PQxxxEN01ZPH Series

Low Voltage Operation,Compact Surface Mount type Low Power-Loss Voltage Regulators

■ Features

1.Low voltage operation
(Minimum operating voltage: 2.35V)
2.Output current : 1A
3.Low dissipation current
(Dissipation current at no load: MAX. 2mA
Output OFF-state dissipation current: MAX.5μA)
4.Low power-loss
5.Built-in overcurrent and overheat protection functions
6.Conform to Flow Soldering SC-63 package
7.RoHS directive compliant

■ Applications

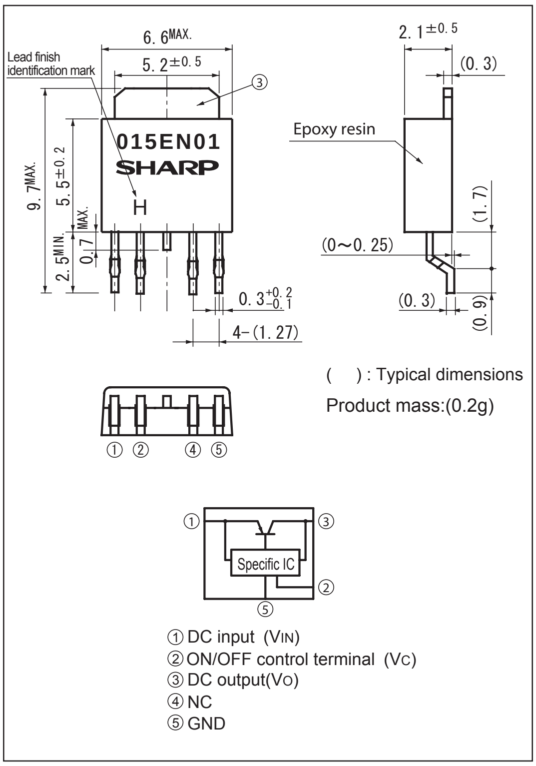
1.Personal computers and peripheral equipment
2.Power supplies for various digital electronic equipment such as DVD player or STB

■ Model Line-up

Output Voltage (TYP.)	Model No.
1.5V	**PQ015EN01ZPH**
1.8V	**PQ018EN01ZPH**
2.5V	**PQ025EN01ZPH**
3.0V	**PQ030EN01ZPH**
3.3V	**PQ033EN01ZPH**

■ Outline Dimensions

(Unit : mm)



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

■ Absolute Maximum Ratings

(Ta=25°C)

Parameter	Symbol	Rating	Unit
*1 Input voltage	V_{IN}	10	V
*1 Output control voltage	V_C	10	V
Output current	I_O	1	A
*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 At surface-mounted condition
*3 Overheat protection may operate at Tj:125°C to 150°C

Electrical Characteristics

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

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input voltage	V_{IN}	-	Refer to the following table.1			V
Output voltage	V_O	-	Refer to the following table.2			V
Load regulation	$R_{eg}L$	I_O=5mA to 1A	-	0.2	2	%
Line regulation	$R_{eg}I$	$V_{IN}=V_O$(TYP.)+1V to V_O(TYP.)+6V , I_O=5mA	-	0.1	1	%
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.3	45	60	-	dB
※4 Dropout voltage	V_{I-O}	I_O=0.5A ※5	-	0.2	0.5	V
※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 to **PQ030EN01ZPH** and **PQ033EN01ZPH**
※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

Table.1 Input Voltage range

(Unless otherwise specified,condition shall be I_O=0.5A,V_C=2.7V,Ta=25°C)

Model No.	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
PQ015EN01ZPH	V_{IN}	-	2.35	-	10	V
PQ018EN01ZPH	V_{IN}	-	2.35	-	10	V
PQ025EN01ZPH	V_{IN}	-	3.0	-	10	V
PQ030EN01ZPH	V_{IN}	-	3.5	-	10	V
PQ033EN01ZPH	V_{IN}	-	3.8	-	10	V

Table.2 Output Voltage

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

Model No.	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
PQ015EN01ZPH	V_O	-	1.45	1.5	1.55	V
PQ018EN01ZPH	V_O	-	1.75	1.8	1.85	V
PQ025EN01ZPH	V_O	-	2.438	2.5	2.562	V
PQ030EN01ZPH	V_O	-	2.925	3.0	3.075	V
PQ033EN01ZPH	V_O	-	3.218	3.3	3.382	V

Fig.1 Typical Application

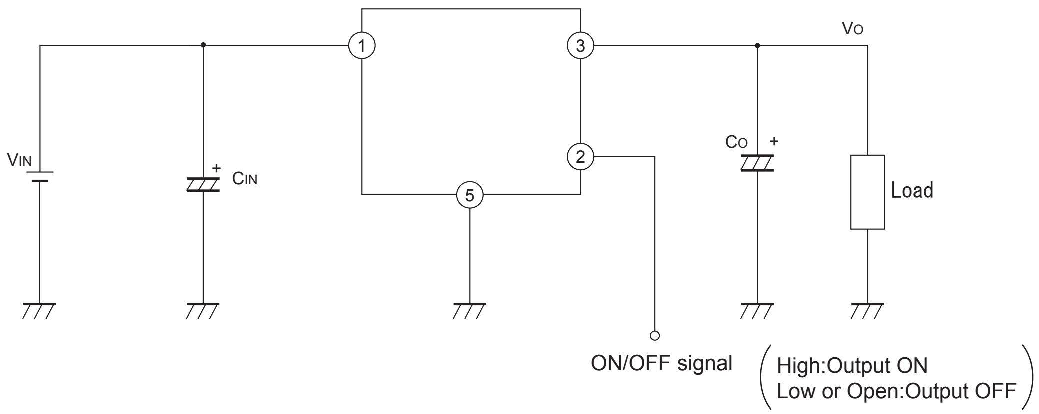


Fig.2 Test Circuit

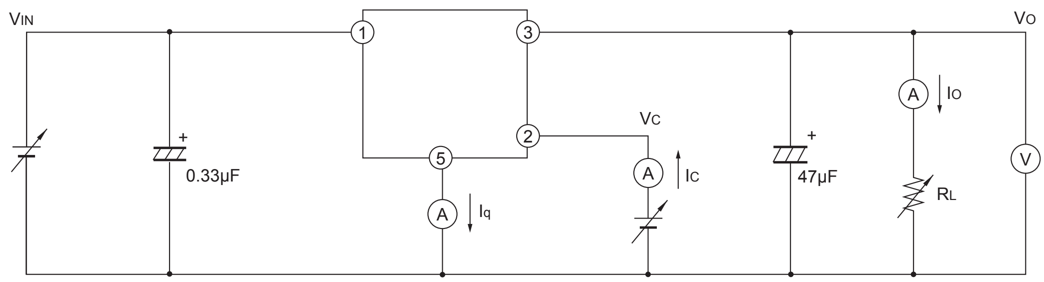
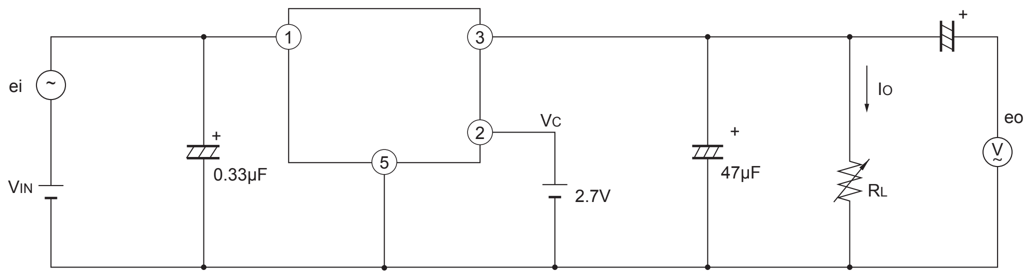
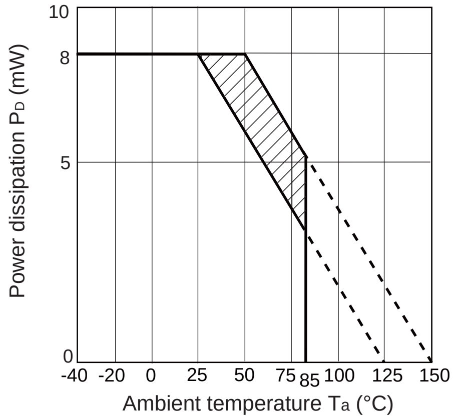


Fig.3 Test Circuit for Ripple Rejection



f=120Hz(sine wave)
ei(rms)=0.5V
$V_{IN}=V_O(TYP)+2V$
$I_O=0.3A$
RR=20log(ei(rms)/eo(rms))

Fig.4 Power Dissipation vs. Ambient Temperature



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

Fig.5 Overcurrent Protection Characteristics (**PQ015EN01ZPH**)

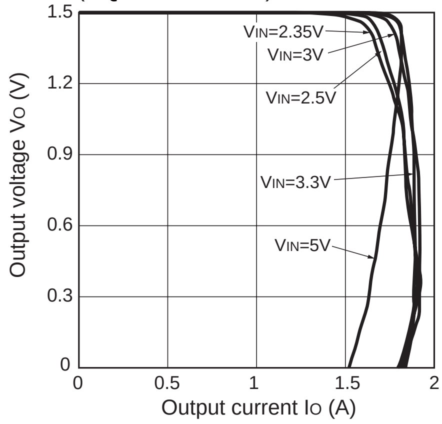


Fig.6 Overcurrent Protection Characteristics (**PQ018EN01ZPH**)

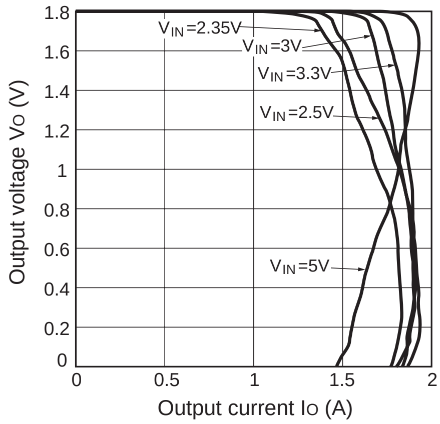


Fig.7 Overcurrent Protection Characteristics (**PQ025EN01ZPH**)

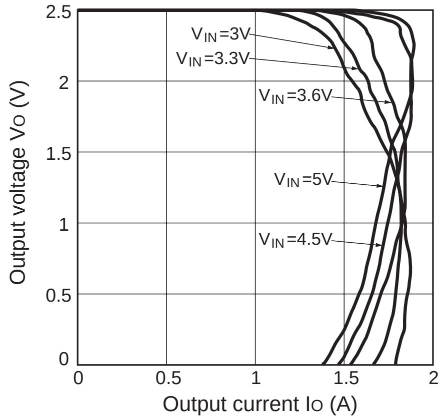


Fig.8 Overcurrent Protection Characteristics (**PQ030EN01ZPH**)

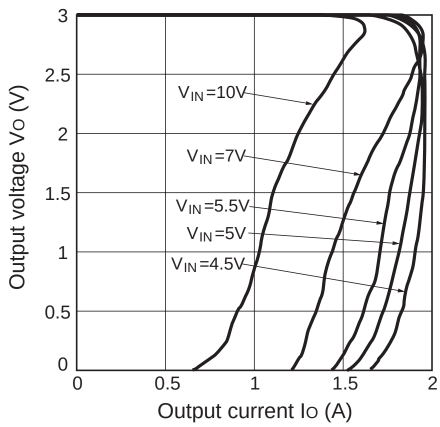


Fig.9 Overcurrent Protection Characteristics (**PQ033EN01ZPH**)

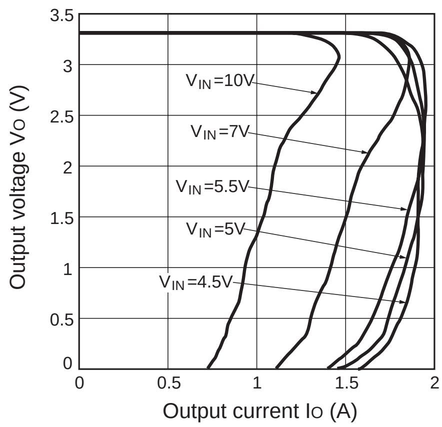


Fig.10 Output Voltage vs. Ambient Temperature (**PQ015EN01ZPH)**

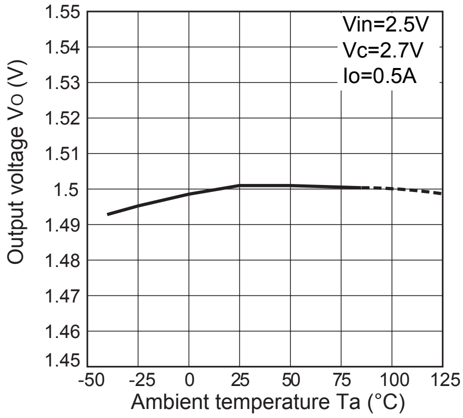


Fig.11 Output Voltage vs. Ambient Temperature (**PQ018EN01ZPH)**

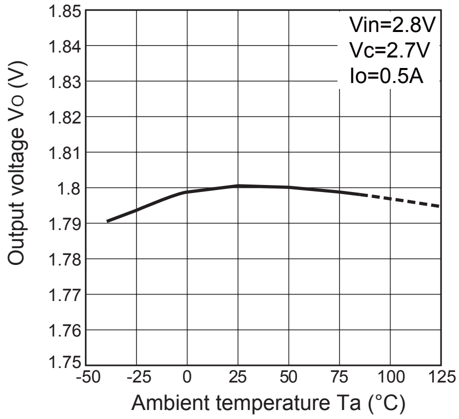


Fig.12 Output Voltage vs. Ambient Temperature (**PQ025EN01ZPH)**

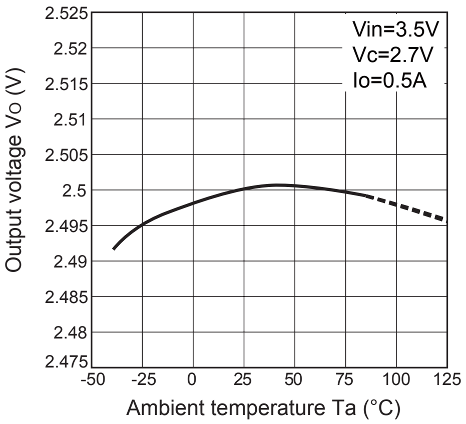


Fig.13 Output Voltage vs. Ambient Temperature (**PQ030EN01ZPH)**

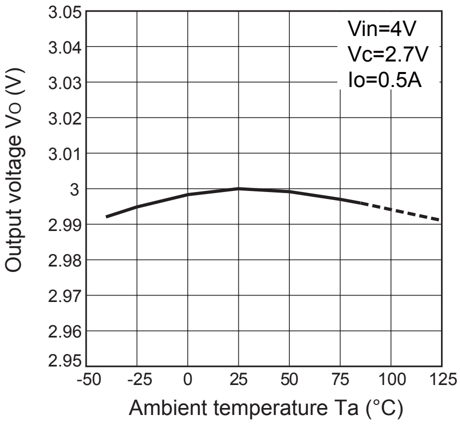


Fig.14 Output Voltage vs. Ambient Temperature (**PQ033EN01ZPH)**

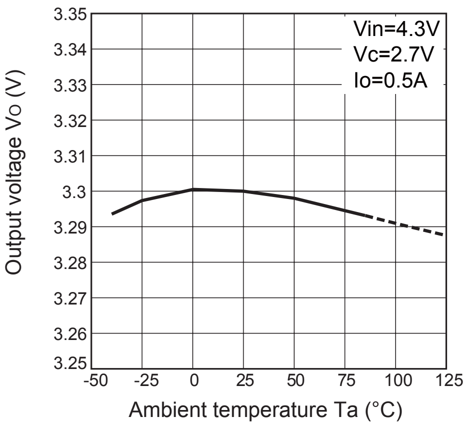


Fig.15 Output Voltage vs. Input Voltage (**PQ015EN01ZPH**)

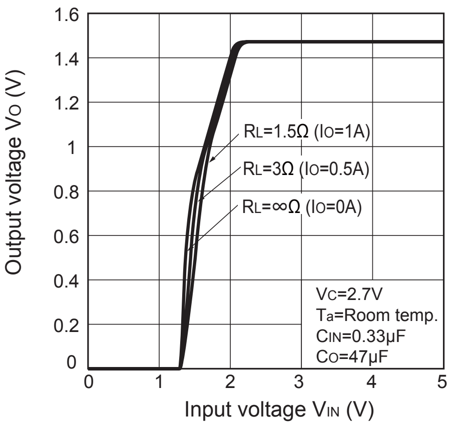


Fig.16 Output Voltage vs. Input Voltage (**PQ018EN01ZPH**)

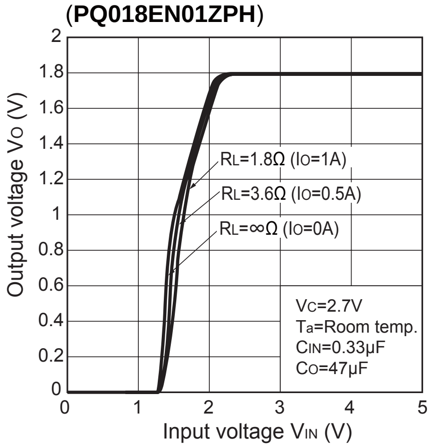


Fig.17 Output Voltage vs. Input Voltage (**PQ025EN01ZPH**)

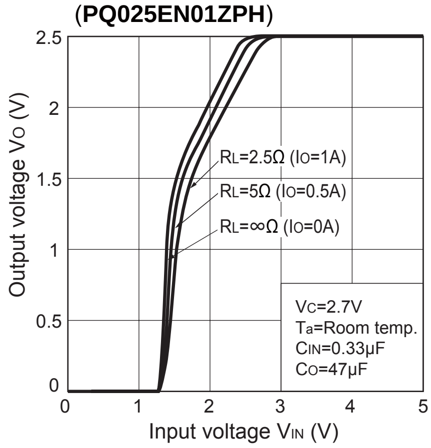


Fig.18 Output Voltage vs. Input Voltage (**PQ030EN01ZPH**)

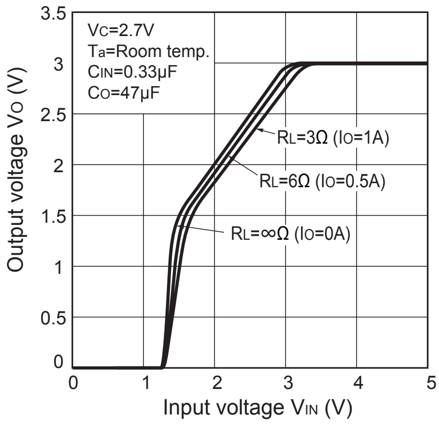


Fig.19 Output Voltage vs. Input Voltage (**PQ033EN01ZPH**)

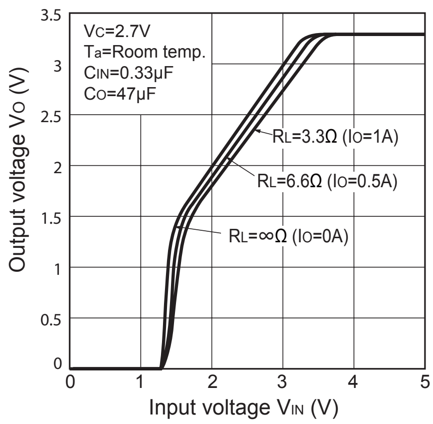


Fig.20 Circuit Operating Current vs. Input Voltage (**PQ015EN01ZPH**)

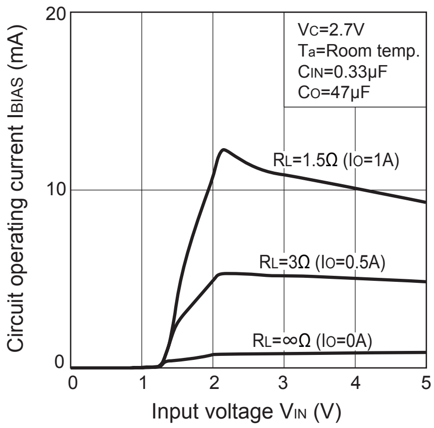


Fig.21 Circuit Operating Current vs. Input Voltage (**PQ018EN01ZPH**)

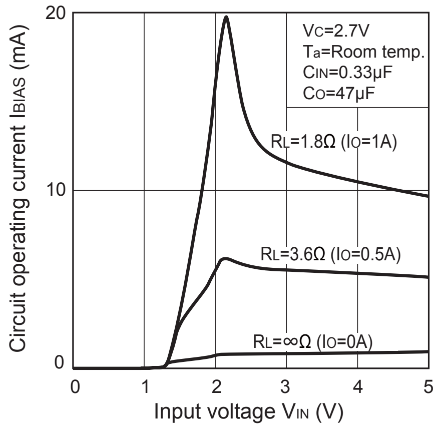


Fig.22 Circuit Operating Current vs. Input Voltage (**PQ025EN01ZPH**)

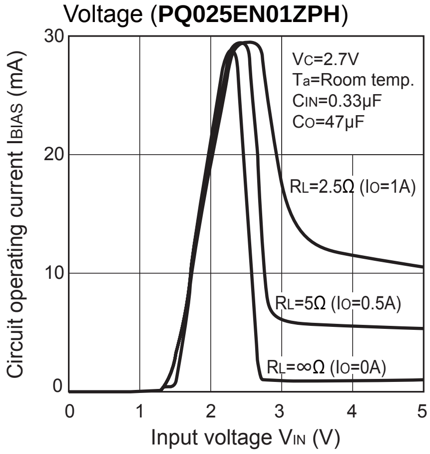


Fig.23 Circuit Operating Current vs. Input Voltage (**PQ030EN01ZPH**)

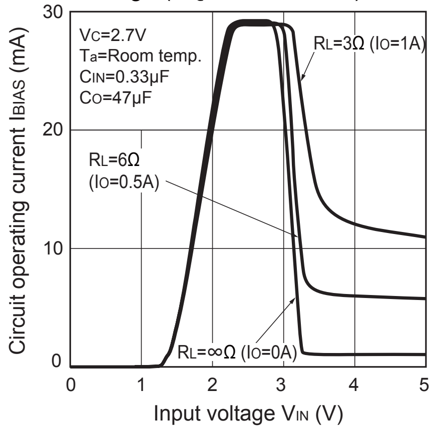


Fig.24 Circuit Operating Current vs. Input Voltage (**PQ033EN01ZPH**)

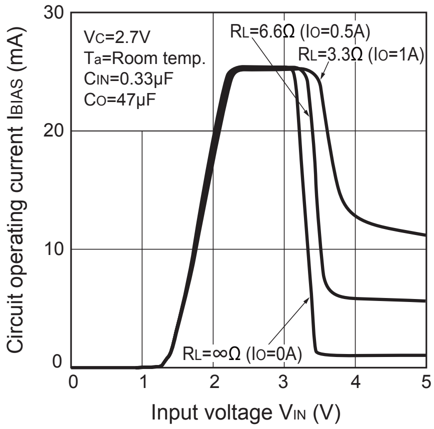


Fig.25 Quiescent Current vs. Junction Temperature (**PQxxxEN01ZPH**)

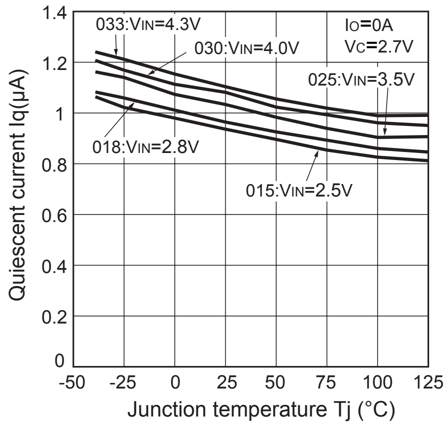


Fig.26 Dropout Voltage vs. Junction Temperature (**PQ030EN01ZPH,PQ033EN01ZPH**)

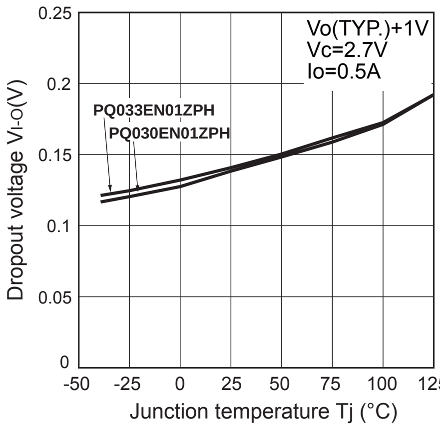


Fig.27 Ripple Rejection vs. Input Ripple Frequency (**PQxxxEN01ZPH**)

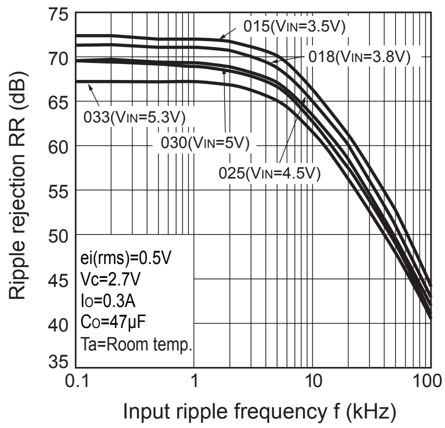


Fig.28 Ripple Rejection vs. Output Current (**PQxxxEN01ZPH**)

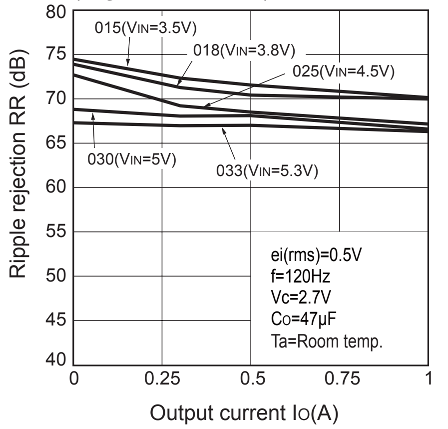
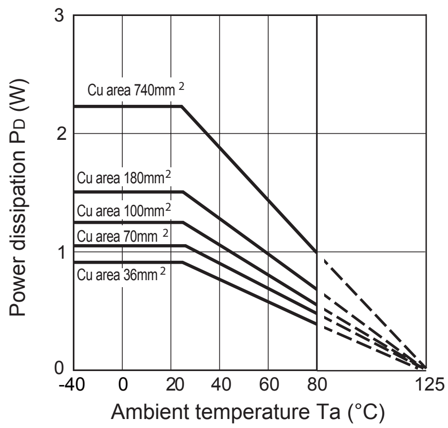
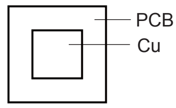


Fig.29 Power Dissipation vs. Ambient Temperature (Typical Value)



Mounting PCB



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