PQxxxEF01SZH Series

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

■ Features

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

■ Applications

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

■ Model Line-up

Output voltage	Model No.	Output voltage	Model No.
1.5V	**PQ015EF01SZH**	2.5V	**PQ025EF01SZH**
1.8V	**PQ018EF01SZH**	3.3V	**PQ033EF01SZH**

■ Absolute Maximum Ratings

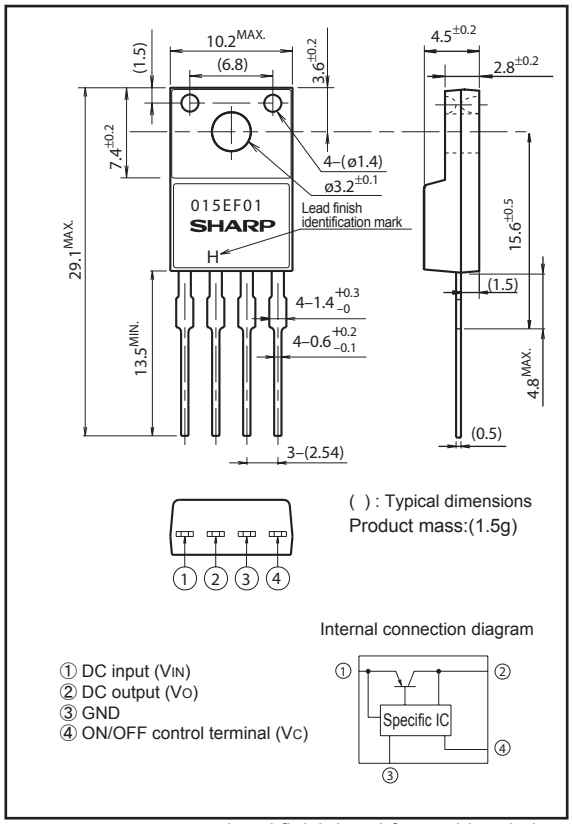
(Ta=25°C)

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 Tj=125°C to 150°C

■ Outline Dimensions

(Unit : mm)



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

■ 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_{egL}	I_O=5mA to 1A	-	0.2	2	%
Line regulation	R_{egI}	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	-	45	60	-	dB
※5 Dropout voltage	V_{I-O}	I_O=0.5A(at V_O=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	$V_{C(OFF)}$	I_O=0A	-	-	0.8	V
OFF-state current for control	$I_{C(OFF)}$	I_O=0A,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 In case of opening control terminal ④, output voltage turns off.
※5 In case of **PQ033EF01SZH**,apply to **PQ033EF01SZH** specification sheet.

Table.1 Input Voltage Range

Model No.	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
PQ015EF01SZH	V_{IN}	I_O=0.5A, V_C=2.7V, T_a=25°C	2.35	-	10	V
PQ018EF01SZH			2.35	-	10	
PQ025EF01SZH			3.0	-	10	
PQ033EF01SZH			3.8	-	10	

Table.2 Output Voltage

Model No.	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
PQ015EF01SZH	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
PQ018EF01SZH			1.75	1.8	1.85	
PQ025EF01SZH			2.438	2.5	2.562	
PQ033EF01SZH			3.218	3.3	3.382	

Fig.1 Test Circuit

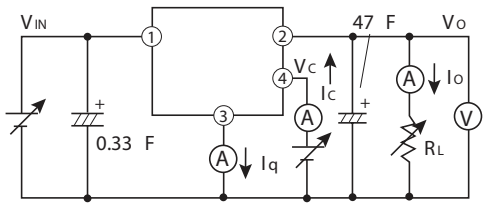
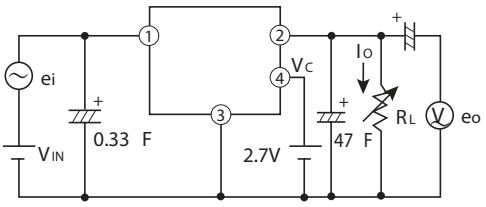
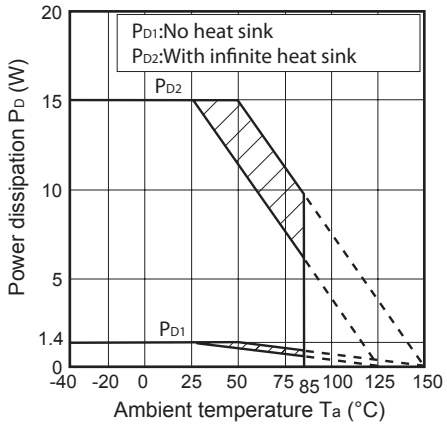


Fig.2 Test Circuit of Ripple Rejection



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

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, **PQ015EF01SZH**)

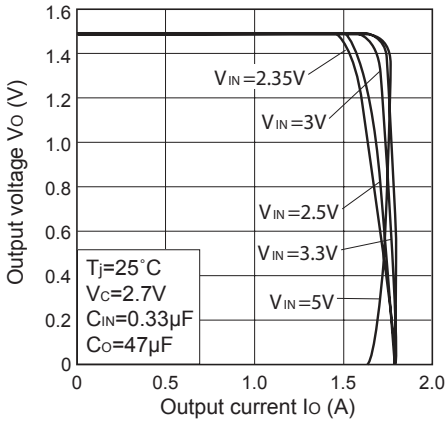


Fig.5 Overcurrent Protection Characteristics (Typical Value, **PQ018EF01SZH**)

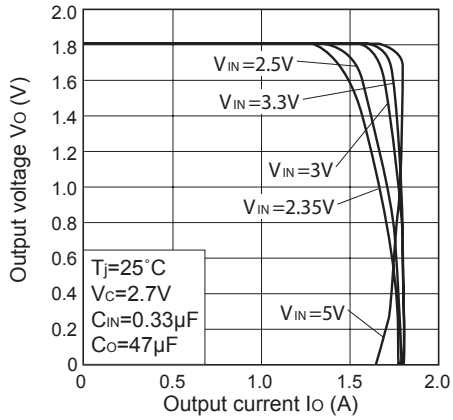


Fig.6 Overcurrent Protection Characteristics (Typical Value, **PQ025EF01SZH**)

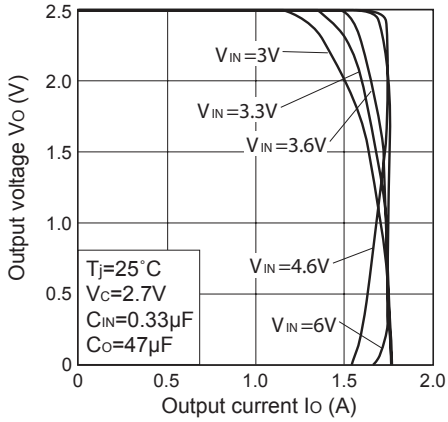


Fig.7 Overcurrent Protection Characteristics (Typical Value, **PQ033EF01SZH**)

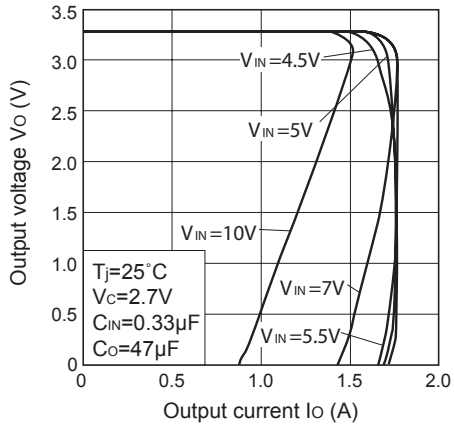


Fig.8 Output Voltage Fluctuation vs. Junction Temperature (**PQ015EF01SZH**)

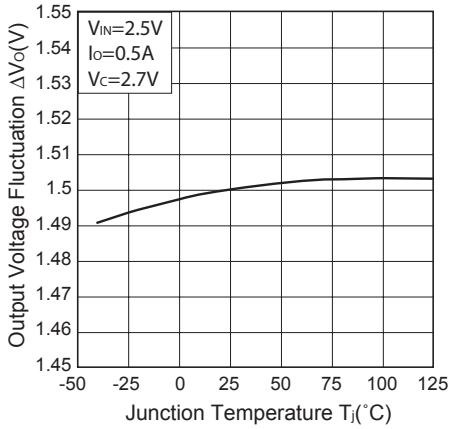


Fig.9 Output Voltage Fluctuation vs. Junction Temperature (**PQ018EF01SZH**)

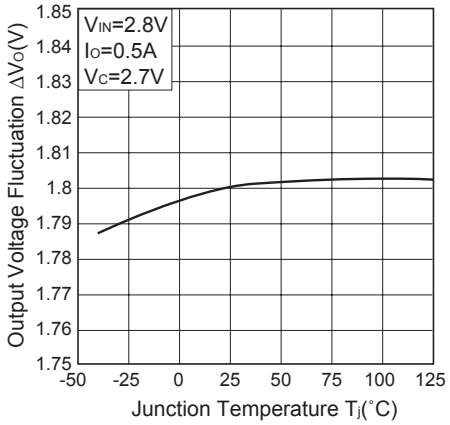


Fig.10 Output Voltage Fluctuation vs. Junction Temperature (**PQ025EF01SZH**)

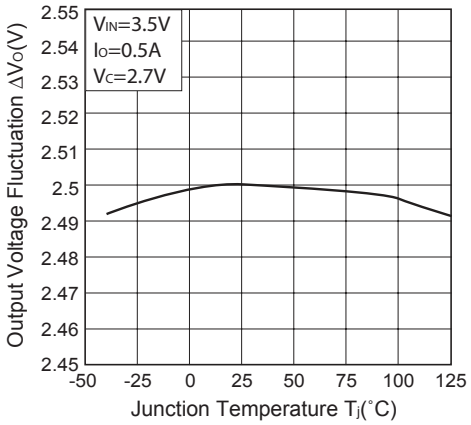


Fig.11 Output Voltage Fluctuation vs. Junction Temperature (**PQ033EF01SZH**)

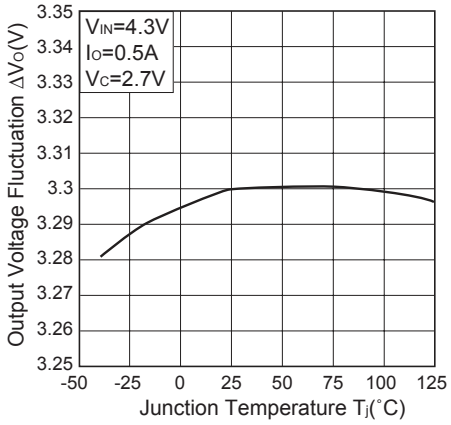


Fig.12 Output Voltage vs. Input Voltage (**PQ015EF01SZH**)

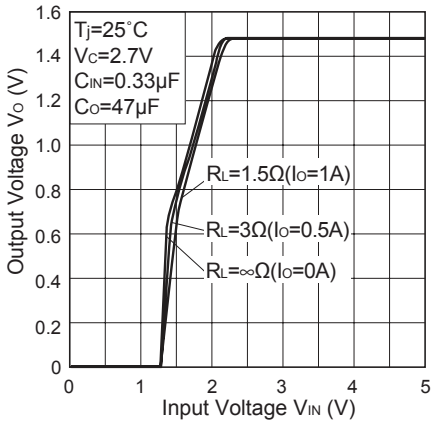


Fig.13 Output Voltage vs. Input Voltage (**PQ018EF01SZH**)

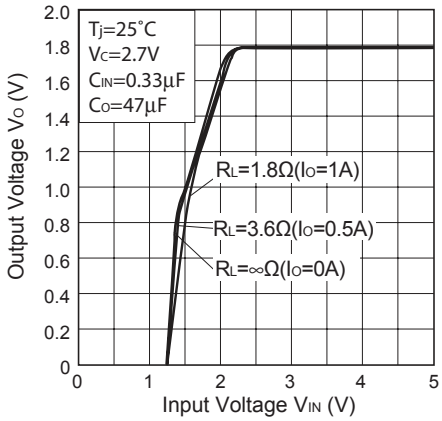


Fig.14 Output Voltage vs. Input Voltage (**PQ025EF01SZH**)

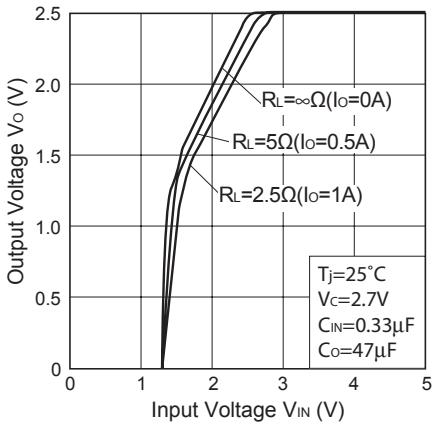


Fig.15 Output Voltage vs. Input Voltage (**PQ033EF01SZH**)

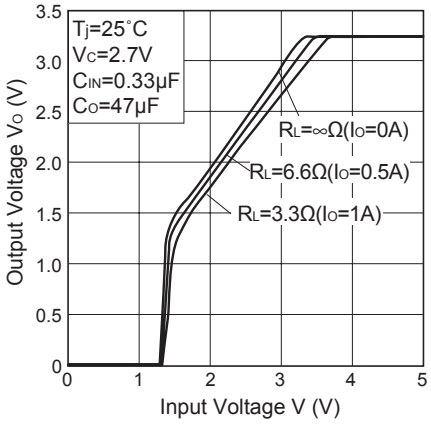


Fig.16 Circuit Operating Current vs. Input Voltage (**PQ015EF01SZH**)

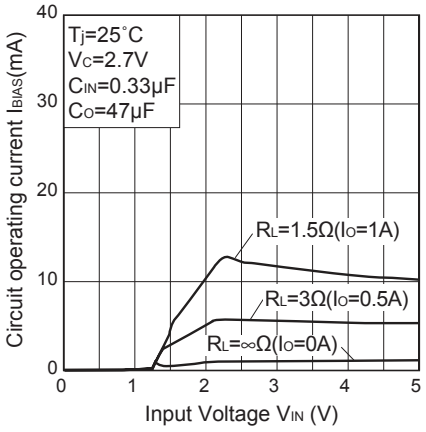


Fig.17 Circuit Operating Current vs. Input Voltage (**PQ018EF01SZH**)

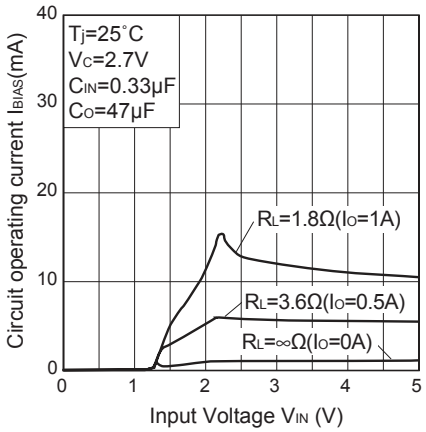


Fig.18 Circuit Operating Current vs. Input Voltage (**PQ025EF01SZH**)

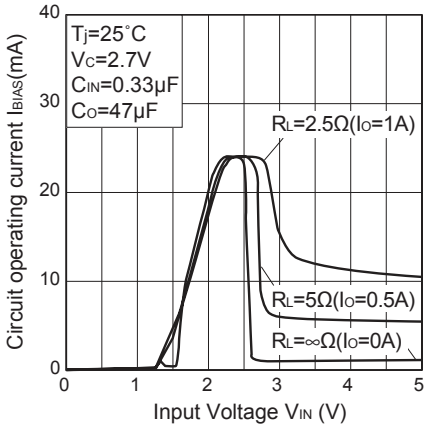


Fig.19 Circuit Operating Current vs. Input Voltage (**PQ033EF01SZH**)

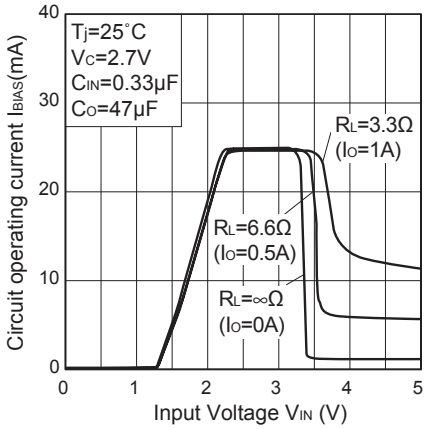


Fig.20 Dropout Voltage vs. Junction Temperature (**PQ033EF01SZH**)

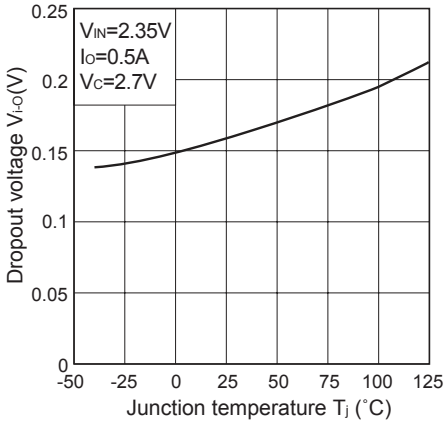


Fig.21 Quiescent Current vs. Junction Temperature

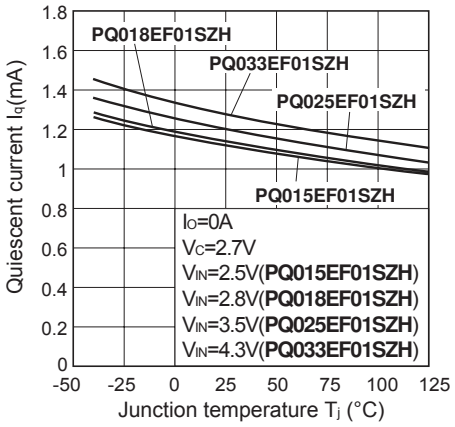


Fig.22 Ripple Rejection vs. Input Ripple Frequency

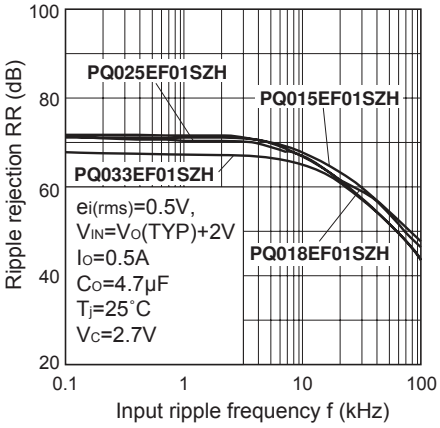
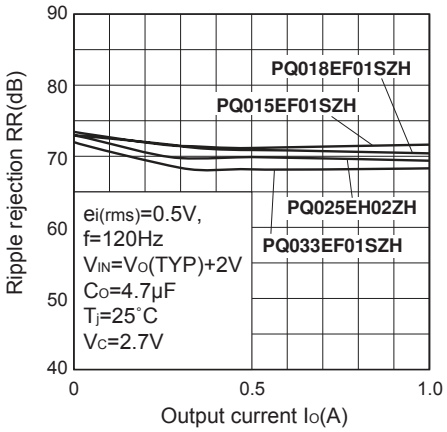


Fig.23 Ripple Rejection vs. Output Current



■ Typical Application