

PQ1CX12H2ZPQ

Bootstrap system
Chopper Regulator

Features

1. Maximum switching current: 2.5A
2. High efficiency (efficiency : 88% [$V_{IN}=5V, V_{OUT}=3.3V$])
3. Built-in oscillation circuit
(Oscillation frequency: TYP. 150kHz)
4. Built-in overheat, overcurrent protection functions
5. Variable output voltage
(Output variable range: V_{ref} to 24V)
6. RoHS directive compliant

Applications

1. AV equipment
2. Digital OA equipment

Absolute Maximum Ratings

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

| Parameter | Symbol | Rating | Unit |
|---------------------------------------|-----------|---------------|------------------|
| *1 Input voltage | V_{IN} | 33 | V |
| *2 Boost terminal voltage | V_B | 33 | V |
| *3 Voltage between V_B and V_{IN} | V_{B-I} | 15 | V |
| Malfunction input voltage | V_{adj} | 7 | V |
| Input-output voltage | V_{I-O} | 34 | V |
| *4 Output-GND voltage | V_{OUT} | -1 | V |
| *5 ON/OFF control voltage | V_C | -0.3 to 20 | V |
| Switching current | I_{SW} | 2.5 | A |
| *6 Power dissipation | P_D | 0.9 | W |
| *7 Junction temperature | T_j | 150 | $^\circ\text{C}$ |
| Operating temperature | T_{opr} | -30 to +85 | $^\circ\text{C}$ |
| 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 GND

*2 Voltage between V_B and GND

*3 Voltage between V_B and V_{IN}

*4 Voltage between V_{out} and GND

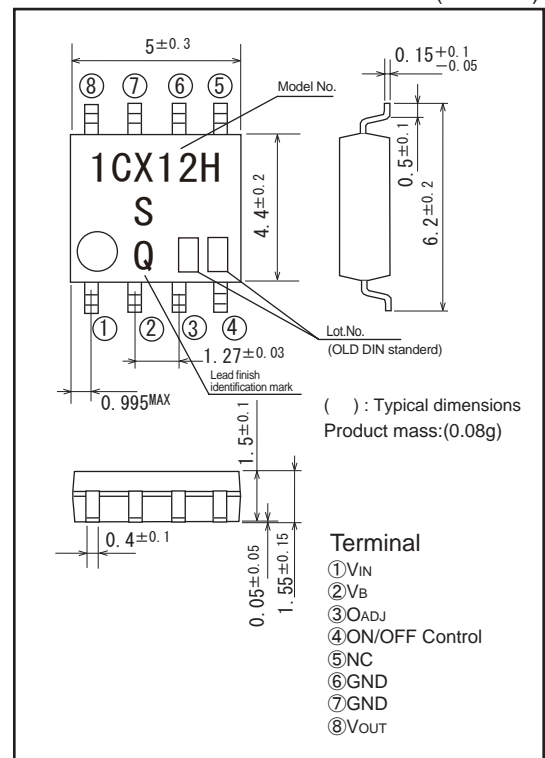
*5 Voltage between ON/OFF and GND

*6 At the time of the PCB mounting

*7 There is case that over heat protection function operates at the temperature $T_j=125^\circ\text{C}$ to 150°C , so this item cannot be used in this temperature range.

Outline Dimensions

(Unit:mm)



Lead finish:Lead-free solder plating
(Composition: Sn2Bi)

Notice The content of data sheet is subject to change without prior 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.

Electrical Characteristics

(VIN=5 V, Io=0.5 A, Vo=3.3V, Terminal No. 4 open and Ta=25°C unless otherwise specified)

| Parameter | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|--------------------------------------|-------------|------------------------------------------|-------|------|-------|---------|
| Voltage ratio VOUT-VIN | DI-O | - | 15 | - | - | % |
| Output saturation voltage | Vsat | Isw=2.0A | - | 0.25 | 0.4 | V |
| Reference voltage | VREF | - | 1.235 | 1.26 | 1.285 | V |
| Load regulation | RegL | Io=0.5 to 2.0A | - | 0.2 | 1.5 | % |
| Line regulation | Regl | VIN=5 to 20V | - | 1 | 2.5 | % |
| Efficiency | η | Io=2.0 A | - | 88 | - | % |
| Oscillation frequency | fo | - | 135 | 150 | 165 | kHz |
| Overcurrent detection level | IL | Switching current peak | 2.55 | 3.2 | 4.2 | A |
| Maximum Duty | DMAX | Terminal 3 = 1.1 V | 83 | 90 | - | % |
| Charge current | ICHG | Terminal 3,8:OPEN, Terminal 4 | - | -10 | - | μ A |
| | | Duty=0 %, Terminal 3=0V, Terminal 4 | - | 1.3 | - | V |
| Input threshold voltage | VTHL | Duty=0 %, Terminal 3=0V, Terminal 4 | - | 1.3 | - | V |
| | VTHH | Duty=DMAX, Terminal 3:OPEN, Terminal 4 | - | 2.3 | - | V |
| ON threshold voltage | VTHON | Terminal 3 = 0V, Terminal 4 | 0.7 | 0.8 | 0.9 | V |
| Standby current | ISD | VIN=33V, Terminal 4 = 0V | - | 120 | 400 | μ A |
| Output OFF-state consumption current | IQS | VIN=33V, Terminal 4 = 0.9V | - | 5 | 10 | mA |
| Minimum Input Voltage | VIN(MIN) | - | - | - | 4.5 | V |
| Minimum Boost Voltage | VBOOST(MIN) | V _B -V _{OUT} Voltage | - | - | 3 | V |

Fig.1 Test Circuit

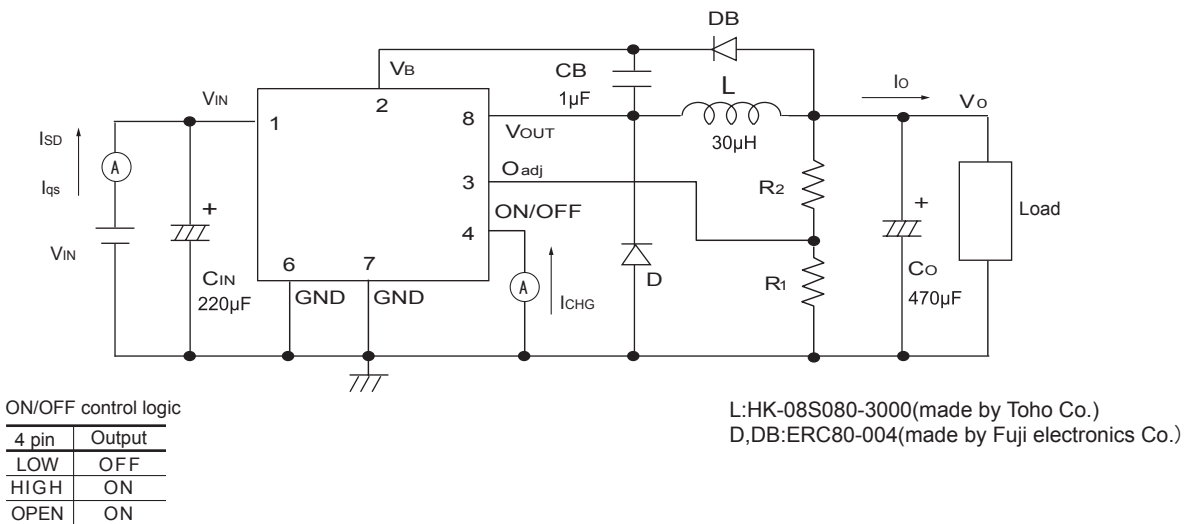
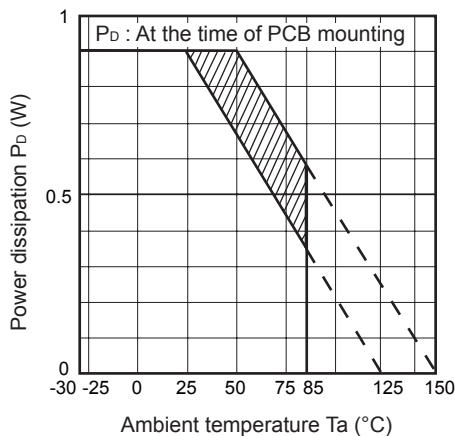


Fig.2 Power Dissipation vs.Ambient Temperature



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

Fig.3 Overcurrent Protection Characteristics (Typical Value)

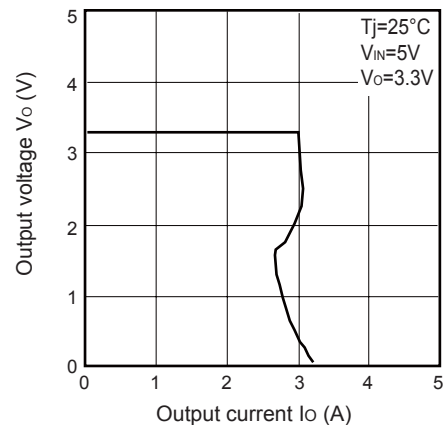


Fig.4 Efficiency vs. Input Voltage

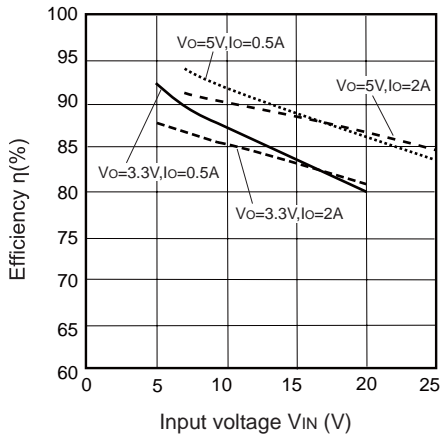


Fig.5 Output Saturation Voltage vs. Switching Current

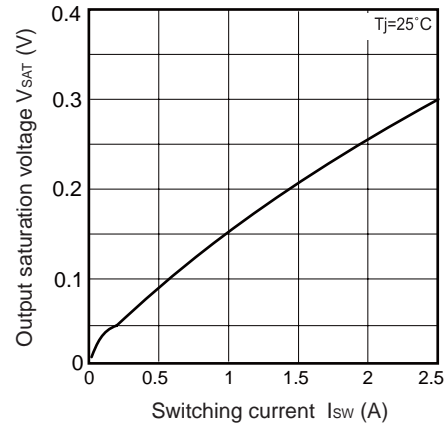


Fig.6 Stand-by Current vs. Input Voltage

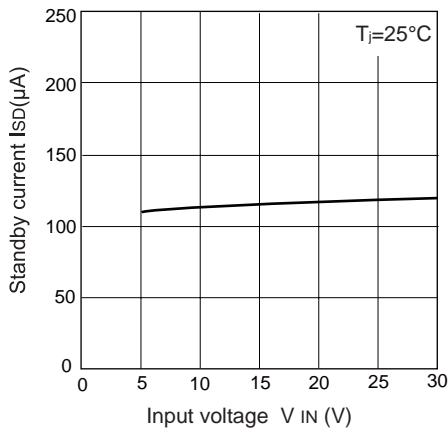


Fig.7 Reference Voltage Fluctuation vs. Junction Temperature

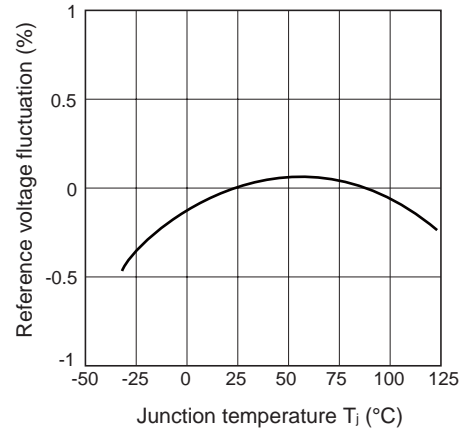


Fig.8 Load Regulation vs. Output Current

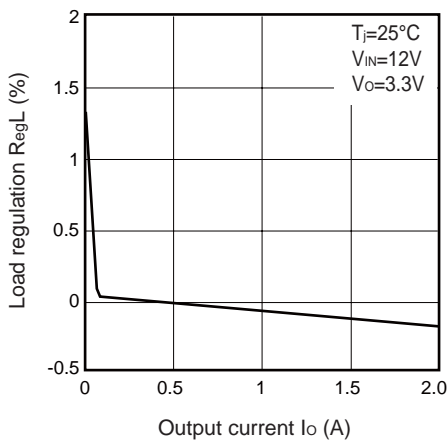


Fig.9 Line Regulation vs. Input Voltage

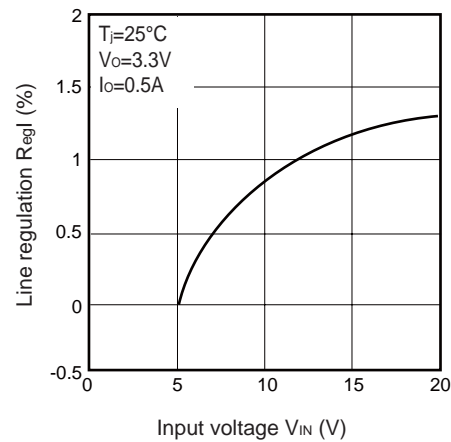


Fig.10 Oscillation Frequency Fluctuation vs. Junction Temperature

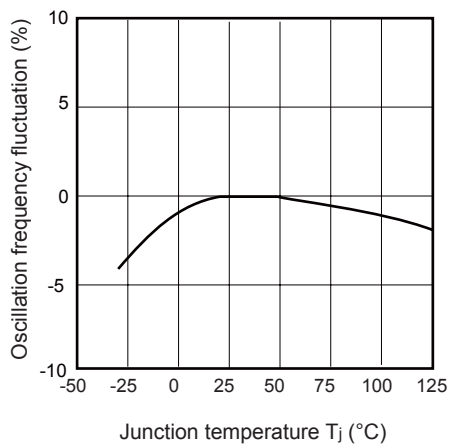


Fig.11 Overcurrent Detecting Level Fluctuation vs. Junction Temperature

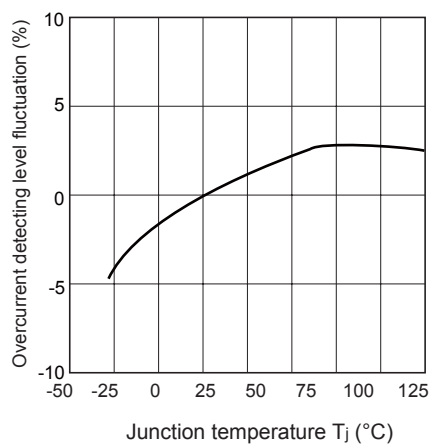


Fig.12 Threshold Voltage vs. Junction Temperature

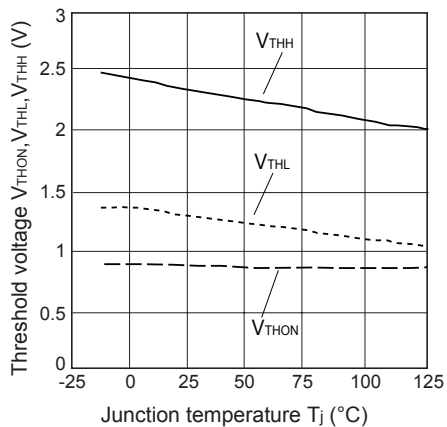


Fig.13 Operating Dissipation Current vs. Input Voltage

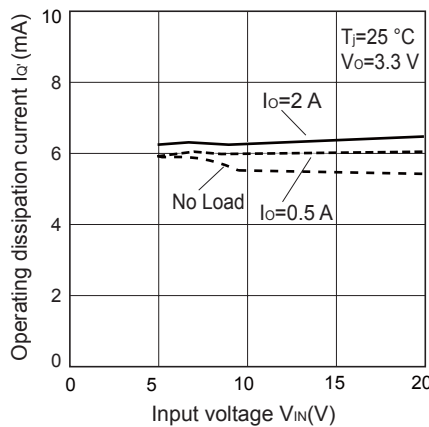
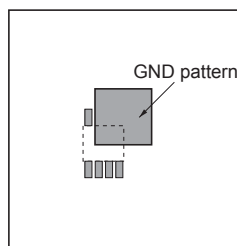
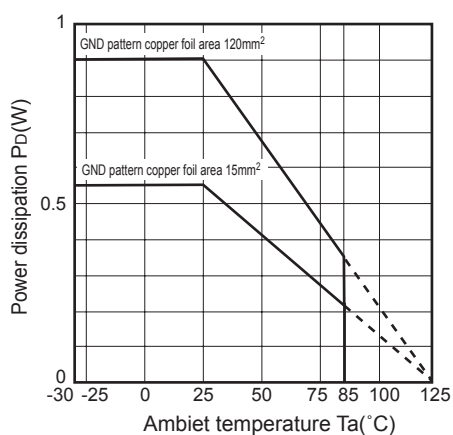


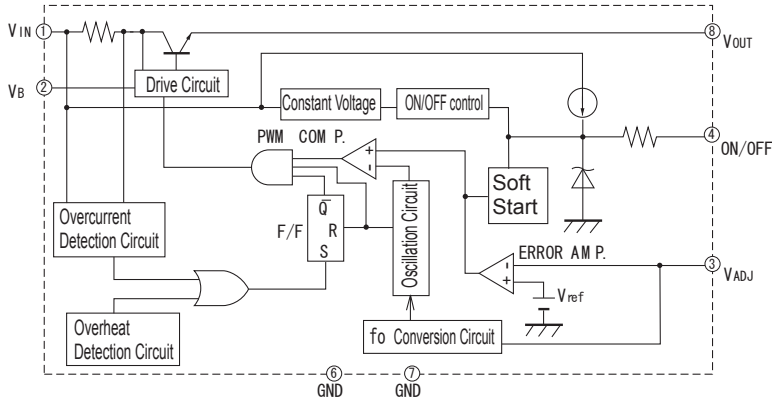
Fig.14 PD-Ta rating(Typical value)



Mounting PCB

Material : Glass-cloth epoxy resin
 Size : 30mm × 30mm × 1mm
 GND pattern copper foil area : 120mm²,35μm

■ Block Diagram



■ Step-down voltage output circuit diagram

