PQxxxY3H3Z Series/PQxxxY053Z Series

Surface Mount, Large Output Current Type Low Power-Loss Voltage Regulators

■ Features

- Low power-loss (Dropout voltage: MAX. 0.5V)
- Compact surface mount type package (Size:10.6×13.7×3.5mm)
- High output current type
- Low voltage operation (Minimum supply voltage: 2.35V)
- High-precision output type (Output voltage precision: ± 1%)
- Overcurrent, overheat protection functions

■ Applications

- PC motherboad, PC peripherals
- Power supplies for various electronic equipment such as AV, OA

■ Model Line-up

Output current (I_O)	Package type	Output voltage (V_O)		
		1.5V	2.5V	3.3V
3.5A	Taping	PQ015Y3H3ZP	PQ025Y3H3ZP	PQ033Y3H3ZP
	Sleeve	PQ015Y3H3ZZ	PQ025Y3H3ZZ	PQ033Y3H3ZZ
5A	Taping	PQ015Y053ZP	PQ025Y053ZP	PQ033Y053ZP
	Sleeve	PQ015Y053ZZ	PQ025Y053ZZ	PQ033Y053ZZ

■ Absolute Maximum Ratings

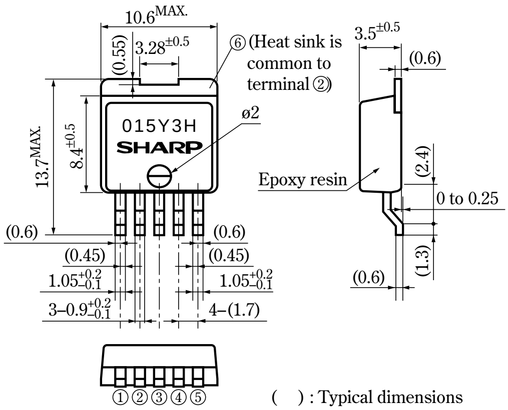
(Ta=25°C)

Parameter		Symbol	Rating	Unit
Input voltage		V_{IN}	7	V
Dropout voltage		V_{I-O}	4	V
❋1 ON/OFF control terminal voltage		V_C	7	V
Output current	PQxxxY3H3Z Series	I_O	3.5	A
	PQxxxY053Z Series		5	
❋2 Power dissipation		P_D	35	W
❋3 Junction temperature		T_j	150	˚C
Operating temperature		T_{opr}	–20 to +80	˚C
Storage temperature		T_{stg}	–40 to +150	˚C
Soldering temperature		T_{sol}	260 (10s)	˚C

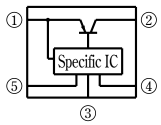
❋1 All are open except GND and applicable terminals.
❋2 P_D:With infinite heat sink
❋3 Overheat protection may operate at Tj=125˚C to 150˚C.

■ Outline Dimensions

(Unit : mm)



( ) : Typical dimensions



① DC input (V_{IN})
② DC output (V_O)
③ GND
④ Output voltage sense ($V_{O(sense)}$)
⑤ ON/OFF control terminal (V_C)
⑥ DC output (V_O)

•Please refer to the chapter " Handling Precautions ".

Electrical Characteristics (PQ015Y3H3Z/PQ015Y053Z)

(Unless otherwise specified, condition shall be V_{IN}=5V, I_O=1.75A(**PQ015Y3H3Z**), I_O=2.5A(**PQ015Y053Z**), connects $V_{O(sense)}$ terminal to V_O terminal, Ta=25˚C)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input voltage		V_{IN}	–	2.35	–	7	V
※4 Output voltage		V_O	Connects $V_{O(sense)}$ terminal to V_O terminal	1.485	1.5	1.515	V
Load regulation	PQ015Y3H3Z	$R_{eg}L$	I_O=5mA to 3.5A	–	0.1	0.5	%
	PQ015Y053Z		I_O=5mA to 5A				
Line regulation		$R_{eg}I$	V_{IN}=2.5 to 5.5V, I_O=5mA	–	0.05	0.1	%
Temperature coefficient of output voltage		T_CV_O	T_j=0 to 125˚C, I_O=5mA	–	±1	–	%
Ripple rejection		RR	Refer to Fig.2	60	70	–	dB
※5 ON-state voltage for control		$V_{C(ON)}$	–	2.0	–	–	V
ON-state current for control		$I_{C(ON)}$	V_C=2.7V	–	–	20	μA
OFF-state voltage for control		$V_{C(OFF)}$	–	–	–	0.8	V
OFF-state current for control		$I_{C(OFF)}$	V_C=0.4V	–	–	–0.4	mA
Quiescent current		I_q	I_O=0A	–	5	10	mA

Electrical Characteristics (PQ025Y3H3Z/PQ025Y053Z)

(Unless otherwise specified, condition shall be V_{IN}=5V, I_O=1.75A(**PQ025Y3H3Z**), I_O=2.5A(**PQ025Y053Z**), connects $V_{O(sense)}$ terminal to V_O terminal, Ta=25˚C)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
※4 Output voltage		V_O	Connects $V_{O(sense)}$ terminal to V_O terminal	2.475	2.5	2.525	V
Load regulation	PQ025Y3H3Z	$R_{eg}L$	I_O=5mA to 3.5A	–	0.1	0.5	%
	PQ025Y053Z		I_O=5mA to 5A				
Line regulation		$R_{eg}I$	V_{IN}=3 to 6.5V, I_O=5mA	–	0.05	0.1	%
Temperature coefficient of output voltage		T_CV_O	T_j=0 to 125˚C, I_O=5mA	–	±1	–	%
Ripple rejection		RR	Refer to Fig.2	60	70	–	dB
Dropout voltage	PQ025Y3H3Z	V_{I-O}	※6 I_O=3.5A	–	–	0.5	V
	PQ025Y053Z		※6 I_O=5A				
※5 ON-state voltage for control		$V_{C(ON)}$	–	2.0	–	–	V
ON-state current for control		$I_{C(ON)}$	V_C=2.7V	–	–	20	μA
OFF-state voltage for control		$V_{C(OFF)}$	–	–	–	0.8	V
OFF-state current for control		$I_{C(OFF)}$	V_C=0.4V	–	–	–0.4	mA
Quiescent current		I_q	I_O=0A	–	5	10	mA

Electrical Characteristics (PQ033Y3H3Z/PQ033Y053Z)

(Unless otherwise specified, condition shall be V_{IN}=V_O(TYP)+1, I_O=1.75A(**PQ033Y3H3Z**), I_O=2.5A(**PQ033Y053Z**), connects $V_{O(sense)}$ terminal to V_O terminal, Ta=25˚C)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
※4 Output voltage		V_O	Connects $V_{O(sense)}$ terminal to V_O terminal	3.267	3.3	3.333	V
Load regulation	PQ033Y3H3Z	$R_{eg}L$	I_O=5mA to 3.5A	–	0.1	0.5	%
	PQ033Y053Z		I_O=5mA to 5A				
Line regulation		$R_{eg}I$	V_{IN}=4 to 7V, I_O=5mA	–	0.05	0.1	%
Temperature coefficient of Output voltage		T_CV_O	T_j=0 to 125˚C, I_O=5mA	–	±1	–	%
Ripple Rejection		RR	Refer to Fig2	60	70	–	dB
Dropout voltage	PQ033Y3H3Z	V_{I-O}	※6 I_O=3.5A	–	–	0.5	V
	PQ033Y053Z		※6 I_O=5A				
※5 ON-state voltage for control		$V_{C(ON)}$	–	2.0	–	–	V
ON-state current for control		$I_{C(ON)}$	V_C=2.7V	–	–	20	μA
OFF-state voltage for control		$V_{C(OFF)}$	–	–	–	0.8	V
OFF-state current for control		$I_{C(OFF)}$	V_C=0.4V	–	–	–0.4	mA
Quiescent current		I_q	I_O=0A	–	5	10	mA

※4 Connects $V_{O(sense)}$ terminal ④ to V_O terminal ②

※5 In case of opening control terminal ⑤, output voltage turns ON.

※6 Input voltage shall be the value when output voltage is 95% in comparison with the initial value.

Fig.1 Test Circuit

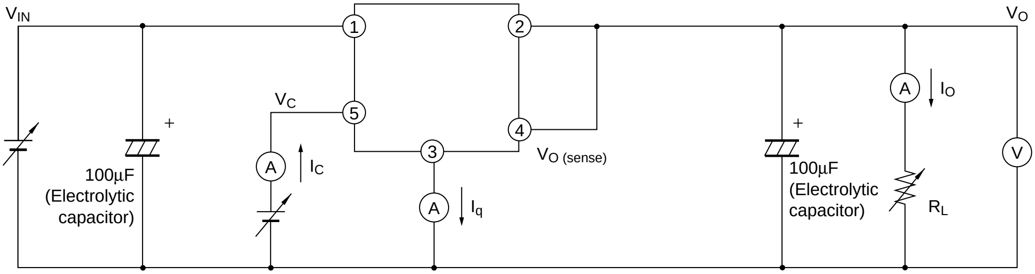
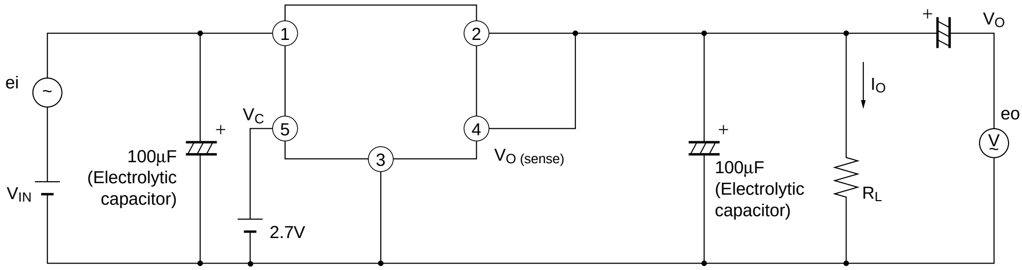
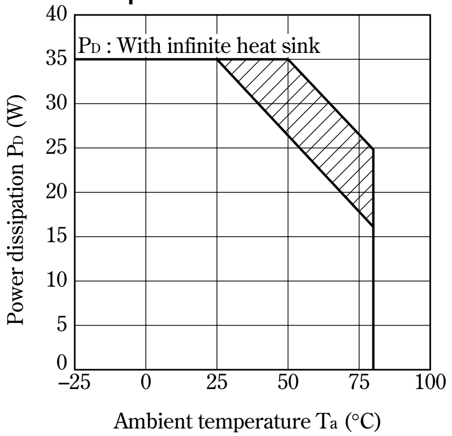


Fig.2 Test Circuit for Ripple Rejection



f=120Hz(sine wave)
ei(rms)=0.5V
V_{IN}=3.3V(**PQ015Y3H3ZZ/P**)
=3.3V(**PQ025Y3H3ZZ/P**)
=5V(**PQ033Y3H3ZZ/P**)
I_O=0.5A
RR=20log(ei(rms)/eo(rms))

Fig.3 Power Dissipation vs. Ambient Temperature



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

Fig.4 Overcurrent Protection Characteristics (PQ015Y3H3Z/PQ025Y3H3Z/PQ033Y3H3Z)

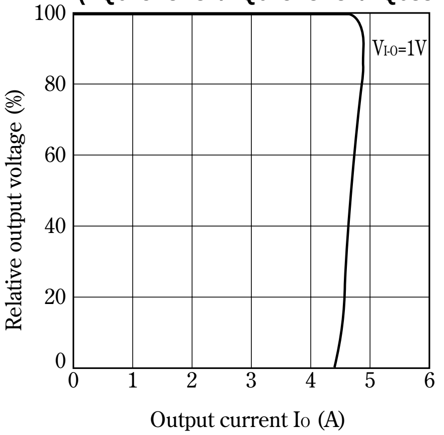


Fig.5 Overcurrent Protection Characteristics (PQ015Y053Z/PQ025Y053Z/PQ033Y053Z)

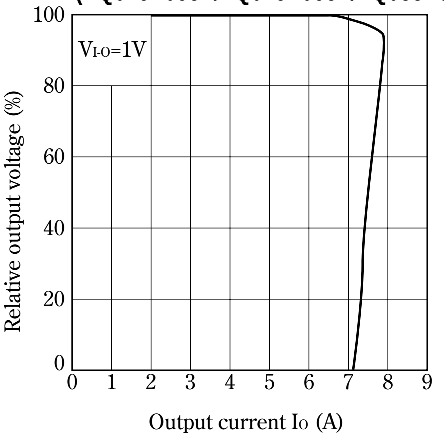


Fig.6 Output Voltage Fluctuation vs. Ambient Temperature

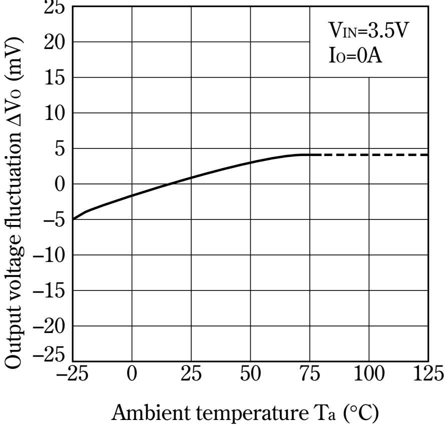


Fig.7 Output Voltage vs. Input Voltage (PQ015Y3H3Z)

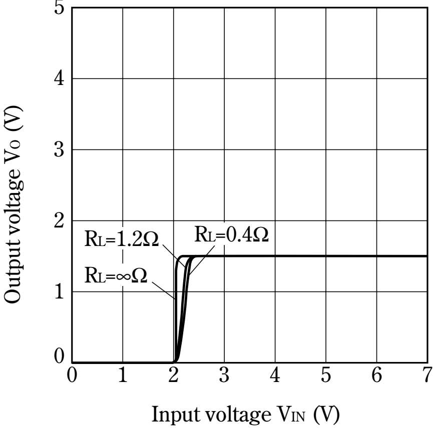


Fig.8 Output Voltage vs. Input Voltage (PQ015Y053Z)

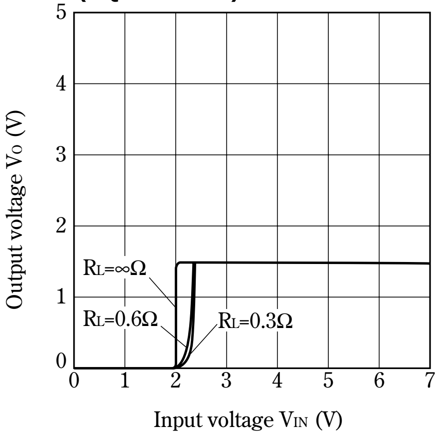


Fig.9 Output Voltage vs. Input Voltage (PQ025Y3H3Z)

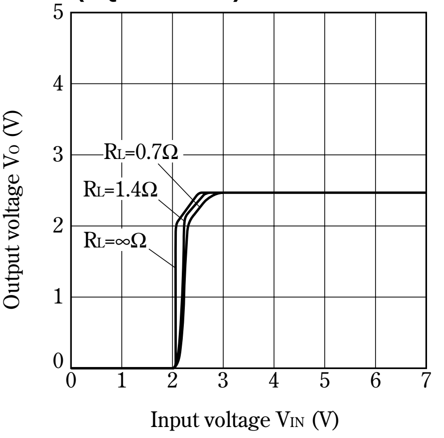


Fig.10 Output Voltage vs. Input Voltage (PQ025Y053Z)

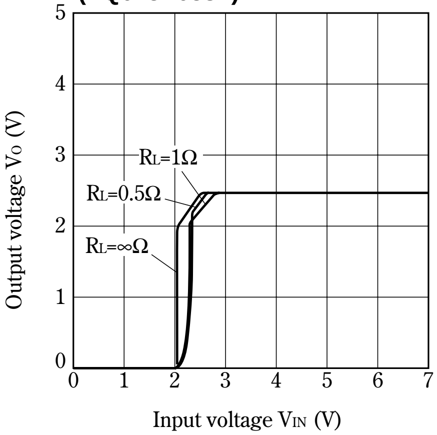


Fig.11 Output Voltage vs. Input Voltage (PQ033Y3H3Z)

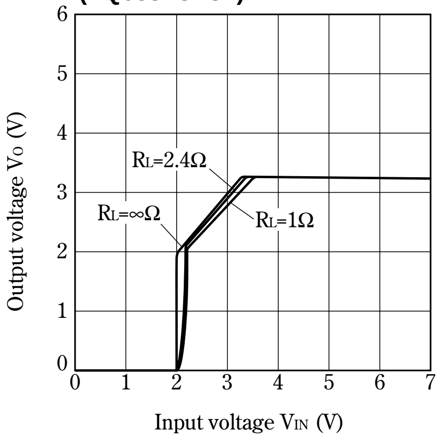


Fig.12 Circuit Operating Current vs. Input Voltage (PQ015Y3H3Z)

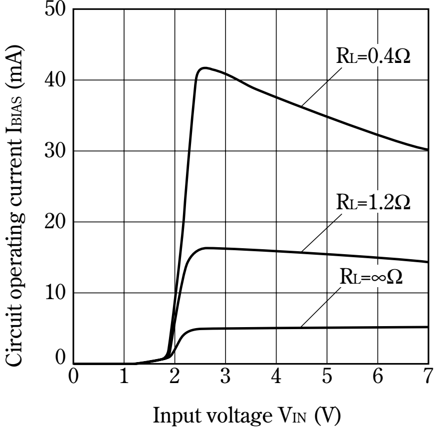


Fig.13 Circuit Operating Current vs. Input Voltage (PQ015Y053Z)

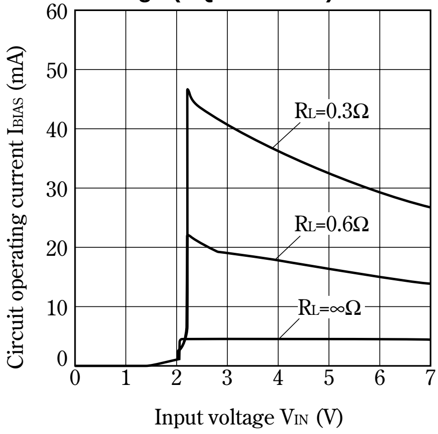


Fig.14 Circuit Operating Current vs. Input Voltage (PQ025Y3H3Z)

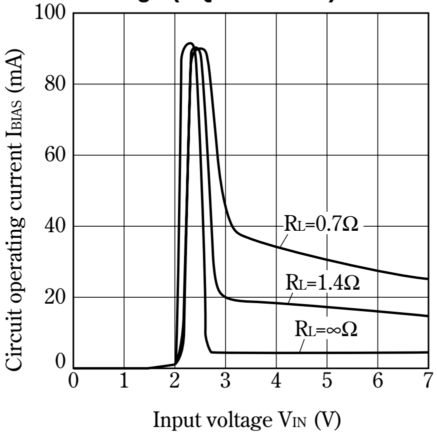


Fig.15 Circuit Operating Current vs. Input Voltage (PQ025Y053Z)

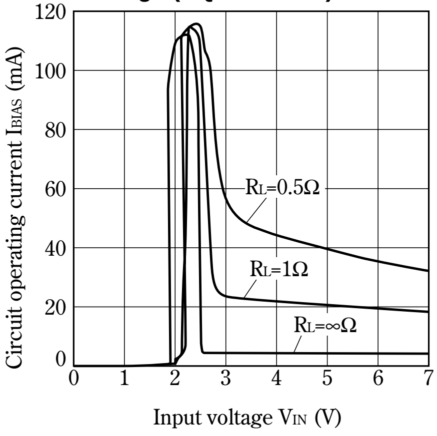


Fig.16 Circuit Operating Current vs. Input Voltage (PQ033Y3H3Z)

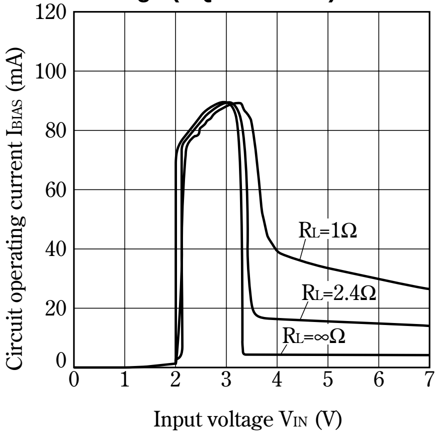


Fig.17 Ripple Rejection vs. Input Ripple Frequency (PQ025Y3H3Z)

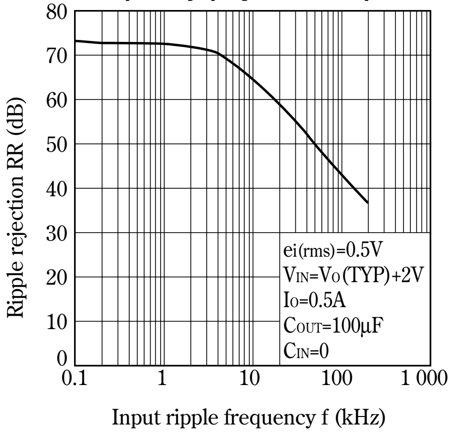
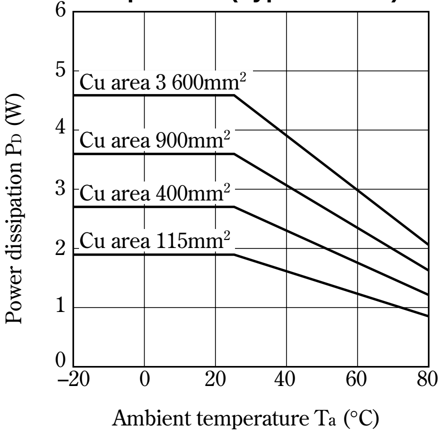
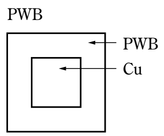


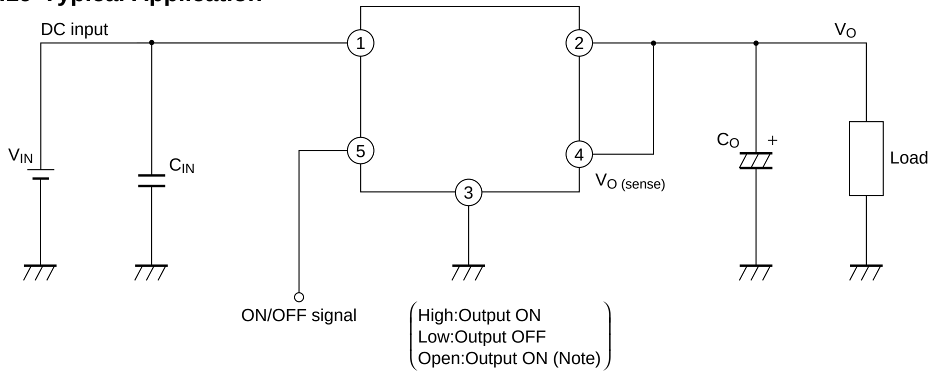
Fig.18 Power Dissipation vs. Ambient Temperature (Typical Value)





Material : Glass-cloth epoxy resin
Size : 60×60×1.6mm
Cu thickness : 65µm

Fig.19 Typical Application



❋ Please make sure to use this device, pulling up to the power supply with less than 7V at the resistor less than 50kΩ in switching ON/OFF with open collector output or in not using ON/OFF function (in keeping "ON"), because input impedance is high in ON/OFF terminals.

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  --- Personal computers
  --- Office automation equipment
  --- Telecommunication equipment [terminal]
  --- Test and measurement equipment
  --- Industrial control
  --- Audio visual equipment
  --- Consumer electronics

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  --- Traffic signals
  --- Gas leakage sensor breakers
  --- Alarm equipment
  --- Various safety devices, etc.

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