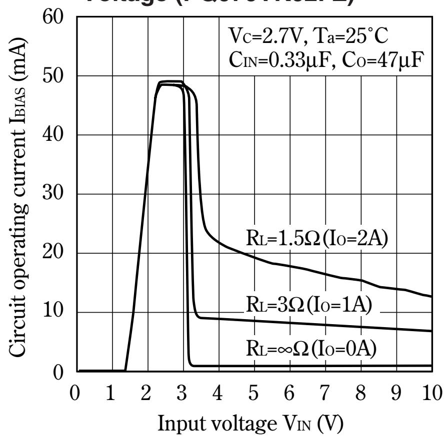


Fig.16 Dropout Voltage vs. Junction Temperature(PQ070VK02FZ)

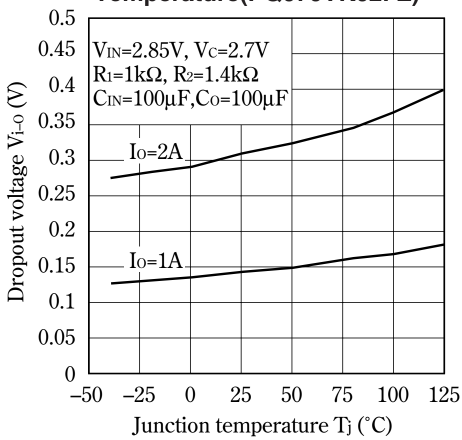


Fig.17 Quiescent Current vs. Junction Temperature (PQ070VK02FZ)

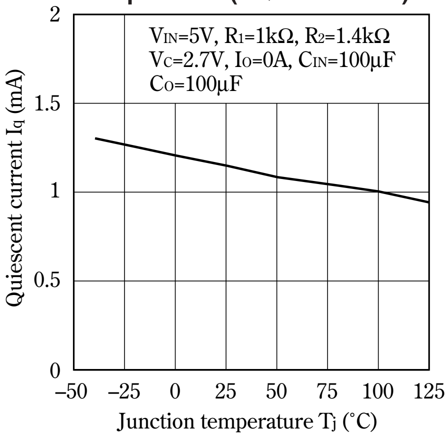


Fig.18 Ripple Rejection vs. Input Ripple Frequency (PQ070VK02FZ)

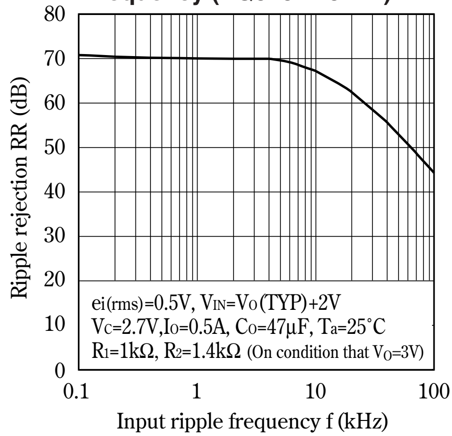


Fig.19 Ripple Rejection vs. Output Current (PQ070VK02FZ)

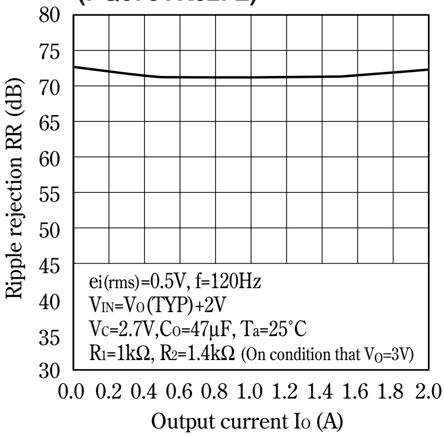


Fig.20 Output Voltage Adjustment Characteristics (Typical Value)

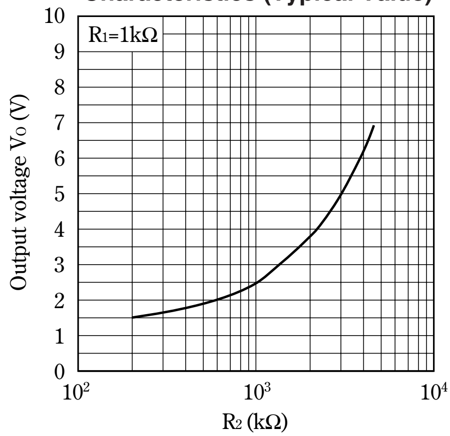
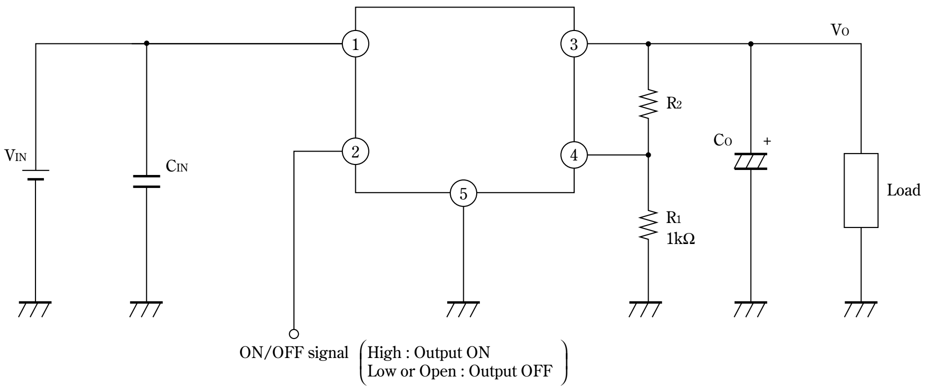
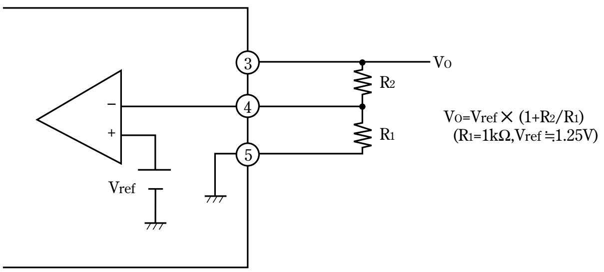


Fig.22 Typical Application



■ Setting of Output Voltage

Output voltage is able to set (1.5V to 7V) 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.20.



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