

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

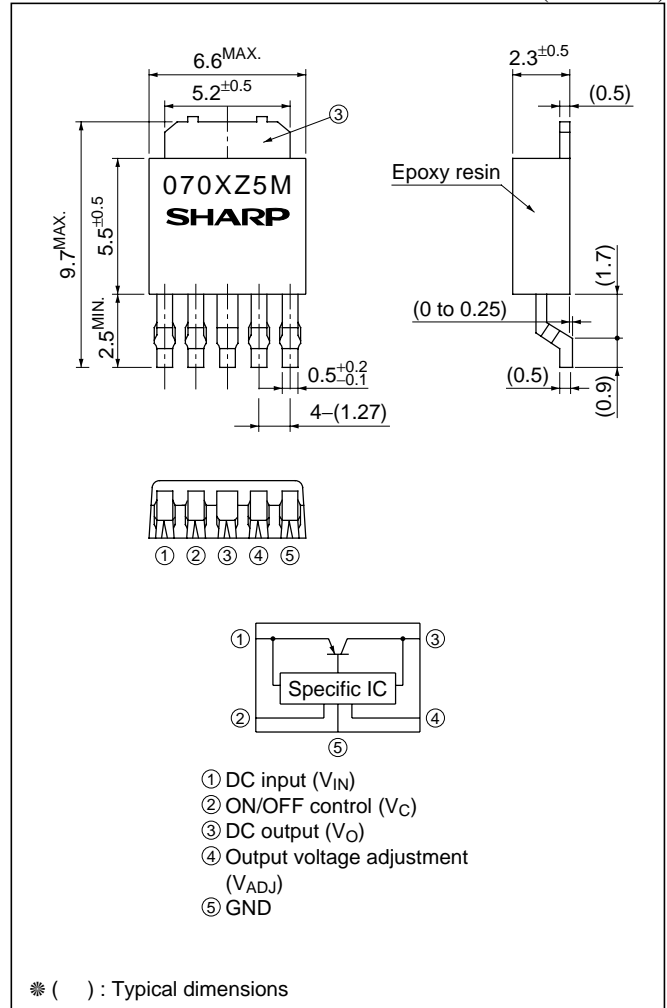
*2 P_D:With infinite heat sink

*3 Overheat protection may operate at the condition T_j=125°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 | R_{regL} | $I_O=5mA$ to 0.5A | – | 0.2 | 2 | % |
| | | $I_O=5mA$ to 1A | – | 0.2 | 2 | % |
| Line regulation | R_{regI} | $V_{IN}=4$ to 8V, $I_O=5mA$ | – | 0.2 | 1 | % |
| Ripple Rejection | RR | Refer to Fig.2 | 45 | 60 | – | dB |
| Dropout voltage | V_{1-O} | $V_{IN}=2.85V$, $I_O=0.3mA$ | – | – | 0.5 | V |
| | | $V_{IN}=2.85V$, $I_O=0.5mA$ | – | – | 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

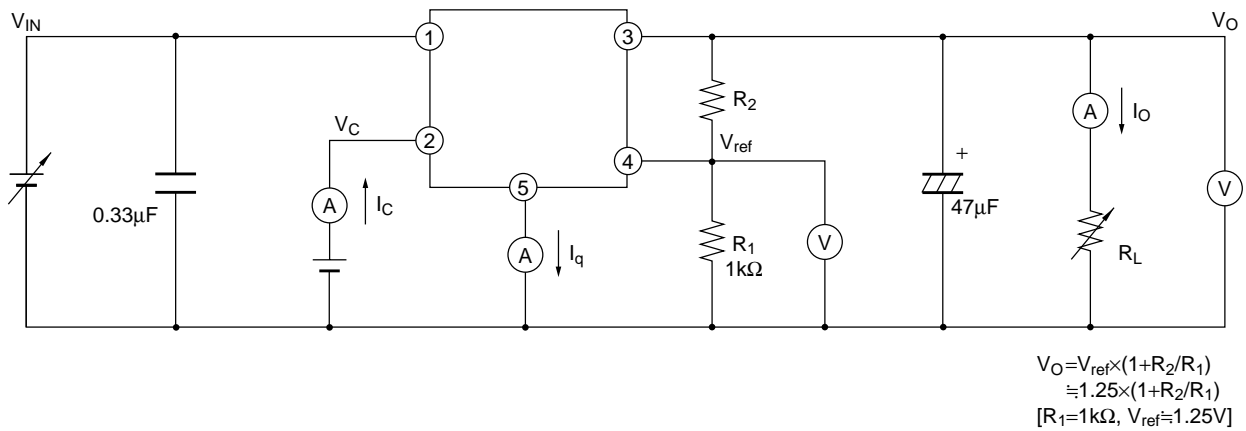


Fig.2 Test Circuit for Ripple Rejection

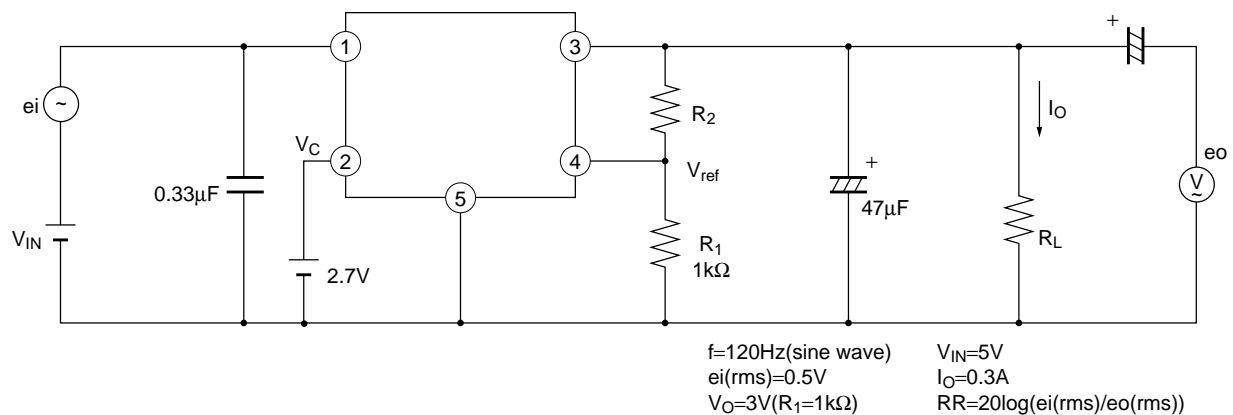
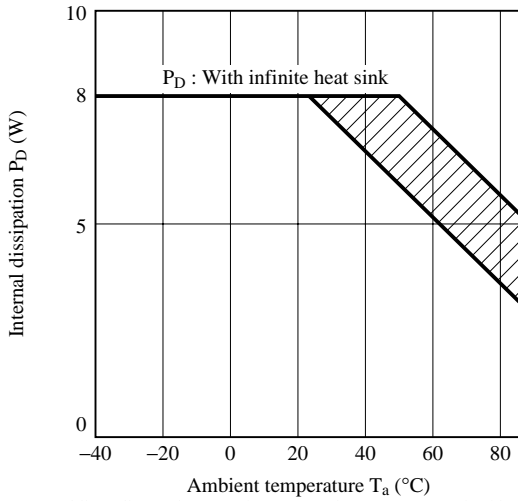


Fig.3 Internal Dissipation vs. Ambient Temperature



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

Fig.4 Overcurrent Protection Characteristics (PQ070XZ01Z)

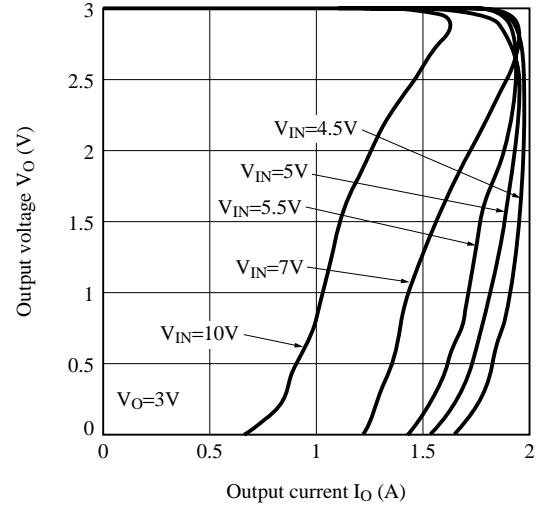


Fig.5 Overcurrent Protection Characteristics (PQ070XZ5MZ)

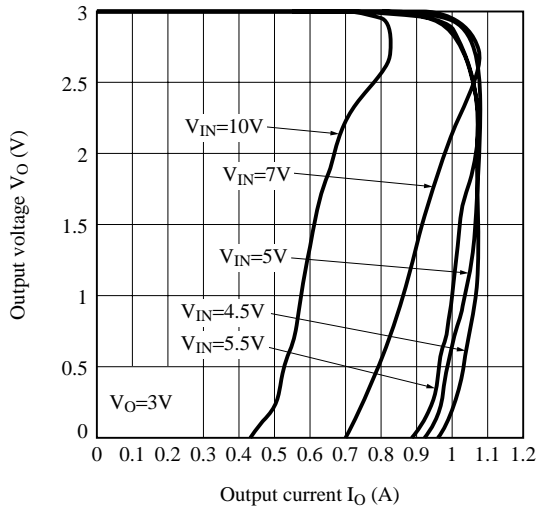


Fig.6 Reference Voltage vs. Ambient Temperature

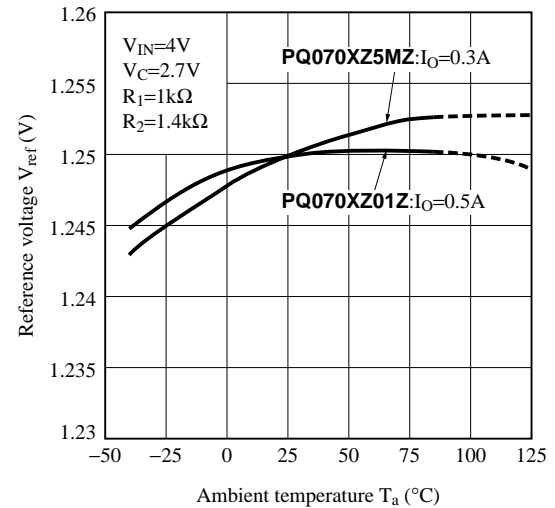


Fig.7 Output Voltage vs. Input Voltage (PQ070XZ5MZ)

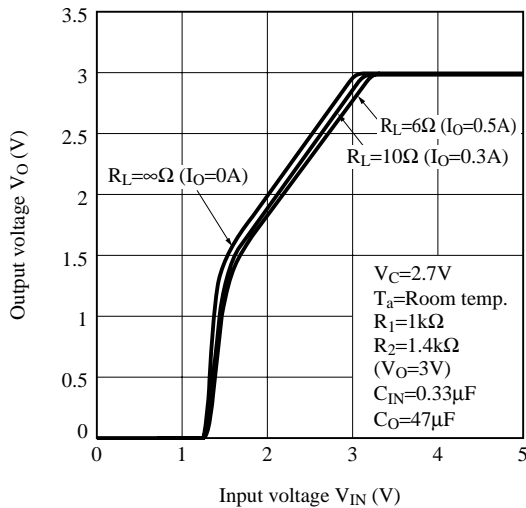


Fig.8 Output Voltage vs. Input Voltage (PQ070XZ01Z)

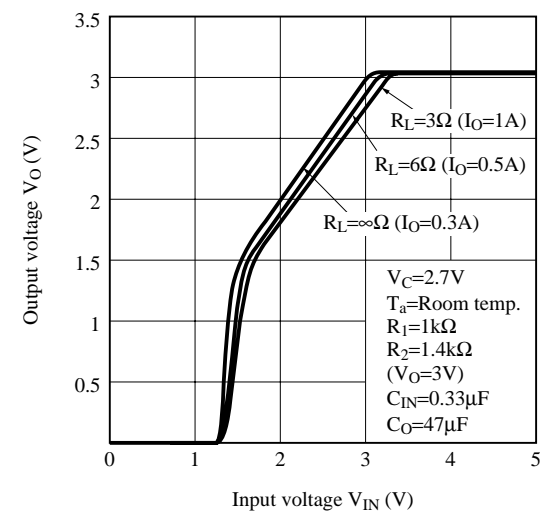


Fig.9 Circuit Operating Current vs. Input Voltage (PQ070XZ5MZ)

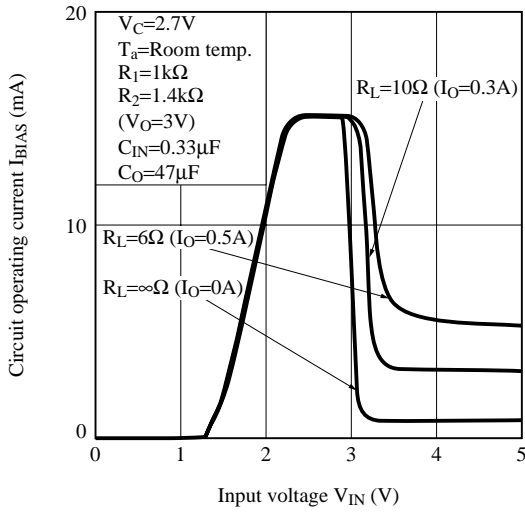


Fig.10 Circuit Operating Current vs. Input Voltage (PQ070XZ01Z)

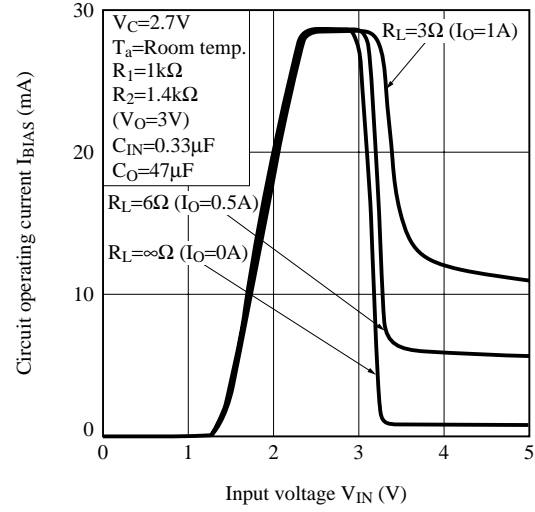


Fig.11 Dropout Voltage vs. Ambient Temperature

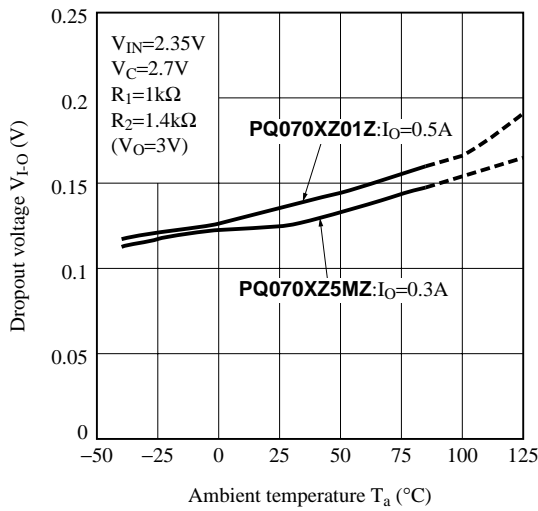


Fig.12 Quiescent Current vs. Ambient Temperature

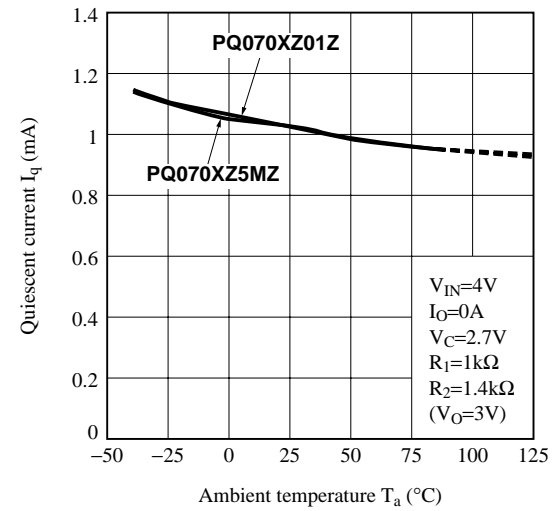


Fig.13 Ripple Rejection vs. Input Ripple Frequency

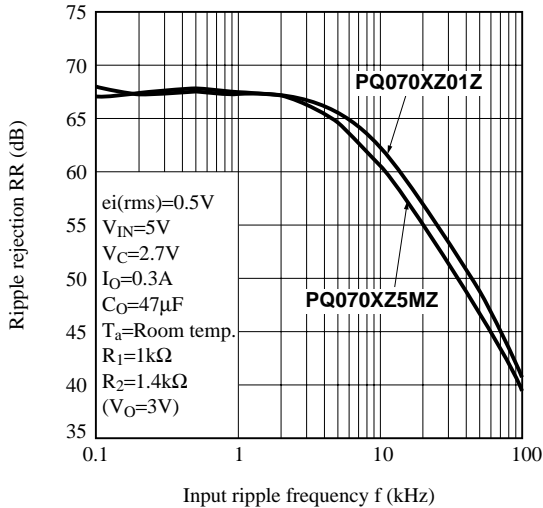


Fig.14 Ripple Rejection vs. Output Current

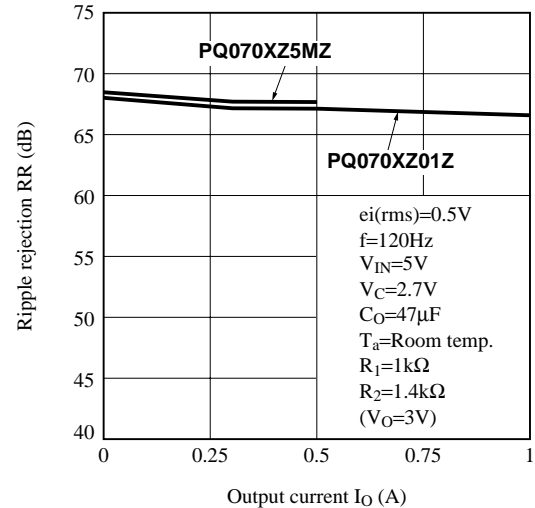


Fig.15 Example of Application

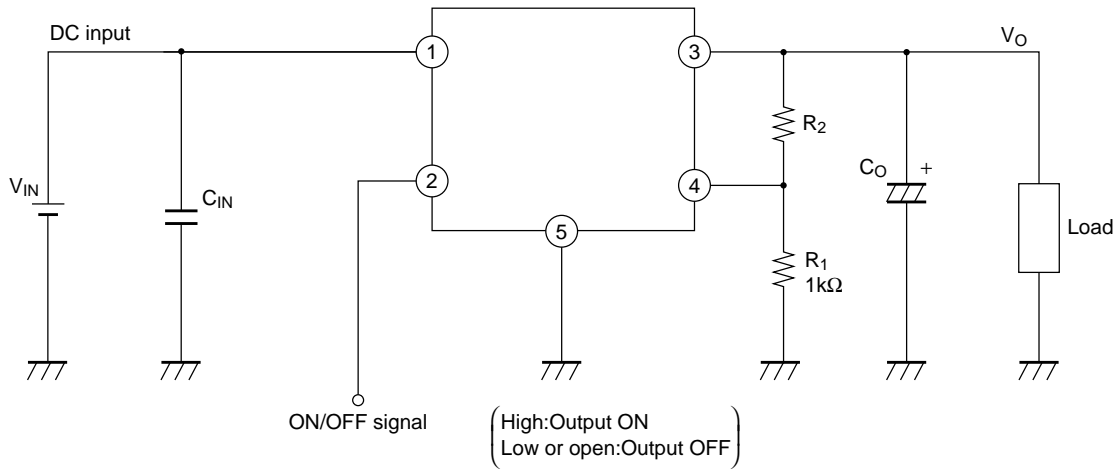


Fig.16 Power Dissipation vs. Ambient Temperature (Typical Value)

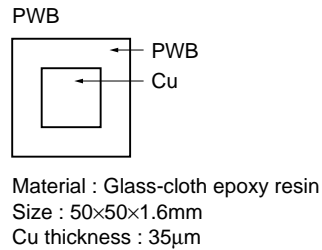
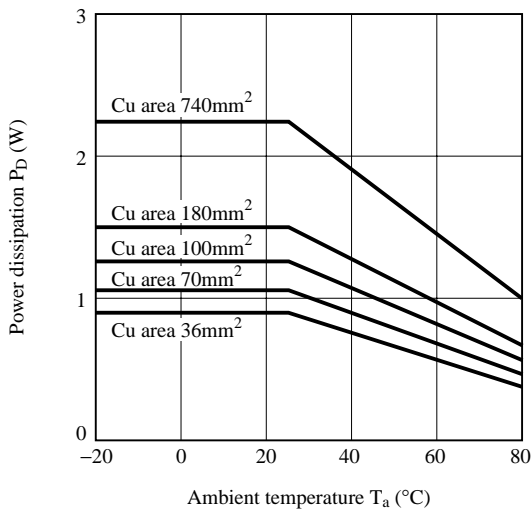
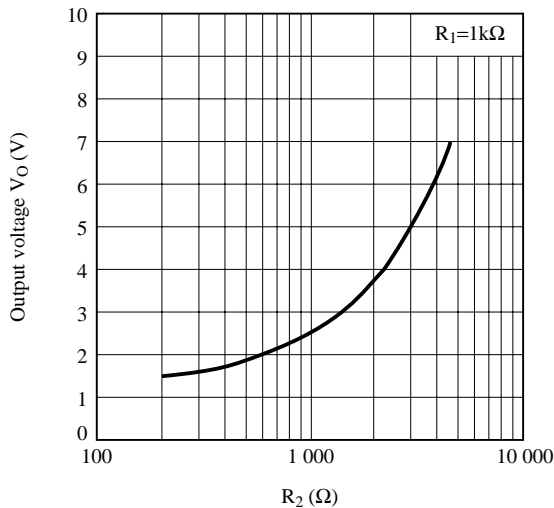
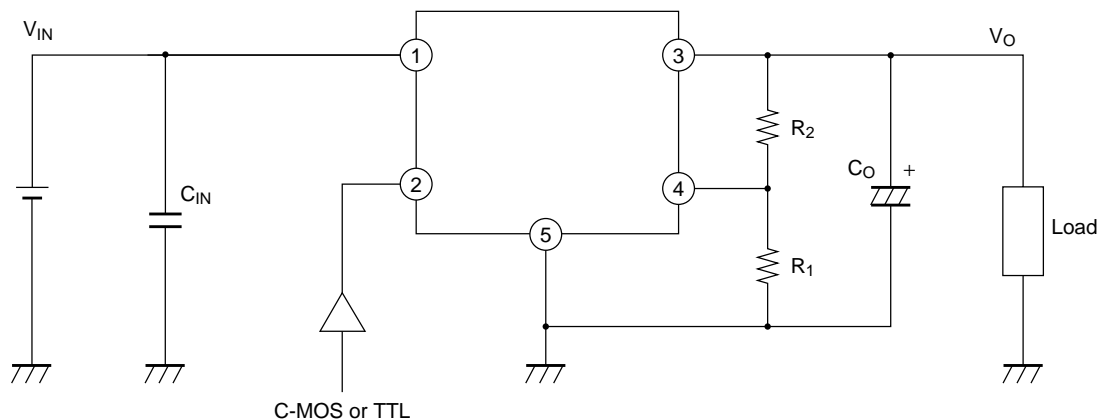


Fig.17 Output Voltage vs. R2



■ 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.

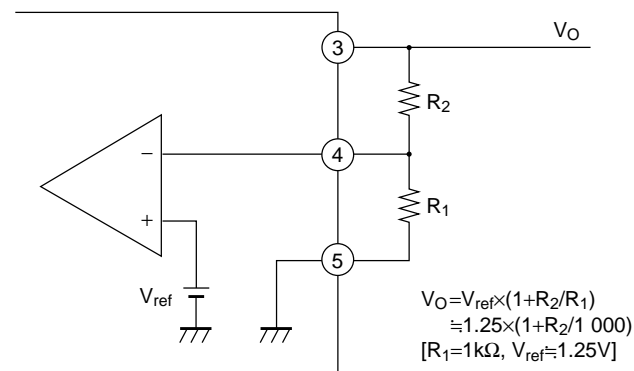
3. ESD (Electrostatic Sensitivity Discharge)

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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