

# PQ1CG2032FZ/PQ1CG2032RZ

TO-220 Type Chopper Regulators

## ■ Features

- Maximum switching current: 3.5A
- Built-in ON/OFF control function
- Built-in soft start function to suppress overshoot of output voltage in power on sequence or ON/OFF control sequence
- Built-in oscillation circuit  
(Oscillation frequency: TYP. 70kHz)
- Built-in overheat, overcurrent protection function
- TO-220 package
- Variable output voltage  
(Output variable range:  $V_{ref}$  to 35V/- $V_{ref}$  to -30V)  
[Possible to select step-down output/inverting output according to external connection circuit]
- PQ1CG2032FZ: Zigzag forming  
PQ1CG2032RZ: Self-stand forming

## ■ Applications

- Switching power supplies
- Facsimiles, printers and other OA equipment
- Battery chargers
- Personal computers and amusement equipment

## ■ Absolute Maximum Ratings

(Ta=25°C)

Parameter	Symbol	Rating	Unit
*1 Input voltage	$V_{IN}$	40	V
Error input voltage	$V_{ADJ}$	7	V
Input-output voltage	$V_{I-O}$	41	V
*2 Output - COM voltage	$V_{OUT}$	-1	V
*3 ON/OFF control voltage	$V_C$	-0.3 to +40	V
Switching current	$I_{SW}$	3.5	A
*4 Power dissipation	$P_{D1}$	1.4	W
	$P_{D2}$	14	W
*5 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

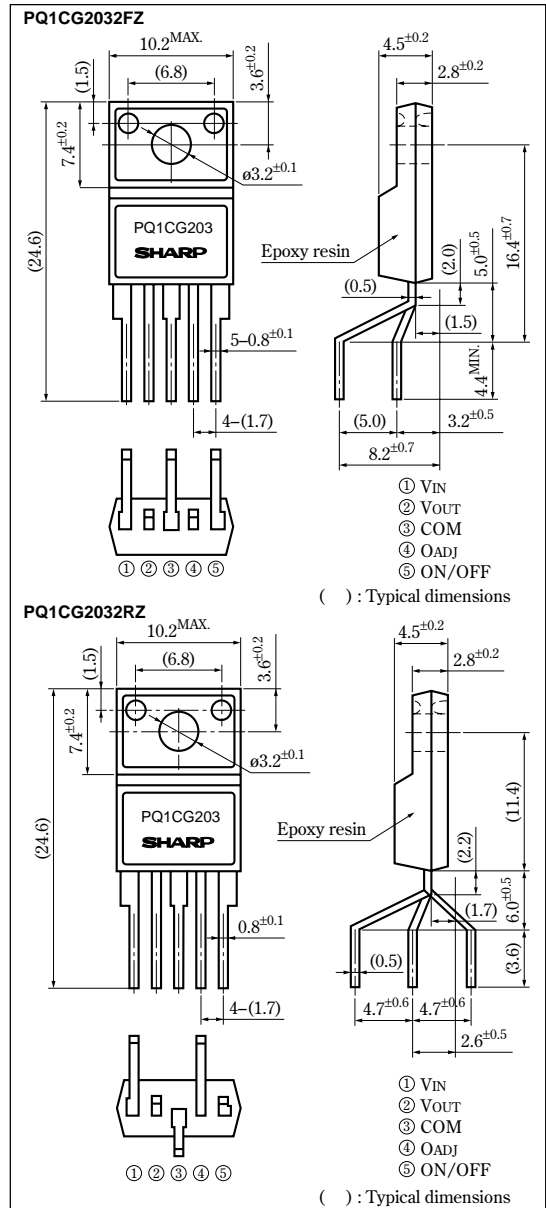
\*1 Voltage between  $V_{IN}$  terminal and COM terminal\*2 Voltage between  $V_{OUT}$  terminal and COM terminal

\*3 Voltage between ON/OFF control and COM terminal

\*4  $P_D$ : With infinite heat sink\*5 Overheat protection may operate at  $T_j=125^\circ\text{C}$  to  $150^\circ\text{C}$ 

## ■ Outline Dimensions

(Unit : mm)

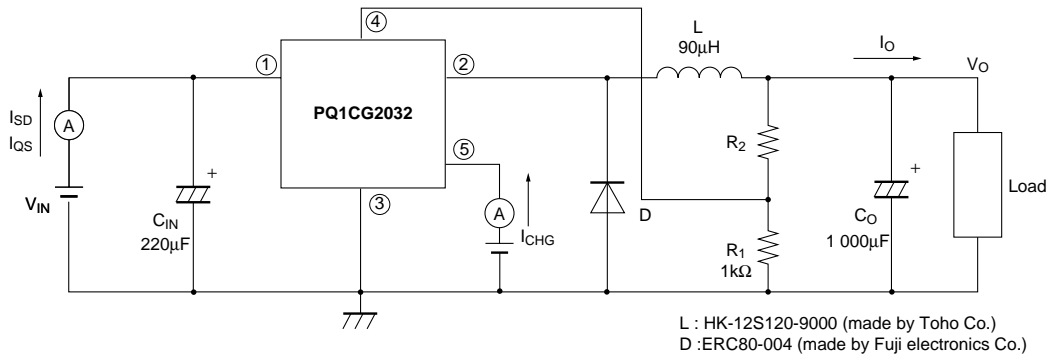

**SHARP**

**Electrical Characteristics**

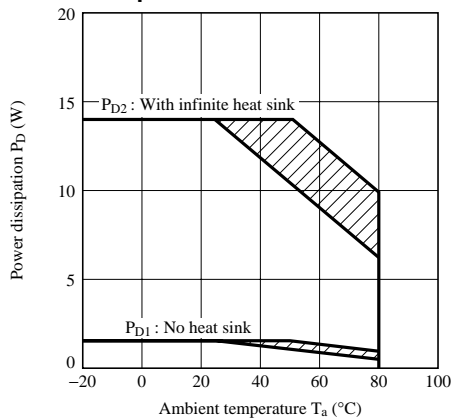
(Unless otherwise specified, condition shall be  $V_{IN}=12V$ ,  $I_o=0.2A$ ,  $V_o=5V$ , ON-OFF terminals is open,  $T_a=25^\circ C$ )

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Output saturation voltage	$V_{SAT}$	$I_{SW}=3A$	—	1.4	1.8	V
Reference voltage	$V_{ref}$	—	1.235	1.26	1.285	V
Reference voltage temperature fluctuation	$\Delta V_{ref}$	$T_j=0$ to $125^\circ C$	—	$\pm 0.5$	—	%
Load regulation	$ R_{egL} $	$I_o=0.5$ to $3A$	—	0.2	1.5	%
Line regulation	$ R_{egI} $	$V_{IN}=8$ to $35V$	—	0.5	2.5	%
Efficiency	$\eta$	$I_o=3A$	—	80	—	%
Oscillation frequency	$f_o$	—	60	70	80	kHz
Oscillation frequency temperature fluctuation	$\Delta f_o$	$T_j=0$ to $125^\circ C$	—	$\pm 2$	—	%
Overcurrent detecting level	$I_L$	—	3.6	4.2	5.8	A
Charge current	$I_{CHG}$	②, ④ terminals is open, ⑤ terminal	—	-10	—	$\mu A$
Input threshold voltage	$V_{THL}$	Duty ratio=0%, ④ terminal=0V, ⑤ terminal	—	1.3	—	V
	$V_{THH}$	Duty ratio=100%, ④ terminals is open, ⑤ terminal	—	2.3	—	V
ON threshold voltage	$V_{TH(ON)}$	④ terminal=0V, ⑤ terminal	0.7	0.8	0.9	V
Stand-by current	$I_{SD}$	$V_{IN}=40V$ , ⑤ terminal=0V	—	140	400	$\mu A$
Output OFF-state dissipation current	$I_{OS}$	$V_{IN}=40V$ , ⑤ terminal=0.9V	—	8	16	mA

**Fig.1 Test Circuit**



**Fig.2 Power Dissipation vs. Ambient Temperature**



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

**Fig.3 Overcurrent Protection Characteristics (Typical Value)**

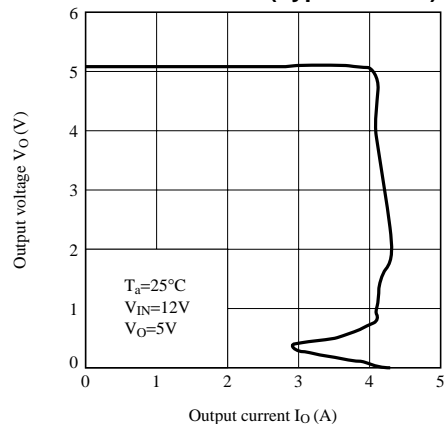


Fig.4 Efficiency vs. Input Voltage

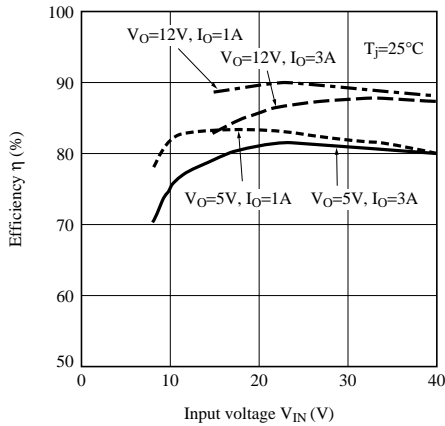


Fig.5 Output Saturation Voltage vs. Switching Current

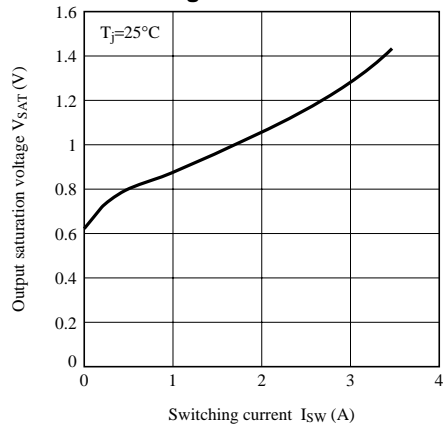


Fig.6 Stand-by Current vs. Input Voltage

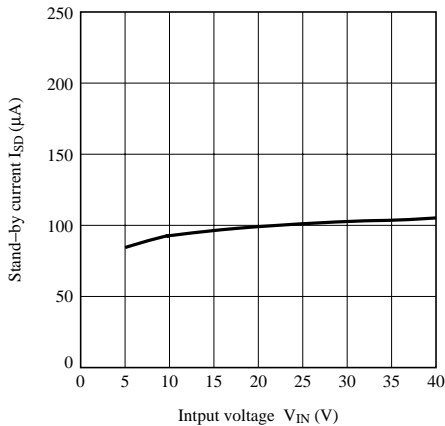


Fig.7 Reference Voltage Fluctuation vs. Junction Temperature

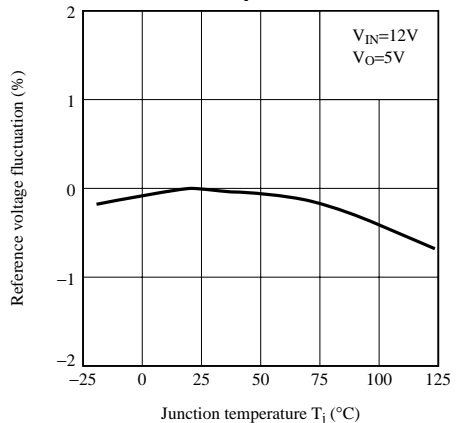


Fig.8 Load Regulation vs. Output Current

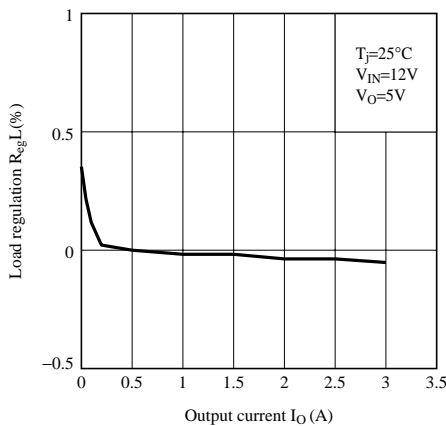
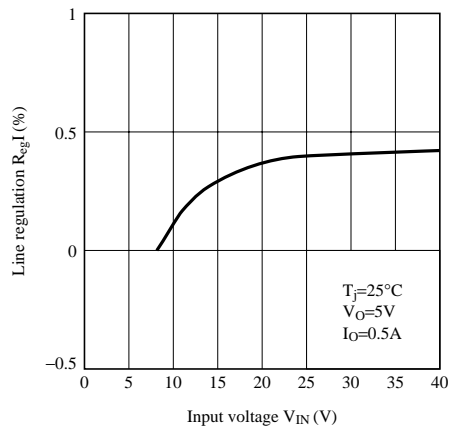
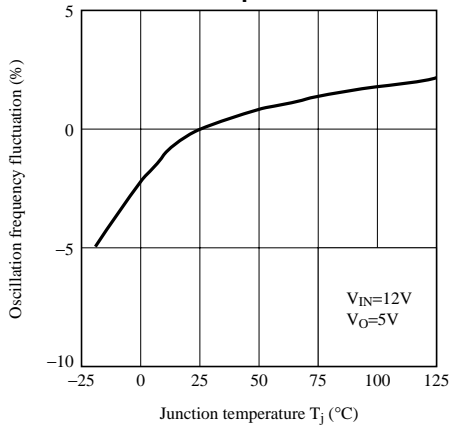


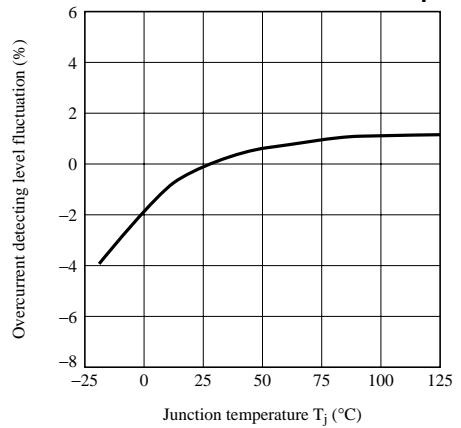
Fig.9 Line Regulation vs. Input Voltage



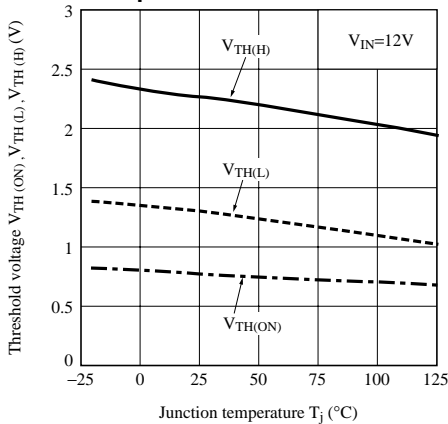
**Fig.10 Oscillation Frequency Fluctuation vs. Junction Temperature**



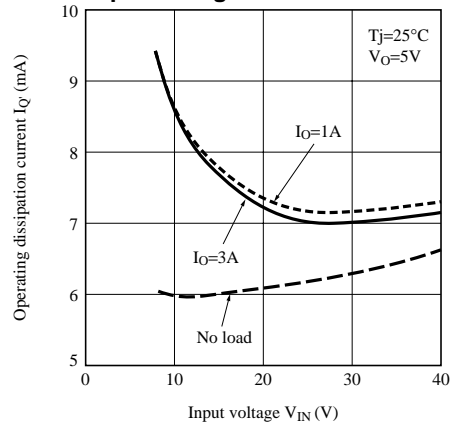
**Fig.11 Overcurrent Detecting Level Fluctuation vs. Junction Temperature**



**Fig.12 Threshold Voltage vs. Junction Temperature**



**Fig.13 Operating Dissipation Current vs. Input Voltage**



**Fig.14 Block Diagram**

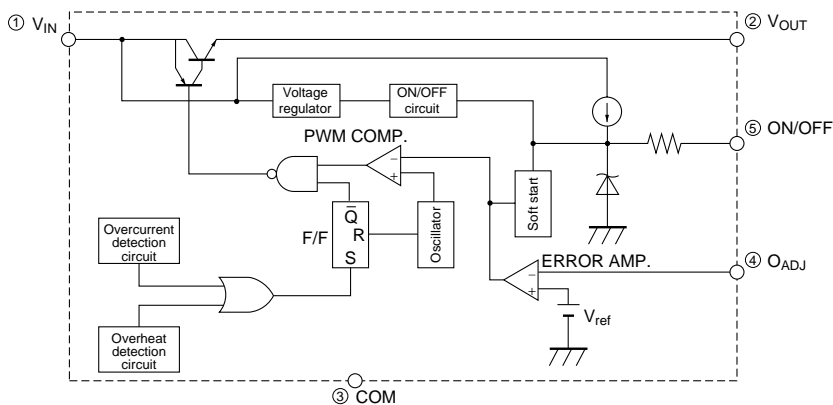


Fig.15 Step Down Type Circuit Diagram

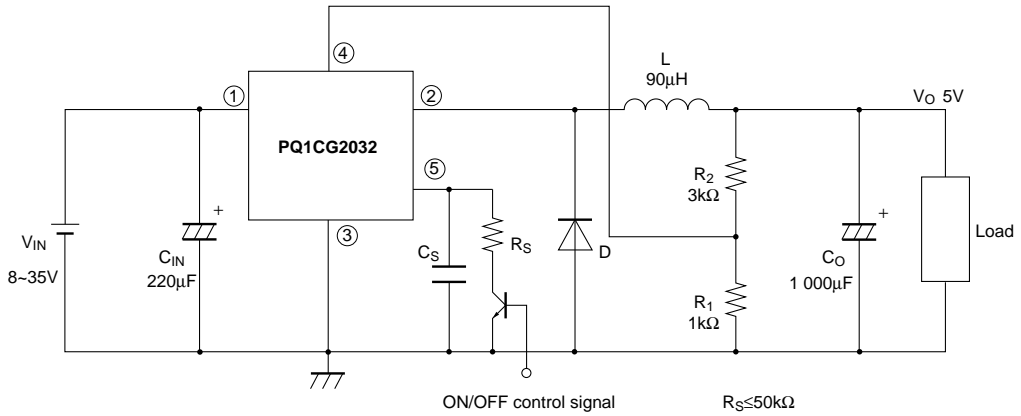
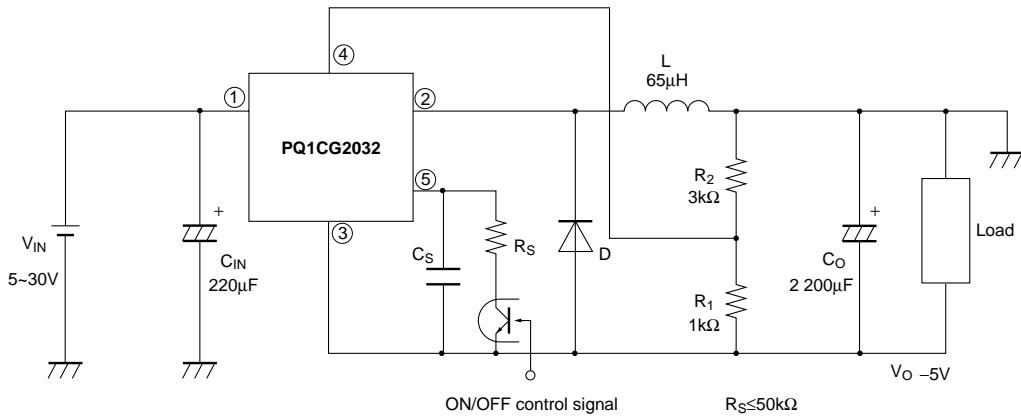


Fig.16 Polarity Inversion Type Circuit Diagram



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