PQ05NF1 Series

1A Output, General Purpose Low Power-Loss Voltage Regulators

Features

- TO-220 package
- Low power-loss (Dropout voltage : MAX.0.5V)
  [Applying the voltage exceeding Vo+2.5V to control terminal]
- Built-in ON/OFF control function
- Output voltage precision : ±4%

Applications

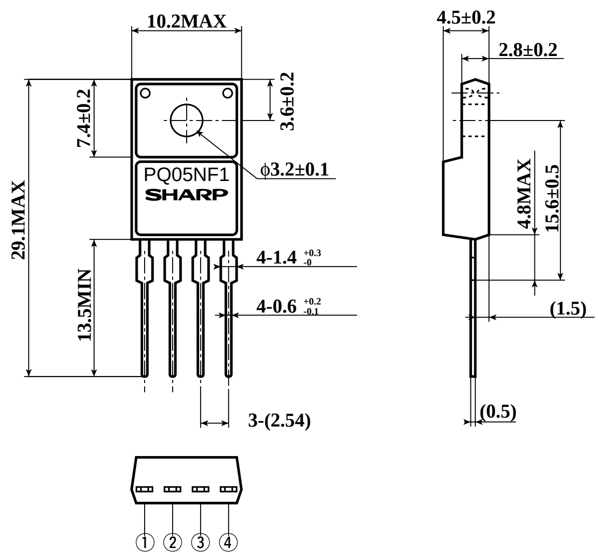
- Power supplies for various electronic equipment such as TVs, VCRs, CD stereos etc.

Model Line-ups

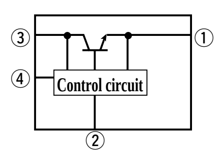
5V output	9V output	12V output
PQ05NF1	PQ09NF1	PQ12NF1

Outline Dimensions

(Unit : mm)



Internal connection diagram



① DC output (V_O)
② GND
③ DC input (V_{IN})
④ Bias input (V_B)

Absolute Maximum Ratings

(T_a=25˚C)

Parameter	Symbol	Rating	Unit
*1 Input voltage	V_{IN}	24	V
*1 Bias supply voltage	V_B	24	V
Output current	I_O	1	A
Power dissipation (No heat sink)	P_{D1}	1.4	W
Power dissipation (With infinite heat sink)	P_{D2}	14	W
*2 Junction temperature	T_j	150	˚C
Operating temperature	T_{opr}	-20 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 Overheat protection may operate at 125=<T_j=<150˚C

· Please refer to the chapter“ Handling Precautions ”.

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■ Electrical Characteristics

(Unless otherwise specified, I_O=0.5A/*3/*4/T_a=25˚C)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Output voltage	PQ05NF1	V_O	V_{IN}=7V	4.8	5.0	5.2	V
	PQ09NF1		V_{IN}=11V	8.64	9.0	9.36	
	PQ12NF1		V_{IN}=14V	11.52	12.0	12.48	
Load regulation		$R_{eg}L$	I_O=5mA to 1A	-	-	2.0	%
Line regulation		$R_{eg}I$	*5,*6	-	-	2.0	%
Temperature coefficient of output voltage		T_CV_O	T_j=0 to 125˚C	-	-	-	%/˚C
Ripple rejection		RR_1	Refer to Fig.2	45	-	-	dB
		RR_2	Refer to Fig.3	45	-	-	dB
Dropout voltage		V_{i-O}	*7,V_B>=V_O+2.5V	-	-	0.5	V
Bias inflow current		I_{B1}	V_{IN}=V_O+1V	-	-	15	mA
Bias limitation current		$I_B(l)$	V_{IN}=0 to 24V, V_B=0 to 24V	-	-	40	mA
Ground current		I_g	I_O=0A	-	3.5	8	mA
OFF-state bias supply voltage		$V_{B(OFF)}$		-	-	0.8	V

*3 PQ05NF1:V_{IN}=7V, PQ09NF1:V_{IN}=11V, PQ12NF1:V_{IN}=14V

*4 PQ05NF1:V_B=8V, PQ09NF1:V_B=12V, PQ12NF1:V_B=15V

*5 PQ05NF1:V_{IN}=6V to 16V, PQ09NF1:V_{IN}=10V to 20V, PQ12NF1:V_{IN}=13V to 23V

*6 PQ05NF1:V_B=8V to 24V, PQ09NF1:V_B=12V to 24V, PQ12NF1:V_B=15V to 24V

*7 Input voltage shall be the value when output voltage is 95% in comparison with the initial value.

Fig.1 Test Circuit

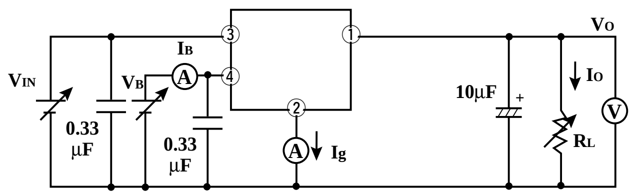
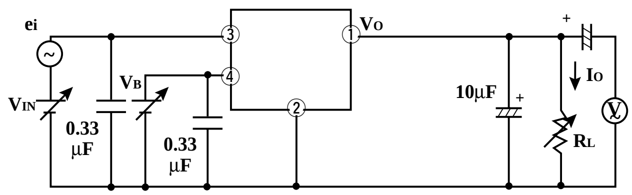
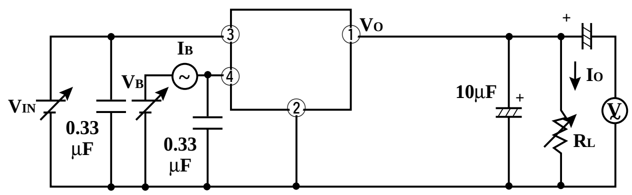


Fig.2 Test Circuit of Ripple Rejection(1)



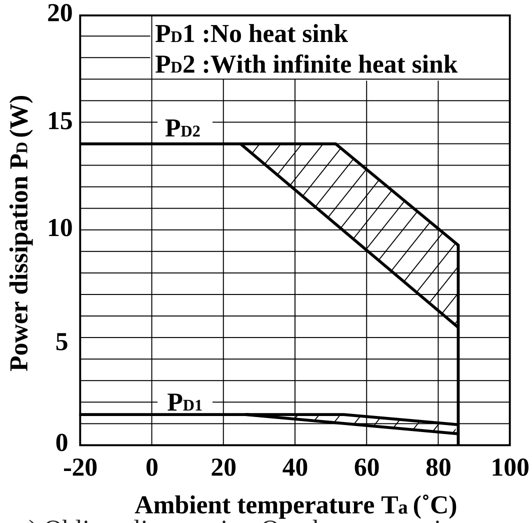
f=120Hz (Sine wave)
I_O=0.5A
ei=0.5V_{rms}
RR=20 log (ei/eo)

Fig.3 Test Circuit of Ripple Rejection(2)



f=120Hz (Sine wave)
I_O=0.5A
ei=0.5V_{rms}
RR=20 log (ei/eo)

Fig.4 Power Dissipation vs. Ambient Temperature



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

Fig.5 Output Voltage vs. Input Voltage (PQ05NF1) (Typical value)

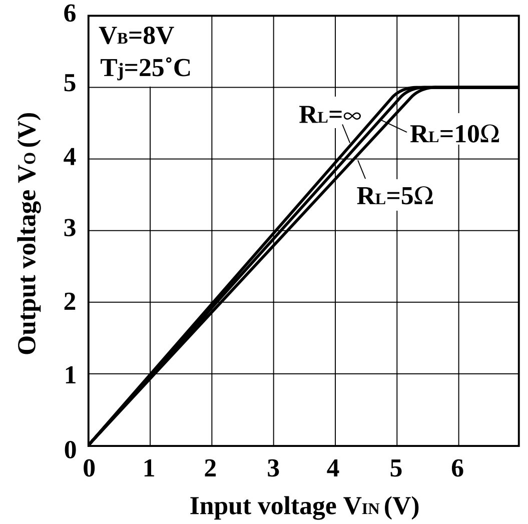


Fig.6 Output Voltage vs. Input Voltage (PQ09NF1) (Typical value)

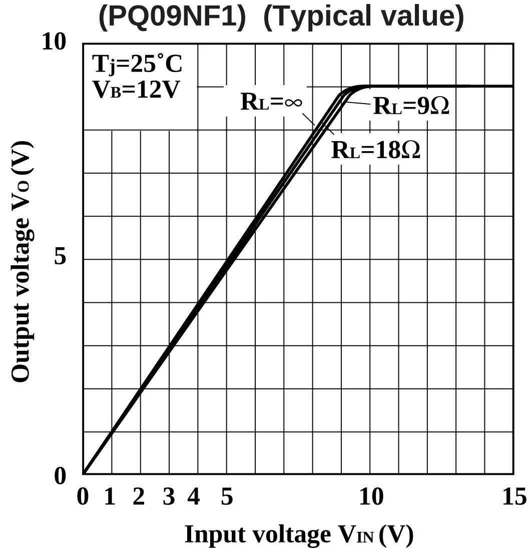


Fig.7 Output Voltage vs. Input Voltage (PQ12NF1) (Typical value)

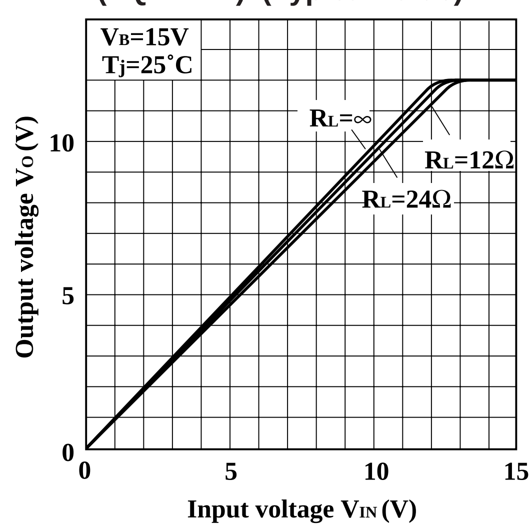


Fig.8 Output Voltage vs. Bias Supply Voltage (PQ05NF1) (Typical value)

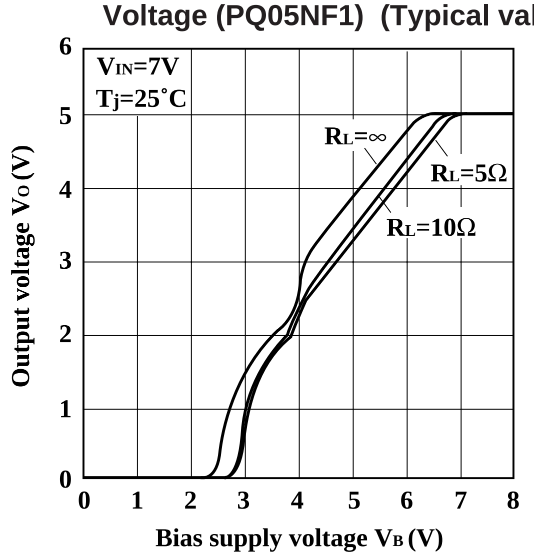


Fig.9 Output Voltage vs. Bias Supply Voltage (PQ09NF1) (Typical value)

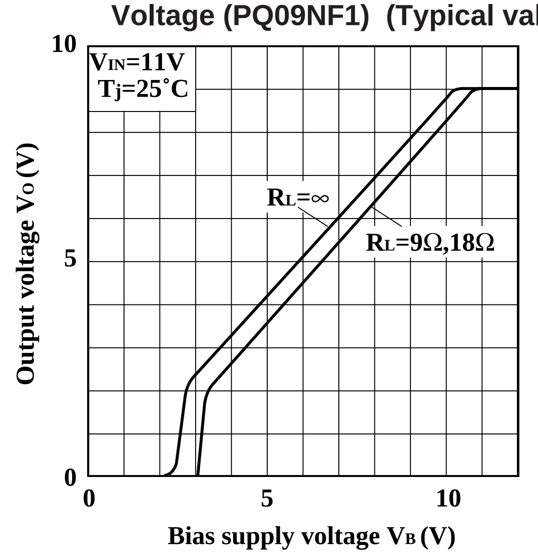


Fig.10 Output Voltage vs. Bias Supply Voltage (PQ12NF1) (Typical value)

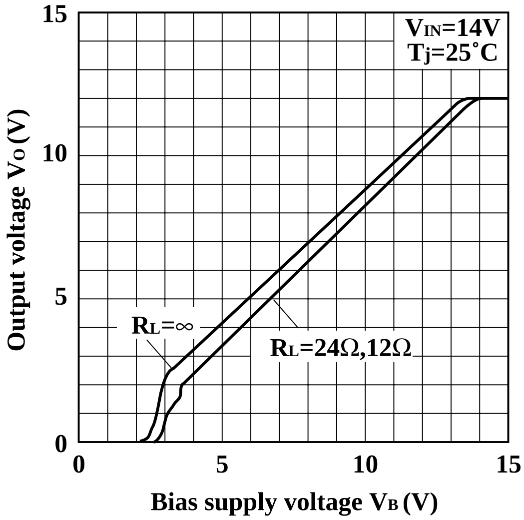


Fig.11 Bias Supply Current vs. Input Voltage (PQ05NF1) (Typical value)

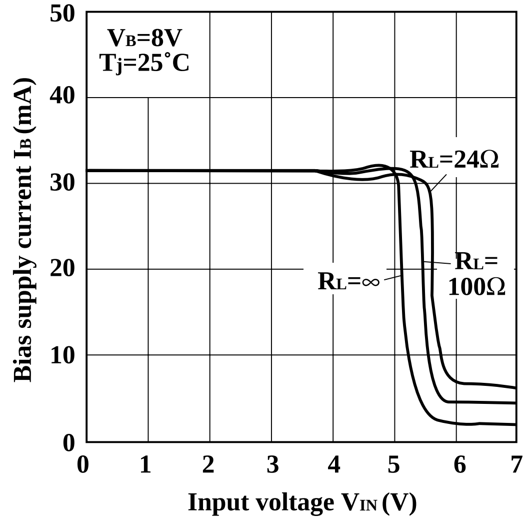


Fig.12 Bias Supply Current vs. Input Voltage (PQ09NF1) (Typical value)

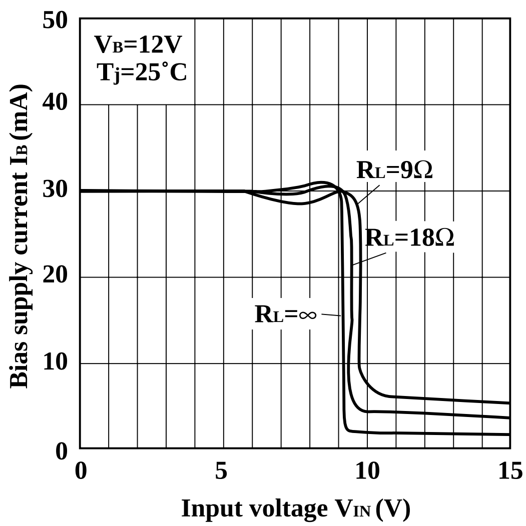


Fig.13 Bias Supply Current vs. Input Voltage (PQ12NF1) (Typical value)

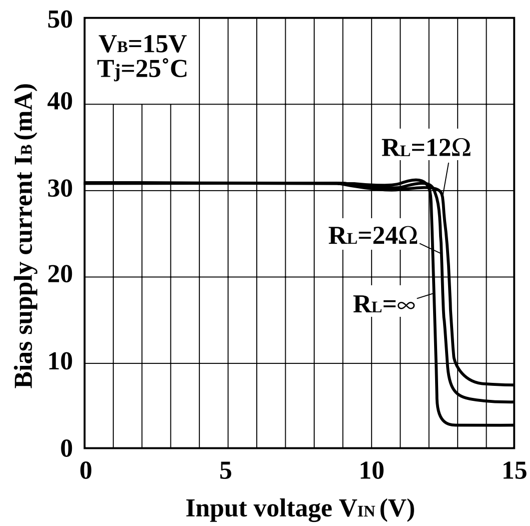


Fig.14 Bias Supply Current vs. Bias Supply Voltage (PQ05NF1) (Typical value)

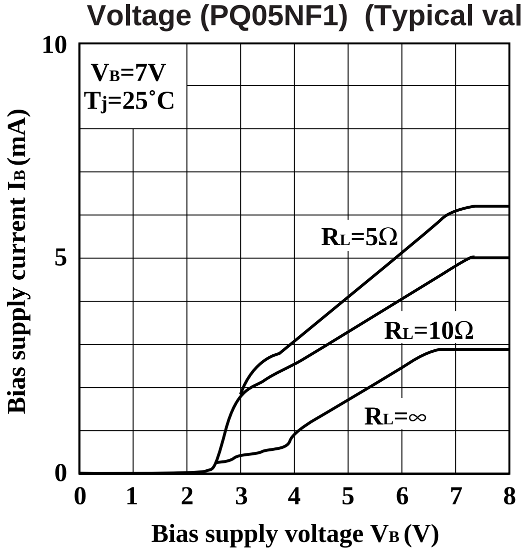


Fig.15 Bias Supply Current vs. Bias Supply Voltage (PQ09NF1) (Typical value)

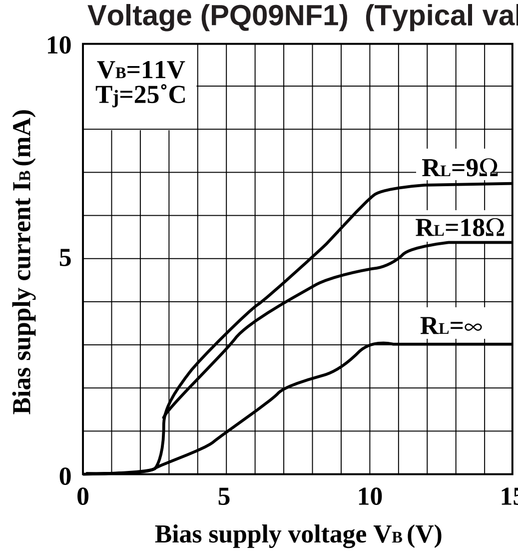
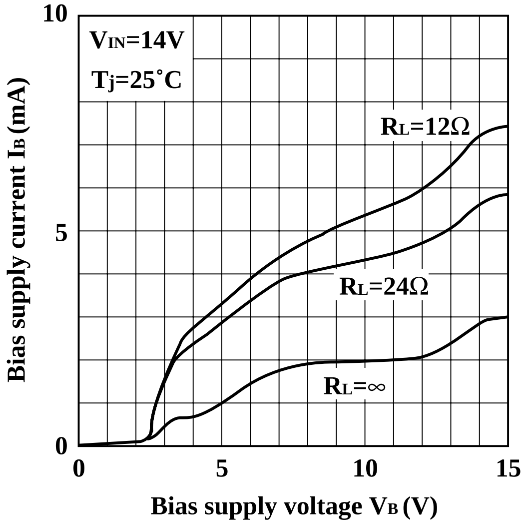
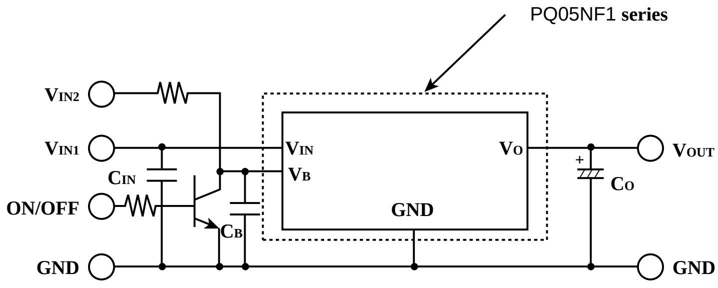


Fig.16 Bias Supply Current vs. Bias Supply Voltage (PQ12NF1) (Typical value)



■ Typical Application



(1) This device can be used as a low power-loss voltage regulator, applying the voltage exceeding V_O+2.5V to bias input terminal ④ (V_B)When bias input (V_B) is open or less than 0.8V, OFF-state is available.
(V_B>=V_O+2.5V:output ON, V_B=<0.8V or open:output OFF)

(2) It can used as a general regulator with single power supply (dropout voltage : MAX2.5V) by connecting bias input terminal ④ (V_B) with DC input terminal ③.