PQ05RG1/PQ05RG11 Series

Low Power-Loss Voltage Regulators (Built-in Reverse Voltage Protection Function Between Input and output)

■ Features

- Low power-loss (Dropout voltage : MAX. 0.5V)
- Compact resin full-mold package
- Built-in a function to prevent reverse voltage between input and output
  The diode to prevent reverse voltage between input and output is not necessary. ($V_{O-i} \leqq 15V$)
- Built-in ON/OFF control function

■ Applications

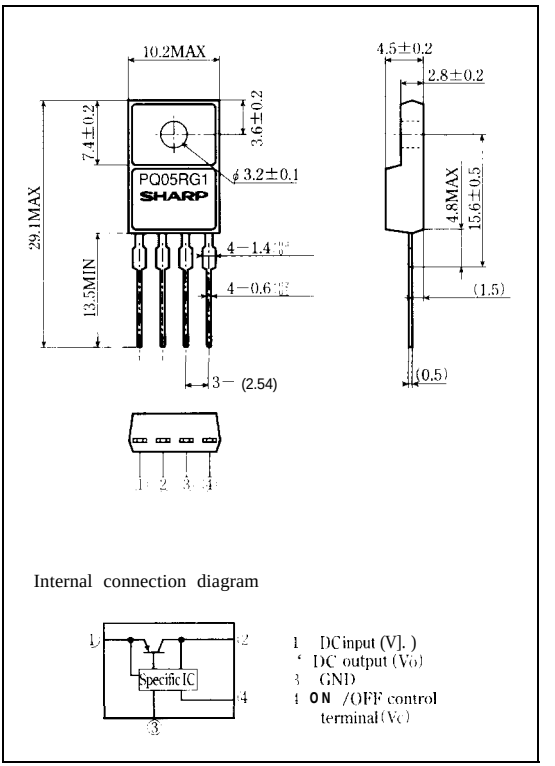
- Series power supply for various electronic equipment such as VCRs and musical instruments

■ Model Line-ups

Output voltage	5V output	9V output	12V output
Output voltage precision: ± 5 %	PQ05RG1	PQ09RG1	PQ12RG1
Output voltage precision: ±2.5%	PQ05RG11	PQ09RG11	PQ12RG11

■ Outline Dimensions

(Unit : mm)



■ Absolute Maximum Ratings

(T_a=25℃)

Parameter	Symbol	Rating	Unit
*1 Input voltage	V_{IN}	35	V
*1 ON/OFF control terminal voltage	V_C	35	V
*2 Input-output reverse voltage	V_{O-i}	15	V
Output current	I_O	1.0	A
Power dissipation (No heat sink)	P_{D1}	1.5	W
Power dissipation (With infinite heat sink)	P_{D2}	15	
*3 Junction temperature	T_j	150	℃
Operating temperature	T_{opr}	-20 to +80	℃
Storage temperature	T_{stg}	-40 to +150	℃
Soldering temperature	T_{sol}	260 (For 10s)	℃

*1 All are open except GND and applicable terminals.
*2 Vo terminal applicable voltage from external : Vo (characteristics value) to 25V
*3 Overheat protection may operate at $125 \leqq T_j \leqq 150$℃

Please refer to the chapter "Handling Precautions"

Electrical Characteristics

(Unless otherwise specified, condition shall be I_O=0.5A, T_a=25°C *4)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
output voltage	PQ05RG1	V_O	V_{IN}= 7V, I_O=0.5A	4.75	5.0	5.25	V
	PQ09RGI		V_{IN}=11V	8.55	9.0	9.45	
	PQ12RGI		V_{IN}=14V	11.4	12.0	12.6	
	PQ05RGI 1		V_{IN}= 7V	4.88	5.0	5.12	
	PQ09RG11		V_{IN}=11V	8.78	9.0	9.22	
	PQ12RGI 1		V_{IN}= 14v	11.7	12.0	12.3	
Load regulation		$R_{eg}L$	*4		0.3	2.0	%
Line regulation		$R_{eg}I$	I_O=5mA, *5		0.1	2.5	%
Temperature coefficient of output voltage		T_CV_O	I_O=5mA, T_j=0 to 125°C, *6		±0.01		%/°C
Ripple rejection		RR	Refer to Fig. 2	45	60		dB
Dropout voltage		V_{i-O}	*7, I_O=0.5A		0.2	0.5	v
*8 ON-state voltage for control		$V_{C(ON)}$	*6, I_O=0.5A	2.0			v
ON-state current for current		$I_{C(ON)}$	*6, I_O=0.5A, V_C=2.7V			20	μA
OFF-state voltage for control		$V_{C(OFF)}$	*6			0.8	v
OFF-state current for control		$I_{C(OFF)}$	*6, V()=O.4A			-0.4	mA
Quiescent current		I_q	I_O=0A, *6		6.0	10.0	mA

*4 PQ05RG1/11: V_{IN}=7V, I_O=5mA to 1.(JA
PQ09RG1/11 : V_{IN}=11V, I_O=5mA to 1.0A
PQ12RG1/11 : V_{IN}=14V, I_O=5mA to 1.0A
*5 PQ05RG1/11 V_{IN}=6 to 16V
PQo9RGi/11 : V_{IN}=10 to 20V
PQ12RG1/11: V_{IN}=13 10Z1%
*6 PQ05RG1/11: V_{IN}=7V
PQo9RG1/11 : V_{IN}=I1V
PQ12RG1/11: V_{IN}=14\
*7 Input voltage shall he the value when output voltage is 95% in comparison with the initial value
*8 In case of opening control terminal (4), output voltage turns on

Fig. 1 Test Circuit

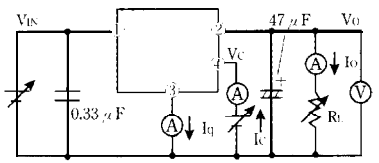
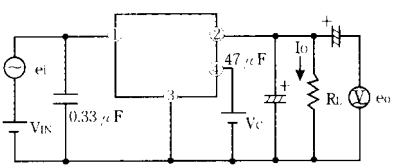
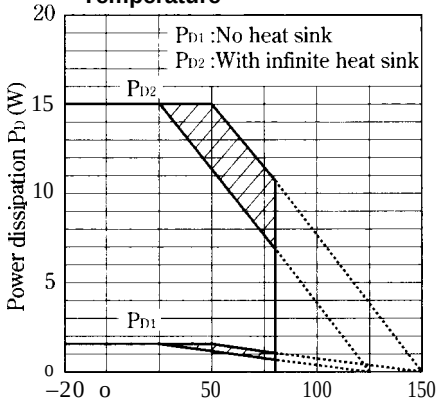


Fig. 2 Test Circuit of Ripple Rejection



f= 120Hz (sine wave)
e_i=0.5Vrms
V_{IN}= 7V(PQ05RGI /PQ05RGII)
V_{IN}=11V(PQ09RG1/PQ09RG11)
V_{IN}=14V(PQ12RG1/PQ12RG11)
I_O=0.5A
RR=20log(e_i/e_o)

Fig. 3 Power Dissipation vs. Ambient Temperature



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

Fig. **5 Overcurrent protection Characteristics (Typical Value)**

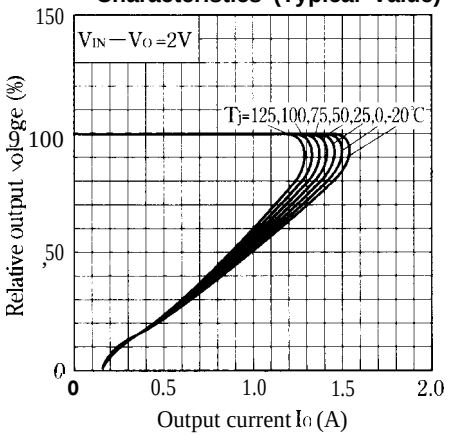


Fig. 4 Overcurren Protection Characteristics (Typical Value)

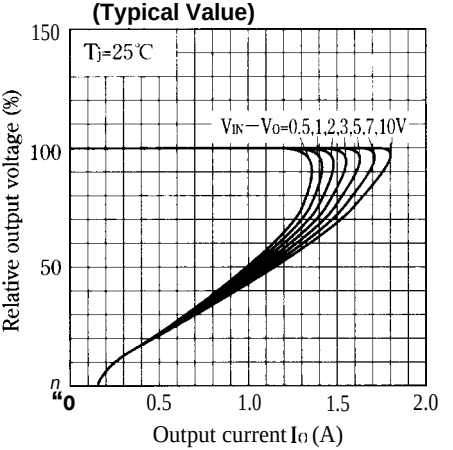


Fig. 6 Output Voltage Deviation vs. Junction Temperature (PQ05RG1/11)

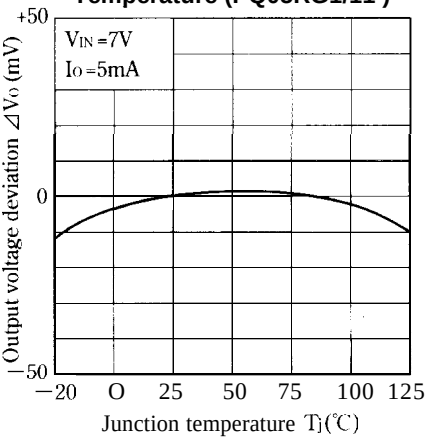


Fig. 7 Output Voltage Deviation vs. Junction Temperature (PQ09RG1/11)

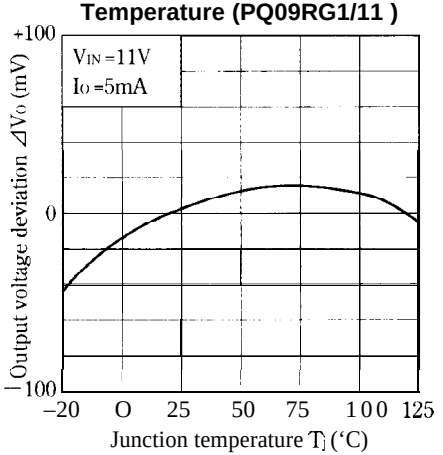


Fig. 8 Output Voltage Deviation vs. Junction Temperature (PQ12RG1/1 1)

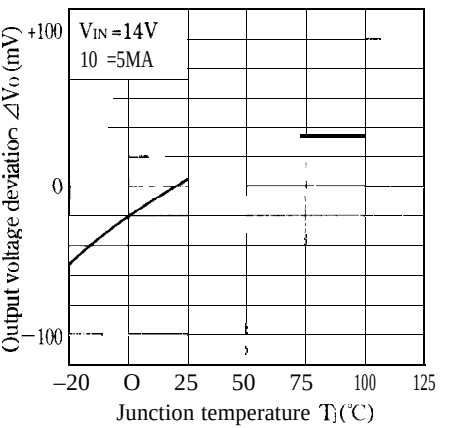


Fig. 9 Output Voltage vs. Input Voltage (PQ05RG1/11)

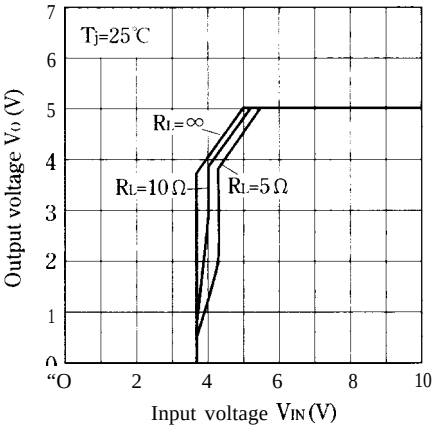


Fig.1O Output Voltage vs. Input Voltage (pQ09RG1/11)

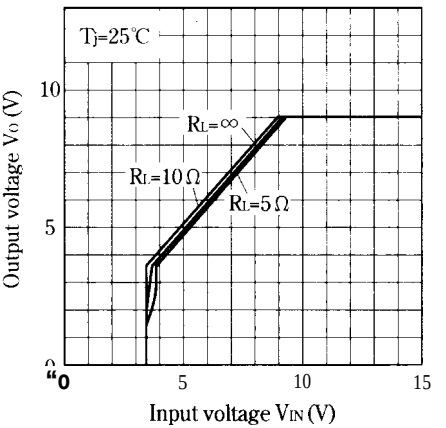


Fig.11 Output Voltage vs. Input Voltage (PQ12RG1/1 1)

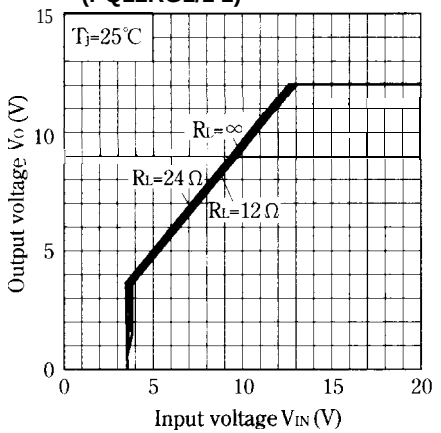


Fig.12 Circuit Operating Current vs. Input Voltage (PQ05RG1/11)

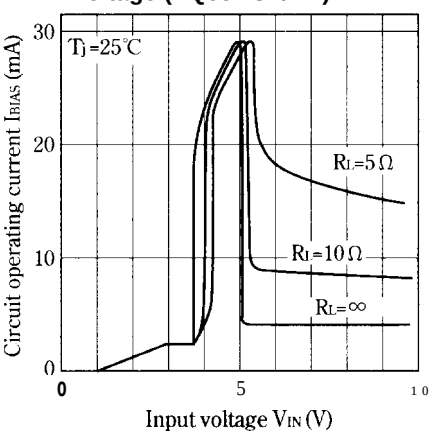


Fig.13 Circuit Operating Current vs. Input Voltage (PQ09RG1/11)

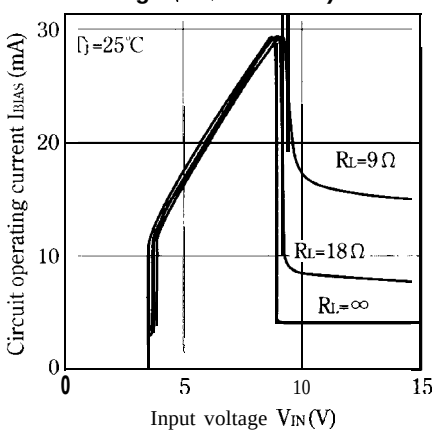


Fig.14 Circuit Operating Current vs. Input Voltage (PQ12RG1/1 1)

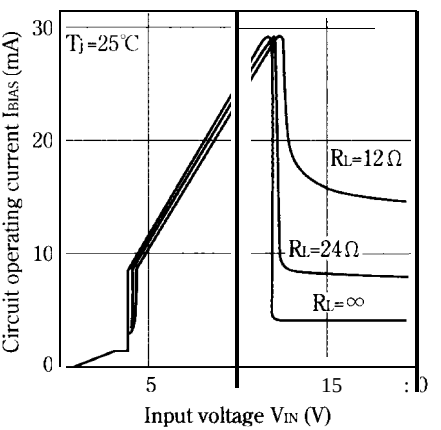


Fig.15 Dropout Voltage vs. Junction Temperature

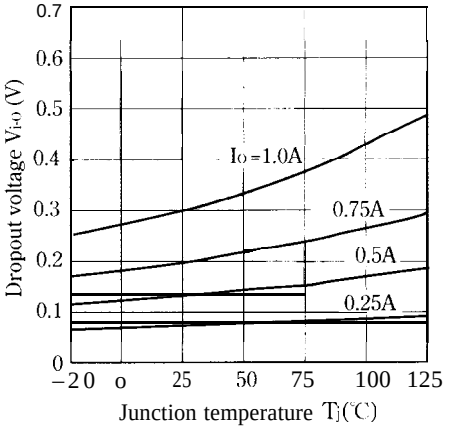


Fig.16 Quiescent Current vs. Input Voltage (PQ05RG1/11)

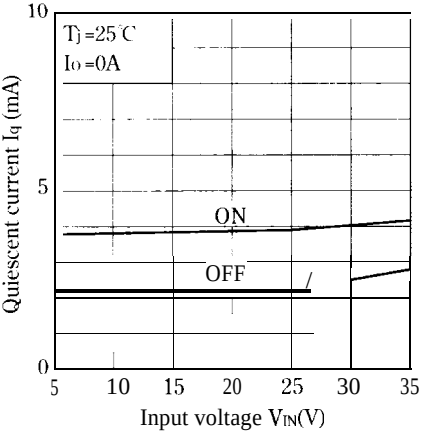


Fig.17 Quiescent Current vs. Input Voltage (PQ09RG1/11)

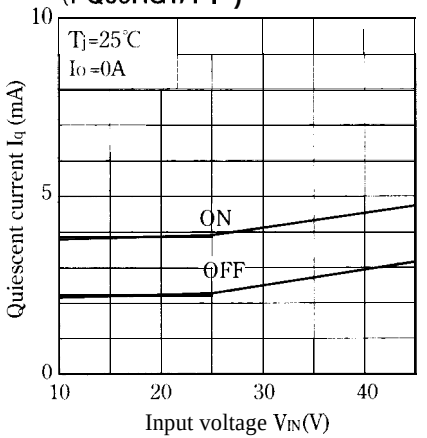


Fig.18 Quiescent Current vs. Input Voltage (PQ12RG1/11)

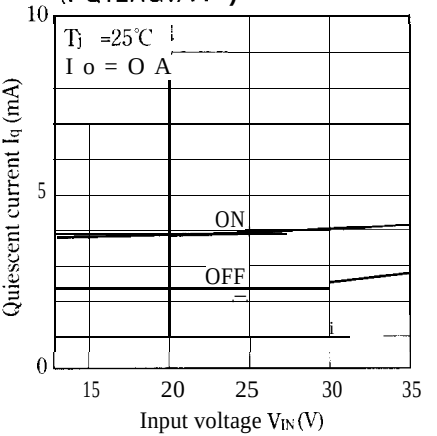


Fig.19 Quiescent Current vs. Junction Temperature

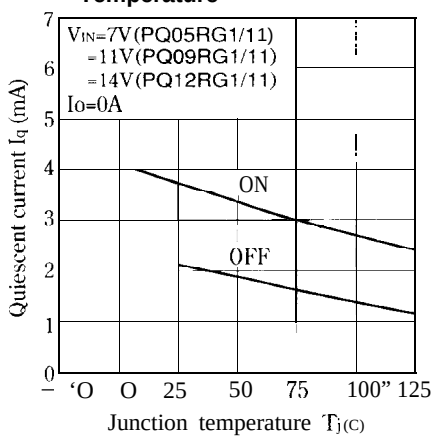


Fig.20 Ripple Rejection vs. Output Current

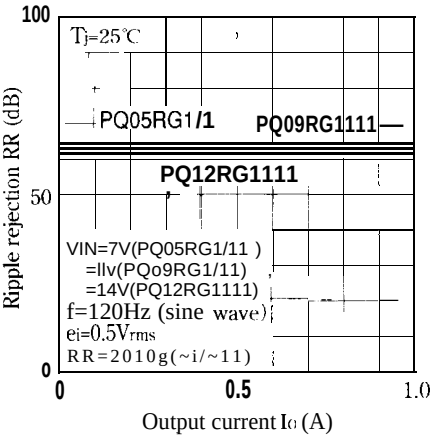


Fig.21 Ripple Rejection vs. Input Ripple Frequency

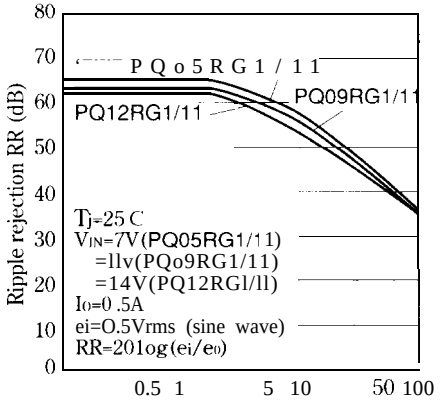


Fig.22 Input-Output Reverse Current vs. In"put-Output Reverse Voltage

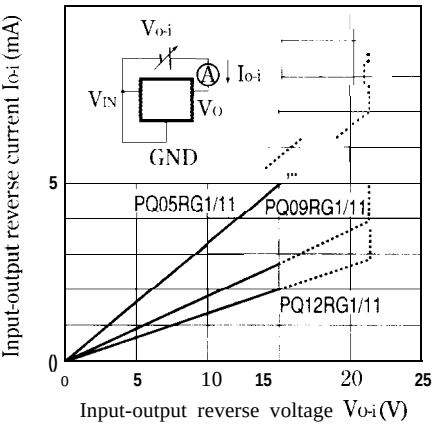


Fig.23 Output Peak Current vs. Junction Temperature