

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

($T_a=25^{\circ}C$)

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	$^{\circ}C$
Operating temperature	T_{opr}	-30 to +85	$^{\circ}C$
Storage temperature	T_{stg}	-55 to +150	$^{\circ}C$
Soldering temperature	T_{sol}	270(10s)	$^{\circ}C$

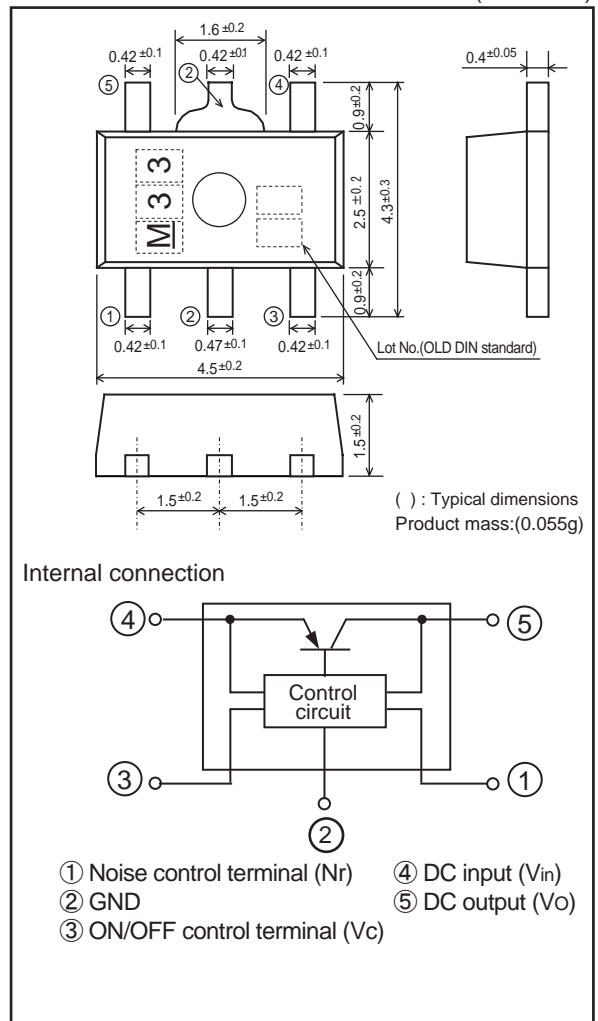
*1 All are open except GND and applicable terminals.

*2 At surface-mounted condition

*3 Overheat protection may operate at $T_j:125^{\circ}C$ to $150^{\circ}C$

Outline Dimensions

(Unit : mm)



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

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Electrical Characteristics

(Unless otherwise specified, $V_{IN}=3.0V, I_o=30mA, V_c=1.8V, T_a=25^\circ C$ (PQ1M155M2SPQ, PQ1M185M2SPQ))
 (Unless otherwise specified, $V_{IN}=V_o(TYP.)+1.0V, I_o=30mA, V_c=1.8V, T_a=25^\circ C$ (PQ1M255M2SPQ, PQ1M335M2SPQ, PQ1M505M2SPQ))

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit	
Output voltage	V_o	-	Refer to the table below.			V	
Load regulation	$RegL$	$I_o=5mA$ to $500mA$	-	60	200	mV	
Line regulation	PQ1M155M2SPQ PQ1M185M2SPQ PQ1M255,335,505M2SPQ	$Regl$	-	$V_{IN}=3.0V$ to $7.5V$	3.0	20	mV
				$V_{IN}=3.0V$ to $7.8V$			
				$V_{IN}=V_o(TYP.)+1V$ to $V_o(TYP.)+6V(MAX9V)$			
Temperature coefficient of output voltage	TcV_o	$I_o=10mA, T_j=-25$ to $+75^\circ C$	-	0.1	-	mV/ $^\circ C$	
Ripple rejection	RR	Refer to Fig.2	-	65	-	dB	
Output noise voltage	PQ1M155,185M2SPQ PQ1M335M2SPQ	$V_{no(rms)}$	-	$10kHz < f < 100kHz, C_n=0.1\mu F, I_o=30mA$	30	-	μV
				$10kHz < f < 100kHz, C_n=0.1\mu F, I_o=30mA$			
^{*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

$V_{IN}=3.0V, I_o=30mA, V_c=1.8V, T_a=25^\circ C$ (PQ1M155M2SPQ, PQ1M185M2SPQ)
 $V_{IN}=V_o(TYP.)+1.0V, I_o=30mA, V_c=1.8V, T_a=25^\circ C$ (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

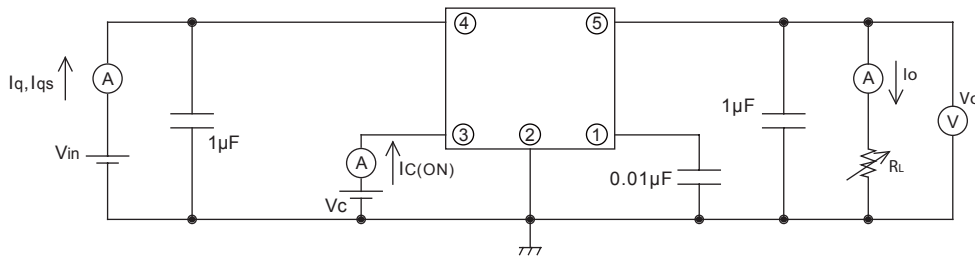


Fig.2 Test Circuit for Ripple Rejection

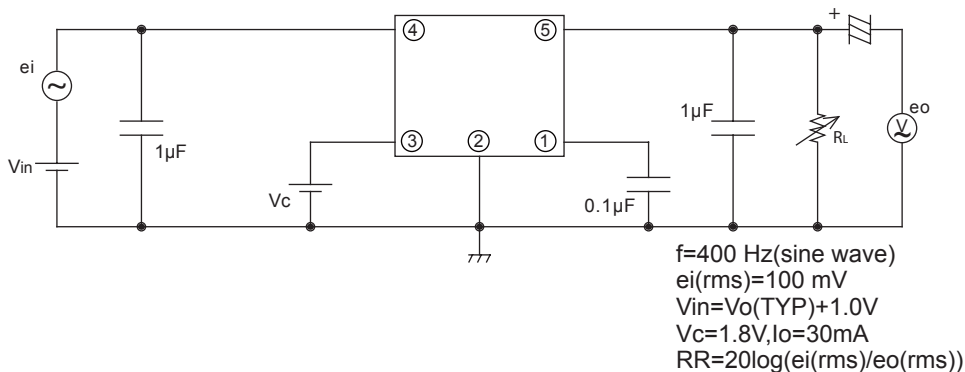
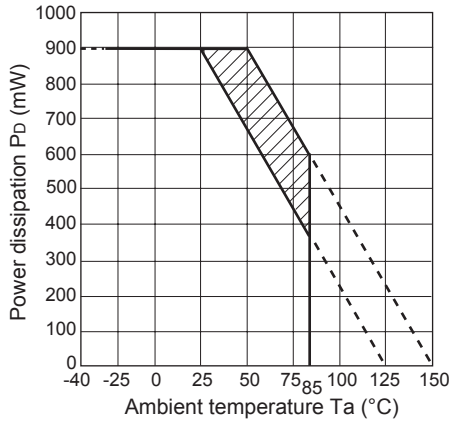
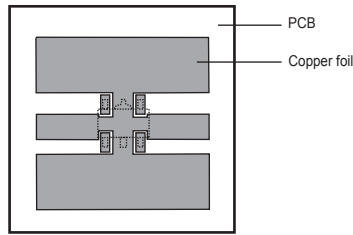


Fig.3 Power Dissipation vs. Ambient Temperature



Mounting PCB



Material : Glass-cloth epoxy resin
 PCB Size : 20mm × 20mm × 1.0mm
 Copper foil area : 180mm²
 Thickness of copper : 35μm

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

Fig.4 Overcurrent Protection Characteristics (Typical Value)

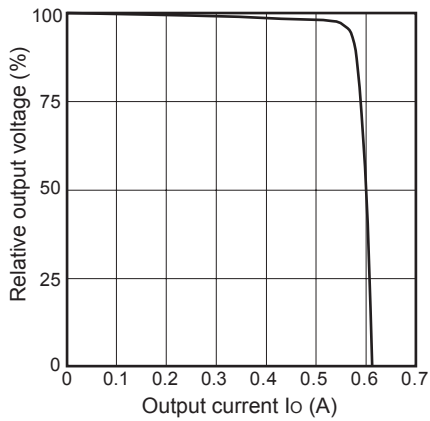


Fig.5 Output Voltage vs. Input Voltage (Typical Value) (PQ1M335M2SPQ)

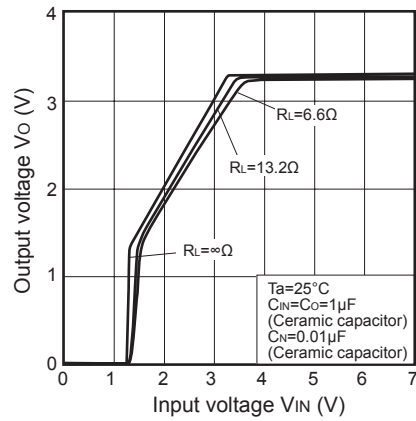


Fig.6 Circuit Operating Current vs. Input Voltage (Typical Value) (PQ1M335M2SPQ)

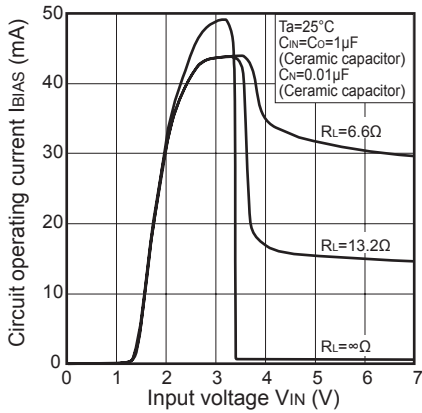


Fig.7 Quiescent Current vs. Junction Temperature (Typical Value)

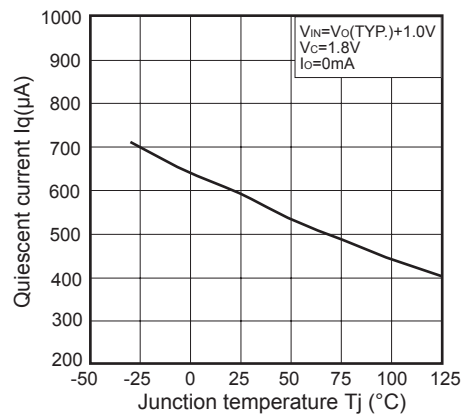


Fig.8 Dropout Voltage vs. Junction Temperature (Typical Value) (PQ1M335M2SPQ)

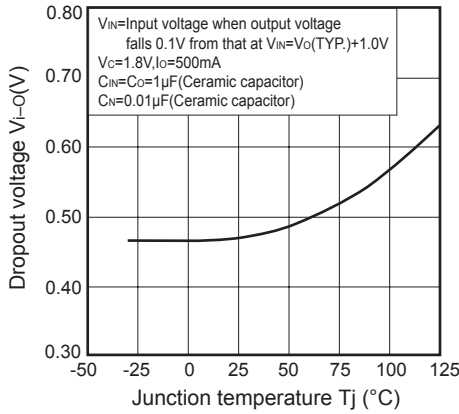


Fig.9 Output Voltage Deviation vs. Junction Temperature (Typical Value) (PQ1M335M2SPQ)

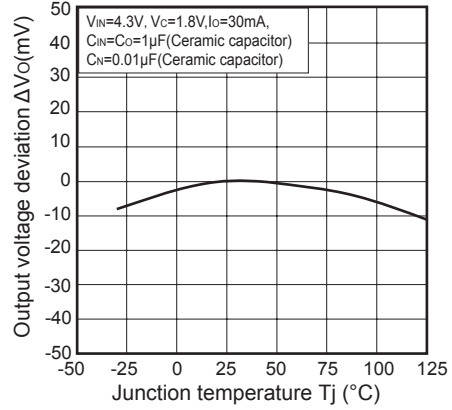


Fig.10 Dropout Voltage vs. Output Current (Typical Value)

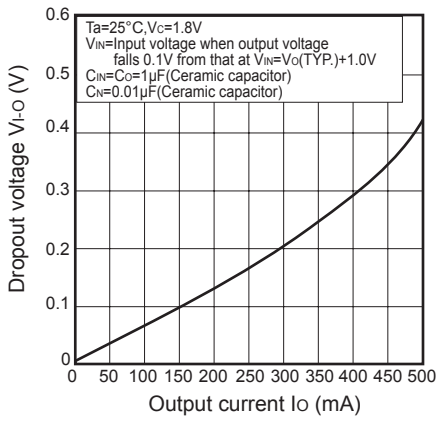


Fig.11 Ripple Rejection vs. Input Ripple Frequency (Typical Value) (PQ1M335M2SPQ)

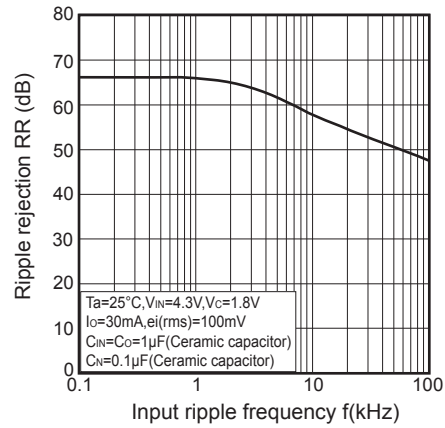
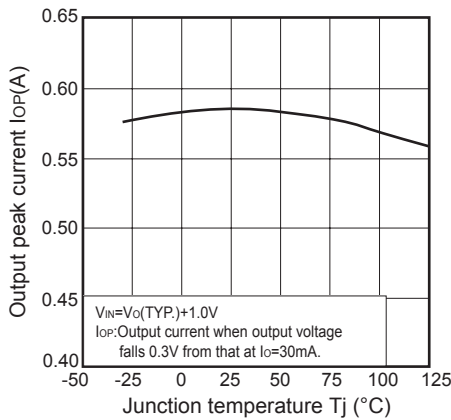


Fig.12 Output Peak Current vs. Junction Temperature (Typical Value)



■ Example of application

