

PQ05VY3H3Z/PQ05VY053Z

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

Features

- Low power-loss
(Dropout voltage: MAX. 0.5V)
- Surface mount type (10.6×13.7×3.5mm)
- Large output current
- Low voltage operation (minimum operating voltage: 2.35V)
- High-precision reference voltage type
(Reference voltage precision: ±1.0%)
- Overcurrent, overheat protection functions

Applications

- Peripheral equipment of personal computers
- Power supplies for various electronic equipment such as AV or OA equipment

Model Line-up

Output current (I _O)	Package type	Variable output
3.5A	Taping	PQ05VY3H3ZP
	Sleeve	PQ05VY3H3ZZ
5A	Taping	PQ05VY053ZP
	Sleeve	PQ05VY053ZZ

Absolute Maximum Ratings

(T_a=25°C)

Parameter	Symbol	Rating	Unit
Input voltage	V _{IN}	7	V
Dropout voltage	V _{LO}	4	V
*1 ON/OFF control terminal voltage	V _C	7	V
*1 Output adjustment terminal voltage	V _{ADJ}	5	V
Output current	PQ05VY3H3Z	3.5	A
	PQ05VY053Z	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

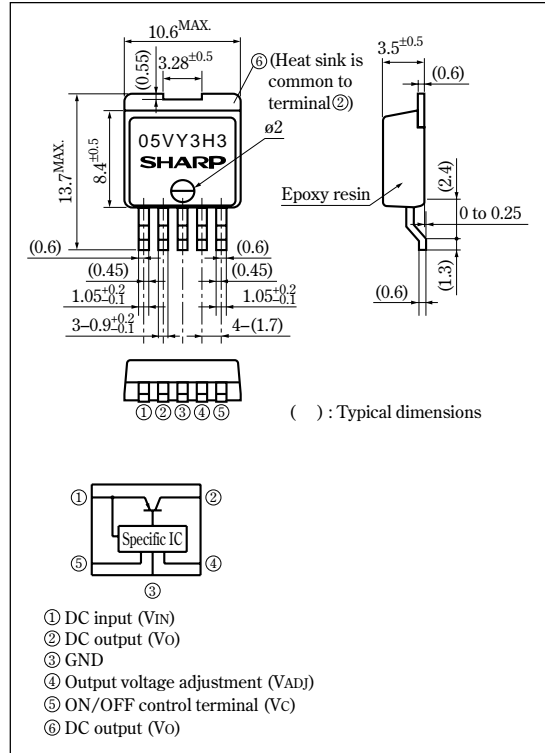
*1 All are open except GND and applicable terminals.

*2 P_D: With infinite heat sink

*3 Overheat protection may operate at T_J=125°C to 150°C

Outline Dimensions

(Unit : mm)



Electrical Characteristics

(Unless otherwise specified, condition shall be $V_{IN}=5V$, $I_o=1.75A$ (PQ05VY3H3Z), $I_o=2.5A$ (PQ05VY053Z), $V_o=3V$ ($R_L=2k\Omega$), $T_a=25^\circ C$)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit		
Input voltage	V_{IN}	—	2.35	—	7	V		
Output voltage	V_o	—	1.5	—	5	V		
Reference voltage	V_{ref}	—	1.2276	1.24	1.2524	V		
Load regulation	PQ05VY3H3Z PQ05VY053Z	R_{regL}	$I_o=5mA$ to $3.5A$		—	0.1	0.5	%
			$I_o=5mA$ to $5A$					
Line regulation	R_{regI}	$V_{IN}=4$ to $7V$, $I_o=5mA$	—	0.05	0.1	—	—	—
Temperature coefficient of reference voltage	TcV_{ref}	$T_j=0$ to $125^\circ C$, $I_o=5mA$	—	± 1	—	—	—	—
Ripple rejection	RR	Refer to Fig.2	60	70	—	—	—	—
Dropout voltage	PQ05VY3H3Z PQ05VY053Z	V_{L-O}	*4 $I_o=3.5A$		—	—	0.5	V
			*4 $I_o=5A$					
*5 ON-state voltage for control	$V_{C(ON)}$	—	2	—	—	—	—	—
ON-state current for control	$I_{C(ON)}$	$V_C=2.7V$	—	—	20	—	—	—
OFF-state voltage for control	$V_{C(OFF)}$	—	—	—	0.8	—	—	—
OFF-state current for control	$I_{C(OFF)}$	$V_C=0.4V$	—	—	-0.4	—	—	—
Quiescent current	I_q	$I_o=0A$	—	5	10	—	—	—

*4 The values of input voltage when output voltage is 0.95V.

*5 In case of opening control terminal ⑤, output voltage turns on.

Fig.1 Test Circuit

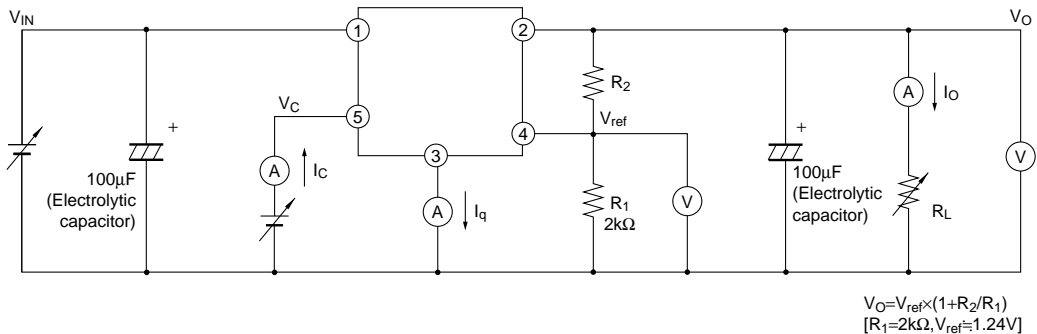


Fig.2 Test Circuit for Ripple Rejection

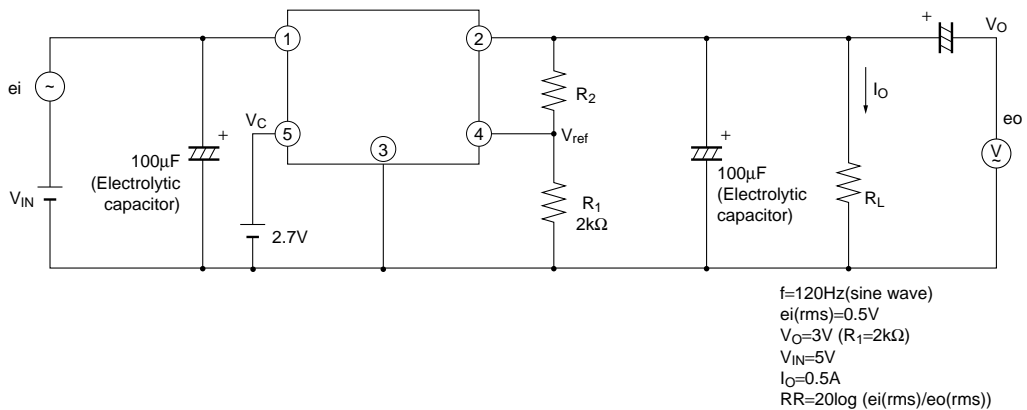
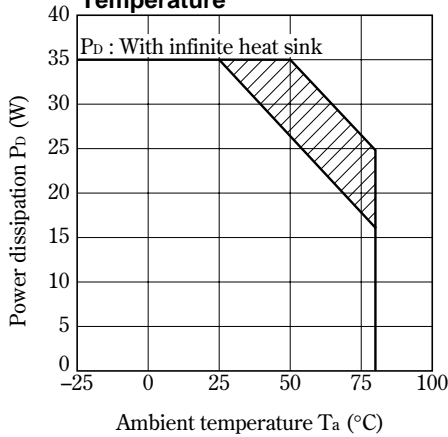


Fig.3 Power Dissipation vs. Ambient Temperature



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

Fig.4 Overcurrent Protection Characteristics (PQ05VY3H3Z)

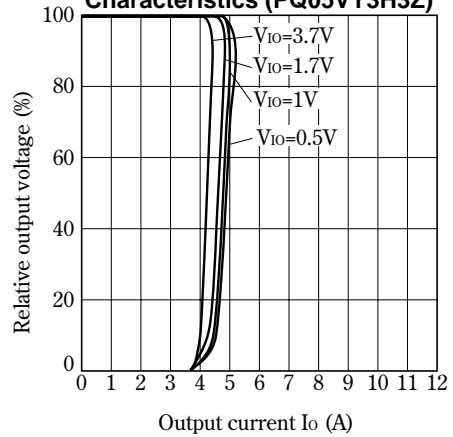


Fig.5 Overcurrent Protection Characteristics (PQ05VY053Z)

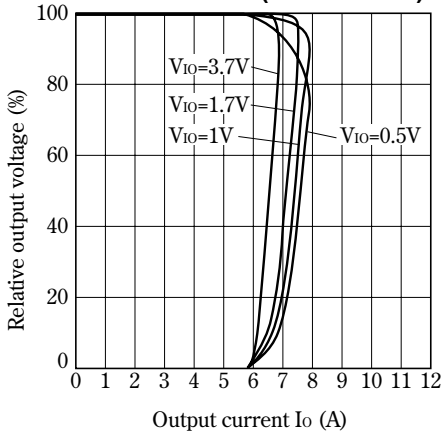


Fig.6 Reference Voltage Fluctuation vs. Ambient Temperature

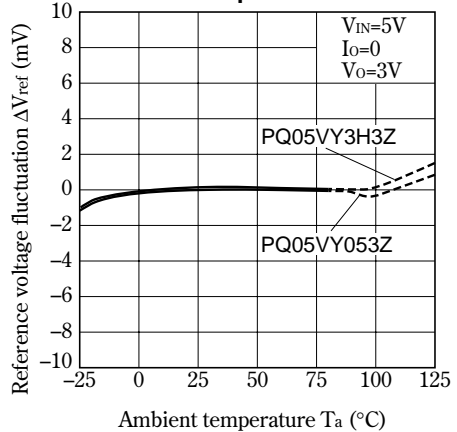


Fig.7 Output Voltage vs. Input Voltage (PQ05VY3H3Z)

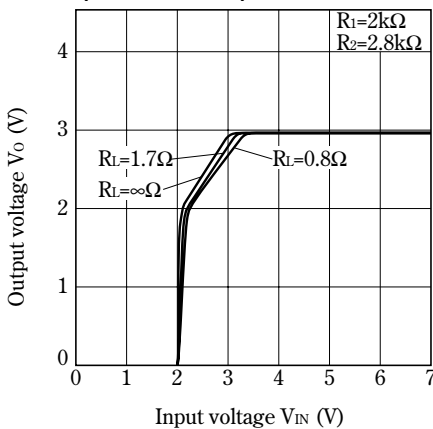


Fig.8 Output Voltage vs. Input Voltage (PQ05VY053Z)

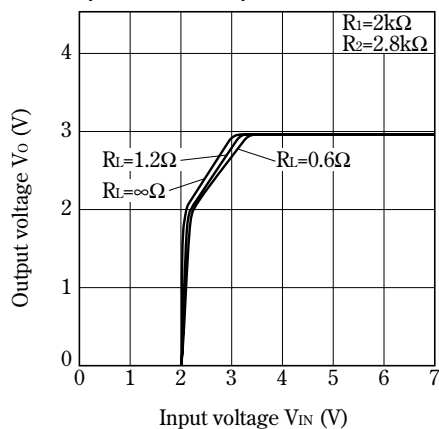


Fig.9 Circuit Operating Current vs. Input Voltage (PQ05VY3H3Z)

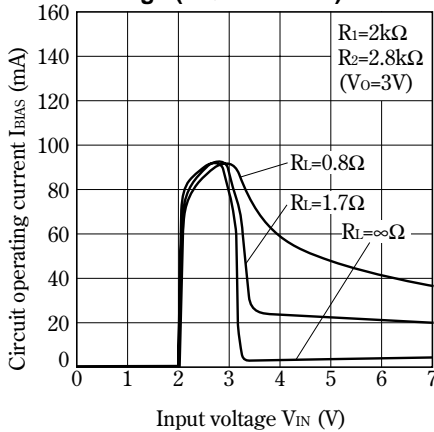


Fig.10 Circuit Operating Current vs. Input Voltage (PQ05VY053Z)

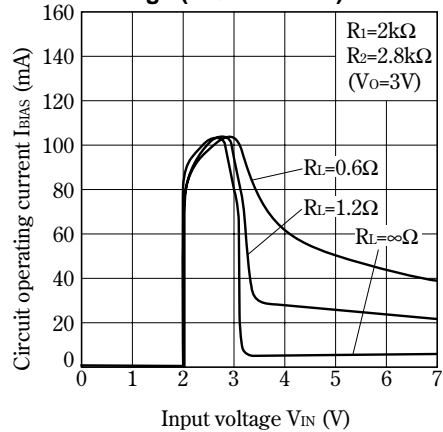


Fig.11 Dropout Voltage vs. Ambient Temperature

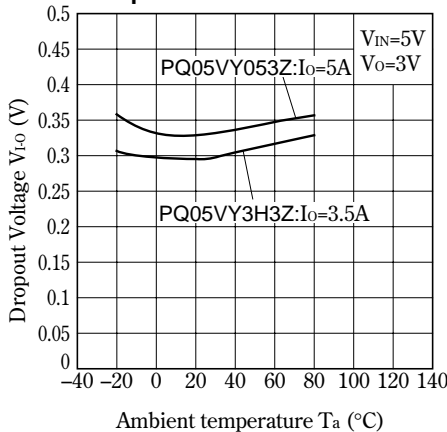


Fig.12 Quiescent Current vs. Ambient Temperature

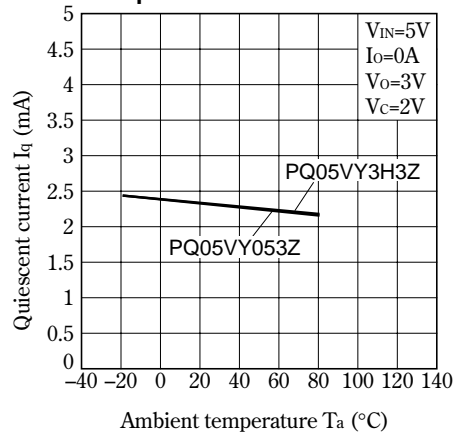


Fig.13 ON-OFF Threshold Voltage vs. Ambient Temperature

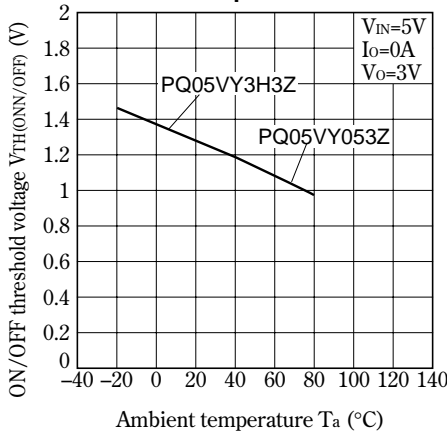


Fig.14 Ripple Rejection vs. Input Ripple Frequency

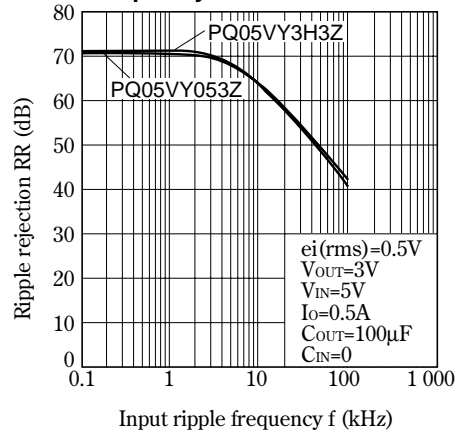
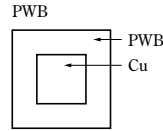
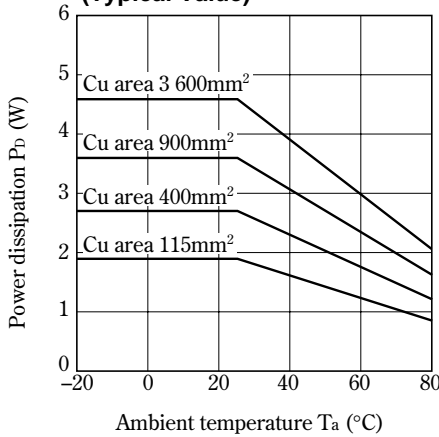


Fig.15 Power Dissipation vs. Ambient Temperature (Typical Value)



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

Fig.16 Output Voltage Adjustment Characteristics (Typical Value)

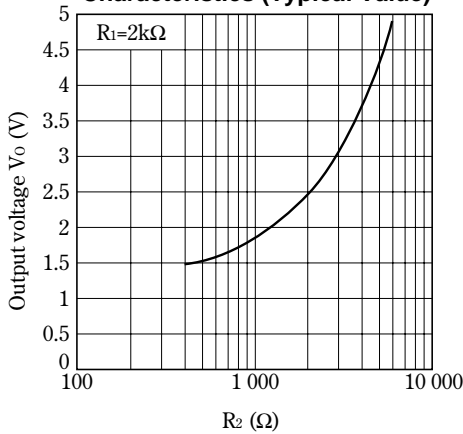
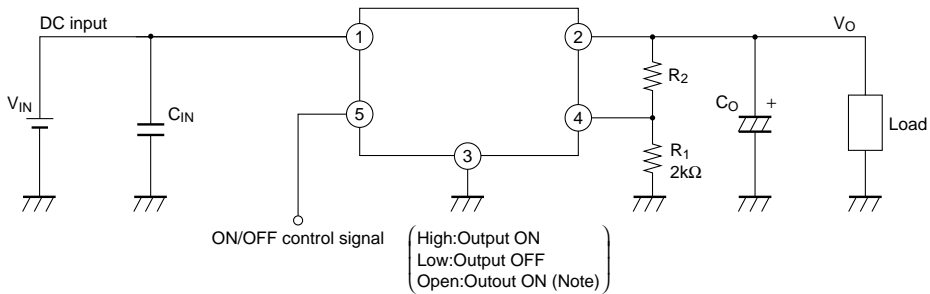


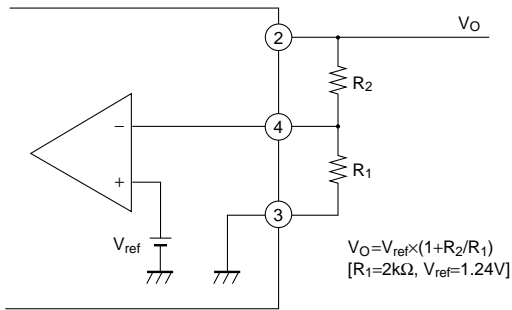
Fig.17 Typical Application



* 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.

■ Setting of Output Voltage

Output voltage is able to set from 1.5V to 5V when resistors R₁ and R₂ are attached to ②, ③, ④ terminals. As for the external resistors to set output voltage, refer to the figure below and Fig.16.



NOTICE

- The circuit application examples in this publication are provided to explain representative applications of SHARP devices and are not intended to guarantee any circuit design or license any intellectual property rights. SHARP takes no responsibility for any problems related to any intellectual property right of a third party resulting from the use of SHARP's devices.
- Contact SHARP in order to obtain the latest device specification sheets before using any SHARP device. SHARP reserves the right to make changes in the specifications, characteristics, data, materials, structure, and other contents described herein at any time without notice in order to improve design or reliability. Manufacturing locations are also subject to change without notice.
- Observe the following points when using any devices in this publication. SHARP takes no responsibility for damage caused by improper use of the devices which does not meet the conditions and absolute maximum ratings to be used specified in the relevant specification sheet nor meet the following conditions:
 - (i) The devices in this publication are designed for use in general electronic equipment designs such as:
 - Personal computers
 - Office automation equipment
 - Telecommunication equipment [terminal]
 - Test and measurement equipment
 - Industrial control
 - Audio visual equipment
 - Consumer electronics
 - (ii) Measures such as fail-safe function and redundant design should be taken to ensure reliability and safety when SHARP devices are used for or in connection with equipment that requires higher reliability such as:
 - Transportation control and safety equipment (i.e., aircraft, trains, automobiles, etc.)
 - Traffic signals
 - Gas leakage sensor breakers
 - Alarm equipment
 - Various safety devices, etc.
 - (iii) SHARP devices shall not be used for or in connection with equipment that requires an extremely high level of reliability and safety such as:
 - Space applications
 - Telecommunication equipment [trunk lines]
 - Nuclear power control equipment
 - Medical and other life support equipment (e.g., scuba).
- Contact a SHARP representative in advance when intending to use SHARP devices for any "specific" applications other than those recommended by SHARP or when it is unclear which category mentioned above controls the intended use.
- If the SHARP devices listed in this publication fall within the scope of strategic products described in the Foreign Exchange and Foreign Trade Control Law of Japan, it is necessary to obtain approval to export such SHARP devices.
- This publication is the proprietary product of SHARP and is copyrighted, with all rights reserved. Under the copyright laws, no part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, in whole or in part, without the express written permission of SHARP. Express written permission is also required before any use of this publication may be made by a third party.
- Contact and consult with a SHARP representative if there are any questions about the contents of this publication.