

# PQ1CG38M2FZ/PQ1CG38M2RZ

TO-220 Type Chopper Regulator, built-in 300kHz oscillation circuit

## Features

- Maximum switching current: 0.8A
- 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. 300kHz)
- Built-in overheat, overcurrent protection functions
- 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]
- PQ1CG38M2FZ: Zigzag forming  
PQ1CG38M2RZ: Self-stand forming

## Applications

- Color TV
- Digital OA equipment
- Facsimiles, printers and other OA equipment
- Personal computers and amusement equipment

## Absolute Maximum Ratings

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

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	$I_{SW}$	0.8	A
*4 Power dissipation	$P_{D1}$	1.4	W
	$P_{D2}$	14	W
*5 Junction temperature	$T_J$	150	$^\circ\text{C}$
Operating temperature	$T_{opr}$	-20 to +80	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-40 to +150	$^\circ\text{C}$
Soldering temperature	$T_{sol}$	260 (10s)	$^\circ\text{C}$

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

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

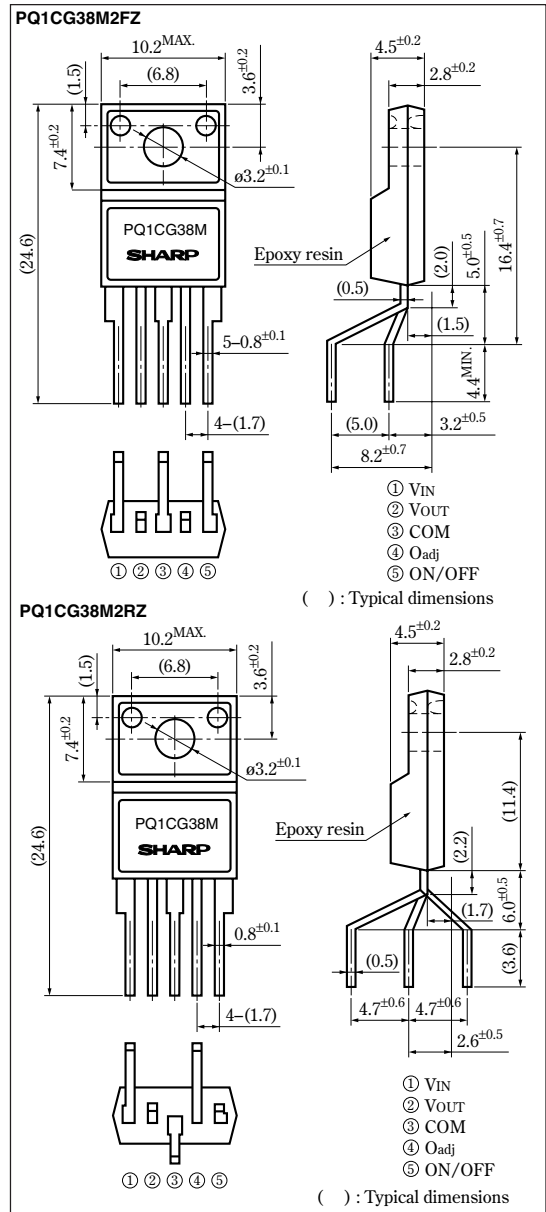
\*3 Voltage between ON/OFF control and COM terminal

\*4  $P_{D1}$ : No heat sink,  $P_{D2}$ : 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)



• Please refer to the chapter "Handling Precautions".

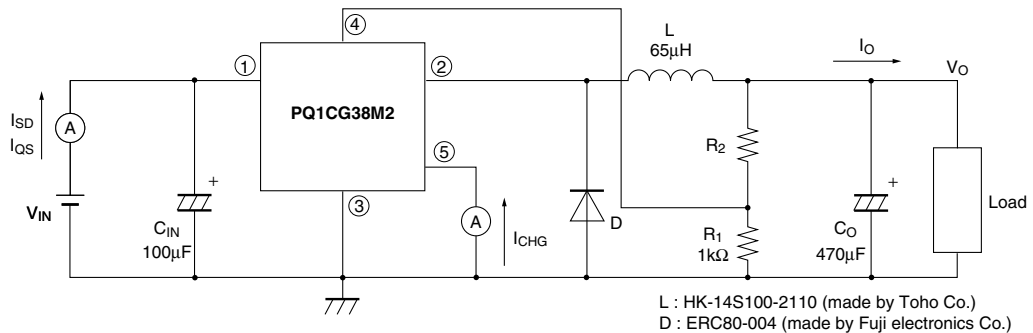
**SHARP**

**Electrical Characteristics**

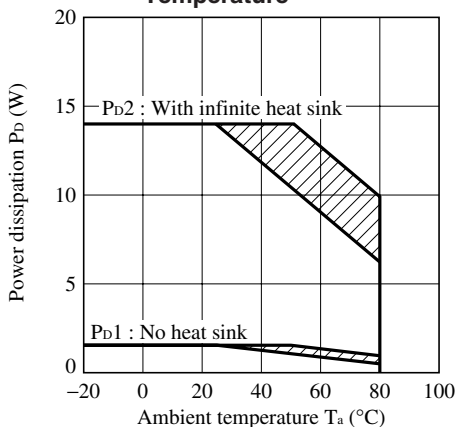
(Unless otherwise specified, condition shall be  $V_{IN}=12V$ ,  $I_o=0.5A$ ,  $V_o=5V$ , ON-OFF terminals is open,  $T_a=25^\circ C$ )

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Output saturation voltage	$V_{SAT}$	$I_{SW}=0.5A$	-	0.95	1.5	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} $	$I_o=0.2$ to $0.5A$	-	0.2	1.5	%
Line regulation	$ R_{egI} $	$V_{IN}=8$ to $35V$	-	1	2.5	%
Efficiency	$\eta$	$I_o=0.5A$	-	80	-	%
Oscillation frequency	$f_o$	-	270	300	330	kHz
Oscillation frequency temperature fluctuation	$\Delta f_o$	$T_j=0$ to $125^\circ C$	-	$\pm 3$	-	%
Overcurrent detecting level	$I_L$	-	0.85	1.2	1.6	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 terminal=1.1V, ⑤ terminal	-	2.1	-	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	-	120	400	$\mu A$
Output OFF-state dissipation current	$I_{QS}$	$V_{IN}=40V$ , ④ terminal=0V, ⑤ terminal=0.9V	-	5	10	mA

**Fig.1 Test Circuit**

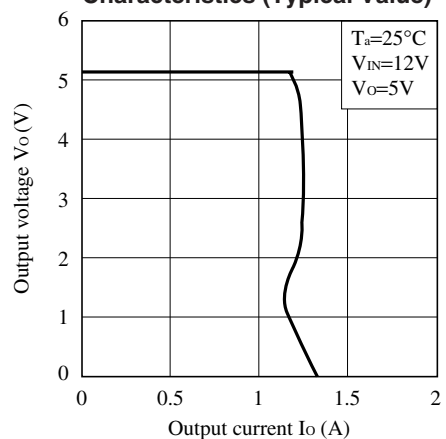


**Fig.2 Power Dissipation vs. Ambient Temperature**

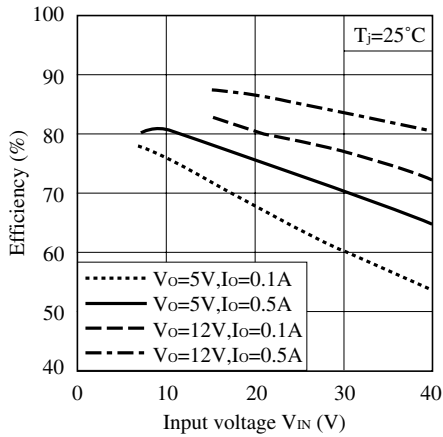


Note) Oblique line portion: Overheat protection may operate in this area

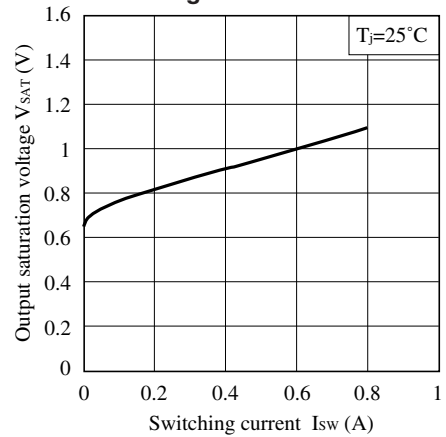
**Fig.3 Overcurrent Protection Characteristics (Typical Value)**



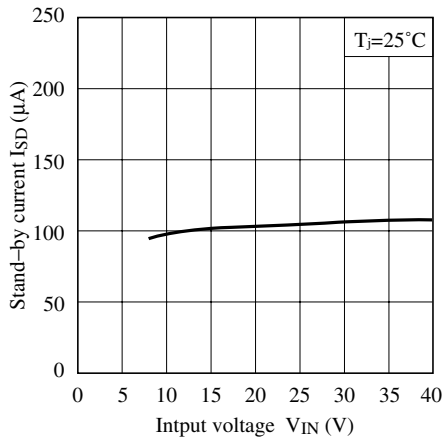
**Fig.4 Efficiency vs. Input Voltage**



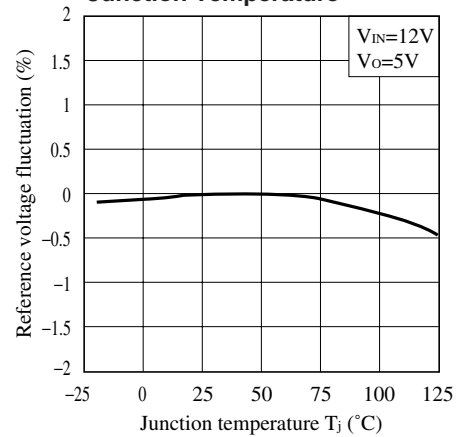
**Fig.5 Output Saturation Voltage vs. Switching Current**



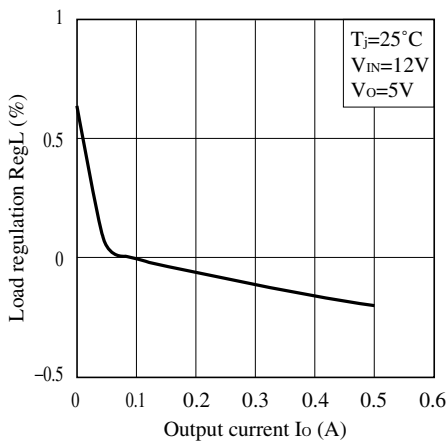
**Fig.6 Stand-by Current vs. Input Voltage**



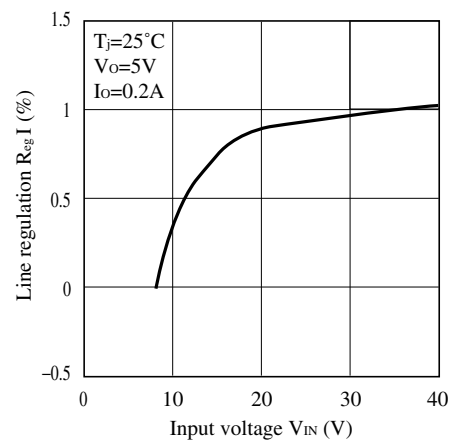
**Fig.7 Reference Voltage Fluctuation vs. Junction Temperature**



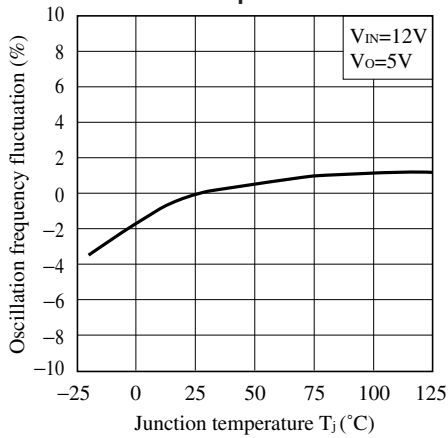
**Fig.8 Load Regulation vs. Output Current**



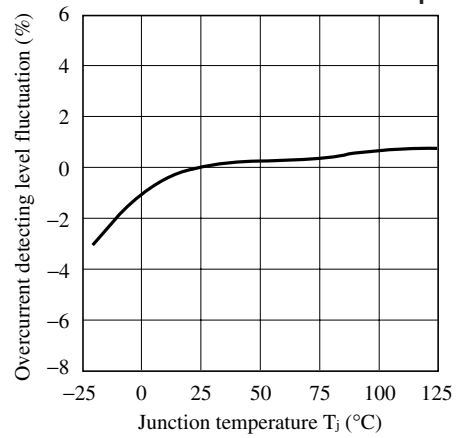
**Fig.9 Line Regulation vs. Input Voltage**



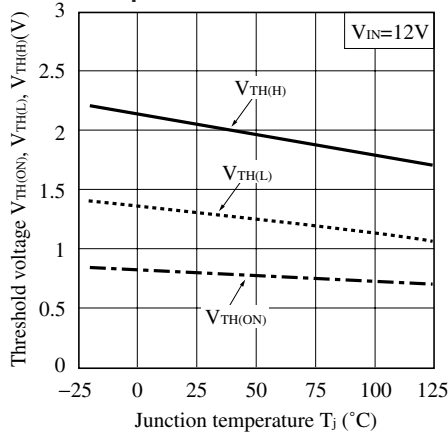
**Fig.10 Oscillation Frequency Fluctuation vs. Junction Temperature**



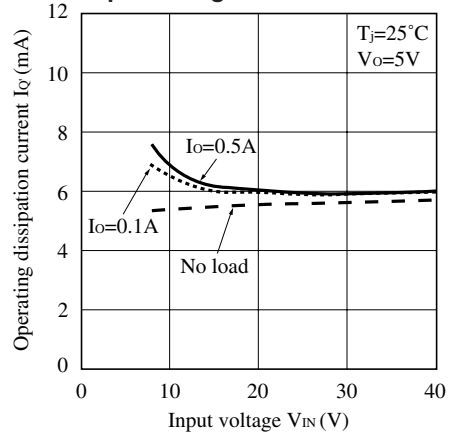
**Fig.11 Overcurrent Detecting Level Fluctuation vs. Junction Temperature**



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



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



**Fig.14 Block Diagram**

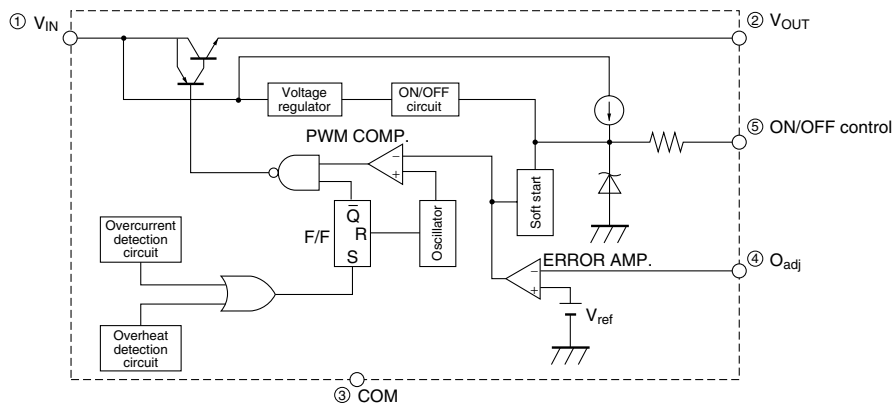


Fig.15 Step Down Type Circuit Diagram

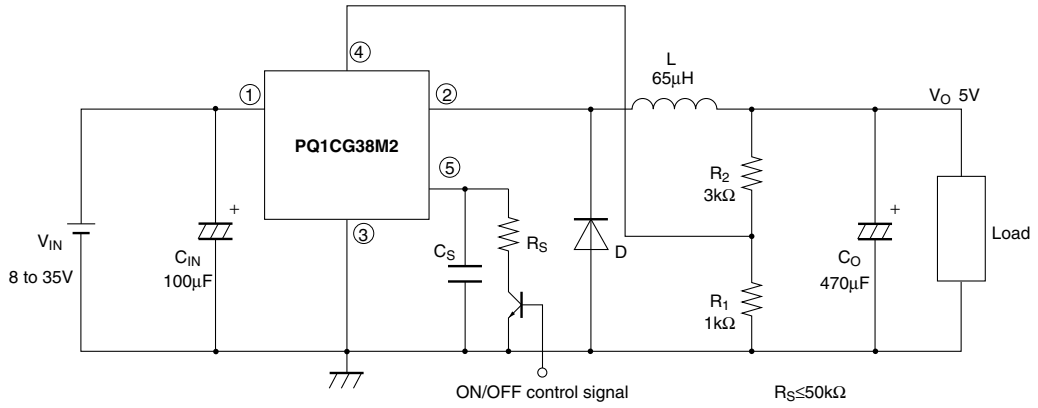
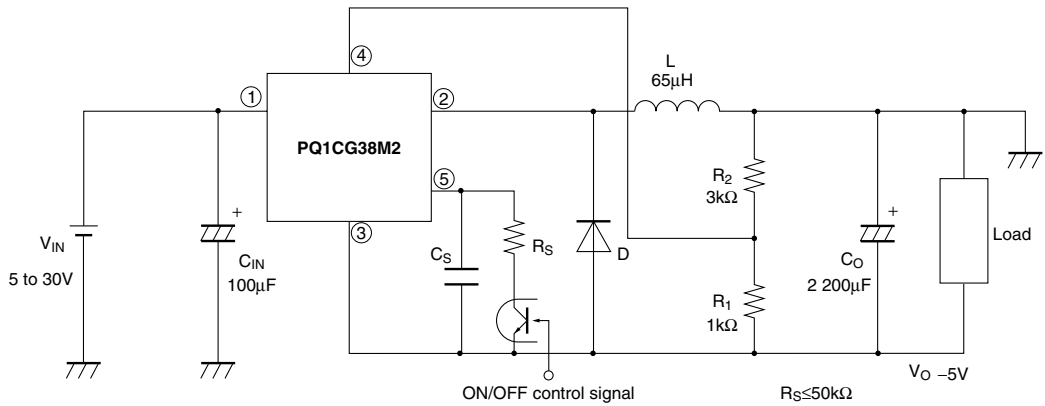


Fig.16 Polarity Inversion Type Circuit Diagram



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