PQ1Nxx3MxSPQ 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.350mA
3.Power dissipation : MAX.900mW
4.Low power-loss
(Dropout voltage : MAX. 0.7V at I_O=350mA)
5.Built-in reset signal generating function
6.Built-in overcurrent, overheat protection functions
7.Use of ceramic capacitor is possible as output smooth capacitor
8.RoHS directive compliant

■ Applications

1.Optical disk drive
2.DVD player

■ Absolute Maximum Ratings

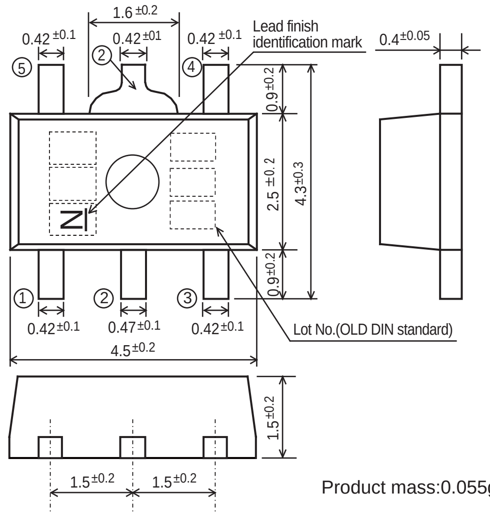
(Ta=25°C)

Parameter	Symbol	Rating	Unit
*1 Input voltage	V_{IN}	9	V
*1 Reset output voltage	V_r	9	V
Output current	I_O	350	mA
*1 Reset output current	I_r	5	mA
*2 Power dissipation	P_D	900	mW
*3 Junction temperature	T_j	150	°C
Operating temperature	T_{opr}	-30 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

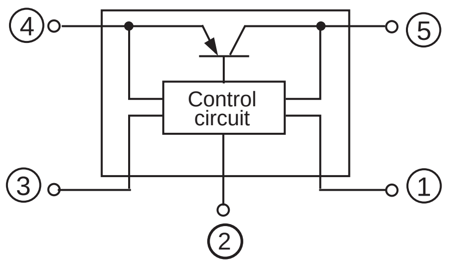
■ Outline Dimensions

(Unit : mm)



Product mass:0.055g

Internal connection



① Reset output voltage (V_r)
② GND
③ Delay time setting (Cd)
④ DC input (V_{in})
⑤ DC output (V_O)

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

■ Electrical Characteristics

(Unless otherwise specified, V_{IN}=5V, I_O=30mA,Ta=25°C)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Output voltage	PQ1N253MxSPQ	V_O	-	2.440	2.50	2.560	V
	PQ1N333MxSPQ			3.234	3.30	3.366	
Load regulation		RegL	I_O=5mA to 350mA	-	60	160	mV
Line regulation		RegI	V_{IN}=5 to 9V	-	5.0	20	mV
Temperature coefficient of output voltage		T_CV_O	I_O=10mA,Tj=-25 to +75°C	-	0.1	-	mV/°C
Ripple rejection		RR	Refer to Fig.2	-	55	-	dB
Output noise voltage		$V_{no(rms)}$	10Hz<f<100kHz, I_O=30mA	-	60	-	μV
Dropout voltage		V_{i-o}	I_O=350mA ※4	-	0.45	0.7	V
Quiescent current		I_q	I_O=0mA	-	1.0	2	mA
Input detecting voltage		Vri	I_O=5mA,Vr<0.8V, Rr=10kΩ	Refer to list.1			V
Hysteresis voltage		ΔVri	I_O=5mA, Rr=10kΩ	-	Vri×0.05	-	V
Low reset output voltage		Vrl	Ir=5mA, 3V<V_{IN}<Vri	-	-	0.8	V
Reset output leak current		Irlk	Vr=5V, Rr=10kΩ	-	-	5	μA
※5 Reset output delay time		Td	V_{IN}=0→5V,Vr≧0.8V,Cd=0.47μF	50	100	150	ms

※4 Input voltage when output voltage falls 0.1V from that at Vin=5V
※5 Reset output delay time(TYP.) is obtained by the following equation
td(TYP.)=100×Cd(μF)/0.47 (ms)

List.1 Input detecting voltage

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

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input detecting voltage	**PQ1N253MASPQ**	Vri	-	4.116	4.2	4.284	V
	PQ1N253MCSPQ			3.724	3.8	3.876	
	PQ1N333MASPQ			4.116	4.2	4.284	
	PQ1N333MCSPQ			3.724	3.8	3.876	

Fig.1 Standard measuring circuit of Regulator portion

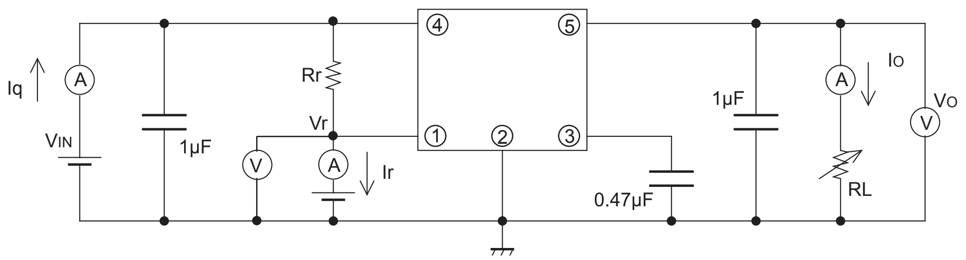
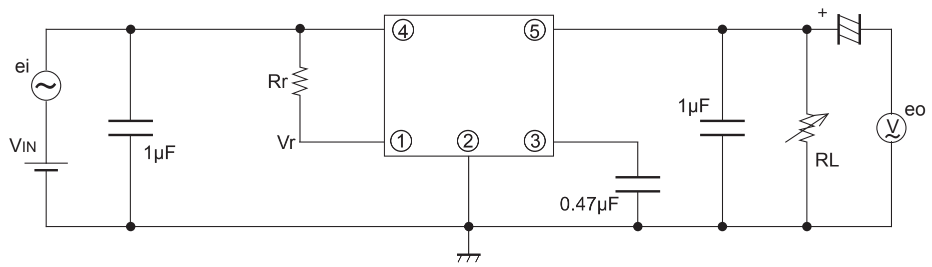
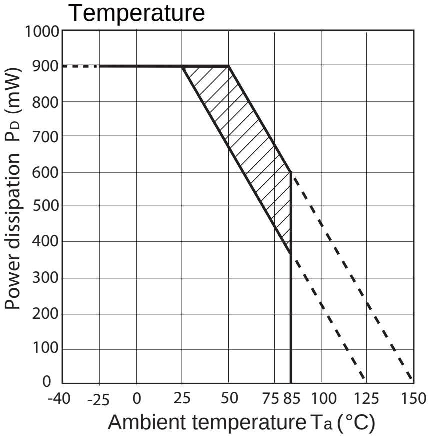


Fig.2 Standard measuring circuit of critical rate of ripple rejection



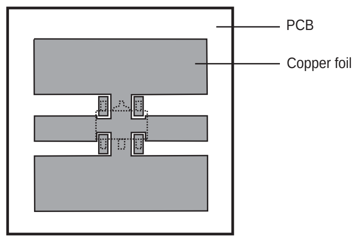
f=400 Hz(sine wave)
ei(rms)=100 mV
Vin=5.0V
Rr=10kΩ
Io=30mA
RR=20log(ei(rms)/eo(rms))

Fig.3 Power Dissipation vs. Ambient Temperature



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

Mounting PCB



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

Fig.4 Overcurrent Protection Characteristics

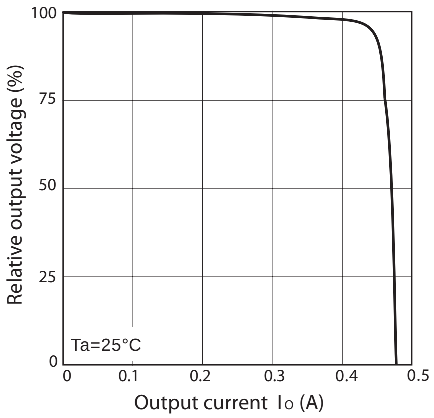


Fig.5 Output Voltage vs. Input Voltage (**PQ1N333MASPQ**)

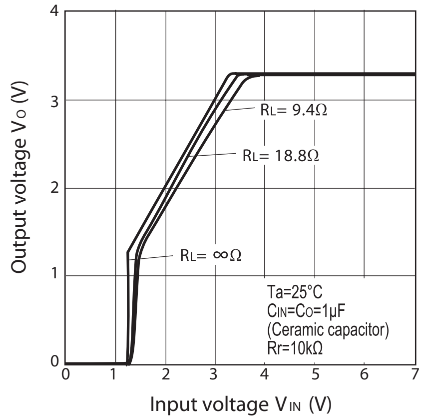


Fig.6 Circuit Operating Current vs. Input Voltage (**PQ1N333MASPQ**)

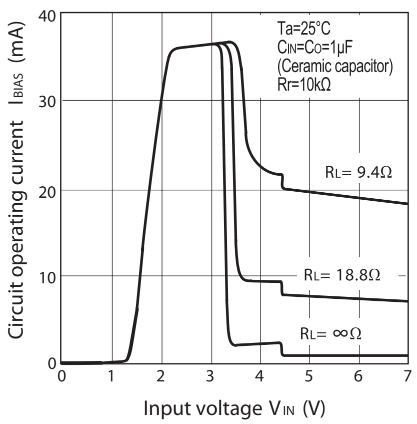


Fig.7 Quiescent Current vs. Junction Temperature

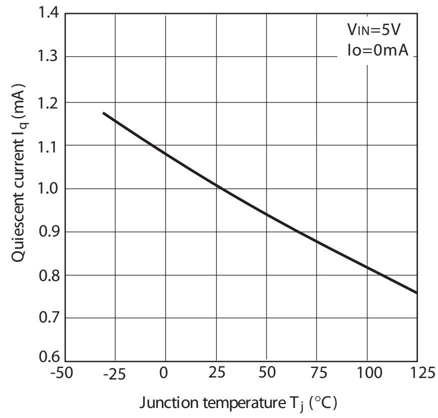


Fig.8 Dropout Voltage vs. Junction Temperature (**PQ1N333MASPQ**)

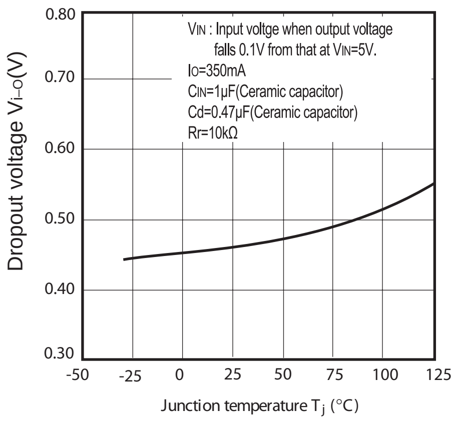


Fig.9 Reference Voltage Deviation vs. Junction Temperature (**PQ1N333MASPQ**)

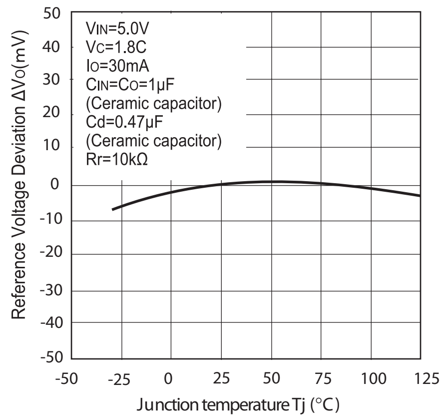


Fig.10 Dropout Voltage vs. Output Current

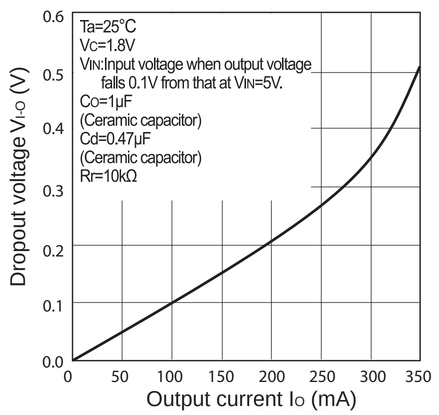


Fig.11 Reset Output Voltage vs. Input Voltage

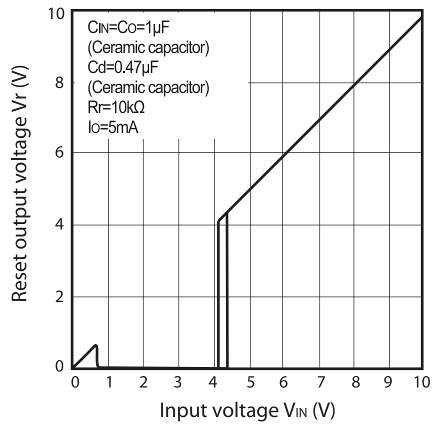


Fig.12 Input Detecting Voltage vs. Junction Temperature

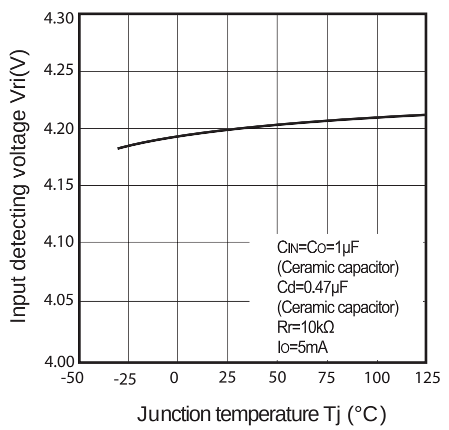


Fig.13 Hysteresis Voltage vs. Junction Temperature

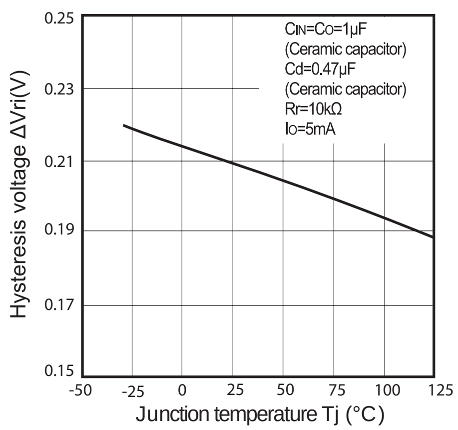


Fig.14 Ripple Rejection vs. Input Ripple Frequency (**PQ1N333MASPQ**)

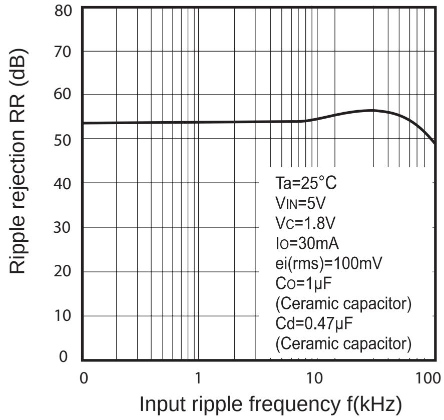


Fig.15 Reset Output Delay Time vs. Delay Time Setting

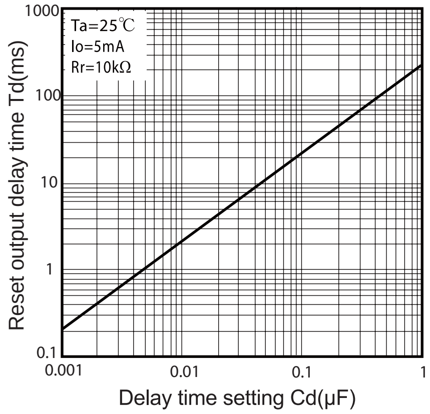


Fig.16 Output Peak Current vs. Junction Temperature

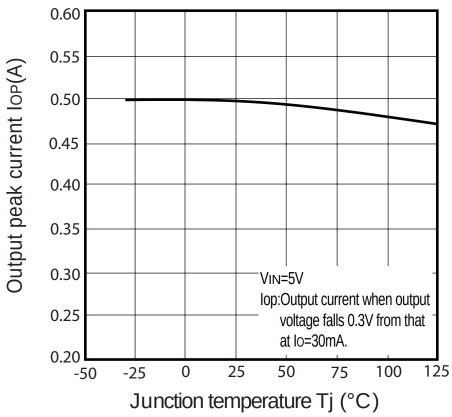


Fig.17 Example of application