

## PQ1CZ38M2Z series

## Chopper Regulator

### 300kHz Oscillation Type Chopper Regulator

#### Features

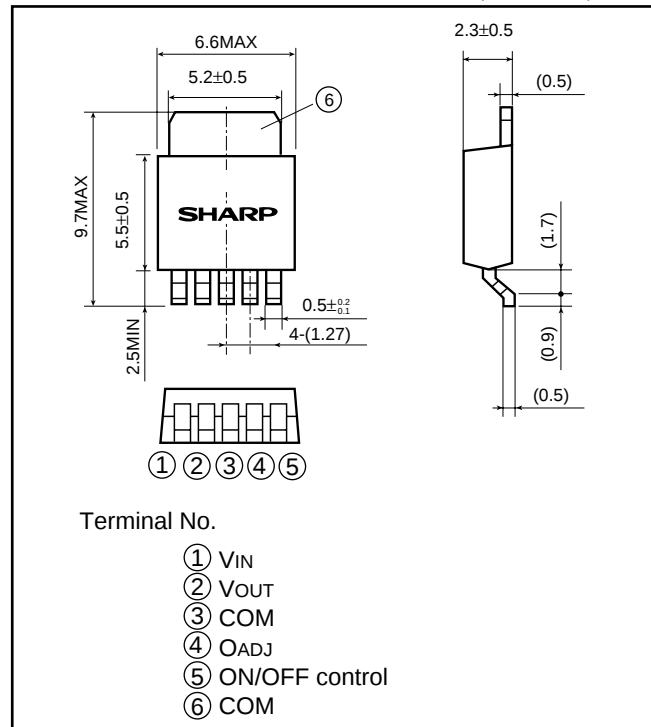
- (1) Maximum switching current: 0.8 A
- (2) Built-in ON/OFF control function
- (3) Built-in soft start function to suppress overshoot of output voltage in power on sequence or ON/OFF control sequence.
- (4) Built-in oscillation circuit  
(Oscillation frequency : TYP. 300 kHz)
- (5) Built-in overheat/overcurrent protection function
- (6) SC-63 surface mount type package
- (7) Variable output voltage  
(Output variable range :  $V_{REF}$  to 35 V/ $-V_{REF}$  to -30 V)  
[Possible to choose step-down output/inverting output according to external connection circuit]

#### Applications

- (1) CTV
- (2) Digital OA equipment
- (3) Facsimiles, printers and other OA equipment
- (4) Personal computers and amusement equipment

#### Outline Dimensions

(Unit: mm)



#### Absolute Maximum Ratings

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

| 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-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               | $P_D$     | 8            | W                  |
| 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(for 10s) | $^{\circ}\text{C}$ |

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

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

\*3 Voltage between ON/OFF and COM

\*4 With infinite heat sink.

#### (Notice)

•In the absence of confirmation by device specification sheets, SHARP takes no responsibility for any defects that may occur in equipment using any SHARP devices shown in catalogs, data books, etc. Contact SHARP in order to obtain the latest device specification sheets before using any SHARP device.

•Specifications are subject to change without notice for improvement.

(Internet)

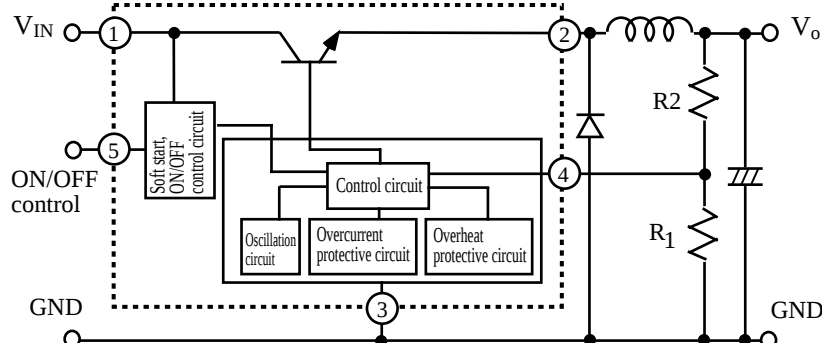
•Data for Sharp's optoelectronic/power devices is provided on internet. (Address <http://sharp-world.com/ecg/>)

### Electrical Characteristics

( $V_{IN}=12\text{ V}$ ,  $I_O=0.2\text{ A}$ ,  $V_O=5\text{ V}$ , Terminal No. 5 open and  $T_A=25^\circ\text{C}$  unless otherwise specified)

| Parameter                                     | Symbol                  | Conditions                                                   | MIN.  | TYP.      | MAX.  | Unit          |
|-----------------------------------------------|-------------------------|--------------------------------------------------------------|-------|-----------|-------|---------------|
| Output saturation voltage                     | $V_{\text{sat}}$        | $I_{\text{SW}}=0.5\text{ A}$                                 | —     | 0.95      | 1.5   | V             |
| Reference voltage                             | $V_{\text{REF}}$        | —                                                            | 1.235 | 1.26      | 1.285 | V             |
| Reference voltage temperature fluctuation     | $\Delta V_{\text{REF}}$ | $T_j=0\text{ to }125^\circ\text{C}$                          | —     | $\pm 0.5$ | —     | %             |
| Load regulation                               | $ R_{\text{egL}} $      | $I_O=0.1\text{ to }0.5\text{ A}$                             | —     | 0.2       | 1.5   | %             |
| Line regulation                               | $ R_{\text{egI}} $      | $V_{\text{IN}}=8\text{ to }35\text{ V}$                      | —     | 1         | 2.5   | %             |
| Efficiency                                    | $\eta$                  | $I_O=0.5\text{ A}$                                           | —     | 80        | —     | %             |
| Oscillation frequency                         | $f_o$                   | —                                                            | 270   | 300       | 330   | kHz           |
| Oscillation frequency temperature fluctuation | $\Delta f_o$            | $T_j=0\text{ to }125^\circ\text{C}$                          | —     | $\pm 3$   | —     | %             |
| Overcurrent detection level                   | $I_L$                   | —                                                            | 0.85  | 1.2       | 1.6   | A             |
| ON threshold voltage                          | $V_{\text{THON}}$       | Terminal 4 = 0 V, Terminal 5                                 | 0.7   | 0.8       | 0.9   | V             |
| Standby current                               | $I_{\text{SD}}$         | $V_{\text{IN}}=40\text{ V}$ , Terminal 5=0V                  | —     | 140       | 400   | $\mu\text{A}$ |
| Output OFF-state consumption current          | $I_{\text{QS}}$         | $V_{\text{IN}}=40\text{ V}$ , Terminal 4=0V, Terminal 5=0.9V | —     | 5         | 10    | mA            |

### Step-down voltage output circuit diagram

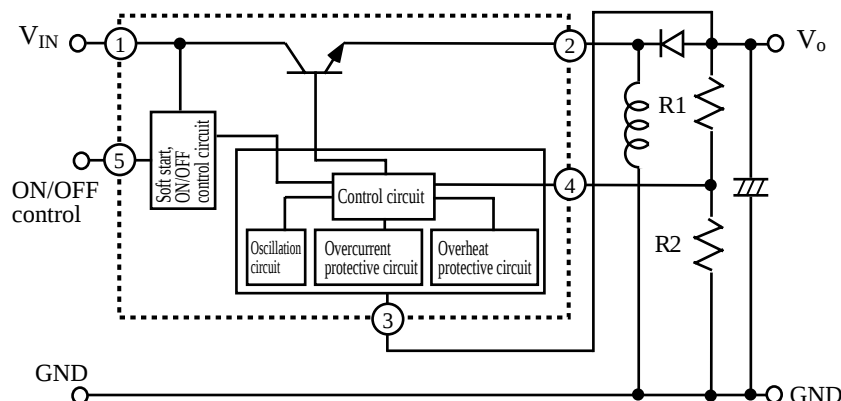


$$V_O = V_{\text{REF}} \times (1 + R_2/R_1)$$

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

Here, the upper limit is restricted by  $V_{\text{IN}} - V_{\text{sa}}$  value according to the input.

### Inverting output circuit diagram



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

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

Here, the upper limit of the absolute value is restricted by  $40\text{ V} - V_i$  according to the input.

As of September 2001