PQxxxEZ5MZxH Series
PQxxxEZ01ZxH Series

Compact Surface Mount type
Low Power-Loss Voltage Regulators

■ Features

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

■ Applications

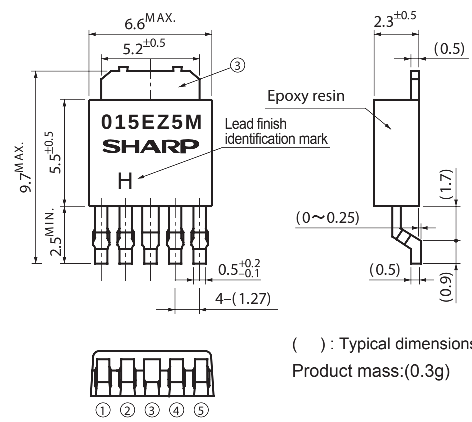
1. Peripheral equipment of personal computers
2. Power supplies for various electronic equipment such as DVD player or STB

■ Model Line-up

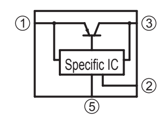
Output current (I_O)	Package type	Output voltage (V_O)		
		1.5V	1.8V	2.5V
0.5A	Taping	PQ015EZ5MZPH	PQ018EZ5MZPH	PQ025EZ5MZPH
	Sleeve	PQ015EZ5MZZH	PQ018EZ5MZZH	PQ025EZ5MZZH
1A	Taping	PQ015EZ01ZPH	PQ018EZ01ZPH	PQ025EZ01ZPH
	Sleeve	PQ015EZ01ZZH	PQ018EZ01ZZH	PQ025EZ01ZZH
		3.0V	3.3V	
0.5A	Taping	PQ030EZ5MZPH	PQ033EZ5MZPH	
	Sleeve	PQ030EZ5MZZH	PQ033EZ5MZZH	
1A	Taping	PQ030EZ01ZPH	PQ033EZ01ZPH	
	Sleeve	PQ030EZ01ZZH	PQ033EZ01ZZH	

■ Outline Dimensions

(Unit : mm)



( ) : Typical dimensions
Product mass:(0.3g)



① DC input (V_{IN})
② ON/OFF control terminal (V_C)
③ DC output(V_O)
④ NC
⑤ GND

Lead finish:Lead-free solder plating
(Composition: Sn2Cu)

■ Absolute Maximum Ratings

(Ta=25°C)

Parameter		Symbol	Rating	Unit
Input voltage		V_{IN}	10	V
*1 ON/OFF control terminal voltage		V_C	10	V
Output current	PQxxxEZ5MZxH Series	I_O	0.5	A
	PQxxxEZ01ZxH Series		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_D: With infinite heat sink
*3 Overheat protection may operate at Tj:125°C to 150°C

Sheet No.: OP06021

Electrical Characteristics

(Unless otherwise specified, condition shall be V_{IN}=V_O(TYP.)+1V, I_O=0.3A,V_C=2.7V,Ta=25˚C(**PQxxxEZ5MZxH**))
(Unless otherwise specified, condition shall be V_{IN}=V_O(TYP.)+1V, I_O=0.5A,V_C=2.7V,Ta=25˚C(**PQxxxEZ01ZxH**))

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	**PQxxxEZ5MZxH**	$R_{eg}L$	I_O=5mA to 0.5A	–	0.2	2.0	%
	PQxxxEZ01ZxH		I_O=5mA to 1A				
Line regulation		$R_{eg}I$	V_{IN}=V_O(TYP.)+1V to V_O(TYP.)+6V,I_O=5mA	–	0.1	1.0	%
Temperature coefficient of output voltage		T_CV_O	Tj=0 to 125°C, I_O=5mA	–	±0.01	–	%/°C
Ripple Rejection		RR	Refer to Fig.2	45	60	–	dB
※4 Dropout voltage	**PQxxxEZ5MZxH**	V_{I-O}	※5 I_O=0.3A	–	0.2	0.5	V
	PQxxxEZ01ZxH		※5 I_O=0.5A				
※6 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		$V_{C(OFF)}$	–	–	–	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 **PQ030EZ5MZxH**,**PQ033EZ5MZxH**
※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 range

(Unless otherwise specified, condition shall be I_O=0.3A,V_C=2.7V,Ta=25˚C(**PQxxxEZ5MZxH**))
(Unless otherwise specified, condition shall be I_O=0.5A,V_C=2.7V,Ta=25˚C(**PQxxxEZ01ZxH**))

Model No.	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
PQ015EZ5MZxH / PQ015EZ01ZxH	V_{IN}	–	2.35	–	10	V
PQ018EZ5MZxH / PQ018EZ01ZxH	V_{IN}	–	2.35	–	10	V
PQ025EZ5MZxH / PQ025EZ01ZxH	V_{IN}	–	3.0	–	10	V
PQ030EZ5MZxH / PQ030EZ01ZxH	V_{IN}	–	3.5	–	10	V
PQ033EZ5MZxH / PQ033EZ01ZxH	V_{IN}	–	3.8	–	10	V

Output voltage

(Unless otherwise specified, condition shall be V_{IN}=V_O(TYP.)+1V, I_O=0.3A,V_C=2.7V,Ta=25˚C(**PQxxxEZ5MZxH**))
(Unless otherwise specified, condition shall be V_{IN}=V_O(TYP.)+1V, I_O=0.5A,V_C=2.7V,Ta=25˚C(**PQxxxEZ01ZxH**))

Model No.	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
PQ015EZ5MZxH / PQ015EZ01ZxH	V_O	–	1.45	1.5	1.55	V
PQ018EZ5MZxH / PQ018EZ01ZxH	V_O	–	1.75	1.8	1.85	V
PQ025EZ5MZxH / PQ025EZ01ZxH	V_O	–	2.438	2.5	2.562	V
PQ030EZ5MZxH / PQ030EZ01ZxH	V_O	–	2.925	3	3.075	V
PQ033EZ5MZxH / PQ033EZ01ZxH	V_O	–	3.218	3.3	3.382	V

Fig.1 Test Circuit

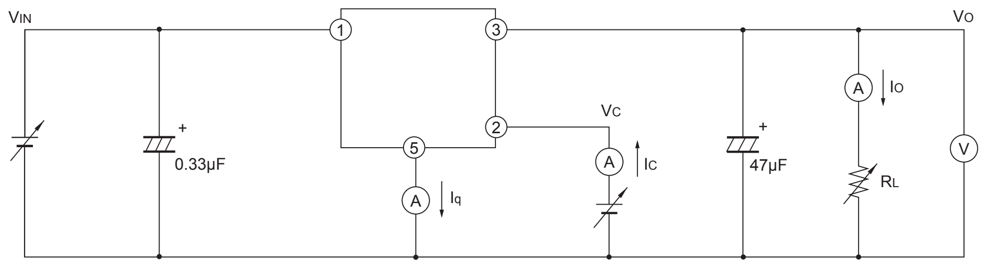
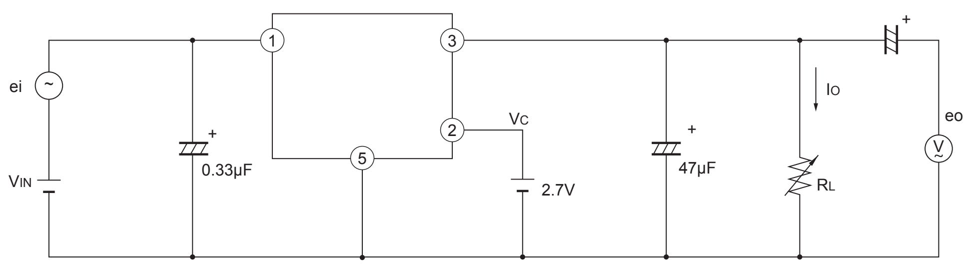
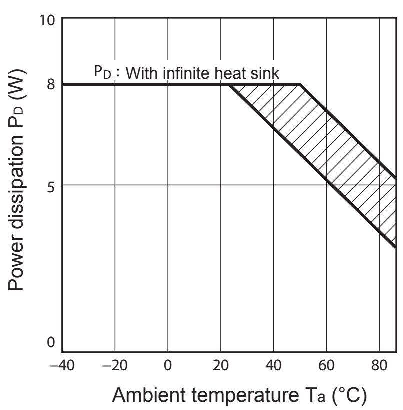


Fig.2 Test Circuit for Ripple Rejection



f=120Hz(sine wave)
ei(rms)=0.5V
V_{IN}= V_O(TYP)+0.5V
I_O=0.3A
RR=20log(ei(rms)/eo(rms))

Fig.3 Power Dissipation vs. Ambient Temperature



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

Fig.4 Overcurrent Protection Characteristics (**PQ015EZ5MZxH**)

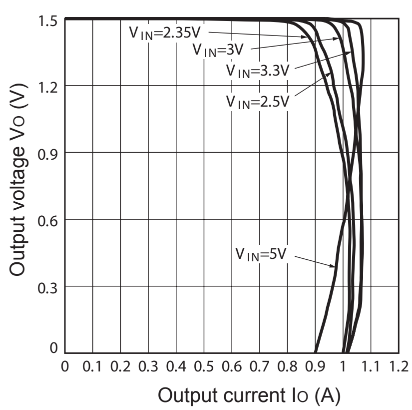


Fig.5 Overcurrent Protection Characteristics (**PQ018EZ5MZxH**)

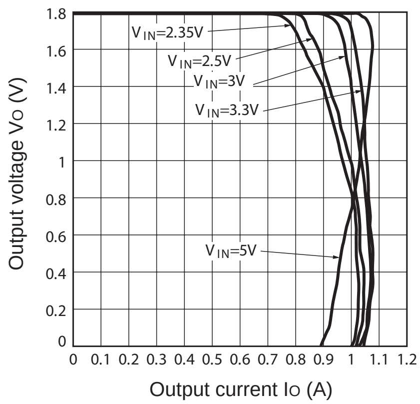


Fig.6 Overcurrent Protection Characteristics (**PQ025EZ5MZxH**)

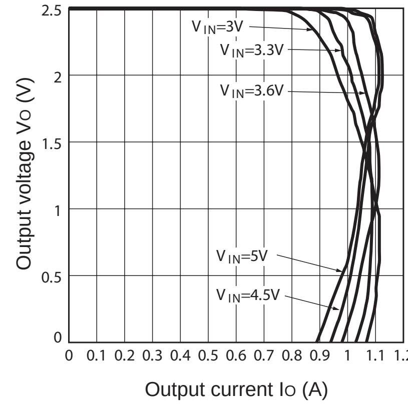


Fig.7 Overcurrent Protection Characteristics (**PQ030EZ5MZxH**)

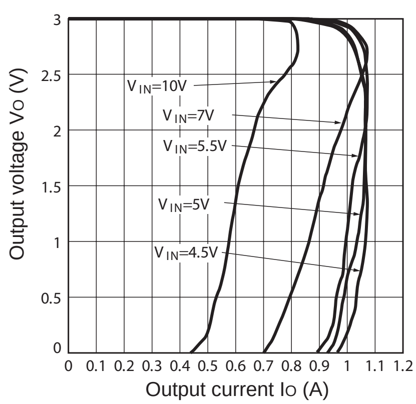


Fig.8 Overcurrent Protection Characteristics (**PQ033EZ5MZxH**)

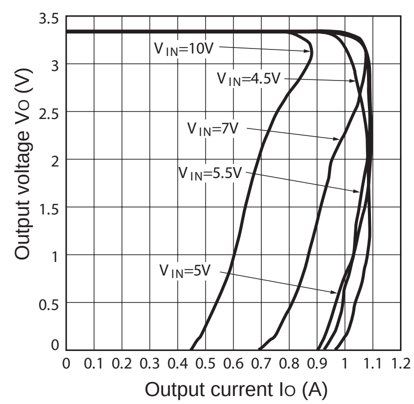


Fig.9 Overcurrent Protection Characteristics (**PQ015EZ01ZxH**)

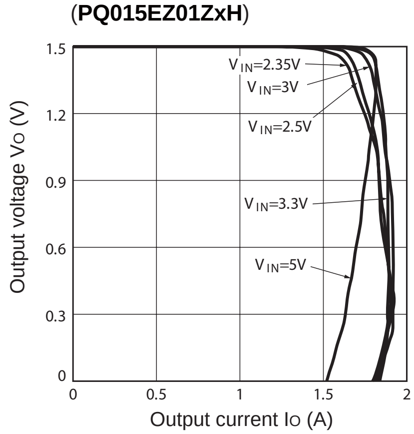


Fig.10 Overcurrent Protection Characteristics (**PQ018EZ01ZxH**)

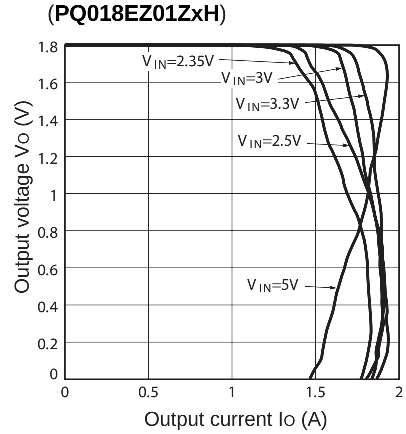


Fig.11 Overcurrent Protection Characteristics
(**PQ025EZ01ZxH**)

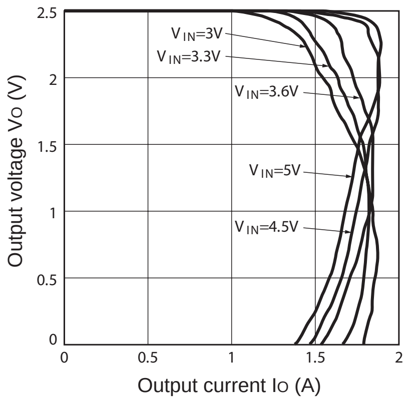


Fig.12 Overcurrent Protection Characteristics
(**PQ030EZ01ZxH**)

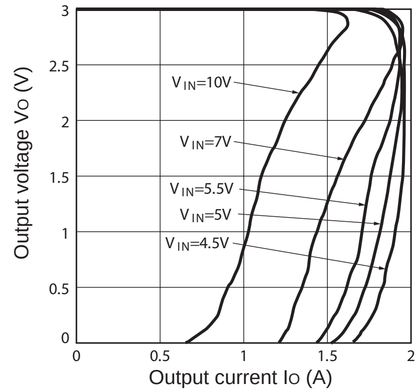


Fig.13 Overcurrent Protection Characteristics
(**PQ033EZ01ZxH**)

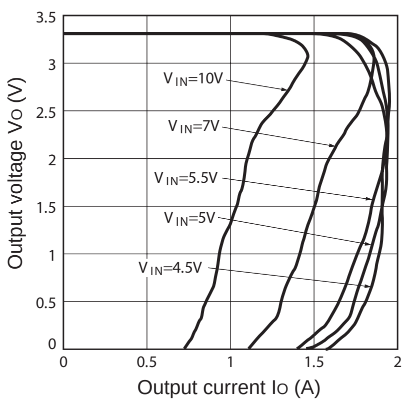


Fig.14 Output Voltage vs. Ambient Temperature
(PQ015EZ5MZxH / PQ015EZ01ZxH)

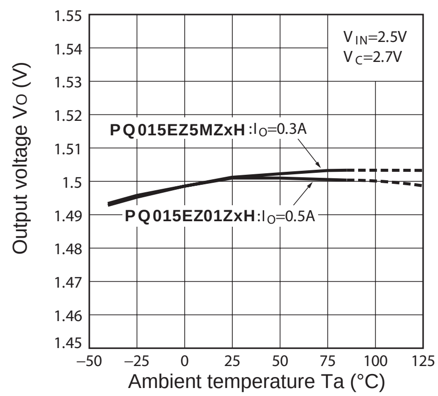


Fig.15 Output Voltage vs. Ambient Temperature
(PQ018EZ5MZxH / PQ018EZ01ZxH)

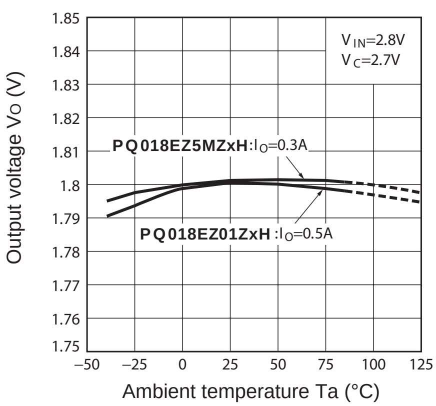


Fig.16 Output Voltage vs. Ambient Temperature
(PQ025EZ5MZxH / PQ025EZ01ZxH)

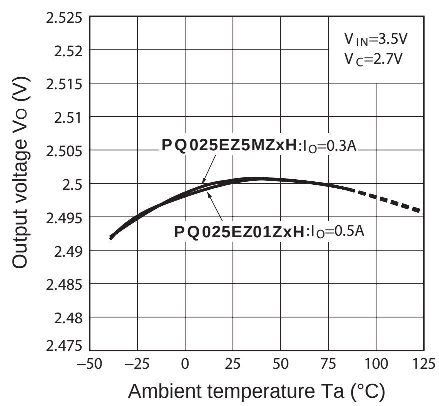


Fig.17 Output Voltage vs. Ambient Temperature
(**PQ030EZ5MZxH / PQ030EZ01ZxH)**

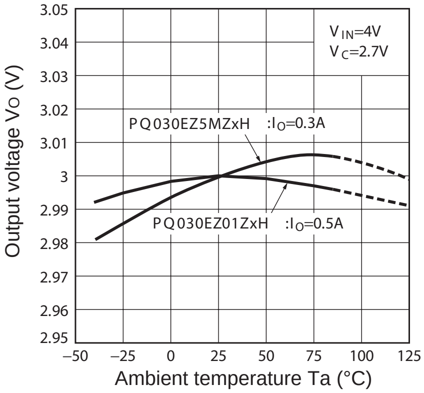


Fig.18 Output Voltage vs. Ambient Temperature
(**PQ033EZ5MZxH / PQ033EZ01ZxH)**

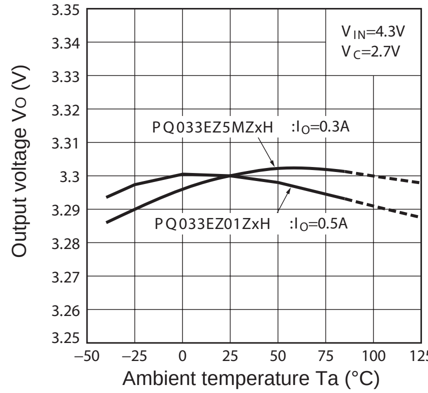


Fig.19 Output Voltage vs. Input Voltage
(**PQ015EZ5MZxH**)

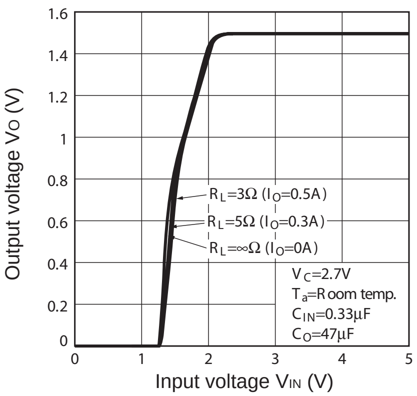


Fig.20 Output Voltage vs. Input Voltage
(**PQ018EZ5MZxH**)

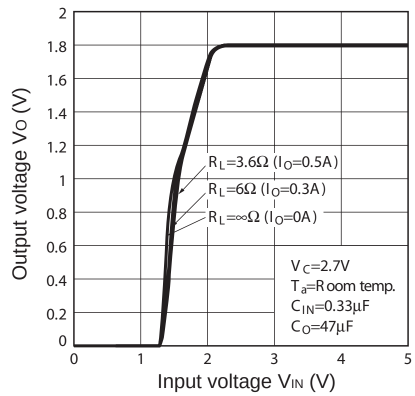


Fig.21 Output Voltage vs. Input Voltage
(**PQ025EZ5MZxH**)

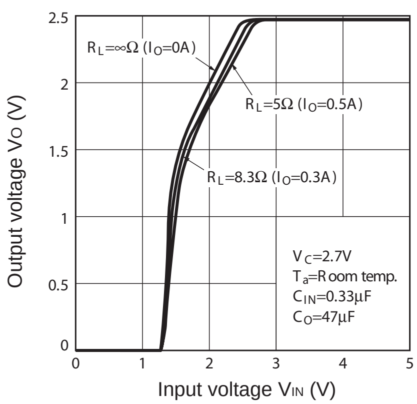


Fig.22 Output Voltage vs. Input Voltage
(**PQ030EZ5MZxH**)

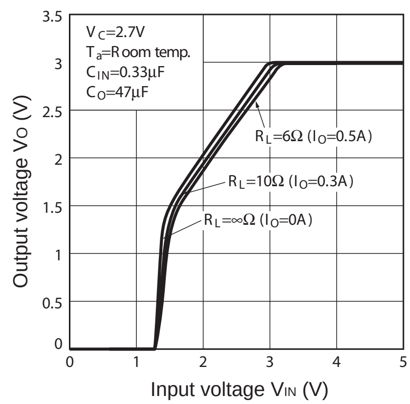


Fig.23 Output Voltage vs. Input Voltage (**PQ033EZ5MZxH**)

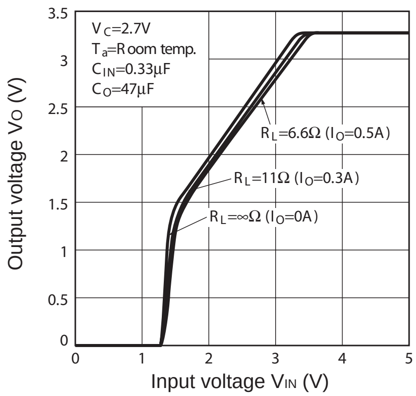


Fig.24 Output Voltage vs. Input Voltage (**PQ015EZ01ZxH**)

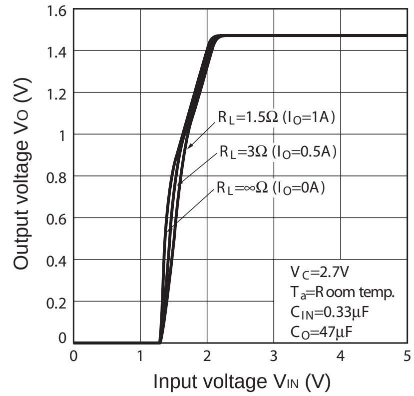


Fig.25 Output Voltage vs. Input Voltage (**PQ018EZ01ZxH**)

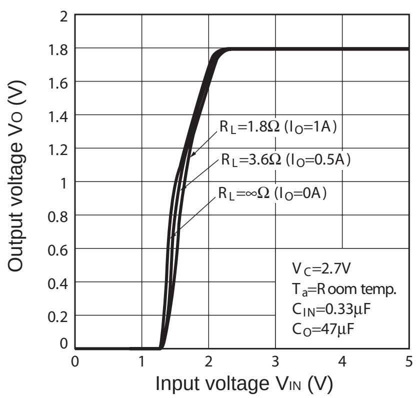


Fig.26 Output Voltage vs. Input Voltage (**PQ025EZ01ZxH**)

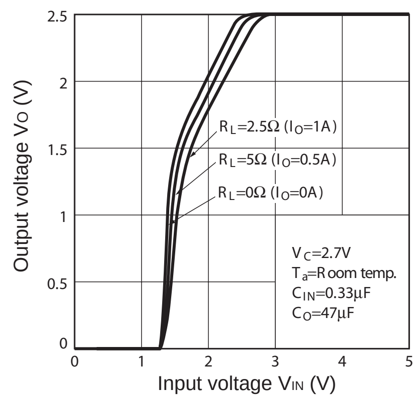


Fig.27 Output Voltage vs. Input Voltage (**PQ030EZ01ZxH**)

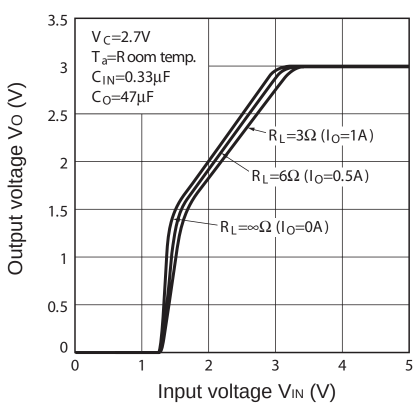


Fig.28 Output Voltage vs. Input Voltage (**PQ033EZ01ZxH**)

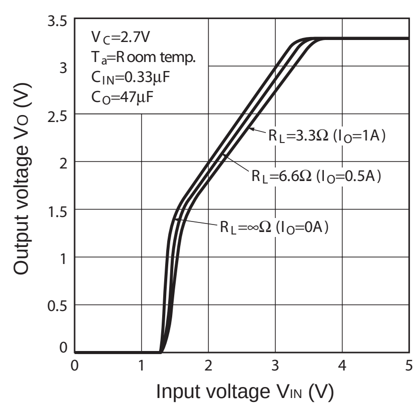


Fig.29 Circuit Operating Current vs. Input Voltage (**PQ015EZ5MZxH**)

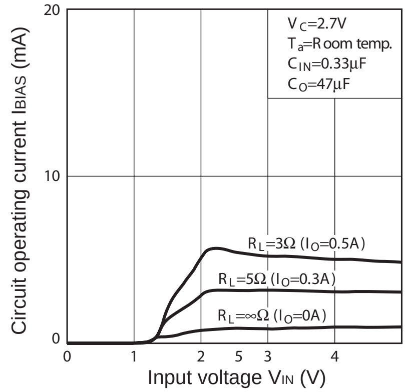


Fig.30 Circuit Operating Current vs. Input Voltage (**PQ018EZ5MZxH**)

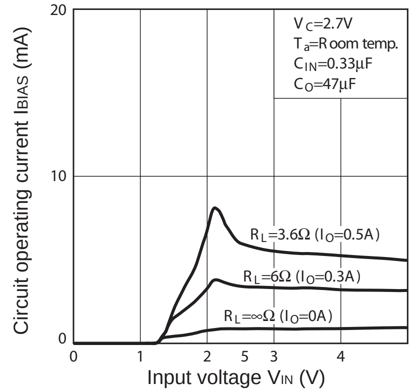


Fig.31 Circuit Operating Current vs. Input Voltage (**PQ025EZ5MZxH**)

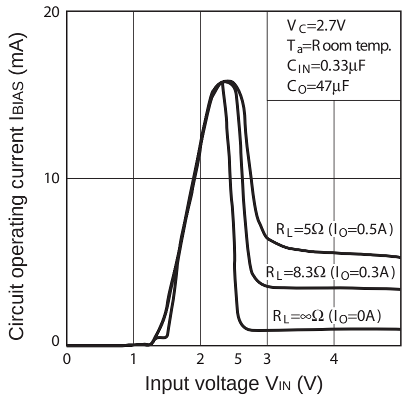


Fig.32 Circuit Operating Current vs. Input Voltage (**PQ030EZ5MZxH**)

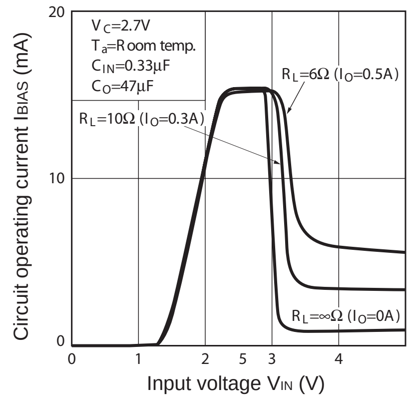


Fig.33 Circuit Operating Current vs. Input Voltage (**PQ033EZ5MZxH**)

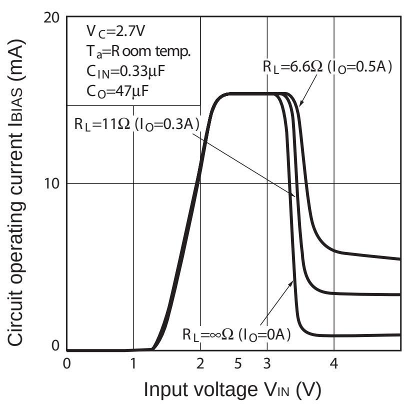


Fig.34 Circuit Operating Current vs. Input Voltage (**PQ015EZ01ZxH**)

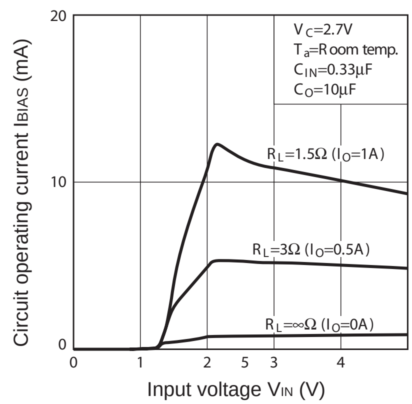


Fig.35 Circuit Operating Current vs. Input Voltage (**PQ018EZ01ZxH**)

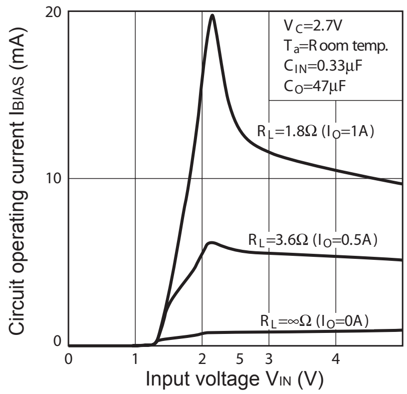


Fig.36 Circuit Operating Current vs. Input Voltage (**PQ025EZ01ZxH**)

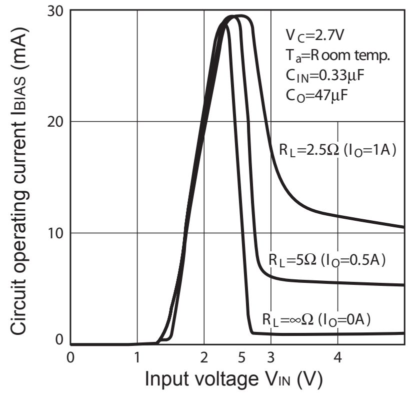


Fig.37 Circuit Operating Current vs. Input Voltage (**PQ030EZ01ZxH**)

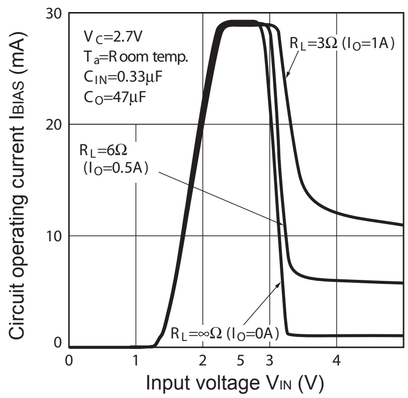


Fig.38 Circuit Operating Current vs. Input Voltage (**PQ033EZ01ZxH**)

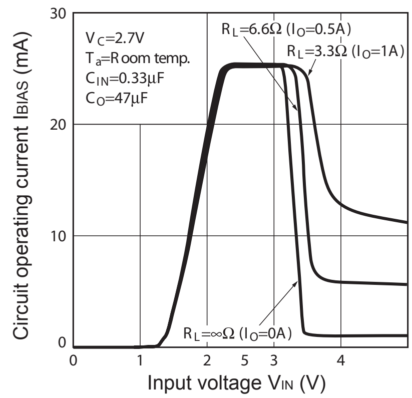


Fig.39 Quiescent Current vs. Junction Temperature

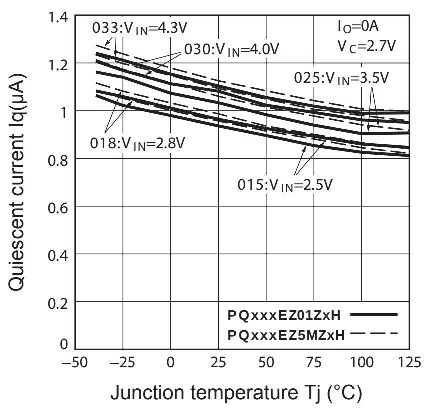


Fig.40 Dropout Voltage vs. Junction Temperature

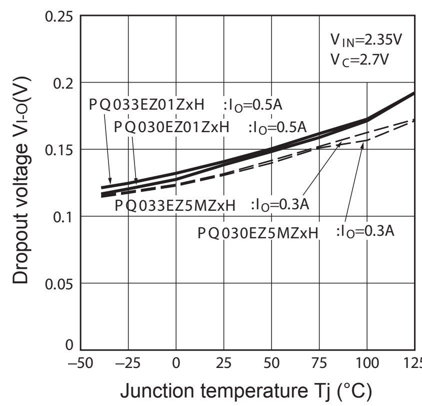


Fig.41 Ripple Rejection vs. Input Ripple Frequency

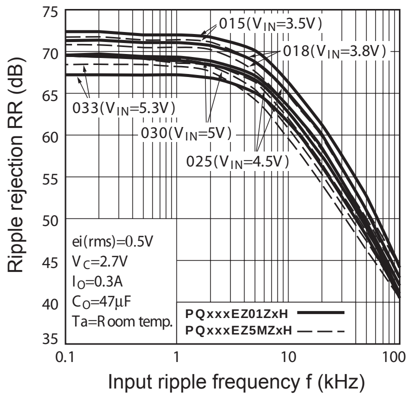


Fig.42 Ripple Rejection vs. Output Current

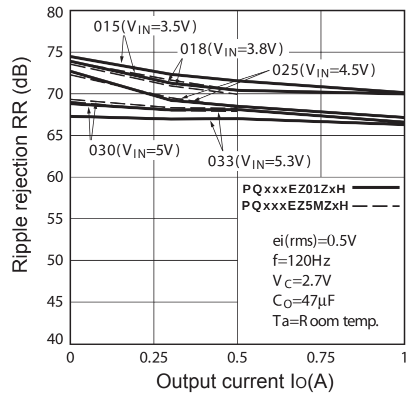


Fig.43 Typical Application

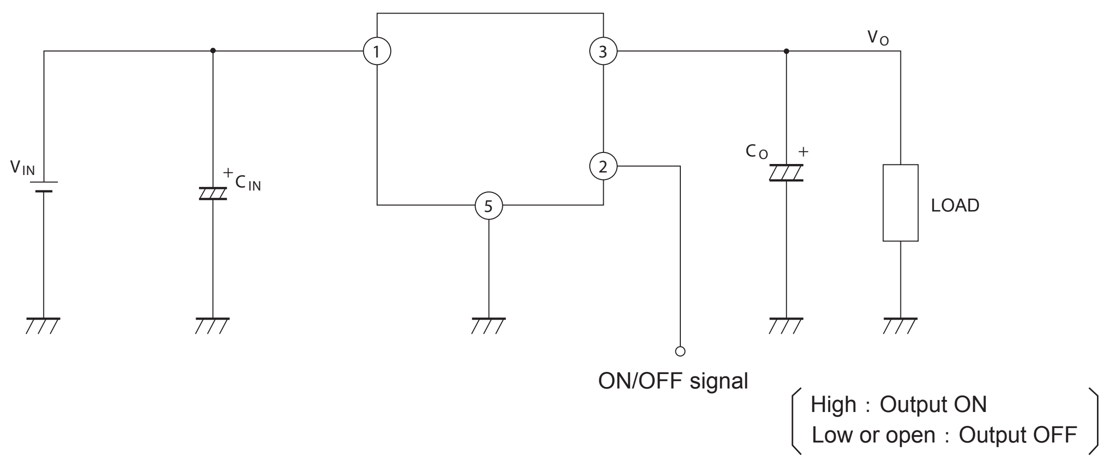
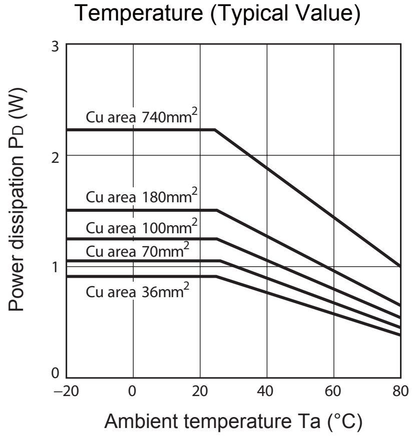
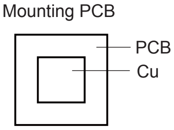


Fig.44 Power Dissipation vs. Ambient Temperature (Typical Value)



Mounting PCB



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