PQ05RF12/PQ05RF13 Series

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

■ Features

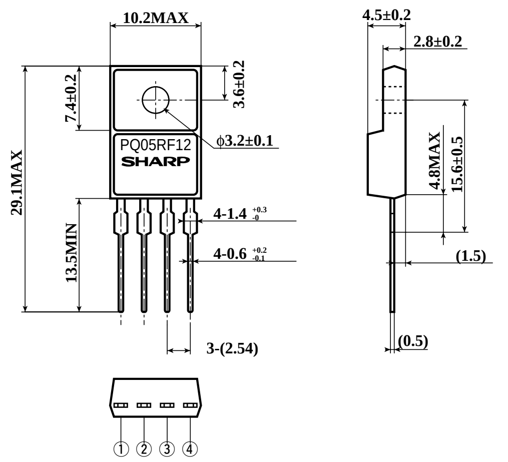
- Low power-loss (Dropout voltage : MAX.0.5V)
- Compact resin full-mold package
- Output voltage value (5.3V, 9.3V, 12.3V) with an allowance for power line voltage drop
- The high-precision output voltage models are also available. (output voltage precision : ±2.5%)
- Built-in ON/OFF control function.

■ Applications

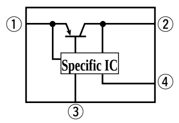
- Series power supply for various electronic equipment such as VCRs and electronic instruments

■ Outline Dimensions

(Unit : mm)



Internal connection diagram



① DC input (V_{IN})
② DC output (V_O)
③ GND
④ ON/OFF control terminal (V_C)

■ Model Line-ups

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

■ 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<=Tj<=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˚C)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Output voltage	PQ05RF12	V_O	-	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		$R_{eg}L$	I_O=5mA to 1.0A	-	0.1	2.0	%
Line regulation	PQ05RF12/13	$R_{eg}I$	V_{IN}=7 to 17V	-	0.5	2.5	%
	PQ09RF12/13		V_{IN}=11 to 21V				
	PQ12RF12/13		V_{IN}=14 to 24V				
Temperature coefficient of output voltage		T_CV_O	T_j=0 to 125˚C	-	±0.02	-	%/˚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

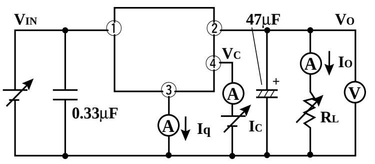
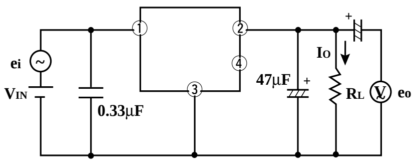
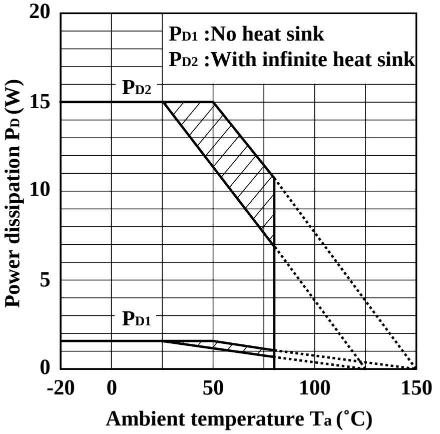


Fig.2 Test Circuit of Ripple Rejection



f=120Hz (sine wave)
RR=20 log (ei/eo)
IO=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)

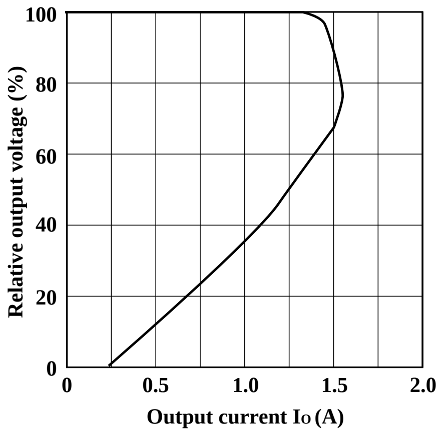


Fig.5 Output Voltage Deviation vs. Junction Temperature (PQ05RF12/PQ05RF13)

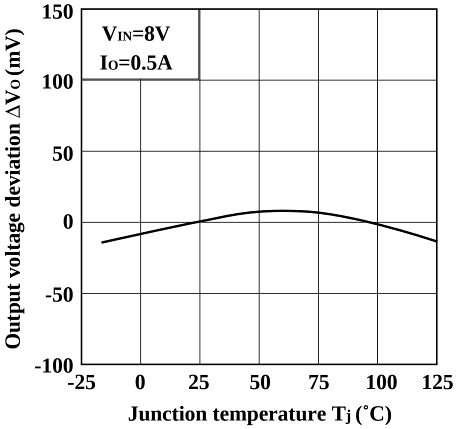


Fig.6 Output Voltage Deviation vs. Junction Temperature (PQ09RF12/PQ09RF13)

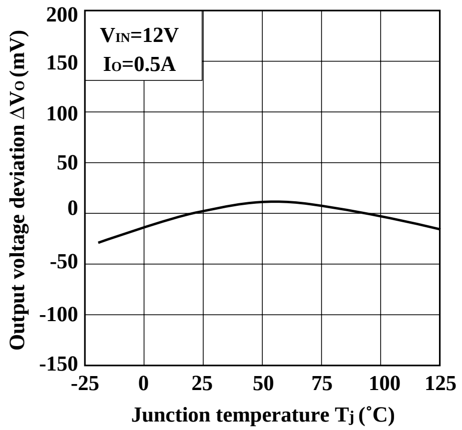


Fig.7 Output Voltage Deviation vs. Junction Temperature (PQ12RF12/PQ12RF13)

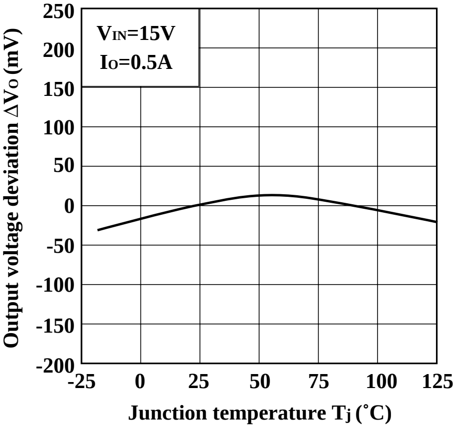


Fig.8 Output Voltage vs. Input Voltage (PQ05RF12/PQ05RF13)

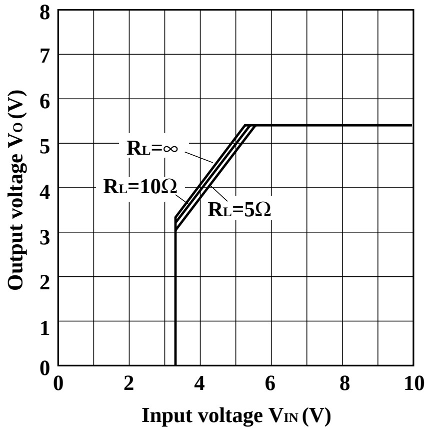


Fig.9 Output Voltage vs. Input Voltage (PQ09RF12/PQ09RF13)

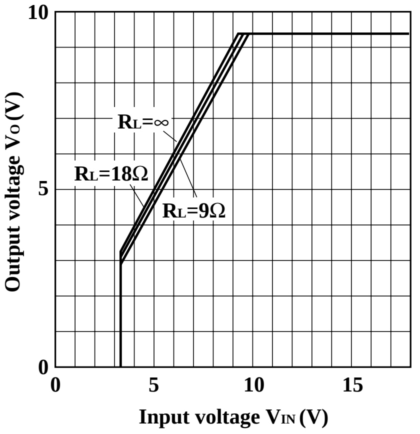


Fig.10 Output Voltage vs. Input Voltage (PQ12RF12/PQ12RF13)

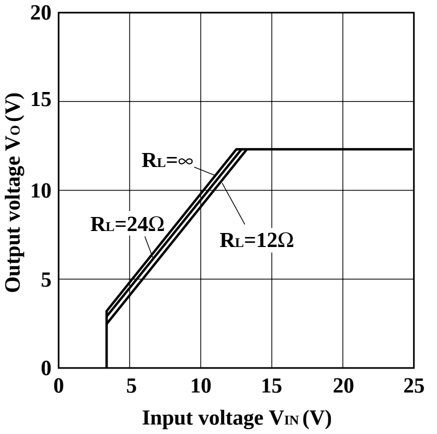


Fig.11 Circuit Operating Current vs. Input Voltage (PQ05RF12/PQ05RF13)

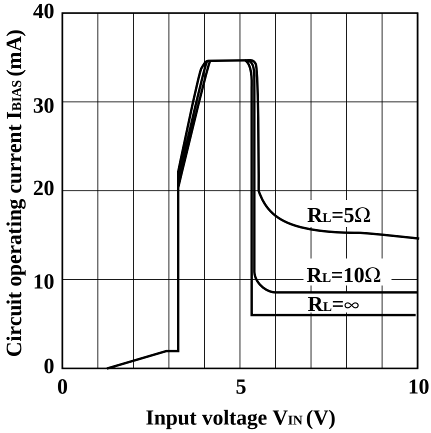


Fig.12 Circuit Operating Current vs. Input Voltage (PQ09RF12/PQ09RF13)

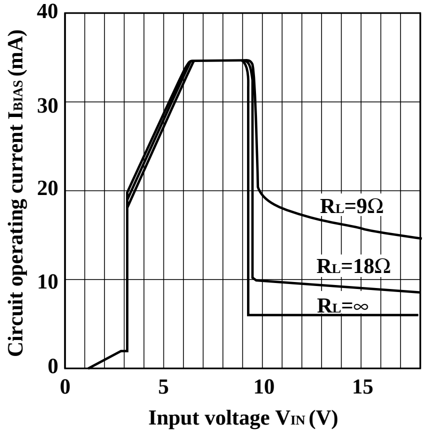


Fig.13 Circuit Operating Current vs. Input Voltage (PQ12RF12/PQ12RF13)

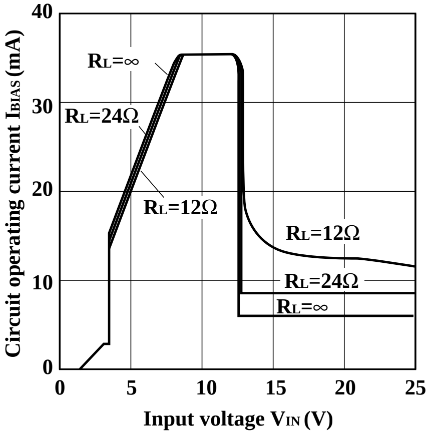


Fig.14 Dropout Voltage vs. Junction Temperature

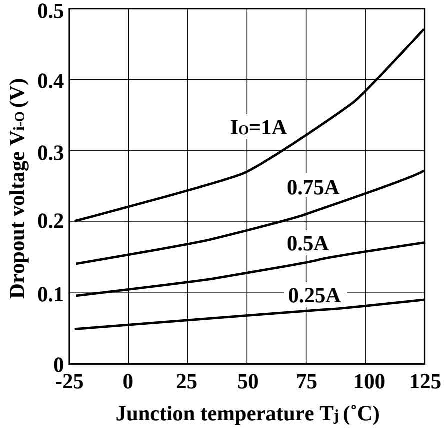


Fig.15 Quiescent Current vs. Junction Temperature

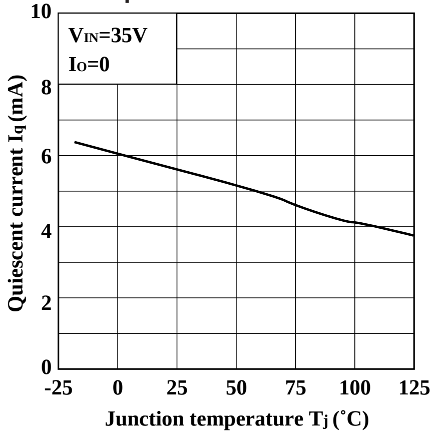


Fig.16 Ripple Rejection vs. Input Ripple Frequency

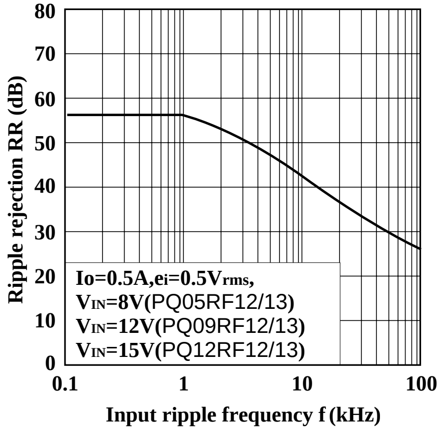


Fig.17 Ripple Rejection vs. Output Current

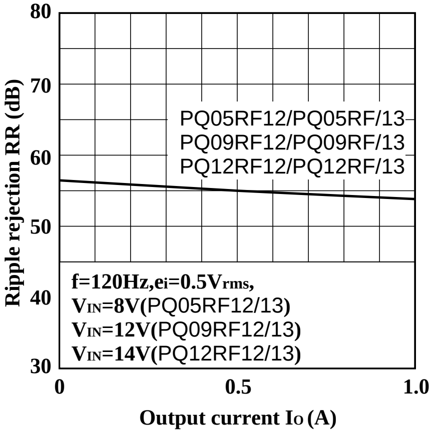


Fig.18 Output Peak Current vs. Input-output differential voltage

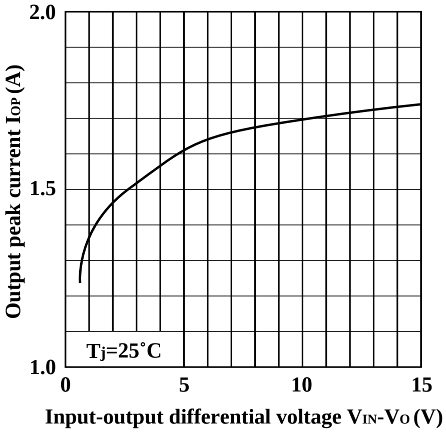
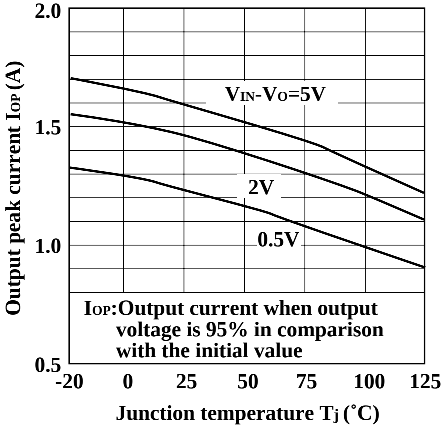


Fig.19 Output Peak Current vs. Junction Temperature



NOTICE