PQ05RF12/PQ05RF13 Series

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

Features

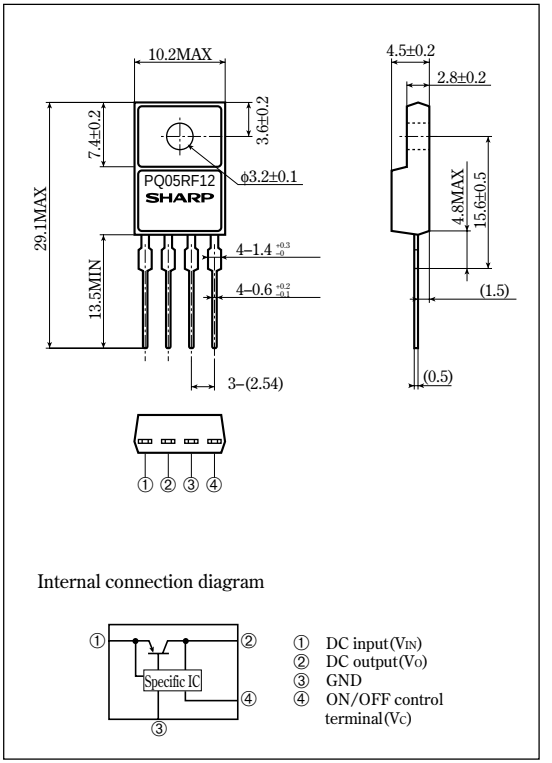
- Low power-loss (Dropout voltage: MAX.0.5V)
- Compact resin full-mold package
- Output voltage value (5.3V, 9.3V, 12.3V) with an allowance for power line voltage drop
- The high-precision output voltage models are also available. (output voltage precision: ±2.5%)
- Built-in ON/OFF control function.

Applications

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

Outline Dimensions

(Unit : mm)



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

• Please refer to the chapter " Handling Precautions ".

■ 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, I_O=5mA	–	0.5	2.5	%
	PQ09RF12/13		V_{IN}=11 to 21V, I_O=5mA				
	PQ12RF12/13		V_{IN}=14 to 24V, I_O=5mA				
Temperature coefficient of output voltage		T_CV_O	T_j=0 to 125°C, I_O=5mA	–	±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

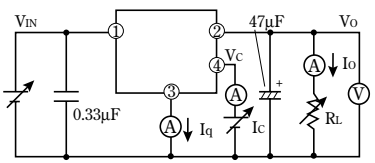
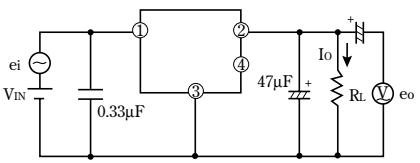


Fig.2 Test Circuit of Ripple Rejection



f=120Hz (sine wave)
RR=20 log (ei(rms)/eo(rms))
I_O=0.5A
ei(rms)=0.5V
V_{IN}= 8V (PQ05RF12/13)
12V (PQ09RF12/13)
15V (PQ12RF12/13)

Fig.3 Power Dissipation vs. Ambient Temperature

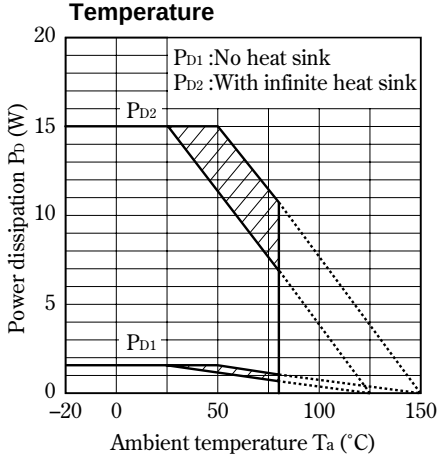
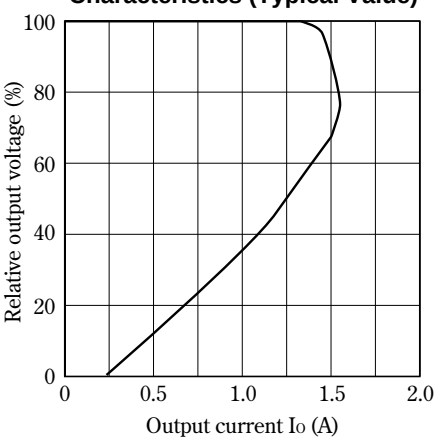


Fig.4 Overcurrent Protection Characteristics (Typical Value)



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

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

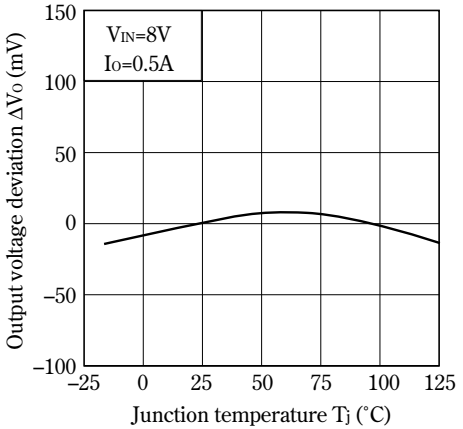


Fig.6 Output Voltage Deviation vs. Junction Temperature (PQ09RF12/PQ09RF13)

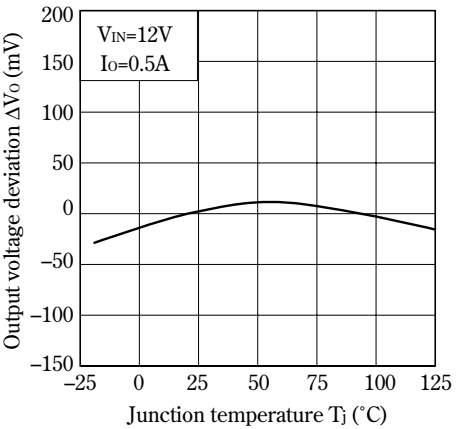


Fig.7 Output Voltage Deviation vs. Junction Temperature (PQ12RF12/PQ12RF13)

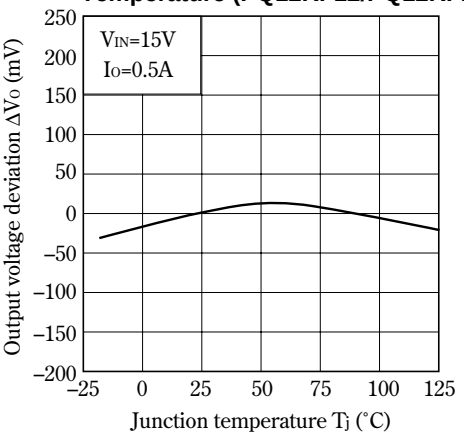


Fig.8 Output Voltage vs. Input Voltage (PQ05RF12/PQ05RF13)

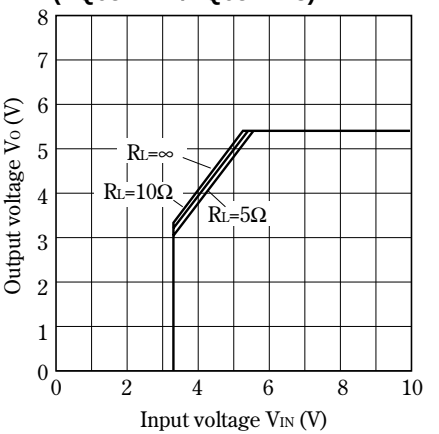


Fig.9 Output Voltage vs. Input Voltage (PQ09RF12/PQ09RF13)

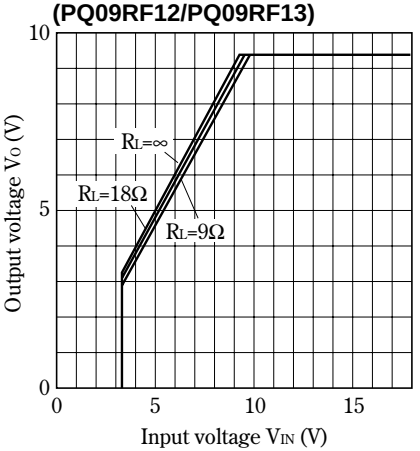


Fig.10 Output Voltage vs. Input Voltage (PQ12RF12/PQ12RF13)

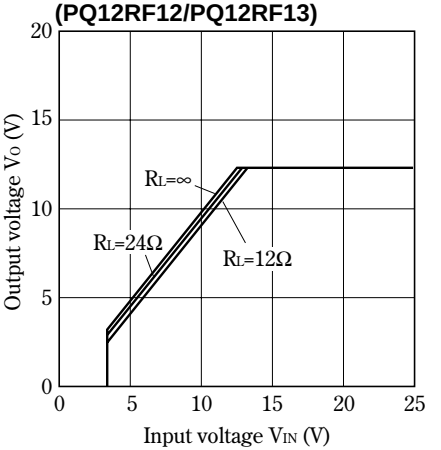


Fig.11 Circuit Operating Current vs. Input Voltage (PQ05RF12/PQ05RF13)

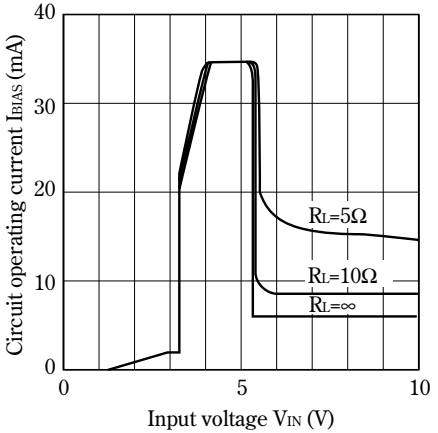


Fig.12 Circuit Operating Current vs. Input Voltage (PQ09RF12/PQ09RF13)

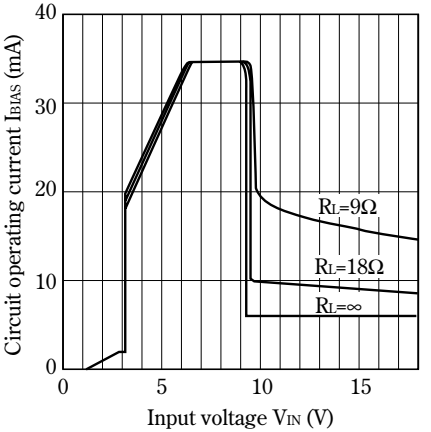


Fig.13 Circuit Operating Current vs. Input Voltage (PQ12RF12/PQ12RF13)

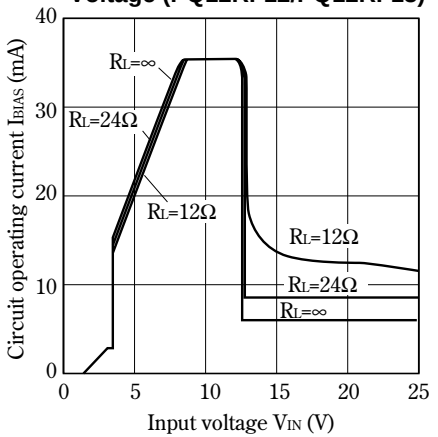


Fig.14 Dropout Voltage vs. Junction Temperature

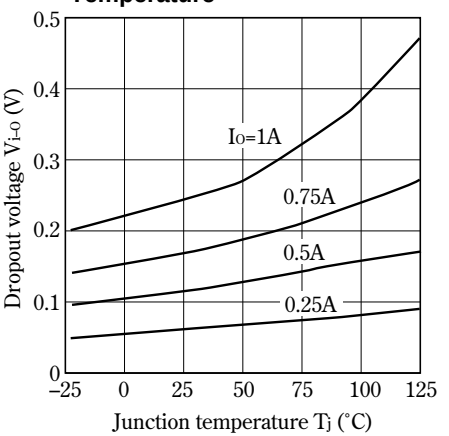


Fig.15 Quiescent Current vs. Junction Temperature

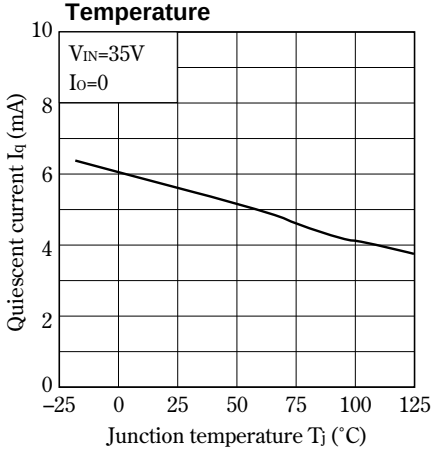


Fig.16 Ripple Rejection vs. Input Ripple Frequency

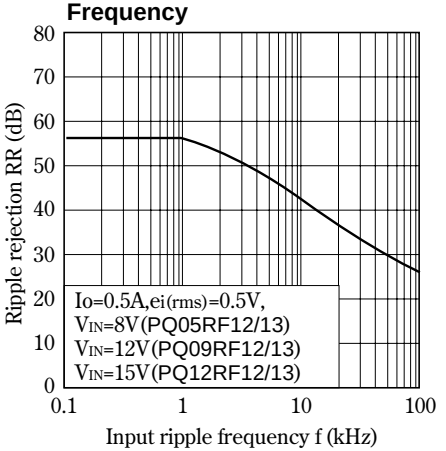


Fig.17 Ripple Rejection vs. Output Current

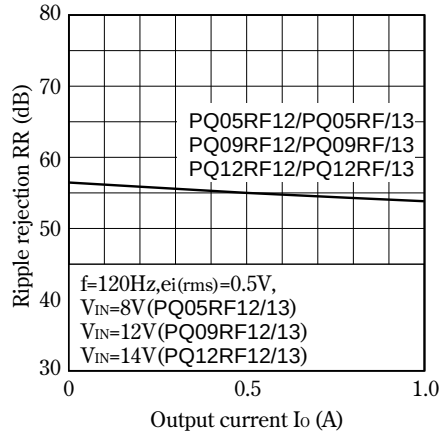


Fig.18 Output Peak Current vs. Dropout Voltage

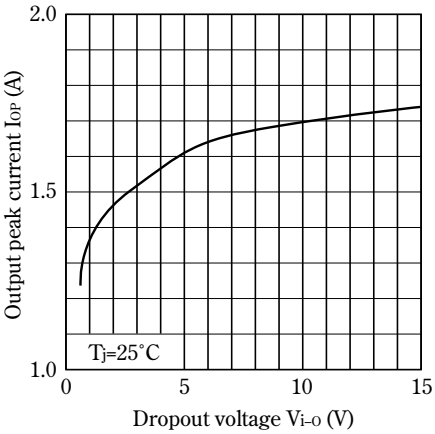
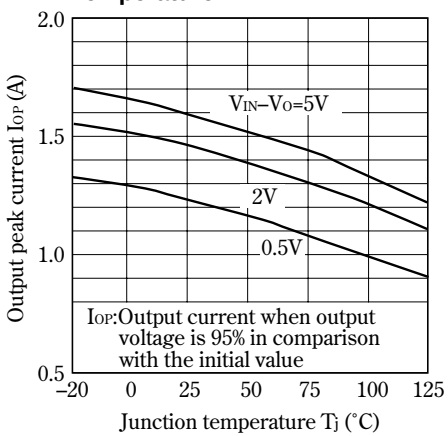


Fig.19 Output Peak Current vs. Junction Temperature



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  --- Alarm equipment
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