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PQ1Mxx5M2SPQ 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.500mA
3.Power dissipation : MAX.900mW
(At mounting PCB shown in Fig.3)
4.Low power-loss
(Dropout voltage : MAX. 0.7V at I_O=500mA)
5.High ripple rejection(TYP.65dB)
6.Built-in ON/OFF control function
7.Built-in overcurrent, overheat protection functions
8.Use of ceramic capacitor is possible as output smooth capacitor
9.RoHS directive compliant

■ Applications

1.CD-ROM drives
2.DVD-ROM drives
3.Digital Still Cameras

■ Model Line-up

Output Voltage (TYP.)	Model No.
1.5V	**PQ1M155M2SPQ**
1.8V	**PQ1M185M2SPQ**
2.5V	**PQ1M255M2SPQ**
3.3V	**PQ1M335M2SPQ**
5.0V	**PQ1M505M2SPQ**

■ Absolute Maximum Ratings

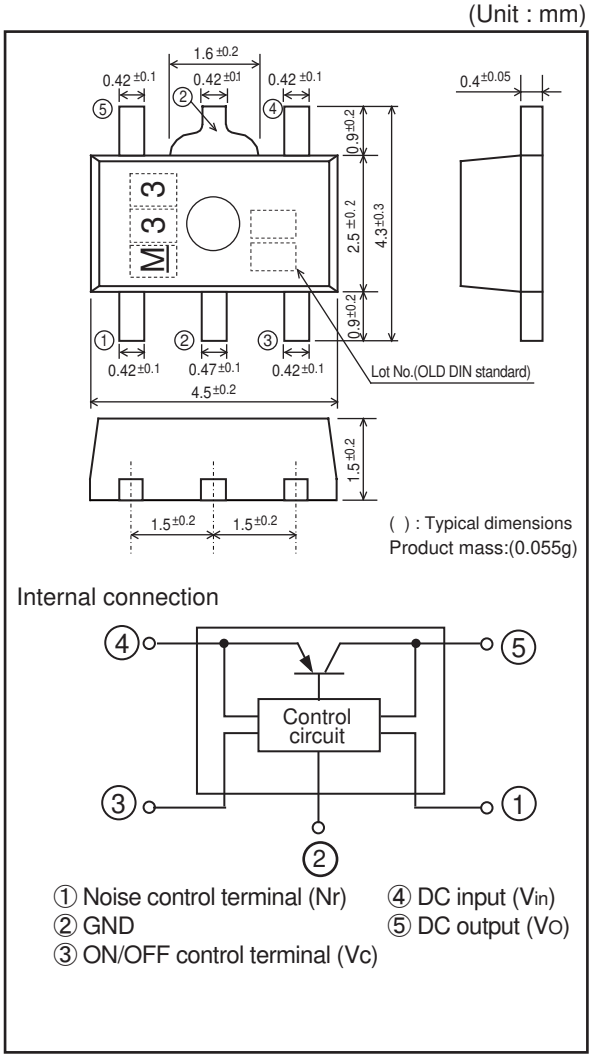
(Ta=25°C)

Parameter	Symbol	Rating	Unit
*1 Input voltage	V_{IN}	9	V
*1 ON/OFF control terminal voltage	V_C	9	V
Output current	I_O	500	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)



Internal connection

① Noise control terminal (Nr)
② GND
③ ON/OFF control terminal (Vc)
④ DC input (V_{in})
⑤ DC output (V_O)

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

■ Electrical Characteristics

(Unless otherwise specified, V_{IN}=3.0V,I_O=30mA,V_C=1.8V,Ta=25°C(**PQ1M155M2SPQ,PQ1M185M2SPQ**))
(Unless otherwise specified, V_{IN}=V_O(TYP.)+1.0V,I_O=30mA,V_C=1.8V,Ta=25°C(**PQ1M255M2SPQ,PQ1M335M2SPQ,PQ1M505M2SPQ**))

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Output voltage		V_O	-	Refer to the table below.			V
Load regulation		R_{egL}	I_O=5mA to 500mA	-	60	200	mV
Line regulation	**PQ1M155M2SPQ**	R_{egl}	V_{IN}=3.0V to 7.5V	-	3.0	20	mV
	PQ1M185M2SPQ		V_{IN}=3.0V to 7.8V				
	PQ1M255,335,505M2SPQ		V_{IN}=V_O(TYP.)+1V to V_O(TYP.)+6V(MAX9V)				
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	-	65	-	dB
Output noise voltage	**PQ1M155,185M2SPQ**	$V_{no(rms)}$	10kHz<f<100kHz,Cn=0.1μF,I_O=30mA	-	30	-	μV
	PQ1M335M2SPQ		10kHz<f<100kHz,Cn=0.1μF,I_O=30mA	-	40	-	
※4 Dropout voltage		V_{i-o}	I_O=500mA※5	-	0.4	0.7	V
※6 ON-state voltage for control		$V_{C(ON)}$	-	1.8	-	-	V
ON-state current for control		$I_{C(ON)}$	V_C=1.8V	-	20	70	μA
OFF-state voltage for control		$V_{C(OFF)}$	-	-	-	0.4	V
Quiescent current		I_q	I_O=0mA	-	0.6	1	mA
Output OFF-state dissipation current		I_{qs}	V_C=0.2V	-	-	1	μA

※4 Excluding **PQ1M155M2SPQ,PQ1M185M2SPQ**
※5 Dropout voltage when output voltage lowers 0.1V from the voltage at V_{IN}=V_O+1V.
※6 In case of opening control terminal ③,output voltage turns off.

Table.1 Output Voltage

V_{IN}=3.0V,I_O=30mA,V_C=1.8V,Ta=25°C(**PQ1M155M2SPQ,PQ1M185M2SPQ**)
V_{IN}=V_O(TYP.)+1.0V,I_O=30mA,V_C=1.8V,Ta=25°C(**PQ1M255M2SPQ,PQ1M335M2SPQ,PQ1M505M2SPQ**)

Model No.	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
PQ1M155M2SPQ	V_O	-	1.44	1.5	1.56	V
PQ1M185M2SPQ			1.74	1.8	1.86	
PQ1M255M2SPQ			2.440	2.5	2.560	
PQ1M335M2SPQ			3.234	3.3	3.366	
PQ1M505M2SPQ			4.900	5.0	5.100	

Fig.1 Test Circuit

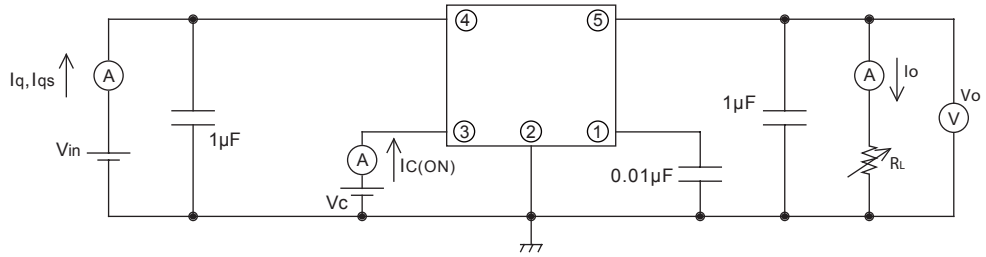
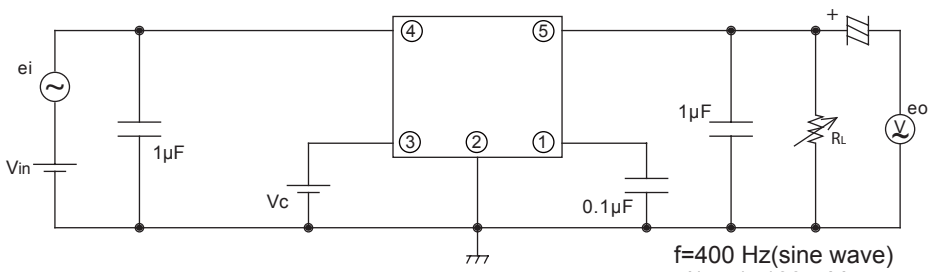
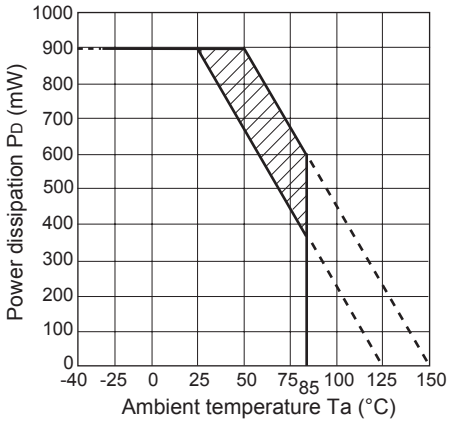


Fig.2 Test Circuit for Ripple Rejection

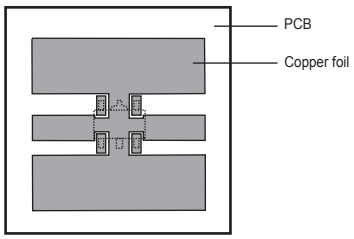


f=400 Hz(sine wave)
ei(rms)=100 mV
Vin=Vo(TYP)+1.0V
Vc=1.8V,Io=30mA
RR=20log(ei(rms)/eo(rms))

Fig.3 Power Dissipation vs. Ambient Temperature



Mounting PCB



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 (Typical Value)

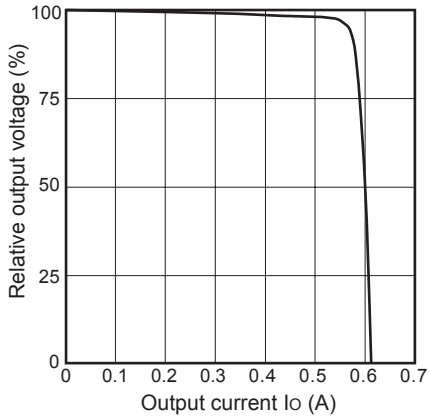


Fig.5 Output Voltage vs. Input Voltage (Typical Value) (**PQ1M335M2SPQ**)

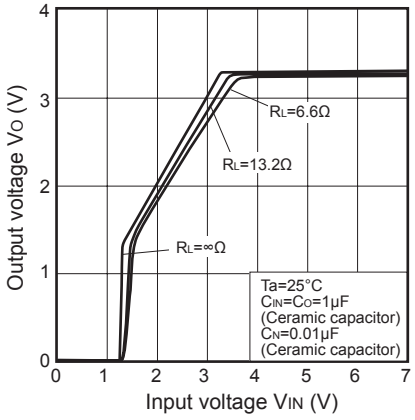


Fig.6 Circuit Operating Current vs. Input Voltage (Typical Value) (**PQ1M335M2SPQ**)

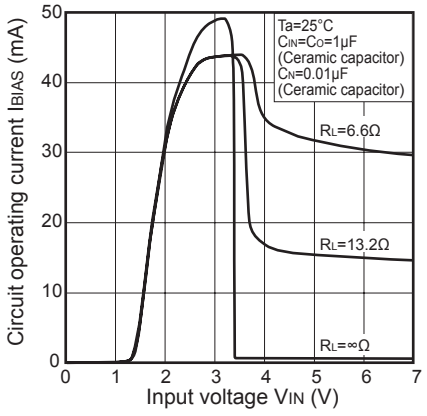


Fig.7 Quiescent Current vs. Junction Temperature (Typical Value)

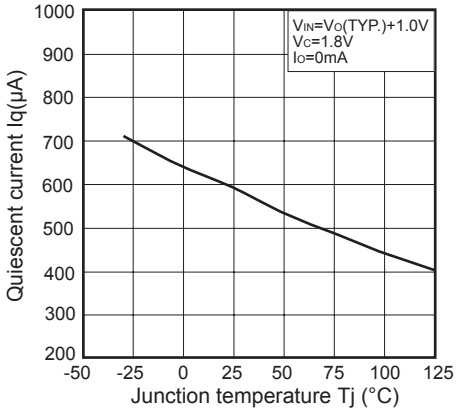


Fig.8 Dropout Voltage vs. Junction Temperature (Typical Value) (**PQ1M335M2SPQ**)

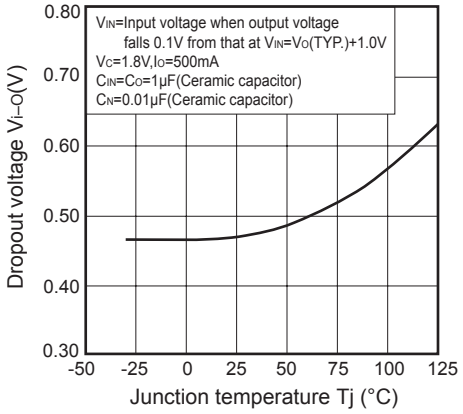


Fig.9 Output Voltage Deviation vs. Junction Temperature (Typical Value) (**PQ1M335M2SPQ**)

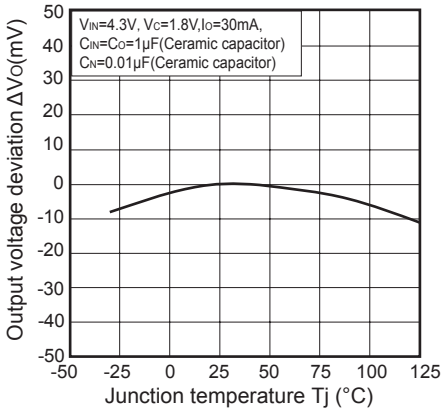


Fig.10 Dropout Voltage vs. Output Current (Typical Value)

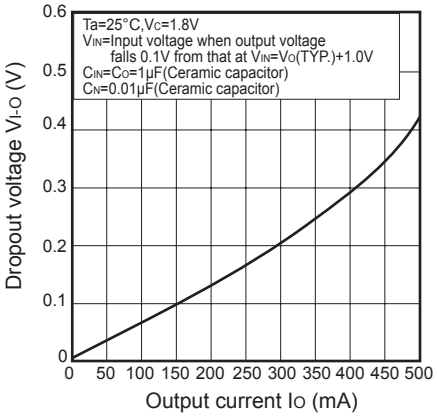


Fig.11 Ripple Rejection vs. Input Ripple Frequency (Typical Value) (**PQ1M335M2SPQ**)

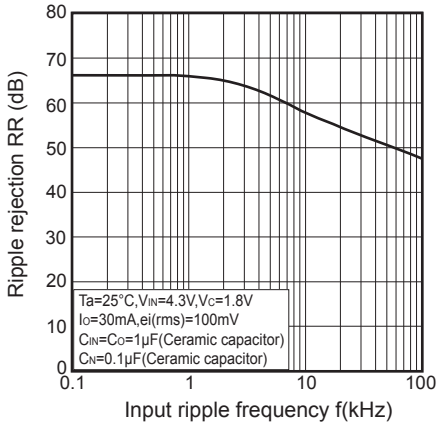
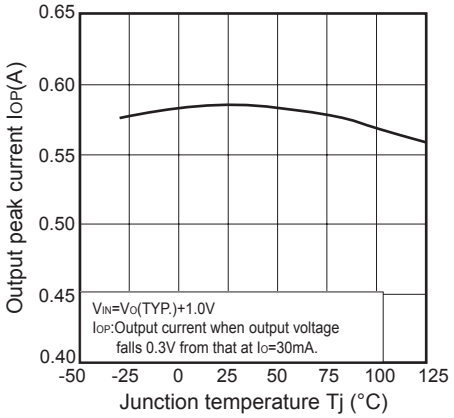
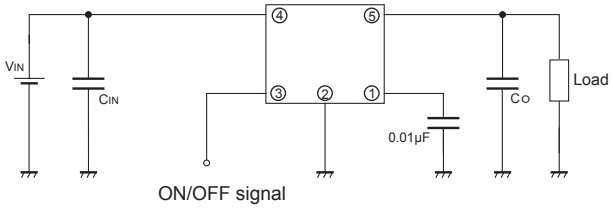


Fig.12 Output Peak Current vs. Junction Temperature (Typical Value)



■ Example of application



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