PQ05TZ51/PQ05TZ11 Series

Surface Mount Type Low Power-Loss Voltage Regulators

Features

- Low power-loss(Dropout voltage: MAX 0.5V)
- Surface mount type package(Equivalent to EIAJ SC-63)
- Output current:
  (0.5A : PQ2TZ55, PQ3TZ50/53, PQ05TZ51 series)
  (1.0A : PQ2TZ15, PQ05TZ11 series)
- Output voltage precision: ±2.5%
- Built-in ON/OFF control function
- Low dissipation current at OFF-state(Iqs: MAX.5µA)
- Tape packaged type is also available.
  (ϕ330mm reel: 3 000pcs.)

Applications

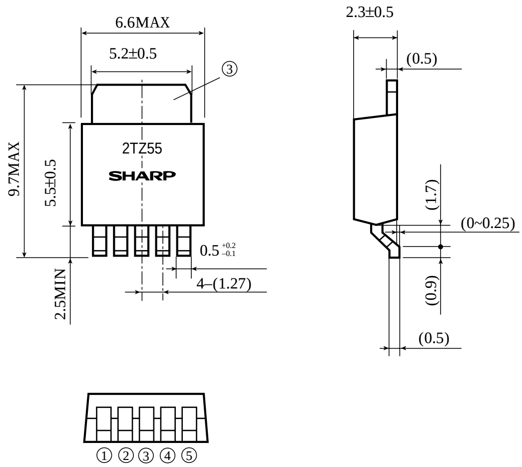
- Personal computers
- Personal information tools(PDA)
- Various OA equipment

Model Line-ups

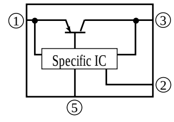
	0.5A output	1.0A output
2.5V output	PQ2TZ55	PQ2TZ15
3.0V output	PQ3TZ50	
3.3V output	PQ3TZ53	
5V output	PQ05TZ51	PQ05TZ11
9V output	PQ09TZ51	PQ09TZ11
12V output	PQ12TZ51	PQ12TZ11

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 NC
⑤ GND

Heat sink is common to ③(V_O).

Absolute Maximum Ratings

(T_a=25˚C)

Parameter		Symbol	Rating PQ2TZx5 PQ3TZ5x	Rating PQxxTZ51 PQxxTZ11	Unit
※1 Input voltage		V_{IN}	10	24	V
※1 ON/OFF control terminal voltage		V_C	10	24	V
Output current	PQ2TZ55, PQ3TZ50/53, PQ05TZ51 series	I_O	0.5		A
	PQ2TZ15, PQ05TZ11 series		1		
※2 Power dissipation		P_D	8		W
※3 Junction temperature		T_j	150		˚C
Operating temperature		T_{opr}	–20 to +80		˚C
Storage temperature		T_{stg}	–40 to +150		˚C
Soldering temperature		T_{sol}	260(For 10s)		˚C

※1 All are open except GND and applicable terminals.
※2 P_D:With infinite heat sink.
※3 Overheat protection may operate at 125<=T_j<=150˚C

• Please refer to the chapter " Handling Precautions ".

Electrical Characteristics

(Unless otherwise specified, conditions shall be※4, V_C=2.7V, T_a=25˚C)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input voltage	PQ2TZ55/15	V_{IN}	—	3.0	—	10.0	V
	PQ3TZ50			3.4	—	10.0	
	PQ3TZ53			3.7	—	10.0	
Output voltage	PQ2TZ55/15	Vo	※5, ※9	2.438	2.5	2.562	V
	PQ3TZ50			2.925	3.0	3.075	
	PQ3TZ53			3.218	3.3	3.382	
	PQ05TZ51/11			4.88	5.0	5.12	
	PQ09TZ51/11			8.87	9.0	9.22	
	PQ12TZ51/11			11.7	12.0	12.3	
Load regulation		RegL	※5, ※6	—	0.2	2.0	%
Line regulation		RegI	Io=5mA, ※10	—	0.1	2.5	%
Temperature coefficient of output voltage		TcVo	Tj=0 to 125˚C, Io=5mA, ※5	—	±0.01	—	%/˚C
Ripple rejection		RR	Refer to Fig.2	45	60	—	dB
Dropout voltage	PQ05TZ51/11	Vi-o	※7, ※9	—	0.2	0.5	V
	PQ2TZ55/15, PQ3TZ50/53			—	—	0.5	
※4 ON-state voltage for control		$V_{C(on)}$	※5, ※8, ※9	2.0	—	—	V
ON-state current for control		$I_{C(on)}$	※5, ※9	—	—	200	µA
OFF-state voltage for control		$V_{C(off)}$	※5	—	—	0.8	V
OFF-state current for control	PQ05TZ51/11, PQ2TZ55/15, PQ3TZ50/53	$I_{C(off)}$	※5, Vc=0.4V	—	—	2	µA
Quiescent current	PQ05TZ51/11	Iq	※5, Io=0A	—	4	10	mA
	PQ2TZ55/15, PQ3TZ50/53			—	—	10	
Output OFF-state consumption current		Iqs	※5,※11, Vc=0.4V	—	—	5	µA

※4 PQ2TZ55 : Io=0.3A, V_{IN}=3.3V, PQ2TZ15 : Io=0.5A, V_{IN}=3.3V
※5 PQ2TZ51/11 :V_{IN}=7V, PQ09TZ51/11 : V_{IN}=11V, PQ12TZ51/11 : V_{IN}=14V, PQ3TZ50/53 : V_{IN}=5V
※6 PQxxTZ51, PQ3TZ50/53, PQ2TZ55 : Io=5mA to 0.5A, PQxxTZ51, PQ2TZ15 : Io=5mA to 1.0A
※7 Input voltage shall be the value when output voltage is 95% in comparison with the initial value.
※8 In case of opening control terminal ②, output voltage turns off.
※9 PQxxTZ51, PQ3TZ50/53 : Io=0.3A, PQxxTZ11, PQ2TZ55 : Io=0.5A, PQ2TZ15 : Io=1.0A
PQ3TZ50 : V_{IN}=3.4V, PQ3TZ53 : V_{IN}=3.7V, PQ2TZ55/15 : V_{IN}=3V
※10 PQ05TZ51/11 : V_{IN}=6V to 16V, PQ09TZ51/11 : V_{IN}=10V to 20V, PQ12TZ51/11 : V_{IN}=13V to 23V, PQ3TZ50/53 : V_{IN}=4V to 10V, PQ2TZ55/15 : V_{IN}=3V to 10V
※11 PQxxTZ51/11, PQ2TZ55/15 : Io=0A, PQ3TZ50/53 : Io=0.3A

Fig. 1 Test Circuit

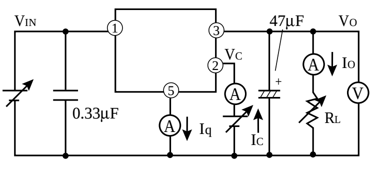
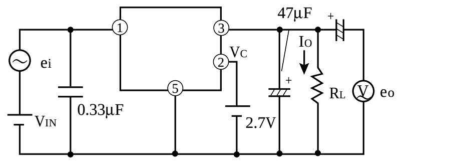
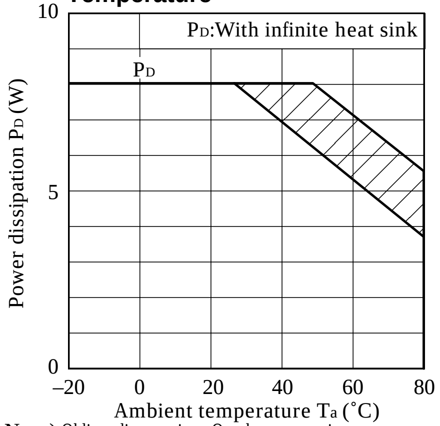


Fig. 2 Test Circuit for Ripple Rejection



f=120Hz(sine wave)
ei=0.5Vrms
V_{IN}=3.3V(PQ2TZ55/15)
5V(PQ3TZ50/53)
7V(PQ05TZ51/11)
11V(PQ09TZ51/11)
14V(PQ12TZ51/11)
Io=0.5A(PQ2TZ15)
Io=0.3A(PQ2TZ55/PQ3TZ50/53/PQxxTZ51/11)
RR=20 log(ei/eo)

Fig. 3 Power Dissipation vs. Ambient Temperature



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

Fig. 4 Overcurrent Protection Characteristics (PQ2TZ55)

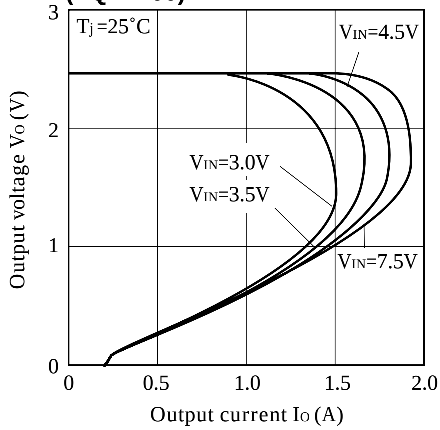


Fig. 5 Overcurrent Protection Characteristics(PQ2TZ15)

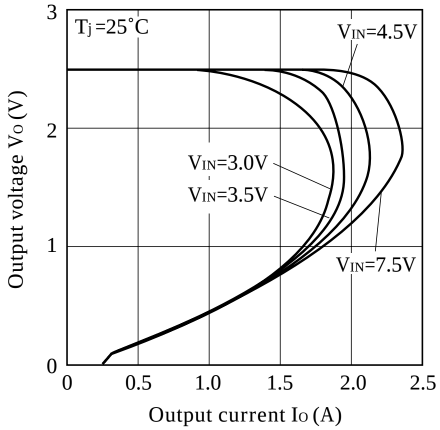


Fig. 6 Overcurrent Protection Characteristics (Typical Value)(PQ3TZ50/53)

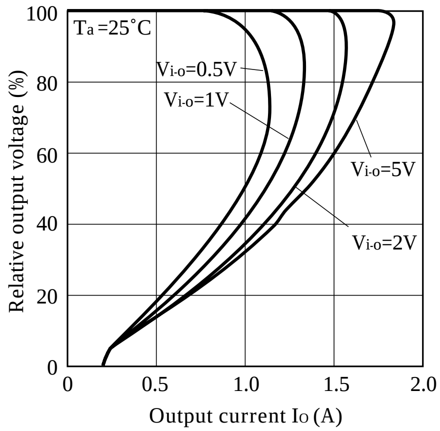


Fig. 7 Overcurrent Protection Characteristics (Typical Value)(PQxxTZ51/11)

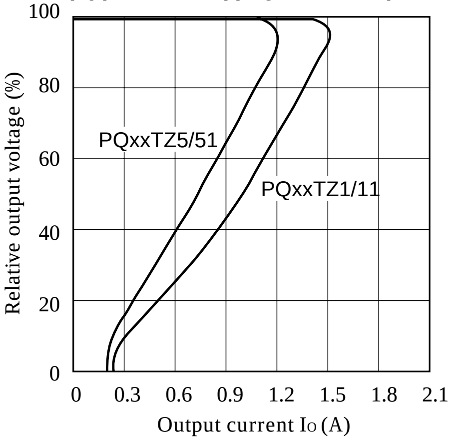


Fig. 8 Output Voltage Deviation vs. Junction Temperature(PQ2TZ55)

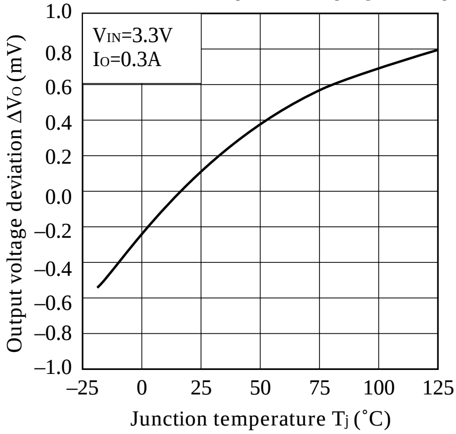


Fig. 9 Output Voltage Deviation vs. Junction Temperature (PQ2TZ15)

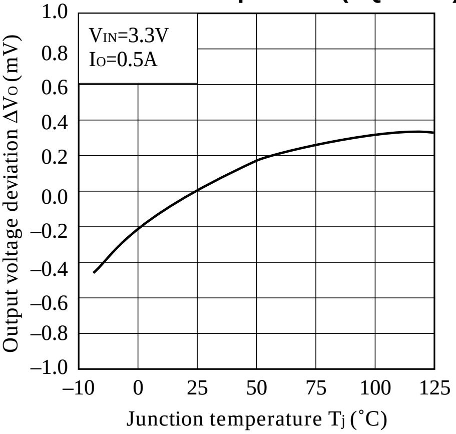


Fig.10 Output Voltage Deviation vs. Junction Temperature(PQ3TZ50/PQ3TZ53)

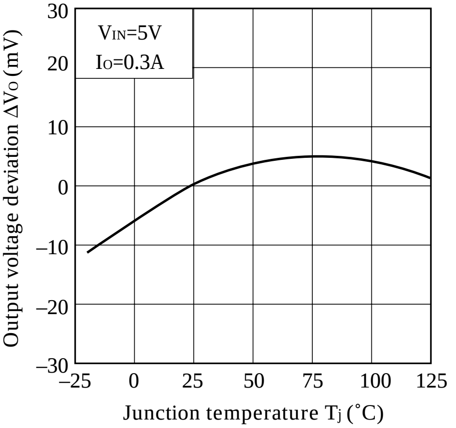


Fig.11 Output Voltage Deviation vs. Junction Temperature(PQ05TZ51/11)

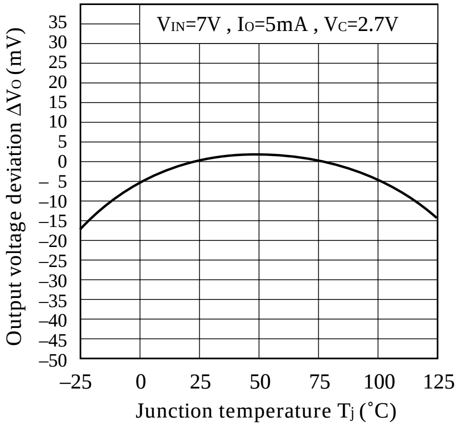


Fig.12 Output Voltage Deviation vs. Junction Temperature(PQ09TZ51/11)

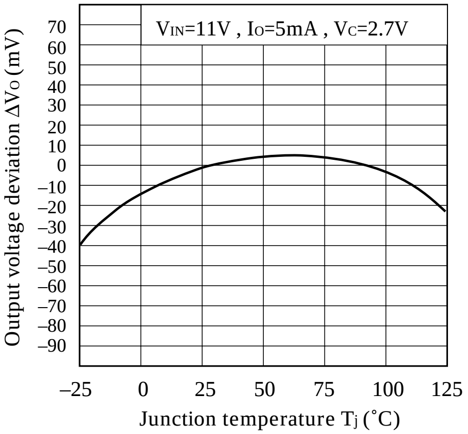


Fig.13 Output Voltage Deviation vs. Junction Temperature(PQ12TZ51/11)

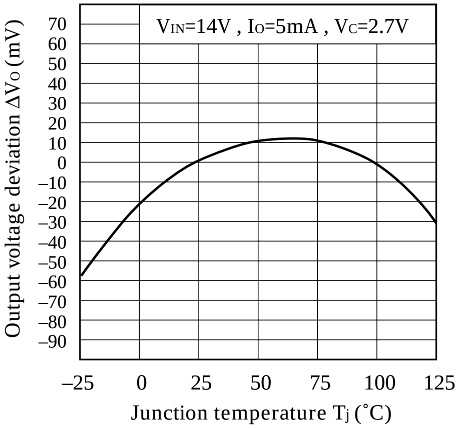


Fig.14 Output Voltage vs. Input Voltage (PQ2TZ55)

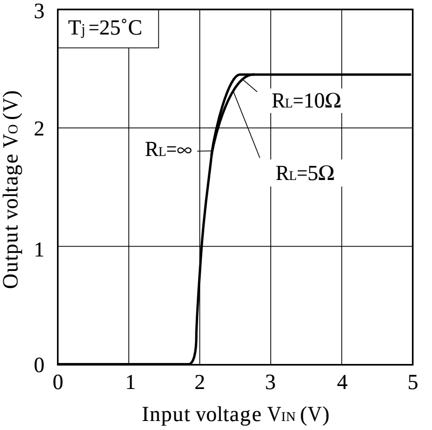


Fig.15 Output Voltage vs. Input Voltage (PQ2TZ15)

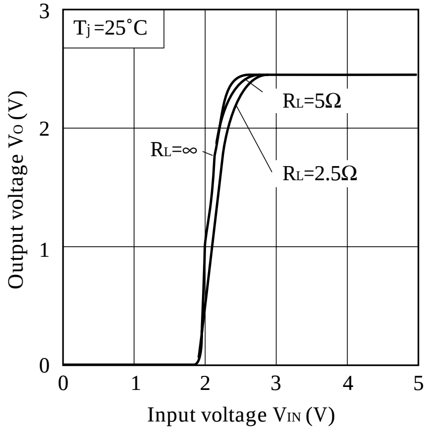


Fig.16 Output Voltage vs. Input Voltage (PQ3TZ50)

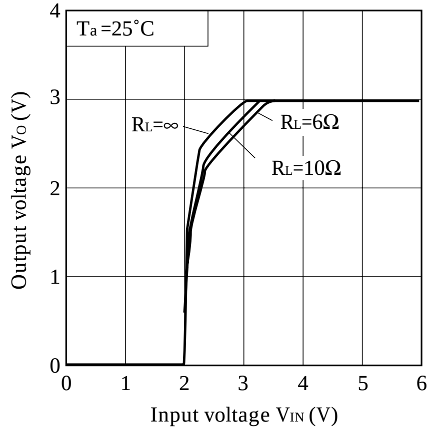


Fig.17 Output Voltage vs. Input Voltage (PQ3TZ53)

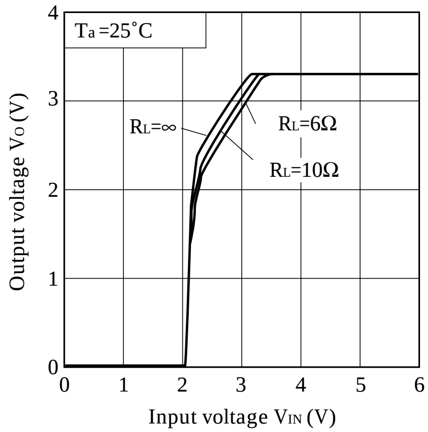


Fig.18 Output Voltage vs. Input Voltage (PQ05TZ51)

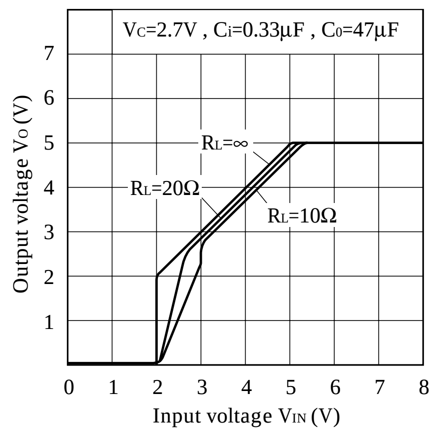


Fig.19 Output Voltage vs. Input Voltage (Typical Value) (PQ09TZ51)

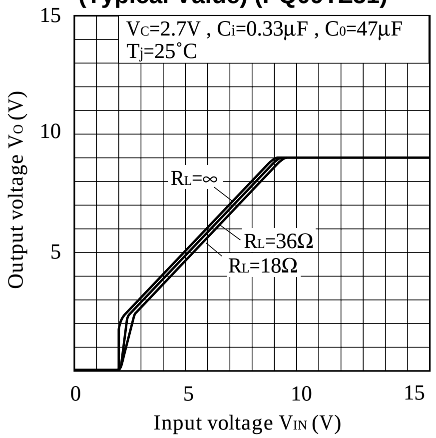


Fig.20 Output Voltage vs. Input Voltage (Typical Value) (PQ12TZ51)

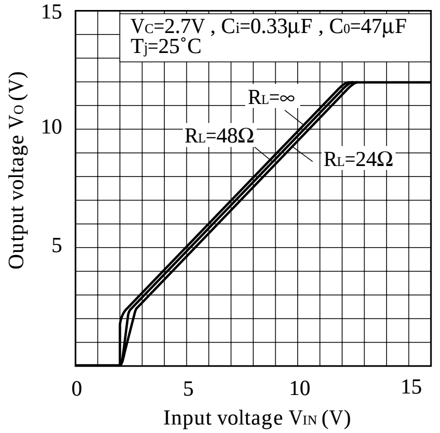


Fig.21 Output Voltage vs. Input Voltage (Typical Value) (PQ05TZ11)

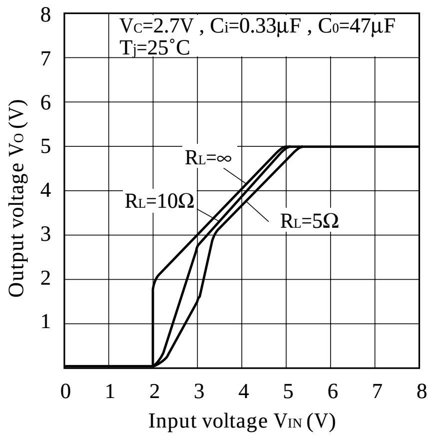


Fig.22 Output Voltage vs. Input Voltage (PQ09TZ11)

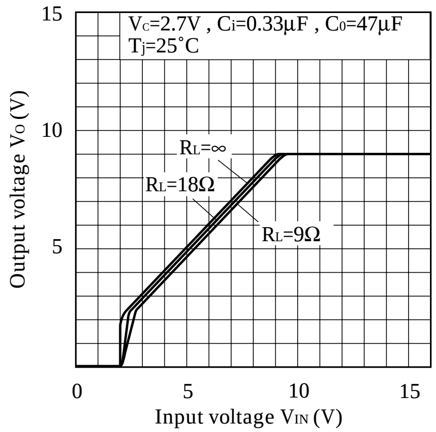


Fig.23 Output Voltage vs. Input Voltage (PQ12TZ11)

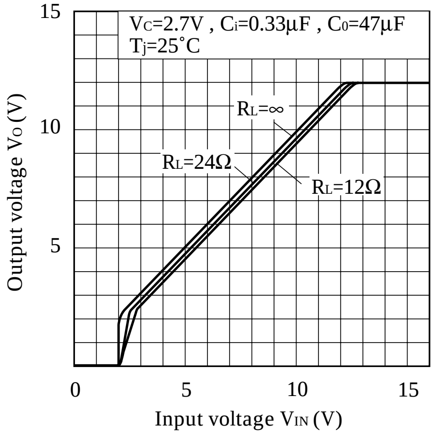


Fig.24 Circuit Operating Current vs. Input Voltage (PQ2TZ55)

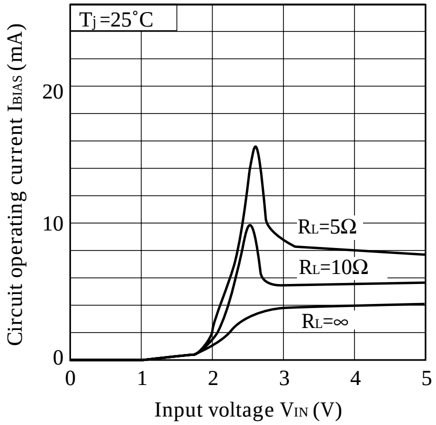


Fig.25 Circuit Operating Current vs. Input Voltage (PQ2TZ15)

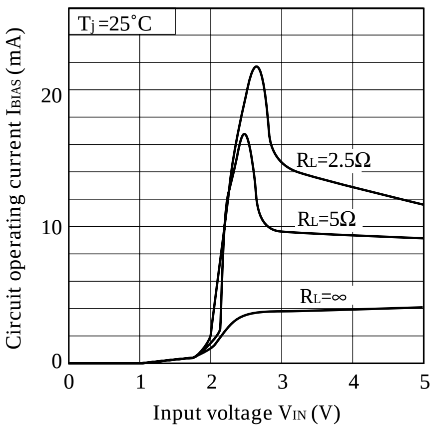


Fig.26 Circuit Operating Current vs. Input Voltage (PQ3TZ50)

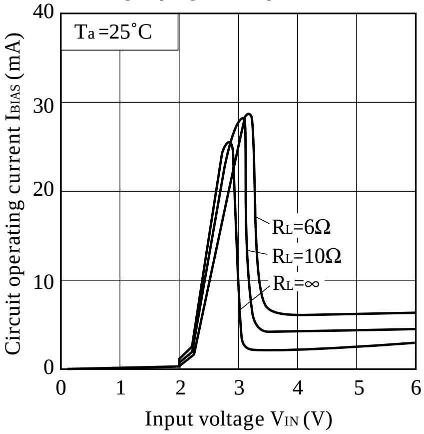


Fig.27 Circuit Operating Current vs. Input Voltage (PQ3TZ53)

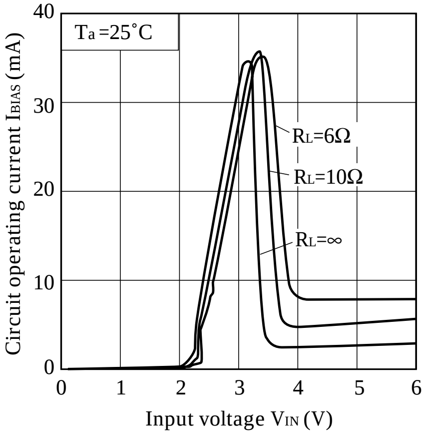


Fig.28 Circuit Operating Current vs. Input Voltage (PQ05TZ51)

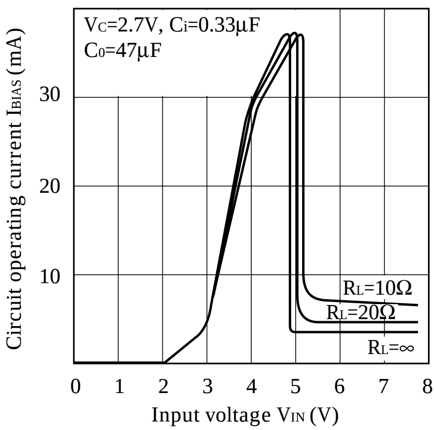


Fig.29 Circuit Operating Current vs. Input Voltage (PQ09TZ51)

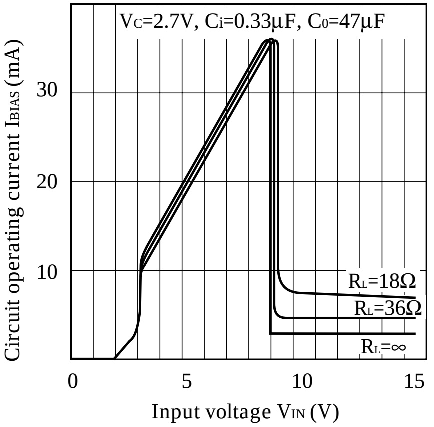


Fig.30 Circuit Operating Current vs. Input Voltage (PQ12TZ51)

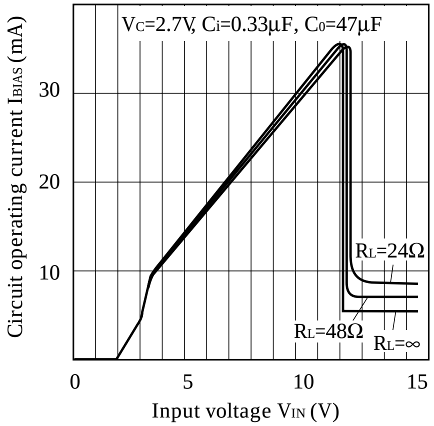


Fig.31 Circuit Operating Current vs. Input Voltage (PQ05TZ11)

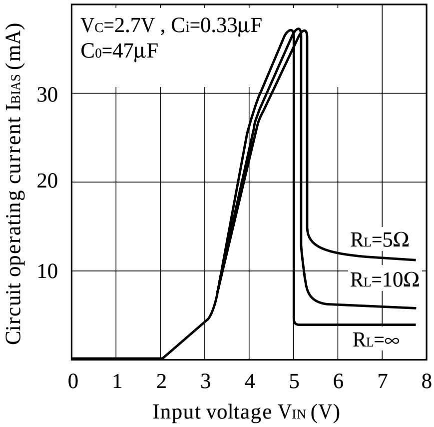


Fig.32 Circuit Operating Current vs. Input Voltage (PQ09TZ11)

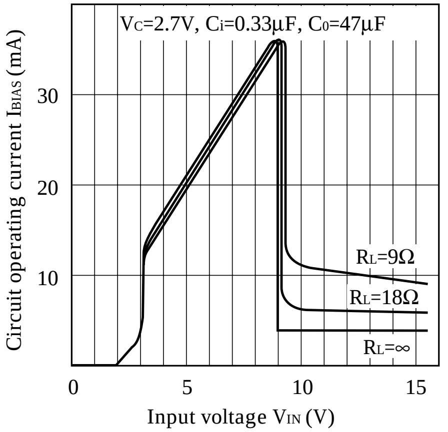


Fig.33 Circuit Operating Current vs. Input Voltage (PQ12TZ11)

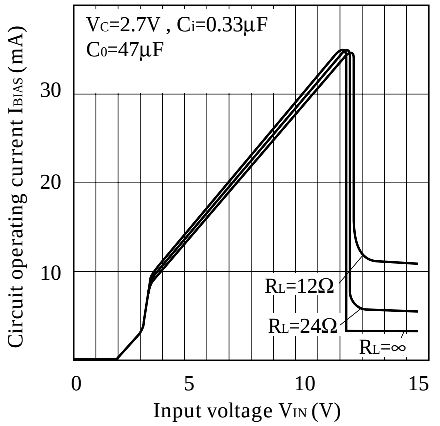


Fig.34 Dropout Voltage vs. Junction Temperature (PQ3TZ50/PQ3TZ53)

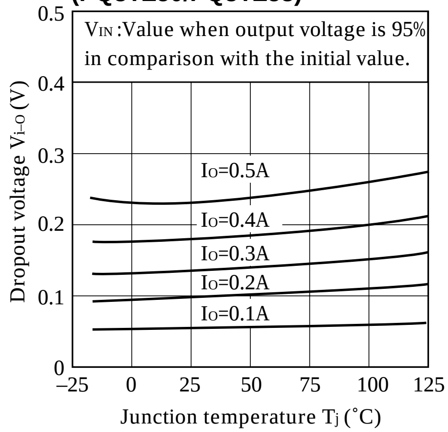


Fig.35 Dropout Voltage vs. Junction Temperature (PQ05TZ51/PQ09TZ51/PQ12TZ51)

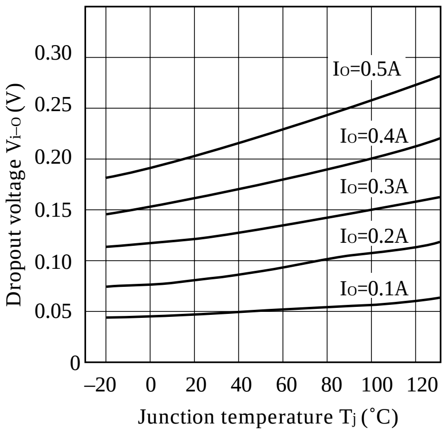


Fig.36 Dropout Voltage vs. Junction Temperature (PQ05TZ11/PQ09TZ11/PQ12TZ11)

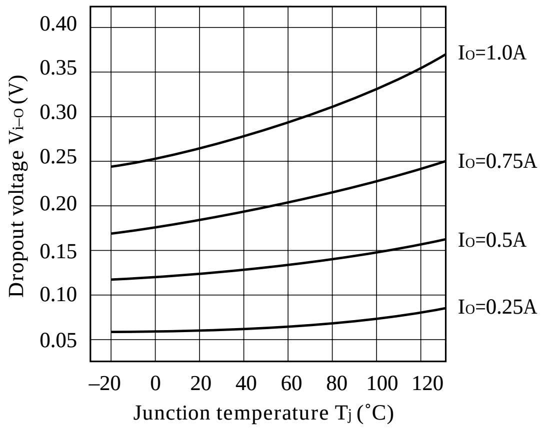


Fig.37 Quiescent Current vs. Junction Temperature (PQ2TZ55)

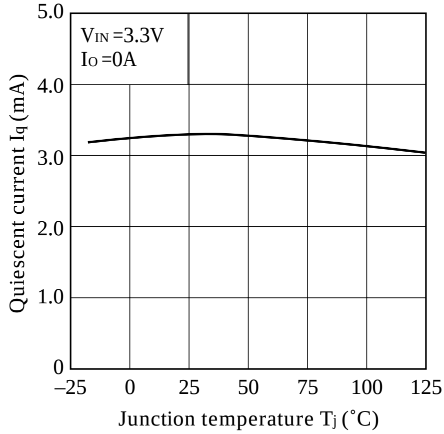


Fig.38 Quiescent Current vs. Junction Temperature (PQ2TZ15)

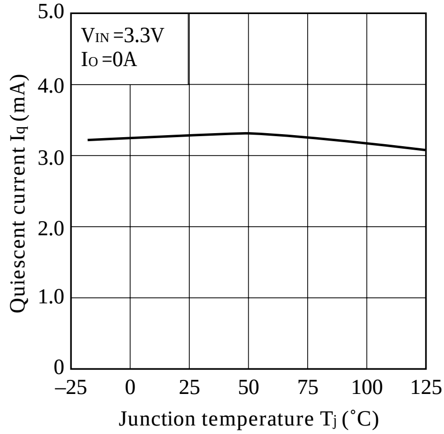


Fig.39 Quiescent Current vs. Junction Temperature (Typical Value) (PQ3TZ50/PQ3TZ53)

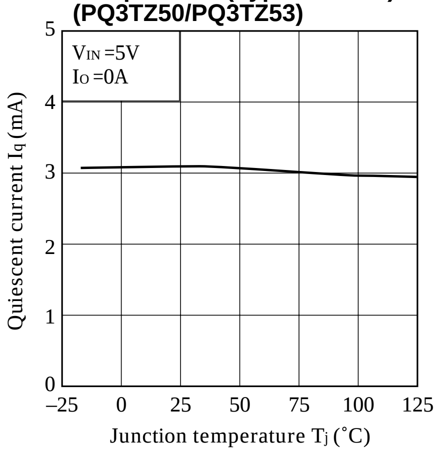


Fig.40 Quiescent Current vs. Junction Temperature (PQxxTZ51/11)

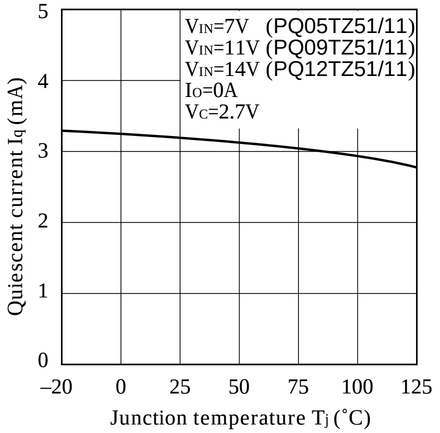


Fig.41 ON-state Voltage for Control vs. Junction Temperature(Typical Value) (PQ3TZ50/PQ3TZ53)

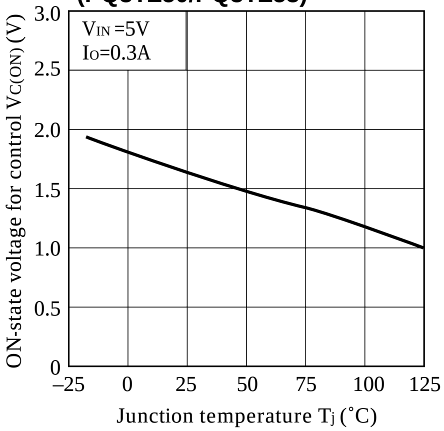


Fig.42 Ripple Rejection vs. Input Ripple Frequency (PQ3TZ50/PQ3TZ53)

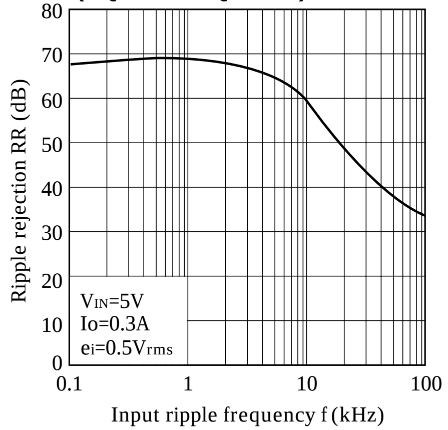


Fig.43 Ripple Rejection vs. Input Ripple Frequency (PQ05TZ51/PQ09TZ51/PQ12TZ51)

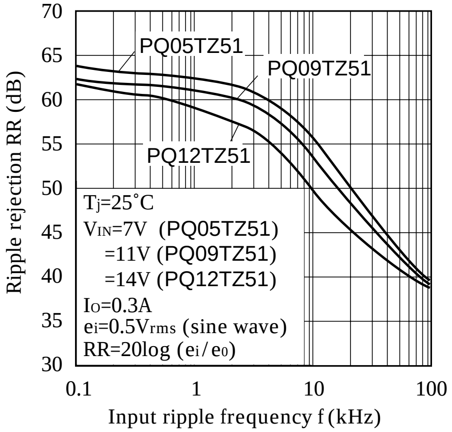


Fig.44 Ripple Rejection vs. Input Ripple Frequency (PQ05TZ11/PQ09TZ11/PQ12TZ11)

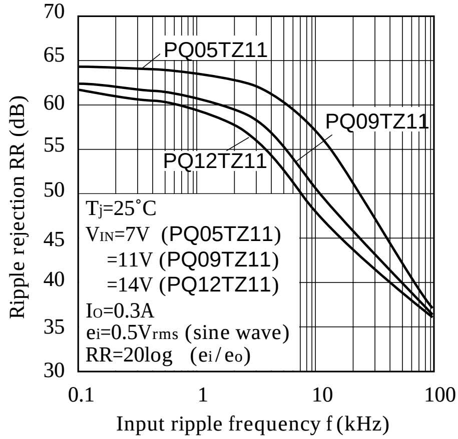


Fig.45 Ripple Rejection vs. Output Current (PQ05TZ51/PQ09TZ51/PQ12TZ51)

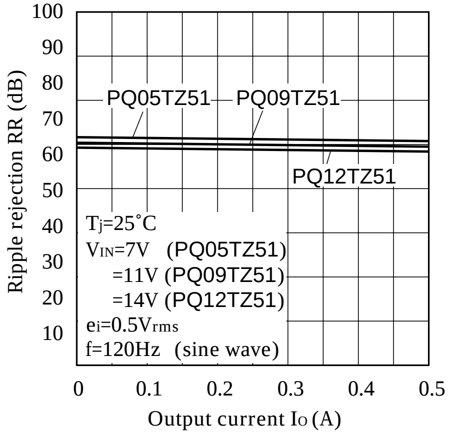


Fig.46 Ripple Rejection vs. Output Current (PQ05TZ11/PQ09TZ11/PQ12TZ11)

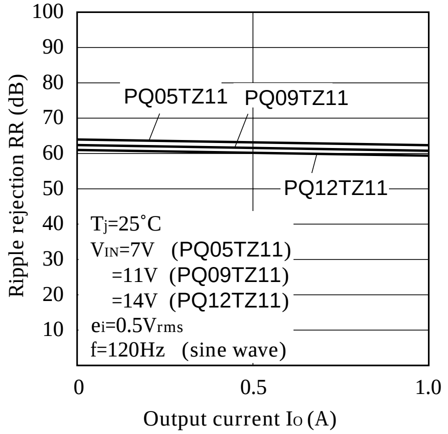


Fig.47 Output Peak Current vs. Junction Temperature(Typical Value) (PQ3TZ50/PQ3TZ53)

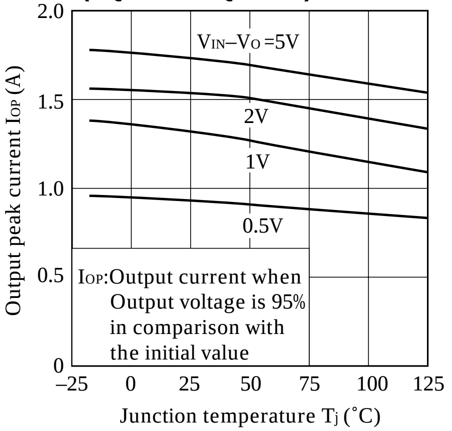


Fig.48 Output Peak Current vs. Dropout Voltage (PQ05TZ51/PQ09TZ51/PQ12TZ51)

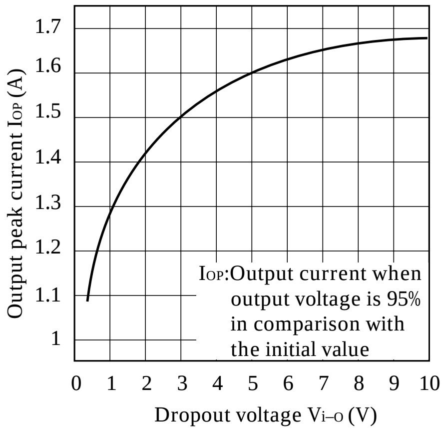


Fig.49 Output Peak Current vs. Dropout Voltage (PQ05TZ11/PQ09TZ11/PQ12TZ11)

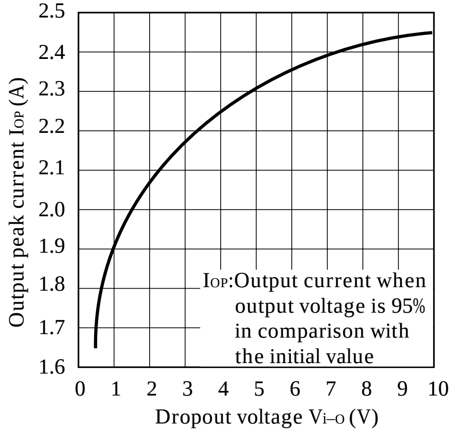


Fig.50 Output Peak Current vs. Junction Temperature (PQ05TZ51/PQ09TZ51/PQ12TZ51)

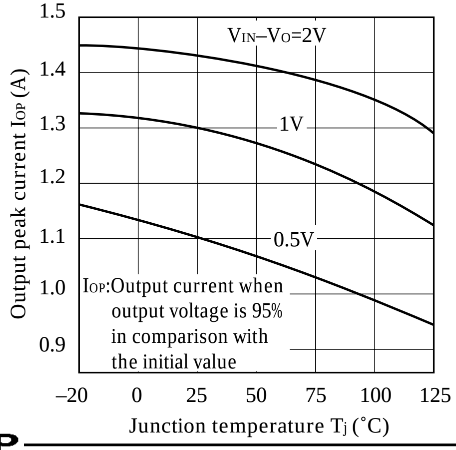


Fig.51 Output Peak Current vs. Junction Temperature (PQ05TZ11/PQ09TZ11/PQ12TZ11)

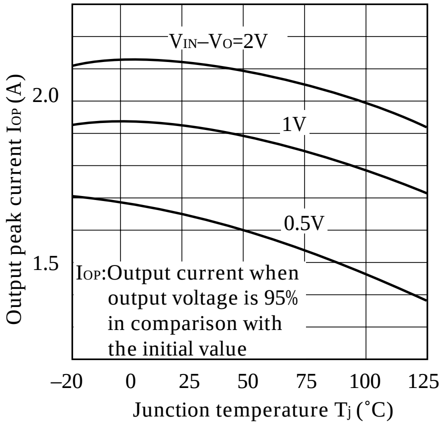
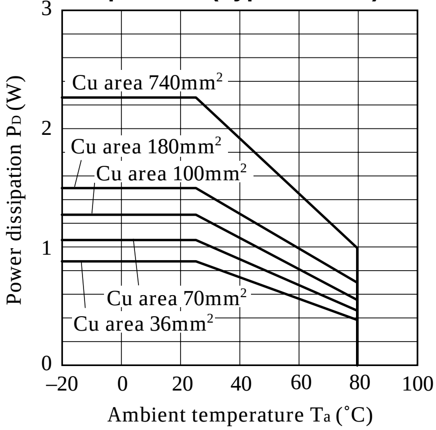
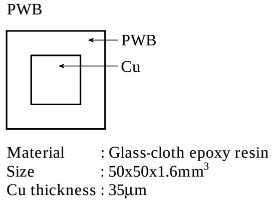


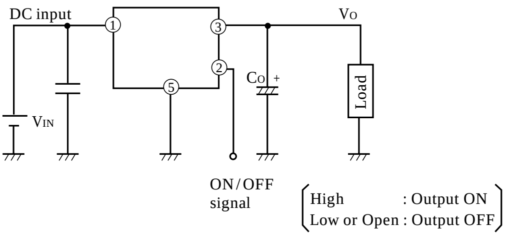
Fig.52 Power Dissipation vs. Ambient Temperature (Typical Value)





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	Standard type	High-precision output type	Standard type	High-precision output type
0.5A output	—	PQ2TZ55/PQ3TZ50/PQ05TZ51 series	—	PQ2TZ55U/PQ3TZ50U/PQ05TZ5U series
1.0A output	—	PQ2TZ15/PQ3TZ53/PQ05TZ11 series	—	PQ2TZ15U/PQ3TZ53U/PQ05TZ1U series

NOTICE