PQ1Txx1M2ZP 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. 0.10 V/MAX. 0.15V at I_O=60mA/V_O=3.0V)
- High ripple rejection (TYP. 70dB)
- Low current operation type (Dissipation current at no load: TYP. 35μA)
- Built-in ON/OFF control function (Output OFF-state dissipation current : MAX. 1μA)
- Low voltage operation type (Input voltage: MIN. 1.8V)
- Built-in overcurrent protection functions

*It is available for every 0.1V of output voltage (1.3V to 6.0V)

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.
1.8V	**PQ1T181M2ZP**	3.3V	**PQ1T331M2ZP**
2.5V	**PQ1T251M2ZP**	3.5V	**PQ1T351M2ZP**
2.7V	**PQ1T271M2ZP**	3.6V	**PQ1T361M2ZP**
2.8V	**PQ1T281M2ZP**	3.8V	**PQ1T381M2ZP**
3.0V	**PQ1T301M2ZP**	4.0V	**PQ1T401M2ZP**
3.2V	**PQ1T321M2ZP**	5.0V	**PQ1T501M2ZP**

Absolute Maximum Ratings

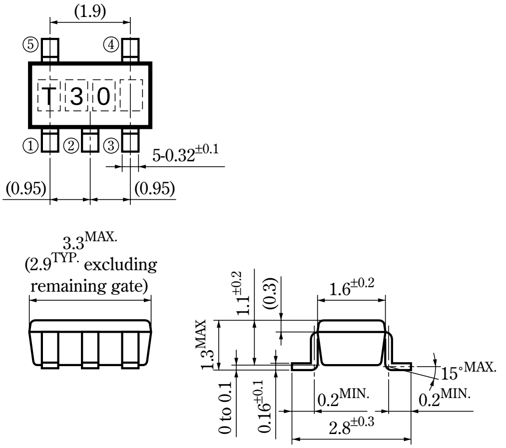
(Ta=25°C)

Parameter	Symbol	Rating	Unit
※1 Input voltage	V_{IN}	9	V
※1 ON/OFF control terminal voltage	V_C	0 to V_{IN}	V
Output current	I_O	400	mA
※2 Power dissipation	P_D	350	mW
Junction temperature	T_j	125	˚C
Operating temperature	T_{opr}	−40 to +80	˚C
Storage temperature	T_{stg}	−55 to +150	˚C
Soldering temperature	T_{sol}	260 (10s)	˚C

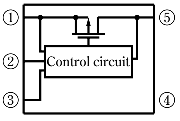
※1 All are open except GND and applicable terminals
※2 At mounted on PCB

Outline Dimensions

(Unit : mm)



( ) : Typical dimensions



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

• 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, Ta=25˚C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Output voltage	V_O	–	Refer to the following table.1			V
※3 Output peak current	I_{op}	–	310	370	–	mA
Recommended output current	–	–	–	–	150	mA
Load regulation	$R_{eg}L1$	I_O=5 to 80mA	–	6	36	mV
	$R_{eg}L2$	I_O=5 to 150mA	–	12	80	mV
	$R_{eg}L3$	I_O=5 to 300mA	–	25	150	mV
Line regulation	$R_{eg}I$	V_{IN}=V_O(TYP)+1V to V_O(TYP)+6V(MAX. 9.0V)	–	0.02	0.15	%/V
Temperature coefficient of output voltage	T_CV_O	I_O=10mA, T_j=–25 to +75˚C	–	±50	–	ppm/˚C
※4 Ripple rejection	RR	Refer to Fig.2	–	70	–	dB
※4 Output noise voltage	$V_{no\ (rms)}$	10Hz<f<100kHz, I_O=30mA	–	60	–	µV
Dropout voltage	$V_{I-O}1$	I_O=60mA ※5	Refer to the following table.2			V
	$V_{I-O}2$	I_O=150mA ※5	Refer to the following table.3			
	$V_{I-O}3$	I_O=300mA ※5	Refer to the following table.4			
※6 ON-state voltage for control	$V_{C\ (ON)}$	–	1.8	–	–	V
ON-state current for control	$I_{C\ (ON)}$	V_{IN}=V_C=9.0V	–	2	4	µA
OFF-state voltage for control	$V_{C\ (OFF)}$	–	–	–	0.8	V
Quiescent current	I_q	I_O=0mA	–	35	65	µA
Output OFF-state dissipation current	I_{qs}	V_C=0.2V	–	–	1	µA

※3 Output current shall be the value when output voltage lowers 0.3V from the voltage at I_O=30mA
Temperature coefficient of output peak current:Around 1.3mA/˚C
(In case of low temperature, current work is lower.)
※4 Typical value of 3.0V output type
※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
PQ1T181M2ZP	V_O	1.770	1.8	1.830	V
PQ1T251M2ZP	V_O	2.462	2.5	2.538	V
PQ1T271M2ZP	V_O	2.659	2.7	2.741	V
PQ1T281M2ZP	V_O	2.758	2.8	2.842	V
PQ1T301M2ZP	V_O	2.955	3.0	3.045	V
PQ1T321M2ZP	V_O	3.152	3.2	3.248	V
PQ1T331M2ZP	V_O	3.250	3.3	3.350	V
PQ1T351M2ZP	V_O	3.447	3.5	3.553	V
PQ1T361M2ZP	V_O	3.546	3.6	3.654	V
PQ1T381M2ZP	V_O	3.743	3.8	3.857	V
PQ1T401M2ZP	V_O	3.940	4.0	4.060	V
PQ1T501M2ZP	V_O	4.925	5.0	5.075	V

Table.2 Dropout Voltage Line-up (Io=60mA)

(V_{IN}:(※5), V_C=1.8V, I_O=60mA, Ta=25°C)

Model No.	Symbol	MIN.	TYP.	MAX.	Unit
PQ1T181M2ZP	$V_{i-o}1$	–	0.17	0.35	V
PQ1T251M2ZP	$V_{i-o}1$	–	0.13	0.18	V
PQ1T271M2ZP	$V_{i-o}1$	–	0.12	0.17	V
PQ1T281M2ZP	$V_{i-o}1$	–	0.11	0.16	V
PQ1T301M2ZP	$V_{i-o}1$	–	0.10	0.15	V
PQ1T321M2ZP	$V_{i-o}1$	–	0.10	0.14	V
PQ1T331M2ZP	$V_{i-o}1$	–	0.10	0.14	V
PQ1T351M2ZP	$V_{i-o}1$	–	0.09	0.14	V
PQ1T361M2ZP	$V_{i-o}1$	–	0.09	0.13	V
PQ1T381M2ZP	$V_{i-o}1$	–	0.09	0.13	V
PQ1T401M2ZP	$V_{i-o}1$	–	0.08	0.12	V
PQ1T501M2ZP	$V_{i-o}1$	–	0.07	0.10	V

※5 Input voltage when output voltage falls 0.1V from that at Vin=Vo(TYP)+1.0V.

Table.3 Dropout Voltage Line-up (Io=150mA)

(V_{IN}:(❋5), V_C=1.8V, I_O=150mA, Ta=25°C)

Model No.	Symbol	MIN.	TYP.	MAX.	Unit
PQ1T181M2ZP	$V_{i\text{-}o}2$	–	0.40	0.68	V
PQ1T251M2ZP	$V_{i\text{-}o}2$	–	0.31	0.43	V
PQ1T271M2ZP	$V_{i\text{-}o}2$	–	0.28	0.40	V
PQ1T281M2ZP	$V_{i\text{-}o}2$	–	0.27	0.39	V
PQ1T301M2ZP	$V_{i\text{-}o}2$	–	0.25	0.37	V
PQ1T321M2ZP	$V_{i\text{-}o}2$	–	0.24	0.35	V
PQ1T331M2ZP	$V_{i\text{-}o}2$	–	0.24	0.35	V
PQ1T351M2ZP	$V_{i\text{-}o}2$	–	0.23	0.34	V
PQ1T361M2ZP	$V_{i\text{-}o}2$	–	0.22	0.33	V
PQ1T381M2ZP	$V_{i\text{-}o}2$	–	0.22	0.32	V
PQ1T401M2ZP	$V_{i\text{-}o}2$	–	0.21	0.31	V
PQ1T501M2ZP	$V_{i\text{-}o}2$	–	0.18	0.27	V

❋5 Input voltage when output voltage falls 0.1V from that at Vin=Vo(TYP)+1.0V.

Table.4 Dropout Voltage Line-up (Io=300mA)

(V_{IN}:(❋5), V_C=1.8V, I_O=300mA, Ta=25°C)

Model No.	Symbol	MIN.	TYP.	MAX.	Unit
PQ1T181M2ZP	$V_{i\text{-}o}3$	–	0.64	0.85	V
PQ1T251M2ZP	$V_{i\text{-}o}3$	–	0.54	0.74	V
PQ1T271M2ZP	$V_{i\text{-}o}3$	–	0.52	0.72	V
PQ1T281M2ZP	$V_{i\text{-}o}3$	–	0.51	0.71	V
PQ1T301M2ZP	$V_{i\text{-}o}3$	–	0.50	0.70	V
PQ1T321M2ZP	$V_{i\text{-}o}3$	–	0.48	0.68	V
PQ1T331M2ZP	$V_{i\text{-}o}3$	–	0.47	0.67	V
PQ1T351M2ZP	$V_{i\text{-}o}3$	–	0.46	0.65	V
PQ1T361M2ZP	$V_{i\text{-}o}3$	–	0.45	0.64	V
PQ1T381M2ZP	$V_{i\text{-}o}3$	–	0.44	0.62	V
PQ1T401M2ZP	$V_{i\text{-}o}3$	–	0.43	0.60	V
PQ1T501M2ZP	$V_{i\text{-}o}3$	–	0.35	0.50	V

❋5 Input voltage when output voltage falls 0.1V from that at Vin=Vo(TYP)+1.0V.

Fig.1 Test Circuit

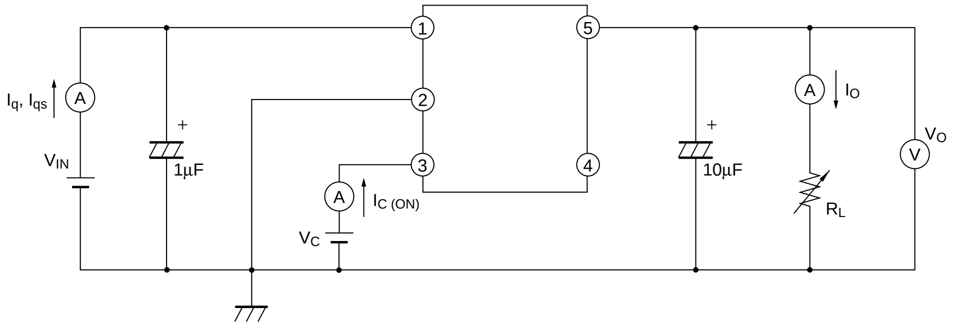
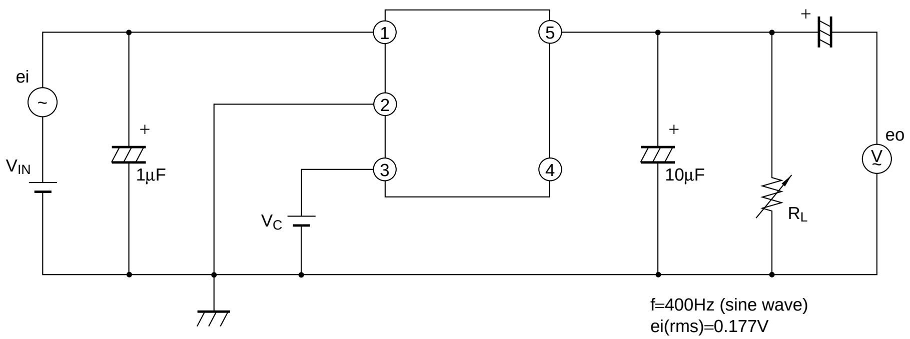


Fig.2 Test Circuit for Ripple Rejection



f=400Hz (sine wave)
ei(rms)=0.177V
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

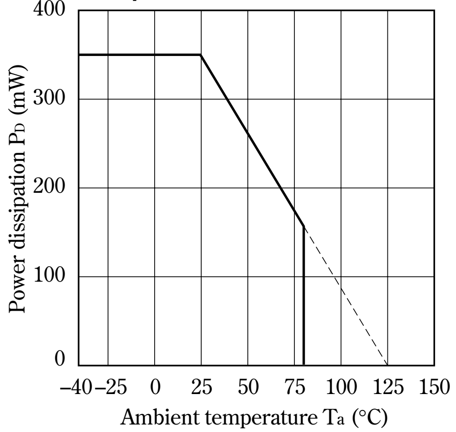


Fig.4 Overcurrent Protection Characteristics (Typical Value)

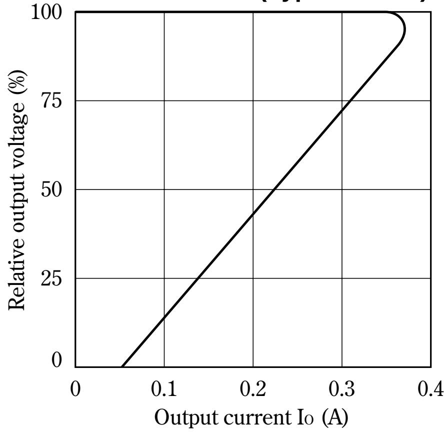


Fig.5 Output Voltage Fluctuation vs. Junction Temperature (PQ1T301M2ZP)(Typical Value)

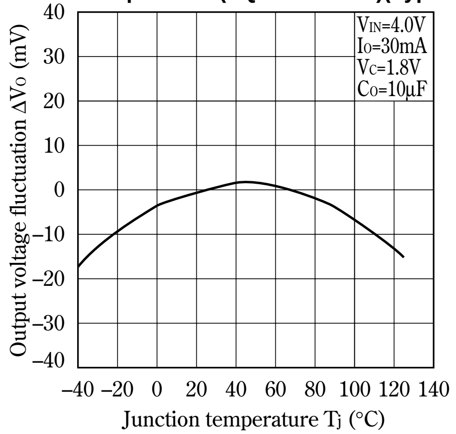


Fig.6 Output Voltage vs. Input Voltage (PQ1T301M2ZP)(Typical Value)

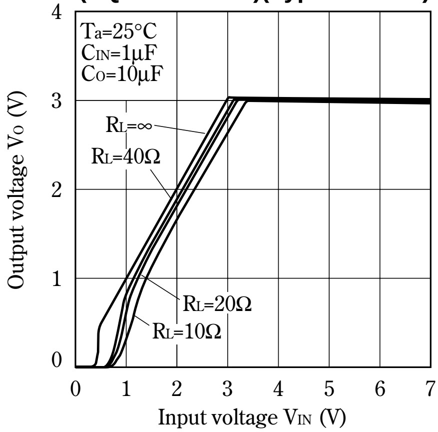


Fig.7 Circuit Operating Current vs. Input Voltage (PQ1T301M2ZP)(Typical Value)

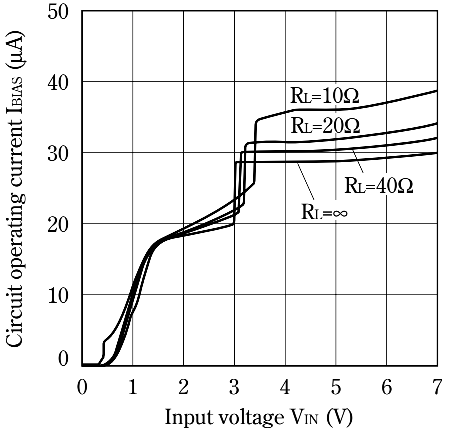


Fig.8 Dropout Voltage vs. Junction Temperature (PQ1T301M2ZP)(Typical Value)

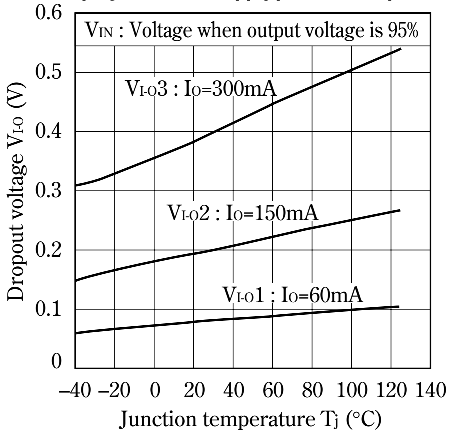


Fig.9 Quiescent Current vs. Junction Temperature (Typical Value)

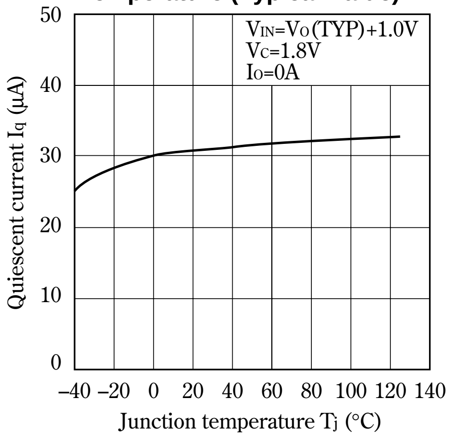


Fig.10 Ripple Rejection vs. Input Ripple Frequency (Typical Value)

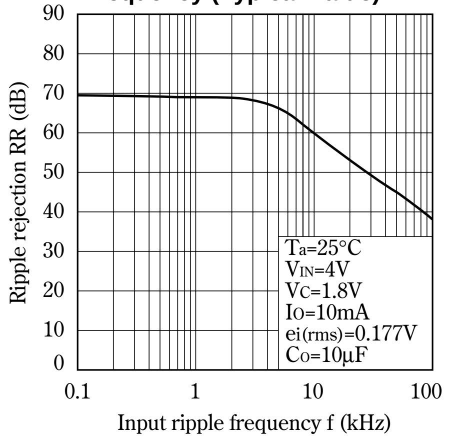


Fig.11 Dropout Voltage vs. Output Current (PQ1T301M2ZP) (Typical Value)

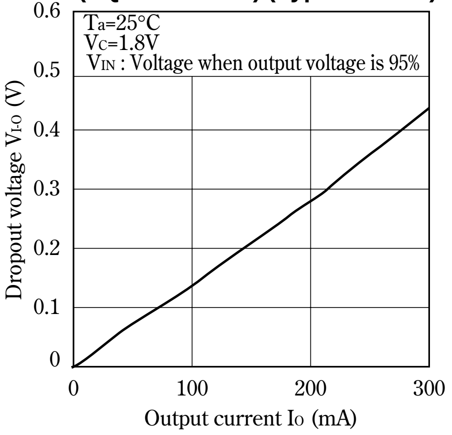
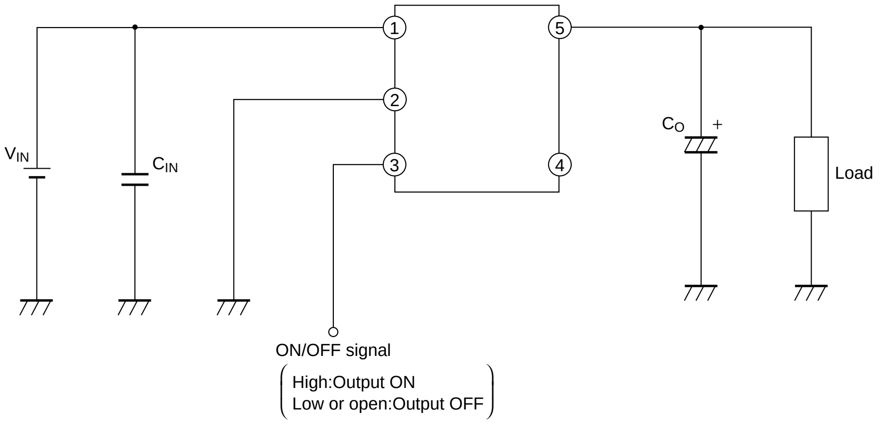


Fig.12 Typical Application



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

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  --- Traffic signals
  --- Gas leakage sensor breakers
  --- Alarm equipment
  --- Various safety devices, etc.

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