

# PQ05RA1/PQ05RA11 Series

OFF-state Low Dissipation Current 1A Output, Low Power-Loss Voltage Regulators

## Features

- Low power-loss(Dropout voltage:MAX.0.5V)
- Compact resin full-mold package
- OFF-state low dissipation current  
( $I_{qs}$ :1 $\mu$ A, 1/10<sup>4</sup> as compared to former model PQ05RF1)
- Built-in ON/OFF control function

## Applications

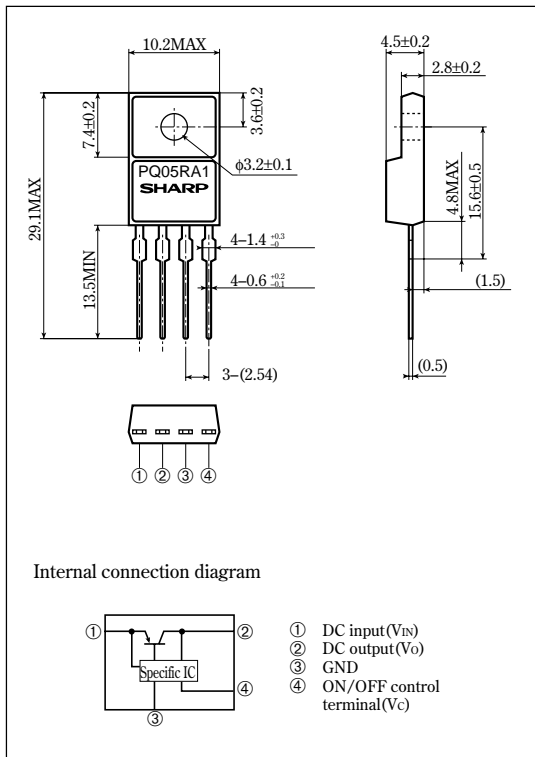
- Series power supplies for OA and AV equipment such as camcorders, word processors, etc.

## Model Line-ups

Output voltage	5V Output	9V Output	12V Output
Output voltage precision:±5%	PQ05RA1	PQ09RA1	PQ12RA1
Output voltage precision:±2.5%	PQ05RA11	PQ09RA11	PQ12RA11

## Outline Dimensions

(Unit : mm)



## Absolute Maximum Ratings

( $T_a=25^{\circ}C$ )

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

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

\*2 Overheat protection may operate at  $125 \leq T_j < 150^{\circ}C$ .

\*3 For 10s.

•Please refer to the chapter " Handling Precautions ".

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Electrical Characteristics

(Unless otherwise specified condition shall be  $I_o=0.5A$ ,  $T_a=25^\circ C^{*4}$ )

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Output voltage	$V_o$	-	4.75	5.0	5.25	V
			8.55	9.0	9.45	
			11.4	12.0	12.6	
			4.88	5.0	5.12	
			8.78	9.0	9.22	
			11.7	12.0	12.3	
Load regulation	$RegL$	$I_o=5mA$ to 1.0A	-	0.1	2.0	%
Line regulation	$RegI$	#5	-	0.2	2.5	%
Temperature coefficient of output voltage	$TcVo$	$T_j=0$ to $125^\circ C$	-	$\pm 0.004$	-	%/ $^\circ C$
Ripple rejection	RR	Refer to Fig.2	45	55	-	dB
Dropout voltage	$V_{F-o}$	#6	-	-	0.5	V
ON-state voltage for control	$V_C(ON)$	-	2.0	-	-	V
ON-state current for control	$I_C(ON)$	-	-	-	200	$\mu A$
*7 OFF-state voltage for control	$V_C(OFF)$	-	-	-	0.8	V
OFF-state current for control	$I_C(OFF)$	$V_C=0.4V$	-	-	2	$\mu A$
Quiescent current	$I_q$	$I_o=0A$ , $V_{IN}=35V$	-	-	8	mA
Output OFF-state consumption current	$I_{qs}$	$I_o=0A$ , $V_{IN}=35V$ $V_C=0.4V$	-	-	1	$\mu A$

\*4 PQ05RA1 series: $V_{IN}=7V$ , PQ09RA1 series: $V_{IN}=11V$ , PQ12RA1 series: $V_{IN}=14V$

\*5 PQ05RA1/PQ05RA11: $V_{IN}=6$  to  $16V$   
 PQ09RA1/PQ09RA11: $V_{IN}=10$  to  $20V$   
 PQ12RA1/PQ12RA11: $V_{IN}=13$  to  $23V$

\*6 Input voltage shall be the value when output voltage is 95% in comparison with the initial value.

\*7 In case of opening control terminal  $\textcircled{C}$ , output voltage turns off.

Fig.1 Test Circuit

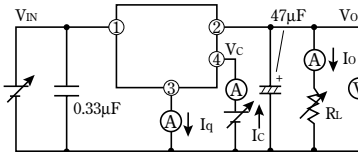


Fig.2 Test Circuit of Ripple Rejection

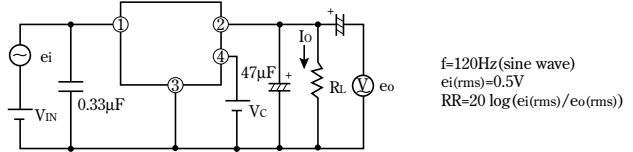
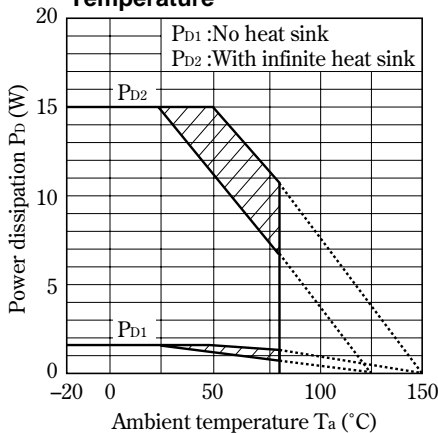
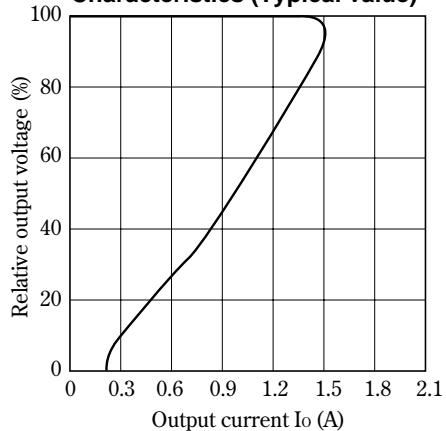


Fig.3 Power Dissipation vs. Ambient Temperature

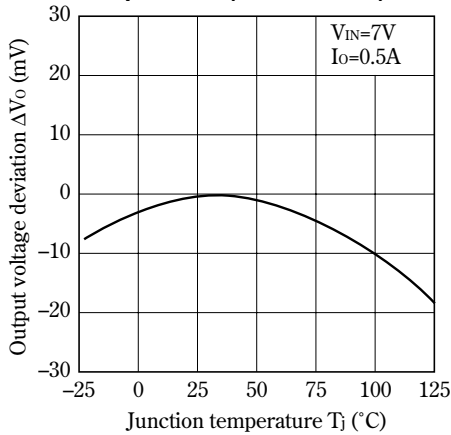


Note) Oblique line portion : Overheat protection may operate in this area.

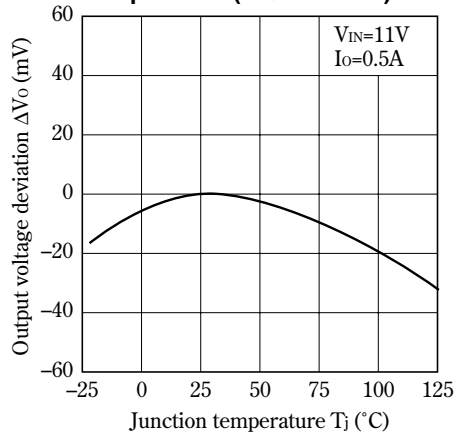
Fig.4 Overcurrent Protection Characteristics (Typical value)



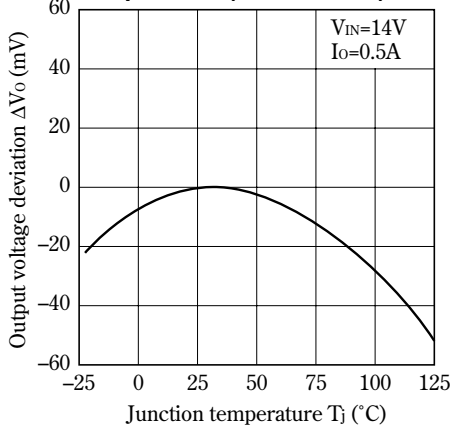
**Fig.5 Output Voltage Deviation vs. Junction Temperature (PQ05RA1/11)**



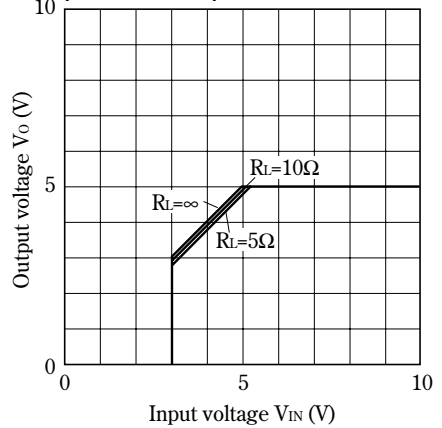
**Fig.6 Output Voltage Deviation vs. Junction Temperature (PQ09RA1/11)**



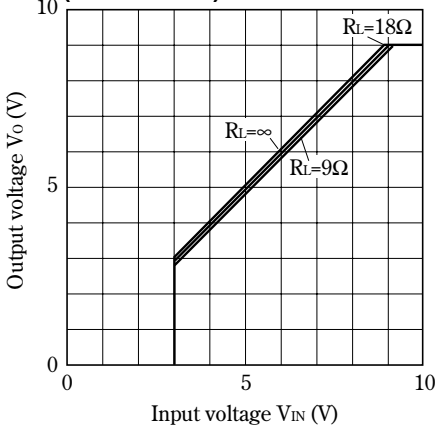
**Fig.7 Output Voltage Deviation vs. Junction Temperature (PQ12RA1/11)**



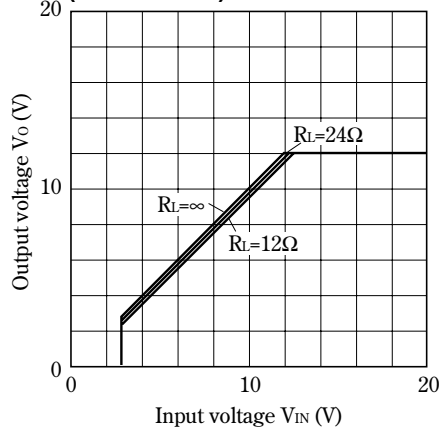
**Fig.8 Output Voltage vs. Input Voltage (PQ05RA1/11)**



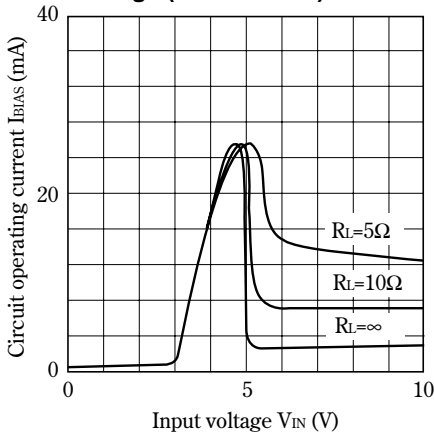
**Fig.9 Output Voltage vs. Input Voltage (PQ09RA1/11)**



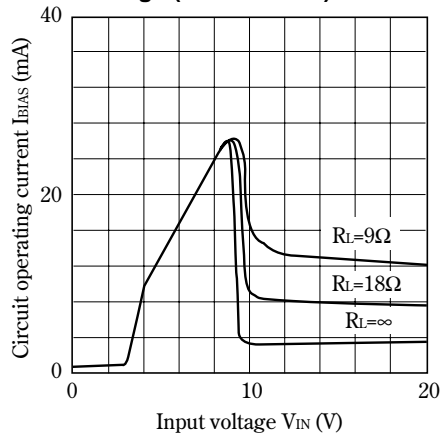
**Fig.10 Output Voltage vs. Input Voltage (PQ12RA1/11)**



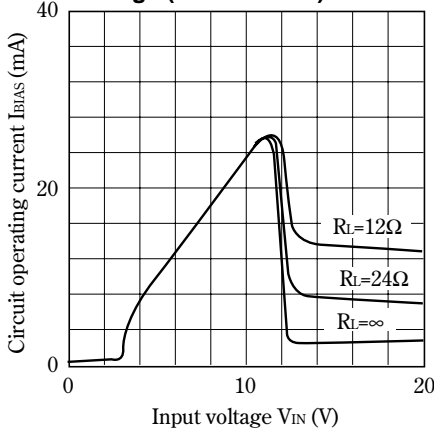
**Fig.11 Circuit Operating Current vs. Input Voltage (PQ05RA1/11)**



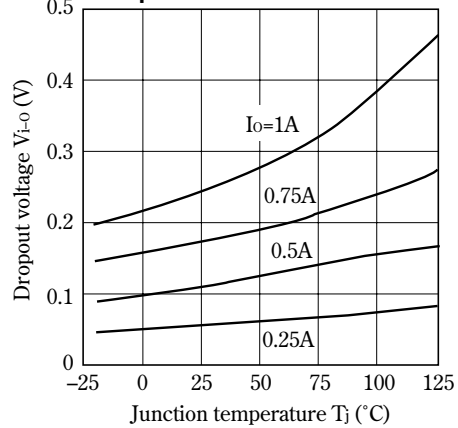
**Fig.12 Circuit Operating Current vs. Input Voltage (PQ09RA1/11)**



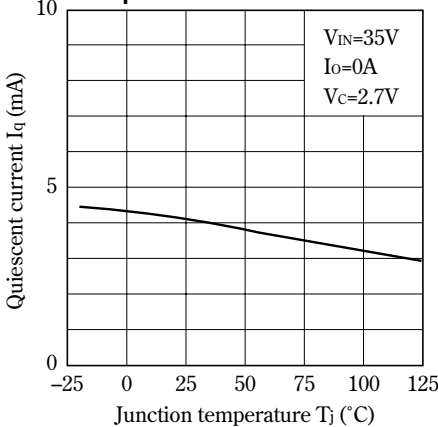
**Fig.13 Circuit Operating Current vs. Input Voltage (PQ12RA1/11)**



**Fig.14 Dropout Voltage vs. Junction Temperature**



**Fig.15 Quiescent Current vs. Junction Temperature**



**Fig.16 Ripple Rejection vs. Input Ripple Frequency**

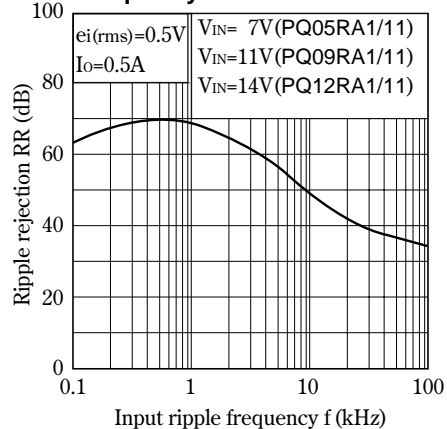


Fig.17 Ripple Rejection vs. Output Current

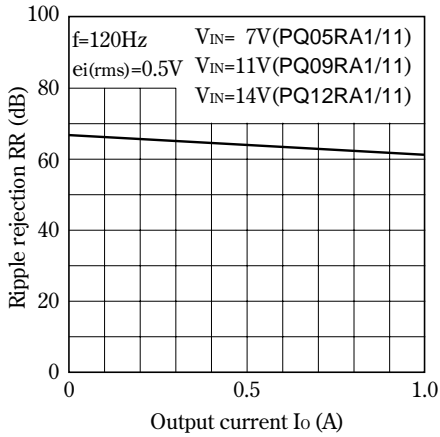


Fig.18 Output Peak Current vs. Junction Temperature

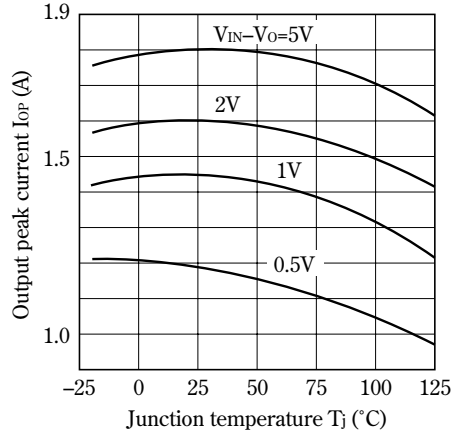
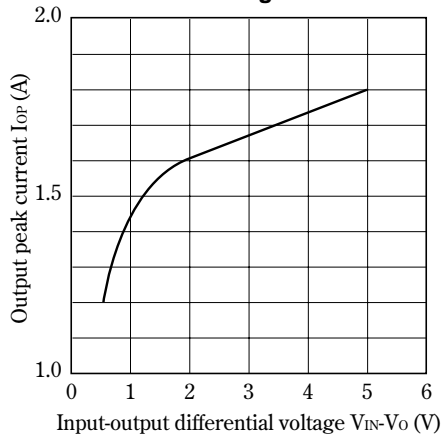
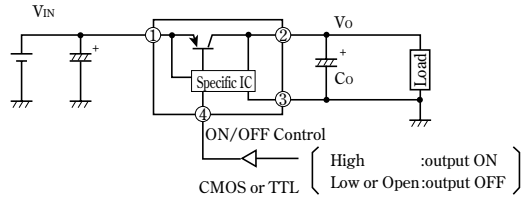


Fig.19 Output Peak Current vs. Input-output Differential Voltage



■ Typical Application



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