

# PQ20VZ51/PQ20VZ11

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

## Features

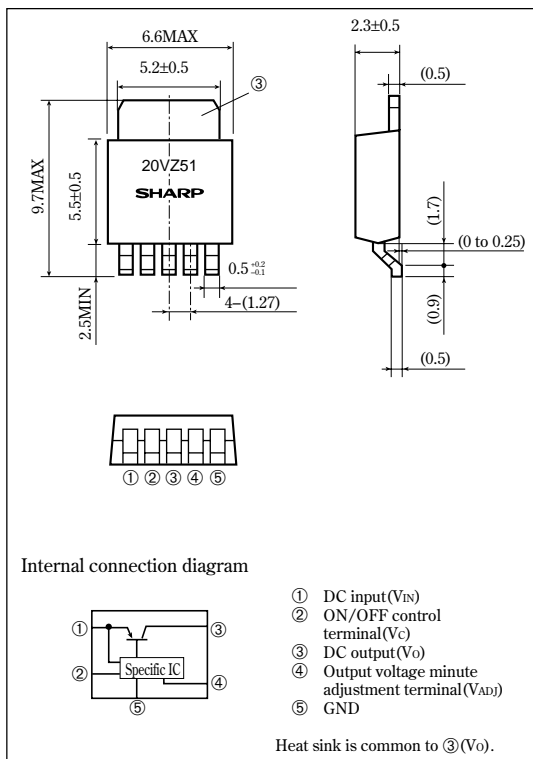
- Low power-loss (Dropout voltage: 0.5V)
- Compact surface mount package
- Both the 0.5A output PQ20VZ51 and the 1A output PQ20VZ11 have high-precision outputs (Reference voltage precision:  $\pm 2.0\%$ )
- Variable output type (Output voltage variable range: 1.5V to 20V)
- Built-in ON-OFF control function
- Low dissipation current at OFF-state ( $I_{qs}$ : MAX.5 $\mu$ A)
- Tape packaged type is available.  
( $\phi 330$ mm reel: 3 000pcs.,PQ20VZ5U/PQ20VZ1U)

## Applications

- Car audio equipment
- VCR

## Outline Dimensions

(Unit : mm)



## Absolute Maximum Ratings

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

Parameter	Symbol	Rating	Unit
*1 Input voltage	$V_{IN}$	24	V
*1 Output control voltage	$V_C$	24	V
*1 Output adjustment terminal Voltage	$V_{ADJ}$	7	V
Output current	$I_o$	PQ20VZ51	0.5
		PQ20VZ11	1
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 (For 10s)	$^{\circ}\text{C}$

\*1 All are open except GND and applicable terminals.

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

\*3 For 10s

•Please refer to the chapter " Handling Precautions ".

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**Electrical Characteristics**

Unless otherwise specified,  $V_{IN}=12V$ ,  $V_O=10V$ ,<sup>※4</sup>,  $R_1=1k\Omega$ ,  $V_C=2.7V$  ( $T_a=25^\circ C$ )

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input voltage	$V_i$	$V_O=1.5V$	4.5	—	—	V
Output voltage	$V_O$	$R_2=225\Omega$ to $14.6k\Omega$	1.5	—	20	V
Load regulation	$R_{egL}$	※5	—	0.2	2.0	%
Line regulation	$R_{egI}$	$V_{IN}=11$ 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	$T_C V_{ref}$	$T_j=0$ to $125^\circ C$ , $I_O=5mA$	—	$\pm 1.0$	—	%
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	$\mu A$
OFF-state voltage for control	$V_C(OFF)$	$I_O=0$	—	—	0.8	V
OFF-state current for control	$I_C(OFF)$	—	—	—	2.0	$\mu A$
Output OFF-state consumption current	$I_{qs}$	$V_C=0.4V$	—	—	5.0	$\mu A$

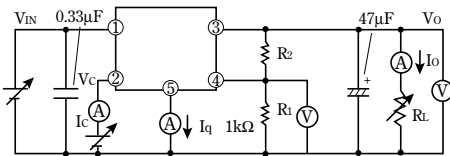
※4 PQ20VZ51: $I_O=0.3A$ , PQ20VZ11: $I_O=0.5A$

※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.

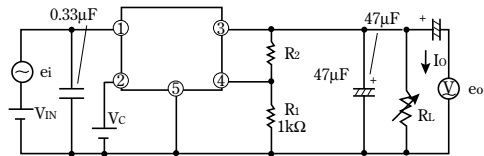
**Fig.1 Test Circuit**



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

[ $R_1=1k\Omega$ ,  $V_{ref}$  Nearly= $1.25V$ ]

**Fig.2 Test Circuit of Ripple Rejection**



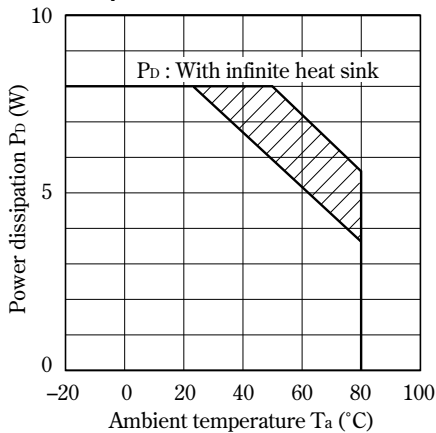
$f=120Hz$ (sine wave)

$e_i(rms)=0.5V$

$I_O=0.3A$

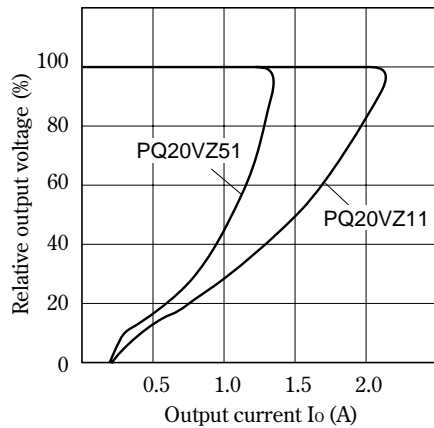
$RR=20 \log(e_i(rms)/e_o(rms))$

**Fig.3 Power Dissipation vs. Ambient Temperature**

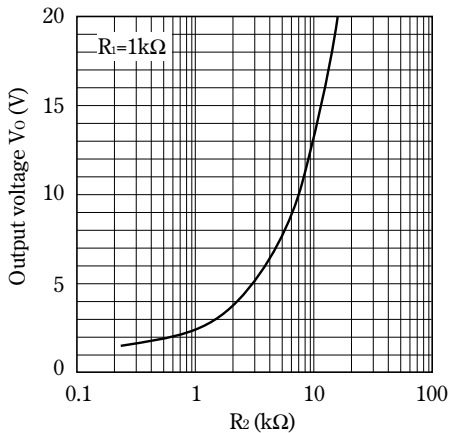


Note) Oblique line portion : Overheat protection may operate in this area.

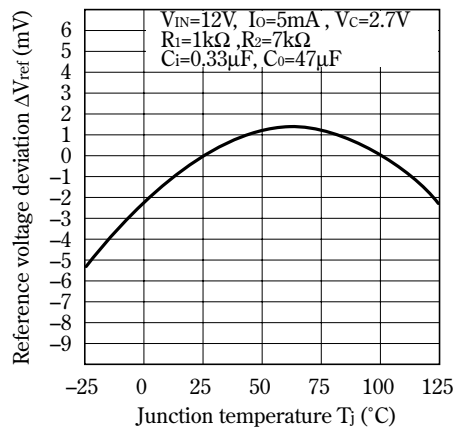
**Fig.4 Overcurrent Protection Characteristics (Typical Value)**



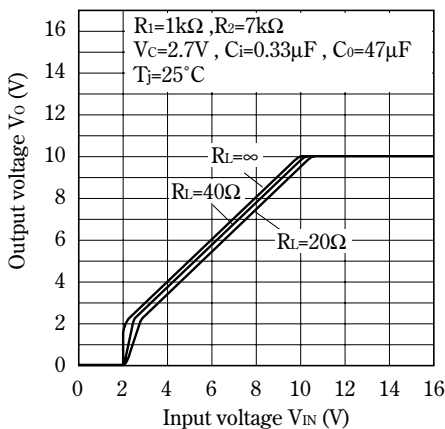
**Fig.5 Output Voltage Adjustment Characteristics**



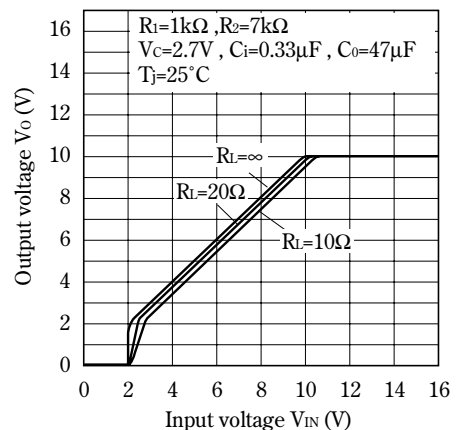
**Fig.6 Reference Voltage Deviation vs. Junction Temperature**



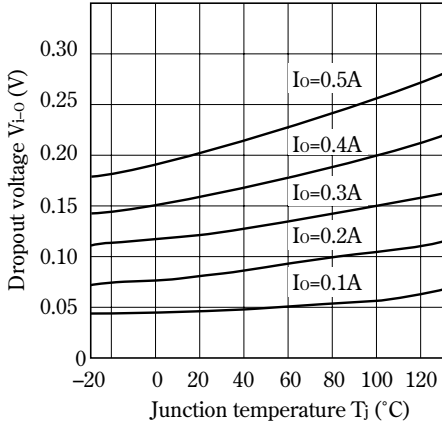
**Fig.7 Output Voltage vs. Input Voltage (PQ20VZ51)**



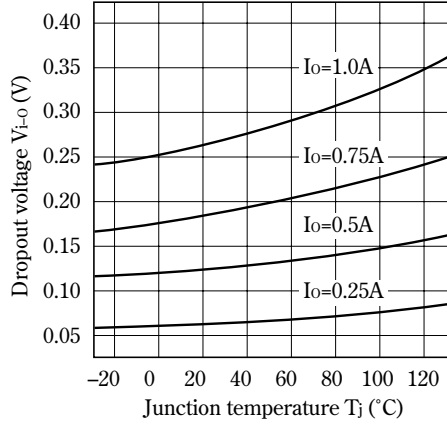
**Fig.8 Output Voltage vs. Input Voltage (PQ20VZ11)**



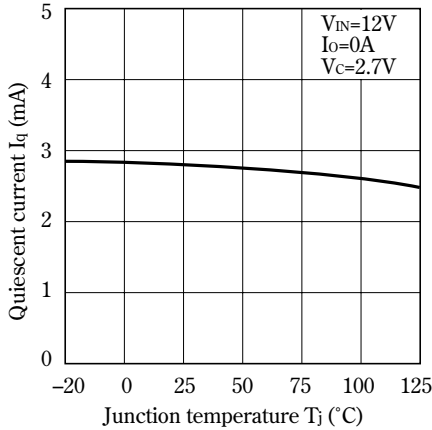
**Fig.9 Dropout Voltage vs. Junction Temperature (PQ20VZ51)**



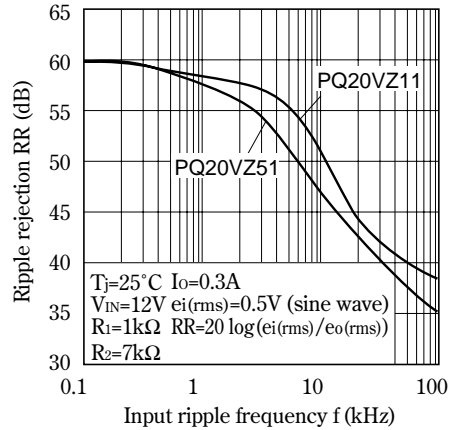
**Fig.10 Dropout Voltage vs. Junction Temperature (PQ20VZ11)**



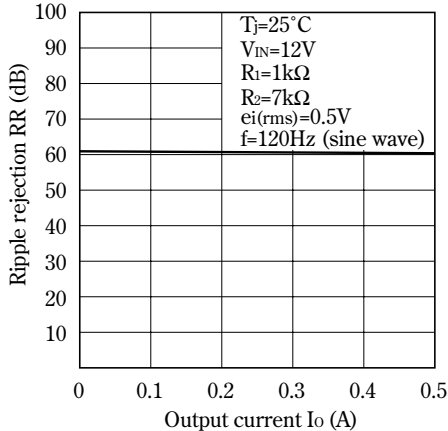
**Fig.11 Quiescent Current vs. Junction Temperature**



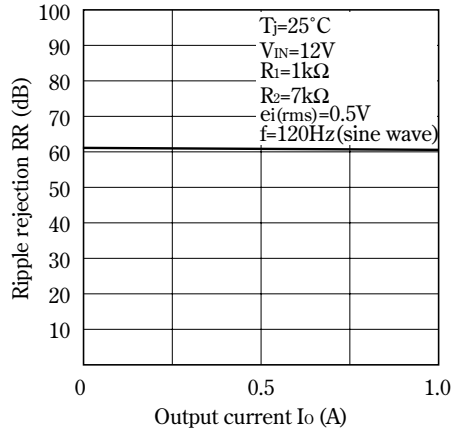
**Fig.12 Ripple Rejection vs. Input Ripple Frequency**



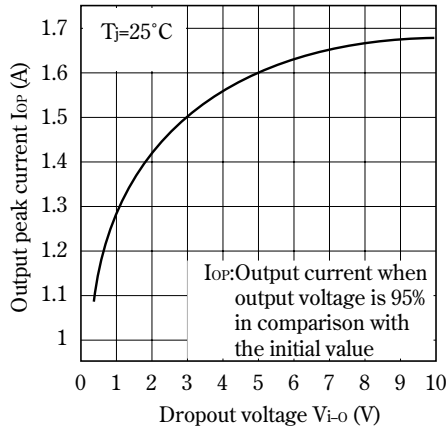
**Fig.13 Ripple Rejection vs. Output Current (PQ20VZ51)**



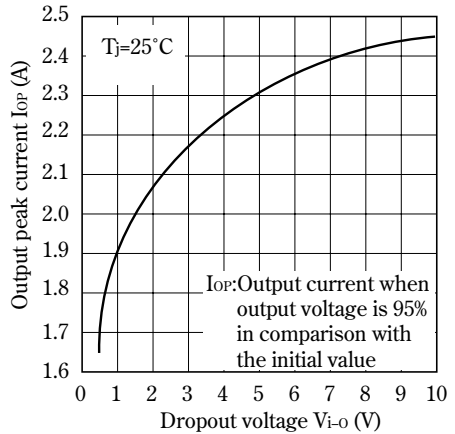
**Fig.14 Ripple Rejection vs. Output Current (PQ20VZ11)**



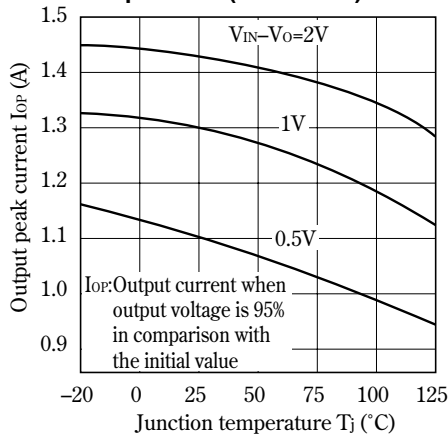
**Fig.15 Output Peak Current vs. Dropout Voltage (PQ20VZ51)**



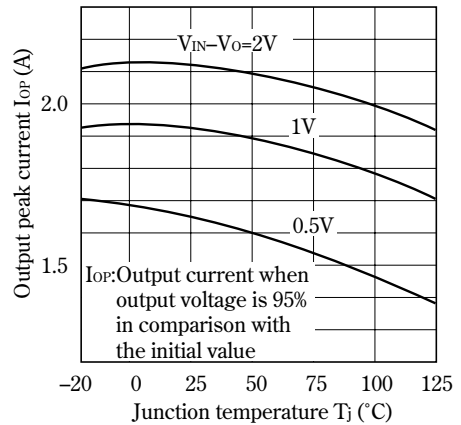
**Fig.16 Output Peak Current vs. Dropout Voltage (PQ20VZ11)**



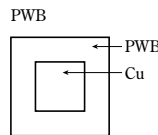
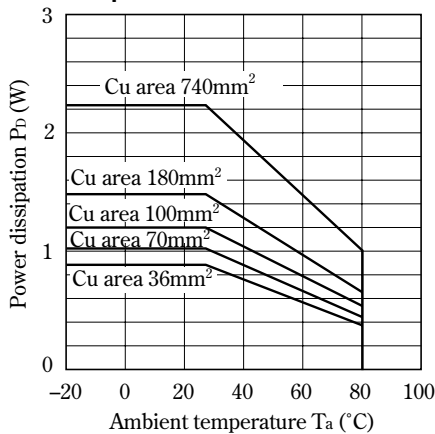
**Fig.17 Output Peak Current vs. Junction Temperature (PQ20VZ51)**



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



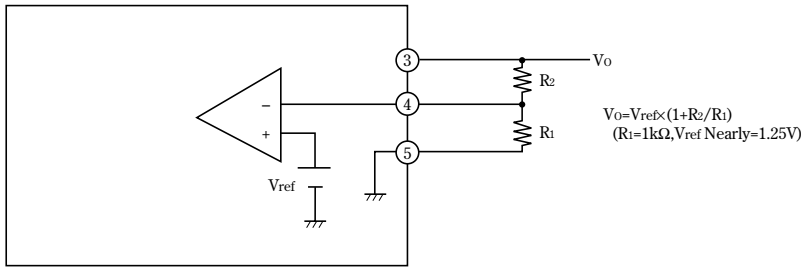
**Fig.19 Power Dissipation vs. Ambient Temperature**



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

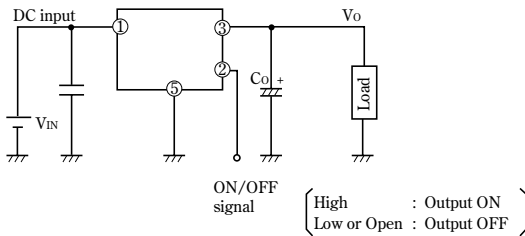
■ Setting of Output Voltage

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

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