# PQ2Lxxx2MSPQ Series

2-Output Type
Low Power-Loss Voltage Regulators

## ■ Features

1.Compact surface mount package (4.5×4.3×1.5mm)
2.Each channel 250mA
  Output 1:Voltage 3.3V / 2.5V
  Output 2:Voltage 3.3V / 2.5V / 1.8V / 1.5V
3.Power dissipation : MAX.900mW
  (At surface-mounted condition)
4.Low power-loss
  (Dropout voltage : MAX. 0.4V at $I_O$=100mA)
5.Use of ceramic capacitor is possible as output smooth capacitor
6.RoHS directive compliant

## ■ Applications

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

## ■ Absolute Maximum Ratings

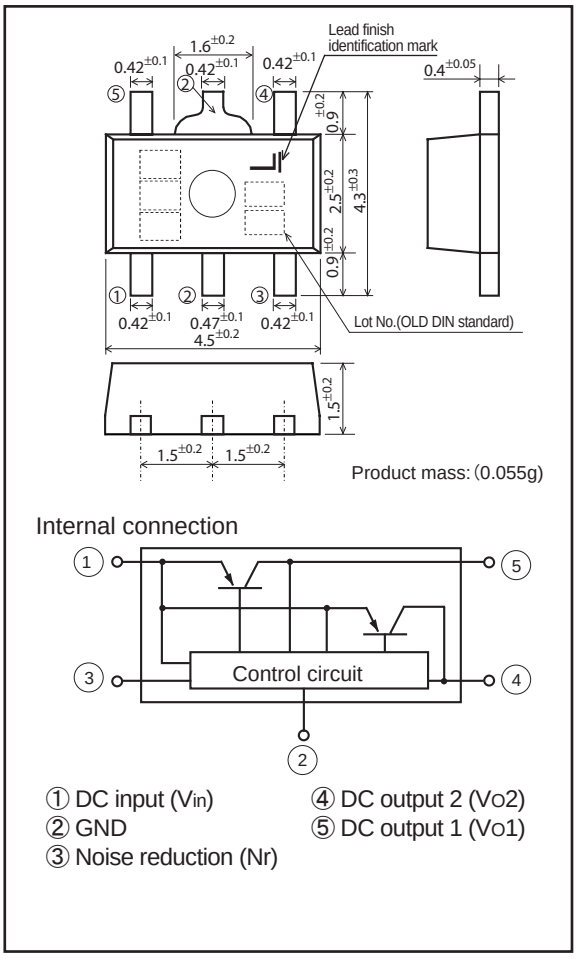
(Ta=25°C)

| Parameter | Symbol | Rating | Unit |
|---|---|---|---|
| *1 Input voltage | $V_{IN}$ | 9 | V |
| Output current | $I_{O1}$ | 250 | mA |
| | $I_{O2}$ | 250 | |
| *2 Power dissipation | $P_D$ | 900 | mW |
| *3 Junction temperature | $T_j$ | 150 | °C |
| Operating temperature | $T_{opr}$ | -30 to +80 | °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 DC input ($V_{in}$)
② GND
③ Noise reduction (Nr)
④ DC output 2 ($V_{O2}$)
⑤ DC output 1 ($V_{O1}$)

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

## ■ Electrical Characteristics

(Unless otherwise specified condition shall be $V_{IN}$=$V_{O1}$(TYP.)+1.0V, $I_{O1}$=0mA,$I_{O2}$=0mA,Ta=25°C)

| Parameter | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|---|---|---|---|---|---|---|
| Output voltage | $V_O$ | - | Refer to list.1 | | | V |
| Load regulation | $R_{egL}1$ | $I_{O1}$=5 to 200mA | - | 30 | 160 | mV |
| | $R_{egL}2$ | $I_{O2}$=5 to 200mA | - | 30 | 160 | |
| Line regulation | $R_{egI}1$ | $V_{IN}$=$V_{O1}$(TYP.)+1V to $V_{O1}$(TYP.)+6V(MAX.9V) ,$I_{O1}$=30mA | - | 3 | 20 | mV |
| | $R_{egI}2$ | $V_{IN}$=$V_{O2}$(TYP.)+1V to $V_{O2}$(TYP.)+6V(MAX.9V) ,$I_{O2}$=30mA | - | 3 | 20 | |
| Temperature coefficient of output voltage | $T_CV_{O1}$ | $I_{O1}$=10mA, Tj=-25 to 75°C | - | 0.1 | - | mV/°C |
| | $T_CV_{O2}$ | $I_{O2}$=10mA, Tj=-25 to 75°C | - | 0.1 | - | |
| ※4 Ripple rejection | RR | Refer to Fig.2 | - | 60 | - | dB |
| Output noise voltage | $V_{no(rms)}$ | 10Hz<f<100kHz,$I_O$=30mA,Cn=0.01µF | - | 50 | - | µV |
| Dropout voltage | $V_{I-O1}$ | $I_{O1}$=100mA, ※5 | - | 0.16 | 0.4 | V |
| | $V_{I-O2}$ | $I_{O2}$=200mA, ※5 | - | 0.24 | 1.0 | |
| Quiescent current | $I_q$ | - | - | 250 | 400 | µA |

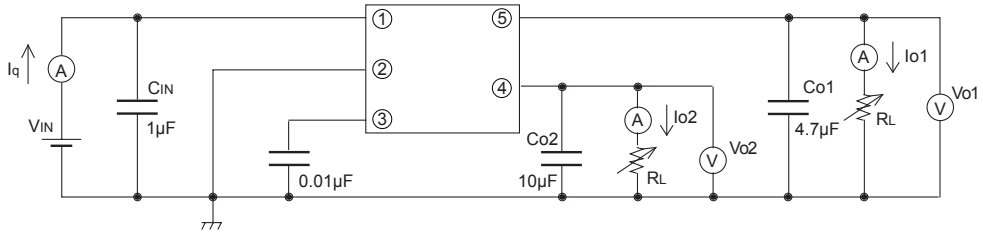
※4 Typical value of 3.3V output model.
※5 Input voltage when output voltage falls 0.1V from that at Vin=$V_O$(TYP)+1.0V.
However,Vin≧2.3V.

### List.1 Output voltage

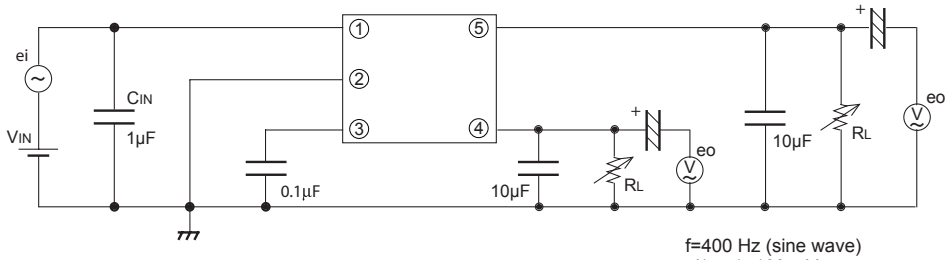
($V_{IN}$=$V_{O1}$(TYP.)+1.0V, Ta=25°C)

| Parameter | Model No. | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|---|---|---|---|---|---|---|---|
| Output voltage | **PQ2L3332MSPQ** | $V_{O1}$ | $I_{O1}$=30mA, $I_{O2}$=0mA | 3.234 | 3.3 | 3.366 | V |
| | | $V_{O2}$ | $I_{O1}$=0mA, $I_{O2}$=30mA | 3.234 | 3.3 | 3.366 | |
| | **PQ2L3252MSPQ** | $V_{O1}$ | $I_{O1}$=30mA, $I_{O2}$=0mA | 3.234 | 3.3 | 3.366 | |
| | | $V_{O2}$ | $I_{O1}$=0mA, $I_{O2}$=30mA | 2.440 | 2.5 | 2.560 | |
| | **PQ2L3182MSPQ** | $V_{O1}$ | $I_{O1}$=30mA, $I_{O2}$=0mA | 3.234 | 3.3 | 3.366 | |
| | | $V_{O2}$ | $I_{O1}$=0mA, $I_{O2}$=30mA | 1.740 | 1.8 | 1.860 | |
| | **PQ2L3152MSPQ** | $V_{O1}$ | $I_{O1}$=30mA, $I_{O2}$=0mA | 3.234 | 3.3 | 3.366 | |
| | | $V_{O2}$ | $I_{O1}$=0mA, $I_{O2}$=30mA | 1.440 | 1.5 | 1.560 | |
| | **PQ2L2182MSPQ** | $V_{O1}$ | $I_{O1}$=30mA, $I_{O2}$=0mA | 2.440 | 2.5 | 2.560 | |
| | | $V_{O2}$ | $I_{O1}$=0mA, $I_{O2}$=30mA | 1.740 | 1.8 | 1.860 | |
| | **PQ2L2152MSPQ** | $V_{O1}$ | $I_{O1}$=30mA, $I_{O2}$=0mA | 2.440 | 2.5 | 2.560 | |
| | | $V_{O2}$ | $I_{O1}$=0mA, $I_{O2}$=30mA | 1.440 | 1.5 | 1.560 | |

### Fig.1 Standard measuring circuit of Regulator portion

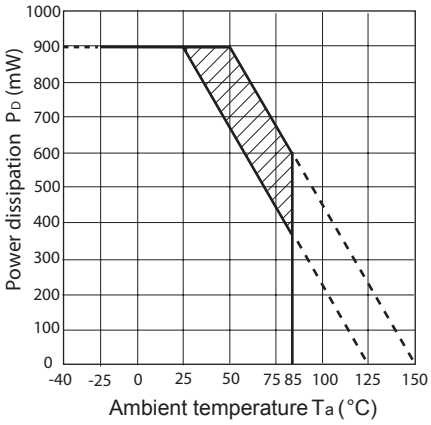



### Fig.2 Standard measuring circuit of critical rate of ripple rejection



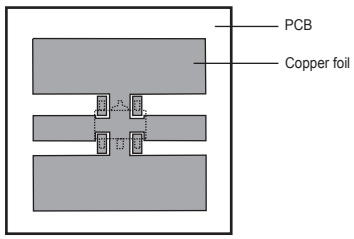

f=400 Hz (sine wave)
ei(rms)=100 mV
Vin=$V_O$(TYP.)+1.0V
$I_O$=10mA
RR=20log(ei(rms)/eo(rms))

Fig.3 Power Dissipation vs. Ambient Temperature




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

Mounting PCB




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

Fig.4 Overcurrent Protection Characteristics (Typical Value)

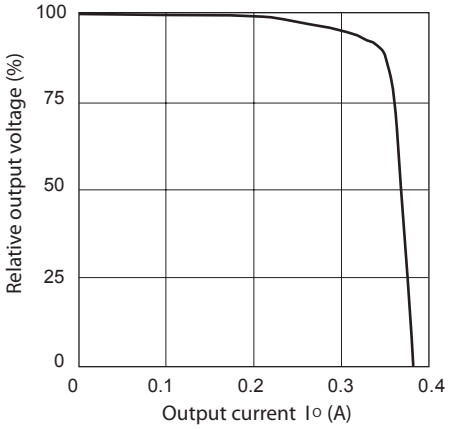



Fig.5 Reference Voltage Deviation vs. Junction Temperature (**PQ2L3252MSPQ**)(Typical Value)

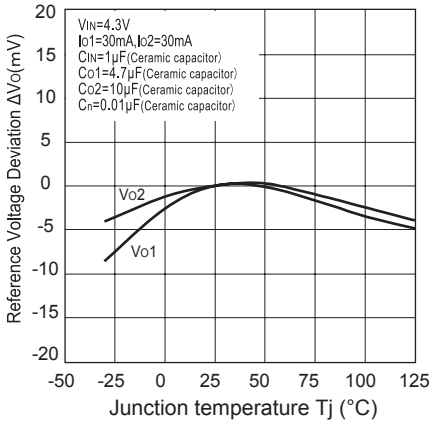



Fig.6 Output Voltage(Vo1) vs. Input Voltage (**PQ2L3152MSPQ**)(Typical Value)

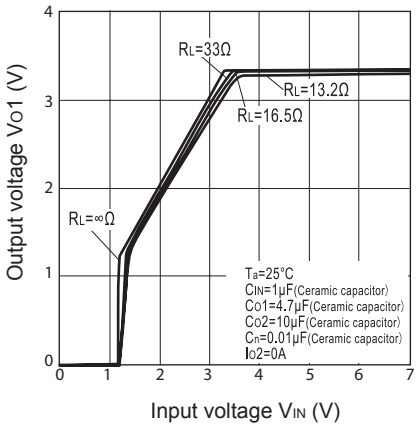



Fig.7 Output Voltage(Vo2) vs. Input Voltage (**PQ2L3152MSPQ**)(Typical Value)

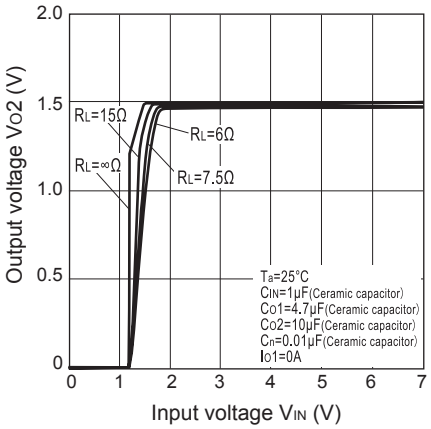


Fig.8 Circuit Operating Current vs. Input Voltage (**PQ2L3152MSPQ**)(Typical Value)

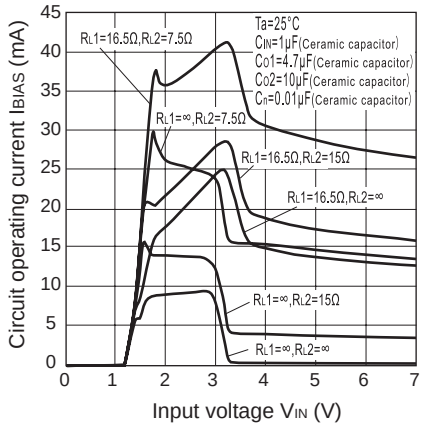



Fig.9 Dropout Voltage vs. Junction Temperature (**PQ2L3252MSPQ**)(Typical Value)

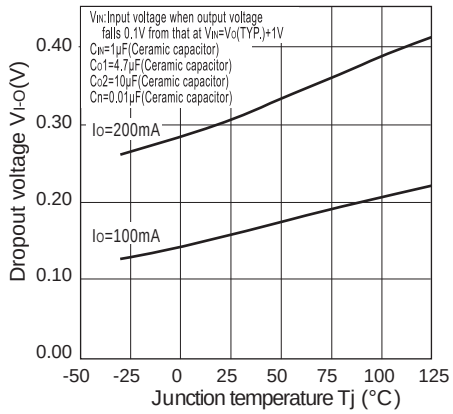



Fig.10 Quiescent Current vs. Junction Temperature (**PQ2L3252MSPQ**)(Typical Value)

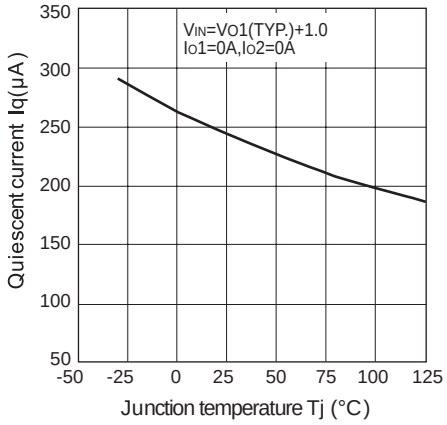



Fig.11 Ripple Rejection vs. Input Ripple Frequency (**PQ2L3182MSPQ**)(Typical Value)

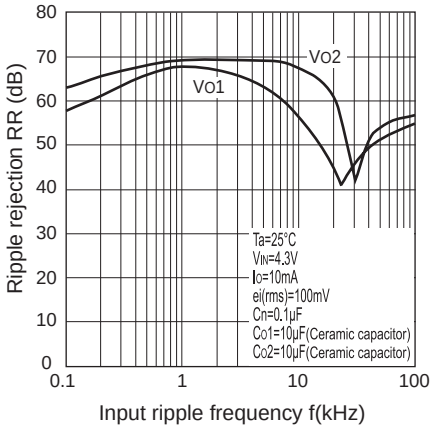



Fig.12 Dropout Voltage vs. Output Current (Typical Value)

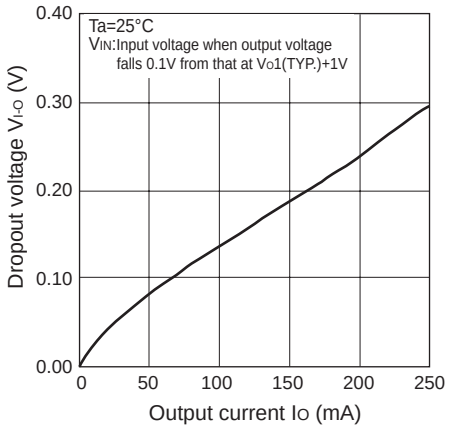



Fig.13 Output Peak Current vs. Junction Temperature(Typical Value)