

# PQ05RD08 Series/PQ3RD083/PQ6RD083

0.8A Output, Low Power-Loss Voltage Regulator

## Features

- Low power-loss (Dropout voltage: MAX. 0.5V at  $I_o=0.5A$ )
- 0.8A output type
- Compact resin package (equivalent to TO-220)
- Available 3.3V/5V/6.3V/9V/12V output type
- Output voltage precision:  $\pm 3.0\%$
- Built-in ON/OFF control function
- Built-in Overcurrent, overheat protection functions, ASO protection circuit
- Lead forming type is also available.

## Applications

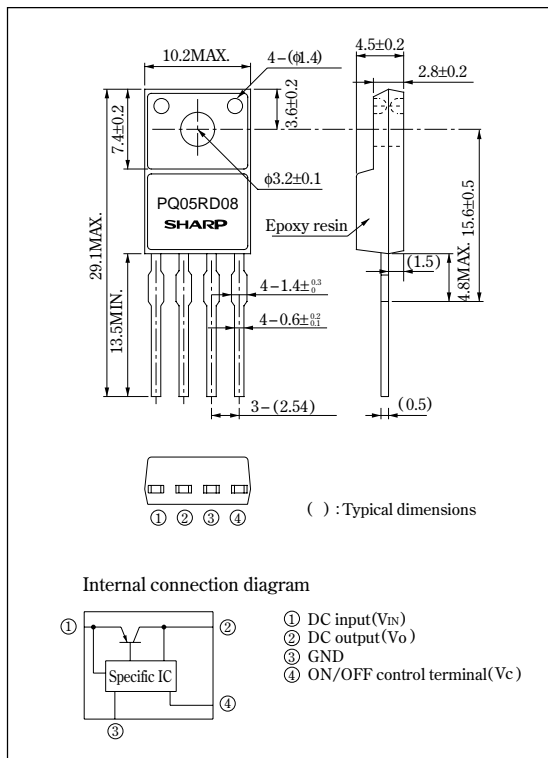
- Power supplies for various electronic equipment such as AV, OA equipment

## Model Line-ups

	0.8A output
3.3V output	PQ3RD083
5.0V output	PQ05RD08
6.3V output	PQ6RD083
9.0V output	PQ09RD08
12.0V output	PQ12RD08

## Outline Dimensions

(Unit : mm)



## Absolute Maximum Ratings

( $T_a=25^\circ C$ )

Parameter	Symbol	Rating	Unit
*1 Input voltage	$V_{IN}$	20	V
*1 ON/OFF control voltage	$V_c$	20	V
Output current	$I_o$	0.8	A
*2 Power dissipation	$P_{D1}$	1.25	W
	$P_{D2}$	10	W
*3 Junction temperature	$T_j$	150	$^\circ C$
Operating temperature	$T_{opr}$	-20 to +80	$^\circ C$
Storage temperature	$T_{stg}$	-40 to +150	$^\circ C$
Soldering temperature	$T_{sol}$	260 (For 10s)	$^\circ C$

\*1 All are open except GND and applicable terminals.

\*2  $P_{D1}$ : No heat sink,  $P_{D2}$ : With infinite heat sink

\*3 Overheat protection may operate at  $125 \leq T_j \leq 150^\circ C$ .

• Please refer to the chapter " Handling Precautions ".

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**Electrical Characteristics**

(Unless otherwise specified,  $I_o=0.5A$ ,  $T_a=25^\circ C$ )

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit	
Output voltage	$V_o$	*4	PQ3RD083	3.201	3.3	3.399	V
			PQ05RD08	4.85	5.0	5.15	
			PQ6RD083	6.111	6.3	6.489	
			PQ09RD08	8.73	9.0	9.27	
			PQ12RD08	11.64	12.0	12.36	
Load regulation	$RegL$	$I_o=5mA$ to 0.8A, *4	—	0.1	2.0	%	
Line regulation	$RegI$	*5, $I_o=5mA$	PQ05RD08 series	—	0.5	2.5	%
			PQ3RD083/PQ6RD083	—	0.1	2.5	
Temperature coefficient of output voltage	$TcV_o$	$T_j=0$ to $125^\circ C$ , $I_o=5mA$	—	$\pm 0.02$	—	%/ $^\circ C$	
Ripple rejection	RR	Refer to Fig.2	45	55	—	dB	
Dropout voltage	$V_{F0}$	*6, $I_o=0.5A$	—	—	0.5	V	
*7 ON-state voltage for control	$V_{C(ON)}$	*4	2.0	—	—	V	
ON-state current for control	$I_{C(ON)}$	$V_C=2.7V$ , *4	—	—	20	$\mu A$	
OFF-state voltage for control	$V_{C(OFF)}$	*4	—	—	0.8	V	
OFF-state current for control	$I_{C(OFF)}$	$V_C=0.4V$ , *4	—	—	-0.4	mA	
Quiescent current	$I_q$	$I_o=0A$ , *4	—	—	10	mA	

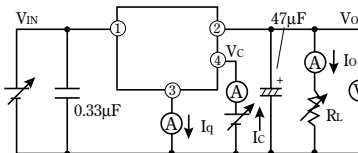
\*4 PQ3RD083:  $V_{IN}=5V$ , PQ05RD08: $V_{IN}=7V$ , PQ6RD083:  $V_{IN}=8V$ , PQ09RD08: $V_{IN}=11V$ , PQ12RD08:  $V_{IN}=14V$

\*5 PQ3RD083:  $V_{IN}=4$  to  $10V$ , PQ6RD083:  $V_{IN}=7$  to  $13V$ , PQ05RD08: $V_{IN}=6$  to  $12V$ , PQ09RD08: $V_{IN}=10$  to  $16V$ , PQ12RD08:  $V_{IN}=13$  to  $17V$

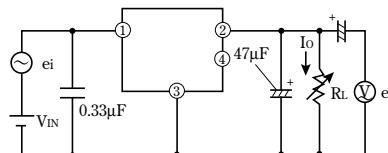
\*6 Input voltage shall be the value when output voltage is 95% in comparison with the initial value. (PQ3RD08: $V_{IN}=3.7V$ )

\*7 In case of opening control terminal ④, output voltage turns on.

**Fig. 1 Test Circuit**

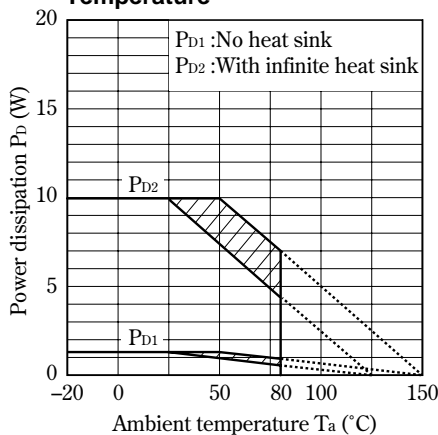


**Fig. 2 Test Circuit of Ripple Rejection**



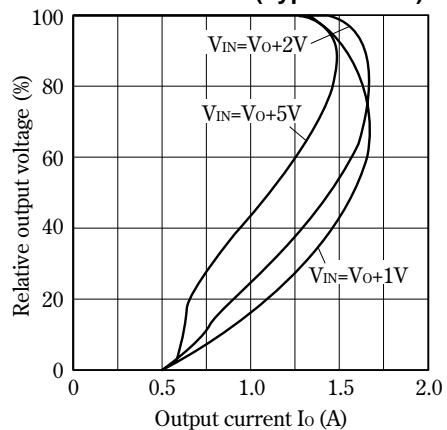
$f=120Hz$  (sine wave)  
 $e_i(rms)=0.5V$   
 $V_{IN}=5V$  (PQ3RD083)  
 $7V$  (PQ05RD08)  
 $8V$  (PQ6RD083)  
 $11V$  (PQ09RD08)  
 $14V$  (PQ12RD08)  
 $I_o=0.5A$   
 $RR=20 \log(e_i(rms)/e_o(rms))$

**Fig. 3 Power Dissipation vs. Ambient Temperature**

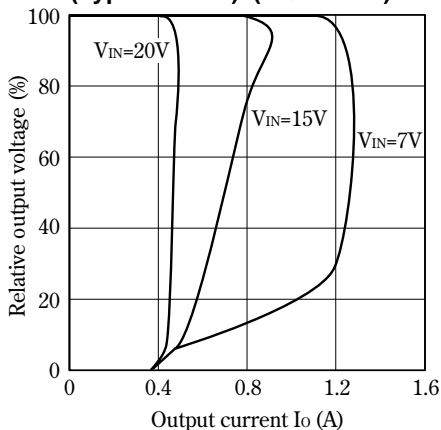


Note) Oblique line portion : Overheat protection may operate in this area.

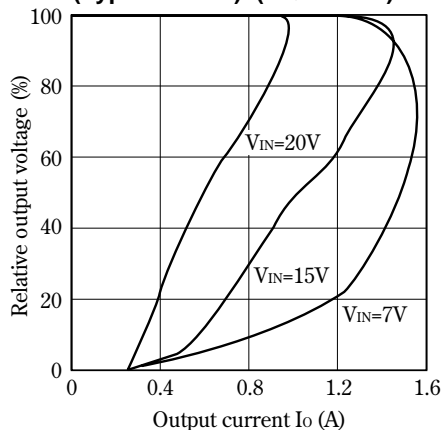
**Fig. 4 Overcurrent Protection Characteristics (Typical Value)**



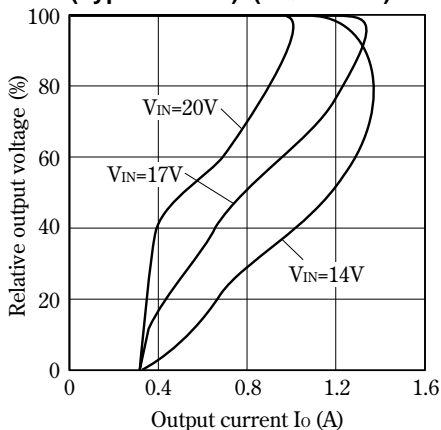
**Fig. 5 Overcurrent Protection Characteristics (Typical Value) (PQ05RD08)**



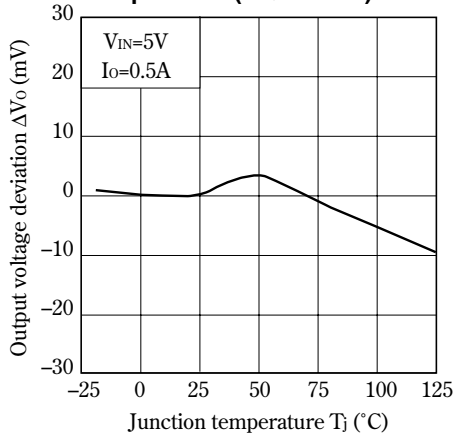
**Fig. 6 Overcurrent Protection Characteristics (Typical Value) (PQ09RD08)**



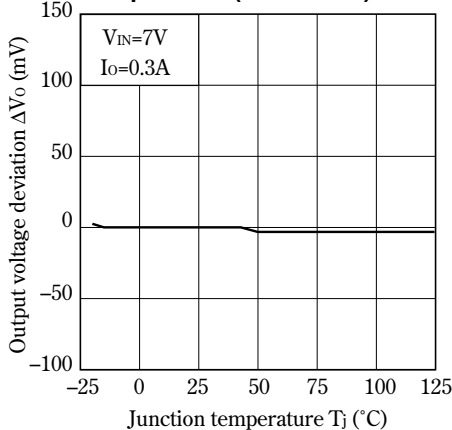
**Fig. 7 Overcurrent Protection Characteristics (Typical Value) (PQ12RD08)**



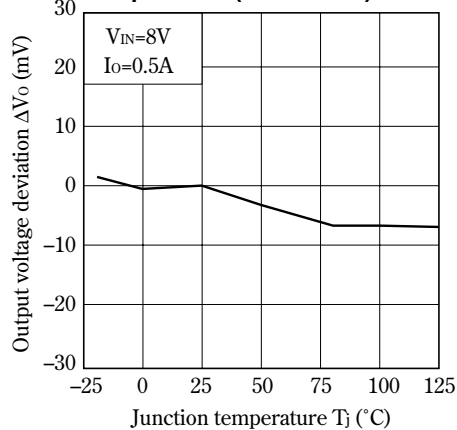
**Fig. 8 Output Voltage Deviation vs. Junction Temperature (PQ3RD083)**



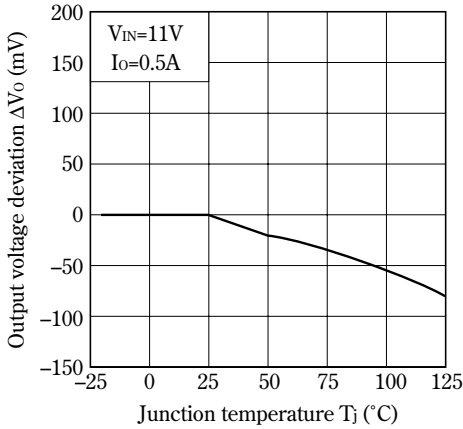
**Fig. 9 Output Voltage Deviation vs. Junction Temperature (PQ05RD08)**



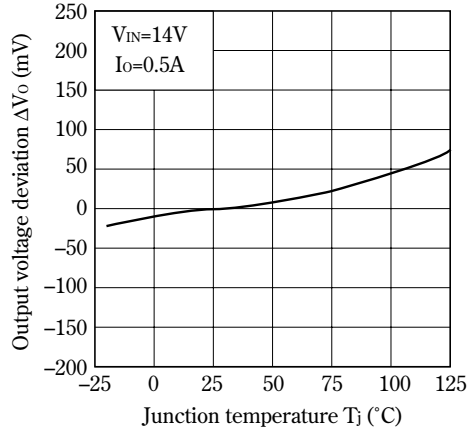
**Fig.10 Output Voltage Deviation vs. Junction Temperature (PQ6RD083)**



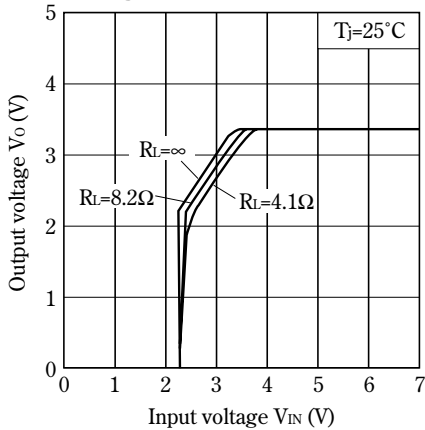
**Fig.11 Output Voltage Deviation vs. Junction Temperature (PQ09RD08)**



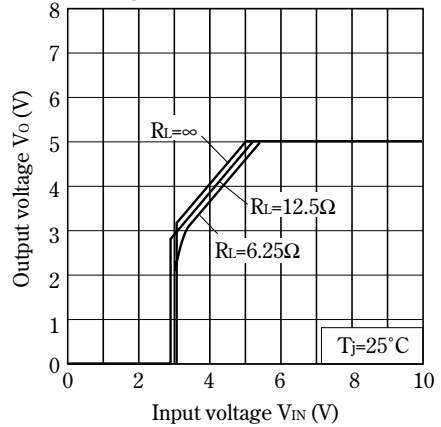
**Fig.12 Output Voltage Deviation vs. Junction Temperature (PQ12RD08)**



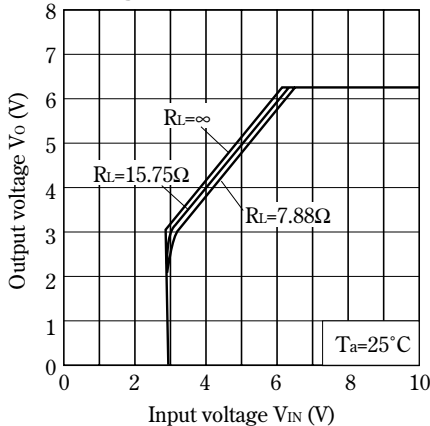
**Fig.13 Output Voltage vs. Input Voltage (PQ3RD083)**



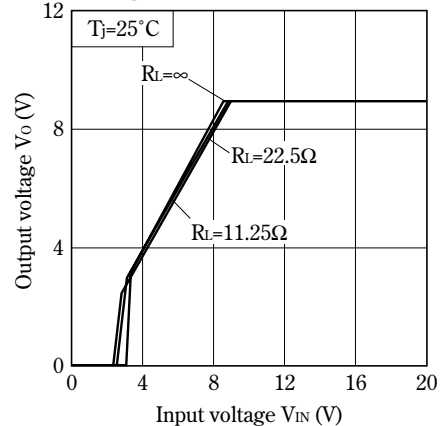
**Fig.14 Output Voltage vs. Input Voltage (PQ05RD08)**



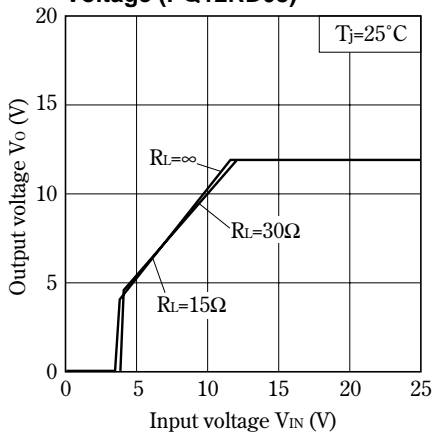
**Fig.15 Output Voltage vs. Input Voltage (PQ6RD083)**



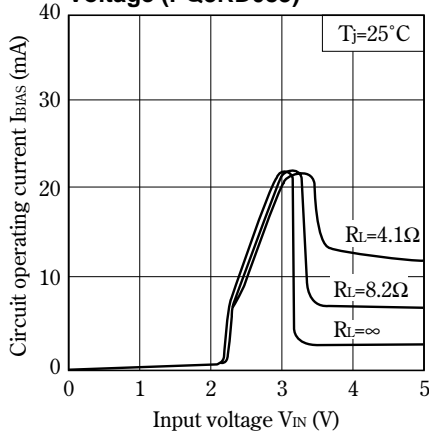
**Fig.16 Output Voltage vs. Input Voltage (PQ09RD08)**



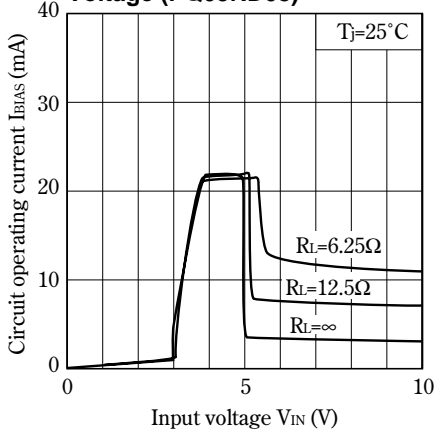
**Fig.17 Output Voltage vs. Input Voltage (PQ12RD08)**



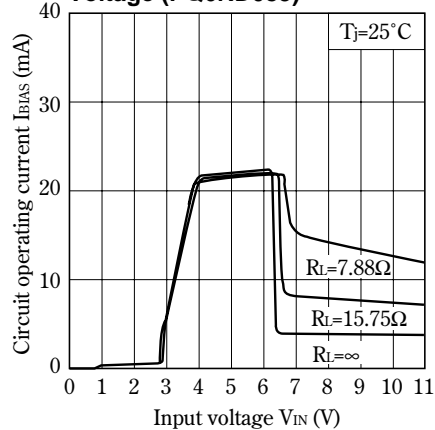
**Fig.18 Circuit Operating Current vs. Input Voltage (PQ3RD083)**



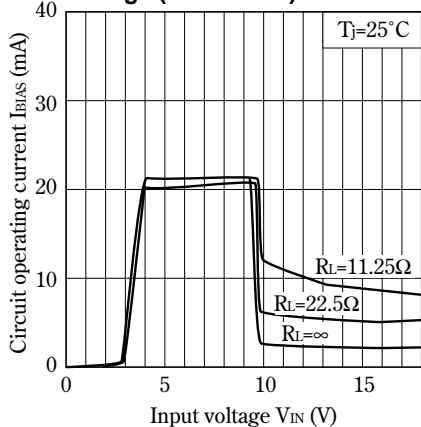
**Fig.19 Circuit Operating Current vs. Input Voltage (PQ05RD08)**



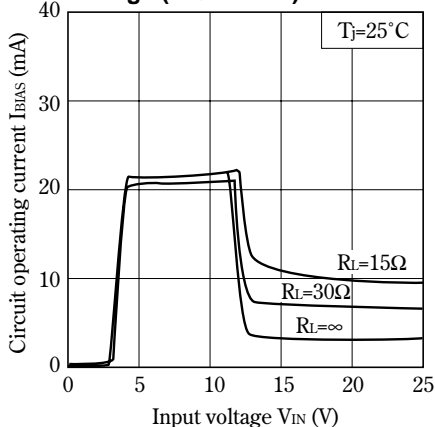
**Fig.20 Circuit Operating Current vs. Input Voltage (PQ6RD083)**



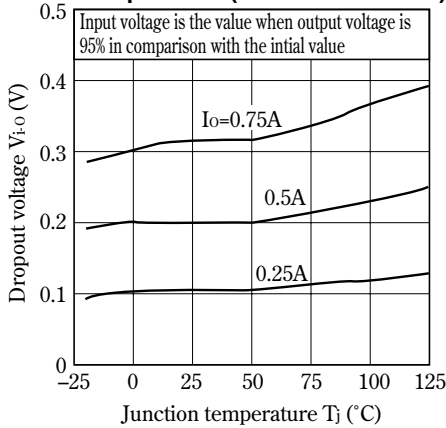
**Fig.21 Circuit Operating Current vs. Input Voltage (PQ09RD08)**



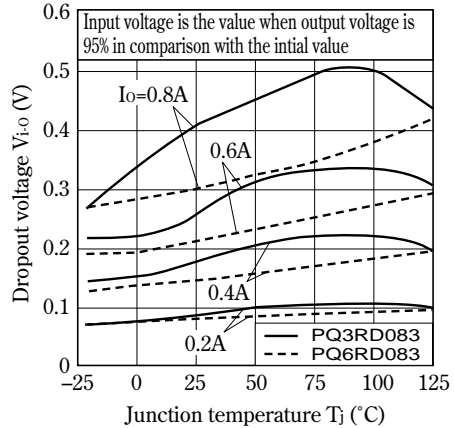
**Fig.22 Circuit Operating Current vs. Input Voltage (PQ12RD08)**



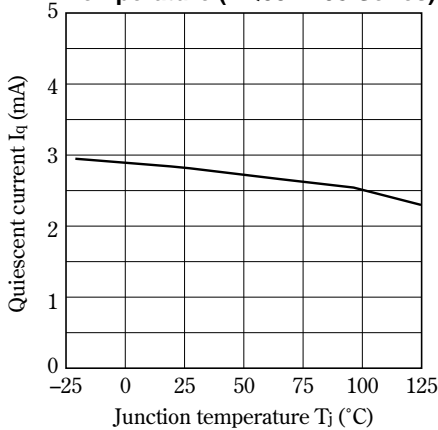
**Fig.23 Dropout Voltage vs. Junction Temperature (PQ05RD08 Series)**



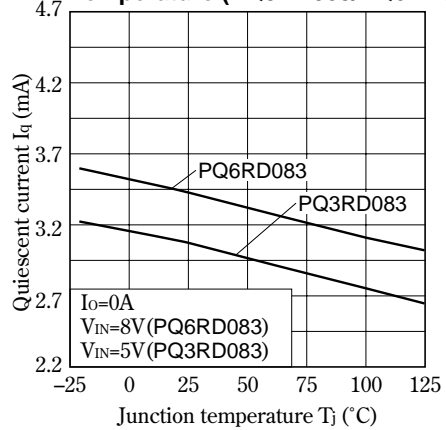
**Fig.24 Dropout Voltage vs. Junction Temperature (PQ3RD083/PQ6RD083)**



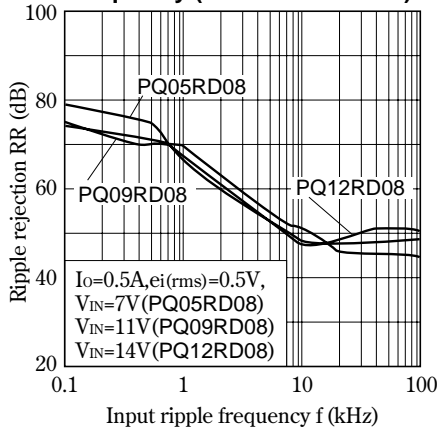
**Fig.25 Quiescent Current vs. Junction Temperature (PQ05RD08 Series)**



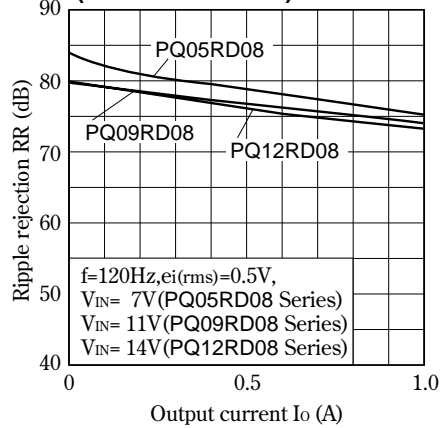
**Fig.26 Quiescent Current vs. Junction Temperature (PQ3RD083/PQ6RD083)**



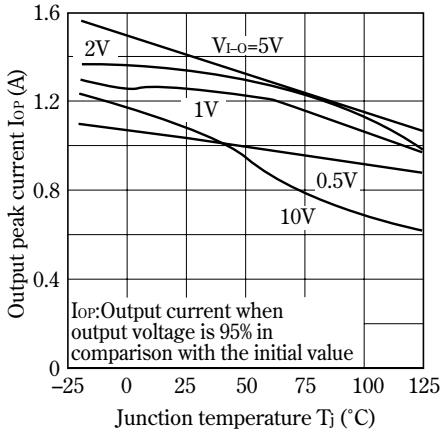
**Fig.27 Ripple Rejection vs. Input Ripple Frequency (PQ05RD08 Series)**



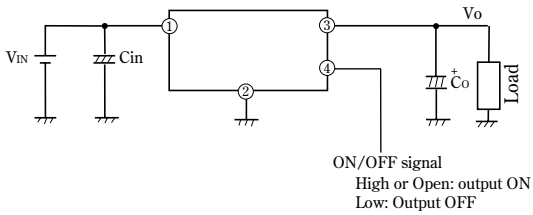
**Fig.28 Ripple Rejection vs. Output Current (PQ05RD08 Series)**



**Fig.29 Output Peak Current vs. Junction Temperature**



**Typical Application**



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