

# PQ1Uxx1M2ZP Series

Low Output Current, Compact Surface Mount Type Low Power-Loss Voltage Regulators

## ■ Features

- Compact surface mount package (2.9×1.6×1.1mm)
- Low power-loss (Dropout voltage: TYP. 0.11 V at I<sub>o</sub>=60mA)
- High ripple rejection (TYP. 70dB)
- Built-in ON/OFF control function  
(Dissipation current at OFF-state: MAX. 1μA)
- Built-in overcurrent, overheat protection functions

\*It is available for every 0.1V of output voltage (1.3V to 5.0V)

## ■ Applications

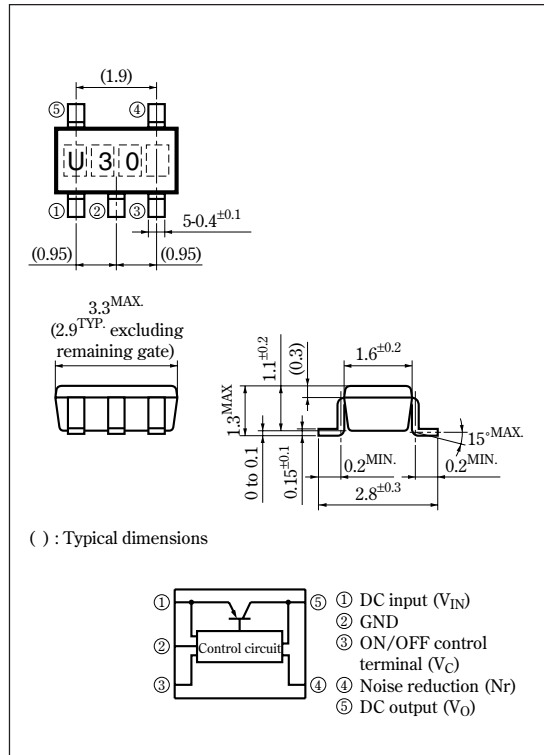
- Cellular phones
- Cordless phones
- Personal information tools (PDA)
- Cameras/Camcoders
- PCMCIA cards for notebook PCs

## ■ Model Line-up

Output Voltage (TYP.)	Model No.	Output Voltage (TYP.)	Model No.
2.5V	PQ1U251M2ZP	3.5V	PQ1U351M2ZP
2.8V	PQ1U281M2ZP	3.6V	PQ1U361M2ZP
3.0V	PQ1U301M2ZP	3.8V	PQ1U381M2ZP
3.3V	PQ1U331M2ZP	4.0V	PQ1U401M2ZP
3.4V	PQ1U341M2ZP	5.0V	PQ1U501M2ZP

## ■ Outline Dimensions

(Unit : mm)



## ■ Absolute Maximum Ratings

(T<sub>a</sub>=25°C)

Parameter	Symbol	Rating	Unit
*1 Input voltage	V <sub>IN</sub>	16	V
*1 ON/OFF control terminal voltage	V <sub>C</sub>	16	V
Output current	I <sub>O</sub>	300	mA
*2 Power dissipation	P <sub>D</sub>	350	mW
*3 Junction temperature	T <sub>J</sub>	150	°C
Operating temperature	T <sub>opr</sub>	-30 to +80	°C
Storage temperature	T <sub>stg</sub>	-55 to +150	°C
Soldering temperature	T <sub>sol</sub>	260 (10s)	°C

\*1 All are open except GND and applicable terminals.

\*2 At mounted on PCB

\*3 Overheat protection may operate at T<sub>J</sub>=125°C to 150°C

•Please refer to the chapter " Handling Precautions ".

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**Electrical Characteristics**

(Unless otherwise specified,  $V_{IN}=V_O(TYP)+1.0V$ ,  $I_O=30mA$ ,  $V_C=1.8V$ ,  $T_a=25^\circ C$ )

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Output voltage	$V_O$	—	Refer to the following table.1			V
*4 Output peak current	$I_{OP}$	—	180	300	—	mA
Recommended output current	—	—	—	—	150	mA
Load regulation	$R_{egL1}$	$I_O=5$ to 60mA	—	10	50	mV
	$R_{egL2}$	$I_O=5$ to 100mA	—	20	100	mV
	$R_{egL3}$	$I_O=5$ to 150mA	—	30	160	mV
Line regulation	$R_{egI}$	$V_{IN}=V_O(TYP)+1V$ to $V_O(TYP)+6V$	—	3.0	20	mV
Temperature coefficient of output voltage	$TcV_O$	$I_O=10mA$ , $T_J=-25$ to $+75^\circ C$	—	0.05	—	mV/ $^\circ C$
Ripple rejection	RR	Refer to Fig.2	—	70	—	dB
Output noise voltage	$V_{no(rms)}$	$10Hz < f < 100kHz$ , $C_n=0.1\mu F$ , $I_O=30mA$	Refer to the following table.2			$\mu V$
Dropout voltage	$V_{1-O1}$	$I_O=60mA$ *5	—	0.11	0.26	V
	$V_{1-O2}$	$I_O=150mA$ *5	—	0.20	0.4	
*6 ON-state voltage for control	$V_C(ON)$	—	1.8	—	—	V
ON-state current for control	$I_C(ON)$	$V_C=1.8V$	—	5	30	$\mu A$
OFF-state voltage for control	$V_C(OFF)$	—	—	—	0.4	V
Quiescent current	$I_q$	$I_O=0mA$	—	130	200	$\mu A$
Output OFF-state dissipation current	$I_{qs}$	$V_C=0.2V$	—	—	1	$\mu A$

\*4 Output current shall be the value when output voltage lowers 0.3V from the voltage at  $I_O=30mA$ .

\*5 Input voltage when output voltage falls 0.1V from that at  $V_{IN}=V_O(TYP)+1.0V$ .

\*6 In case that the control terminal (Ⓞ pin) is open, output voltage should be OFF state.

\*7 In case of **PQ1U181M2ZP**,  $V_{IN}$  minimum=2.3V.

**Table.1 Output Voltage Line-up**

( $V_{IN}=V_O(TYP)+1.0V$ ,  $I_O=30mA$ ,  $V_C=1.8V$ ,  $T_a=25^\circ C$ )

Model No.	Symbol	MIN.	TYP.	MAX.	Unit
<b>PQ1U181M2ZP</b>	V <sub>O</sub>	1.740	1.8	1.860	V
<b>PQ1U251M2ZP</b>		2.440	2.5	2.560	
<b>PQ1U281M2ZP</b>		2.740	2.8	2.860	
<b>PQ1U291M2ZP</b>		2.840	2.9	2.960	
<b>PQ1U301M2ZP</b>		2.940	3.0	3.060	
<b>PQ1U331M2ZP</b>		3.234	3.3	3.366	
<b>PQ1U341M2ZP</b>		3.332	3.4	3.468	
<b>PQ1U351M2ZP</b>		3.430	3.5	3.570	
<b>PQ1U361M2ZP</b>		3.528	3.6	3.672	
<b>PQ1U381M2ZP</b>		3.724	3.8	3.876	
<b>PQ1U401M2ZP</b>		3.920	4.0	4.080	
<b>PQ1U501M2ZP</b>		4.900	5.0	5.100	

**Table.2 Output Noise Voltage Line-up**

( $V_{IN}=V_O(TYP)+1.0V$ ,  $I_O=30mA$ ,  $V_C=1.8V$ ,  $C_n=0.1\mu F$ ,  $10Hz < f < 100kHz$ ,  $T_a=25^\circ C$ )

Model No.	Symbol	MIN.	TYP.	MAX.	Unit
<b>PQ1U181M2ZP</b>	V <sub>no(rms)</sub>	—	15	—	$\mu V$
<b>PQ1U251M2ZP</b>		—	25	—	
<b>PQ1U281M2ZP</b>		—	25	—	
<b>PQ1U291M2ZP</b>		—	25	—	
<b>PQ1U301M2ZP</b>		—	30	—	
<b>PQ1U331M2ZP</b>		—	30	—	
<b>PQ1U341M2ZP</b>		—	30	—	
<b>PQ1U351M2ZP</b>		—	35	—	
<b>PQ1U361M2ZP</b>		—	35	—	
<b>PQ1U381M2ZP</b>		—	35	—	
<b>PQ1U401M2ZP</b>		—	40	—	
<b>PQ1U501M2ZP</b>		—	50	—	

**Fig.1 Test Circuit**

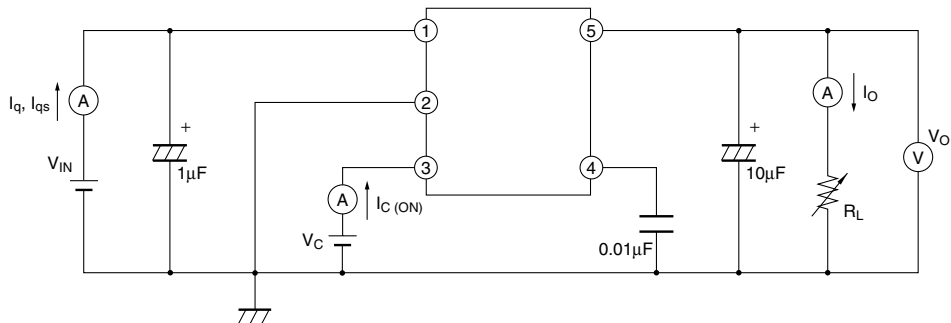


Fig.2 Test Circuit for Ripple Rejection

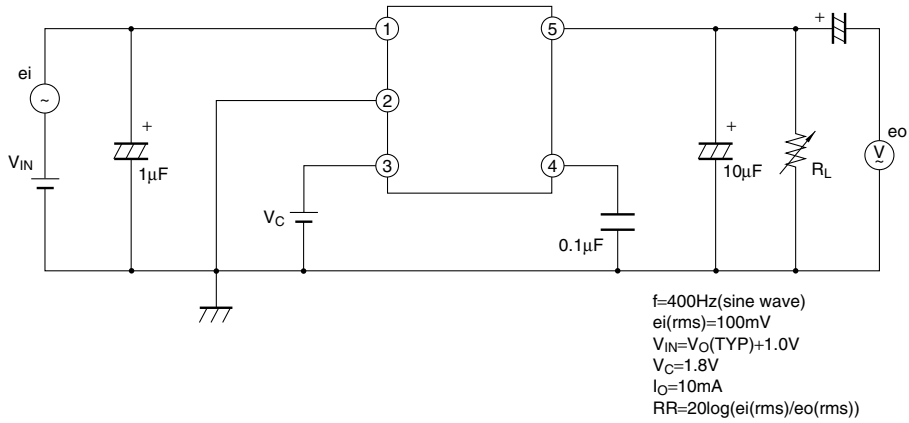
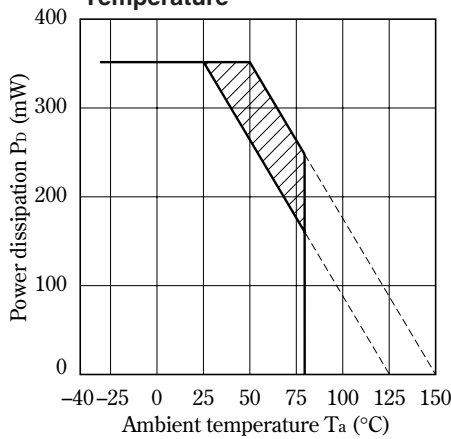


Fig.3 Power Dissipation vs. Ambient Temperature



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

Fig.5 Output Voltage Fluctuation vs. Junction Temperature (PQ1U281M2ZP)(Typical Value)

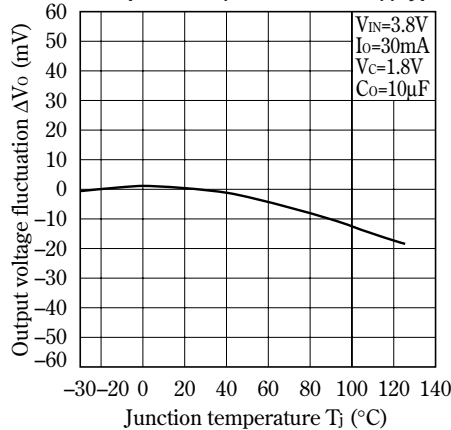


Fig.4 Overcurrent Protection Characteristics (Typical Value)

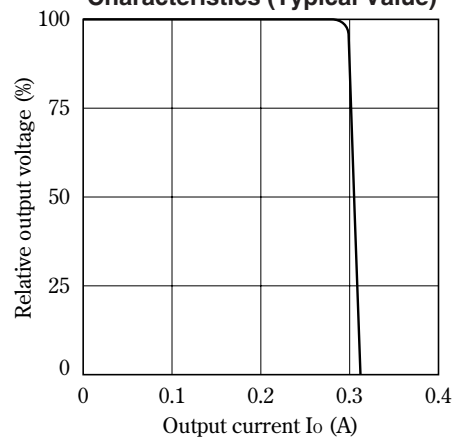
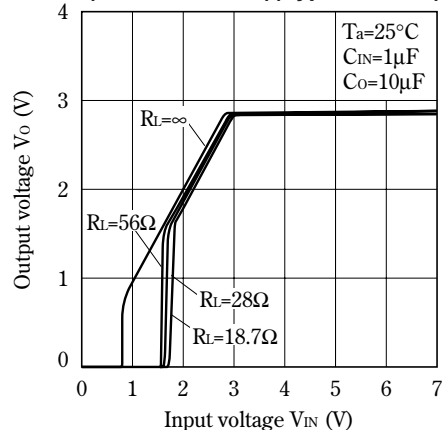
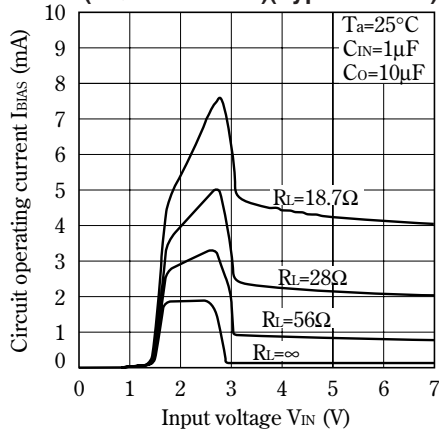


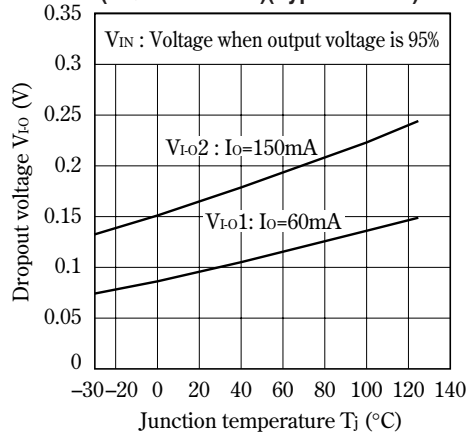
Fig.6 Output Voltage vs. Input Voltage (PQ1U281M2ZP)(Typical Value)



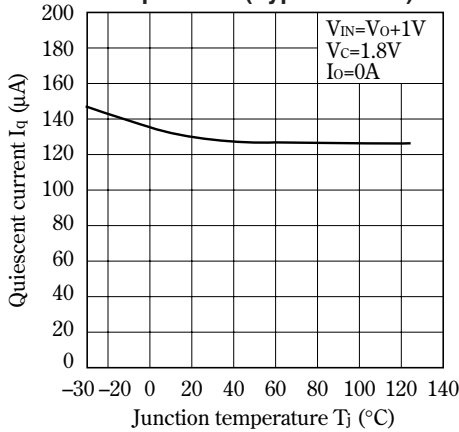
**Fig.7 Circuit Operating Current vs. Input Voltage (PQ1U281M2ZP)(Typical Value)**



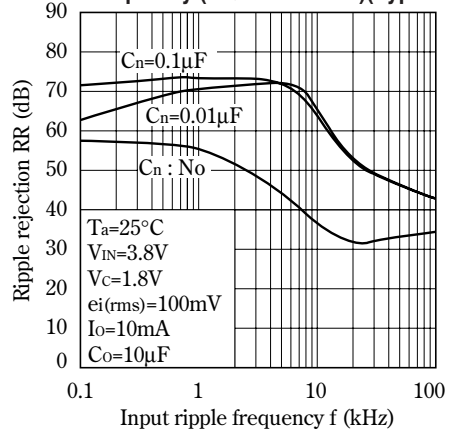
**Fig.8 Dropout Voltage vs. Junction Temperature (PQ1U281M2ZP)(Typical Value)**



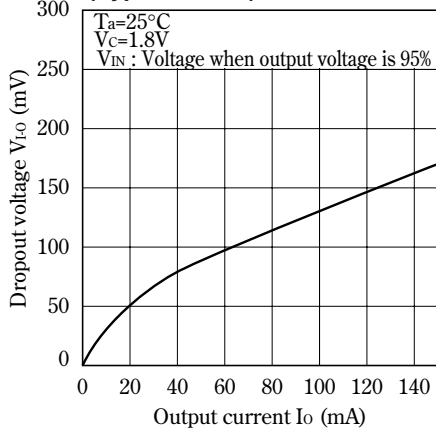
**Fig.9 Quiescent Current vs. Junction Temperature (Typical Value)**



**Fig.10 Ripple Rejection vs. Input Ripple Frequency (PQ1U281M2ZP)(Typical Value)**



**Fig.11 Dropout Voltage vs. Output Current (Typical Value)**



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