

PQ20WZ51/PQ20WZ11

Variable Output, General Purpose, Surface Mount Type Low Power-Loss Voltage Regulator

Features

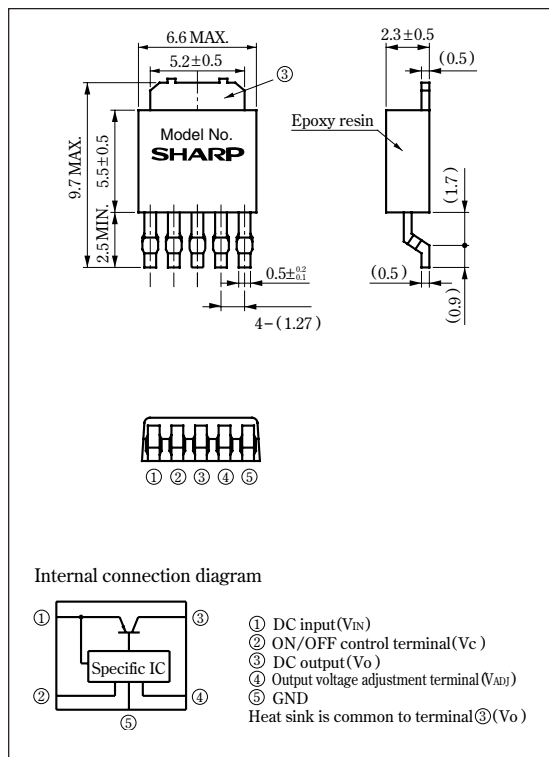
- Low power-loss
(Dropout voltage : MAX. 0.5V)
- Surface mount package (equivalent to SC-63)
- Variable output voltage (3.0 to 20V)
- Output current (0.5A : PQ20WZ51)
(1.0A : PQ20WZ11)
- Reference voltage precision : $\pm 2.5\%$
- Built-in ON/OFF control function
- Low dissipation current at OFF-state (I_{qs} : MAX. 5 μ A)
- Built-in overcurrent, overheat protection functions, ASO protection circuit
- Available tape-packaged products
($\phi 330$ mm reel : 3 000 pcs., PQ20WZ5U/1U)

Applications

- Personal computers
- CD-ROM drives
- Power supplies for various OA equipment

Outline Dimensions

(Unit : mm)



Absolute Maximum Ratings

($T_a = 25^\circ\text{C}$)

| Parameter | Symbol | Rating | | Unit |
|---|-----------|-------------|----------|------------------|
| | | PQ20WZ51 | PQ20WZ11 | |
| *1 Input voltage | V_{IN} | 24 | | V |
| *1 ON/OFF control terminal voltage | V_C | 24 | | V |
| *1 Output adjustment terminal voltage | V_{ADJ} | 5 | | V |
| Output current | I_O | 0.5 | 1.0 | A |
| Power dissipation (with infinite heat sink) | P_D | 8 | | W |
| *2 Junction temperature | T_j | 150 | | $^\circ\text{C}$ |
| Operating temperature | T_{opr} | -20 to +80 | | $^\circ\text{C}$ |
| Storage temperature | T_{stg} | -40 to +150 | | $^\circ\text{C}$ |
| *3 Soldering temperature | T_{sol} | 260 | | $^\circ\text{C}$ |

*1 All are open except GND and applicable terminals.

*2 Overheat protection may operate at $125 \leq T_j \leq 150^\circ\text{C}$

*3 For 10s

• Please refer to the chapter " Handling Precautions ".

SHARP

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Electrical Characteristics

(Unless otherwise specified, conditions shall be $V_{IN}=5V$, $V_o=3.3V$,^{#4}, $R_1=2k\Omega$, $R_2=500\Omega$, $V_C=2.7V$, $T_a=25^\circ C$)

| Parameter | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|--|---------------|--------------------------------------|-------|-----------|-------|---------|
| Input voltage | V_{IN} | — | 3.5 | — | 24 | V |
| Output voltage | V_o | — | 3.0 | — | 20 | V |
| Load regulation | R_{egL} | $\#5$ | — | — | 2.0 | % |
| Line regulation | R_{egI} | $V_{IN}=4$ to $10V$, $I_o=5mA$ | — | — | 2.5 | % |
| Ripple rejection | RR | Refer to Fig. 2 | 45 | 60 | — | dB |
| Reference voltage | V_{ref} | $\#4$ | 2.574 | 2.64 | 2.706 | V |
| Temperature coefficient of Reference voltage | $V_C V_{ref}$ | $T_j=0$ to $125^\circ C$, $I_o=5mA$ | — | ± 1.0 | — | % |
| Dropout voltage | V_{I-o} | $\#4, 6$ | — | — | 0.5 | V |
| Quiescent current | I_q | $I_o=0A$ | — | — | 8 | mA |
| ^{#7} ON-state voltage for control | $V_C(ON)$ | — | 2.0 | — | — | 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 | $I_C(OFF)$ | $I_o=0A$, $V_C=0.4V$ | — | — | 2.0 | μA |
| Output OFF-state consumption current | I_{qs} | $I_o=0A$, $V_C=0.4V$ | — | — | 5.0 | μA |

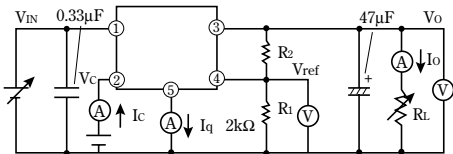
^{#4} PQ20WZ51: $I_o=0.3A$, PQ20WZ11: $I_o=0.5A$

^{#5} PQ20WZ51: $I_o=5mA$ to $0.5A$, PQ20WZ11: $I_o=5mA$ to $1.0A$

^{#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 ②, output voltage turns off.

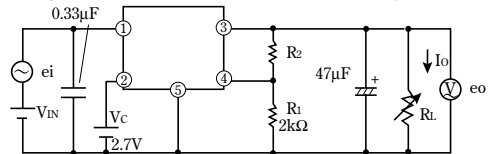
Fig. 1 Test Circuit



$$V_o = V_{ref} \times \left(1 + \frac{R_2}{R_1} \right)$$

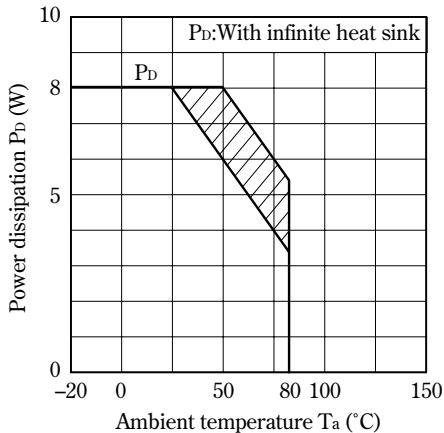
[$R_1=2k\Omega$, V_{ref} Nearly =2.64V]

Fig. 2 Test Circuit for Ripple Rejection



$f=120Hz$ (sine wave)
 $e_{i(rms)}=0.5V$
 $I_o=0.3A$
 $RR=20 \log(e_{i(rms)}/e_{o(rms)})$
 $V_{IN}=5V$
 $V_o=3.3V$ ($R_1=2k\Omega$)

Fig. 3 Power Dissipation vs. Ambient Temperature



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

Fig. 4 Overcurrent Protection Characteristics (Typical Value) (PQ20WZ51)

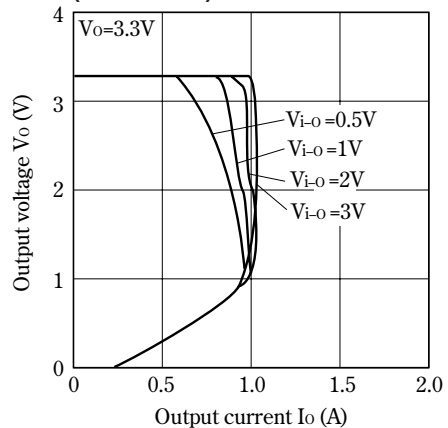


Fig. 5 Overcurrent Protection Characteristics (Typical Value) (PQ20WZ11)

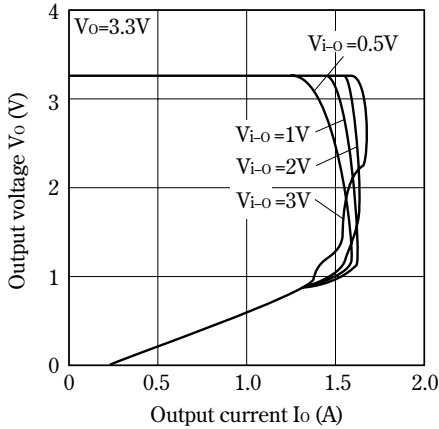


Fig. 6 Output Voltage Adjustment Characteristics

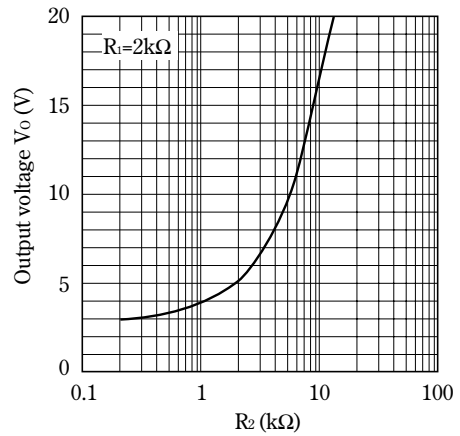


Fig. 7 Reference Voltage Deviation vs. Junction Temperature (Typical Value)

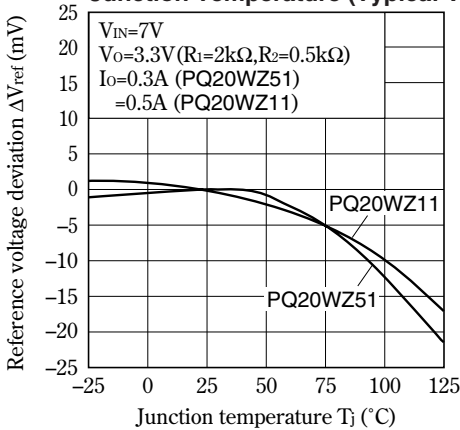


Fig. 8 Output Voltage vs. Input Voltage (PQ20WZ51)

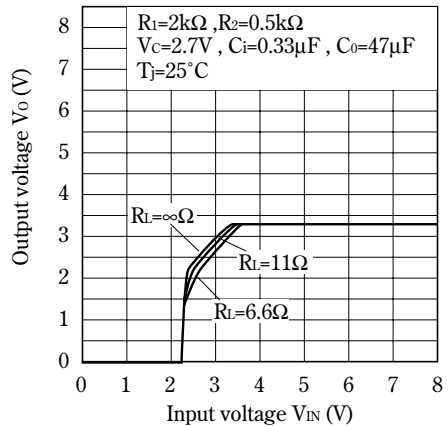


Fig. 9 Output Voltage vs. Input Voltage (PQ20WZ11)

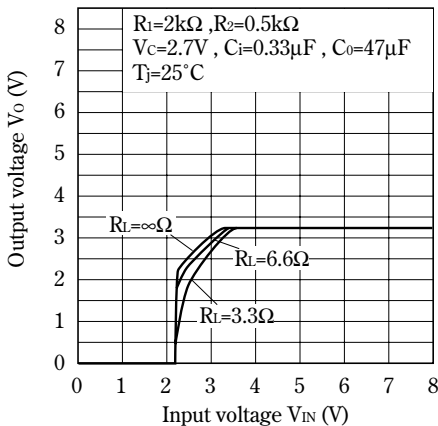


Fig.10 Dropout Voltage vs. Junction Temperature (PQ20WZ51)

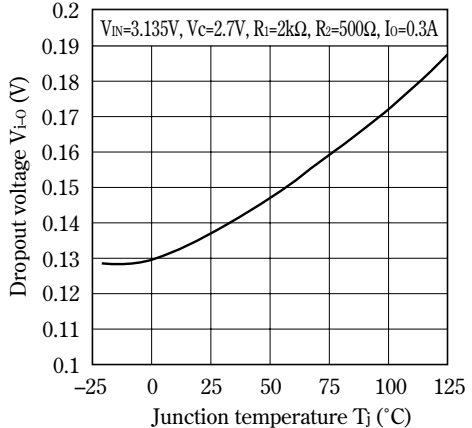


Fig.11 Dropout Voltage vs. Junction Temperature (PQ20WZ11)

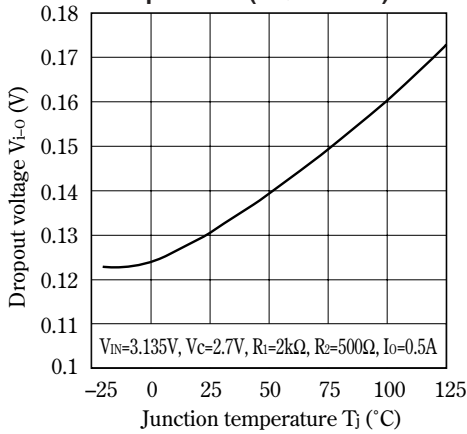


Fig.12 Quiescent Current vs. Junction Temperature

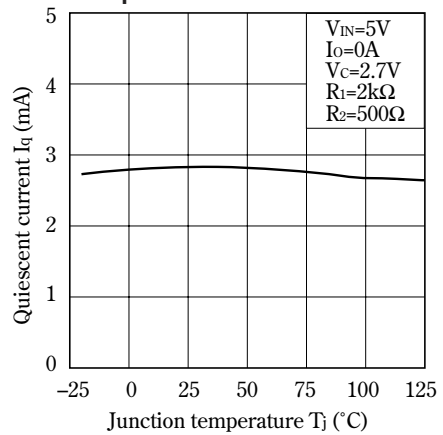


Fig.13 Ripple Rejection vs. Input Ripple Frequency

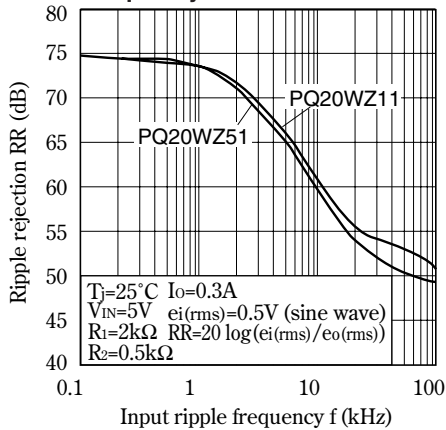


Fig.14 Ripple Rejection vs. Output Current (PQ20WZ51)

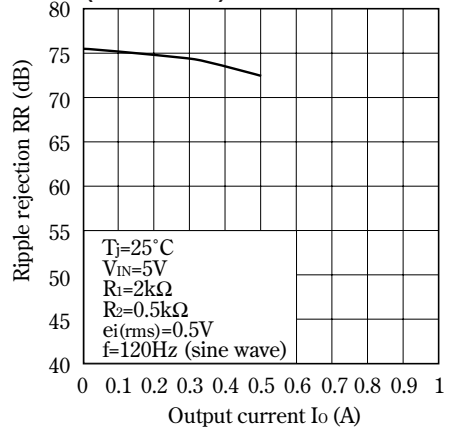


Fig.15 Ripple Rejection vs. Output Current (PQ20WZ11)

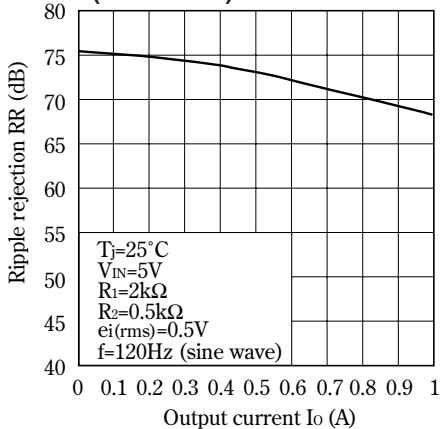


Fig.16 Circuit Operating Current vs. Input Voltage (PQ20WZ51)

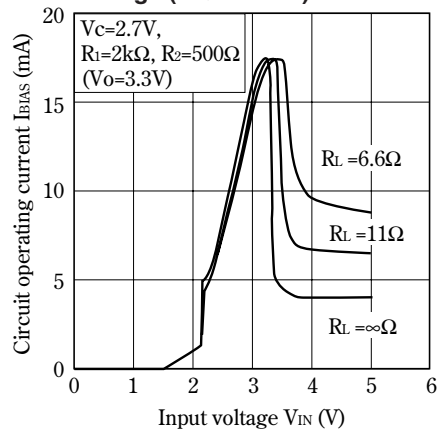


Fig.17 Circuit Operating Current vs. Input Voltage (PQ20WZ11)

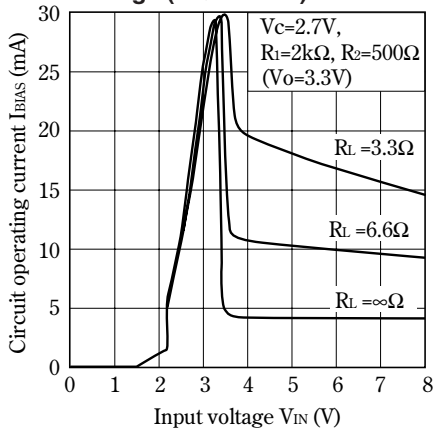
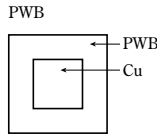
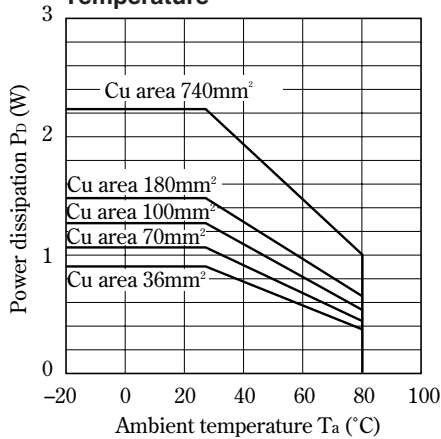
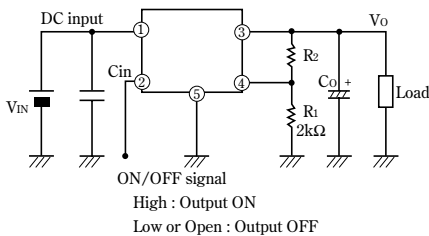


Fig.18 Power Dissipation vs. Ambient Temperature



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

Typical Application



Model Line-ups for Tape-packaged Products

| | Sleeve-packaged products | Tape-packaged products |
|----------------|----------------------------|----------------------------|
| Output current | High-precision output type | High-precision output type |
| 0.5A output | PQ20WZ51 | PQ20WZ5U |
| 1.0A output | PQ20WZ11 | PQ20WZ1U |

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