PQ070XZ5MZ/PQ070XZ01Z

SC-63 Package, Low Voltage Operation Low Power-loss Voltage Regulators

■ Features

- Low voltage operation (Minimum operating voltage: 2.35V)
  2.5V input → available 1.5 to 1.8V
- Low dissipation current
  Dissipation current at no load: MAX. 2mA
  Output OFF-state dissipation current: MAX. 5μA

■ Applications

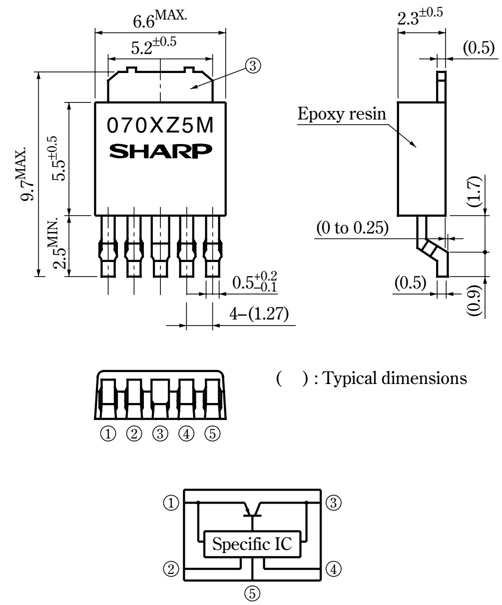
- Peripheral equipment of personal computers
- Power supplies for various electronic equipment such as DVD player or STB

■ Model Line-up

Output current (I_O)	Package type	Variable output
0.5A	Taping	**PQ070XZ5MZP**
	Sleeve	**PQ070XZ5MZZ**
1A	Taping	**PQ070XZ01ZP**
	Sleeve	**PQ070XZ01ZZ**

■ Outline Dimensions

(Unit : mm)



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

■ Absolute Maximum Ratings

(Ta=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	**PQ070XZ5MZ**	I_O	0.5	A
	PQ070XZ01Z		1	
*2 Power dissipation		P_D	8	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 T_j=125˚C to 150˚C

•Please refer to the chapter " Handling Precautions ".

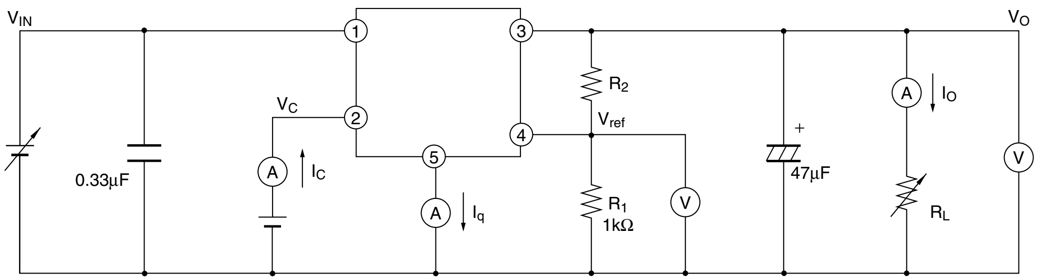
Electrical Characteristics

(Unless otherwise specified, condition shall be V_{IN}=5V, V_O=3V(R_1=1kΩ), I_O=0.3A, V_C=2.7V, Ta=25˚C, (**PQ070XZ5MZ**))
(Unless otherwise specified, condition shall be V_{IN}=5V, V_O=3V(R_1=1kΩ), I_O=0.5A, V_C=2.7V, Ta=25˚C, (**PQ070XZ01Z**))

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input voltage		V_{IN}	–	2.35	–	10	V
Output voltage		V_O	–	1.5	–	7	V
Load regulation	**PQ070XZ5MZ**	$R_{eg}L$	I_O=5mA to 0.5A	–	0.2	2	%
	PQ070XZ01Z		I_O=5mA to 1A				
Line regulation		$R_{eg}I$	V_{IN}=4 to 8V, I_O=5mA	–	0.2	1	%
Ripple Rejection		RR	Refer to Fig.2	45	60	–	dB
Dropout voltage	**PQ070XZ5MZ**	V_{I-O}	V_{IN}=2.85V, I_O=0.3A	–	–	0.5	V
	PQ070XZ01Z		V_{IN}=2.85V, I_O=0.5A				
Reference voltage		V_{ref}	–	1.225	±1.25	1.275	V
Temperature coefficient of reference voltage		T_CV_{ref}	T_j=0 to 125˚C, I_O=5mA	–	±1.0	–	%
※4 ON-state voltage for control		$V_{C\ (ON)}$	※4	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}	V_C=0.4V	–	–	5	μA

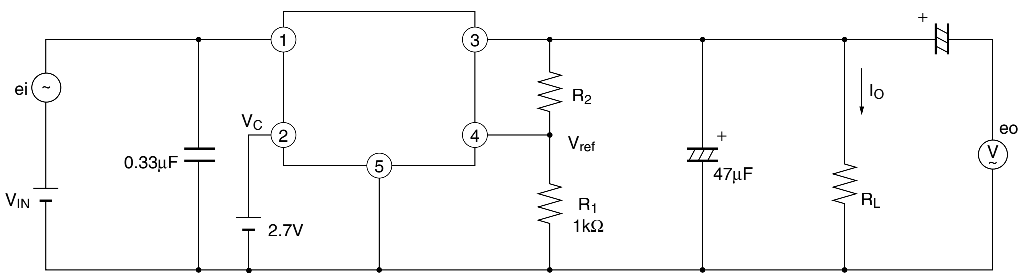
※4 In case of opening control terminal ②, output voltage turns off

Fig.1 Test Circuit



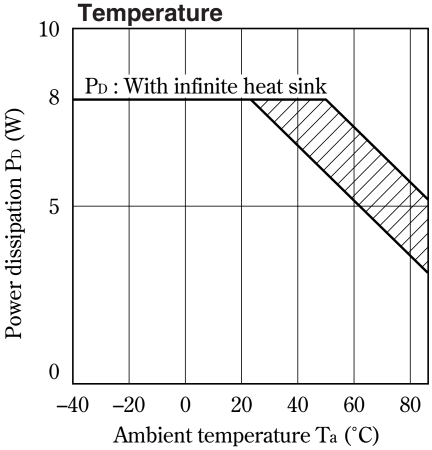
$V_O = V_{ref} \times (1+R_2/R_1)$
[R_1=1kΩ, $V_{ref} \fallingdotseq 1.25$V]

Fig.2 Test Circuit for Ripple Rejection



f=120Hz(sine wave)
ei(rms)=0.5V
V_O=3V(R_1=1kΩ)
V_{IN}=5V
I_O=0.3A
RR=20log(ei(rms)/eo(rms))

Fig.3 Power Dissipation vs. Ambient Temperature



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

Fig.4 Overcurrent Protection Characteristics (PQ070XZ01Z)

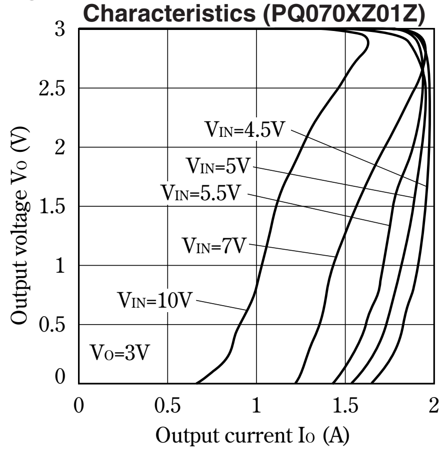


Fig.5 Overcurrent Protection Characteristics (PQ070XZ5MZ)

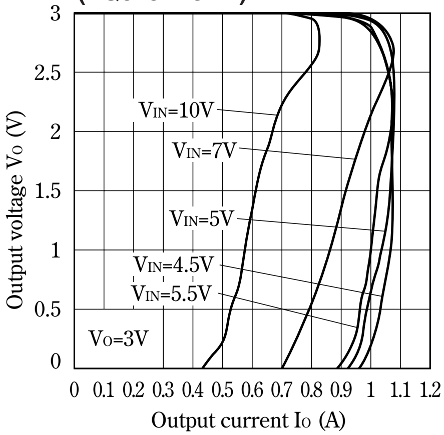


Fig.6 Reference Voltage vs. Ambient Temperature

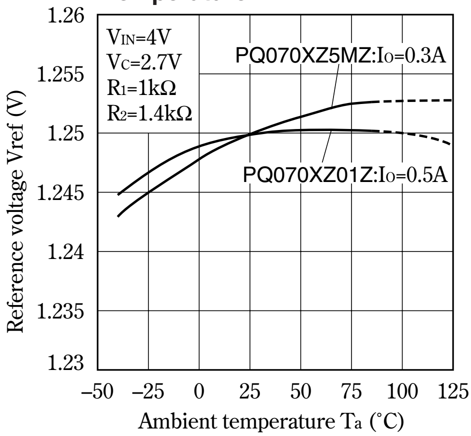


Fig.7 Output Voltage vs. Input Voltage (PQ070XZ5MZ)

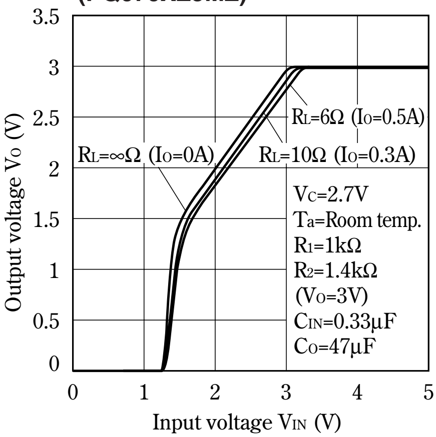


Fig.8 Output Voltage vs. Input Voltage (PQ070XZ01Z)

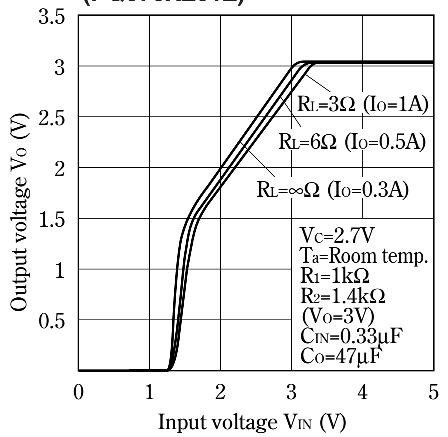


Fig.9 Circuit Operating Current vs. Input Voltage (PQ070XZ5MZ)

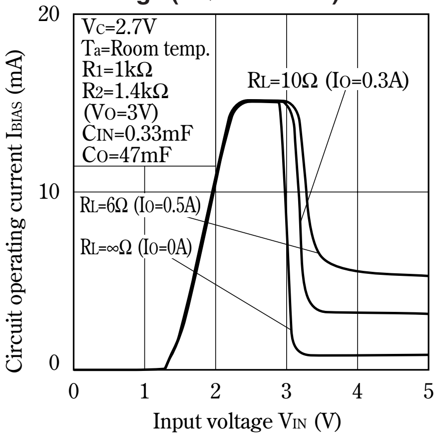


Fig.10 Circuit Operating Current vs. Input Voltage (PQ070XZ01Z)

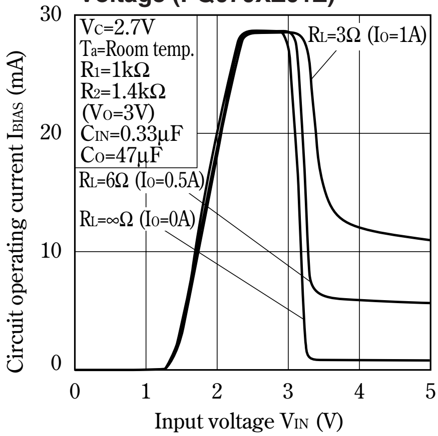


Fig.11 Dropout Voltage vs. Ambient Temperature

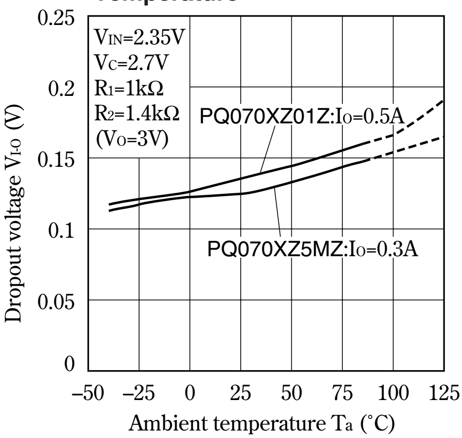


Fig.12 Quiescent Current vs. Ambient Temperature

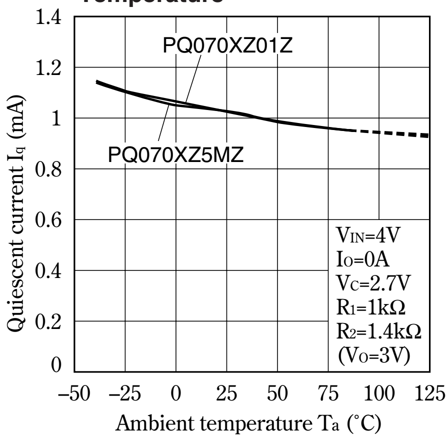


Fig.13 Ripple Rejection vs. Input Ripple Frequency

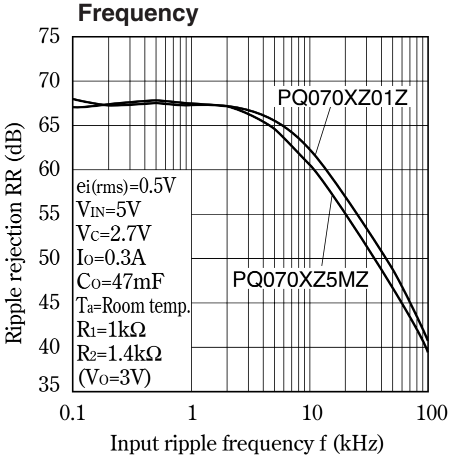


Fig.14 Ripple Rejection vs. Output Current

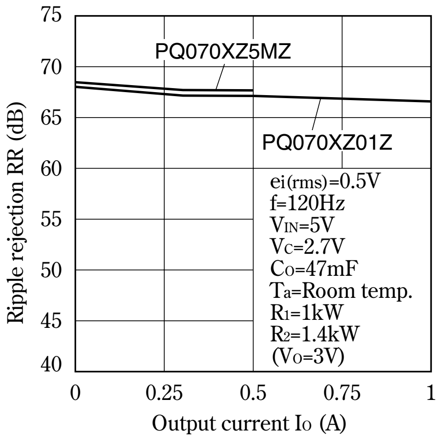


Fig.15 Typical Application

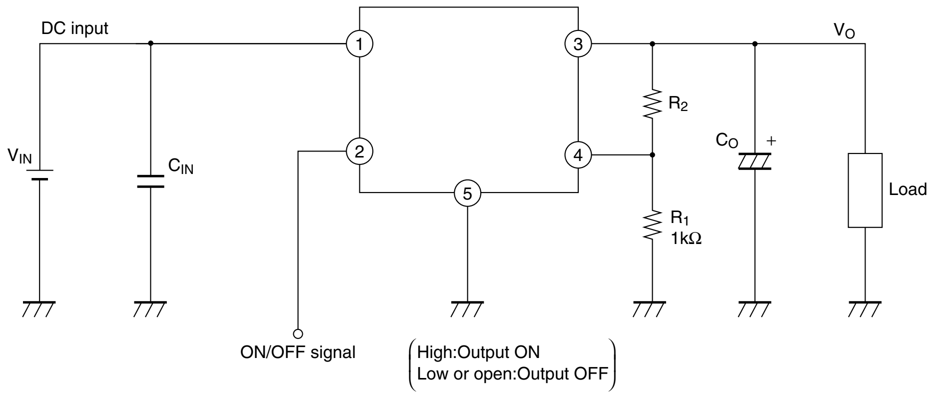
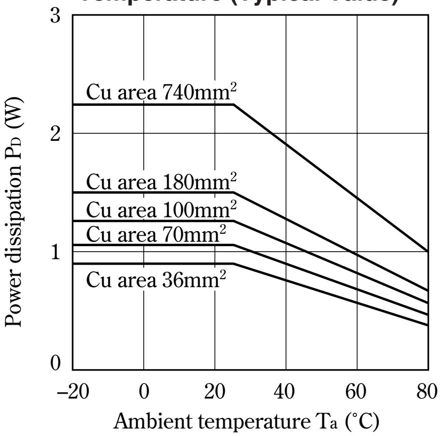
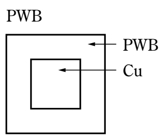


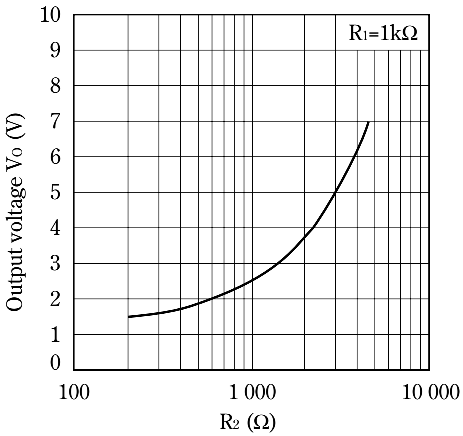
Fig.16 Power Dissipation vs. Ambient Temperature (Typical Value)





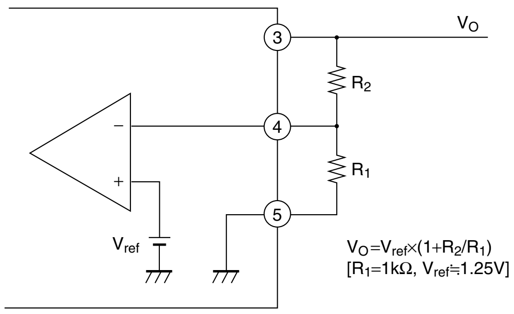
Material : Glass-cloth epoxy resin
Size : 50×50×1.6mm
Cu thickness : 35µm

Fig.17 Output Voltage Adjustment Characteristics



Setting of Output Voltage

Output voltage is able to set from 1.5V to 7V when resistors R_1 and R_2 are attached to ③, ④, ⑤ terminals. As for the external resistors to set output voltage, refer to the figure below and Fig.17.



NOTICE

- The circuit application examples in this publication are provided to explain representative applications of SHARP devices and are not intended to guarantee any circuit design or license any intellectual property rights. SHARP takes no responsibility for any problems related to any intellectual property right of a third party resulting from the use of SHARP's devices.
- Contact SHARP in order to obtain the latest device specification sheets before using any SHARP device. SHARP reserves the right to make changes in the specifications, characteristics, data, materials, structure, and other contents described herein at any time without notice in order to improve design or reliability. Manufacturing locations are also subject to change without notice.
- Observe the following points when using any devices in this publication. SHARP takes no responsibility for damage caused by improper use of the devices which does not meet the conditions and absolute maximum ratings to be used specified in the relevant specification sheet nor meet the following conditions:

  (i) The devices in this publication are designed for use in general electronic equipment designs such as:
  --- 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:
  --- Transportation control and safety equipment (i.e., aircraft, trains, automobiles, etc.)
  --- Traffic signals
  --- Gas leakage sensor breakers
  --- Alarm equipment
  --- Various safety devices, etc.

  (iii) SHARP devices shall not be used for or in connection with equipment that requires an extremely high level of reliability and safety such as:
  --- Space applications
  --- Telecommunication equipment [trunk lines]
  --- Nuclear power control equipment
  --- Medical and other life support equipment (e.g., scuba).

- If the SHARP devices listed in this publication fall within the scope of strategic products described in the Foreign Exchange and Foreign Trade Law of Japan, it is necessary to obtain approval to export such SHARP devices.

- Contact and consult with a SHARP representative if there are any questions about the contents of this publication.