PQ1Xxx1M2ZP 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/MAX. 0.26V at I_O=60mA)
- Also compatible ceramic capacitors because of suppressing oscillation level
- High ripple rejection (TYP. 70dB)
- Low dissipation current
  (Dissipation current at no load: TYP. 150µA)
- Built-in ON/OFF control function
  (Dissipation current at OFF-state: MAX. 1µA)
- Built-in overcurrent and 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
- Cameras/Camcoders
- PCMCIA cards for notebook PCs

■ Model Line-up

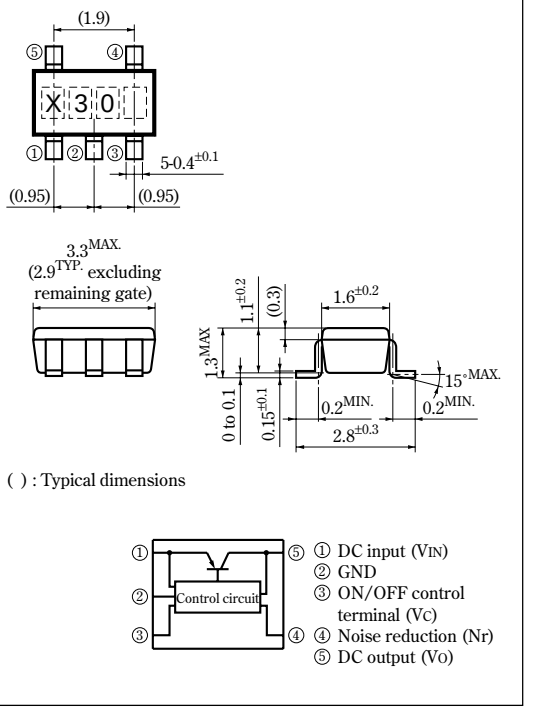
Output Voltage (TYP.)	Model No.	Output Voltage (TYP.)	Model No.
2.5V	**PQ1X251M2ZP**	3.8V	**PQ1X381M2ZP**
2.8V	**PQ1X281M2ZP**	4.0V	**PQ1X401M2ZP**
3.0V	**PQ1X301M2ZP**	4.2V	**PQ1X421M2ZP**
3.3V	**PQ1X331M2ZP**	4.5V	**PQ1X451M2ZP**
3.6V	**PQ1X361M2ZP**	5.0V	**PQ1X501M2ZP**

■ Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Rating	Unit
※1Input voltage	V_{IN}	9	V
※1ON/OFF control terminal voltage	V_C	9	V
Output current	I_O	300	mA
※2Power dissipation	P_D	350	mW
※3Junction temperature	T_j	150	˚C
Operating temperature	T_{opr}	−30 to +80	˚C
Storage temperature	T_{stg}	−55 to +150	˚C
Soldering temperature	T_{sol}	260 (10s)	˚C

※1 All are open except GND and applicable terminals
※2 At mounted on PCB
※3 Overheat protection may operate at T_j:125°C to 150°C

■ Outline Dimensions (Unit : mm)



•Please refer to the chapter " Handling Precautions ".

■ Electrical Characteristics

(Unless otherwise specified, V_{IN}=V_O(TYP)+1.0V, I_O=30mA, V_C=1.8V, Ta=25˚C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Output voltage	V_O	–	Refer to the following table.1			V
※4Output peak current	I_{op}	–	180	300	–	mA
Recommended output current	–	–	–	–	150	mA
Load regulation	$R_{egL}1$	I_O=5 to 60mA	–	10	50	mV
	$R_{egL}2$	I_O=5 to 100mA	–	20	100	mV
	$R_{egL}3$	I_O=5 to 150mA	–	40	160	mV
Line regulation	R_{egI}	V_{IN}=V_O(TYP)+1V to V_O(TYP)+6V(MAX. 9.0V)	–	3.0	20	mV
Temperature coefficient of output voltage	T_CV_O	I_O=10mA, T_j=–25 to +75˚C	–	0.05	–	mV/˚C
Ripple rejection	RR	Refer to Fig.2	–	70	–	dB
Output noise voltage	$V_{no\ (rms)}$	10Hz<f<100kHz, C_n=0.1µF, I_O=30mA	Refer to the following table.2			µV
Dropout voltage	$V_{I-O}1$	I_O=60mA ※5	–	0.11	0.26	V
	$V_{I-O}2$	I_O=150mA ※5	–	0.20	0.4	
※6ON-state voltage for control	$V_{C\ (ON)}$	–	1.8	–	–	V
ON-state current for control	$I_{C\ (ON)}$	V_C=1.8V	–	5	30	µA
OFF-state voltage for control	$V_{C\ (OFF)}$	–	–	–	0.4	V
Quiescent current	I_q	I_O=0mA	–	150	200	µA
Output OFF-state dissipation current	I_{qs}	V_C=0.2V	–	–	1	µA

※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 Vin=Vo(TYP)+1.0V.
※6 In case that the control terminal (③ pin) is open, output voltage should be OFF state.

Table.1 Output Voltage Line-up

(V_{IN}=V_O(TYP)+1.0V, I_O=30mA, V_C=1.8V, Ta=25°C)

Model No.	Symbol	MIN.	TYP.	MAX.	Unit
PQ1X251M2ZP	V_O	2.440	2.5	2.560	V
PQ1X281M2ZP	V_O	2.740	2.8	2.860	V
PQ1X301M2ZP	V_O	2.940	3.0	3.060	V
PQ1v331M2ZP	V_O	3.234	3.3	3.366	V
PQ1X361M2ZP	V_O	3.528	3.6	3.672	V
PQ1X381M2ZP	V_O	3.724	3.8	3.876	V
PQ1X401M2ZP	V_O	3.920	4.0	4.080	V
PQ1X421M2ZP	V_O	4.116	4.2	4.284	V
PQ1X451M2ZP	V_O	4.410	4.5	4.590	V
PQ1X501M2ZP	V_O	4.900	5.0	5.100	V

Table.2 Output Noise Voltage Line-up

(V_{IN}=V_O(TYP)+1.0V, I_O=30mA, V_C=1.8V, C_n=0.1µF, 10Hz<f<100kHz, Ta=25°C)

Model No.	Symbol	MIN.	TYP.	MAX.	Unit
PQ1X251M2ZP	$V_{no(rms)}$	–	25	–	µV
PQ1X281M2ZP	$V_{no(rms)}$	–	25	–	µV
PQ1X301M2ZP	$V_{no(rms)}$	–	30	–	µV
PQ1X331M2ZP	$V_{no(rms)}$	–	30	–	µV
PQ1X361M2ZP	$V_{no(rms)}$	–	35	–	µV
PQ1X381M2ZP	$V_{no(rms)}$	–	35	–	µV
PQ1X401M2ZP	$V_{no(rms)}$	–	40	–	µV
PQ1X421M2ZP	$V_{no(rms)}$	–	40	–	µV
PQ1X451M2ZP	$V_{no(rms)}$	–	45	–	µV
PQ1X501M2ZP	$V_{no(rms)}$	–	50	–	µV

Fig.1 Test Circuit

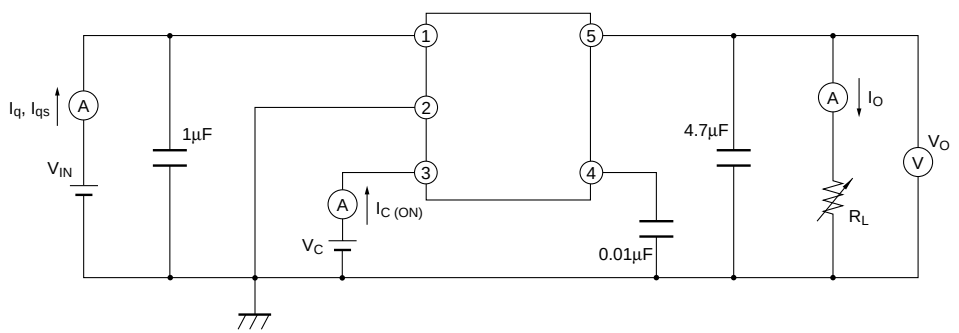
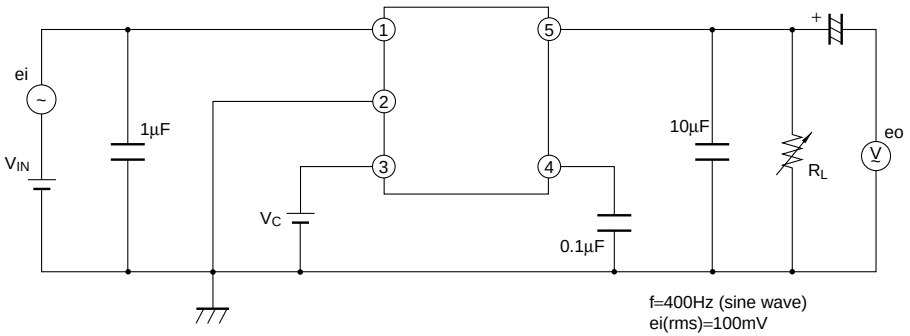
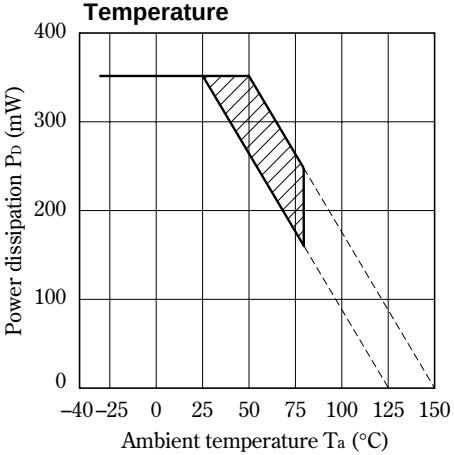


Fig.2 Test Circuit for Ripple Rejection



f=400Hz (sine wave)
ei(rms)=100mV
$V_{IN}=V_O$(TYP)+1.0V
V_C=1.8V
I_O=10mA
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)

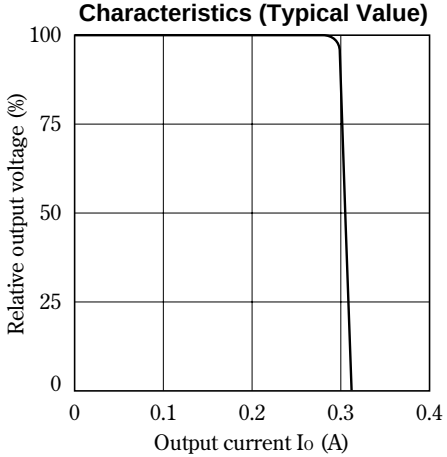


Fig.5 Output Voltage Fluctuation vs. Junction Temperature (PQ1X301M2ZP)(Typical Value)

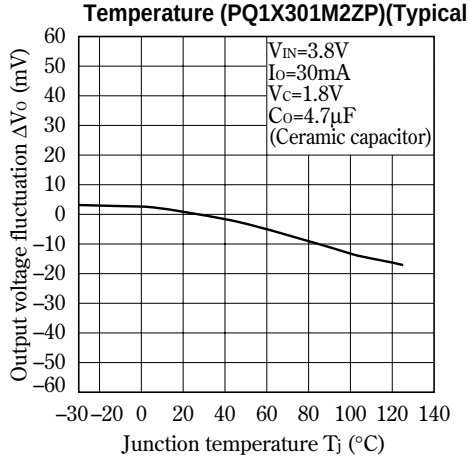


Fig.6 Output Voltage vs. Input Voltage (PQ1X301M2ZP)(Typical Value)

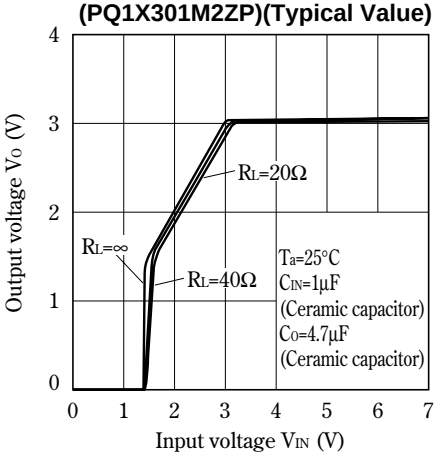


Fig.7 Circuit Operating Current vs. Input Voltage (PQ1X301M2ZP)(Typical Value)

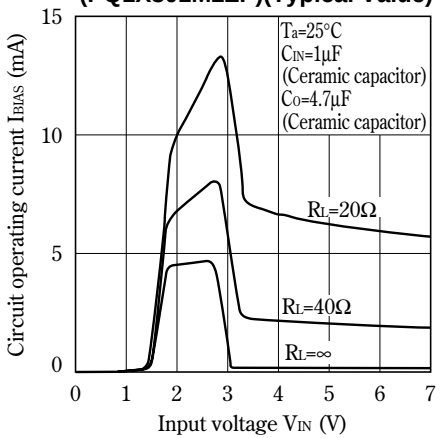


Fig.8 Dropout Voltage vs. Junction Temperature (PQ1X301M2ZP)(Typical Value)

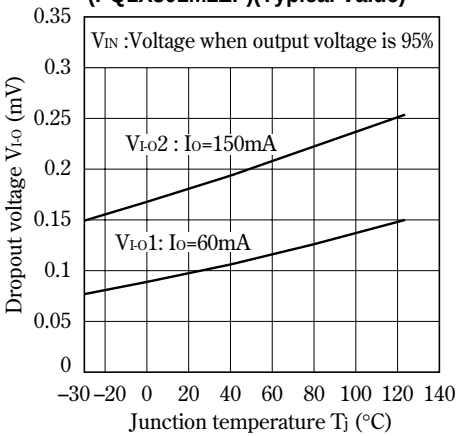


Fig.9 Quiescent Current vs. Junction Temperature (Typical Value)

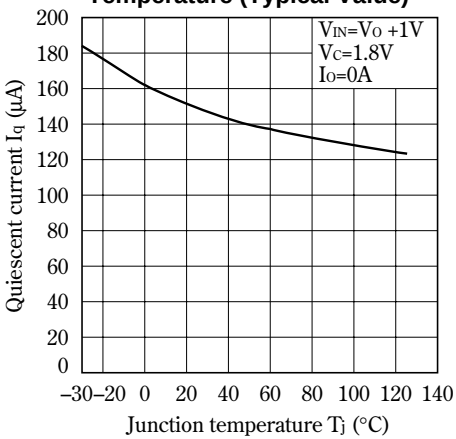


Fig.10 Ripple Rejection vs. Input Ripple Frequency (PQ1X281M2ZP)(Typical Value)

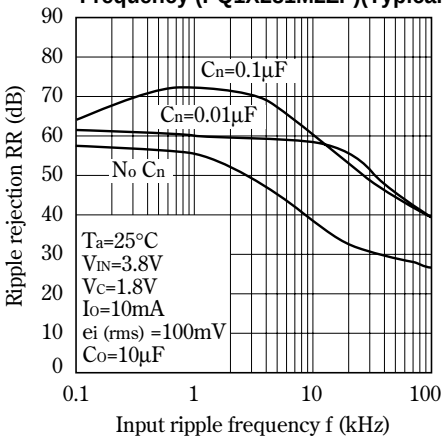
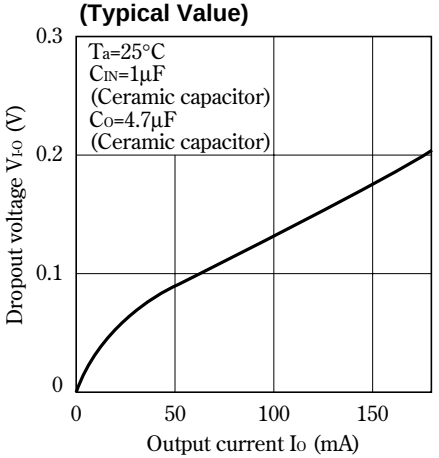


Fig.11 Dropout Voltage vs. Output Current (Typical Value)



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