PQ05RG1/PQ05RG11 Series

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

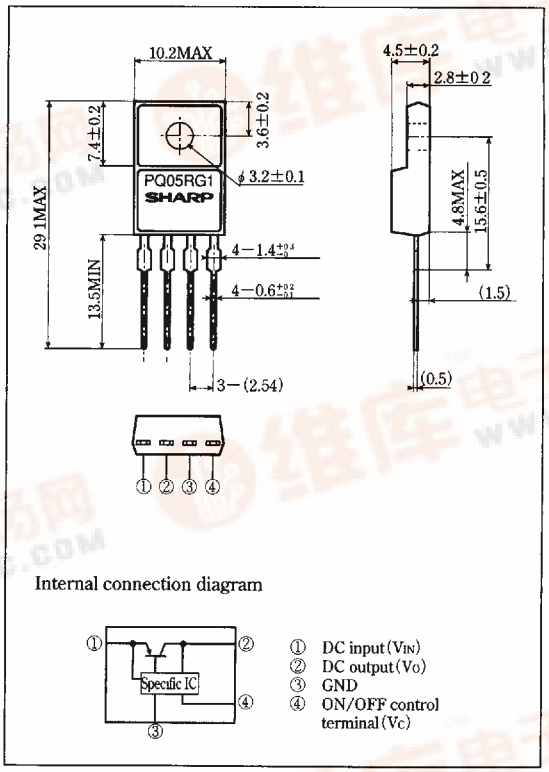
■ Features

- 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

■ Outline Dimensions (Unit : mm)



■ 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

■ 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≦Tj≦150℃

・Please refer to the chapter "Handling Precautions".

■ Electrical Characteristics

(Unless otherwise specified, condition shall be Io=0.5A,Ta=25℃※4)

Parameter		Symbol	Conditions		MIN.	TYP.	MAX.	Unit
Output voltage	PQ05RG1	Vo	VIN= 7V	Io=0.5A	4.75	5.0	5.25	V
	PQ09RG1		VIN=11V		8.55	9.0	9.45	
	PQ12RG1		VIN=14V		11.4	12.0	12.6	
	PQ05RG11		VIN= 7V		4.88	5.0	5.12	
	PQ09RG11		VIN=11V		8.78	9.0	9.22	
	PQ12RG11		VIN=14V		11.7	12.0	12.3	
Load regulation		RegL	※4		—	0.3	2.0	%
Line regulation		RegI	Io=5mA, ※5		—	0.1	2.5	%
Temperature coefficient of output voltage		TcVo	Io=5mA, Tj=0 to 125℃, ※6		—	±0.01	—	%/℃
Ripple rejection		RR	Refer to Fig. 2		45	60	—	dB
Dropout voltage		VI-O	※7, Io=0.5A		—	0.2	0.5	V
※8 ON-state voltage for control		VC(ON)	※6, Io=0.5A		2.0	—	—	V
ON-state current for current		IC(ON)	※6, Io=0.5A, Vc=2.7V		—	—	20	μA
OFF-state voltage for control		VC(OFF)	※6		—	—	0.8	V
OFF-state current for control		IC(OFF)	※6, Vo=0.4A		—	—	-0.4	mA
Quiescent current		Iq	Io=0A, ※6		—	6.0	10.0	mA

※4 PQ05RG1/11.VIN= 7V, Io=5mA to 1 0A
PQ09RG1/11:VIN=11V, Io=5mA to 1.0A
PQ12RG1/11·VIN=14V, Io=5mA to 1.0A

※5 PQ05RG1/11:VIN= 6 to 16V
PQ09RG1/11:VIN=10 to 20V
PQ12RG1/11:VIN=13 to 23V

※6 PQ05RG1/11 VIN= 7V
PQ09RG1/11.VIN=11V
PQ12RG1/11:VIN=14V

※7 Input voltage shall be 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

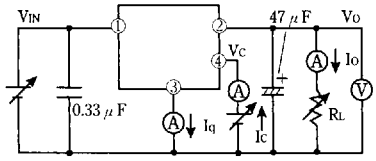
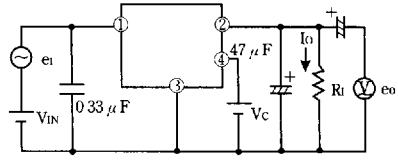
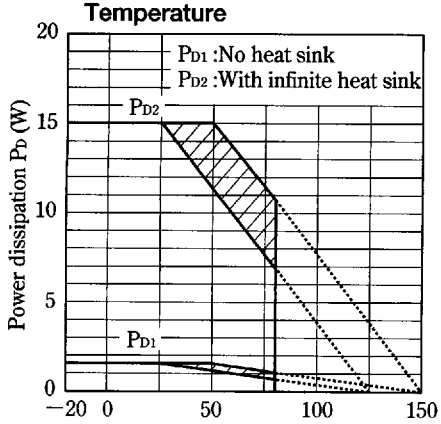


Fig. 2 Test Circuit of Ripple Rejection



f=120Hz(sine wave)
ei=0.5Vrms
VIN= 7V(PQ05RG1/PQ05RG11)
VIN=11V(PQ09RG1/PQ09RG11)
VIN=14V(PQ12RG1/PQ12RG11)
Io=0.5A
RR=20 log(ei/eo)

Fig. 3 Power Dissipation vs. Ambient Temperature



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

Fig. 4 Overcurren Protection Characteristics (Typical Value)

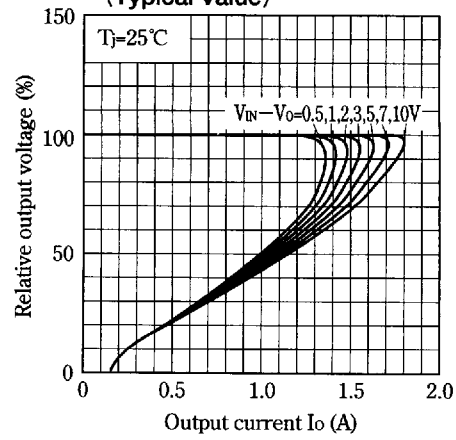


Fig. 5 Overcurrent Protection Characteristics (Typical Value)

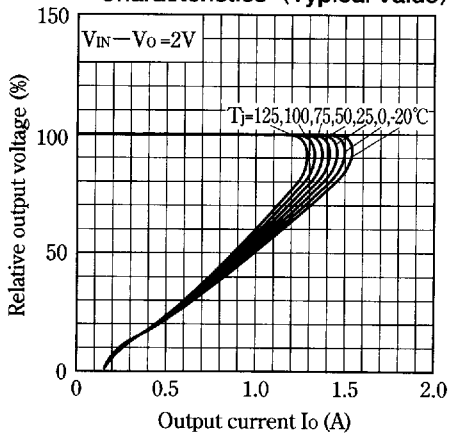


Fig. 6 Output Voltage Deviation vs. Junction Temperature (PQ05RG1/11)

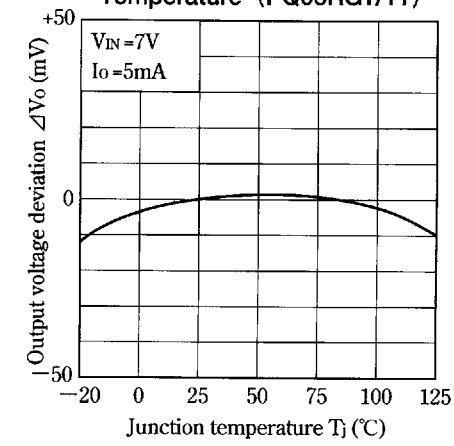


Fig. 7 Output Voltage Deviation vs. Junction Temperature (PQ09RG1/11)

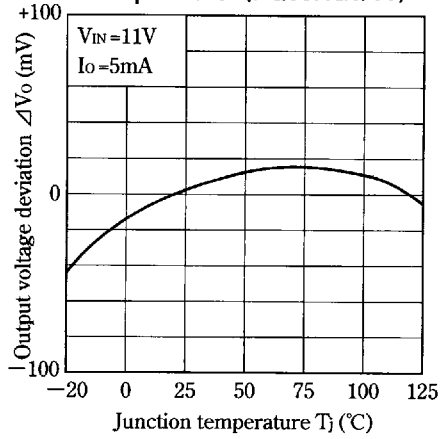


Fig. 8 Output Voltage Deviation vs. Junction Temperature (PQ12RG1/11)

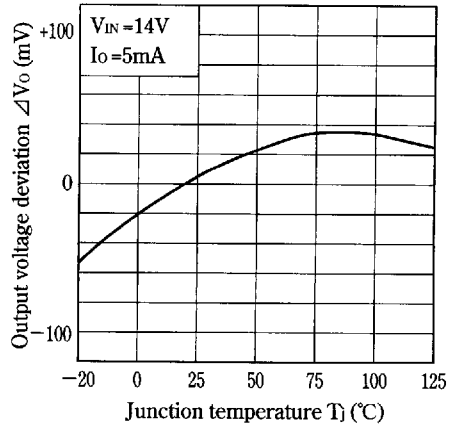


Fig. 9 Output Voltage vs. Input Voltage (PQ05RG1/11)

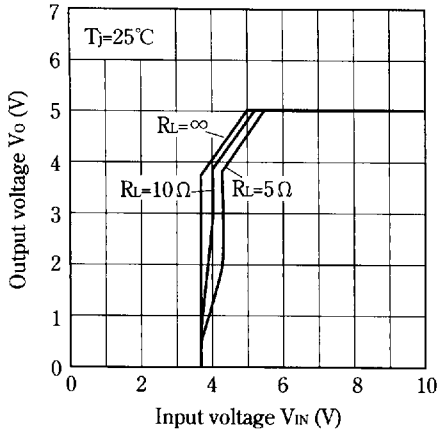


Fig.10 Output Voltage vs. Input Voltage (PQ09RG1/11)

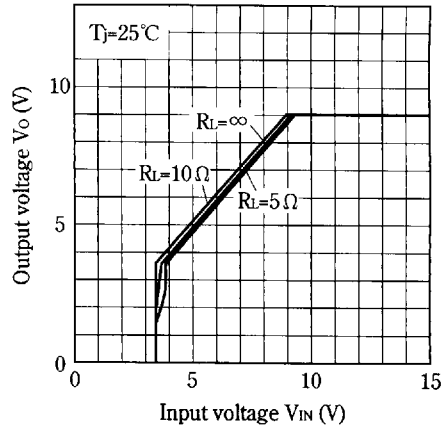


Fig.11 Output Voltage vs. Input Voltage (PQ12RG1/11)

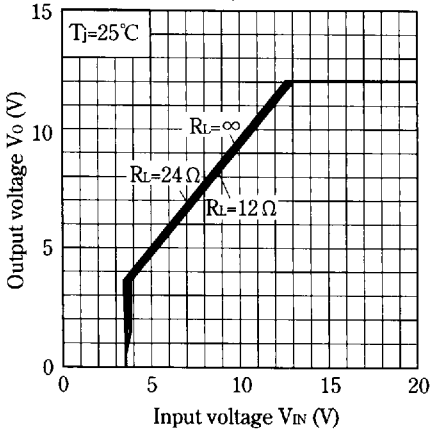


Fig.12 Circuit Operating Current vs. Input Voltage (PQ05RG1/11)

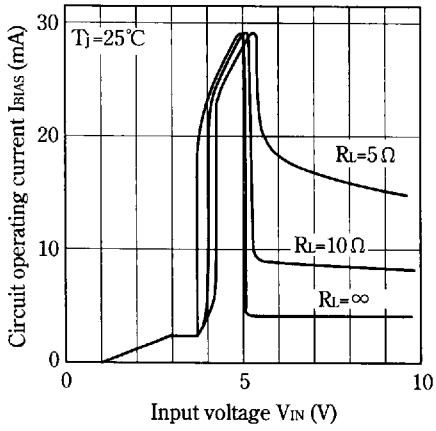


Fig.13 Circuit Operating Current vs. Input Voltage (PQ09RG1/11)

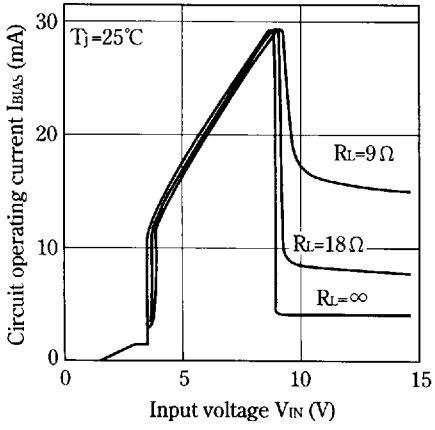


Fig.14 Circuit Operating Current vs. Input Voltage (PQ12RG1/11)

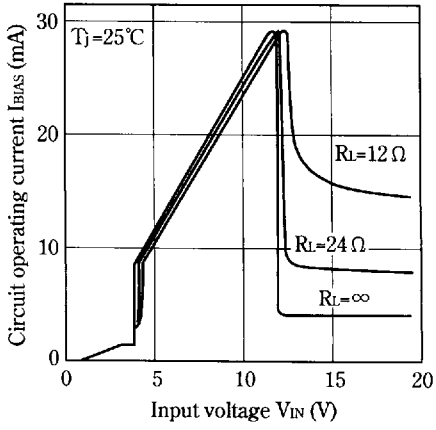


Fig.15 Dropout Voltage vs. Junction Temperature

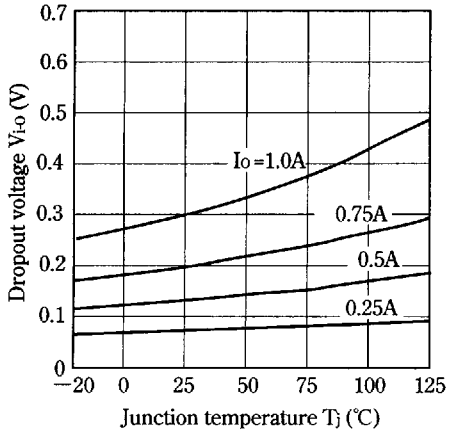


Fig.16 Quiescent Current vs. Input Voltage (PQ05RG1/11)

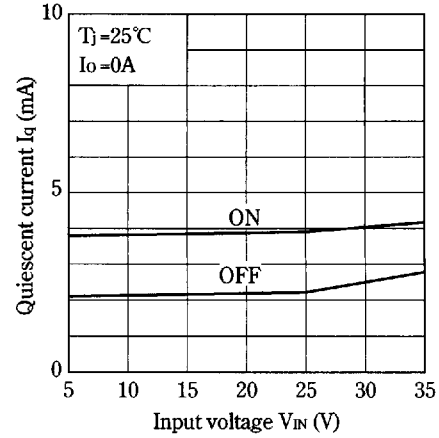


Fig.17 Quiescent Current vs. Input Voltage (PQ09RG1/11)

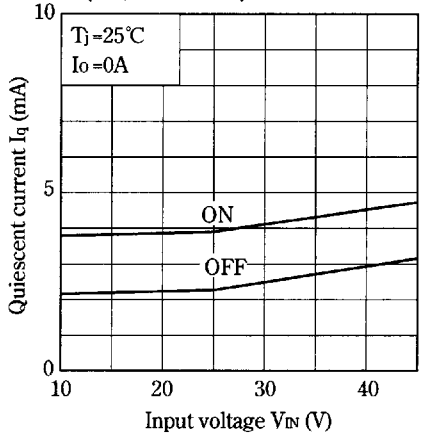


Fig.18 Quiescent Current vs. Input Voltage (PQ12RG1/11)

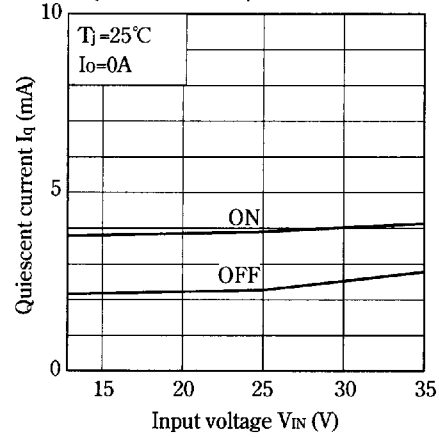


Fig.19 Quiescent Current vs. Junction Temperature

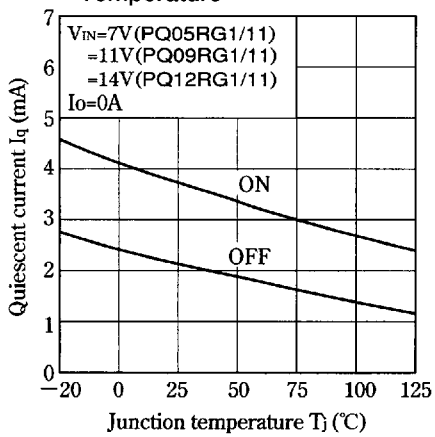


Fig.20 Ripple Rejection vs. Output Current

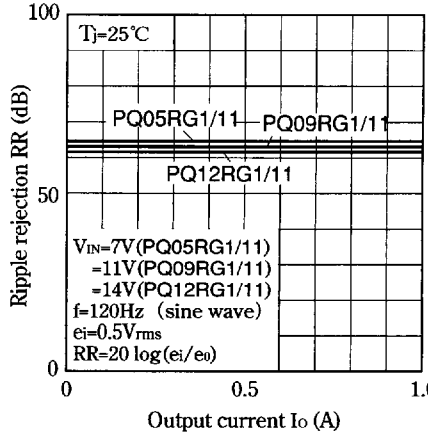


Fig.21 Ripple Rejection vs. Input Ripple Frequency

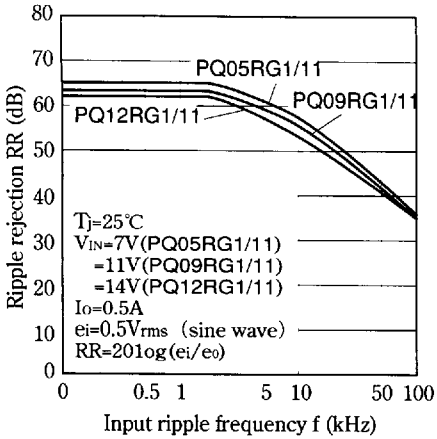


Fig.22 Input-Output Reverse Current vs. Input-Output Reverse Voltage

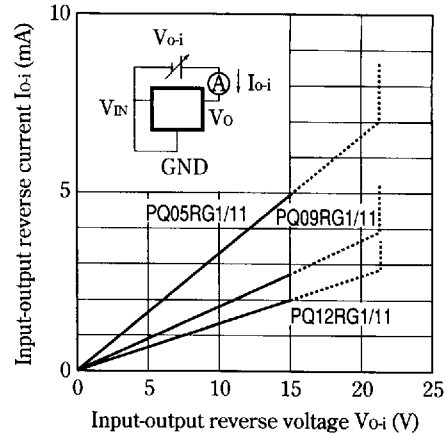


Fig.23 Output Peak Current vs. Junction Temperature