PQ1LAxx3MSPQ Series

Compact Surface Mount Type
Low Power-Loss Voltage Regulators

■ Features

1.Compact surface mount package (4.5×4.3×1.5mm)
2.Output current : MAX.300mA
3.Power dissipation : MAX.900mW
(At mounting PCB shown in Fig.3)
4.Built-in ON/OFF control function
5.Built-in overcurrent, overheat protection functions
6.Use of ceramic capacitor is possible as output smooth capacitor
7.RoHS directive compliant

■ Applications

1.CD-ROM drives
2.DVD-ROM drives

■ Model Line-up

Output Voltage (TYP.)	Model No.
1.5V	PQ1LA153MSPQ
1.8V	PQ1LA183MSPQ
2.5V	PQ1LA253MSPQ
3.0V	PQ1LA303MSPQ
3.3V	PQ1LA333MSPQ
5.0V	PQ1LA503MSPQ
9.0V	PQ1LA903MSPQ

■ Absolute Maximum Ratings

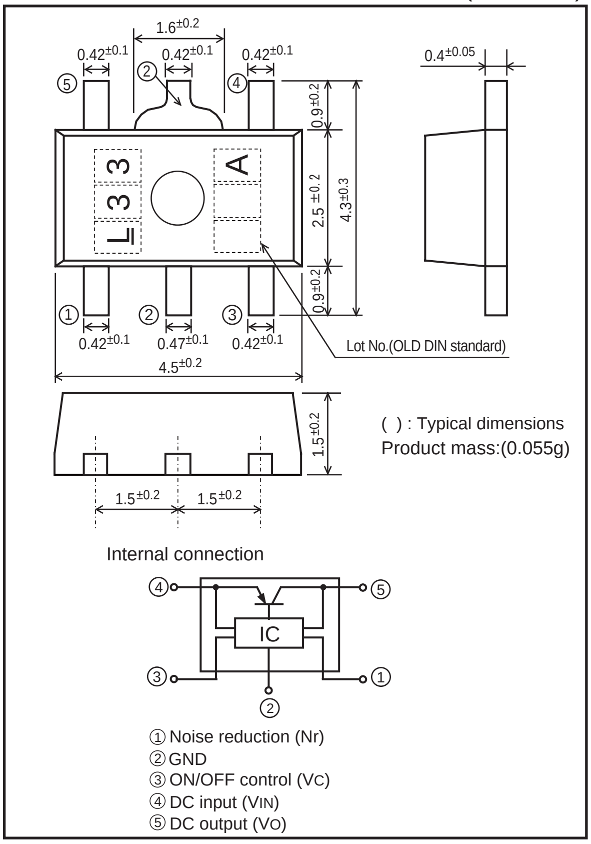
(Ta=25°C)

Parameter	Symbol	Rating	Unit
*1 Input voltage	V_{IN}	15	V
*1 Output control voltage	V_C	15	V
Output current	I_O	300	mA
*2 Power dissipation	P_D	900	mW
*3 Junction temperature	Tj	150	°C
Operating temperature	T_{opr}	-40 to +85	°C
Storage temperature	T_{stg}	-55 to +150	°C
Soldering temperature	T_{sol}	270(10s)	°C

*1 All are open except GND and applicable terminals.
*2 At surface-mounted condition
*3 Overheat protection may operate at Tj:125°C to 150°C

■ Outline Dimensions

(Unit : mm)



Lead finish:Lead-free solder plating
(Composition: Sn2Bi)

■ Electrical Characteristics

(Unless otherwise specified condition shall be 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 list.1			V
Input voltage	V_{IN}	—	2.5	—	15	V
Load regulation	RegL	V_O<3V,I_O=5 to 300mA	—	10	60	mV
		V_O≥3V,I_O=5 to 300mA	—	0.2	2	%
Line regulation	RegI	V_O<3V,V_{IN}=V_O(TYP)+1V to V_O(TYP)+6V	—	5	15	mV
		V_O≧3V,V_{IN}=V_O(TYP)+1V to V_O(TYP)+6V	—	0.05	0.5	%
Temperature coefficient of output voltage	T_CV_O	I_O=10mA, Tj=0 to 100°C	—	±0.5	—	%
*4 Ripple rejection	RR	Refer to Fig.2	—	55	—	dB
*4 Output noise voltage	$V_{no(rms)}$	10Hz<f<100kHz,C_n=0.1μF,I_O=30mA	—	50	—	μV
Dropout voltage	V_{I-O}	I_O=300mA,*5,*6	—	0.4	0.7	V
*7 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	μA
Off-voltage for control	$V_{C(OFF)}$	—	—	—	0.4	V
Quiescent current	I_q	I_O=0mA	—	550	800	μA
Output off-state consumption current	I_{qs}	V_C=0.2V	—	—	1	μA

*4 Typical value of 3.3V output model.
*5 Input voltage when output voltage falls 0.1V from that at V_{IN}=V_O(TYP)+1.0V.
*6 V_{IN}(MIN)=2.5V(**PQ1LA153MSPQ, PQ1LA183MSPQ**)
*7 In case that the control terminal (③ pin) is non-connection,output voltage should be OFF state.

List.1 Output voltage Line-up

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
PQ1LA153MSPQ	V_O	V_{IN}=V_O(TYP.)+1.0V, I_O=30mA, V_C=1.8V,Ta=25°C	1.440	1.5	1.560	V
PQ1LA183MSPQ			1.740	1.8	1.860	
PQ1LA253MSPQ			2.440	2.5	2.560	
PQ1LA303MSPQ			2.940	3.0	3.060	
PQ1LA333MSPQ			3.234	3.3	3.366	
PQ1LA503MSPQ			4.900	5.0	5.100	
PQ1LA903MSPQ			8.820	9.0	9.180	

Fig.1 Standard measuring circuit of Regulator portion

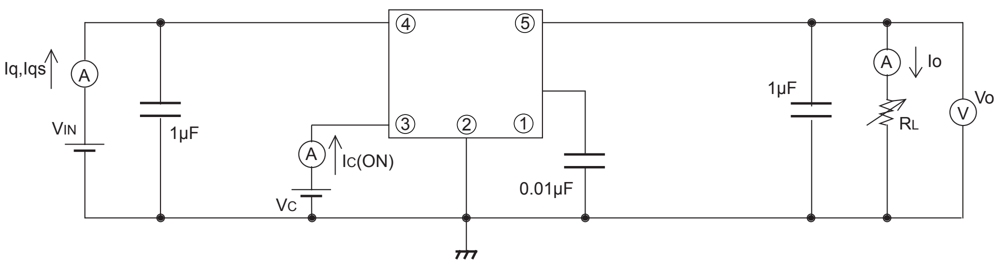
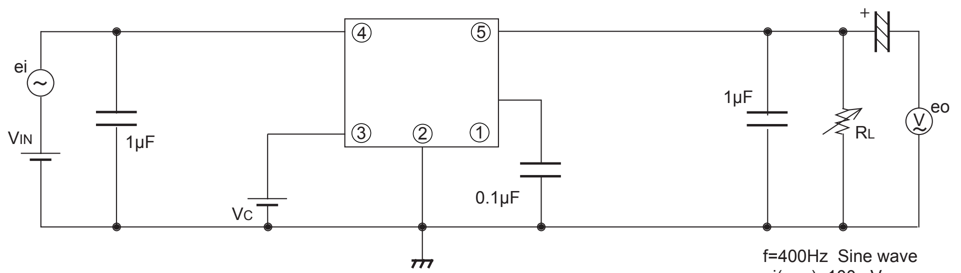
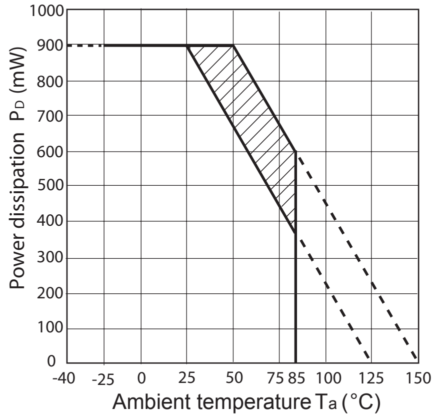


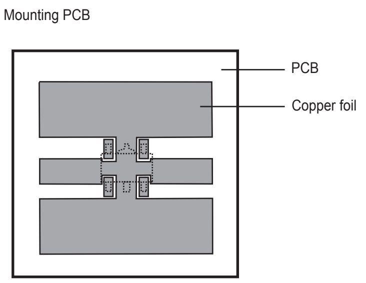
Fig.2 Standard measuring circuit of critical rate of ripple rejection



f=400Hz Sine wave
ei(rms)=100mV
V_{IN}=V_O(TYP.)+1.0V
V_C=1.8V
I_O=30mA
RR=20log {ei(rms)/Eo(rms)}

Fig.3 Power Dissipation vs. Ambient Temperature





Material	: Glass-cloth epxy resin
PCB Size	: 20mm × 20mm × 1.0mm
Copper foil area	: 180mm^2
Thickness of copper	: 35μm

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

Fig.4 Overcurrent Protection Characteristics

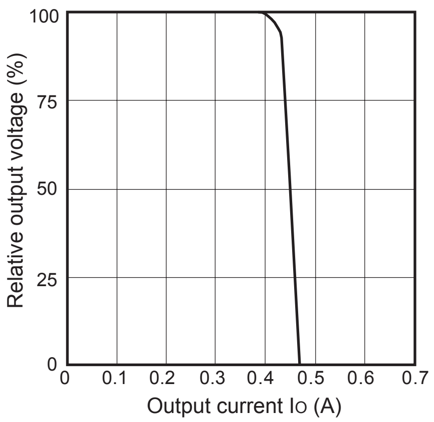


Fig.5 Output Voltage vs. Input Voltage (Typical Value) (**PQ1LA333MSPQ**)

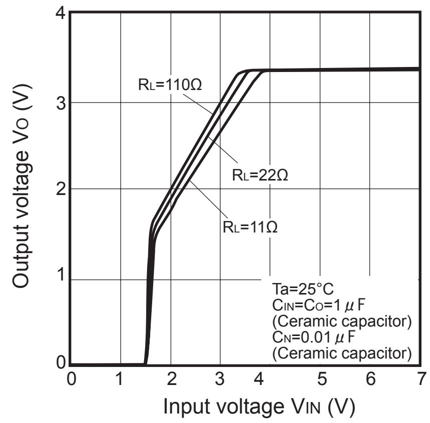


Fig.6 Circuit Operating Current vs. Input Voltage (Typical Value) (**PQ1LA333MSPQ**)

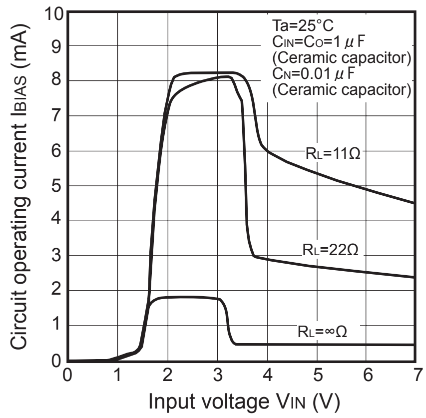


Fig.7 Quiescent Current vs. Junction Temperature (Typical Value)

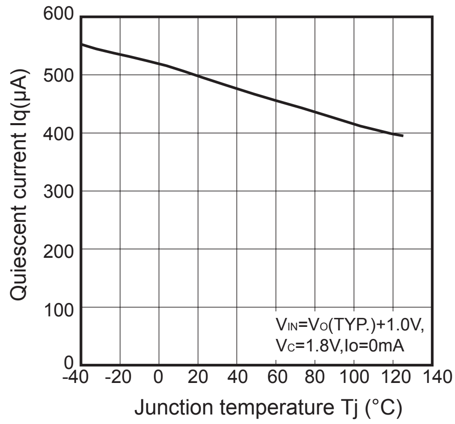


Fig.8 Dropout Voltage vs. Junction Temperature (Typical Value) (**PQ1LA333MSPQ**)

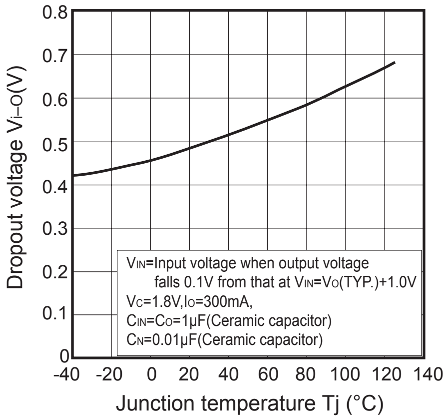


Fig.9 Output Voltage Deviation vs. Junction Temperature (Typical Value) (**PQ1LA333MSPQ**)

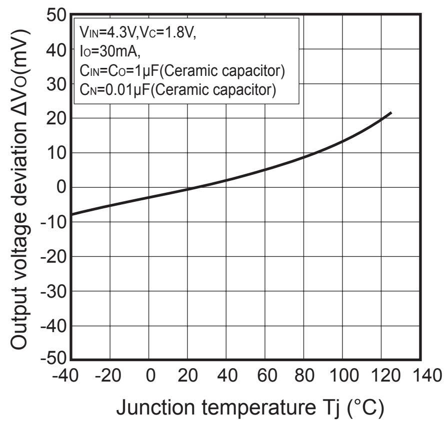


Fig.10 Dropout Voltage vs. Output Current (Typical Value)

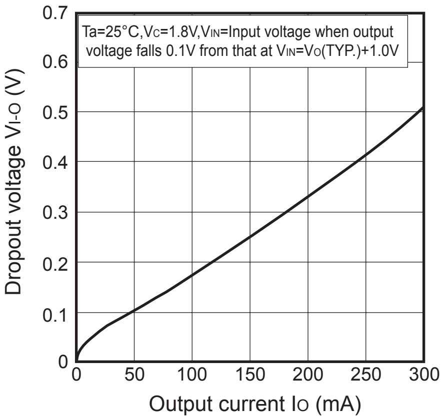


Fig.11 Ripple Rejection vs. Input Ripple Frequency (Typical Value) (**PQ1LA333MSPQ**)

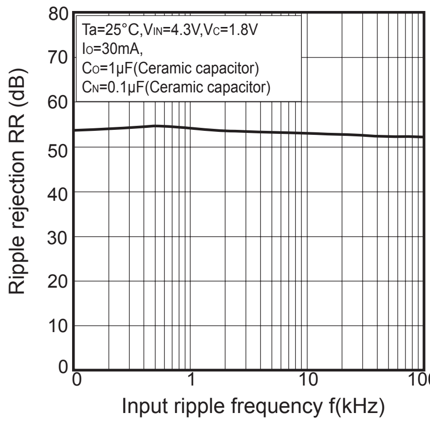
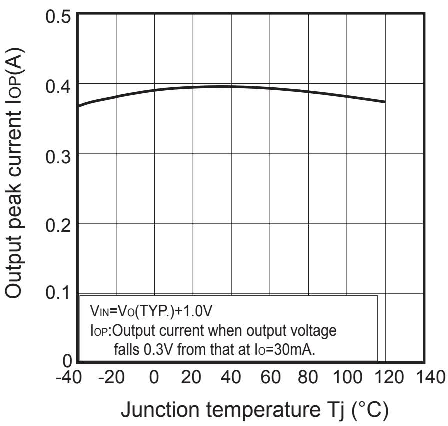
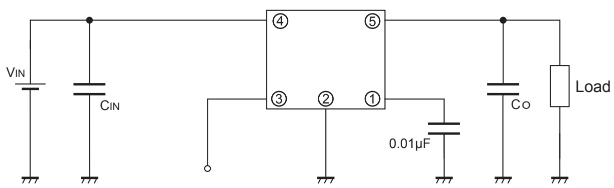


Fig.12 Output Peak Current vs. Junction Temperature (Typical Value)



■ Example of application



ON/OFF signal
High : Output ON
Low or Open : Output OFF