PQxxxEZ1HZ Series

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
- Low power-loss
- Built-in overcurrent and overheat protection functions

Applications

- Power supplies for personal computers and peripheral equipment
- Power supplies for various electronic equipment such as DVD player or STB

Model Line-up

Output current	Output voltage		
	1.5V	1.8V	2.5V
1.5A	PQ015EZ1HZ	PQ018EZ1HZ	PQ025EZ1HZ
	3V	3.3V	
1.5A	PQ030EZ1HZ	PQ033EZ1HZ	

Absolute Maximum Ratings

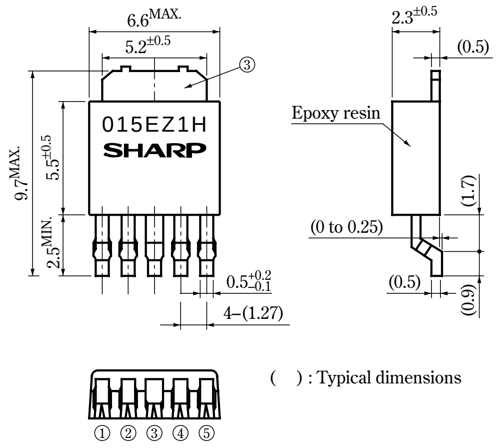
(Ta=25°C)

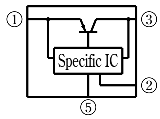
Parameter	Symbol	Rating	Unit
※1 Input voltage	V_{IN}	10	V
※1 ON/OFF control terminal voltage	V_C	10	V
Output current	I_O	1.5	A
※2 Power dissipation	P_D	8	W
※3 Junction temperature	T_j	150	˚C
Operating temperature	T_{opr}	–40 to +85	˚C
Storage temperature	T_{stg}	–40 to +150	˚C
Soldering temperature	T_{sol}	260 (10s)	˚C

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

Outline Dimensions

(Unit : mm)





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

•Please refer to the chapter " Handling Precautions ".

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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 table 1			V
Output voltage	V_O	–	Refer to the table 2			V
Load regulation	$R_{eg}L$	I_O=5mA to 1.5A	–	0.2	2	%
Line regulation	$R_{eg}I$	$V_{IN}=V_O$(TYP.)+1V to V_O(TYP.)+6V	–	0.1	1	%
Temperature coefficient of output voltage	T_CV_O	T_j=0 to 125˚C, I_O=5mA	–	±0.01	–	%/˚C
Ripple Rejection	RR	Refer to Fig.2	45	60	–	dB
※4 Dropout voltage	V_{I-O}	※5 I_O=1.25A	–	–	1	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 for PQ030EZ1HZ, PQ033EZ1HZ
※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 Line-up

(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
PQ015EZ1HZ	V_{IN}	–	2.35	–	10	V
PQ018EZ1HZ	V_{IN}	–	2.35	–	10	V
PQ025EZ1HZ	V_{IN}	–	3	–	10	V
PQ030EZ1HZ	V_{IN}	–	3.5	–	10	V
PQ033EZ1HZ	V_{IN}	–	3.8	–	10	V

Table.2 Output Voltage Line-up

(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
PQ015EZ1HZ	V_O	–	1.45	1.5	1.55	V
PQ018EZ1HZ	V_O	–	1.75	1.8	1.85	V
PQ025EZ1HZ	V_O	–	2.438	2.5	2.562	V
PQ030EZ1HZ	V_O	–	2.925	3	3.075	V
PQ033EZ1HZ	V_O	–	3.218	3.3	3.382	V

Fig.1 Test Circuit

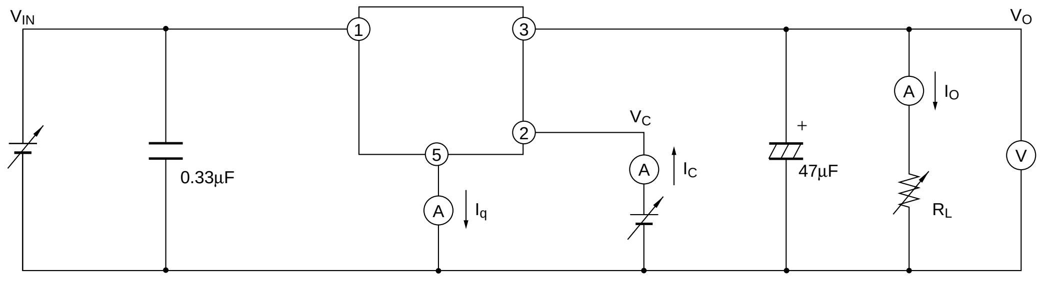
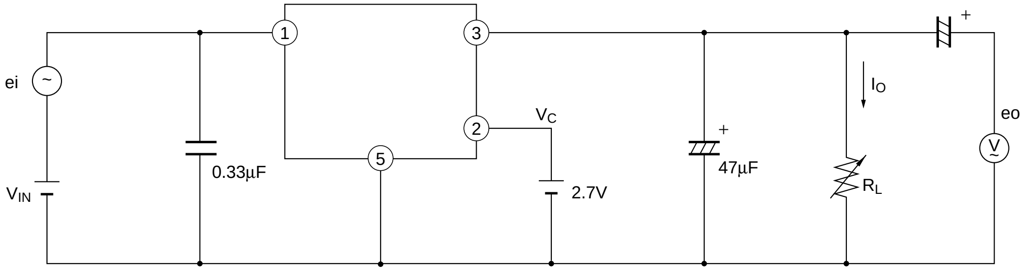
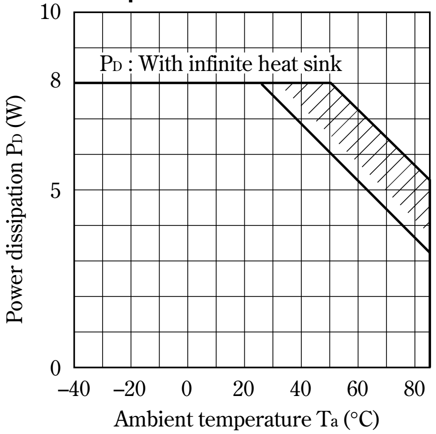


Fig.2 Test Circuit for Ripple Rejection



f=120Hz (sine wave)
ei(rms)=0.5V
$V_{IN}=V_O(TYP)+2V$
$I_O=0.3A$
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 (Typical Value) (PQ015EZ1HZ)

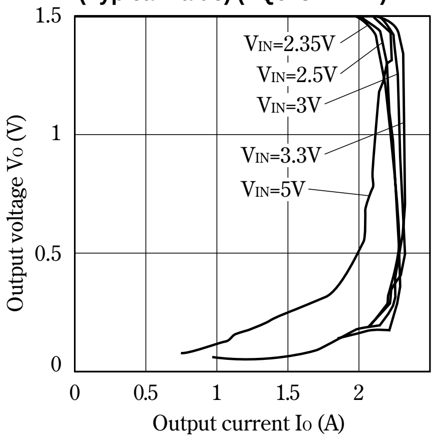


Fig.5 Overcurrent Protection Characteristics (Typical Value) (PQ018EZ1HZ)

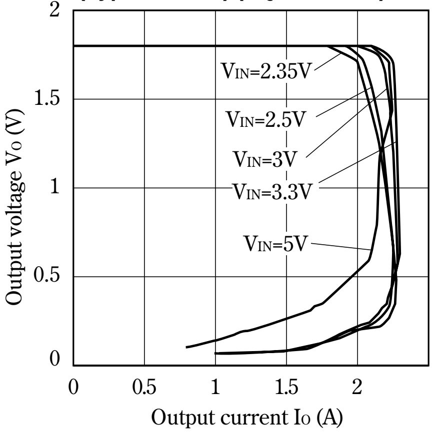


Fig.6 Overcurrent Protection Characteristics (PQ025EZ1HZ)

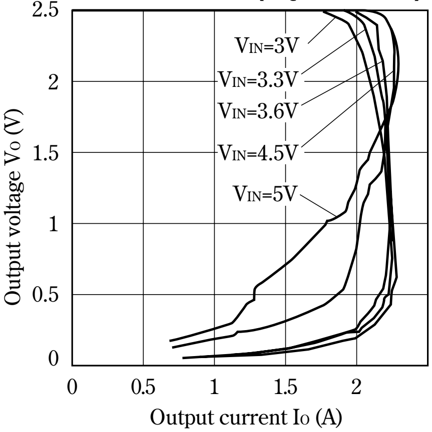


Fig.7 Overcurrent Protection Characteristics (PQ030EZ1HZ)

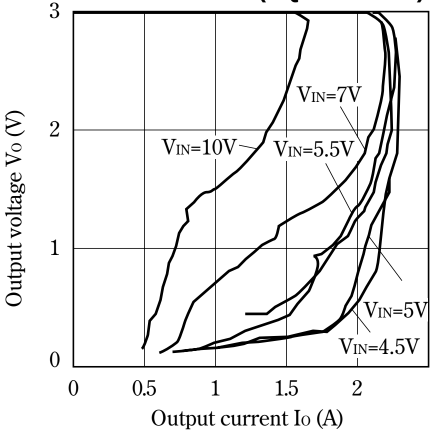


Fig.8 Overcurrent Protection Characteristics (PQ033EZ1HZ)

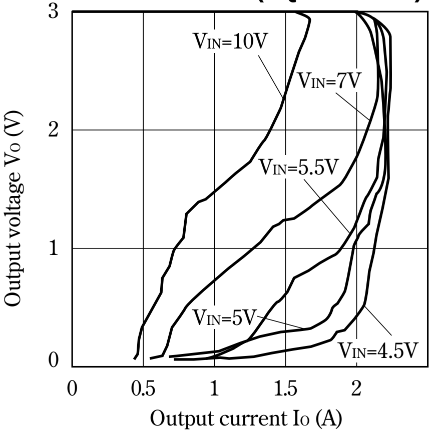


Fig.9 Output Voltage vs. Junction Temperature (PQ015EZ1HZ)

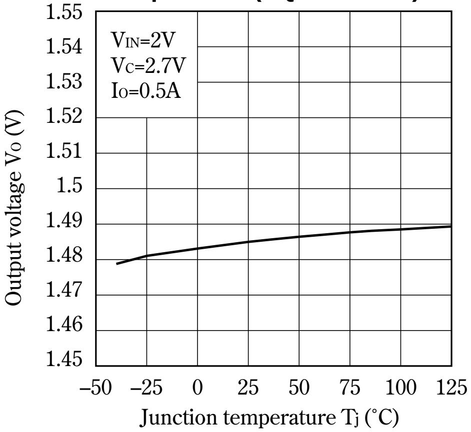


Fig.10 Output Voltage vs. Junction Temperature (PQ018EZ1HZ)

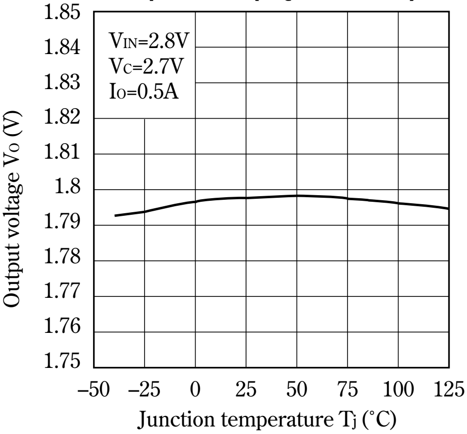


Fig.11 Output Voltage vs. Junction Temperature (PQ025EZ1HZ)

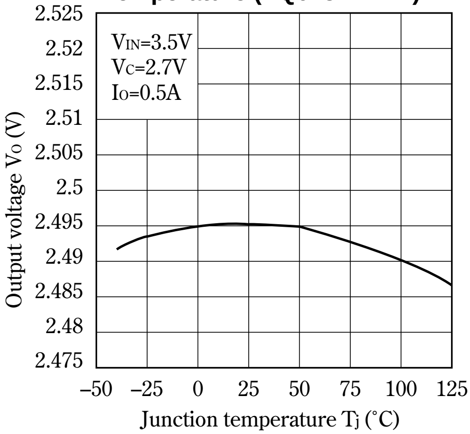


Fig.12 Output Voltage vs. Junction Temperature (PQ030EZ1HZ)

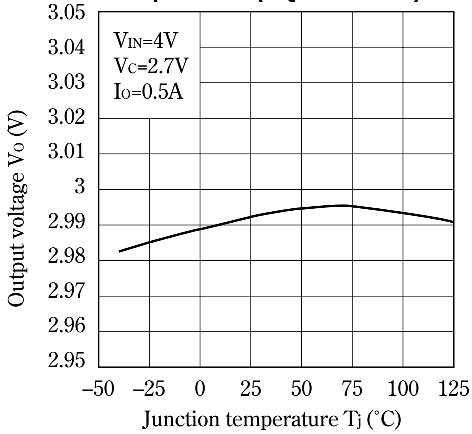


Fig.13 Output Voltage vs. Junction Temperature (PQ033EZ1HZ)

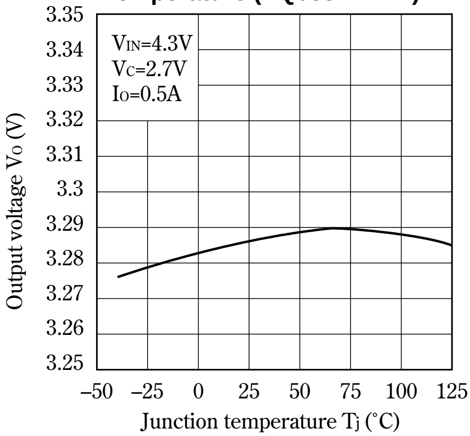


Fig.14 Output Voltage vs. Input Voltage (PQ015EZ1HZ)

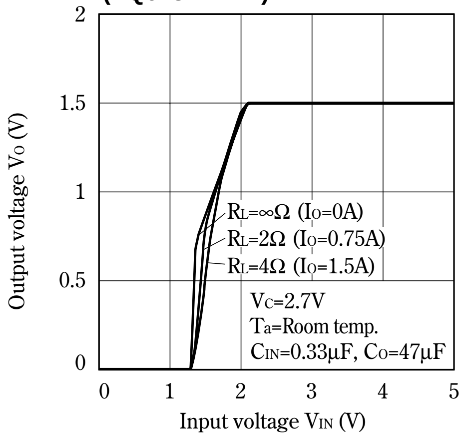


Fig.15 Output Voltage vs. Input Voltage (PQ018EZ1HZ)

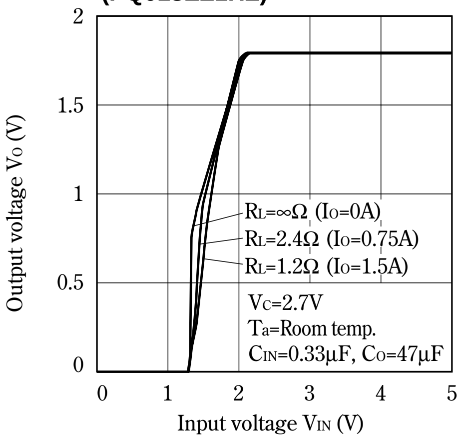


Fig.16 Output Voltage vs. Input Voltage (PQ025EZ1HZ)

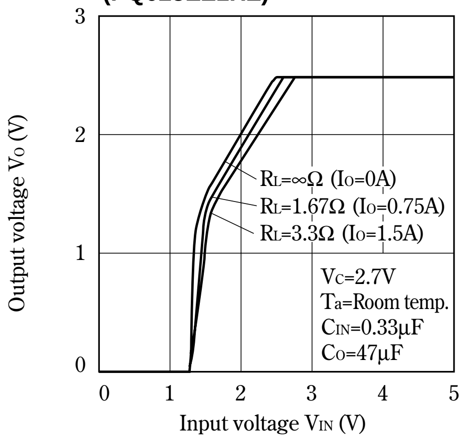


Fig.17 Output Voltage vs. Input Voltage (PQ030EZ1HZ)

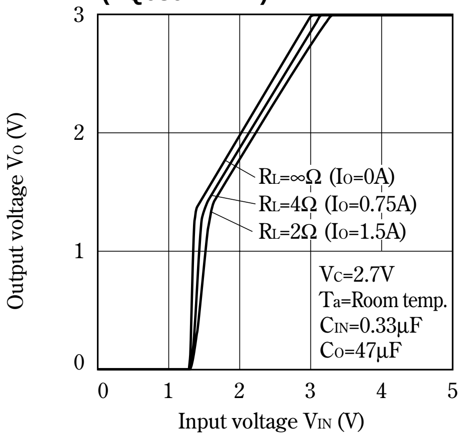


Fig.18 Output Voltage vs. Input Voltage (PQ033EZ1HZ)

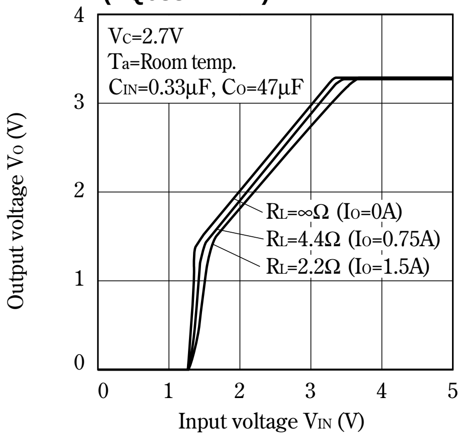


Fig.19 Circuit Operating Current vs. Input Voltage (PQ015EZ1HZ)

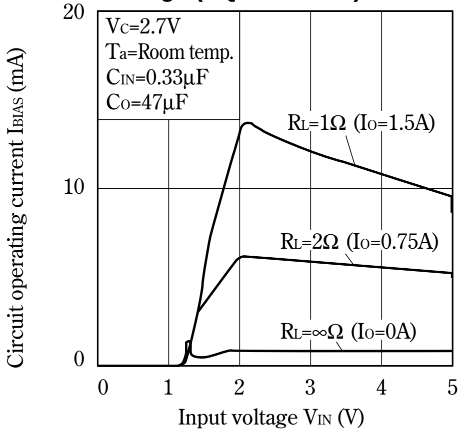


Fig.20 Circuit Operating Current vs. Input Voltage (PQ018EZ1HZ)

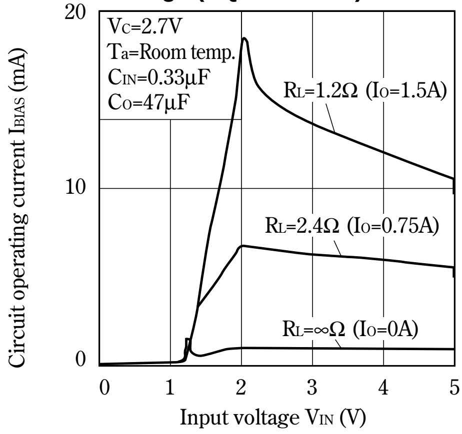


Fig.21 Circuit Operating Current vs. Input Voltage (PQ025EZ1HZ)

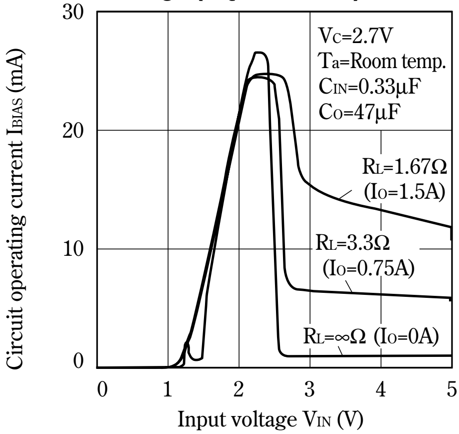


Fig.22 Circuit Operating Current vs. Input Voltage (PQ030EZ1HZ)

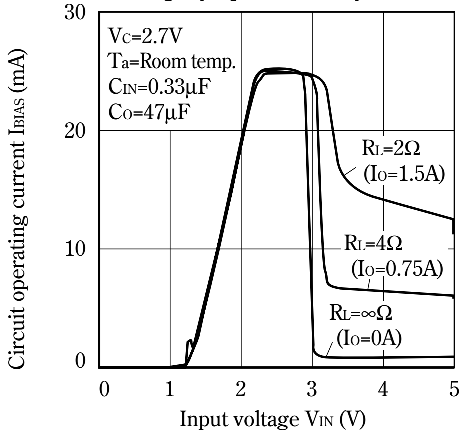


Fig.23 Circuit Operating Current vs. Input Voltage (PQ033EZ1HZ)

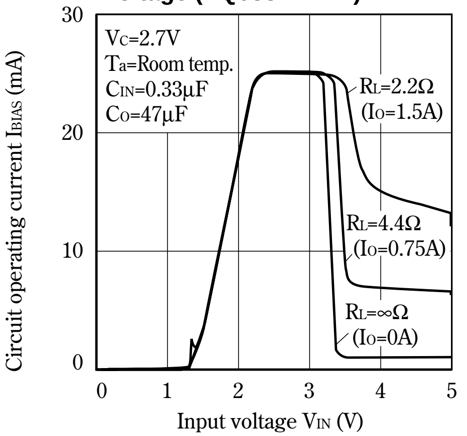


Fig.24 Dropout Voltage vs. Junction Temperature

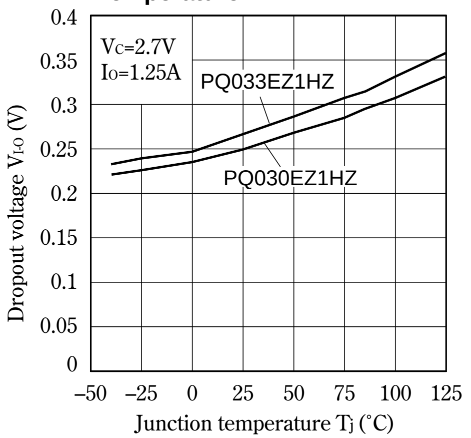


Fig.25 Quiescent Current vs. Junction Temperature

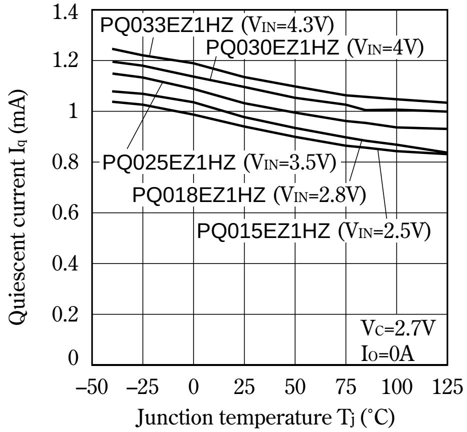


Fig.26 Ripple Rejection vs. Input Ripple Frequency

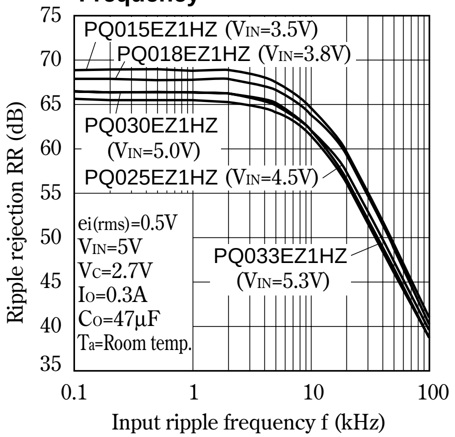


Fig.27 Ripple Rejection vs. Output Current

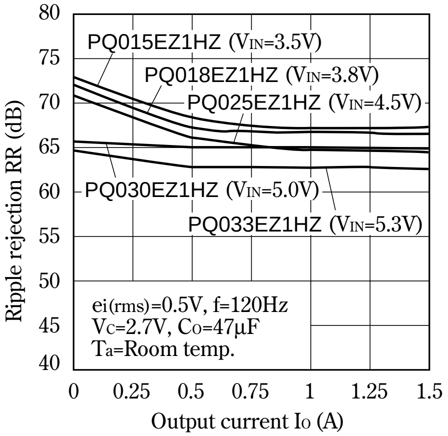
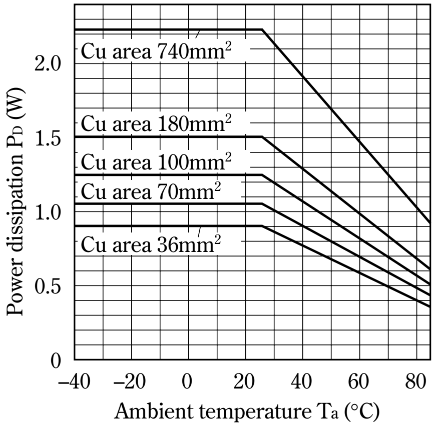
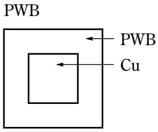


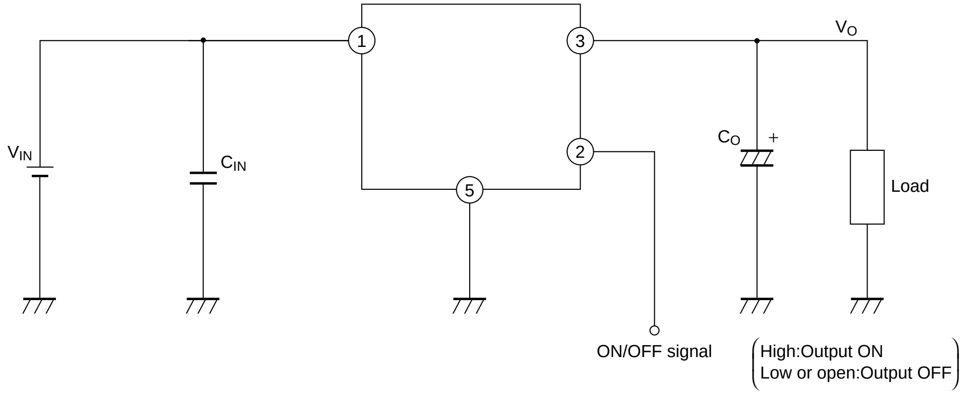
Fig.28 Power Dissipation vs. Ambient Temperature (Typical Value)





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

■ Typical Application



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  --- Personal computers
  --- Office automation equipment
  --- Telecommunication equipment [terminal]
  --- Test and measurement equipment
  --- Industrial control
  --- Audio visual equipment
  --- Consumer electronics

  (ii) Measures such as fail-safe function and redundant design should be taken to ensure reliability and safety when SHARP devices are used for or in connection with equipment that requires higher reliability such as:
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  --- Traffic signals
  --- Gas leakage sensor breakers
  --- Alarm equipment
  --- Various safety devices, etc.

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  --- Nuclear power control equipment
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