

# PQ05RD11 Series/PQ3RD13

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

## Features

- Low power-loss (Dropout voltage : MAX.0.5V at  $I_o=0.5A$ )
- Line-up for 3.3V, 5V, 9V and 12V output type
- Compact resin package (TO-220 package)
- High-precision output voltage type  
(Output voltage precision:  $\pm 3.0\%$ )
- Built-in ON/OFF control function
- Built-in overcurrent protection, overheat protection, ASO protection circuit
- Lead forming type is also available.

## Applications

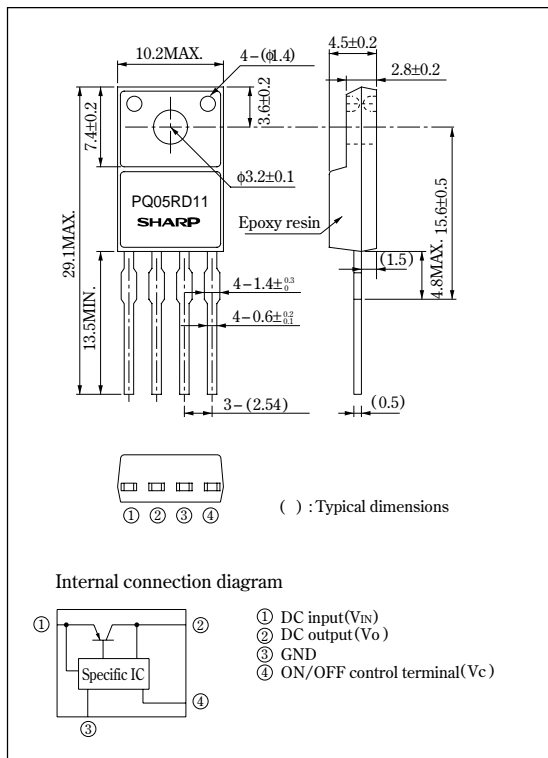
- Power supplies for various electronic equipment such as AV, OA equipment

## Model Line-ups

	1.0A output
3.3V output	PQ3RD13
5.0V output	PQ05RD11
9.0V output	PQ09RD11
12.0V output	PQ12RD11

## Outline Dimensions

(Unit : mm)



## Absolute Maximum Ratings

(T<sub>a</sub>=25°C)

Parameter	Symbol	Rating	Unit
*1 Input voltage	V <sub>IN</sub>	20	V
*1 ON/OFF control terminal voltage	V <sub>C</sub>	20	V
Output current	I <sub>O</sub>	1.0	A
Power dissipation (No heat sink)	P <sub>D1</sub>	1.4	W
Power dissipation (With infinite heat sink)	P <sub>D2</sub>	15	
*2 Junction temperature	T <sub>J</sub>	150	°C
Operating temperature	T <sub>opr</sub>	-20 to +80	°C
Storage temperature	T <sub>stg</sub>	-40 to +150	°C
Soldering temperature	T <sub>sol</sub>	260 (For 10s)	°C

\*1 All are open except GND and applicable terminals.

\*2 Overheat protection may operate at 125<=T<sub>J</sub><=150°C.

• Please refer to the chapter " Handling Precautions ".

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Electrical Characteristics

(Unless otherwise specified, conditions shall be  $I_o=0.5A$ ,  $T_a=25^{\circ}C$ )

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit	
Output voltage	V <sub>O</sub>	*3	PQ03RD13	3.201	3.3	3.399	V
			PQ05RD11	4.85	5.0	5.15	
			PQ09RD11	8.73	9.0	9.27	
			PQ12RD11	11.64	12.0	12.36	
Load regulation	RegL	I <sub>o</sub> =5mA to 1.0A, *3	—	0.1	2.0	%	
Line regulation	RegI	*4, I <sub>o</sub> =5mA	PQ05RD11 Series	—	0.5	2.5	%
			PQ3RD13	—	0.1	2.5	
Temperature coefficient of output voltage	TcV <sub>O</sub>	T <sub>j</sub> =0 to 125°C, I <sub>o</sub> =5mA	—	±0.02	—	%/°C	
Ripple rejection	RR	Refer to Fig.2	45	55	—	dB	
Dropout voltage	V <sub>I-O</sub>	*5	—	—	0.5	V	
*6 ON-state voltage for control	V <sub>C (ON)</sub>	*3	2.0	—	—	V	
ON-state current for control	I <sub>C (ON)</sub>	V <sub>C</sub> =2.7V, *3	—	—	20	μA	
OFF-state voltage for control	V <sub>C (OFF)</sub>	*3	—	—	0.8	V	
OFF-state current for control	I <sub>C (OFF)</sub>	V <sub>C</sub> =0.4V, *3	—	—	-0.4	mA	
Quiescent current	I <sub>q</sub>	I <sub>o</sub> =0A, *3	—	—	10	mA	

\*3 PQ3RD13:V<sub>IN</sub>=5V, PQ05RD11:V<sub>IN</sub>=7V, PQ09RD11:V<sub>IN</sub>=11V, PQ12RD11: V<sub>IN</sub>=14V

\*4 PQ3RD13:V<sub>IN</sub> = 4 to 10V, PQ05RD11:V<sub>IN</sub> = 6 to 12V, PQ09RD11:V<sub>IN</sub>=10 to 16V, PQ12RD11: V<sub>IN</sub>=13 to 19V

\*5 Input voltage shall be the value when output voltage is 95% in comparison with the initial value.

\*6 In case of opening control terminal ④, output voltage turns on.

Fig. 1 Test Circuit

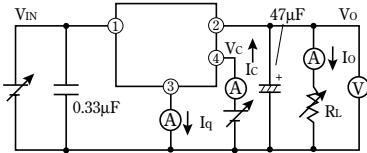


Fig. 2 Test Circuit of Ripple Rejection

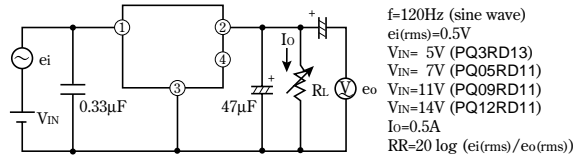
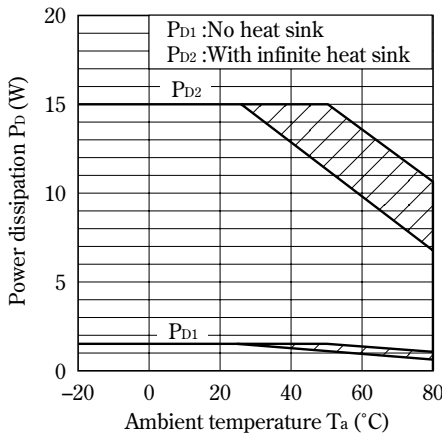
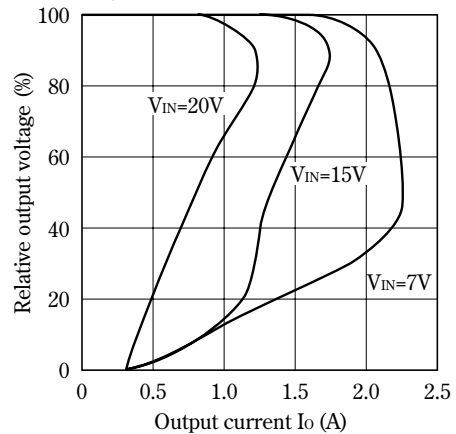


Fig. 3 Power Dissipation vs. Ambient Temperature

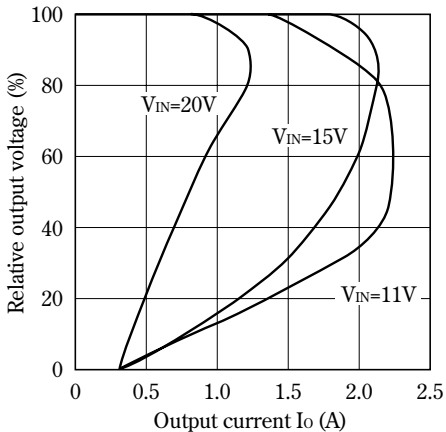


Note) Oblique line portion : Overheat protection may operate in this area.

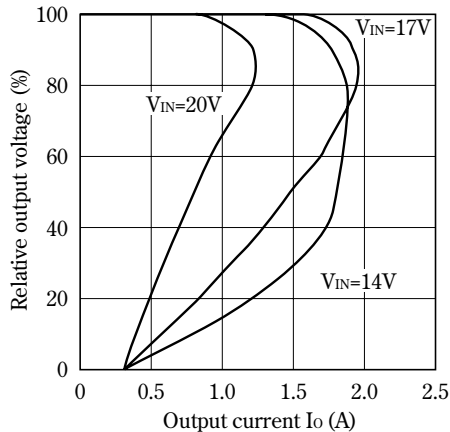
Fig. 4 Overcurrent Protection Characteristics (Typical Value)(PQ05RD11)



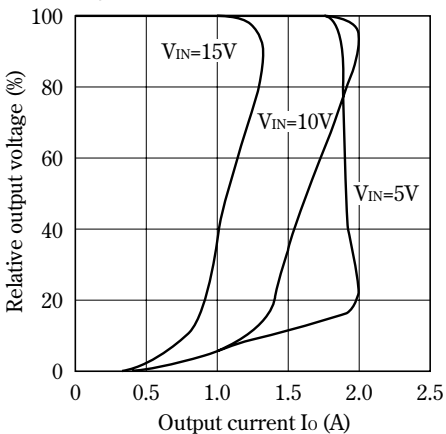
**Fig. 5 Overcurrent Protection Characteristics (Typical Value) (PQ09RD11)**



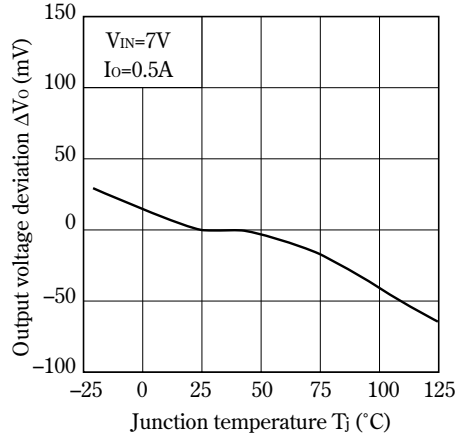
**Fig. 6 Overcurrent Protection Characteristics (Typical Value) (PQ12RD11)**



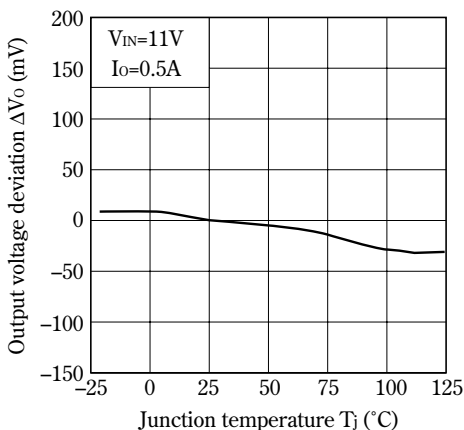
**Fig. 7 Overcurrent Protection Characteristics (Typical Value) (PQ3RD13)**



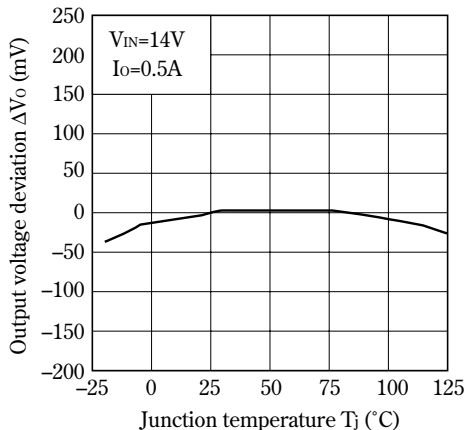
**Fig. 8 Output Voltage Deviation vs. Junction Temperature (PQ05RD11)**



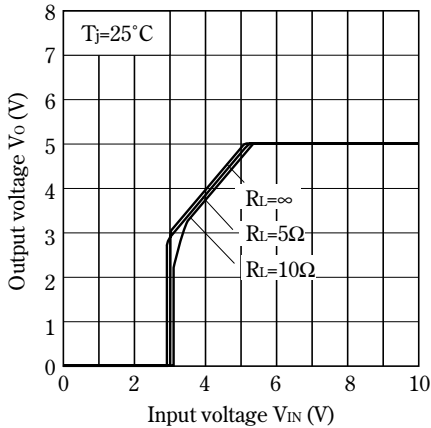
**Fig. 9 Output Voltage Deviation vs. Junction Temperature (PQ09RD11)**



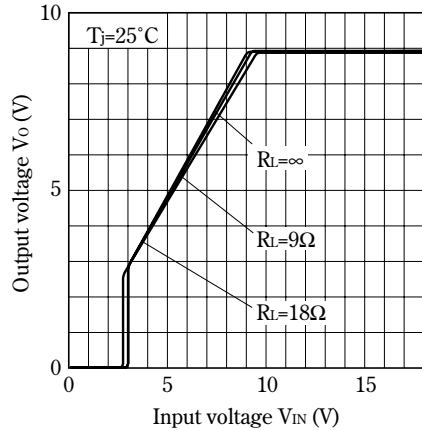
**Fig.10 Output Voltage Deviation vs. Junction Temperature (PQ12RD11)**



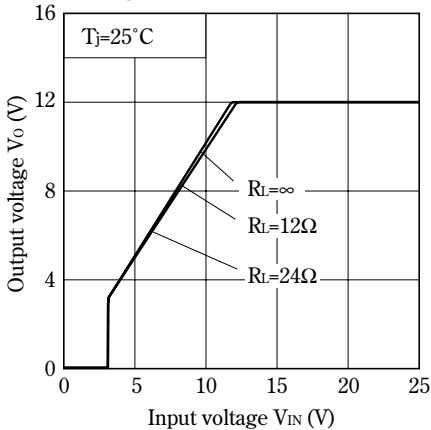
**Fig.11 Output Voltage vs. Input Voltage (PQ05RD11)**



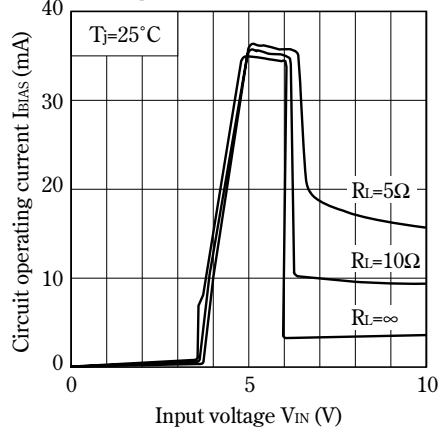
**Fig.12 Output Voltage vs. Input Voltage (PQ09RD11)**



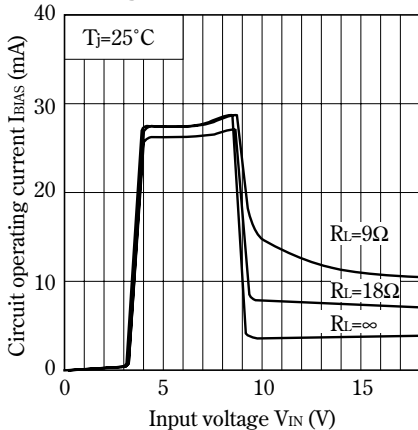
**Fig.13 Output Voltage vs. Input Voltage (PQ12RD11)**



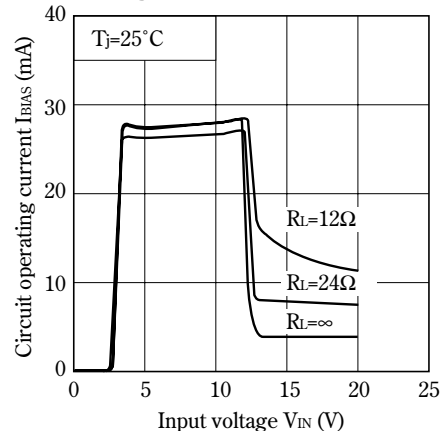
**Fig.14 Circuit Operating Current vs. Input Voltage (PQ05RD11)**



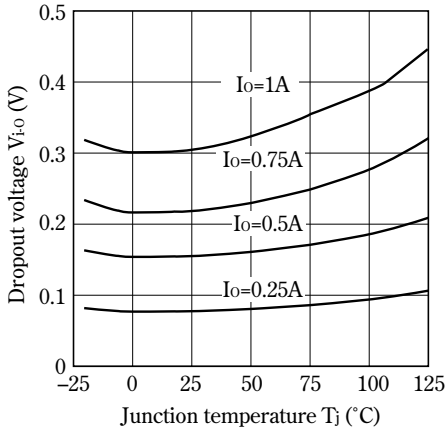
**Fig.15 Circuit Operating Current vs. Input Voltage (PQ09RD11)**



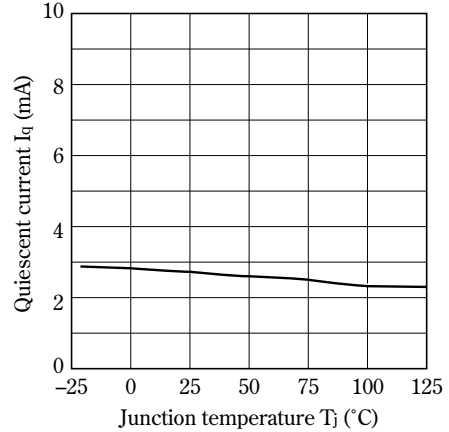
**Fig.16 Circuit Operating Current vs. Input Voltage (PQ12RD11)**



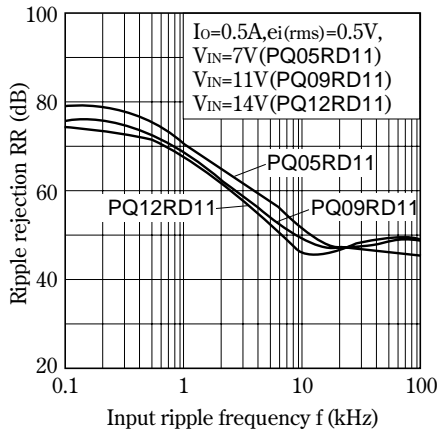
**Fig.17 Dropout Voltage vs. Junction Temperature (PQ05RD11 Series)**



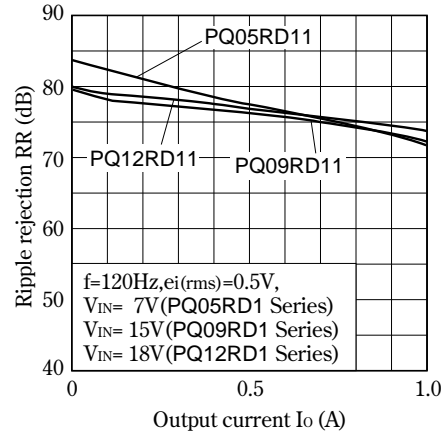
**Fig.18 Quiescent Current vs. Junction Temperature (PQ05RD11 Series)**



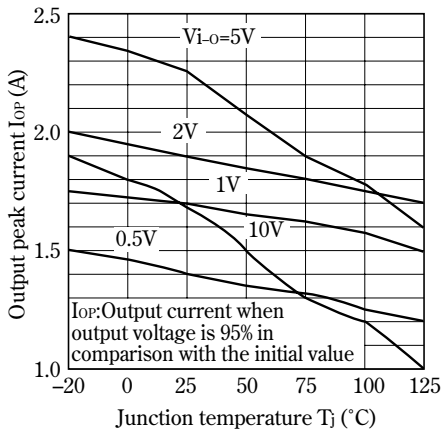
**Fig.19 Ripple Rejection vs. Input Ripple Frequency (PQ05RD11 Series)**



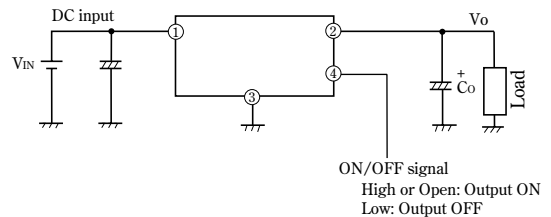
**Fig.20 Ripple Rejection vs. Output Current (PQ05RD11 Series)**



**Fig.21 Output Peak Current vs. Junction Temperature**



■ Typical Application



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    - Alarm equipment
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