

PQ05RF12/PQ05RF13 Series

1A Output Low Power-Loss Voltage Regulators Considering Power Line Voltage Drop

■ Features

- Low power-loss (Dropout voltage : MAX.0.5V)
- Compact resin full-mold package
- Output voltage value (5.3V, 9.3V, 12.3V) with an allowance for power line voltage drop
- The high-precision output voltage models are also available. (output voltage precision : $\pm 2.5\%$)
- Built-in ON/OFF control function.

■ Applications

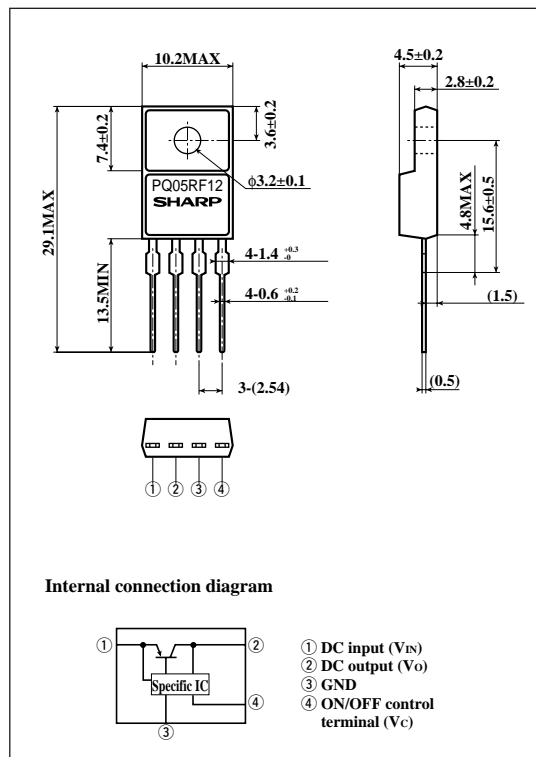
- Series power supply for various electronic equipment such as VCRs and electronic instruments

■ Model Line-ups

Output voltage	5.3V output	9.3V output	12.3V output
Output voltage precision: $\pm 5\%$	PQ05RF12	PQ09RF12	PQ12RF12
Output voltage precision: $\pm 2.5\%$	PQ05RF13	PQ09RF13	PQ12RF13

■ 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
Soldering temperature	T _{sol}	260 (For 10s)	°C

*1 All are open except GND and applicable terminals.

*2 Overheat protection may operate at 125 \leq T_j \leq 150°C

■ Electrical Characteristics

Unless otherwise specified, condition shall be $(V_{IN}=8V, I_o=0.5A(PQ05RF12/PQ05RF13))$
 $(V_{IN}=12V, I_o=0.5A(PQ09RF12/PQ09RF13))$
 $(V_{IN}=15V, I_o=0.5A(PQ12RF12/PQ12RF13))$

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

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit	
Output voltage	V_o	-	PQ05RF12	5.04	5.3	5.56	V
			PQ09RF12	8.84	9.3	9.76	
			PQ12RF12	11.69	12.3	12.91	
			PQ05RF13	5.17	5.3	5.43	
			PQ09RF13	9.07	9.3	9.53	
			PQ12RF13	12.0	12.3	12.6	
Load regulation	R_{eL}	$I_o=5mA$ to 1.0A	-	0.1	2.0	%	
Line regulation	R_{eI}	$V_{IN}=7$ to 17V	-	0.5	2.5	%	
		$V_{IN}=11$ to 21V					
		$V_{IN}=14$ to 24V					
Temperature coefficient of output voltage	TcV_o	$T_j=0$ to $125^{\circ}C$	-	± 0.02	-	%/ $^{\circ}C$	
Ripple rejection	RR	Refer to Fig. 2	45	55	-	dB	
Dropout voltage	V_{i-o}	^{*3}	-	-	0.5	V	
ON-state voltage for control	$V_{C(ON)}$	^{*4}	2.0	-	-	V	
ON-state current for control	$I_{C(ON)}$	$V_C=2.7V$	-	-	20	μA	
OFF-state voltage for control	$V_{C(OFF)}$	-	-	-	0.8	V	
OFF-state current for control	$I_{C(OFF)}$	$V_C=0.4V$	-	-	-0.4	mA	
Quiescent current	I_q	$V_C=0A$	-	-	10	mA	

^{*3} Input voltage shall be the value when output voltage is 95% in comparison with the initial value.

^{*4} In case of opening control terminal ④, output voltage turns on.

Fig.1 Test Circuit

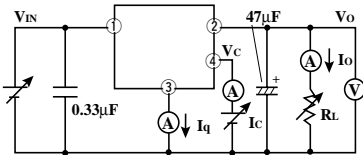
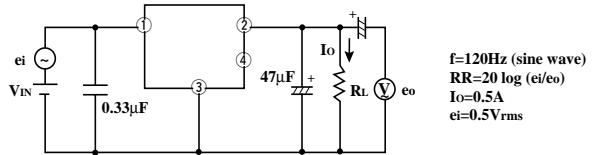
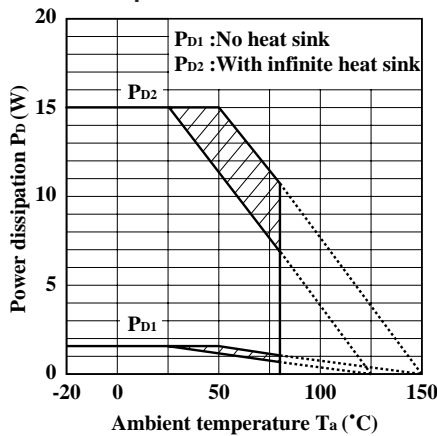


Fig.2 Test Circuit of Ripple Rejection



$f=120Hz$ (sine wave)
 $RR=20 \log(ei/eo)$
 $I_o=0.5A$
 $ei=0.5Vrms$

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)

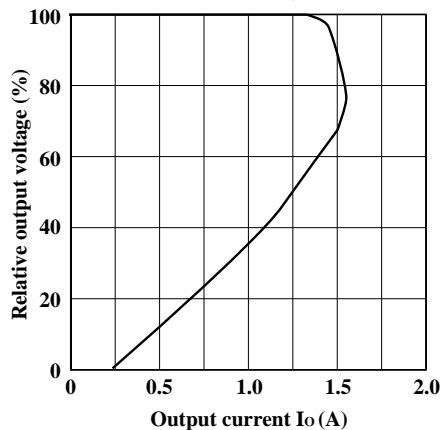


Fig.5 Output Voltage Deviation vs. Junction Temperature (PQ05RF12/PQ05RF13)

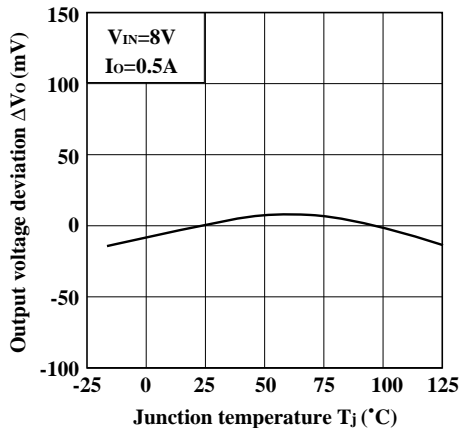


Fig.6 Output Voltage Deviation vs. Junction Temperature (PQ09RF12/PQ09RF13)

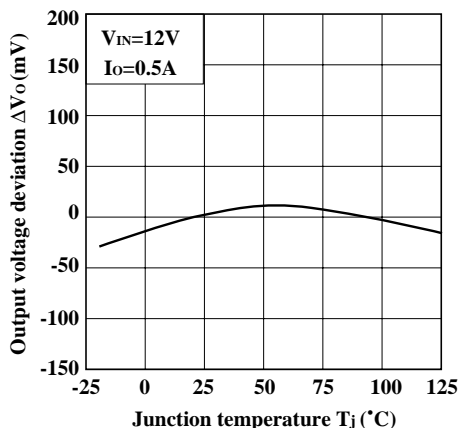


Fig.7 Output Voltage Deviation vs. Junction Temperature (PQ12RF12/PQ12RF13)

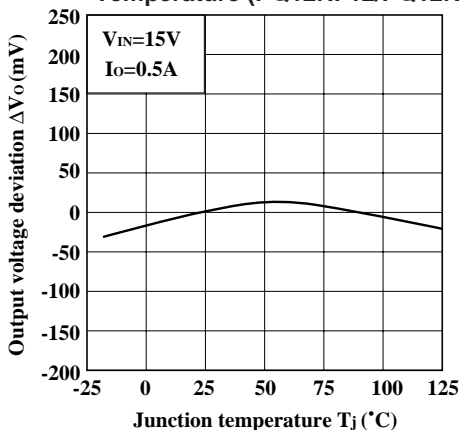


Fig.8 Output Voltage vs. Input Voltage (PQ05RF12/PQ05RF13)

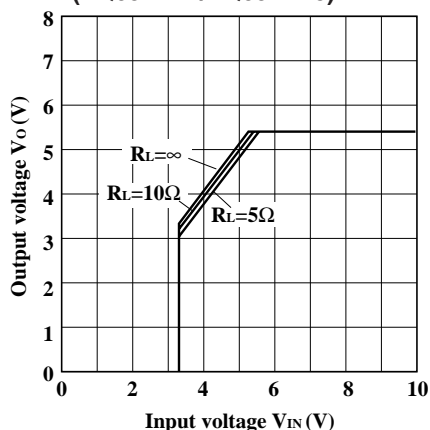


Fig.9 Output Voltage vs. Input Voltage (PQ09RF12/PQ09RF13)

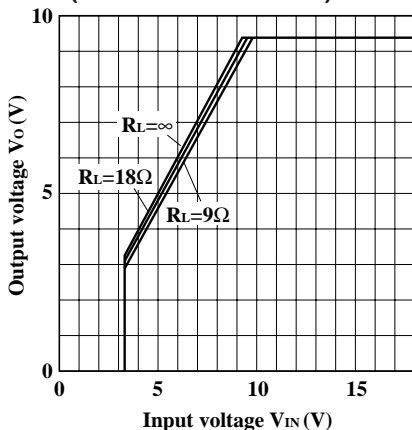


Fig.10 Output Voltage vs. Input Voltage (PQ12RF12/PQ12RF13)

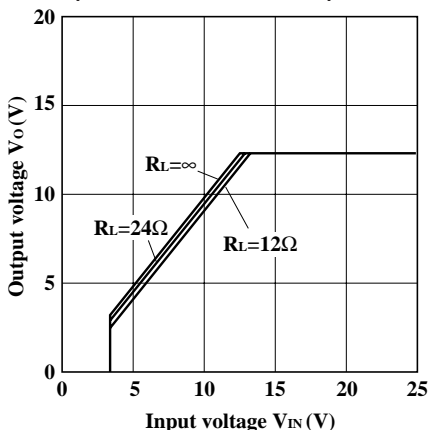


Fig.11 Circuit Operating Current vs. Input Voltage (PQ05RF12/PQ05RF13)

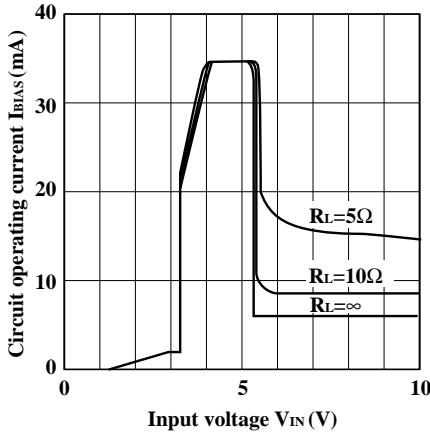


Fig.12 Circuit Operating Current vs. Input Voltage (PQ09RF12/PQ09RF13)

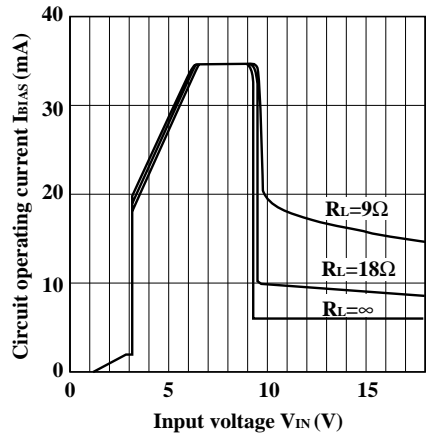


Fig.13 Circuit Operating Current vs. Input Voltage (PQ12RF12/PQ12RF13)

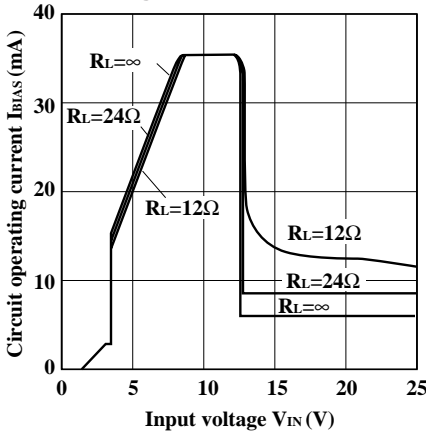


Fig.14 Dropout Voltage vs. Junction Temperature

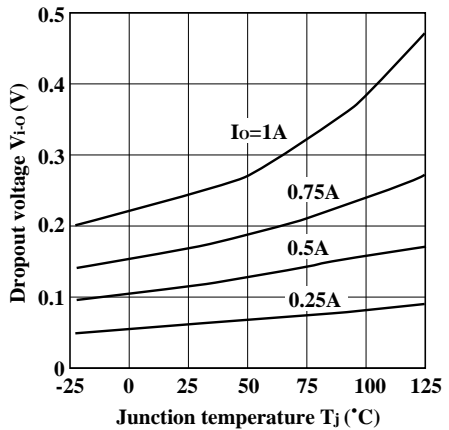


Fig.15 Quiescent Current vs. Junction Temperature

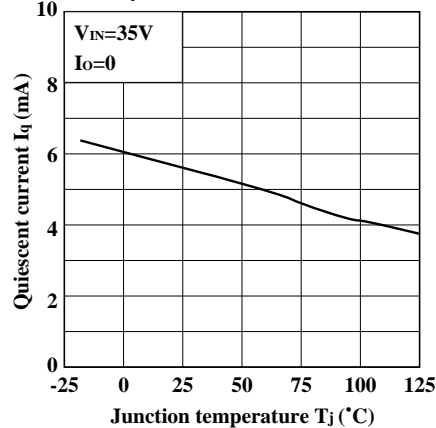


Fig.16 Ripple Rejection vs. Input Ripple Frequency

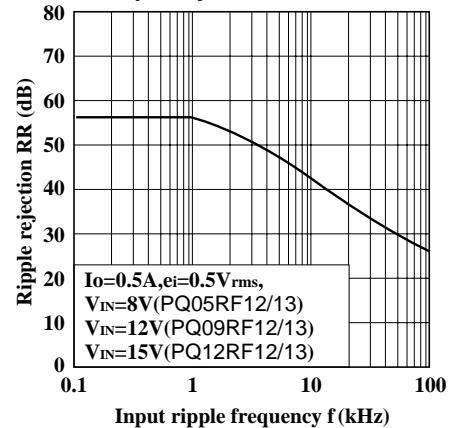


Fig.17 Ripple Rejection vs. Output Current

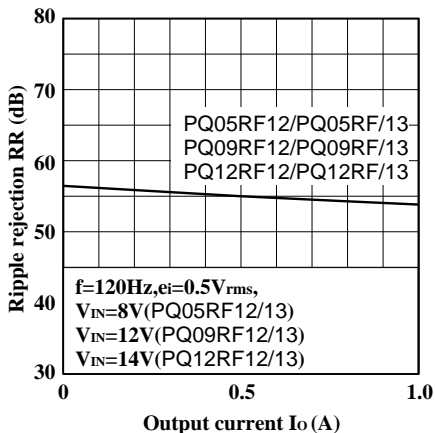


Fig.18 Output Peak Current vs. Input-output differential voltage

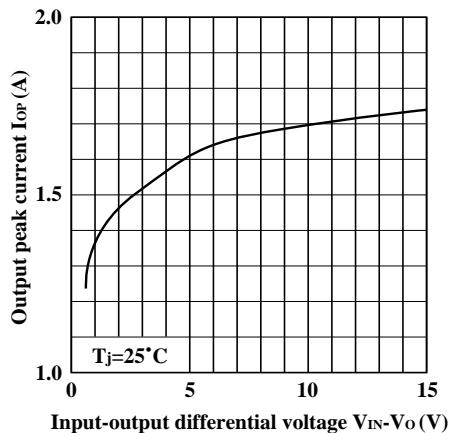
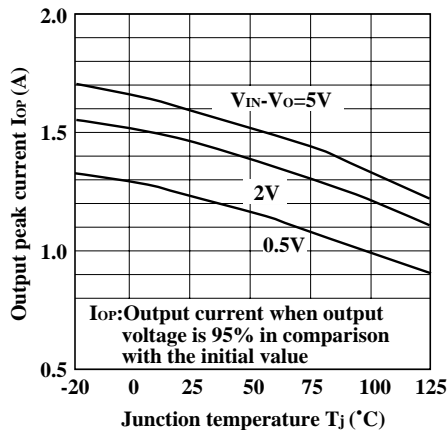


Fig.19 Output Peak Current vs. Junction Temperature



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