PQ20VZ51/PQ20VZ11

Variable Output, Surface Mount Type Low Power-Loss Voltage Regulators

■ Features

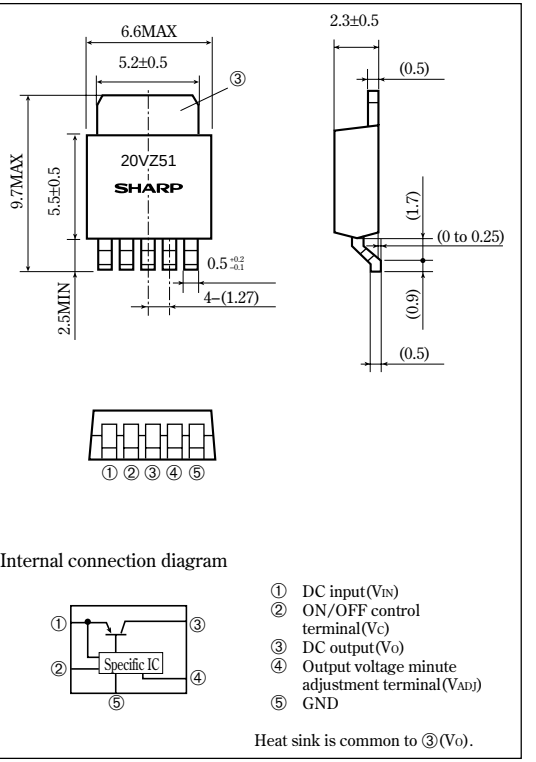
- Low power-loss (Dropout voltage: 0.5V)
- Compact surface mount package
- Both the 0.5A output PQ20VZ51 and the 1A output PQ20VZ11 have high-precision outputs (Reference voltage precision: ±2.0%)
- Variable output type (Output voltage variable range: 1.5V to 20V)
- Built-in ON-OFF control function
- Low dissipation current at OFF-state (Iqs: MAX.5μA)
- Tape packaged type is available.
  (ϕ330mm reel: 3 000pcs.,PQ20VZ5U/PQ20VZ1U)

■ Applications

- Car audio equipment
- VCR

■ Outline Dimensions

(Unit : mm)



Internal connection diagram

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

Heat sink is common to ③(V_O).

■ Absolute Maximum Ratings

(T_a=25˚C)

Parameter		Symbol	Rating	Unit
※1 Input voltage		V_{IN}	24	V
※1 Output contorol voltage		V_C	24	V
※1 Output adjustment terminal Voltage		V_{ADJ}	7	V
Output current	PQ20VZ51	I_O	0.5	A
	PQ20VZ11		1	
Power dissipation (With infinite heat sink)		P_D	8	W
※2 Junction temperature		T_j	150	˚C
Operating temperature		T_{opr}	–20 to +80	˚C
Storage temperature		T_{stg}	–40 to +150	˚C
※3 Soldering temperature		T_{sol}	260 (For 10s)	˚C

※1 All are open except GND and applicable terminals.
※2 Overheat protection may operate at 125˚C<=Tj<=150˚C
※3 For 10s

• Please refer to the chapter " Handling Precautions ".

■ Electrical Characteristics

Unless otherwise specified, V_{IN}=12V, V_O=10V,※4, R_1=1kΩ, V_C=2.7V(T_a=25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input voltage	V_i	V_O=1.5V	4.5	–	–	V
Output voltage	V_O	R_2=225Ω to 14.6kΩ	1.5	–	20	V
Load regulation	$R_{eg}L$	※5	–	0.2	2.0	%
Line regulation	$R_{eg}I$	V_{IN}=11 to 21V, I_O=5mA	–	0.2	2.5	%
Ripple rejection	RR	Refer to Fig. 2	45	60	–	dB
Reference voltage	V_{ref}	※4	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	–	%
Dropout voltage	V_{i-O}	※4,※6	–	0.2	0.5	V
Quiescent current	I_q	I_O=0	–	4	7	mA
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=0	–	–	0.8	V
OFF-state current for control	$I_{C(OFF)}$	–	–	–	2.0	µA
Output OFF-state consumption current	I_{qs}	V_C=0.4V	–	–	5.0	µA

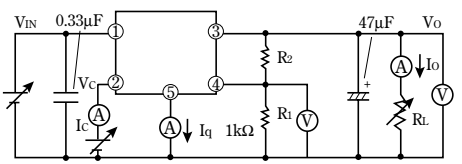
※4 PQ20VZ51:I_O=0.3A, PQ20VZ11:I_O=0.5A

※5 PQ20VZ51:I_O=5mA to 0.5A, PQ20VZ11: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.

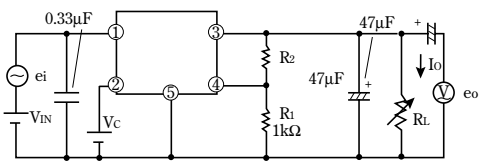
Fig.1 Test Circuit



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

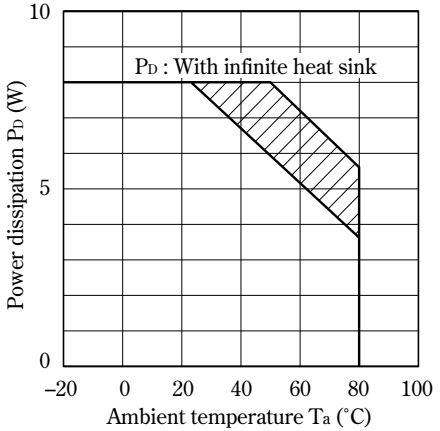
[R_1=1kΩ,V_{ref} Nearly=1.25V]

Fig.2 Test Circuit of Ripple Rejection



f=120Hz(sine wave)
$e_{i(rms)}$=0.5V
I_O=0.3A
RR=20 log($e_{i(rms)}$/$e_{o(rms)}$)

Fig.3 Power Dissipation vs. Ambient Temperature



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

Fig.4 Overcurrent Protection Characteristics (Typical Value)

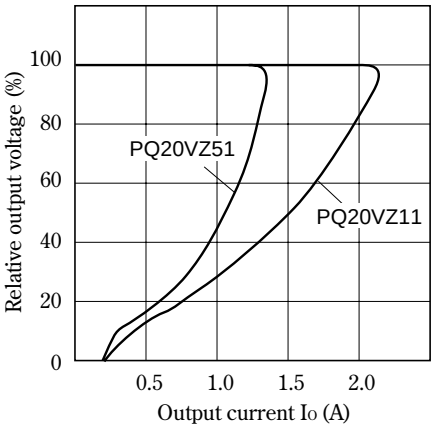


Fig.5 Output Voltage Adjustment Characteristics

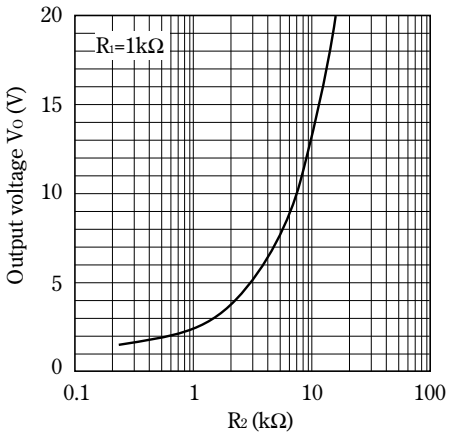


Fig.6 Reference Voltage Deviation vs. Junction Temperature

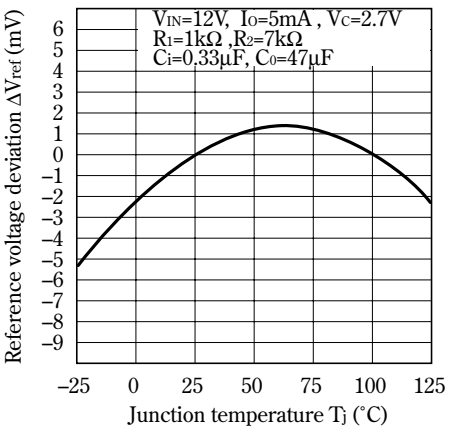


Fig.7 Output Voltage vs. Input Voltage (PQ20VZ51)

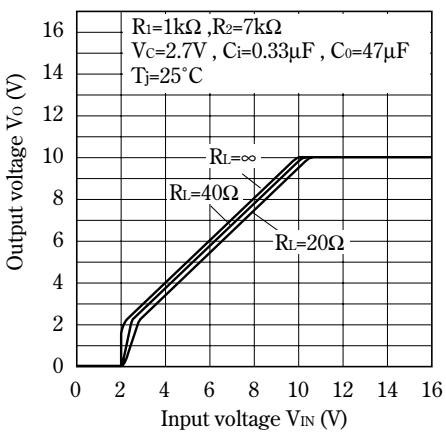


Fig.8 Output Voltage vs. Input Voltage (PQ20VZ11)

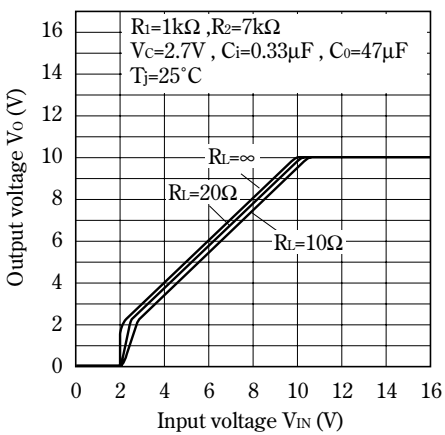


Fig.9 Dropout Voltage vs. Junction Temperature (PQ20VZ51)

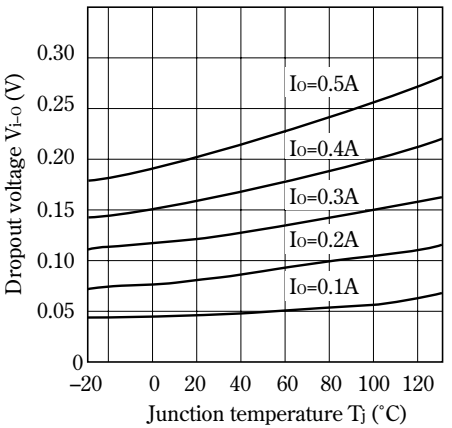


Fig.10 Dropout Voltage vs. Junction Temperature (PQ20VZ11)

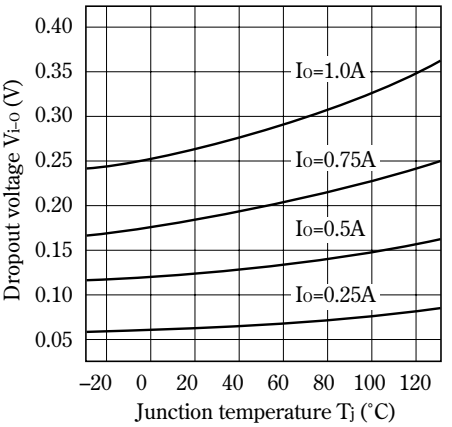


Fig.11 Quiescent Current vs. Junction Temperature

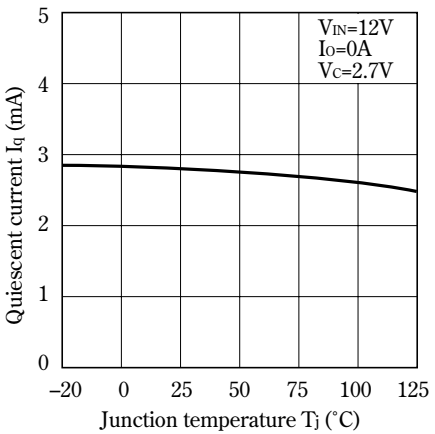


Fig.12 Ripple Rejection vs. Input Ripple Frequency

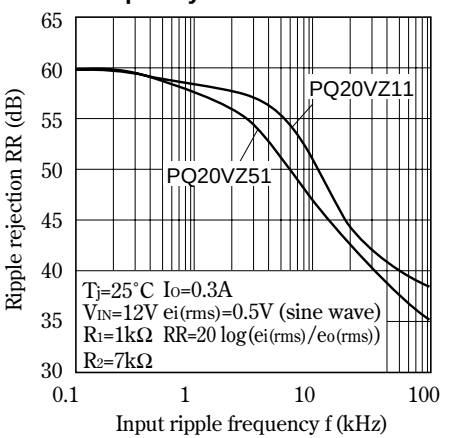


Fig.13 Ripple Rejection vs. Output Current (PQ20VZ51)

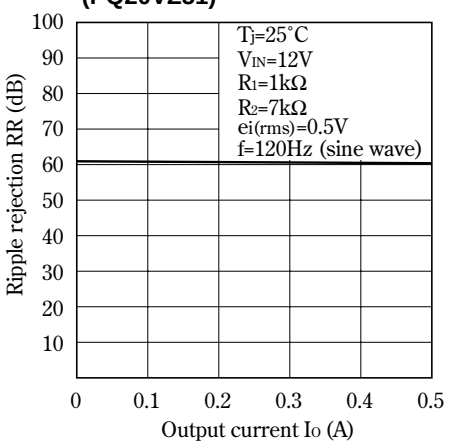


Fig.14 Ripple Rejection vs. Output Current (PQ20VZ11)

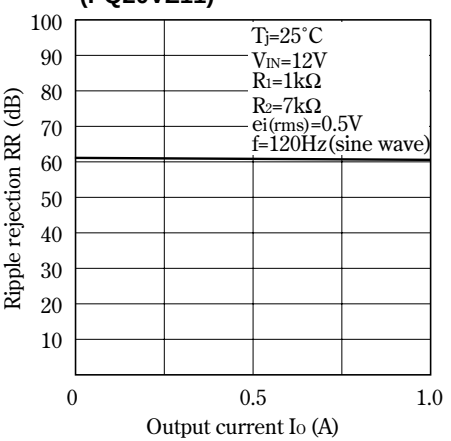


Fig.15 Output Peak Current vs. Dropout Voltage (PQ20VZ51)

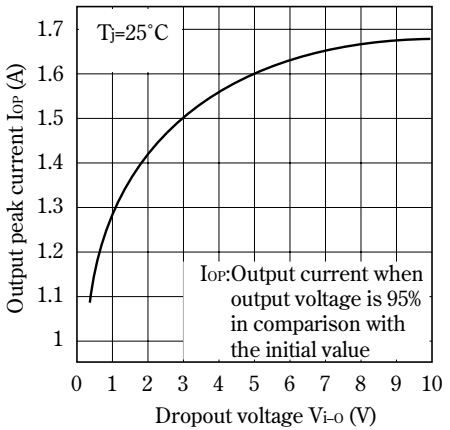


Fig.16 Output Peak Current vs. Dropout Voltage (PQ20VZ11)

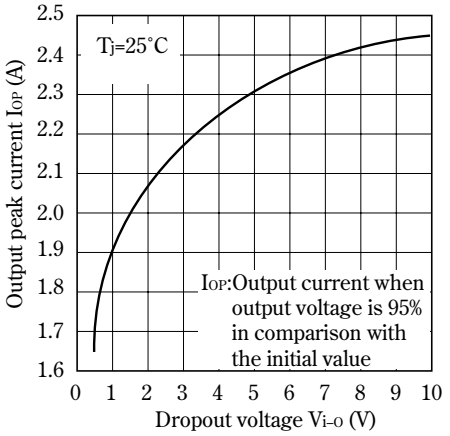


Fig.17 Output Peak Current vs. Junction Temperature (PQ20VZ51)

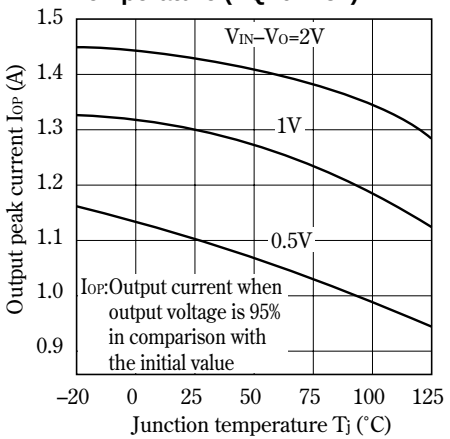


Fig.18 Output Peak Current vs. Junction Temperature (PQ20VZ11)

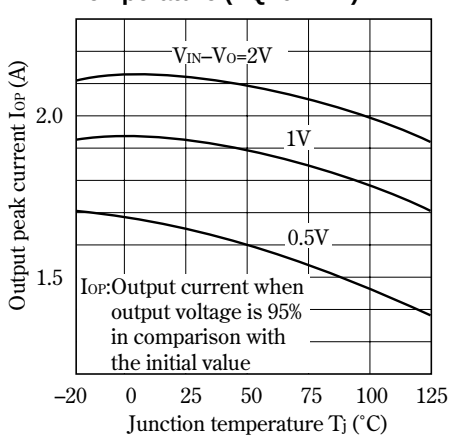
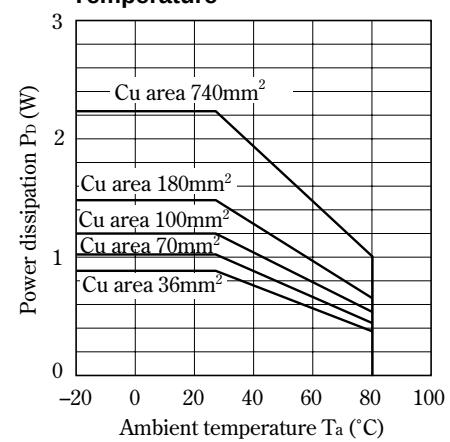
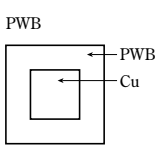


Fig.19 Power Dissipation vs. Ambient Temperature

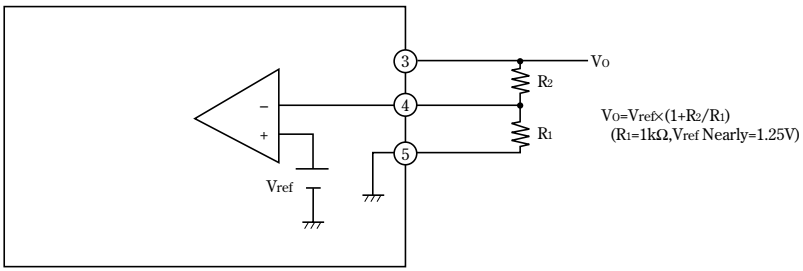




Material : Glass-cloth epoxy resin
Size : 50×50×1.6mm
Cu thickness : 35µm

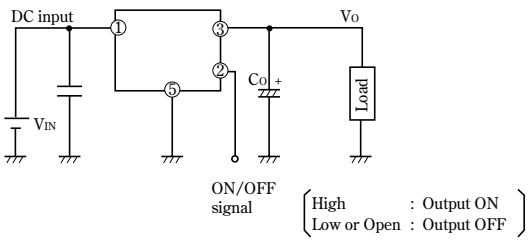
■ Setting of Output Voltage

Output voltage is able to be set from 1.5V to 20V when resistors R1,R2 are attached to③,④,⑤ terminals. As for the external resistors to set output voltage, refer to the figure below or Fig.5.



■ ON/OFF Operation

As shown in the figure,ON/OFF control function is available.



■ 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	PQ20VZ51	PQ20VZ5U
1.0A output	PQ20VZ11	PQ20VZ1U

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).

- Contact a SHARP representative in advance when intending to use SHARP devices for any "specific" applications other than those recommended by SHARP or when it is unclear which category mentioned above controls the intended use.
- If the SHARP devices listed in this publication fall within the scope of strategic products described in the Foreign Exchange and Foreign Trade Control 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.