

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 μ A, 1/10⁴ as compared to former model PQ05RF1)
- Built-in ON/OFF control function

Applications

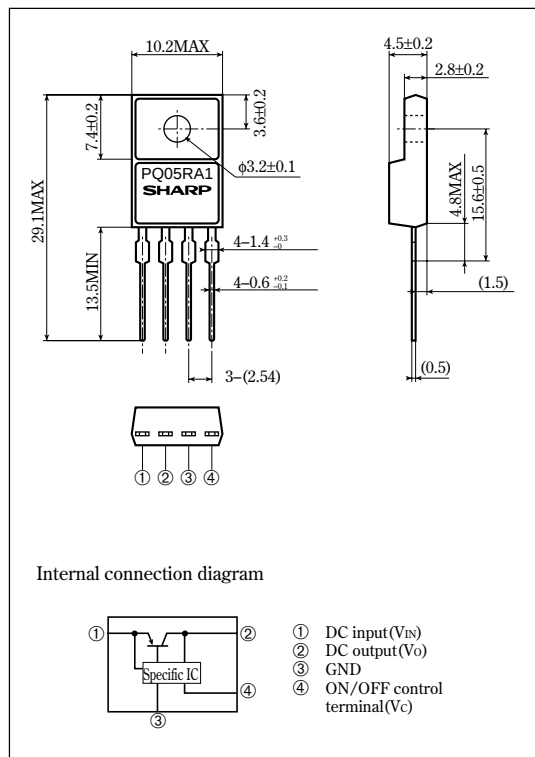
- Series power supplies for OA and AV equipment such as camcorders, word processors, etc.

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°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	°C
Operating temperature	T _{opr}	-20 to +80	°C
Storage temperature	T _{stg}	-40 to +150	°C
*3 Soldering temperature	T _{sol}	260	°C

*1 All are open except GND and applicable terminals.

*2 Overheat protection may operate at 125≤T_J≤150°C.

*3 For 10s.

•Please refer to the chapter " Handling Precautions ".

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Electrical Characteristics

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

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Output voltage	PQ05RA1	-	4.75	5.0	5.25	V
	PQ09RA1		8.55	9.0	9.45	
	PQ12RA1		11.4	12.0	12.6	
	PQ05RA11		4.88	5.0	5.12	
	PQ09RA11		8.78	9.0	9.22	
	PQ12RA11		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 $125^{\circ}C$	-	± 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	μA
*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	μA
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	μA

Ⓢ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 Ⓢ, output voltage turns off.

Fig.1 Test Circuit

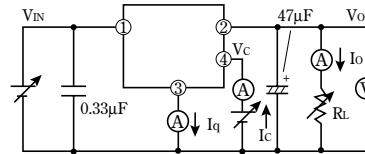
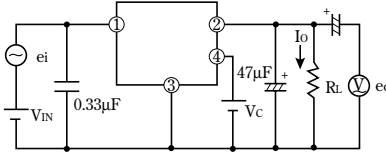


Fig.2 Test Circuit of Ripple Rejection



$f=120Hz$ (sine wave)
 $e_i(rms)=0.5V$
 $RR=20 \log(e_i(rms)/e_o(rms))$

Fig.3 Power Dissipation vs. Ambient Temperature

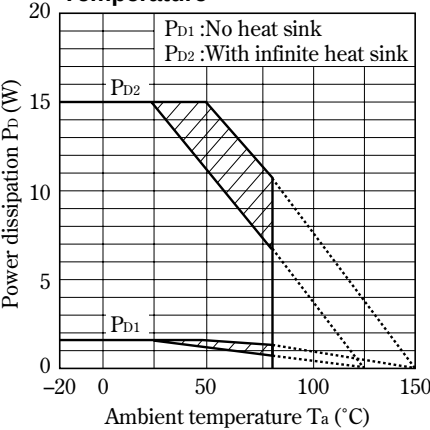
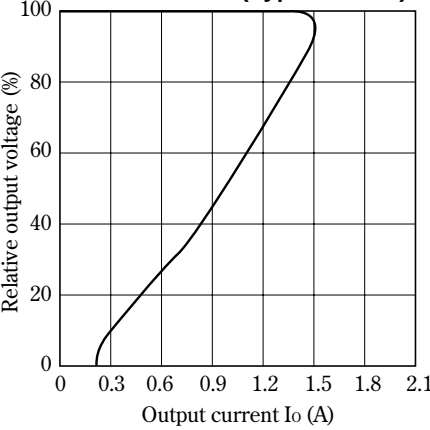


Fig.4 Overcurrent Protection Characteristics (Typical value)



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

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

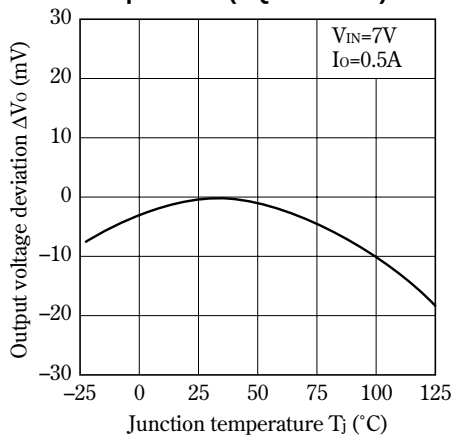


Fig.6 Output Voltage Deviation vs. Junction Temperature (PQ09RA1/11)

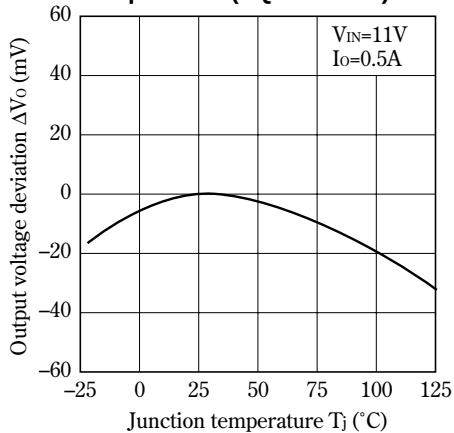


Fig.7 Output Voltage Deviation vs. Junction Temperature (PQ12RA1/11)

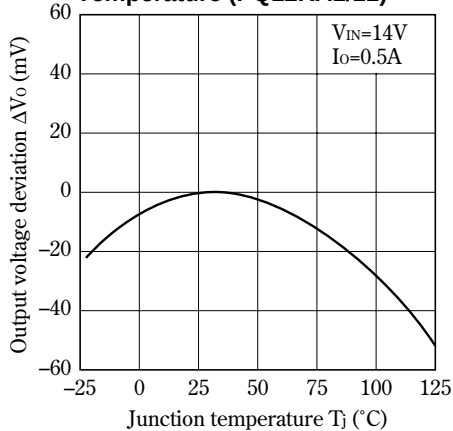


Fig.8 Output Voltage vs. Input Voltage (PQ05RA1/11)

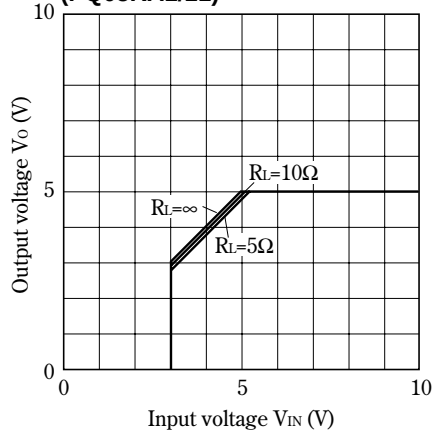


Fig.9 Output Voltage vs. Input Voltage (PQ09RA1/11)

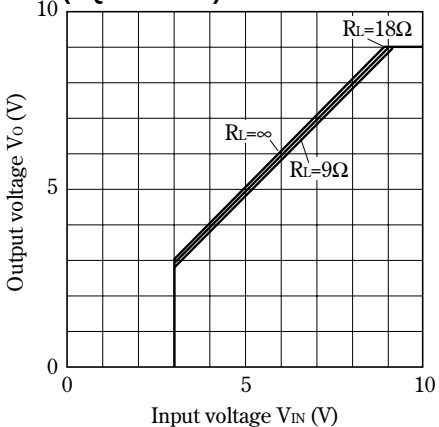


Fig.10 Output Voltage vs. Input Voltage (PQ12RA1/11)

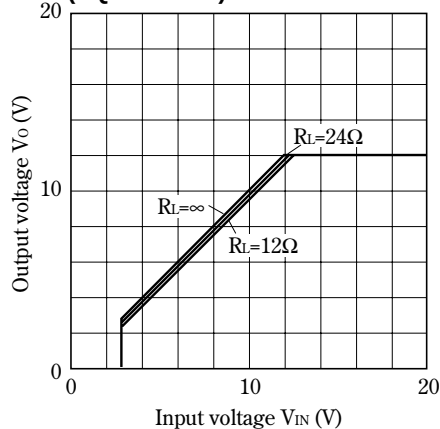


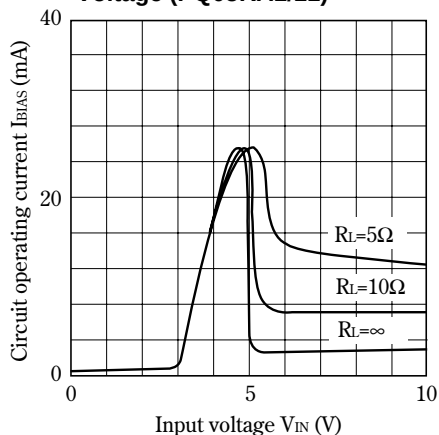
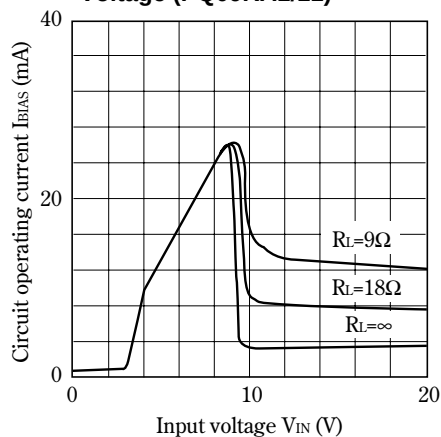
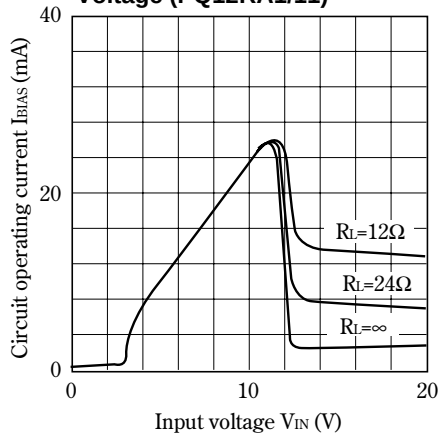
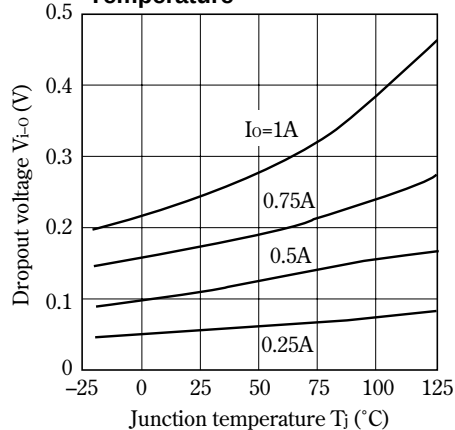
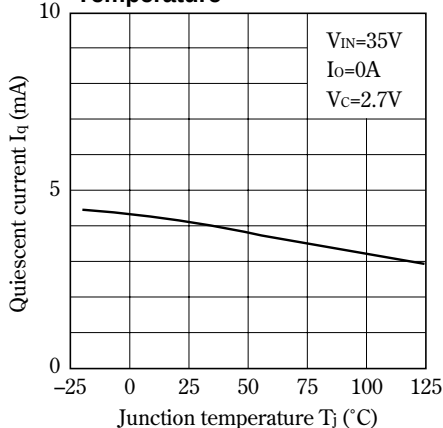
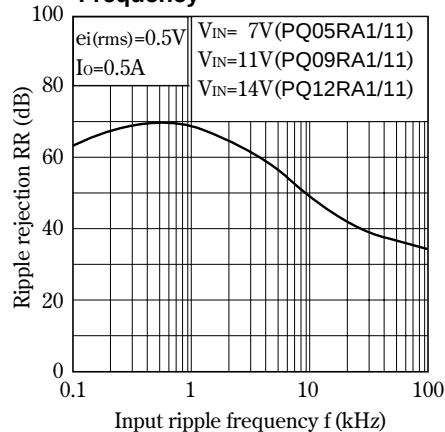
Fig.11 Circuit Operating Current vs. Input Voltage (PQ05RA1/11)**Fig.12 Circuit Operating Current vs. Input Voltage (PQ09RA1/11)****Fig.13 Circuit Operating Current vs. Input Voltage (PQ12RA1/11)****Fig.14 Dropout Voltage vs. Junction Temperature****Fig.15 Quiescent Current vs. Junction Temperature****Fig.16 Ripple Rejection vs. Input Ripple Frequency**

Fig.17 Ripple Rejection vs. Output Current

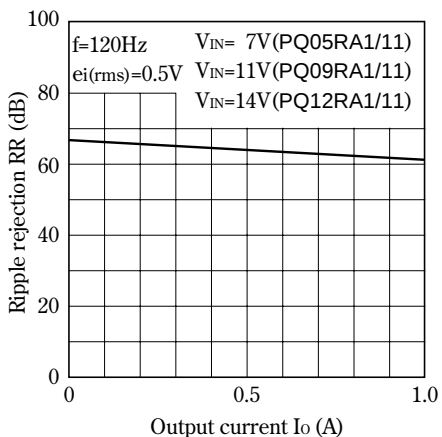


Fig.18 Output Peak Current vs. Junction Temperature

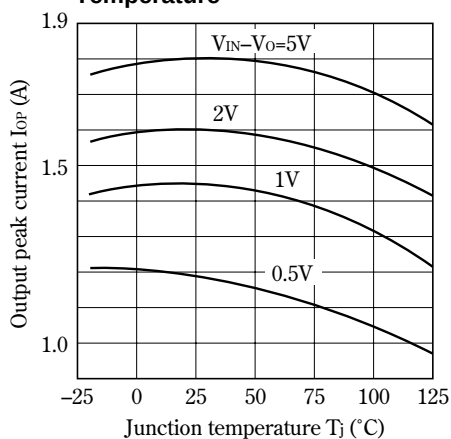
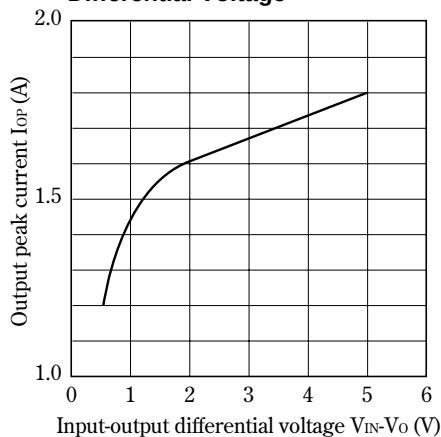
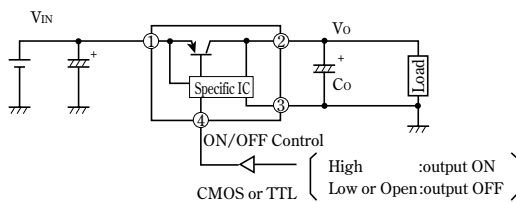


Fig.19 Output Peak Current vs. Input-output Differential Voltage



Typical Application



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