PQ070XH02Z Series

Low Voltage Operation Low Power-Loss Voltage Regulator

Features

- Low voltage operation (Minimum operating voltage: 2.35V)
  2.5V input → available 1.5 to 1.8V output
- Large output current type (I_O: 2A)
- Low dissipation current
  (Quiescent current: MAX. 2mA
  Output OFF-state dissipation current: MAX. 5μA)
- Low power-loss
- Built-in overcurrent and overheat protection functions
- TO-263 surface mount package

Applications

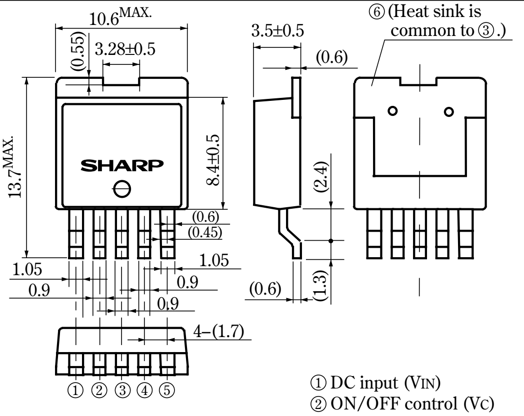
- Personal computers and peripheral equipment
- Power supplies for various digital electronic equipment such as DVD player or STB
- Power supplies for automotive equipment such as car navigation system.

Model Line-up

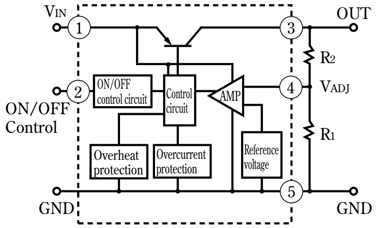
Output current (I_O)	Package type	Variable output type
2A	Taping	PQ070XH02ZP
	Sleeve	PQ070XH02ZZ

Outline Dimensions

(Unit : mm)



① DC input (V_{IN})
② ON/OFF control (V_C)
③ DC output (V_O)
④ Output voltage adjustment(V_{ADJ})
⑤ GND
⑥ DC output (V_O)



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
※1	Output adjustment terminal voltage	V_{ADJ}	5	V
	Output current	I_O	2	A
※2	Power dissipation	P_D	35	W
※3	Junction temperature	T_j	150	˚C
	Operating temperature	T_{opr}	–40 to +85	˚C
	Storage temperature	T_{stg}	–40 to +150	˚C
	Soldering temperature	T_{sol}	260(10s)	˚C

※1 All are open except GND and applicable terminals.
※2 P_D:With infinite heat sink
※3 Overheat protection may operate at 125 <=T_j<=150˚C.

•Please refer to the chapter " Handling Precautions ".

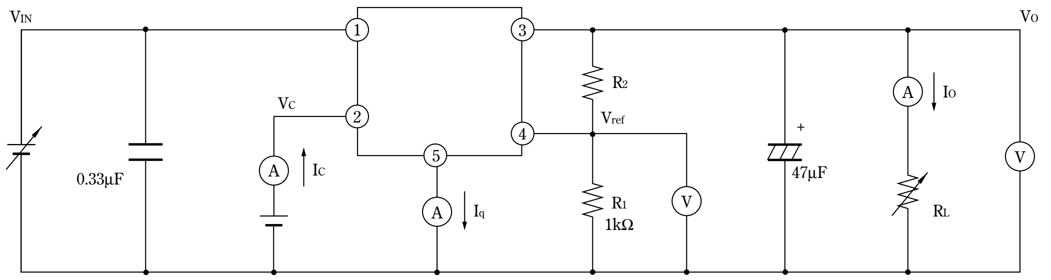
■ Electrical Characteristics

(Unless otherwise specified, condition shall be V_{IN}=5V,V_O=3V(R_1=1kΩ),I_O=1A,V_C=2.7V,T_a=25˚C)

	Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
	Input voltage	V_{IN}	–	2.35	–	10	V
	Output voltage	V_O	–	1.5	–	7	V
	Reference voltage	V_{REF}	–	1.225	1.25	1.275	V
	Load regulation	$R_{eg}L$	I_O=5mA to 2A	–	0.2	2.0	%
	Line regulation	$R_{eg}I$	V_{IN}=4 to 8V, I_O=5mA	–	0.2	1.0	%
	Temperature coefficient of reference voltage	T_CV_{REF}	T_j=0 to 125˚C, I_O=5mA	–	±1.0	–	%/˚C
	Ripple rejection	RR	Refer to Fig.2	45	60	–	dB
	Dropout voltage	V_{I-O}	V_{IN}=2.85A, I_O=2A	–	–	0.5	V
※4	ON-state voltage for control	$V_{C(ON)}$	–	2	–	–	V
	ON-state current for control	$I_{C(ON)}$	–	–	–	200	µA
	OFF-state voltage for control	$V_{C(OFF)}$	I_O=0A	–	–	0.8	V
	OFF-state current for control	$I_{C(OFF)}$	I_O=0A, V_C=0.4V	–	–	2	µA
	Quiescent current	I_q	I_O=0A	–	1	2	mA
	Output OFF-state dissipation current	I_{qs}	I_O=0A, V_C=0.4V	–	–	5	µA

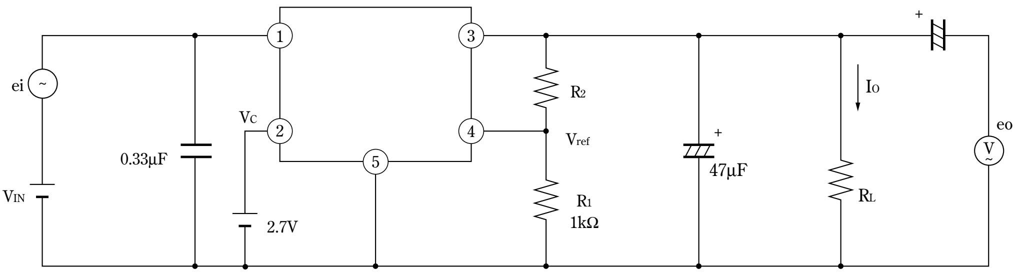
※4 In case of opening control terminal ②, output voltage turns off

Fig.1 Test Circuit



$V_O=V_{ref}\times(1+R_2/R_1)$
[R_1=1kΩ, V_{ref} ≒ 1.25V]

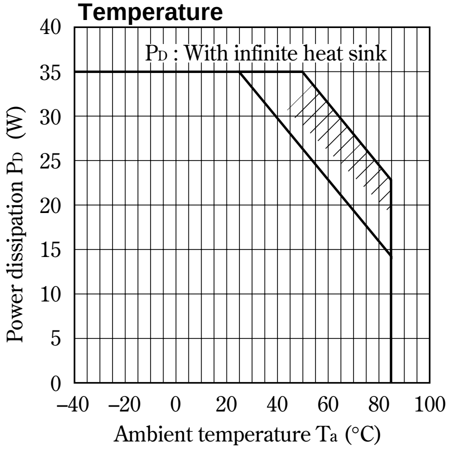
Fig.2 Test Circuit of Ripple Rejection



f=120Hz(sine wave)
$e_{i(rms)}$=0.5V
V_O=3V(R_1=1kΩ)

V_{IN}=5V
I_O=0.3A
RR=20log($e_{i(rms)}/e_{o(rms)}$)

Fig.3 Power Dissipation vs. Ambient Temperature



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

Fig.4 Overcurrent Protection Characteristics

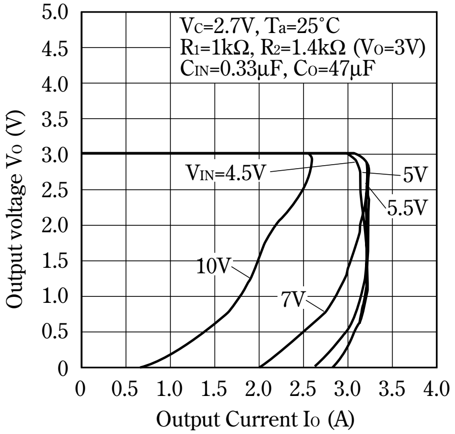


Fig.5 Output Voltage Fluctuation vs. Junction Temperature

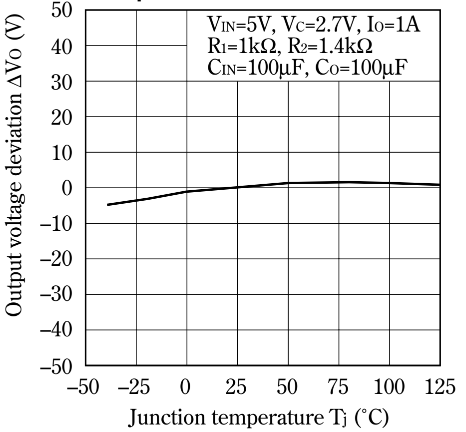


Fig.6 Output Voltage vs. Input Voltage

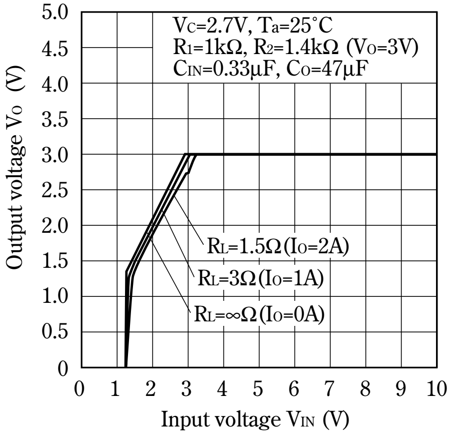


Fig.7 Circuit Operating Current vs. Input Voltage

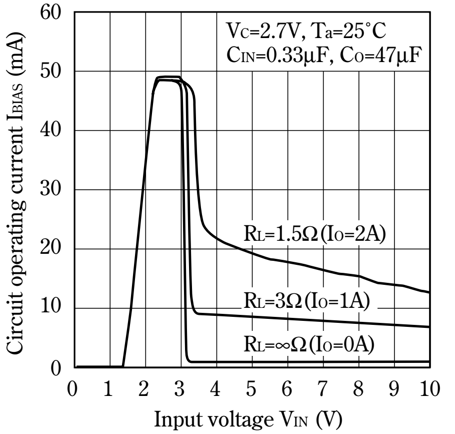


Fig.8 Dropout Voltage vs. Junction Temperature

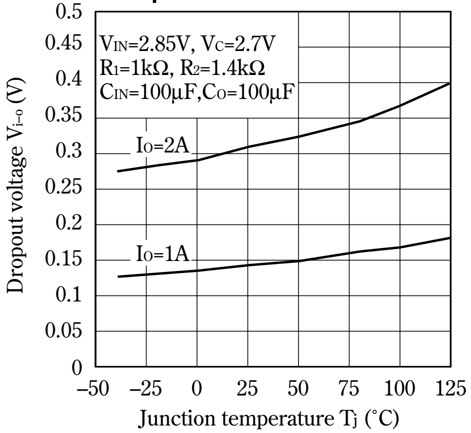


Fig.9 ON-OFF Control Voltage vs. junction Temperature

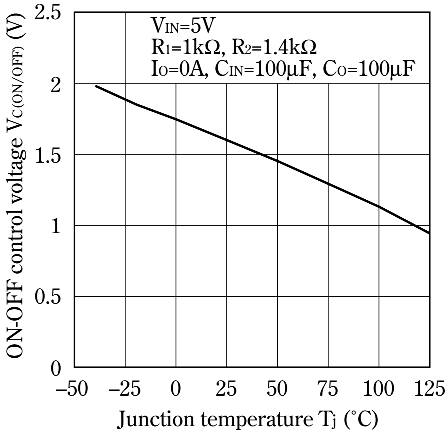


Fig.10 Quiescent Current vs. Junction Temperature

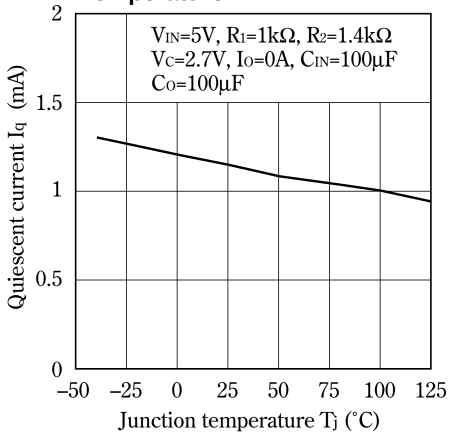


Fig.11 Ripple Rejection vs. Input Ripple Frequency

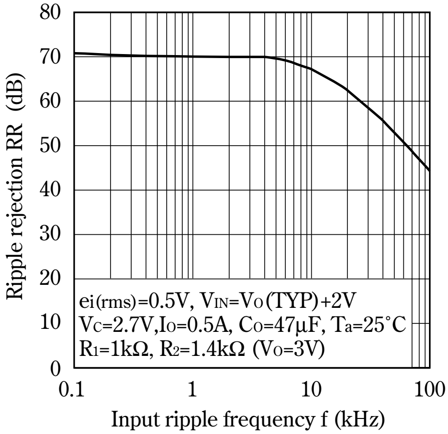


Fig.12 Ripple Rejection vs. Output Current

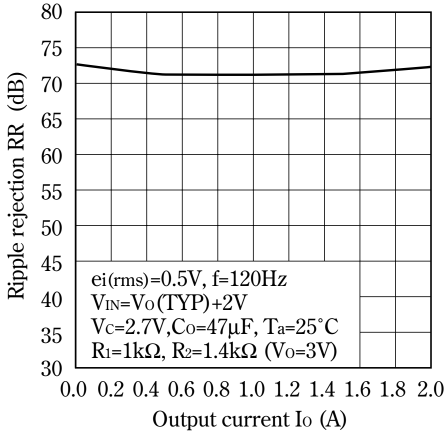
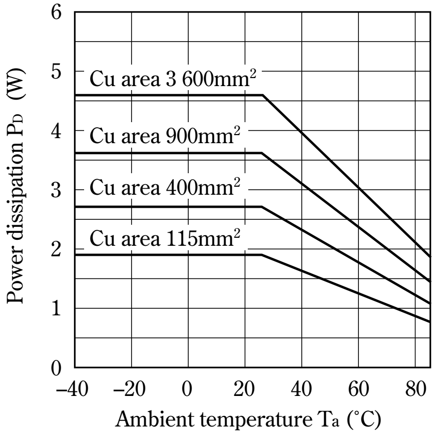
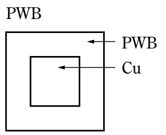


Fig.13 Power Dissipation vs. Ambient Temperature





Material : Glass-cloth epoxy resin
Size : 60×60×1.6mm
Cu thickness : 65μm

Fig.19 Output Voltage Adjustment Characteristics (Typical Value)

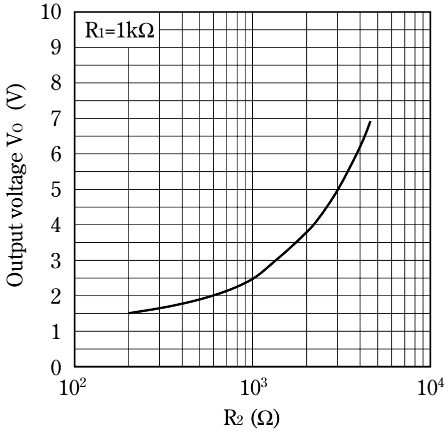
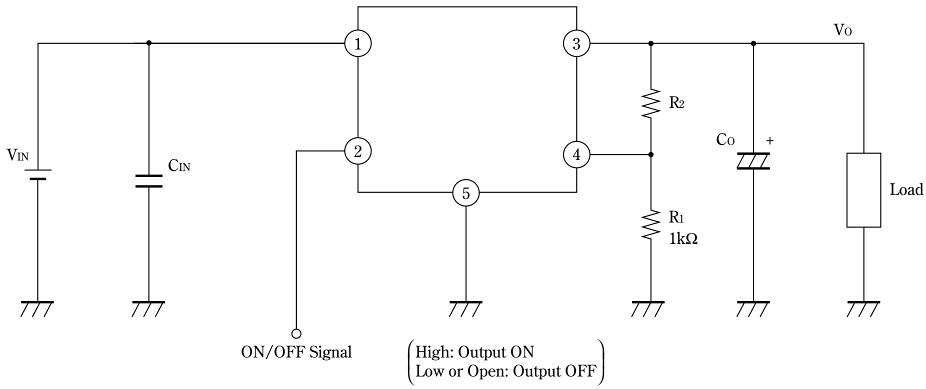
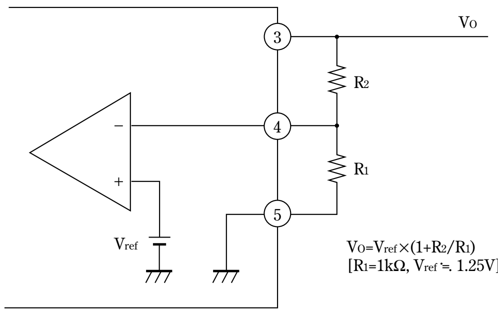


Fig.21 Typical Application



■ Setting of Output Voltage

Output voltage is able to set from 1.5V to 7V when resistors R_1, R_2 are attached to ③, ④, ⑤ terminals. As for the external resistors to set output voltage, refer to the following figure.



$V_O = V_{ref} \times (1 + R_2/R_1)$
$[R_1 = 1k\Omega,\ V_{ref} \fallingdotseq 1.25V]$

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

  (ii) Measures such as fail-safe function and redundant design should be taken to ensure reliability and safety when SHARP devices are used for or in connection with equipment that requires higher reliability such as:
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  --- Traffic signals
  --- Gas leakage sensor breakers
  --- Alarm equipment
  --- Various safety devices, etc.

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  --- Telecommunication equipment [trunk lines]
  --- Nuclear power control equipment
  --- Medical and other life support equipment (e.g., scuba).

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