

# PQ1Lxx3M2SP Series

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

## ■ Features

- Compact surface mount package SOT-89 (4.5×4.3×1.5 mm)
- Output current : MAX.300mA
- Power dissipation : MAX.900mW
- Low power-loss  
(Dropout voltage : MAX.0.7 V at I<sub>o</sub>=300mA)
- High ripple rejection (TYP. 70dB)
- Built-in output ON/OFF control function

## ■ Applications

- CD-ROM drives
- DVD-ROM drives
- Digital Still Cameras

## ■ 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>	900	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 (For 10s)	°C

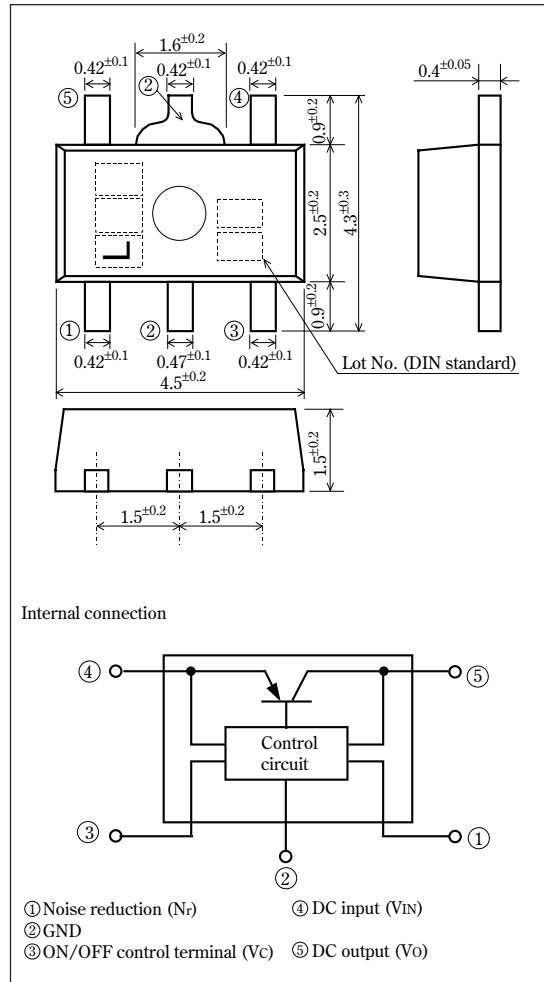
#1 All are open except GND and applicable terminals.

#2 At mounted on PCB

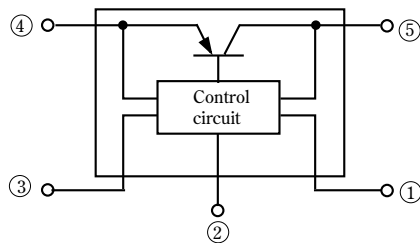
#3 Overheat protection may operate at 125<=T<sub>j</sub><=150°C.

## ■ Outline Dimensions

(Unit : mm)



Internal connection



- ① Noise reduction (Nr)
- ② GND
- ③ ON/OFF control terminal (V<sub>c</sub>)
- ④ DC input (V<sub>IN</sub>)
- ⑤ DC output (V<sub>o</sub>)

•Please refer to the chapter " Handling Precautions ".

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**Electrical Characteristics**

(Unless otherwise specified, condition shall be  $V_{IN}=V_O(TYP.)+1V$ ,  $I_O=0.5A$ ,  $V_C=2.7V$ ,  $T_a=25^{\circ}C$ )

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Output voltage	$V_O$	-	Refer to the table below			V
Load regulation	$RegL$	$I_O=5mA$ to $300mA$	-	35	160	mV
Line regulation	$RegI$	$V_{IN}=V_O(TYP.)+1V$ to $V_O(TYP.)+6V$	-	3	20	mV
Temperature coefficient of output voltage	$TcV_O$	$I_O=10mA$ , $T_J=-25$ to $+75^{\circ}C$	-	0.05	-	mV/ $^{\circ}C$
<sup>#4</sup> Ripple rejection	RR	-	-	70	-	dB
<sup>#4</sup> Output noise voltage	$V_{no(rms)}$	$10Hz < f < 100kHz$ , $I_O=30mA$ , $C_n=0.1\mu F$	-	30	-	$\mu V$
Dropout voltage	$V_{i-o}$	$I_O=300mA$ <sup>#5</sup>	-	0.3	0.7	V
<sup>#6</sup> 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	$I_q$	$I_O=0mA$	-	150	500	$\mu A$
Output OFF-state dissipation current	$I_{qs}$	$V_C=0.2V$	-	-	1	$\mu A$

<sup>#4</sup> Typical value at output voltage is 3.0V type.

<sup>#5</sup> Input voltage when output voltage lowers 100mV from the voltage at  $V_{IN}=V_O(TYP.)+1.0V$ .

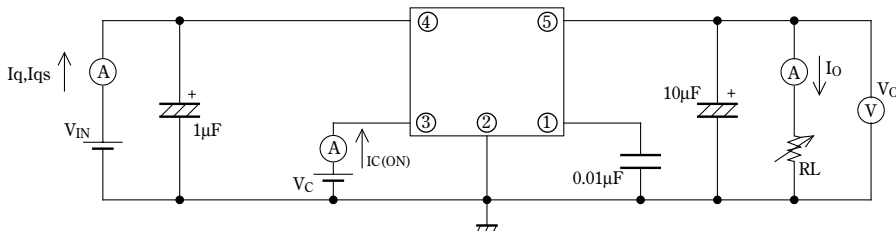
<sup>#6</sup> In case of opening control terminal ③, output voltage turns off.

**Output Voltage Line-up**

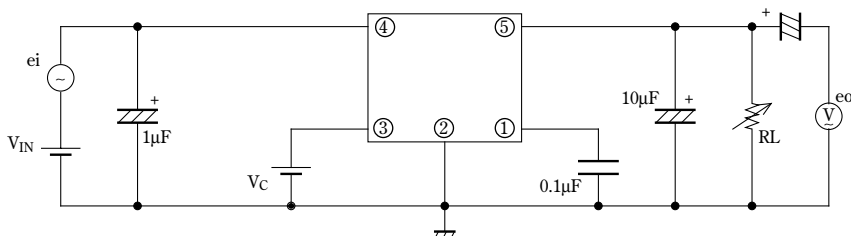
( $V_{IN}=V_O(TYP.)+1.0V$ ,  $I_O=30mA$ ,  $V_C=1.8V$ ,  $T_a=25^{\circ}C$ )

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Output voltage	PQ1L253M2SP	-	2.440	2.5	2.560	V
	PQ1L303M2SP		2.940	3.0	3.060	
	PQ1L333M2SP		3.234	3.3	3.366	
	PQ1L503M2SP		4.900	5.0	5.100	

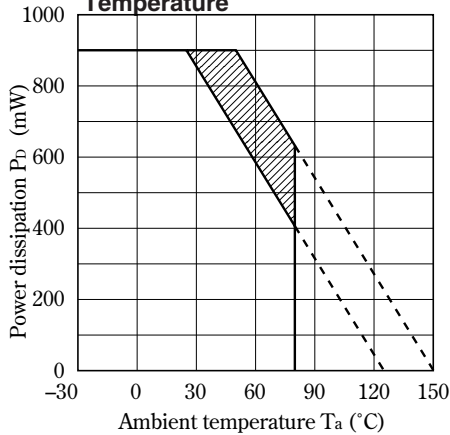
**Fig.1 Test Circuit**



**Fig.2 Test Circuit for Ripple Rejection**

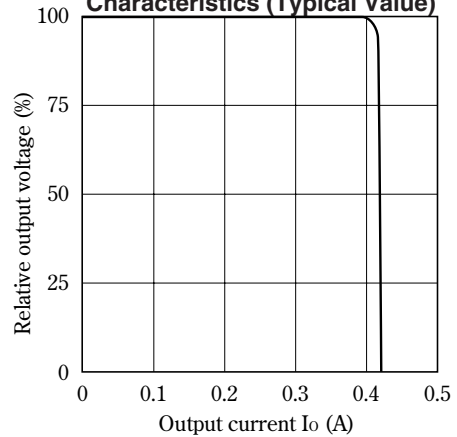


**Fig.3 Power Dissipation vs. Ambient Temperature**

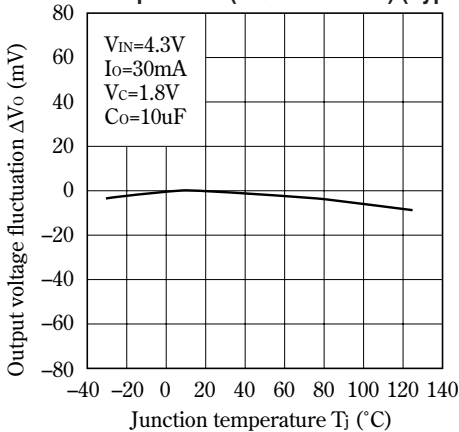


Note) Oblique line portion: Overheat protection may operate in this area.

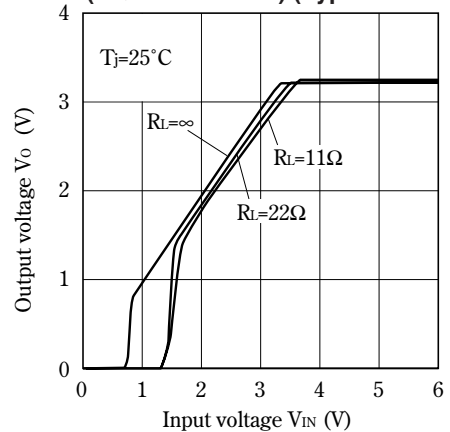
**Fig.4 Overcurrent Protection Characteristics (Typical Value)**



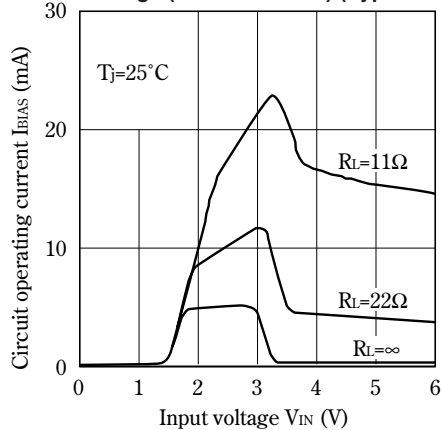
**Fig.5 Output Voltage Fluctuation vs. Junction Temperature (PQ1L333M2SP) (Typical Value)**



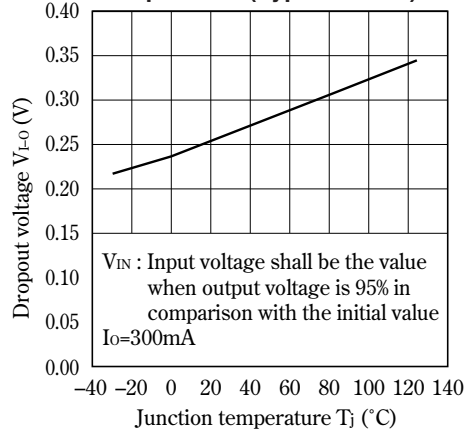
**Fig.6 Output Voltage vs. Input Voltage (PQ1L333MS2SP) (Typical Value)**



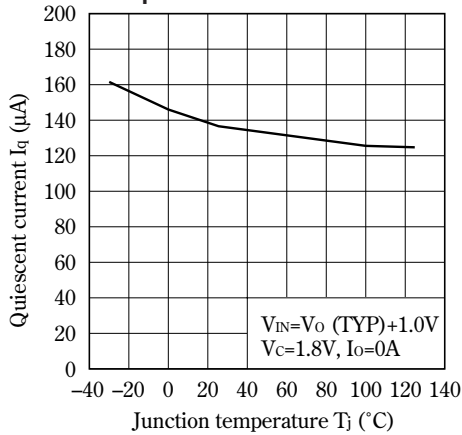
**Fig.7 Circuit Operating Current vs. Input Voltage (PQ1L333M2SP) (Typical Value)**



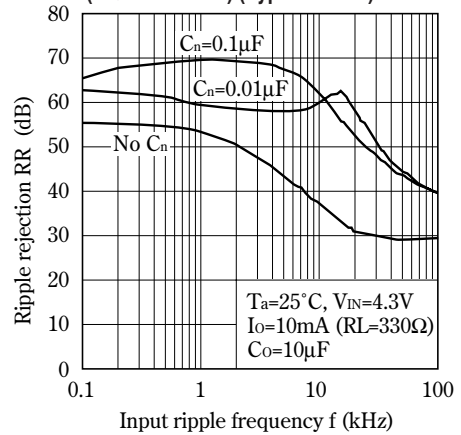
**Fig.8 Dropout Voltage vs. Junction Temperature (Typical Value)**



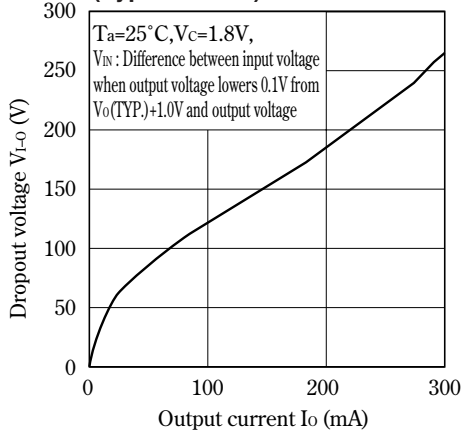
**Fig.9 Quiescent Current vs. Junction Temperature**



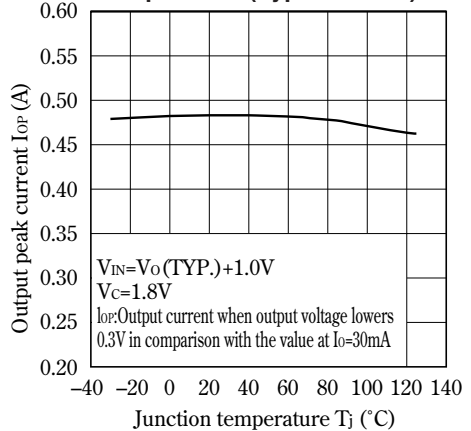
**Fig.10 Ripple Rejection vs. Input Ripple Frequency (PQ1L333M2SP) (Typical Value)**



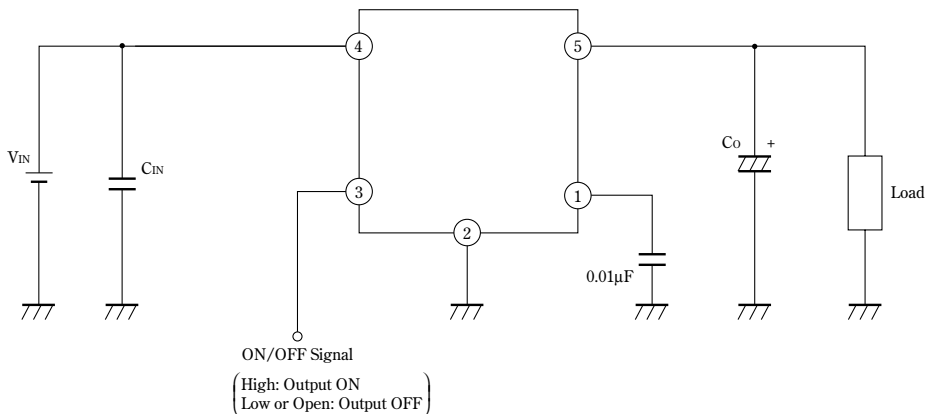
**Fig.11 Dropout Voltage vs. Output Current (Typical Value)**



**Fig.12 Output Peak Current vs. Junction Temperature (Typical Value)**



■ ON/OFF Operation



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