

## PQ1CG21H2FZ PQ1CG21H2RZ

## Chopper Regulator

### TO-220 Type Chopper Regulator

#### General Description

Sharp's chopper regulator **PQ1CG21H2FZ/PQ1CG21H2RZ** 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 thank to its low heat loss.

#### Features

- (1) Maximum switching current: 1.5 A
- (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. 100 kHz)
- (5) Built-in overheat/overcurrent protection function
- (6) TO-220 package
- (7) Variable output voltage  
(Output variable range : 1.26 to 35 V/-1.26 to -30 V)  
[Possible to choose step-down output/inverting output according to external connection circuit]
- (8) **PQ1CG21H2FZ** : Zigzag forming  
**PQ1CG21H2RZ** : Self-stand forming

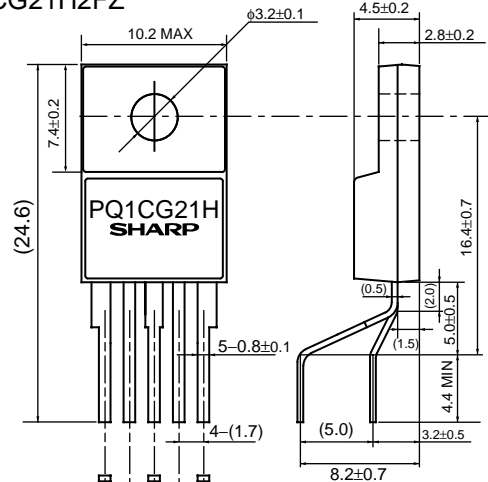
#### Applications

- (1) Switching power supplies
- (2) Facsimiles, printers and other OA equipment
- (3) Color TVs and video CDs
- (4) Personal computers and amusement equipment

#### Outline Dimensions

(Unit: mm)

PQ1CG21H2FZ

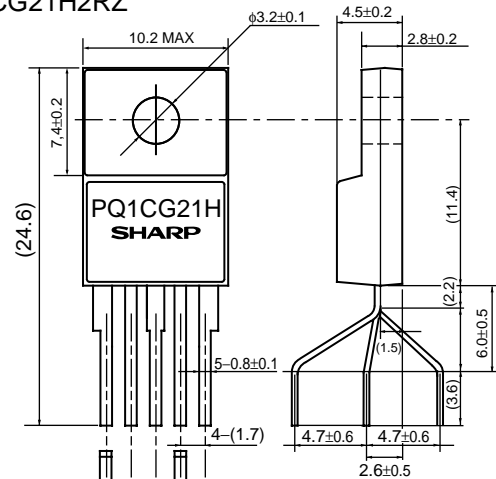


The dimension in ( ) indicates the reference dimensions.

#### Terminal No.

- ①  $V_{IN}$
- ②  $V_{OUT}$
- ③ COM
- ④ Oadj
- ⑤ ON/OFF

PQ1CG21H2RZ



The dimension in ( ) indicates the reference dimensions.

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- ②  $V_{OUT}$
- ③ COM
- ④ Oadj
- ⑤ ON/OFF

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### Absolute Maximum Ratings

(Ta=25°C)

Parameter	Symbol	Rating	Unit
*1 Input voltage	V <sub>IN</sub>	40	V
Output adjustment terminal voltage	V <sub>adj</sub>	7	V
Dropout voltage	V <sub>I-O</sub>	41	V
*2 Output-COM voltage	V <sub>out</sub>	-1	V
*3 ON/OFF control voltage	V <sub>c</sub>	-0.3 to 40	V
Switching current	I <sub>sw</sub>	1.5	A
*4 Power dissipation	P <sub>d1</sub>	1.4	W
	P <sub>d2</sub>	14	W
*5 Junction temperature	T <sub>j</sub>	150	°C
Operating temperature	T <sub>opr</sub>	-20 to +80	°C
Storage temperature	T <sub>stg</sub>	-40 to +150	°C
Soldering temperature	T <sub>sol</sub>	260(For 10s)	°C

\*1 Voltage between V and COM

\*2 Voltage between Vout and COM

\*3 Voltage between ON/OFF and COM

\*4 P: No heat sink P: With infinite heat sink.

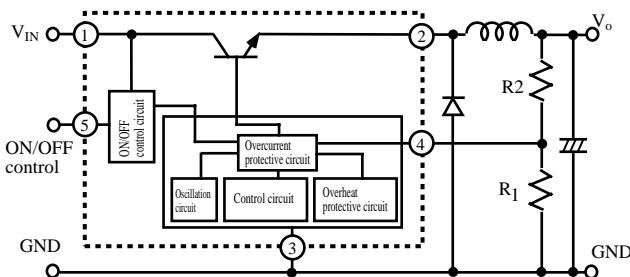
\*5 Overheat protector may operate for Tj=125 to 150°C.

### Electrical Characteristics

(V<sub>in</sub>=12 V, I<sub>o</sub>=0.5 A, Terminal No. 5 open and Ta=25°C unless otherwise specified)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Output saturation voltage	V <sub>sat</sub>	I <sub>sw</sub> =1A	-	1.0	1.5	V
Reference voltage	V <sub>ref</sub>	-	1.235	1.26	1.285	V
Reference voltage temperature fluctuation	ΔV <sub>ref</sub>	T <sub>j</sub> =0 to 125°C	-	±0.5	-	%
Load regulation	R <sub>egL</sub>	I <sub>o</sub> =0.2 to 1A	-	0.2	1.5	%
Line regulation	R <sub>egI</sub>	V <sub>in</sub> =8 to 35V	-	0.5	2.5	%
Efficiency	η	I <sub>o</sub> =1A	-	84	-	%
Oscillation frequency	f <sub>o</sub>	-	80	100	120	kHz
Oscillation frequency temperature fluctuation	Δf <sub>o</sub>	T <sub>j</sub> =0 to 125°C	-	±2	-	%
Overcurrent detection level	I <sub>L</sub>	-	1.55	2.0	2.6	A
Charge current	I <sub>CHG</sub>	Terminals 2/4 are open, Terminal 5	-	-10	-	∞A
Input threshold voltage	V <sub>THL</sub>	Duty=0% Terminal 4 = 0 V, Terminal 5	-	1.3	-	V
	V <sub>THH</sub>	Duty=100%, Terminal 4 is open, Terminal 5	-	2.3	-	V
ON threshold voltage	V <sub>THON</sub>	Terminal 4 = 0 V, Terminal 5	0.7	0.8	0.9	V
Standby current	I <sub>SD</sub>	V <sub>in</sub> =40V, Terminal 5 = 0 V=0V	-	140	400	∞A
Output OFF-state consumption current	I <sub>QS</sub>	V <sub>in</sub> =40V, Terminal 5 = 0 V=0.9V	-	8	12	mA

Step-down output circuit diagram  
PQ1CG21H2FZ/PQ1CG21H2RZ

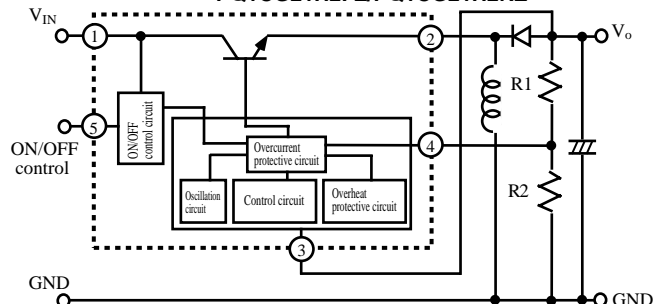


$$V_o = V_{ref} \times (1 + R_2/R_1) \quad (V_{ref} = 1.26V)$$

$$V_o = 1.26V \sim 35V$$

Here, the upper limit is restricted by V<sub>in</sub>-V<sub>sat</sub> value.

Inverting output circuit diagram  
PQ1CG21H2FZ/PQ1CG21H2RZ



$$V_o = -V_{ref} \times (1 + R_2/R_1) \quad (V_{ref} = 1.26V)$$

$$V_o = -1.26V \sim -30V$$

Here, the upper limit of the absolute value is restricted by 40V-V<sub>i</sub>.

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