

PQxxxEZ5MZ Series/PQxxxEZ01Z Series

SC-63 Package, Low Voltage Operation Low Power-Loss Voltage Regulators

■ Features

- Low voltage operation (Minimum operating voltage: 2.35V)
2.5V input → available 1.5 to 1.8V
- Low dissipation current
Dissipation current at no load : MAX. 2mA
Output OFF-state dissipation current: MAX. 5μA
- Built-in overcurrent protection and overheat protection functions

■ Applications

- Peripheral equipment of personal computers
- Power supplies for various electronic equipment such as DVD player or STB

■ Model Line-up

Output current (I _o)	Package type	Output voltage (V _o)		
		1.5V	1.8V	2.5V
0.5A	Taping	PQ015EZ5MZP	PQ018EZ5MZP	PQ025EZ5MZP
	Sleeve	PQ015EZ5MZZ	PQ018EZ5MZZ	PQ025EZ5MZZ
1A	Taping	PQ015EZ01ZP	PQ018EZ01ZP	PQ025EZ01ZP
	Sleeve	PQ015EZ01ZZ	PQ018EZ01ZZ	PQ025EZ01ZZ
		3V	3.3V	
0.5A	Taping	PQ030EZ5MZP	PQ033EZ5MZP	
	Sleeve	PQ030EZ5MZZ	PQ033EZ5MZZ	
1A	Taping	PQ030EZ01ZP	PQ033EZ01ZP	
	Sleeve	PQ030EZ01ZZ	PQ033EZ01ZZ	

■ Absolute Maximum Ratings

(T_a=25°C)

Parameter	Symbol	Rating	Unit
Input voltage	V _{IN}	10	V
*1 ON/OFF control terminal voltage	V _C	10	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

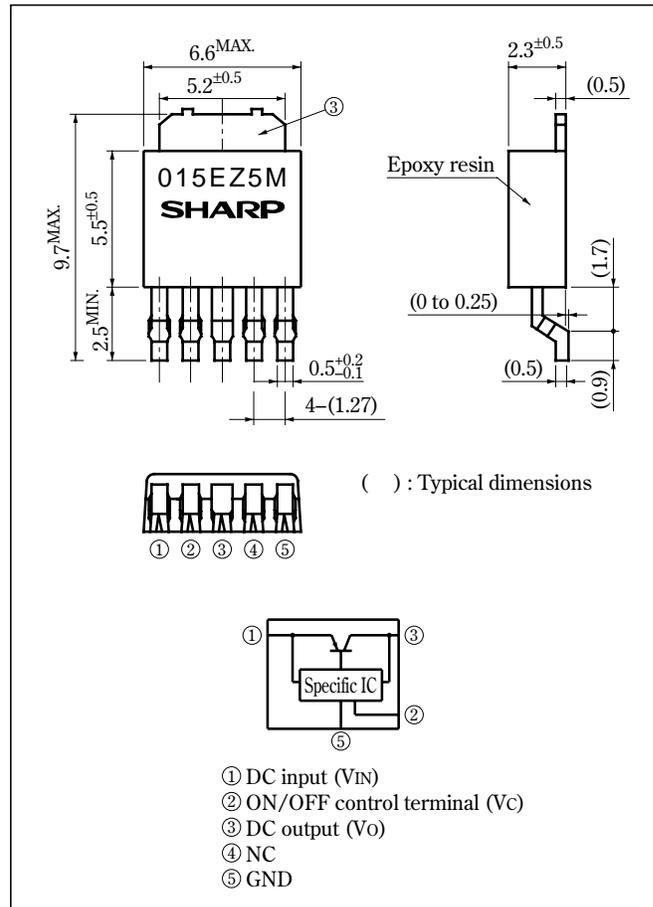
*1 All are open except GND and applicable terminals.

*2 P_p: With infinite heat sink

*3 Overheat protection may operate at T_j=125°C to 150°C

■ Outline Dimensions

(Unit : mm)



• Please refer to the chapter " Handling Precautions ".

SHARP

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Internet Internet address for Electronic Components Group <http://sharp-world.com/ecg/>

■ Electrical Characteristics

(Unless otherwise specified, condition shall be $V_{IN}=V_O(TYP.)+1V$, $I_O=0.3A$, $V_C=2.7V$, $T_a=25^\circ C$ (PQxxxEZ5MZ))

(Unless otherwise specified, condition shall be $V_{IN}=V_O(TYP.)+1V$, $I_O=0.5A$, $V_C=2.7V$, $T_a=25^\circ C$ (PQxxxEZ01Z))

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input voltage	V_{IN}	–	Refer to below table			V
Output voltage	V_O	–	Refer to below table			V
Load regulation	RegL	$I_O=5mA$ to 0.5A	–	0.2	2	%
		$I_O=5mA$ to 1A				
Line regulation	RegI	$V_{IN}=V_O(TYP.)+1V$ to $V_O(TYP.)+6V$, $I_O=5mA$	–	0.1	1	%
Temperature coefficient of output voltage	TcV_O	$T_J=0$ to $125^\circ C$, $I_O=5mA$	–	± 0.01	–	%/ $^\circ C$
Ripple Rejection	RR	Refer to Fig.2	45	60	–	dB
*4 Dropout voltage	V_{I-O}	*5 $I_O=0.3A$	–	0.2	0.5	V
		*5 $I_O=0.5A$				
*6 ON-state voltage for control	$V_{C(ON)}$	–	2	–	–	V
ON-state current for control	$I_{C(ON)}$	–	–	–	200	μA
OFF-state voltage for control	$V_{C(OFF)}$	–	–	–	0.8	V
OFF-state current for control	$I_{C(OFF)}$	$V_C=0.4V$	–	–	2	μA
Quiescent current	I_q	$I_O=0A$	–	1	2	mA
Output OFF-state dissipation current	I_{qs}	$I_O=0A$, $V_C=0.4V$	–	–	5	μA

*4 Applied PQ030EZ5MZ, PQ033EZ5MZ

*5 Input voltage shall be the value when output voltage is 95% in comparison with the initial value.

*6 In case of opening control terminal ②, output voltage turns off.

■ Input Voltage Line-up

(Unless otherwise specified, condition shall be $I_O=0.3A$, $V_C=2.7V$, $T_a=25^\circ C$ (PQxxxEZ5MZ))

(Unless otherwise specified, condition shall be $I_O=0.5A$, $V_C=2.7V$, $T_a=25^\circ C$ (PQxxxEZ01Z))

Model No.	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
PQ015EZ5MZ/PQ015EZ01Z	V_{IN}	–	2.35	–	10	V
PQ018EZ5MZ/PQ018EZ01Z	V_{IN}	–	2.35	–	10	V
PQ025EZ5MZ/PQ025EZ01Z	V_{IN}	–	$V_O+0.5$	–	10	V
PQ030EZ5MZ/PQ030EZ01Z	V_{IN}	–	$V_O+0.5$	–	10	V
PQ033EZ5MZ/PQ033EZ01Z	V_{IN}	–	$V_O+0.5$	–	10	V

■ Output Voltage Line-up

(Unless otherwise specified, condition shall be $V_{IN}=V_O(TYP.)+1V$, $I_O=0.3A$, $V_C=2.7V$, $T_a=25^\circ C$ (PQxxxEZ5MZ))

(Unless otherwise specified, condition shall be $V_{IN}=V_O(TYP.)+1V$, $I_O=0.5A$, $V_C=2.7V$, $T_a=25^\circ C$ (PQxxxEZ01Z))

Model No.	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
PQ015EZ5MZ/PQ015EZ01Z	V_O	–	1.45	1.5	1.55	V
PQ018EZ5MZ/PQ018EZ01Z	V_O	–	1.75	1.8	1.85	V
PQ025EZ5MZ/PQ025EZ01Z	V_O	–	2.438	2.5	2.562	V
PQ030EZ5MZ/PQ030EZ01Z	V_O	–	2.925	3	3.075	V
PQ033EZ5MZ/PQ033EZ01Z	V_O	–	3.218	3.3	3.382	V

Fig.1 Test Circuit

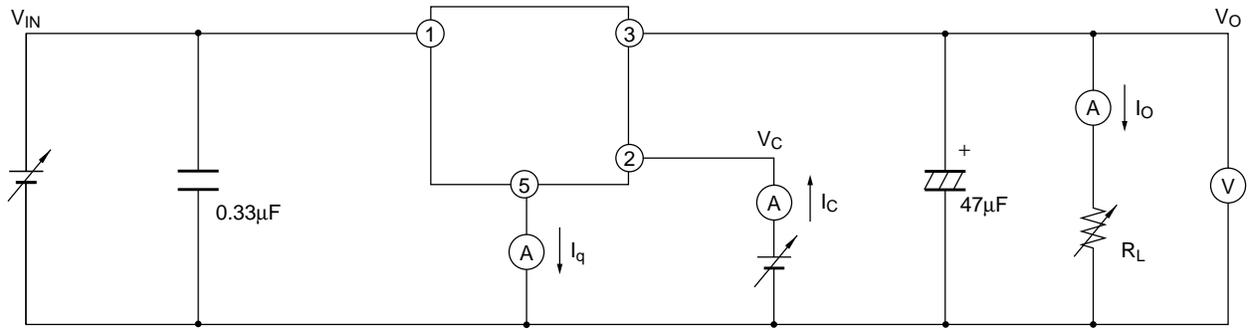
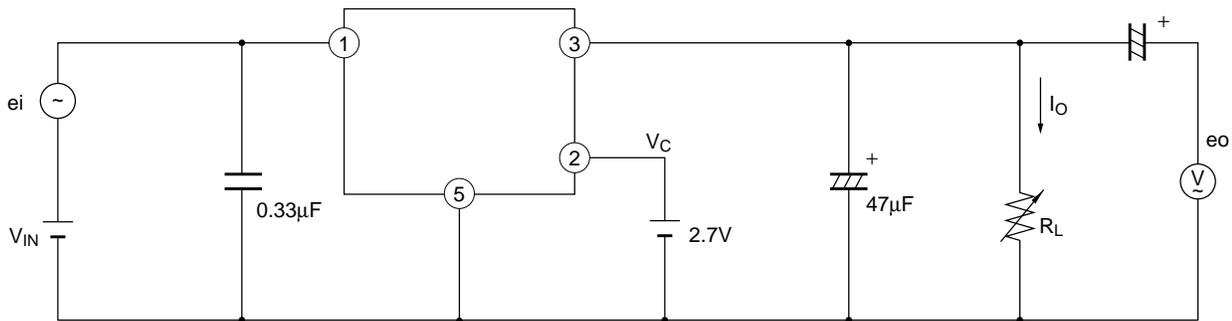
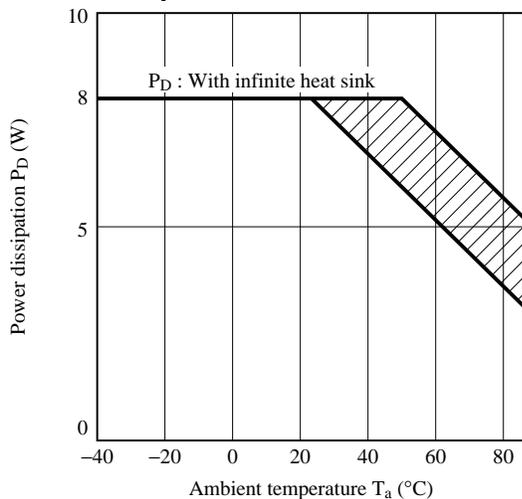


Fig.2 Test Circuit for Ripple Rejection



$f=120\text{Hz}$ (sine wave)
 $e_i(\text{rms})=0.5\text{V}$
 $V_{IN}=V_o(\text{TYP})+2\text{V}$
 $I_o=0.3\text{A}$
 $RR=20\log(e_i(\text{rms})/e_o(\text{rms}))$

Fig.3 Power Dissipation vs. Ambient Temperature



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

Fig.4 Overcurrent Protection Characteristics (PQ015EZ5MZ)

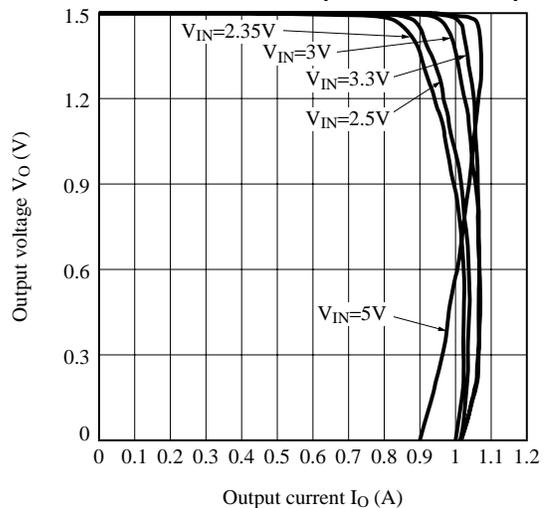


Fig.5 Overcurrent Protection Characteristics (PQ018EZ5MZ)

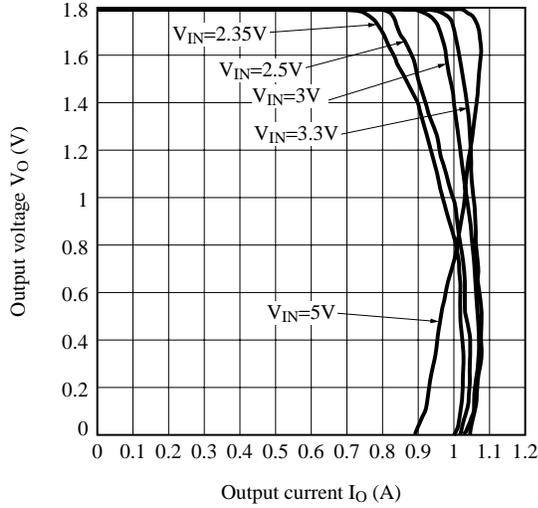


Fig.6 Overcurrent Protection Characteristics (PQ025EZ5MZ)

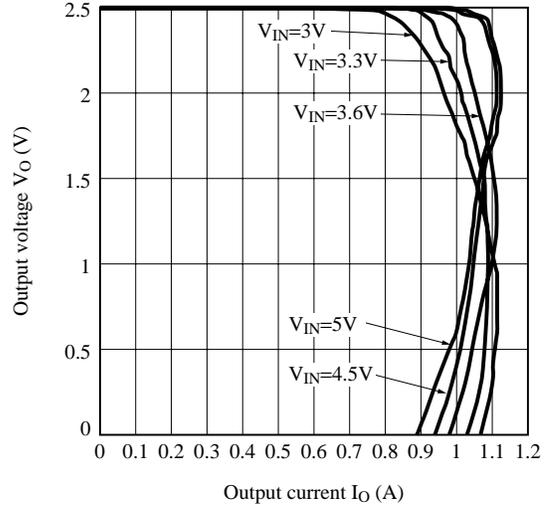


Fig.7 Overcurrent Protection Characteristics (PQ030EZ5MZ)

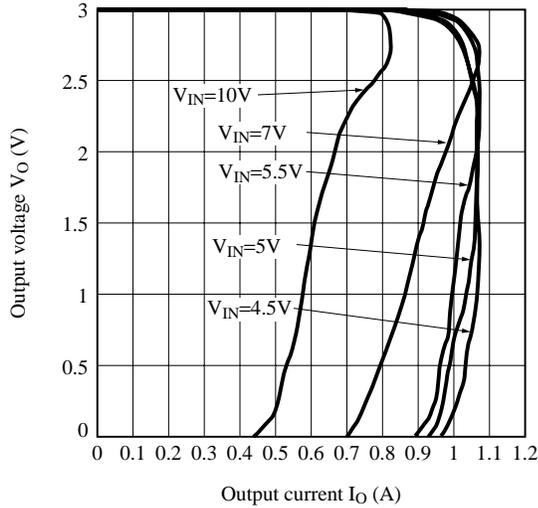


Fig.8 Overcurrent Protection Characteristics (PQ033EZ5MZ)

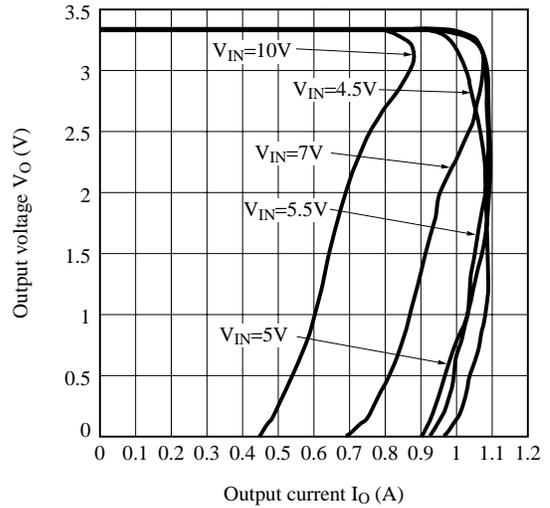


Fig.9 Overcurrent Protection Characteristics (PQ015EZ01Z)

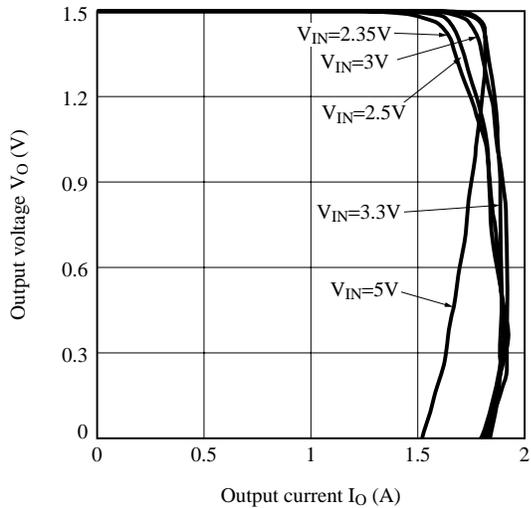


Fig.10 Overcurrent Protection Characteristics (PQ018EZ01Z)

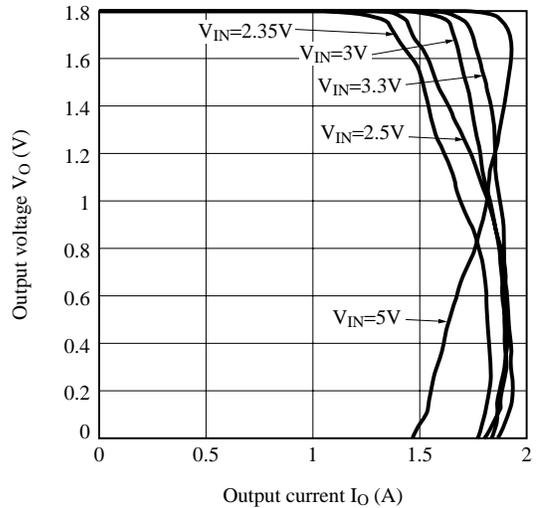


Fig.11 Overcurrent Protection Characteristics (PQ025EZ01Z)

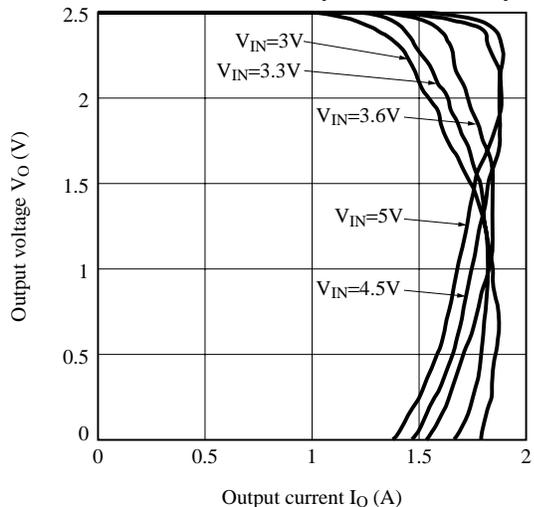


Fig.12 Overcurrent Protection Characteristics (PQ030EZ01Z)

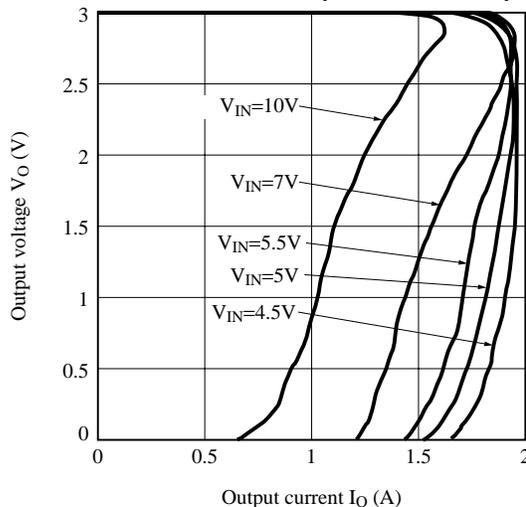


Fig.13 Overcurrent Protection Characteristics (PQ033EZ01Z)

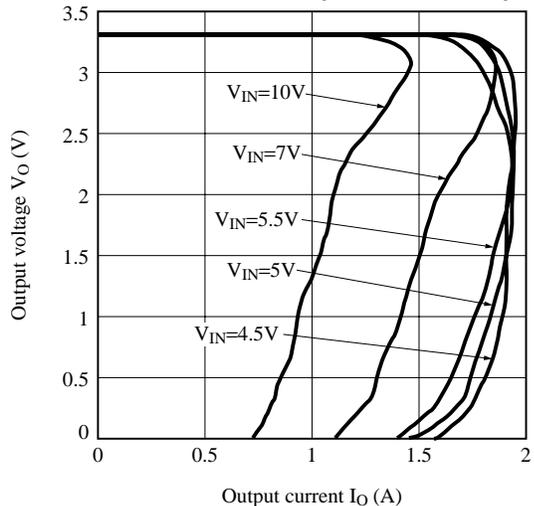


Fig.14 Output Voltage vs. Ambient Temperature (PQ015EZ5MZ/PQ015EZ01Z)

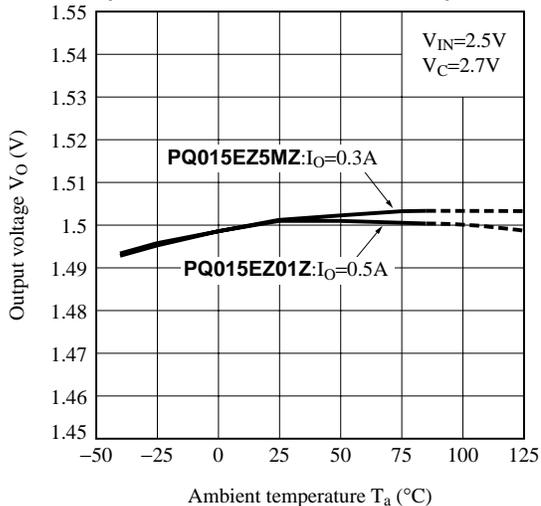


Fig.15 Output Voltage vs. Ambient Temperature (PQ018EZ5MZ/PQ018EZ01Z)

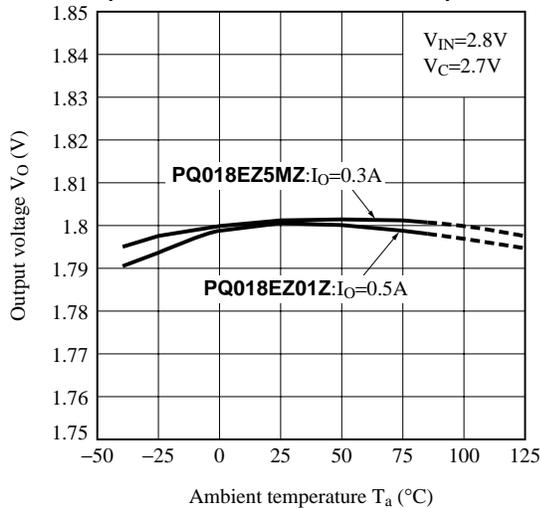


Fig.16 Output Voltage vs. Ambient Temperature (PQ025EZ5MZ/PQ025EZ01Z)

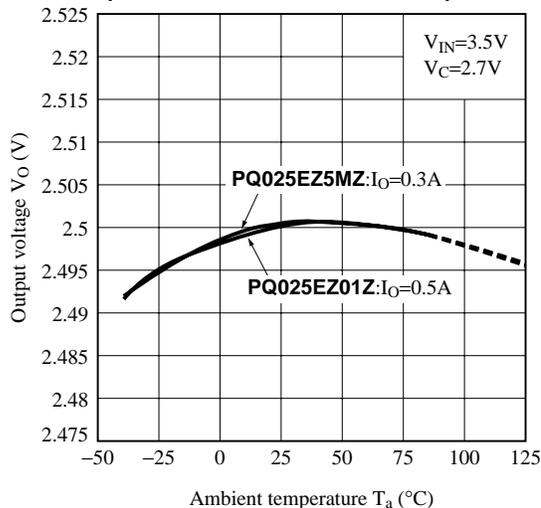


Fig.17 Output Voltage vs. Ambient Temperature (PQ030EZ5MZ/PQ030EZ01Z)

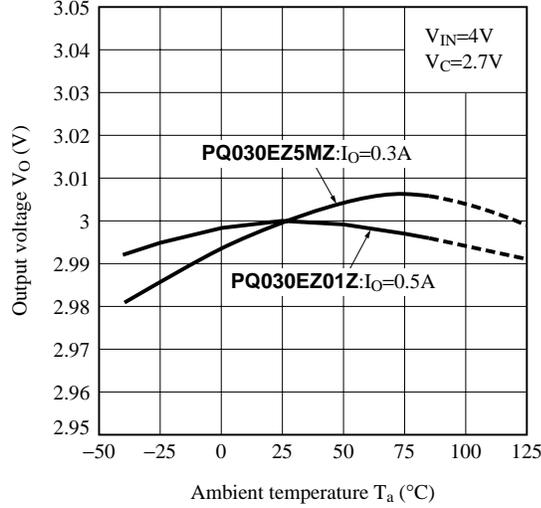


Fig.18 Output Voltage vs. Ambient Temperature (PQ033EZ5MZ/PQ033EZ01Z)

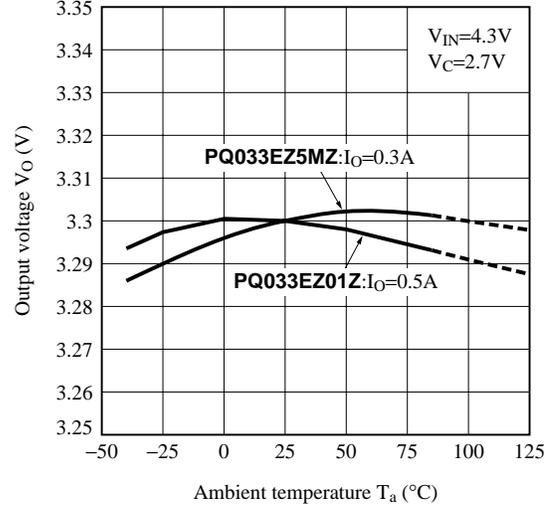


Fig.19 Output Voltage vs. Input Voltage (PQ015EZ5MZ)

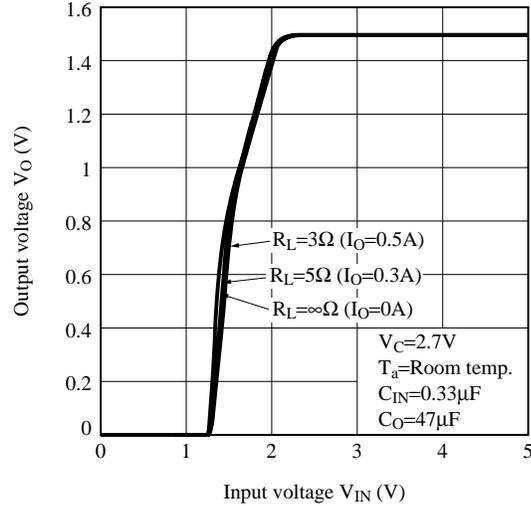


Fig.20 Output Voltage vs. Input Voltage (PQ018EZ5MZ)

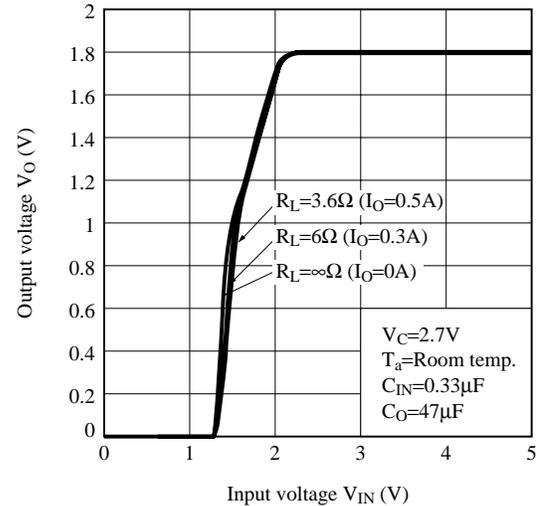


Fig.21 Output Voltage vs. Input Voltage (PQ025EZ5MZ)

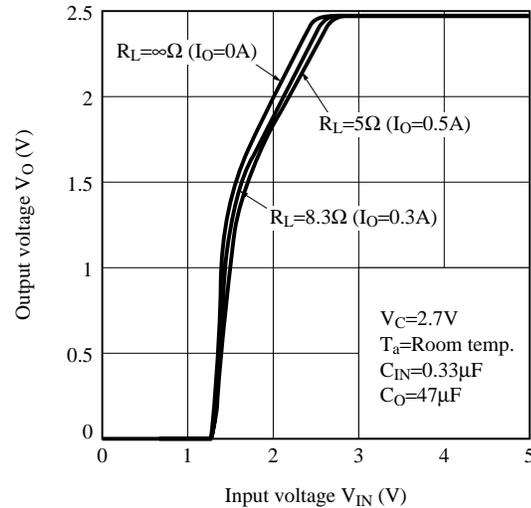


Fig.22 Output Voltage vs. Input Voltage (PQ030EZ5MZ)

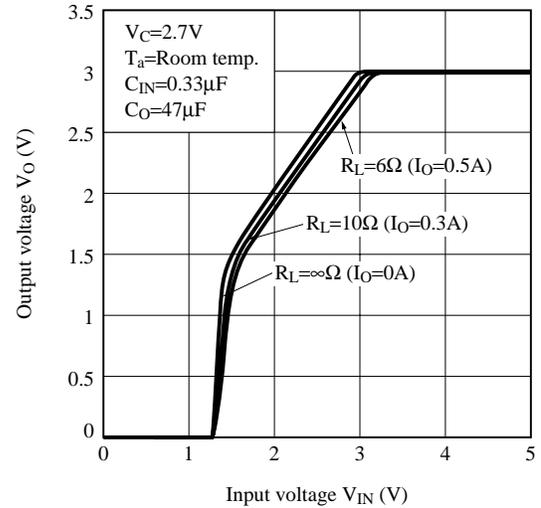


Fig.23 Output Voltage vs. Input Voltage (PQ033EZ5MZ)

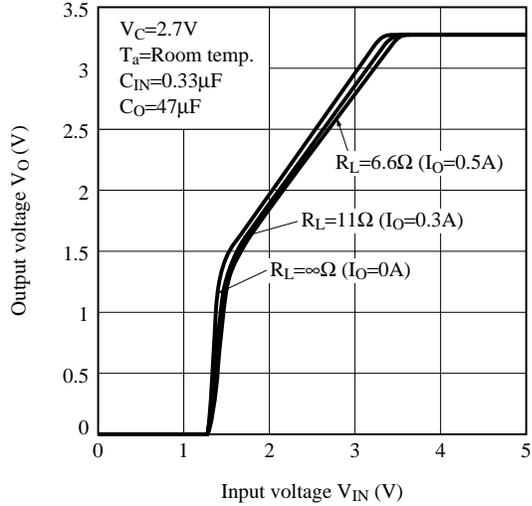


Fig.24 Output Voltage vs. Input Voltage (PQ015EZ01Z)

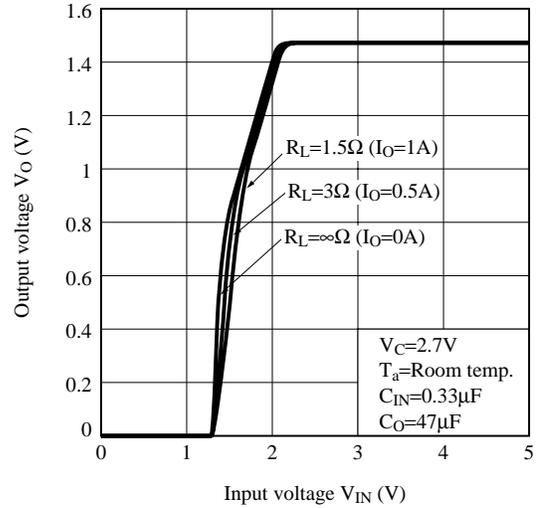


Fig.25 Output Voltage vs. Input Voltage (PQ018EZ01Z)

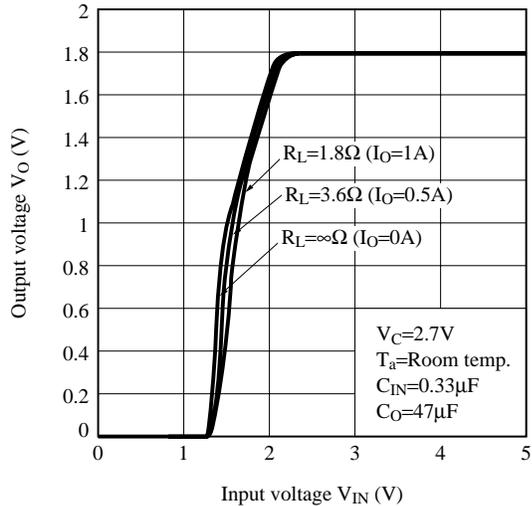


Fig.26 Output Voltage vs. Input Voltage (PQ025EZ01Z)

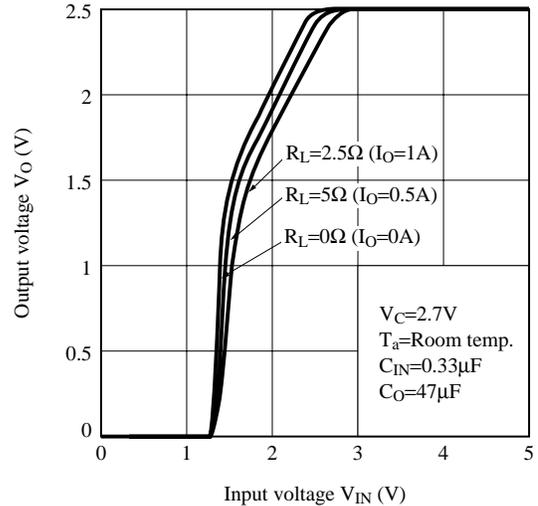


Fig.27 Output Voltage vs. Input Voltage (PQ030EZ01Z)

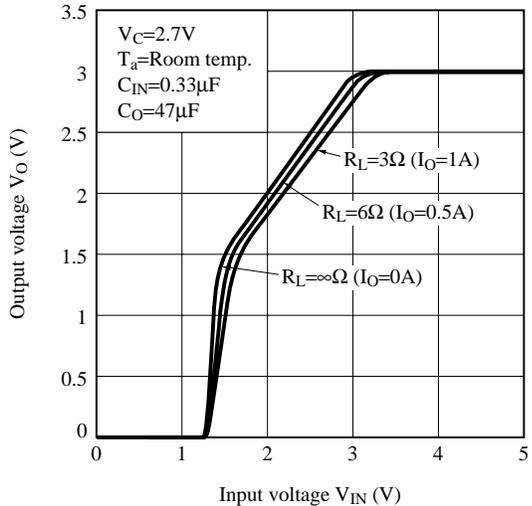


Fig.28 Output Voltage vs. Input Voltage (PQ033EZ01Z)

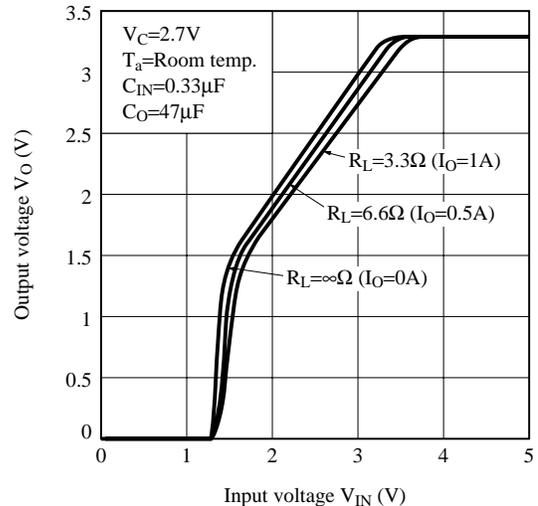


Fig.29 Circuit Operating Current vs. Input Voltage (PQ015EZ5MZ)

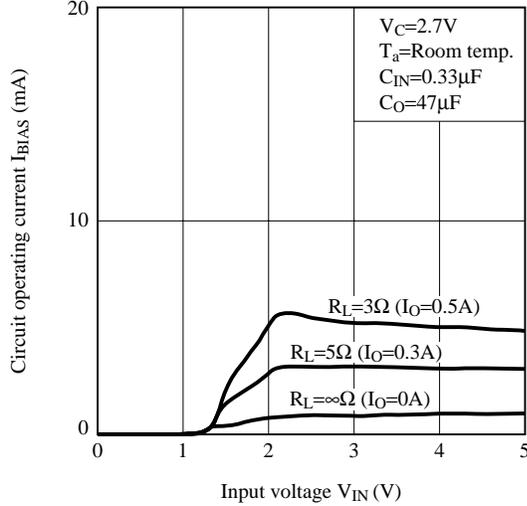


Fig.30 Circuit Operating Current vs. Input Voltage (PQ018EZ5MZ)

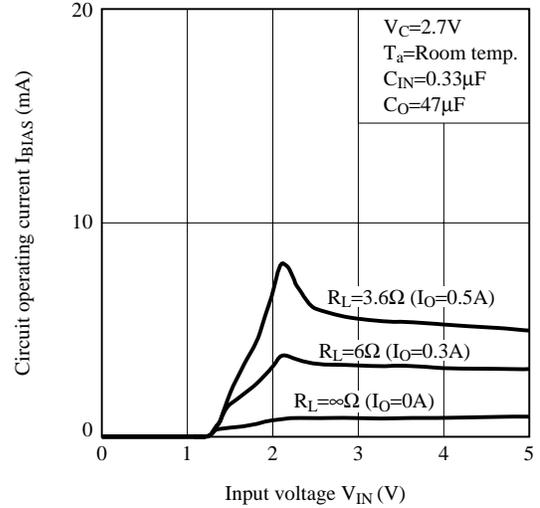


Fig.31 Circuit Operating Current vs. Input Voltage (PQ025EZ5MZ)

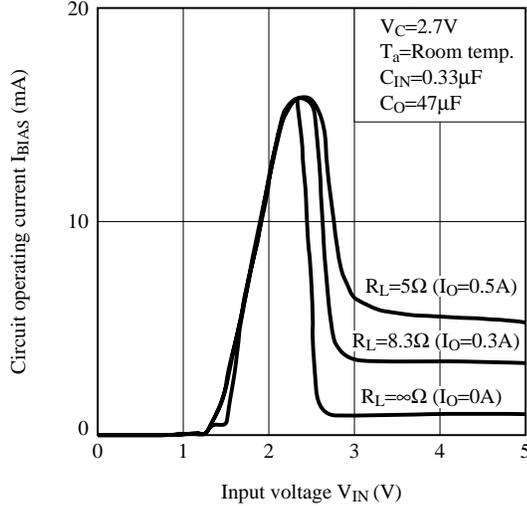


Fig.32 Circuit Operating Current vs. Input Voltage (PQ030EZ5MZ)

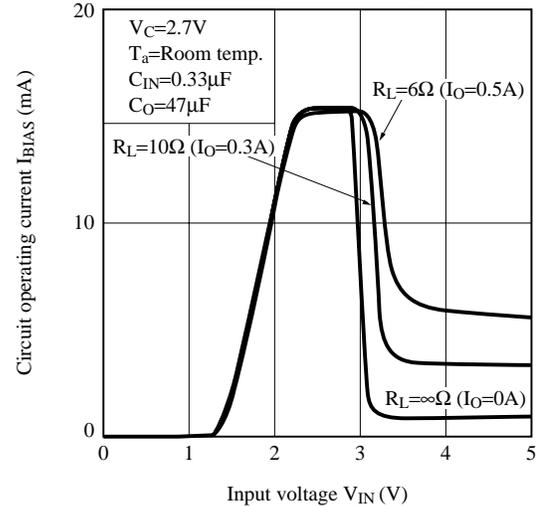


Fig.33 Circuit Operating Current vs. Input Voltage (PQ033EZ5MZ)

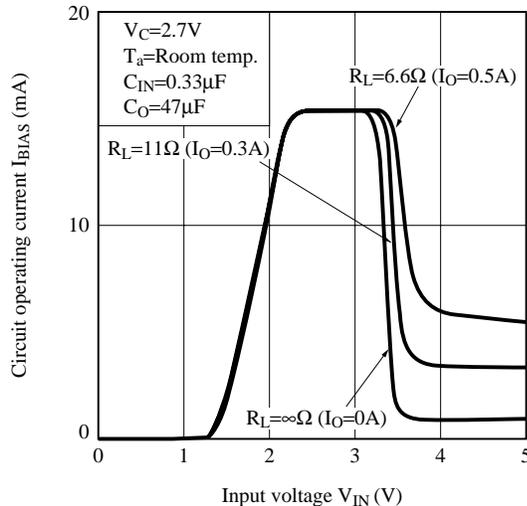


Fig.34 Circuit Operating Current vs. Input Voltage (PQ015EZ01Z)

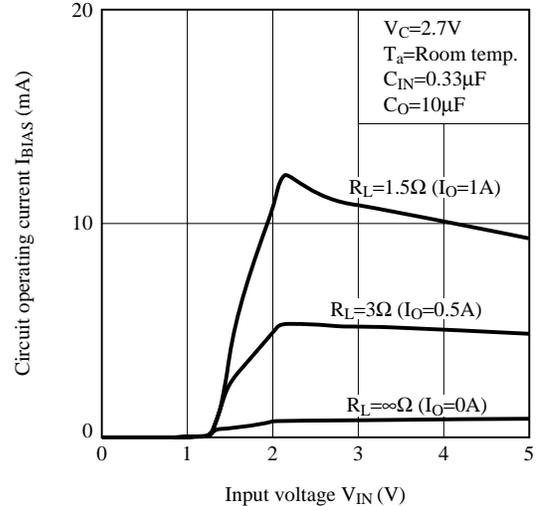


Fig.35 Circuit Operating Current vs. Input Voltage (PQ018EZ01Z)

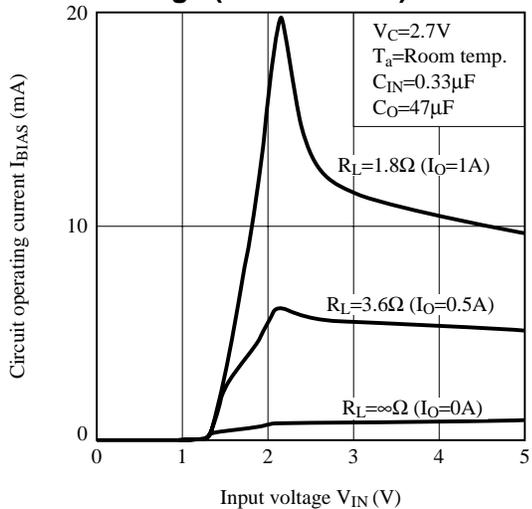


Fig.36 Circuit Operating Current vs. Input Voltage (PQ025EZ01Z)

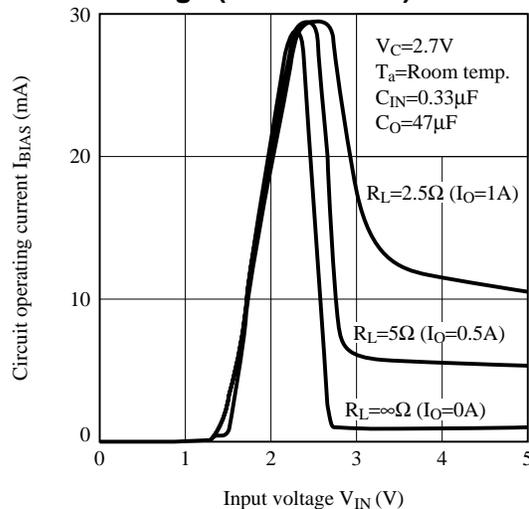


Fig.37 Circuit Operating Current vs. Input Voltage (PQ030EZ01Z)

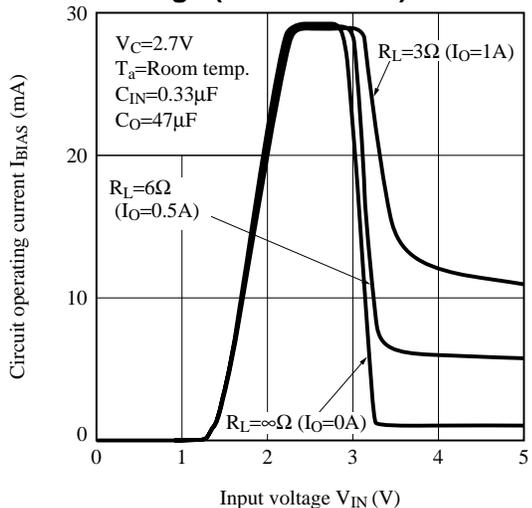


Fig.38 Circuit Operating Current vs. Input Voltage (PQ033EZ01Z)

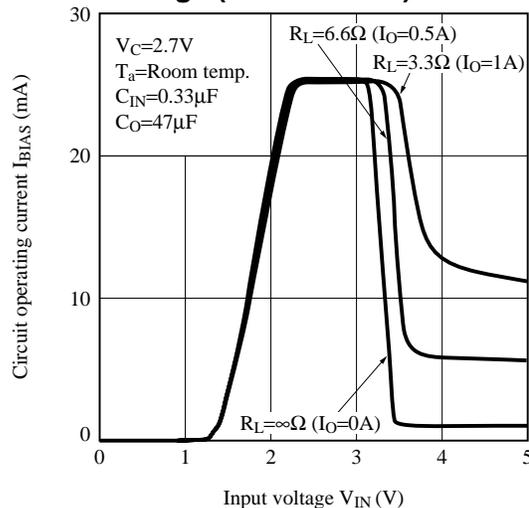


Fig.39 Quiescent Current vs. Junction Temperature

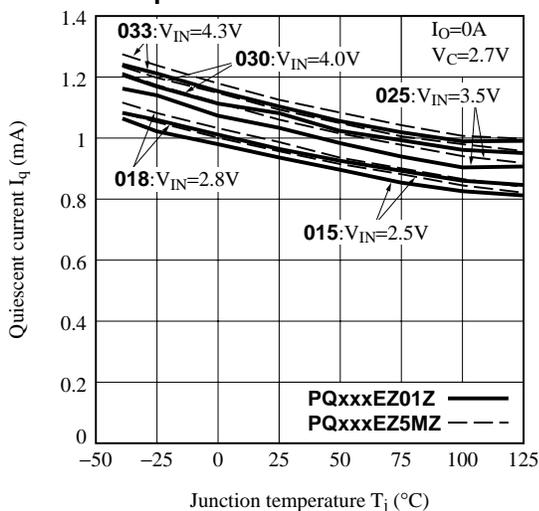


Fig.40 Dropout Voltage vs. Junction Temperature

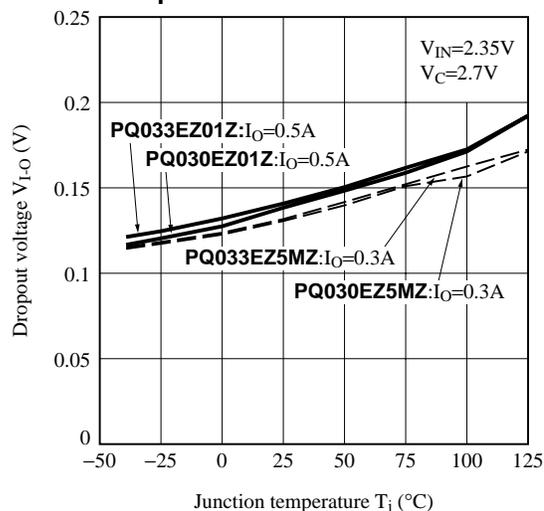


Fig.41 Ripple Rejection vs. Input Ripple Frequency

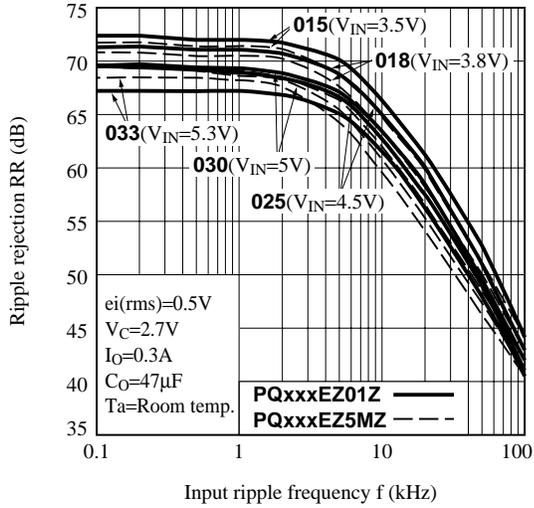


Fig.42 Ripple Rejection vs. Output Current

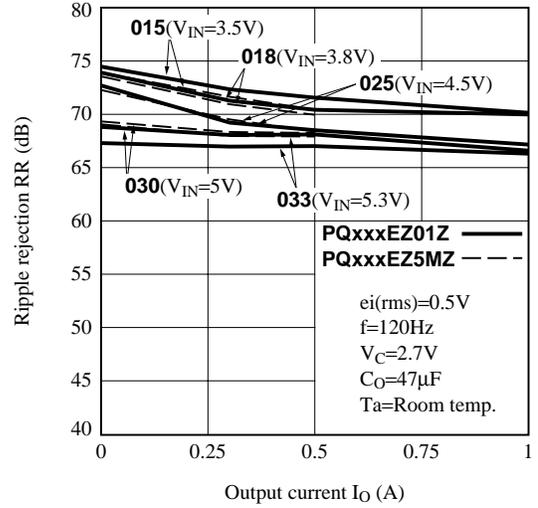


Fig.43 Typical Application

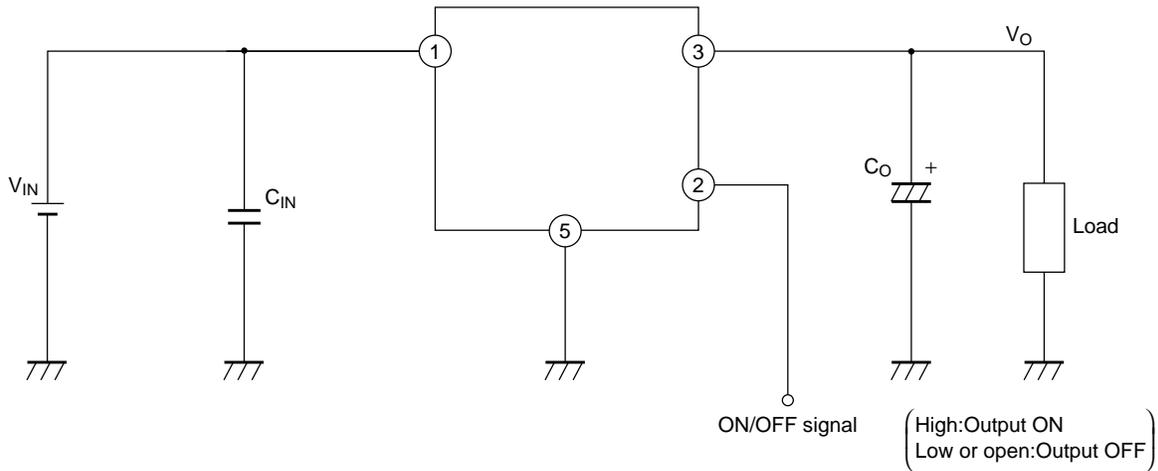
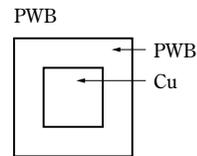
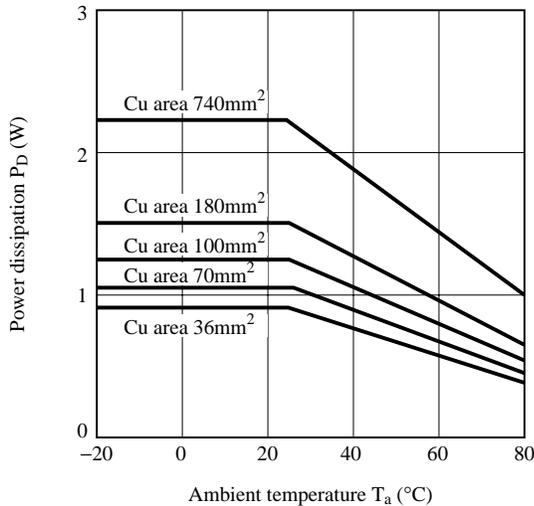


Fig.44 Power Dissipation vs. Ambient Temperature (Typical Value)



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

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 - Traffic signals
 - Gas leakage sensor breakers
 - Alarm equipment
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 - Telecommunication equipment [trunk lines]
 - Nuclear power control equipment
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