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PQ1CG38M2FZ/ PQ1CG38M2RZ

TO-220 Type Chopper Regulator

■ General Description

Sharp's chopper regulator **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

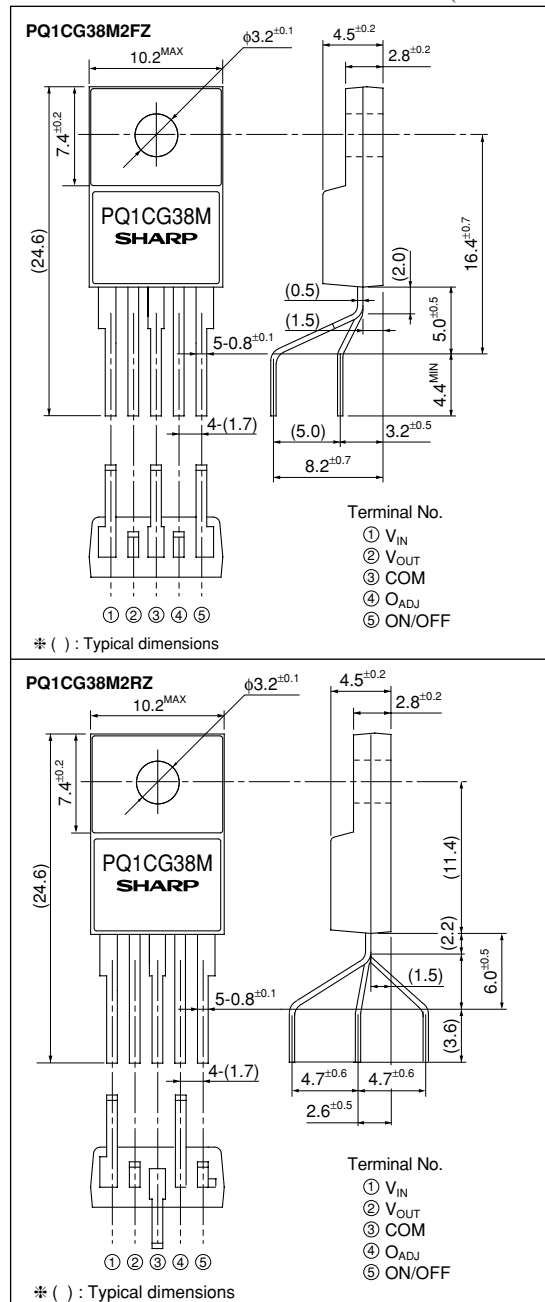
1. Maximum switching current:0.8A
2. Built-in ON/OFF control function
3. Built-in soft start function to suppress overshoot of output voltage in power on sequence or ON/OFF control sequence
4. Built-in oscillation circuit
(Oscillation frequency:TYP. 300kHz)
5. Built-in overheat/overcurrent protection 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)

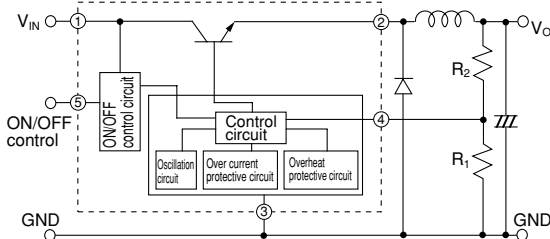
Parameter	Symbol	Rating	Unit
*1 Input voltage	V _{IN}	40	V
Output adjustment terminal voltage	V _{ADJ}	7	V
Dropout voltage	V _{L-O}	41	V
*2 Output to COM voltage	V _{OUT}	-1	V
*3 ON/OFF control voltage	V _C	-0.3 to +40	V
Switching current	I _{SW}	0.8	A
*4 Power dissipation	P _{D1}	1.4	W
	P _{D2}	14	W
*5 Junction temperature	T _j	150	°C
Operating temperature	T _{opr}	-20 to +80	°C
Storage temperature	T _{sig}	-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 _f =0 to 125°C	-	±0.5	-	%
Load regulation	R _{egL}	I _O =0.1 to 0.5A	-	0.2	1.5	%
Line regulation	R _{egI}	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 _f =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

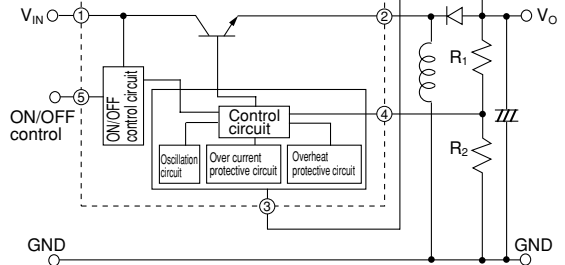


$$V_O = V_{REF} \times (1 + R_2/R_1)$$

$$V_O = V_{REF} \text{ to } +35V \quad (V_{REF} \approx 1.26V)$$

Here, the upper limit is restricted by V_{IN}-V_{SAT} value according to the input.

Fig.2 Inverting Output Circuit Diagram



$$V_O = -V_{REF} \times (1 + R_2/R_1)$$

$$V_O = -V_{REF} \text{ to } -30V \quad (V_{REF} \approx 1.26V)$$

Here, the upper limit of the absolute value is restricted by 40V-V_{IN} according to the input.

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 - Industrial control
 - Audio visual equipment
 - Consumer electronics
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