PQxxxEF01SZ Series

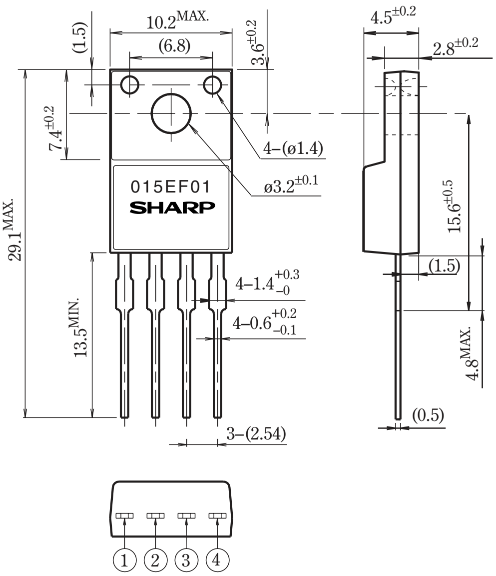
TO-220 Type, Low Voltage Operation Low Power-Loss Voltage Regulators

Features

- Low voltage operation (Minimum operating voltage: 2.35V)
  2.5V input → available 1.5 to 1.8V output
- Low dissipation current
  Dissipation current at no load: MAX.2mA
  Output OFF-state dissipation current: MAX.5μA
- Low power-loss
  Dropout voltage : MAX.0.5 V
- Built-in overcurrent and overheat protection functions

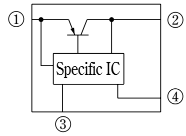
Outline Dimensions

(Unit : mm)



① DC input (VIN)
② DC output (VO)
③ GND
④ ON/OFF control terminal (VC)

Internal connection diagram



Applications

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

Model Line-up

Output voltage	Model No.	Output voltage	Model No.
1.5V	**PQ015EF01SZ**	2.5V	**PQ025EF01SZ**
1.8V	**PQ018EF01SZ**	3.3V	**PQ033EF01SZ**

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	1.0	A
※2 Power dissipation	P_{D1}	1.4	W
	P_{D2}	15	
※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_{D1}: No heat sink, P_{D2}: With infinite heat sink.
※3 Overheat protection may operate at T_j=125˚C to 150˚C.

•Please refer to the chapter " Handling Precautions ".

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 below			V
Output voltage	V_O	–	Refer to the table below			V
Load regulation	$R_{eg}L$	Io=5mA to 1A	–	0.2	2.0	%
Line regulation	$R_{eg}I$	$V_{IN}=V_O$(TYP.)+1V to V_O(TYP.)+6V, Io=5mA	–	0.1	1.0	%
Temperature coefficient of output voltage	T_CV_O	Tj=0 to 125°C, Io=5mA	–	±0.01	–	%/°C
Ripple Rejection	RR	–	45	60	–	dB
※5 Dropout voltage	V_{i-o}	Io=0.5A (at Vo=0.95V)	–	–	0.5	V
※4 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	$V_{C(OFF)}$	Io=0A	–	–	0.8	V
OFF-state current for control	$I_{C(OFF)}$	Io=0A, Vc=0.4V	–	–	–2	μA
Quiescent current	I_q	Io=0A	–	1	2	mA
Output OFF-state dissipation current	I_{qs}	Io=0A, Vc=0.4V	–	–	5	μA

※4 In case of opening control terminal④, output voltage turns off.
※5 In case of **PQ033EF01SZ**, apply to **PQ033EF01SZ** specification sheet.

Input Voltage Line-up

Model No.	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
PQ015EF01SZ	V_{IN}	I_O=0.5A, V_C=2.7V, T_a=25°C	2.35	–	10	V
PQ018EF01SZ			2.35	–	10	
PQ025EF01SZ			3.0	–	10	
PQ033EF01SZ			3.8	–	10	

Output Voltage Line-up

Model No.	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
PQ015EF01SZ	V_O	$V_{IN}=V_O$ (TYP.)+1V, I_O=0.5A, V_C=2.7V, T_a=25°C	1.45	1.5	1.55	V
PQ018EF01SZ			1.75	1.8	1.85	
PQ025EF01SZ			2.438	2.5	2.562	
PQ033EF01SZ			3.218	3.3	3.382	

Fig.1 Test Circuit

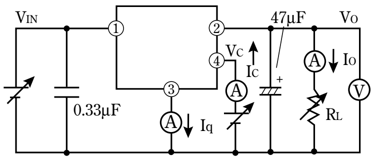
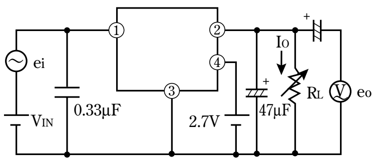
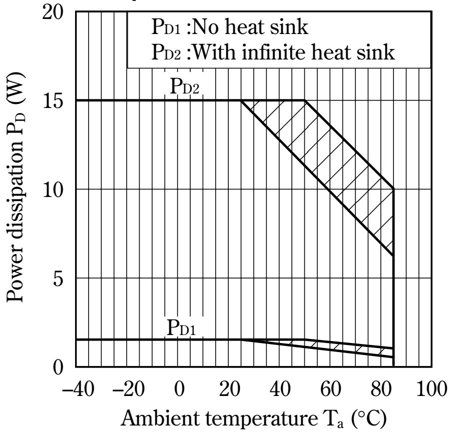


Fig.2 Test Circuit of Ripple Rejection



f=120Hz (sine wave)
ei(rms)=0.5V
$V_{IN}=V_O$(TYP)+2V
I_O=0.3A
RR=20 log(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, PQ015EF01SZ)

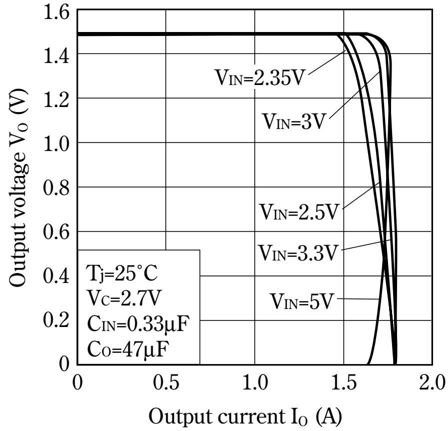


Fig.5 Overcurrent Protection Characteristics (Typical Value, PQ018EF01SZ)

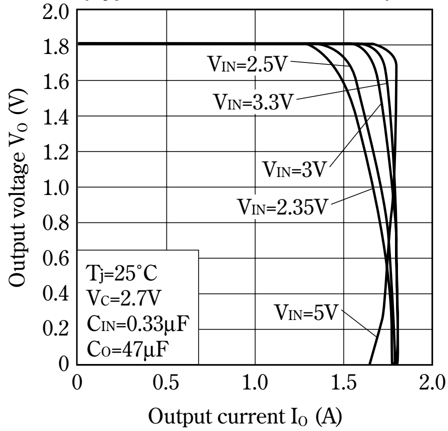


Fig.6 Overcurrent Protection Characteristics (Typical Value, PQ025EF01SZ)

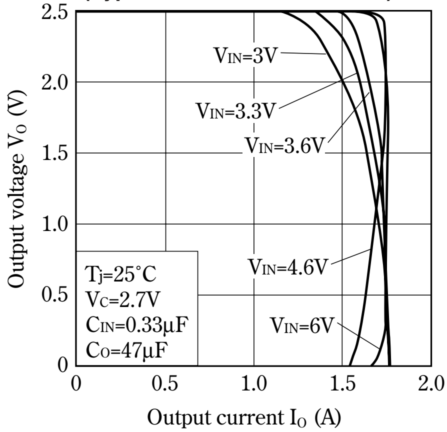


Fig.7 Overcurrent Protection Characteristics (Typical Value, PQ033EF01SZ)

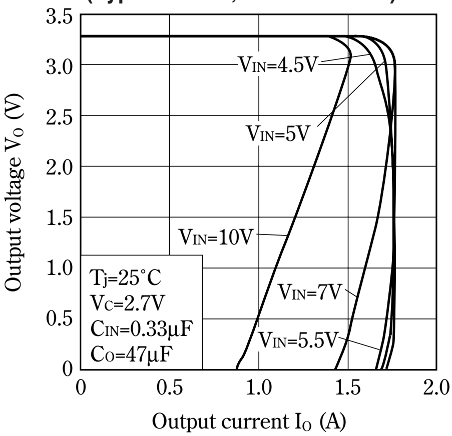


Fig.8 Output Voltage Fluctuation vs. Junction Temperature (PQ015EF01SZ)

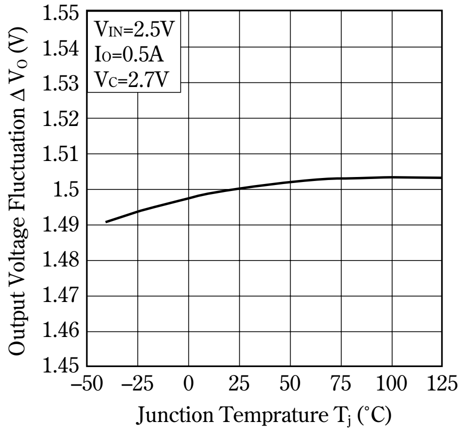


Fig.9 Output Voltage Fluctuation vs. Junction Temperature (PQ018EF01SZ)

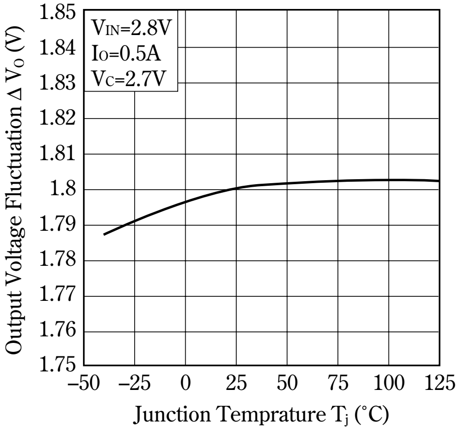


Fig.10 Output Voltage Fluctuation vs. Junction Temperature (PQ025EF01SZ)

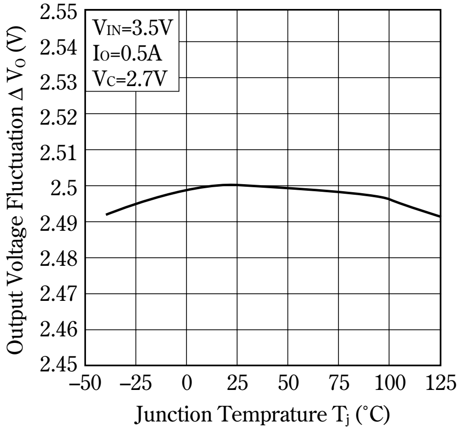


Fig.11 Output Voltage Fluctuation vs. Junction Temperature (PQ033EF01SZ)

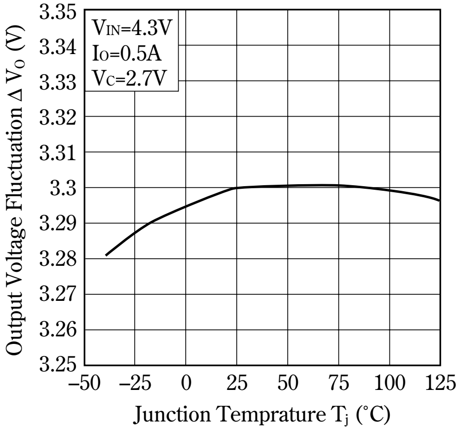


Fig.12 Output Voltage vs. Input Voltage (PQ015EF01SZ)

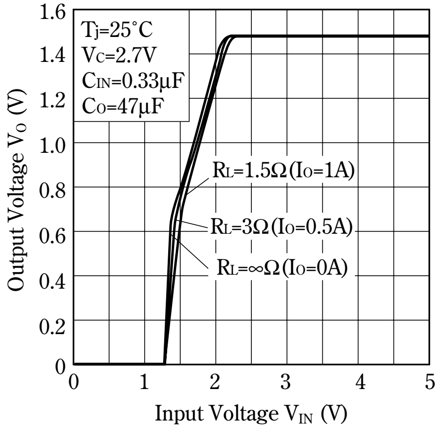


Fig.13 Output Voltage vs. Input Voltage (PQ018EF01SZ)

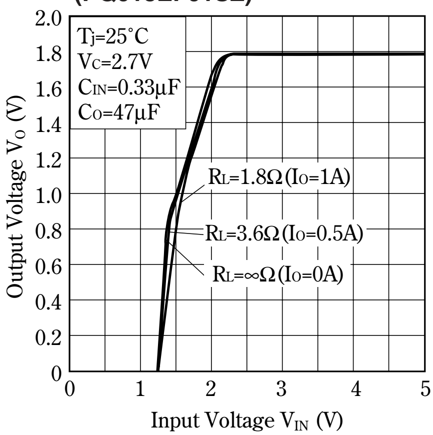


Fig.14 Output Voltage vs. Input Voltage (PQ025EF01SZ)

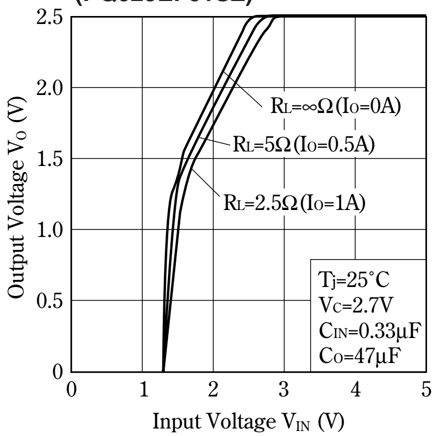


Fig.15 Output Voltage vs. Input Voltage (PQ033EF01SZ)

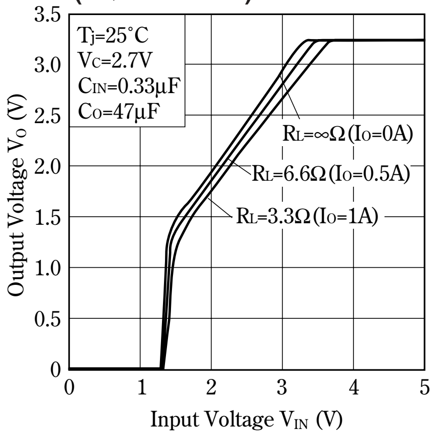


Fig.16 Circuit Operating Current vs. Input Voltage (PQ015EF01SZ)

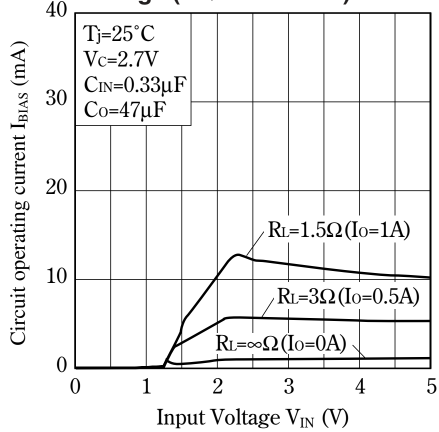


Fig.17 Circuit Operating Current vs. Input Voltage (PQ018EF01SZ)

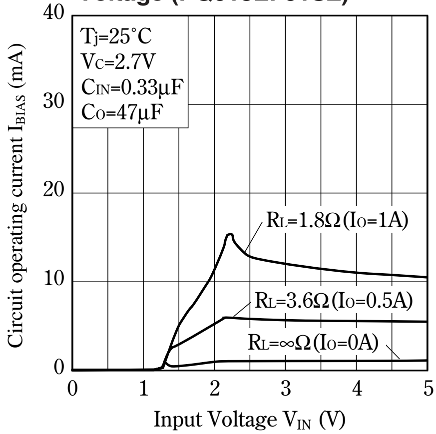


Fig.18 Circuit Operating Current vs. Input Voltage (PQ025EF01SZ)

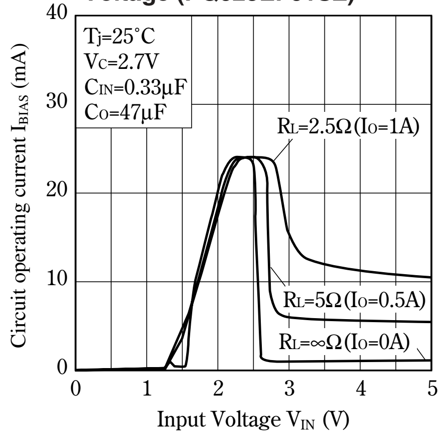


Fig.19 Circuit Operating Current vs. Input Voltage (PQ033EF01SZ)

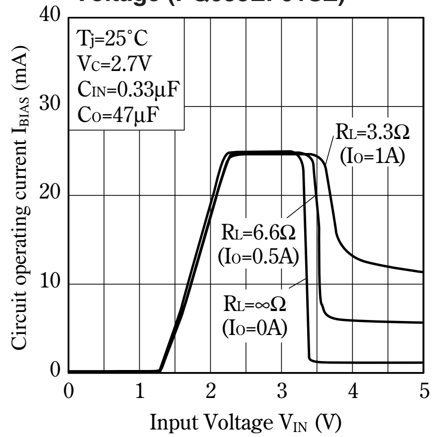


Fig.20 Dropout Voltage vs. Junction Temperature (PQ033EF01SZ)

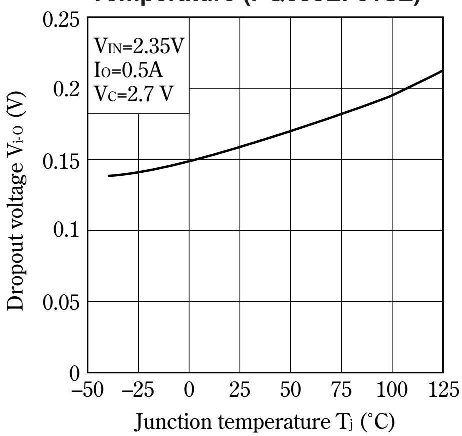


Fig.21 Quiescent Current vs. Junction Temperature

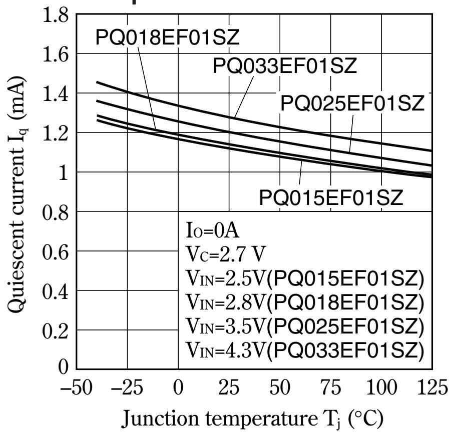


Fig.22 Ripple Rejection vs. Input Ripple Frequency

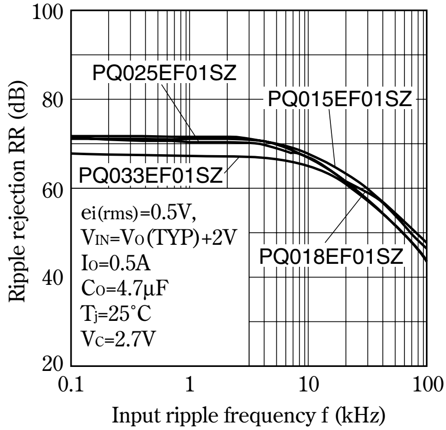
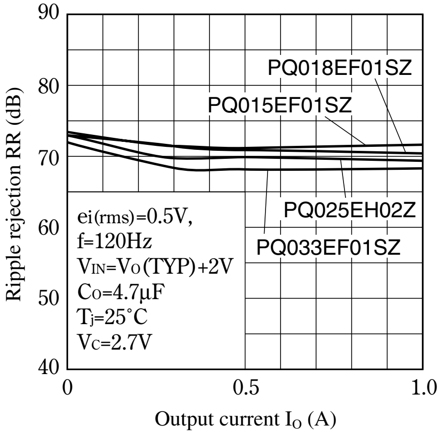
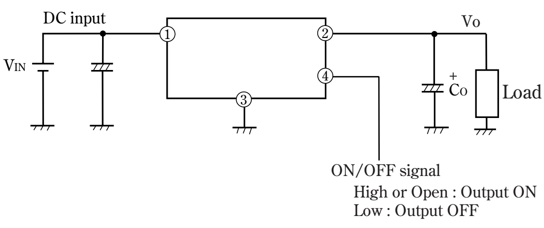


Fig.23 Ripple Rejection vs. Output Current



Typical Application



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  --- Telecommunication equipment [terminal]
  --- Test and measurement equipment
  --- Industrial control
  --- Audio visual equipment
  --- Consumer electronics

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  --- Various safety devices, etc.

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