PQ1CG38M2FZ/ PQ1CG38M2RZ

TO-220 Type Chopper Regulator

■ General Description

Sharp's chopper regurator **PQ1CG38M2FZ/PQ1CG38M2RZ** of TO-220 package uses PWM method.

It is suitable for the applications of large voltage difference between input and output and applications of negative power supply thanks to its low heat loss.

■ Features

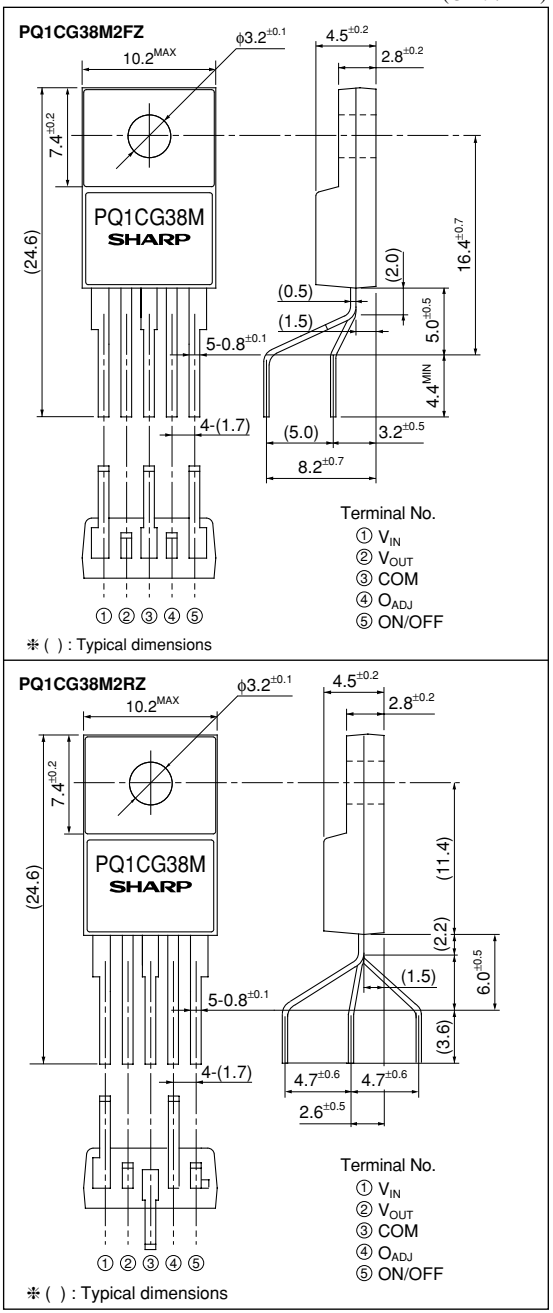
1. Maximum switching current:0.8A
2. Built-in ON/OFF control function
3. Built-in soft start function to suppress overshoot of output voltage in power on sequence or ON/OFF control sequence
4. Built-in oscillation circuit
   (Oscillation frequency:TYP. 300kHz)
5. Built-in overheat/overcurrent protection function
6. TO-220 package
7. 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]
8. **PQ1CG38M2FZ**:Zigzag forming
   PQ1CG38M2RZ:Self-stand forming

■ Applications

1. Switching power supplies
2. Facsimiles, printers and other OA equipment
3. Battery chargers
4. Personal computers and amusement equipment

■ Outline Dimensions

(Unit : mm)



■ Absolute Maximum Ratings (T_a=25°C)

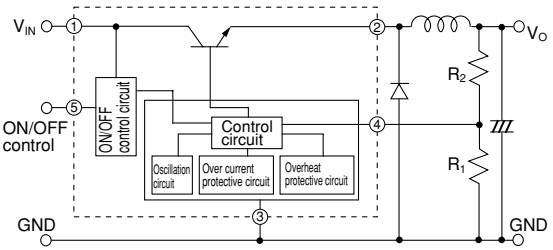
Parameter	Symbol	Rating	Unit
*1 Input voltage	V_{IN}	40	V
Output adjustment terminal voltage	V_{ADJ}	7	V
Dropout voltage	V_{I-O}	41	V
*2 Output to COM voltage	V_{OUT}	−1	V
*3 ON/OFF control voltage	V_C	−0.3 to +40	V
Switching current	I_{SW}	0.8	A
*4 Power dissipation	P_{D1}	1.4	W
	P_{D2}	14	W
*5 Junction temperature	T_j	150	°C
Operating temperature	T_{opr}	−20 to +80	°C
Storage temperature	T_{stg}	−40 to +150	°C
Soldering temperature	T_{sol}	260 (for 10s)	°C

*1 Voltage between V_{IN} and COM
*2 Voltage between V_{OUT} and COM
*3 Voltage between ON/OFF and COM
*4 P_{D1}:No heat sink P_{D2}:With infinite heat sink
*5 Overheat protector may operate for T_j=125 to 150°C

■ Electrical Characteristics (V_{IN}=12V, I_O=0.2A, Terminal No.5 open and T_a=25°C unless otherwise specified)

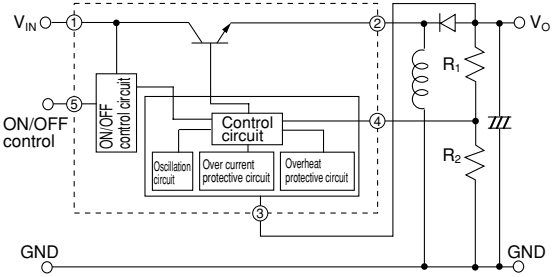
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Output saturation voltage	V_{SAT}	I_{SW}=0.5A	–	0.95	1.5	V
Reference voltage	V_{REF}	–	1.235	1.26	1.285	V
Reference voltage temperature fluctuation	ΔV_{REF}	T_j=0 to 125°C	–	±0.5	–	%
Load regulation	$\|R_{eg}L\|$	I_O=0.1 to 0.5A	–	0.2	1.5	%
Line regulation	$\|R_{eg}I\|$	V_{IN}=8 to 35V	–	1	2.5	%
Efficiency	η	I_O=0.5A	–	80	–	%
Oscillation frequency	f_O	–	270	300	330	kHz
Oscillation frequency temperature fluctuation	Δf_O	T_j=0 to 125°C	–	±3	–	%
Overcurrent detection level	I_L	–	0.85	1.2	1.6	A
Charge current	I_{CHG}	②,④ terminals is open,⑤ terminal	–	−10	–	µA
Input threshold voltage	V_{THL}	Duty ratio=0%,④ terminal=0V,⑤ terminal	–	1.3	–	V
	V_{THH}	Duty ratio=100%,④ terminals=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
Standby current	I_{SD}	V_{IN}=40V,⑤ terminal=0V	–	120	400	µA
Output OFF-state consumption current	I_{QS}	V_{IN}=40V,⑤ terminal=0.9V	–	5	10	mA

Fig.1 Step Down Voltage Output Circuit Diagram



V_O=V_{REF}×(1+R_2/R_1)
V_O=V_{REF} to +35V (V_{REF}≒1.26V)
Here, the upper limit is restricted by V_{IN}–V_{SAT} value according to the input.

Fig.2 Inverting Output Circuit Diagram



V_O=–V_{REF}×(1+R_2/R_1)
V_O=–V_{REF} to –30V (V_{REF}≒1.26V)
Here, the upper limit of the absolute value is restricted by 40V–V_{IN} according to the input.

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

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

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