

PQ070XZ5MZ/ PQ070XZ01Z

■ Features

1. Low voltage operation (Minimum operating voltage:2.35V)
2.5V input → available 1.5 to 1.8V
2. Low dissipation current
Dissipation current at no load:MAX.2mA
(Conventional model:MAX.10mA)
OFF-state dissipation current:MAX.5μA

■ Applications

1. Peripheral equipment of personal computers
2. 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

■ Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Rating	Unit
*1 Input voltage	V_{IN}	10	V
*1 Output control voltage	V_C	10	V
*1 Output adjustment terminal voltage	V_{ADJ}	5	V
Output current	I_O	0.5	A
		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

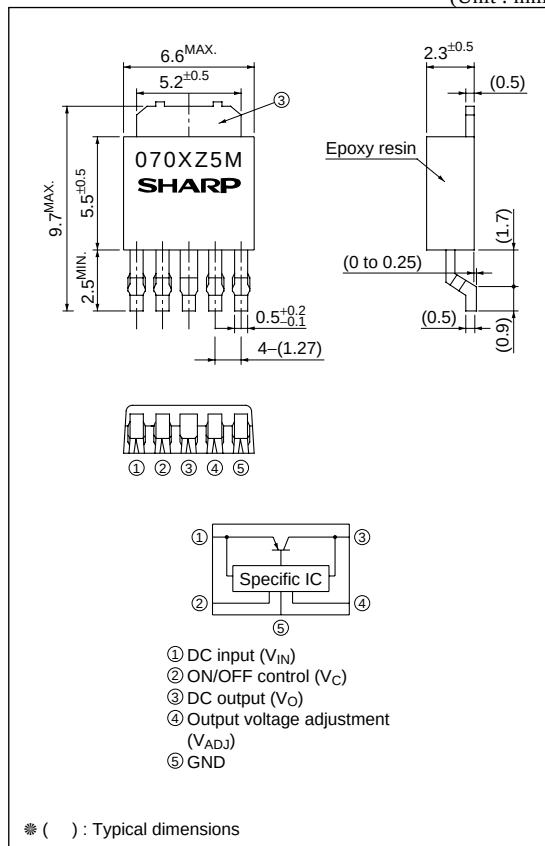
*2 P_D : With infinite heat sink

*3 Overheat protection may operate at the condition $T_j=125^{\circ}\text{C}$ to 150°C

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

■ Outline Dimensions

(Unit : mm)



■ Electrical Characteristics

(Unless otherwise specified, condition shall be $V_{IN}=5V$, $V_O=3V(R_1=1k\Omega)$, $I_O=0.3A$, $V_C=2.7V$, $T_a=25^\circ C$, (**PQ070XZ5MZ**))

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Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input voltage range	V_{IN}	—	2.35	—	10	V
Output voltage	V_O	—	1.5	—	7	V
Load regulation	PQ070XZ5MZ PQ070XZ01Z	RegL $I_O=5mA$ to $0.5A$ $I_O=5mA$ to $1A$	—	0.2	2	%
Line regulation	RegI	$V_{IN}=4$ to $8V$, $I_O=5mA$	—	0.2	1	%
Ripple Rejection	RR	Refer to Fig.2	45	60	—	dB
Dropout voltage	PQ070XZ5MZ PQ070XZ01Z	V_{I-O} $V_{IN}=2.85V$, $I_O=0.3mA$ $V_{IN}=2.85V$, $I_O=0.5mA$	—	—	0.5	V
Reference voltage	V_{ref}	—	1.225	± 1.25	1.275	V
Reference voltage temperature coefficient	$T_C V_{ref}$	$T_J=0$ to $125^\circ C$, $I_O=5mA$	—	± 1.0	—	%
*4 Output on control voltage	$V_C(ON)$	*4	2	—	—	V
Output on control current	$I_C(ON)$	—	—	—	200	μA
Output off control voltage	$V_C(OFF)$	$I_O=0A$	—	—	0.8	V
Output off control current	$I_C(OFF)$	$I_O=0A$, $V_C=0.4V$	—	—	2	μA
Quiescent current	I_q	$I_O=0A$	—	1	2	mA
Output off dissipation current	I_{qs}	$V_C=0.4V$	—	—	5	μA

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

Fig.1 Standard Test Circuit

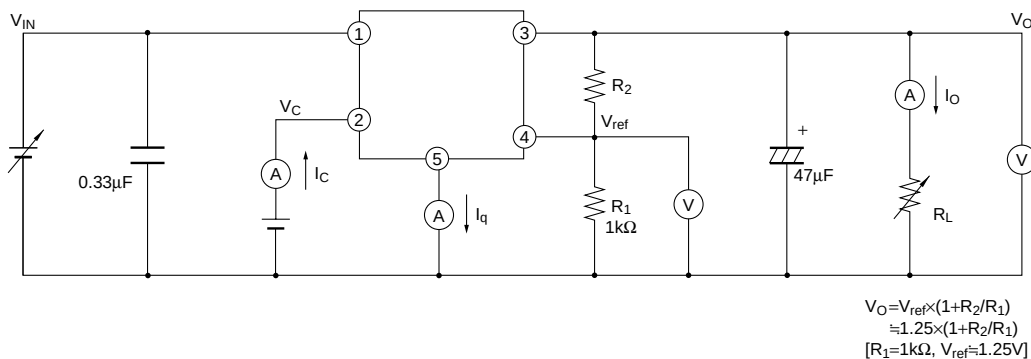


Fig.2 Test Circuit for Ripple Rejection

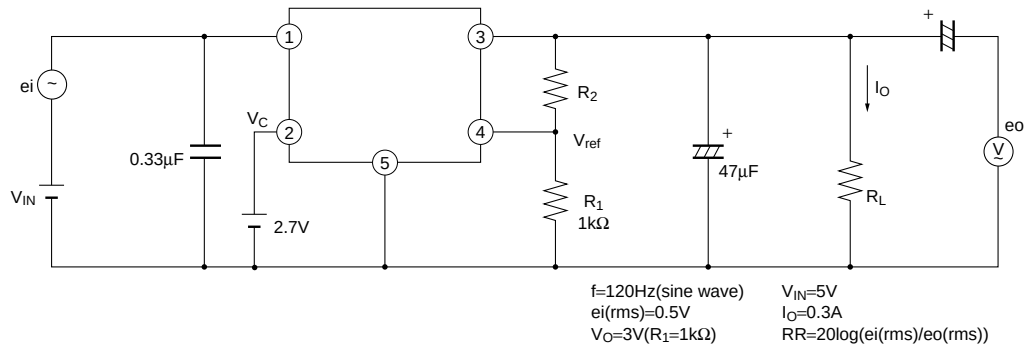
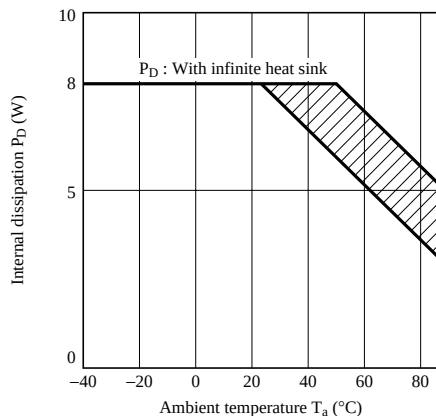


Fig.3 Internal Dissipation vs. Ambient Temperature


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

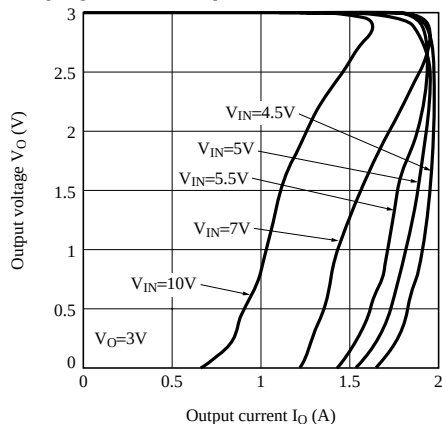
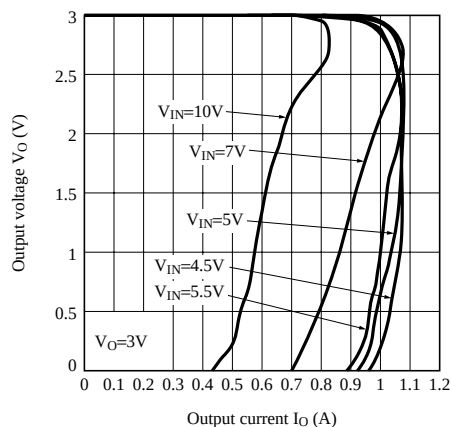
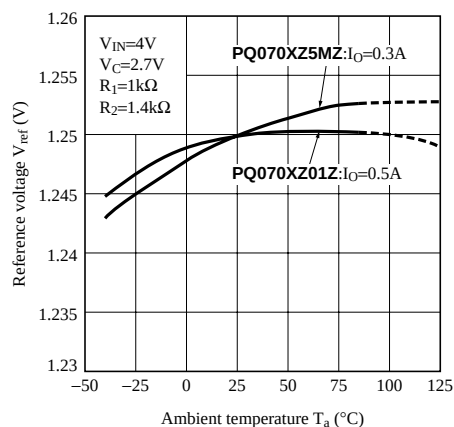
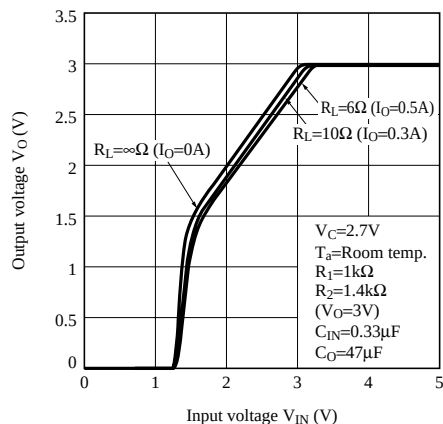
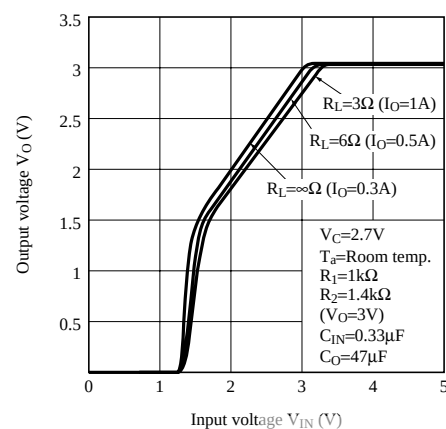
Fig.4 Overcurrent Protection Characteristics (PQ070XZ01Z)

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)


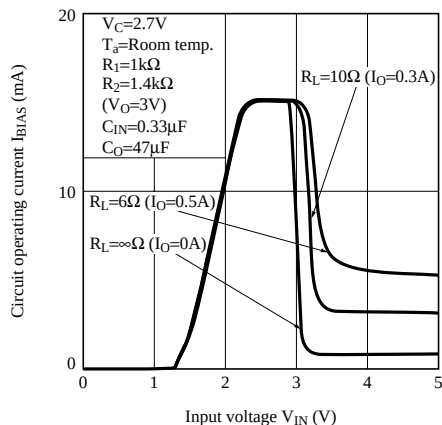
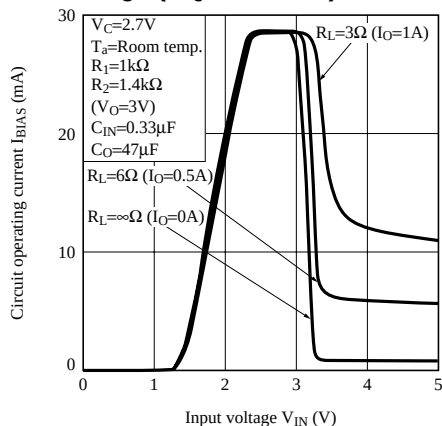
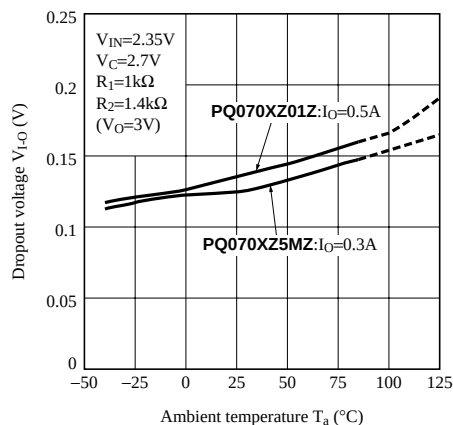
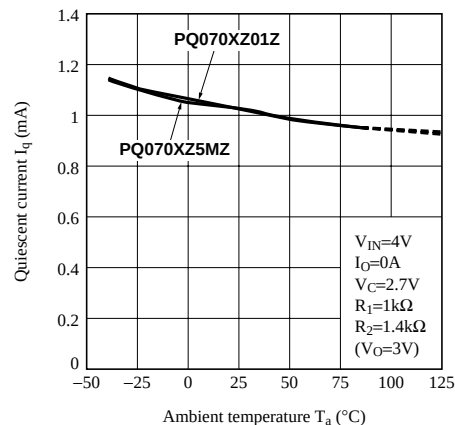
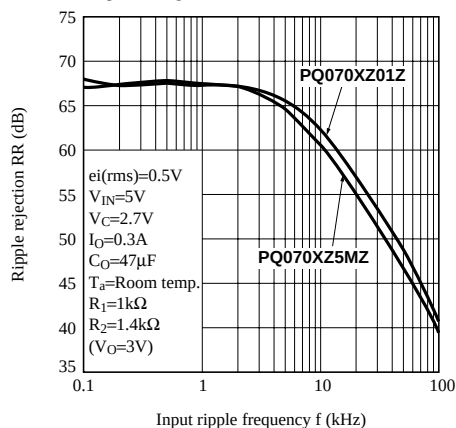
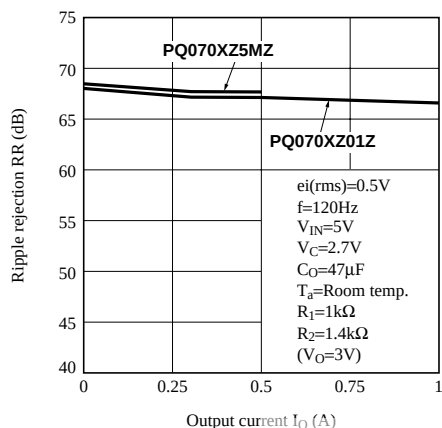
Fig.9 Circuit Operating Current vs. Input Voltage (PQ070XZ5MZ)

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 Example of Application

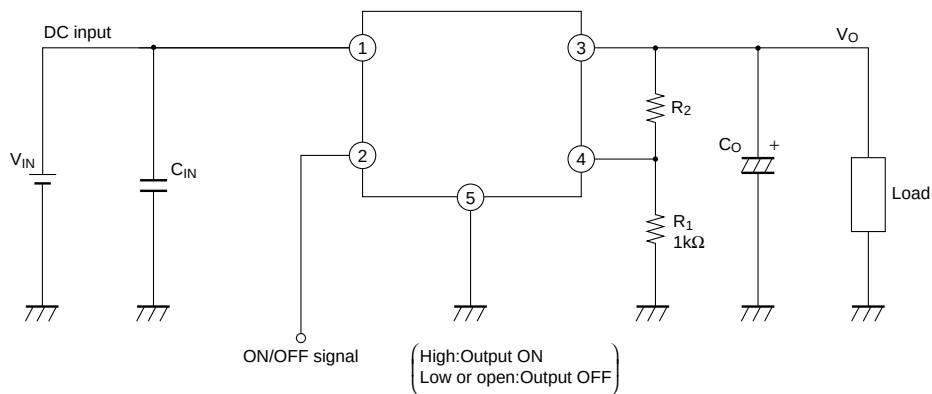
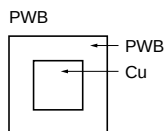
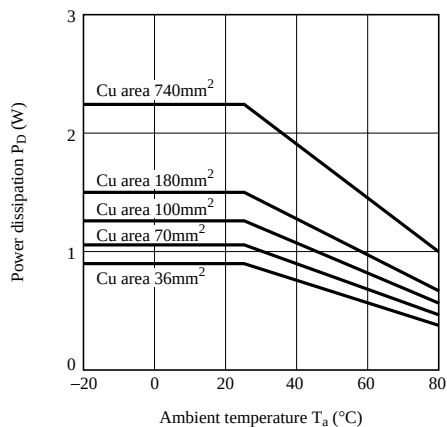
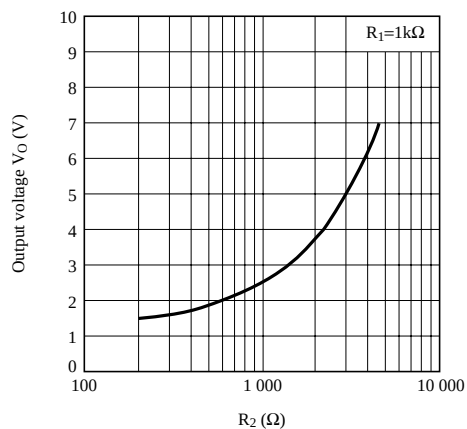


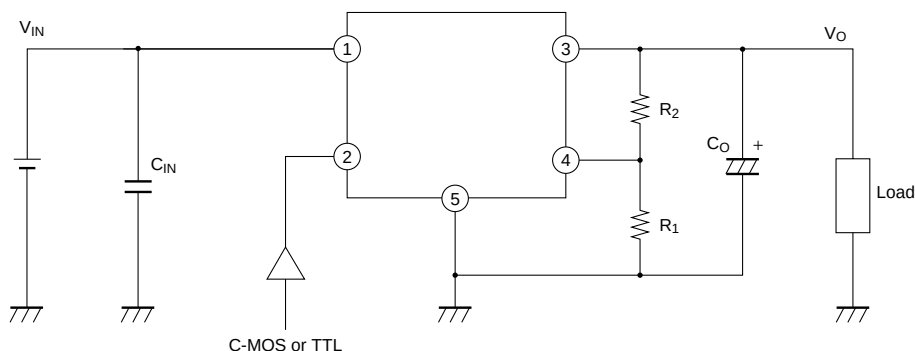
Fig.16 Power Dissipation vs. Ambient Temperature (Typical Value)



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

Fig.17 Output Voltage vs. R_2 

■ Precautions for Use



1. External connection

- (1) The connecting wiring of C_O , C_{IN} and each terminal, fin portion must be as short as possible. It may oscillate by type, value and wiring condition of capacitor. Confirm the output waveform in actual using condition beforehand.
- (2) ON/OFF control terminal ② is compatible with LS-TTL. It enables to be directly driven by TTL or C-MOS standard logic (RCA4000 series).
- (3) If voltage is applied under the conditions that device pin is connected divergently or reversely, the deterioration of characteristics or damage may occur. Never allow improper mounting.

2. Thermal protection design

Maximum power dissipation of devices is obtained by the following equation.

$$P_D = I_O \times (V_{IN} - V_O) + V_{IN} \times I_q$$

When ambient temperature T_a and power dissipation P_D (MAX.) during operation are determined, operate element within the safety operation area specified by the derating curve. Insufficient radiation gives an unfavorable influence to the normal operation and reliability of the device.

In the external area of the safety operation area shown by the derating curve, the overheat protection circuit may operate to shut-down output. However please avoid keeping such condition for a long time.

3. ESD (Electrostatic Sensitivity Discharge)

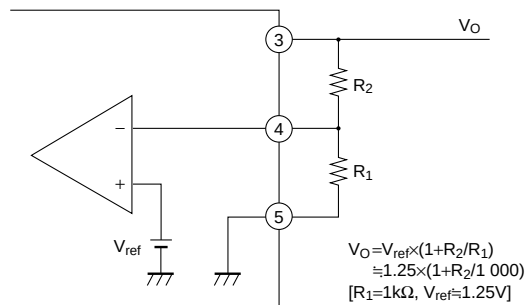
Be careful not to apply electrostatic discharge to the device since this device employs a bipolar IC and may be damaged by electrostatic discharge. Followings are some methods against excessive voltage caused by electrostatic discharge.

- (1) Human body must be grounded to discharge the electro charge which is charged in the body or cloth.
- (2) Anything that is in contact with the device such as workbench, inserter, or measuring instrument must be grounded.
- (3) Use a soldering dip basin with a minimum leak current (isolation resistance $10M\Omega$ or more) from the AC power supply line.

Also the soldering dip basin must be grounded.

■ Output Voltage Fine Tuning

1. Connecting external resistors R_1 and R_2 to terminals ③, ④, ⑤ allows the output voltage to be fine tuned from 1.5V to 7V. Refer to the figure below and Fig.17 when connecting external resistors for fine tuning output voltage.



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