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PQ3RF23/PQ3RF33

3.3V Output, High Output Current (2A, 3.5A) Type Low Power-loss Voltage Regulators

■ Features

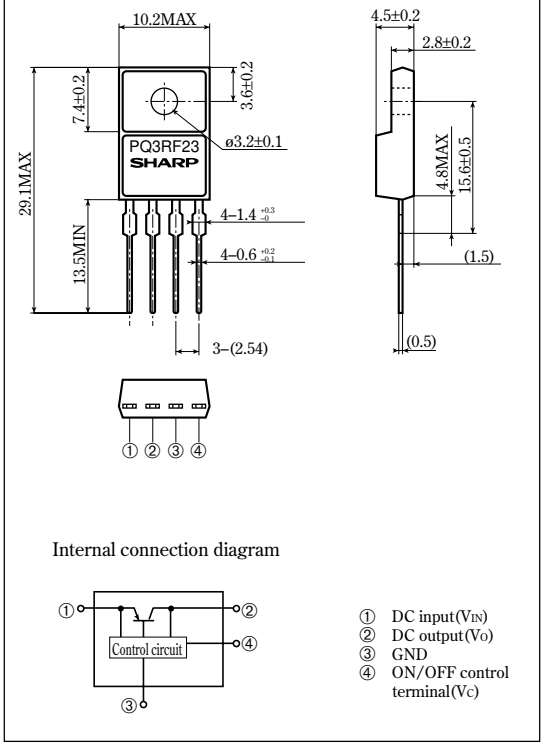
- 3.3V output
- High output current
  2A type: PQ3RF23
  3.5A type: PQ3RF33
- Compact resin full-mold package (TO-220 package)
- Low power-loss (Dropout voltage: MAX. 0.5V)
- High-precision output voltage type
  Output voltage precision: ±2.5%
- Built-in ON/OFF control function
- Built-in overcurrent protection, overheat protection function

■ Applications

- Power supplies for various electronic equipment such as personal computers

■ Outline Dimensions

(Unit : mm)



■ Absolute Maximum Ratings

(T_a=25°C)

Parameter	Symbol	Rating		Unit
※1 Input voltage	V_{IN}	10		V
※1 ON/OFF control terminal voltage	V_C	10		V
Output current	I_O	PQ3RF23	2	A
		PQ3RF33	3.5	
Power dissipation (No heat sink)	P_{D1}	PQ3RF23	1.5	W
		PQ3RF33	1.8	
Power dissipation (With infinite heat sink)	P_{D2}	18		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, conditions shall be I_O=1.0A[PQ3RF23]/I_O=1.5A[PQ3RF33], V_{IN}=5V, T_a=25°C)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Output voltage		V_O	–	3.218	3.3	3.382	V
Load regulation	PQ3RF23	R_{egL}	I_O=5mA to 2.0A	–	0.2	2	%
	PQ3RF33		I_O=5mA to 3.5A	–	0.2	2	
Line regulation		R_{egI}	V_{IN}=4 to 10V	–	0.5	2.5	%
Temperature coefficient of output voltage		T_CV_O	T_j=0 to 125°C	–	±0.02	–	%/°C
Ripple rejection		RR	–	45	55	–	dB
Dropout voltage	PQ3RF23	V_{I-O}	※3, I_O=2.0A	–	–	0.5	V
	PQ3RF33		※3, I_O=3.0A	–	–	0.5	
※4 ON-state voltage for control		$V_{C(ON)}$	–	2	–	–	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	I_O=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

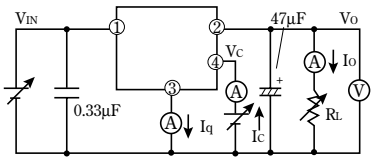
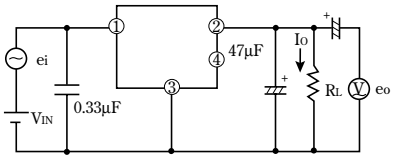
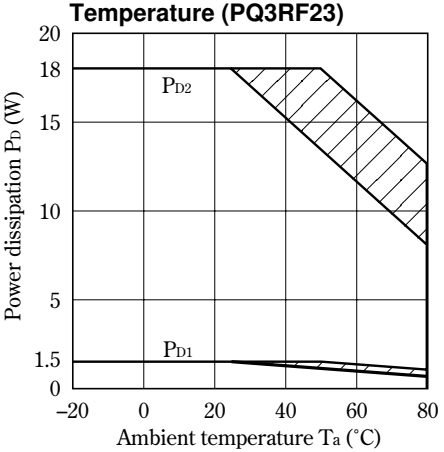


Fig. 2 Test Circuit of Ripple Rejection



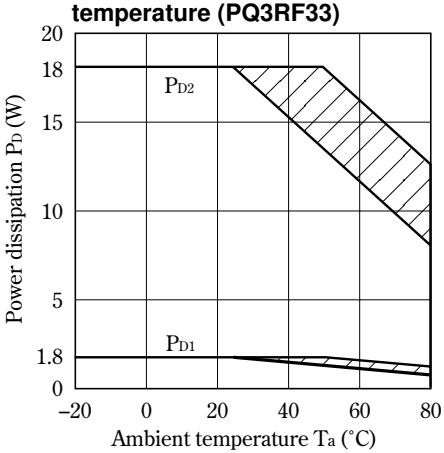
f=120Hz (sine wave)
ei(rms)=0.5V
V_{IN}=5V
I_O=0.5A
RR=20 log(ei(rms)/eo(rms))

Fig. 3 Power Dissipation vs. Ambient Temperature (PQ3RF23)



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

Fig. 4 Power dissipation vs. Ambient temperature (PQ3RF33)



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

Fig. 5 Overcurrent Protection Characteristics (PQ3RF23)

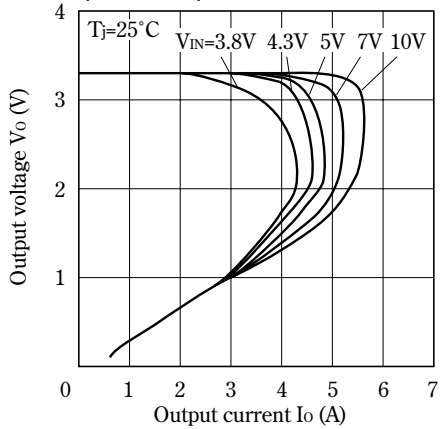


Fig. 6 Overcurrent Protection Characteristics (PQ3RF33)

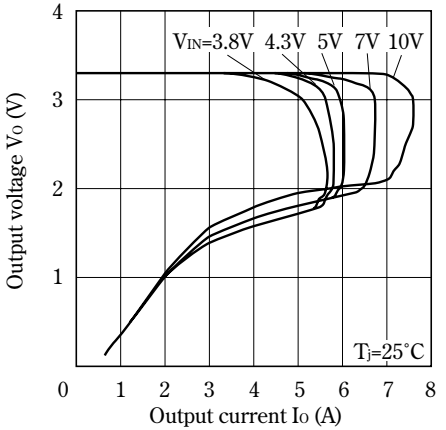


Fig. 7 Output Voltage Deviation vs. Junction Temperature (PQ3RF23)

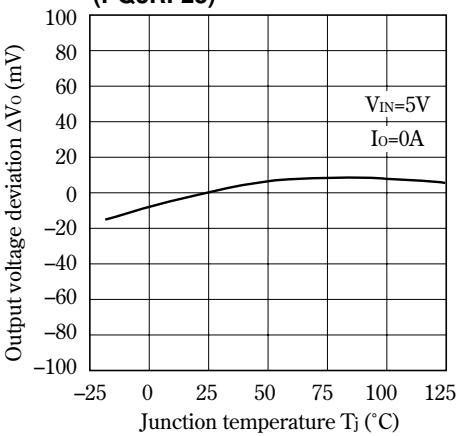


Fig. 8 Output Voltage Deviation vs. Junction Temperature (PQ3RF33)

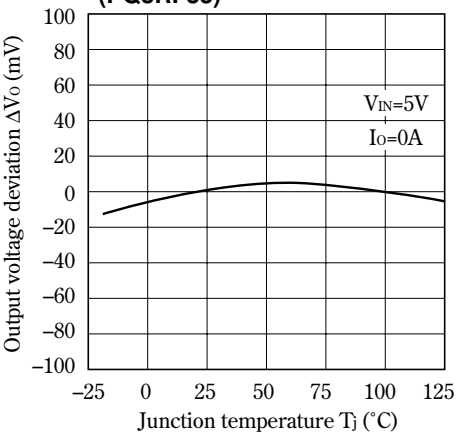


Fig. 9 Output Voltage vs. Input Voltage (PQ3RF23)

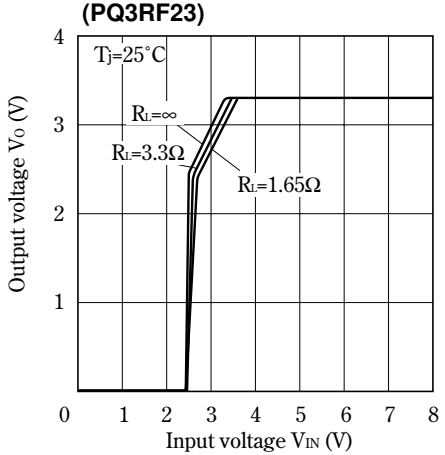


Fig.10 Output Voltage vs. Input Voltage (PQ3RF33)

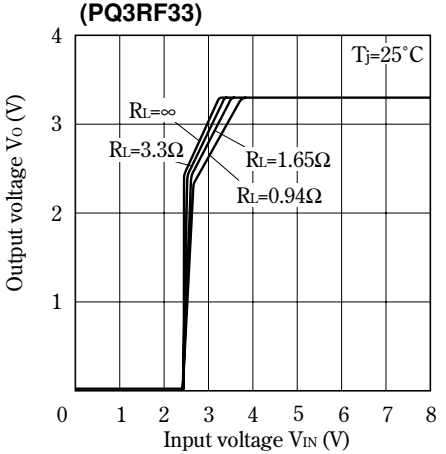


Fig.11 Circuit Operating Current vs. Input Voltage (PQ3RF23)

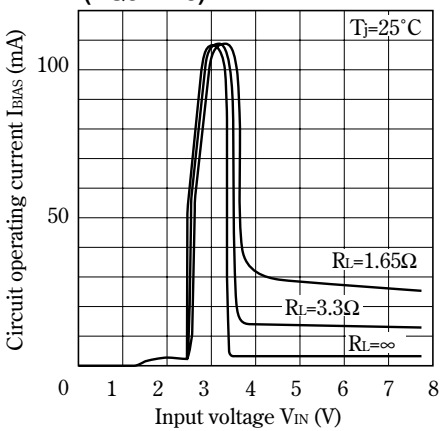


Fig.12 Circuit Operating Current vs. Input Voltage (PQ3RF33)

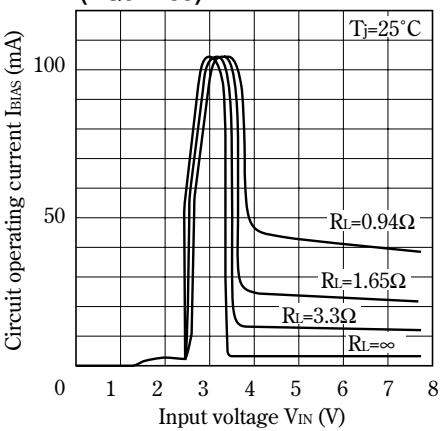


Fig.13 Dropout Voltage vs. Junction Temperature (PQ3RF23)

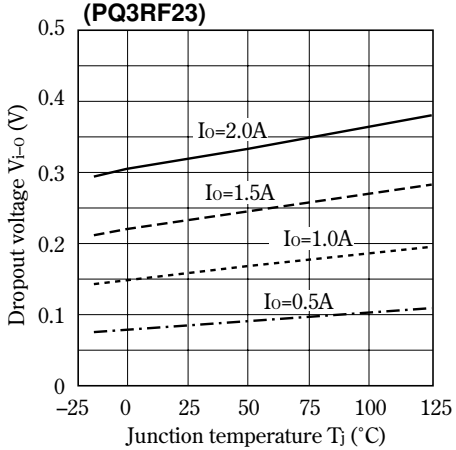


Fig.14 Dropout Voltage vs. Junction Temperature (PQ3RF33)

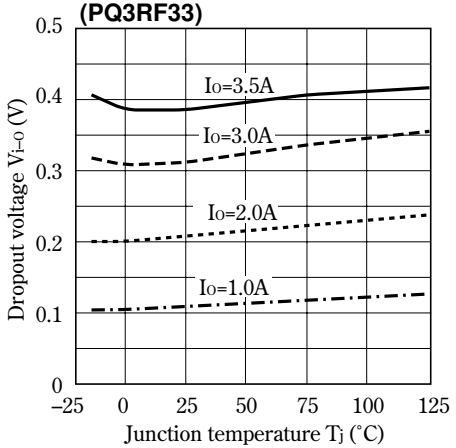


Fig.15 Quiescent Current vs. Junction Temperature (PQ3RF23)

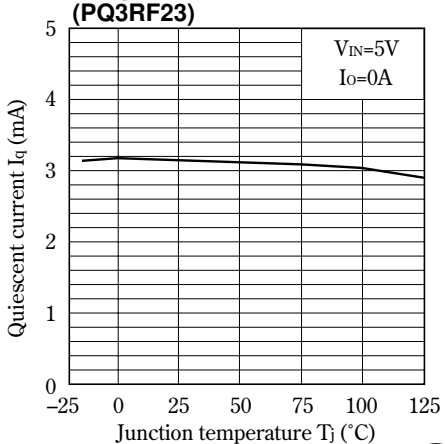


Fig.16 Quiescent Current vs. Junction Temperature (PQ3RF33)

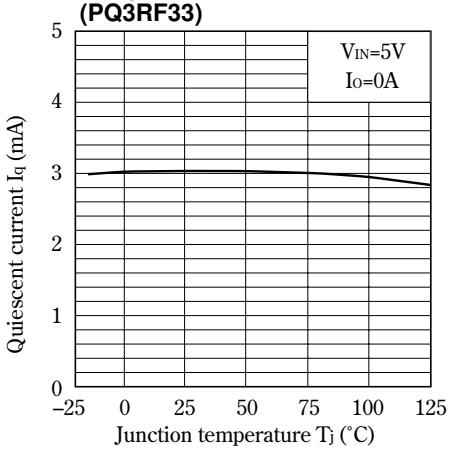


Fig.17 Ripple Rejection vs. Input Ripple Frequency (PQ3RF23)

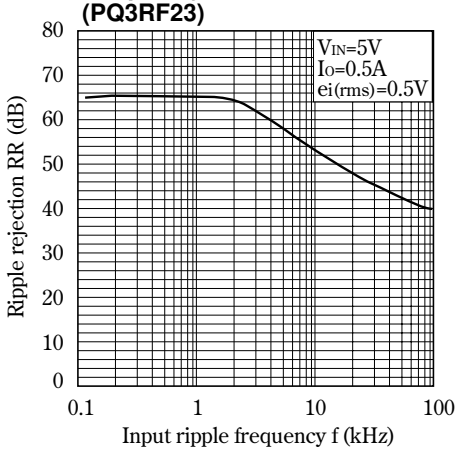


Fig.18 Ripple Rejection vs. Input Ripple Frequency (PQ3RF33)

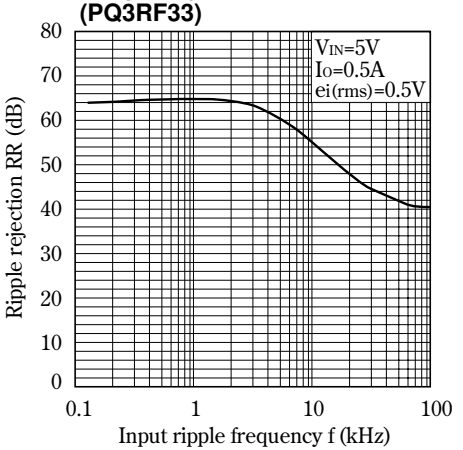


Fig.19 Ripple Rejection vs. Output Current (PQ3RF23)

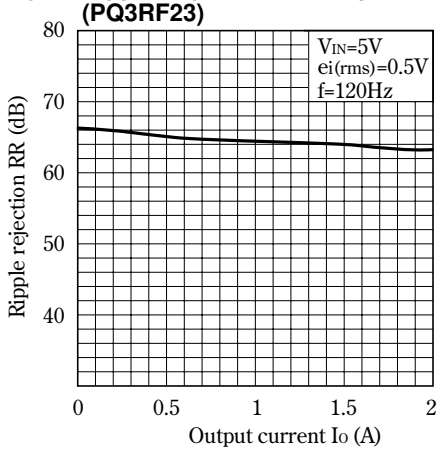


Fig.20 Ripple Rejection vs. Output Current (PQ3RF33)

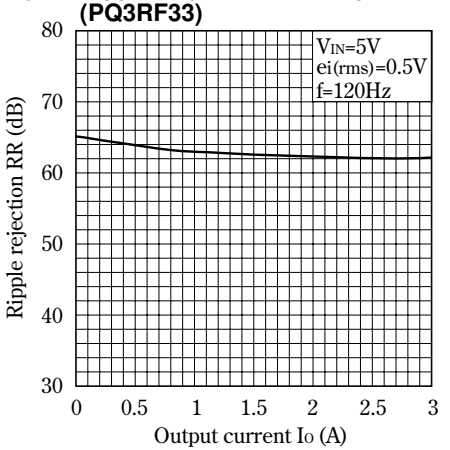


Fig.21 Output Peak Current vs. Junction Temperature (PQ3RF23)

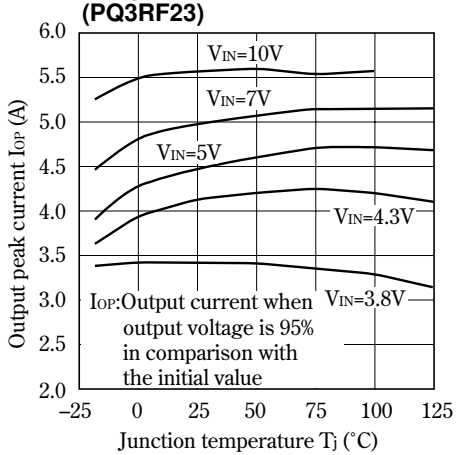
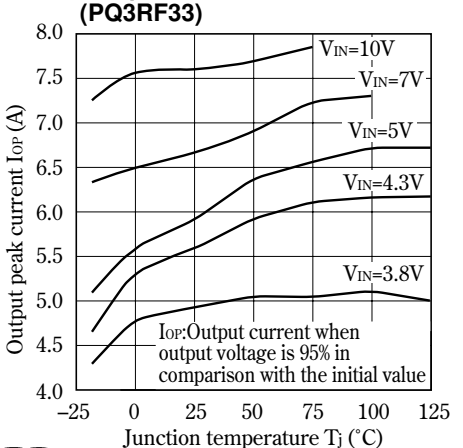
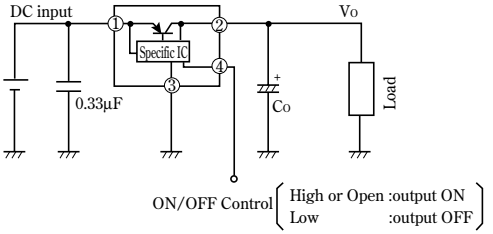


Fig.22 Output Peak Current vs. Junction Temperature (PQ3RF33)



■ Typical Application



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  --- Telecommunication equipment [terminal]
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  --- Industrial control
  --- Audio visual equipment
  --- Consumer electronics

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