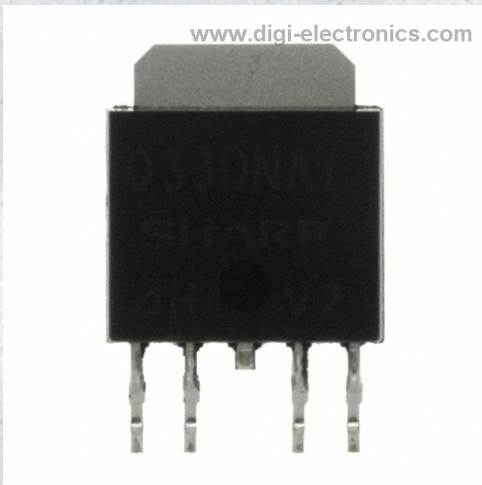


# PQ033DNA1ZPH Datasheet



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DiGi Electronics Part Number	PQ033DNA1ZPH-DG
Manufacturer	<a href="#">Sharp Microelectronics</a>
Manufacturer Product Number	PQ033DNA1ZPH
Description	IC REG LINEAR 3.3V 1A SC63
Detailed Description	Linear Voltage Regulator IC Positive Fixed 1 Output 1A SC-63

This model PQ033DNA1ZPH is available at DiGi Electronics.

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## Purchase and inquiry

Manufacturer Product Number:

PQ033DNA1ZPH

Series:

-

Output Configuration:

Positive

Number of Regulators:

1

Voltage - Output (Min/Fixed):

3.3V

Voltage Dropout (Max):

0.5V @ 500mA

Current - Quiescent (Iq):

8 mA

Control Features:

Enable

Operating Temperature:

-40°C ~ 85°C

Package / Case:

TO-252-5, DPAK (4 Leads + Tab), TO-252AD

Base Product Number:

PQ033

Manufacturer:

Sharp Microelectronics

Product Status:

Obsolete

Output Type:

Fixed

Voltage - Input (Max):

24V

Voltage - Output (Max):

-

Current - Output:

1A

PSRR:

60dB (120Hz)

Protection Features:

Over Current, Over Temperature

Mounting Type:

Surface Mount

Supplier Device Package:

SC-63

## Environmental & Export classification

Moisture Sensitivity Level (MSL):

1 (Unlimited)

HTSUS:

8542.39.0001

ECCN:

EAR99

# PQxxxDNA1ZPH Series

Compact Surface Mount type  
Low Power-Loss Voltage Regulators

## ■ Features

1. Output current : 1A
2. High isolation voltage  $V_{IN}$ : MAX. 24 V
3. Low dissipation current  
(Dissipation current at no load: MAX. 8mA  
Output OFF-state dissipation current: MAX. 5 $\mu$ A)
4. Built-in ON/OFF function
5. Built-in overcurrent and overheat protection functions
6. Built-in ASO protection function
7. Ceramic capacitor compatible
8. RoHS directive compliant

## ■ Applications

1. AV equipment
2. OA equipment

## ■ Model Line-up

Output Voltage (TYP.)	Model No.
3.3V	PQ033DNA1ZPH
5.0V	PQ050DNA1ZPH
8.0V	PQ080DNA1ZPH
9.0V	PQ090DNA1ZPH
12.0V	PQ120DNA1ZPH

## ■ Absolute Maximum Ratings

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

Parameter	Symbol	Rating	Unit
*1 Input voltage	$V_{IN}$	24	V
*1 Output control voltage	$V_C$	24	V
Output current	$I_O$	1	A
*2 Power dissipation	$P_D$	8	W
*3 Junction temperature	$T_j$	150	$^{\circ}\text{C}$
Operating temperature	$T_{opr}$	-40 to +85	$^{\circ}\text{C}$
Storage temperature	$T_{stg}$	-40 to +150	$^{\circ}\text{C}$
Soldering temperature	$T_{sol}$	260(10s)	$^{\circ}\text{C}$

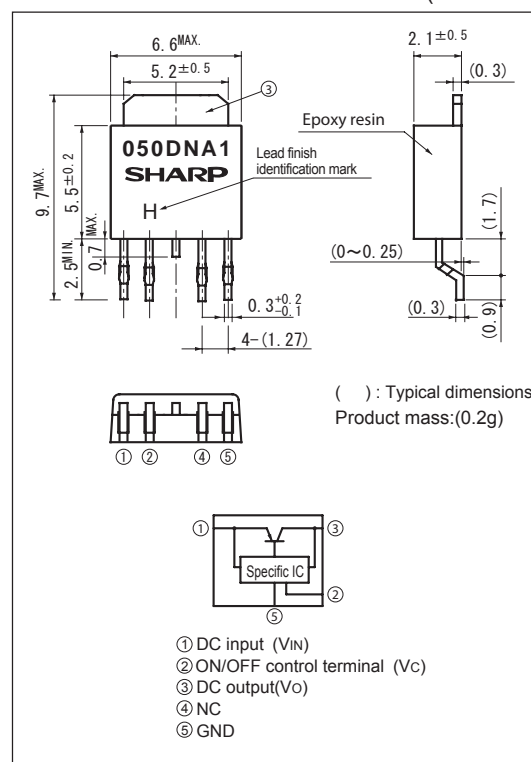
\*1 All are open except GND and applicable terminals.

\*2  $P_D$ : With infinite heat sink

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

## ■ Outline Dimensions

(Unit : mm)



Lead finish: Lead-free solder plating  
(Composition: Sn2Cu)

Notice The content of data sheet is subject to change without prior notice.

In the absence of confirmation by device specification sheets, SHARP takes no responsibility for any defects that may occur in equipment using any SHARP devices shown in catalogs, data books, etc. Contact SHARP in order to obtain the latest device specification sheets before using any SHARP device.

## ■ Electrical Characteristics

## (1) PQ033DNA1ZPH

(Unless otherwise specified, condition shall be  $V_{IN}=5V, I_o=0.5A, V_C=2.7V, T_a=25^\circ C$ )

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Output voltage	$V_O$	-	3.218	3.3	3.382	V
Load regulation	$Reg_L$	$I_o=5mA$ to 1A	-	0.2	1.0	%
Line regulation	$Reg_l$	$V_{IN}=4$ to 14V, $I_o=5mA$	-	0.2	1.0	%
Temperature coefficient of output voltage	$T_C V_O$	$T_j=0$ to $+125^\circ C$ , $I_o=5mA$	-	$\pm 0.01$	-	$\%/^\circ C$
Ripple rejection	RR	Refer to Fig.3	-	60	-	dB
Dropout voltage	$V_{I-O}$	$V_{IN}=3.5V, I_o=0.5A$	-	0.2	0.5	V
*5 ON-state voltage for control	$V_{C(ON)}$	-	2.0	-	-	V
ON-state current for control	$I_{C(ON)}$	$V_C=2.7V$	-	-	200	$\mu A$
OFF-state voltage for control	$V_{C(OFF)}$	-	-	-	0.8	V
OFF-state current for control	$I_{C(OFF)}$	$V_C=0.4V$	-	-	2	$\mu A$
Quiescent current	$I_q$	$I_o=0A$	-	4	8	mA
Output OFF-state dissipation current	$I_{qs}$	$I_o=0A, V_C=0.4V$	-	-	5	$\mu A$

\*5 In case of opening control terminal ②, output voltage turns off

## (2) PQ050DNA1ZPH

(Unless otherwise specified, condition shall be  $V_{IN}=7V, I_o=0.5A, V_C=2.7V, T_a=25^\circ C$ )

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Output voltage	$V_O$	-	4.875	5.0	5.125	V
Load regulation	$Reg_L$	$I_o=5mA$ to 1A	-	0.2	1.0	%
Line regulation	$Reg_l$	$V_{IN}=6$ to 16V, $I_o=5mA$	-	0.2	1.0	%
Temperature coefficient of output voltage	$T_C V_O$	$T_j=0$ to $+125^\circ C$ , $I_o=5mA$	-	$\pm 0.01$	-	$\%/^\circ C$
Ripple rejection	RR	Refer to Fig.3	-	60	-	dB
Dropout voltage	$V_{I-O}$	*4, $I_o=0.5A$	-	0.2	0.5	V
*5 ON-state voltage for control	$V_{C(ON)}$	-	2.0	-	-	V
ON-state current for control	$I_{C(ON)}$	$V_C=2.7V$	-	-	200	$\mu A$
OFF-state voltage for control	$V_{C(OFF)}$	-	-	-	0.8	V
OFF-state current for control	$I_{C(OFF)}$	$V_C=0.4V$	-	-	2	$\mu A$
Quiescent current	$I_q$	$I_o=0A$	-	4	8	mA
Output OFF-state dissipation current	$I_{qs}$	$I_o=0A, V_C=0.4V$	-	-	5	$\mu A$

\*4 Input voltage shall be the value when output voltage is 95% in comparison with the initial value.

\*5 In case of opening control terminal ②, output voltage turns off

## (3) PQ080DNA1ZPH

(Unless otherwise specified, condition shall be  $V_{IN}=10V, I_o=0.5A, V_C=2.7V, T_a=25^\circ C$ )

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Output voltage	$V_O$	-	7.8	8.0	8.2	V
Load regulation	$Reg_L$	$I_o=5mA$ to 1A	-	0.2	1.0	%
Line regulation	$Reg_l$	$V_{IN}=9$ to 19V, $I_o=5mA$	-	0.2	1.0	%
Temperature coefficient of output voltage	$T_C V_O$	$T_j=0$ to $+125^\circ C$ , $I_o=5mA$	-	$\pm 0.01$	-	$\%/^\circ C$
Ripple rejection	RR	Refer to Fig.3	-	60	-	dB
Dropout voltage	$V_{I-O}$	*4, $I_o=0.5A$	-	0.2	0.5	V
*5 ON-state voltage for control	$V_{C(ON)}$	-	2.0	-	-	V
ON-state current for control	$I_{C(ON)}$	$V_C=2.7V$	-	-	200	$\mu A$
OFF-state voltage for control	$V_{C(OFF)}$	-	-	-	0.8	V
OFF-state current for control	$I_{C(OFF)}$	$V_C=0.4V$	-	-	2	$\mu A$
Quiescent current	$I_q$	$I_o=0A$	-	4	8	mA
Output OFF-state dissipation current	$I_{qs}$	$I_o=0A, V_C=0.4V$	-	-	5	$\mu A$

\*4 Input voltage shall be the value when output voltage is 95% in comparison with the initial value.

\*5 In case of opening control terminal ②, output voltage turns off

## (4) PQ090DNA1ZPH

(Unless otherwise specified, condition shall be  $V_{IN}=11V, I_o=0.5A, V_c=2.7V, T_a=25^{\circ}C$ )

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Output voltage	$V_O$	-	8.775	9.0	9.225	V
Load regulation	$RegL$	$I_o=5mA$ to 1A	-	0.2	1.0	%
Line regulation	$Regl$	$V_{IN}=10$ to 20V, $I_o=5mA$	-	0.2	1.0	%
Temperature coefficient of output voltage	$TcVo$	$T_j=0$ to $+125^{\circ}C$ , $I_o=5mA$	-	$\pm 0.01$	-	%/ $^{\circ}C$
Ripple rejection	RR	Refer to Fig.3	-	60	-	dB
Dropout voltage	$V_{I-O}$	*4, $I_o=0.5A$	-	0.2	0.5	V
*5 ON-state voltage for control	$V_{C(ON)}$	-	2.0	-	-	V
ON-state current for control	$I_{C(ON)}$	$V_c=2.7V$	-	-	200	$\mu A$
OFF-state voltage for control	$V_{C(OFF)}$	-	-	-	0.8	V
OFF-state current for control	$I_{C(OFF)}$	$V_c=0.4V$	-	-	2	$\mu A$
Quiescent current	$I_q$	$I_o=0A$	-	4	8	mA
Output OFF-state dissipation current	$I_{qs}$	$I_o=0A, V_c=0.4V$	-	-	5	$\mu A$

\*4 Input voltage shall be the value when output voltage is 95% in comparison with the initial value.

\*5 In case of opening control terminal ②, output voltage turns off

## (5) PQ120DNA1ZPH

(Unless otherwise specified, condition shall be  $V_{IN}=14V, I_o=0.5A, V_c=2.7V, T_a=25^{\circ}C$ )

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Output voltage	$V_O$	-	11.7	12.0	12.3	V
Load regulation	$RegL$	$I_o=5mA$ to 1A	-	0.2	1.0	%
Line regulation	$Regl$	$V_{IN}=13$ to 23V, $I_o=5mA$	-	0.2	1.0	%
Temperature coefficient of output voltage	$TcVo$	$T_j=0$ to $+125^{\circ}C$ , $I_o=5mA$	-	$\pm 0.01$	-	%/ $^{\circ}C$
Ripple rejection	RR	Refer to Fig.3	-	60	-	dB
Dropout voltage	$V_{I-O}$	*4, $I_o=0.5A$	-	0.2	0.5	V
*5 ON-state voltage for control	$V_{C(ON)}$	-	2.0	-	-	V
ON-state current for control	$I_{C(ON)}$	$V_c=2.7V$	-	-	200	$\mu A$
OFF-state voltage for control	$V_{C(OFF)}$	-	-	-	0.8	V
OFF-state current for control	$I_{C(OFF)}$	$V_c=0.4V$	-	-	2	$\mu A$
Quiescent current	$I_q$	$I_o=0A$	-	4	8	mA
Output OFF-state dissipation current	$I_{qs}$	$I_o=0A, V_c=0.4V$	-	-	5	$\mu A$

\*4 Input voltage shall be the value when output voltage is 95% in comparison with the initial value.

\*5 In case of opening control terminal ②, output voltage turns off

Fig.1 Example of application

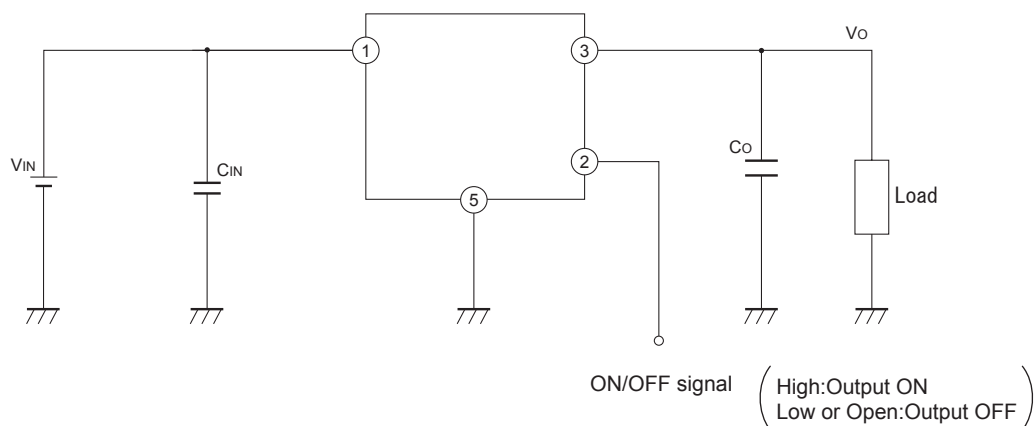


Fig.2 Test Circuit

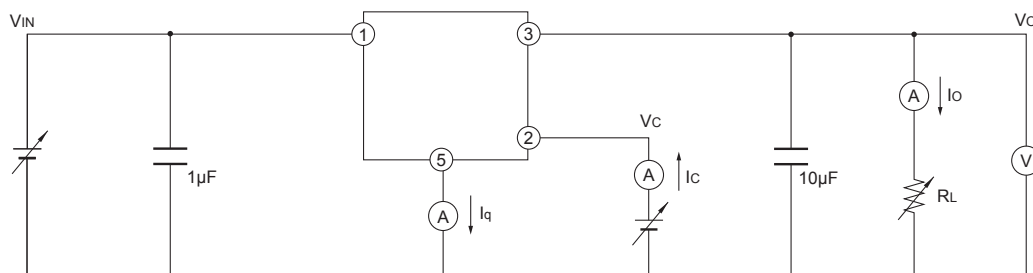
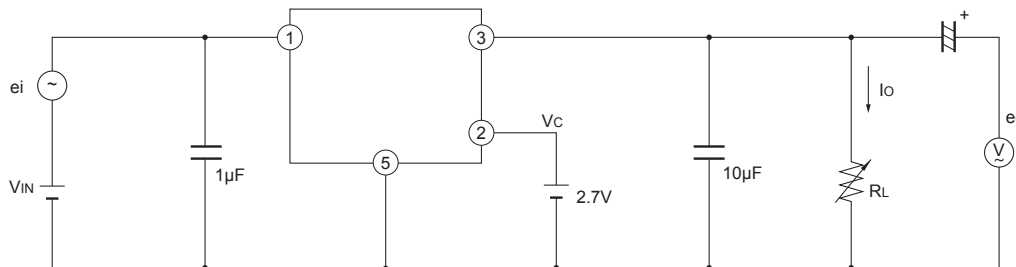
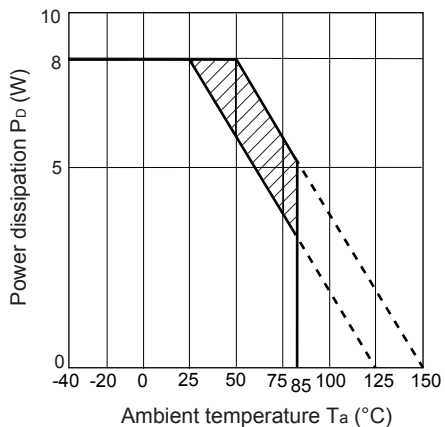


Fig.3 Test Circuit for Ripple Rejection



f=120Hz(sine wave)  
 ei(rms)=0.5V  
 VIN= 5V (PQ033DNA1ZPH)  
 7V (PQ050DNA1ZPH)  
 10V (PQ080DNA1ZPH)  
 11V (PQ090DNA1ZPH)  
 14V (PQ120DNA1ZPH)  
 IO=0.3A  
 RR=20log(ei(rms)/eo(rms))

Fig.4 Power Dissipation vs. Ambient Temperature



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

Fig.5 Overcurrent Protection Characteristics (PQ033DNA1ZPH)

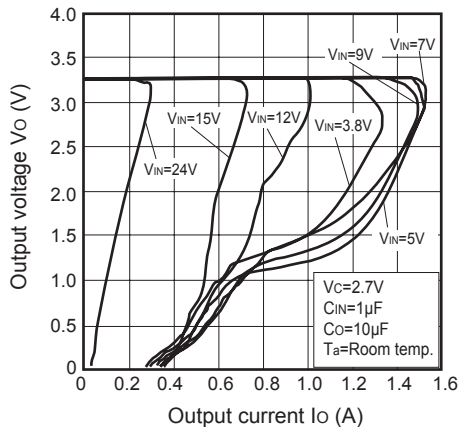


Fig.6 Overcurrent Protection Characteristics (PQ050DNA1ZPH)

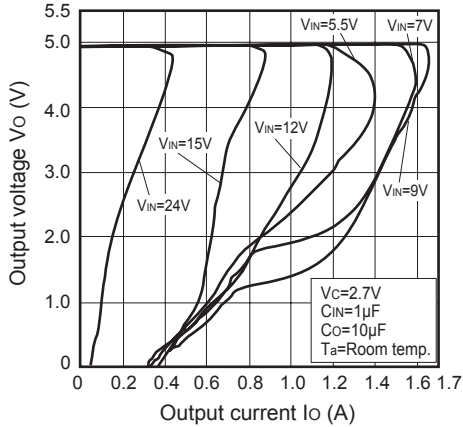


Fig.7 Overcurrent Protection Characteristics (PQ090DNA1ZPH)

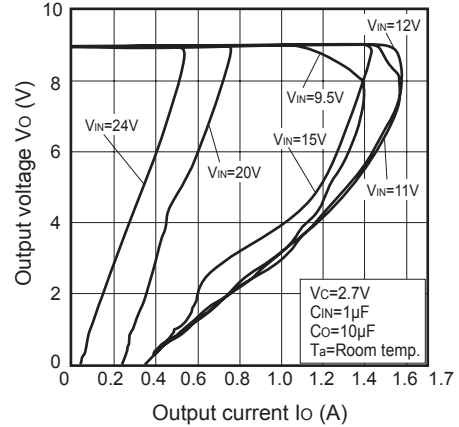


Fig.8 Overcurrent Protection Characteristics (PQ120DNA1ZPH)

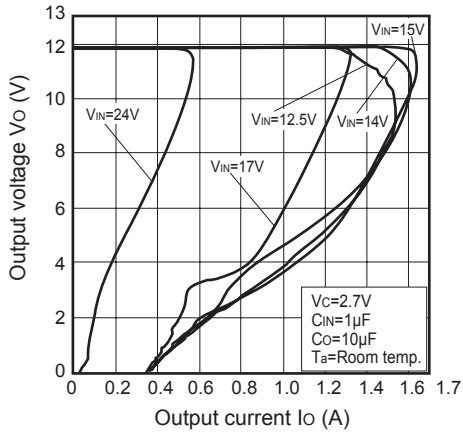


Fig.9 Output Voltage vs. Ambient Temperature (PQ120DNA1ZPH)

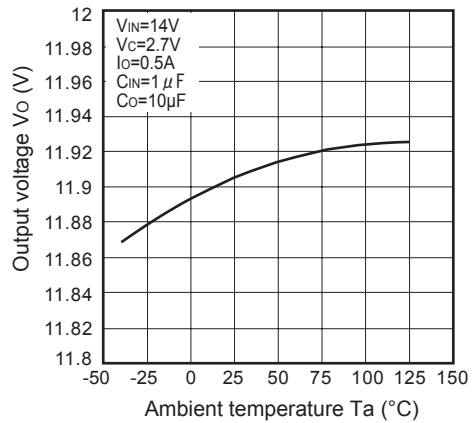


Fig.10 Output Voltage vs. Input Voltage (PQ120DNA1ZPH)

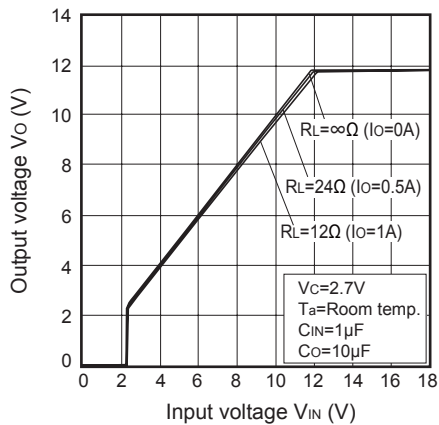


Fig.11 Circuit Operating Current vs. Input Voltage (PQ120DNA1ZPH)

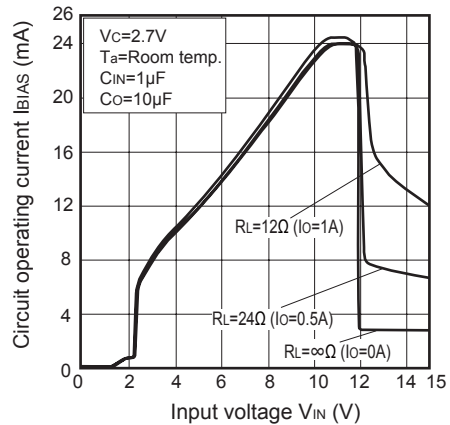


Fig.12 Quiescent Current vs. Ambient Temperature (PQ120DNA1ZPH)

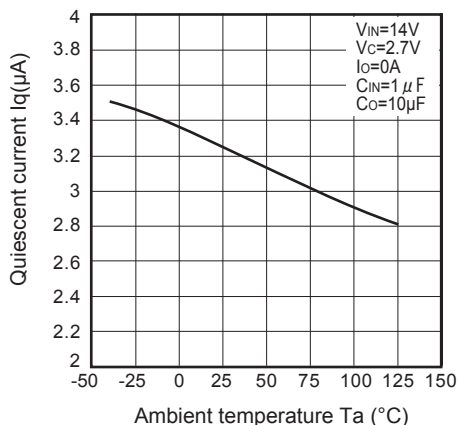


Fig.13 Dropout Voltage vs. Ambient Temperature (PQ120DNA1ZPH)

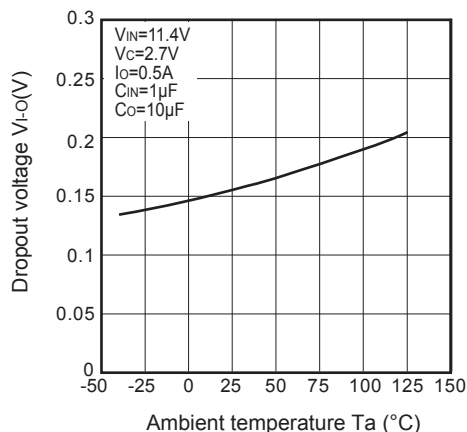


Fig.14 Ripple Rejection vs. Input Ripple Frequency (PQ120DNA1ZPH)

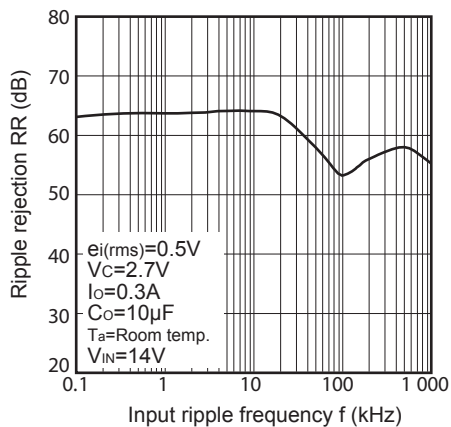


Fig.15 Ripple Rejection vs. Output Current (PQ120DNA1ZPH)

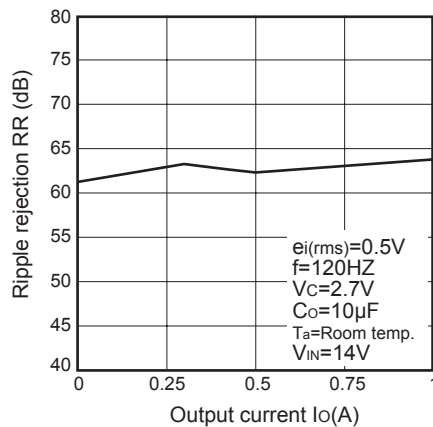
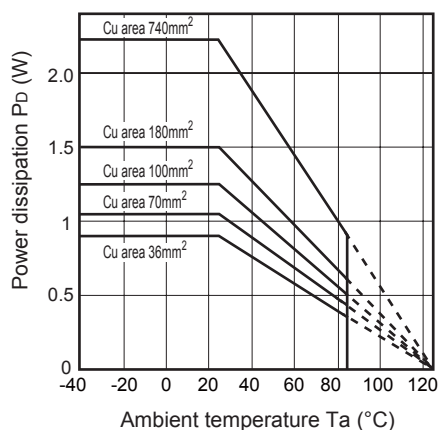
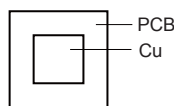


Fig.16 Power Dissipation vs. Ambient Temperature (Typical Value)



Mounting PCB



Material : Glass-cloth epoxy resin  
 Size : 50×50×1.6mm  
 Cu thickness : 35µm

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