PQ05RB11 Series

Low Power-Loss Voltage Regulators (Built-in Overheat Shut-Down Function)

■ Features

- Compact resin full-mold package
- Low power-loss (Dropout voltage: MAX.0.5V)
- Overheat shut-down function (Keep shut-down output until power-on again)
- Overcurrent protection type
- Built-in ON/OFF control function
- High-precision output type (Output voltage precision: ±2.5%)

■ Applications

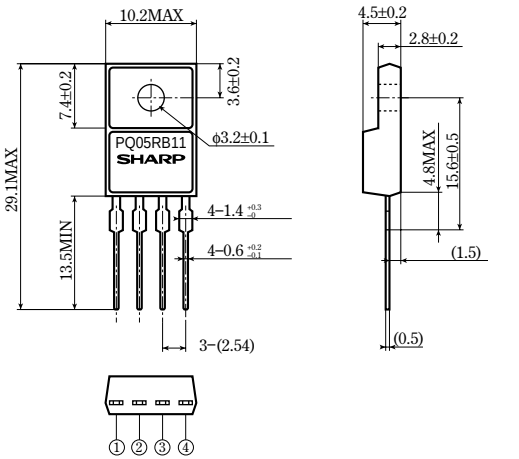
- Series power supply for TVs and VCRs
- Switching power supply

■ Model Line-ups

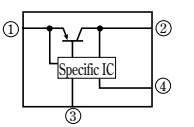
Output	5V	9V	12V
Model No.	PQ05RB11	PQ09RB11	PQ12RB11

■ 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)

■ 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}	1.25	W
Power dissipation (With infinte heat sink)	P_{D2}	12.5	W
※2 Junction temperature	T_j	150	°C
Operating temperature	T_{opr}	−20 to +80	°C
Storage temperature	T_{str}	−40 to +150	°C
※3 Soldering temperature	T_{sol}	260	°C

※1 All are open except GND and applicable terminals.
※2 Overheat shut-down function operates at T_j>=110°C
※3 For 10s

•Please refer to the chapter " Handling Precautions ".

■ Electrical Characteristics

(Unless otherwise specified, condition shall be I_O=0.5A, V_{IN}=※4, Ta=25˚C)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Output Voltage	PQ05RB11	V_O	—	4.88	5.0	5.12	V
	PQ09RB11			8.78	9.0	9.22	
	PQ12RB11			11.7	12.0	12.3	
Load regulation		$R_{eg}L$	I_O=5mA to 1A	—	0.1	2.0	%
Line regulation		$R_{eg}I$	※5	—	0.5	2.5	%
Temperature coefficient of output voltage		T_CV_O	Tj=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}	※6, I_O=0.5A	—	—	0.5	V
ON-state voltage for control		$V_{C(ON)}$	—	2.0 ※7	—	—	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
Overheat shut-down temperature		T_{SD}	—	110	130	150	˚C

※4 PQ05RB11:V_{IN}=7V, PQ09RB11:V_{IN}=15V, PQ12RB11:V_{IN}=18V

※5 PQ05RB11:V_{IN}=6 to 12V, PQ09RB11:V_{IN}=10 to 25V, PQ12RB11:V_{IN}=13 to 29V

※6 Input voltage shall be the value when output voltage is 95% in comparison with the initial value.

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

Fig.1 Test Circuit

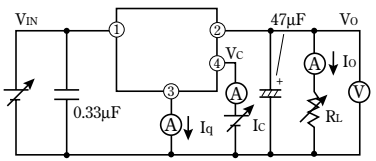
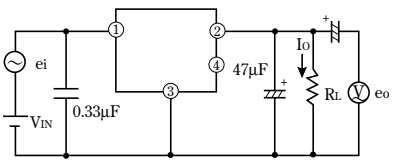


Fig.2 Test Circuit of Ripple Rejection



f=120Hz (sine wave)
ei(rms)=0.5V
RR=20 log (ei(rms)/eo(rms))

Fig.3 Power Dissipation vs. Ambient Temperature

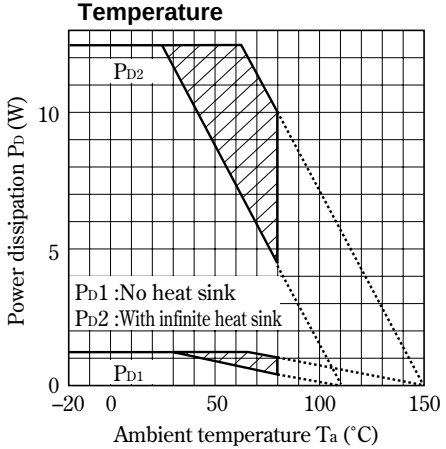
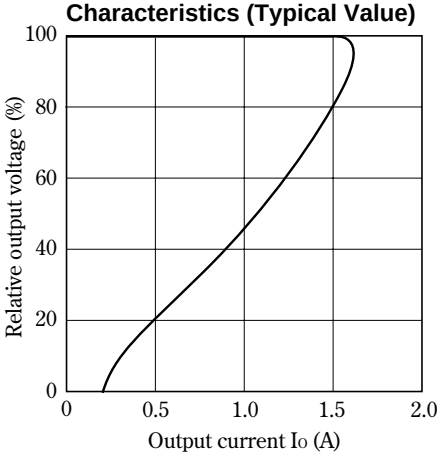


Fig.4 Overcurrent Protection Characteristics (Typical Value)



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

Fig.5 Output Voltage vs. Input Voltage (PQ05RB11)

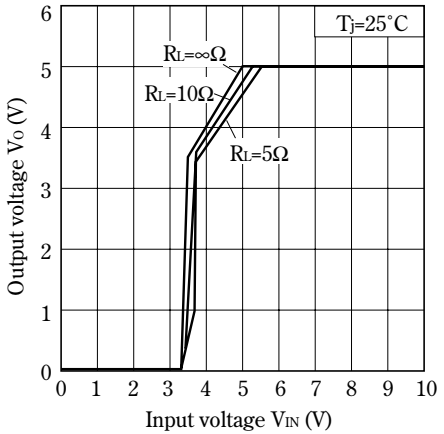


Fig.6 Output Voltage vs. Input Voltage (PQ09RB11)

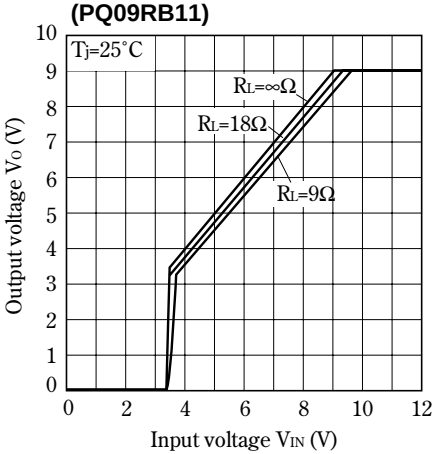


Fig.7 Output Voltage vs. Input Voltage (PQ12RB11)

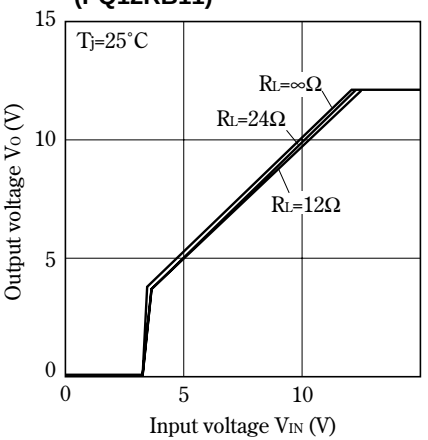


Fig.8 Dropout Voltage vs. Junction Temperature

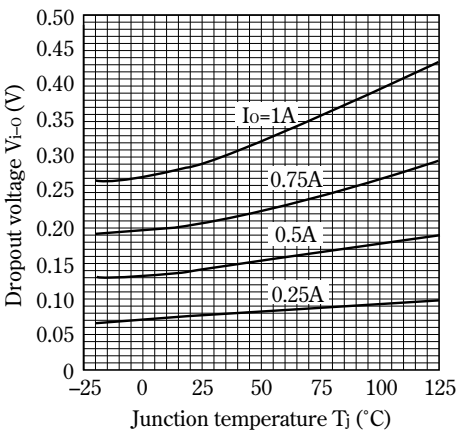


Fig.9 Circuit Operating Current vs. Input Voltage (PQ05RB11)

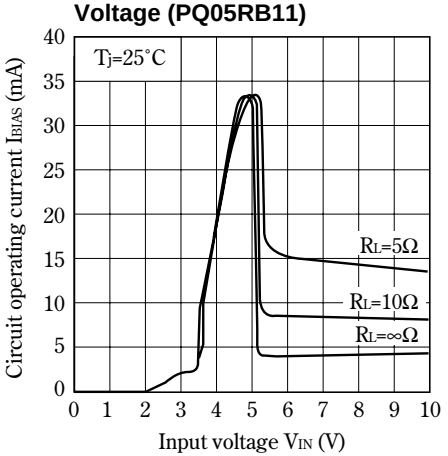


Fig.10 Circuit Operating Current vs. Input Voltage (PQ09RB11)

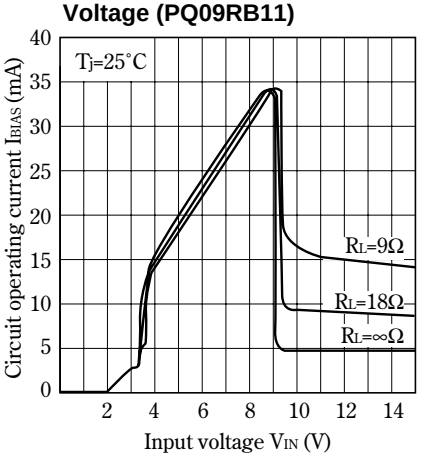


Fig.11 Circuit Operating Current vs. Input Voltage (PQ12RB11)

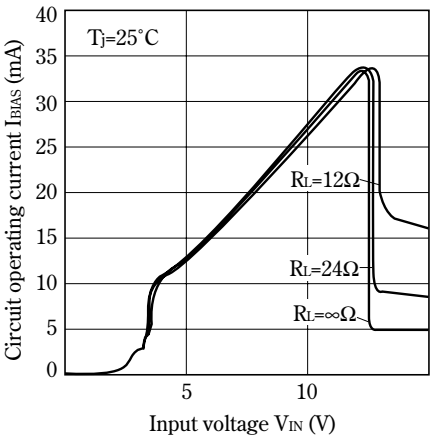
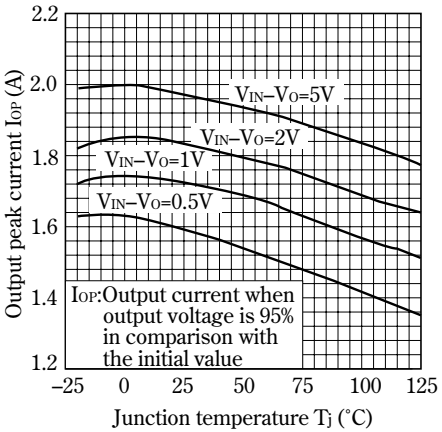
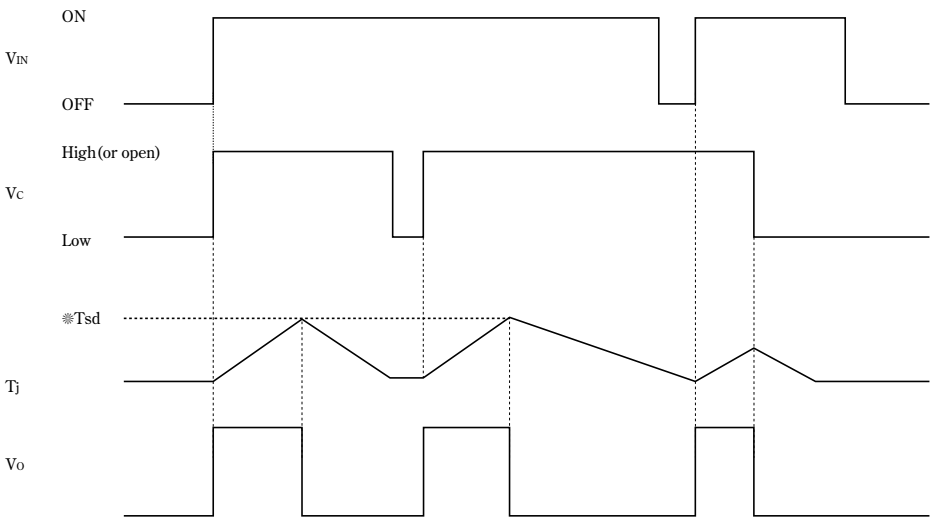


Fig.12 Output Peak Current vs. Junction Temperature



■ Overheat Shut-down Characteristics

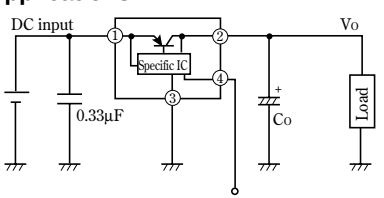


※Tsd : Overheat shut-down temperature (Tj>=110°C)

(1) Overheat shut-down operates at Tj=Tsd and output OFF-state is maintained.

(2) OFF-state is kept untill VIN is once turned off or Vc is turned down to the "L" level.

■ Typical Applications



ON/OFF Signal (High or Open : Output ON)
(Low : Output OFF)

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  --- Office automation equipment
  --- Telecommunication equipment [terminal]
  --- Test and measurement equipment
  --- Industrial control
  --- Audio visual equipment
  --- Consumer electronics

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  --- Traffic signals
  --- Gas leakage sensor breakers
  --- Alarm equipment
  --- Various safety devices, etc.

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  --- Telecommunication equipment [trunk lines]
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