

# PQ6CB11X1CP

Compact SMD CMOS  
Step-up LED Driver

## ■ Features

- 1.High switching voltage :MAX.30V  
(capable of driving max 6 LEDs in series connection)
- 2.Switching current: 250mA
- 3.High frequency PWM control :1.2MHz
- 4.High efficiency(efficiency : 90%)
- 5.Built-in overheat, overcurrent protection functions
- 6.Built-in soft start function
- 7.RoHS directive compliant

## ■ Applications

- 1.Mobile phone
- 2.DSC
- 3.PDA

## ■ Absolute Maximum Ratings

(Ta=25°C)

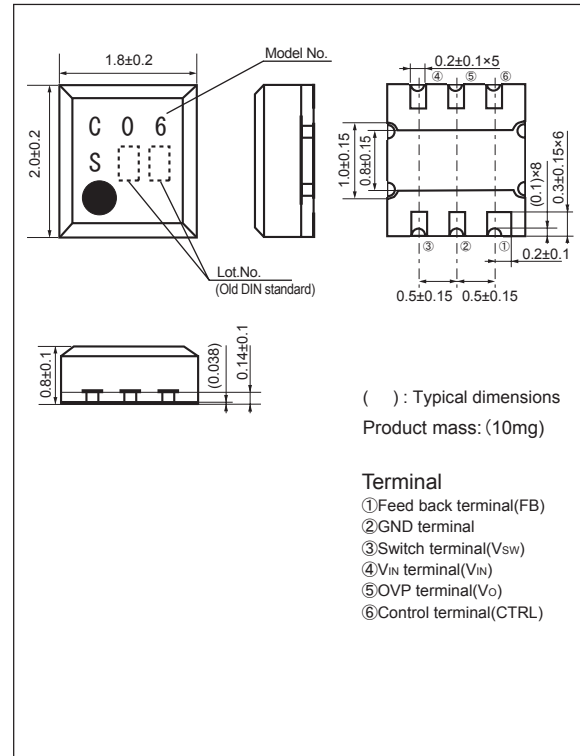
Parameter	Symbol	Rating	Unit
Input voltage	V <sub>IN</sub>	6	V
Output voltage	V <sub>O</sub>	30	V
Switching voltage	V <sub>SW</sub>	30	V
Control voltage	CTRL	V <sub>IN</sub>	V
Feed back voltage	FB	6	V
Switching current	I <sub>SW</sub>	250	mA
Power dissipation	P <sub>d</sub>	350	mW
Junction temperature	T <sub>j</sub>	150	°C
Operating temperature	T <sub>opr</sub>	-40 to +85	°C
Storage temperature	T <sub>stg</sub>	-40 to +150	°C
Soldering temperature	T <sub>sol</sub>	260(10s)	°C

## ■ Operating conditions

Parameter	Symbol	Rating	Unit
Operating Junction temperature	T <sub>j</sub>	-40 to +125	°C

## ■ Outline Dimensions

(Unit:mm)



( ) : Typical dimensions  
Product mass: (10mg)

- Terminal**
- ① Feed back terminal(FB)
  - ② GND terminal
  - ③ Switch terminal(V<sub>SW</sub>)
  - ④ V<sub>IN</sub> terminal(V<sub>IN</sub>)
  - ⑤ OVP terminal(V<sub>O</sub>)
  - ⑥ Control terminal(CTRL)

Lead finish: Au plating

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

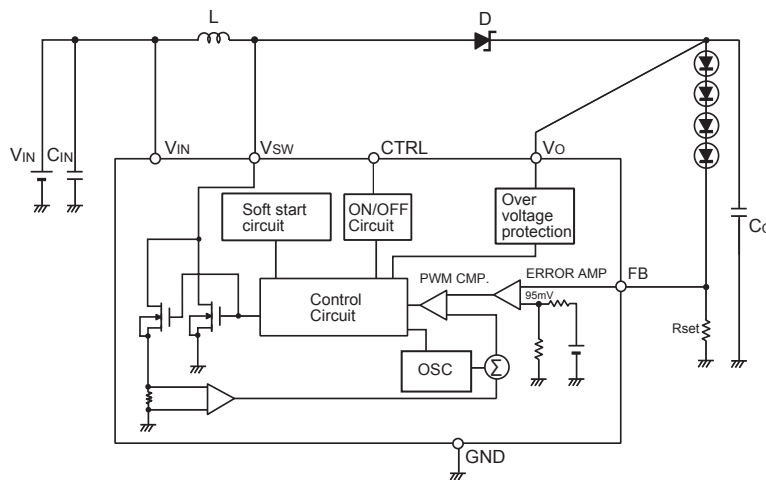
In the absence of confirmation by device specification sheets, SHARP takes no responsibility for any defects that may occur in equipment using any SHARP devices shown in catalogs, data books, etc. Contact SHARP in order to obtain the latest device specification sheets before using any SHARP device.

### Electrical Characteristics

(Unless otherwise specified, condition shall be  $V_{IN}=V_{CTRL}=3.6V, V_o=10V, I_o=20mA, T_a=25^\circ C$ )

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input-output voltage range	$V_{IN}$	-	2.7	-	5.5	V
Overvoltage detecting level	OVP	5pin	26	28	30	V
Overvoltage detecting hysteresis level	OVP(hys)	5pin	-	2	-	V
Quiescent current	$I_q$	Switching, $I_o=0mA$	-	0.8	1.6	mA
Stand-by current	$I_{SD}$	$V_{CTRL}=0V$	-	0.1	1	$\mu A$
Efficiency	$\eta$	3 LEDs	-	90	-	%
<b>Error amplifier</b>						
Reference voltage	$V_{REF}$	-	90.3	95	99.7	mV
FB pin bias current	$I_{FB}$	-	-	30	100	nA
<b>Oscillator</b>						
Oscillation frequency	$f_o$	-	1	1.2	1.4	MHz
Maximum duty	$D_{MAX}$	$V_{IN}=3V$	90	-	-	%
<b>Power switch</b>						
Overcurrent detection level	$I_L$	DUTY=70%, Switching current peak	250	-	-	mA
On-resistance	$R_{ON}$	$I_{sw}=250mA$	-	1.7	2.5	$\Omega$
Leakage current	$I_{LEAK}$	$V_{sw}=28V, V_{IN}=V_{CTRL}=0V$	-	0.05	1	$\mu A$
<b>Control terminal</b>						
ON-state voltage for control	$V_{C(ON)}$	-	1	-	-	V
OFF-state voltage for control	$V_{C(OFF)}$	-	-	-	0.4	V
CTRL pin bias current	$I_{CTRL}$	-	-	-	50	$\mu A$

### Block Diagram



### Example of application

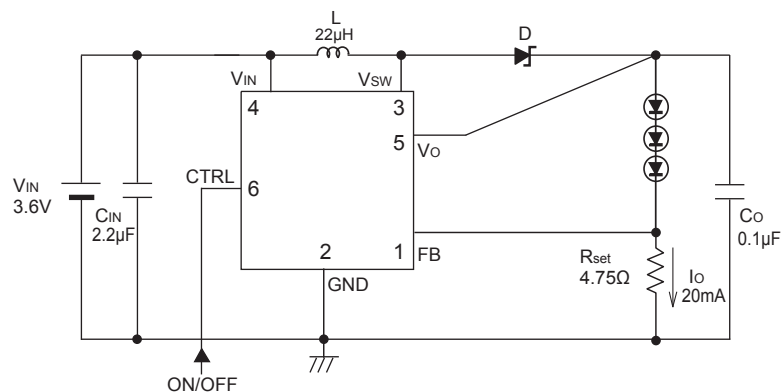
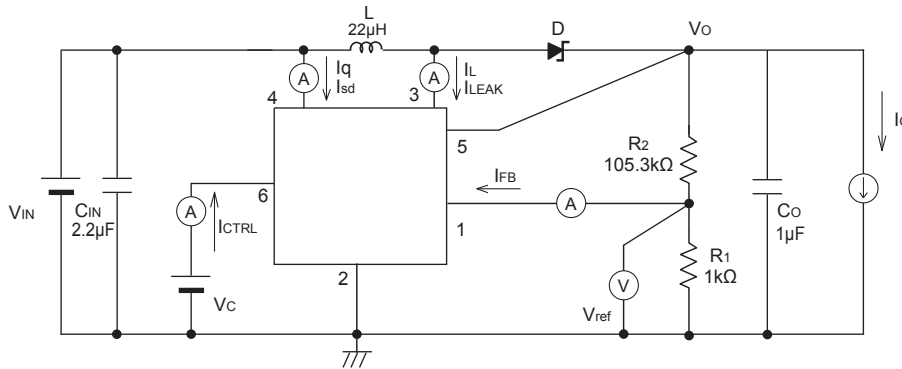


Fig.1 Standard measuring circuit



ON / OFF control logic

4pin	Output
LOW	OFF
HIGH	ON
OPEN	OFF

L:VLP4612(TDK CO.,LTD.)

D:MA2Z720(MATSUSHITA ELECTRIC INDUSTRIAL CO.,LTD)

Fig.2 Power Dissipation vs.Ambient Temperature

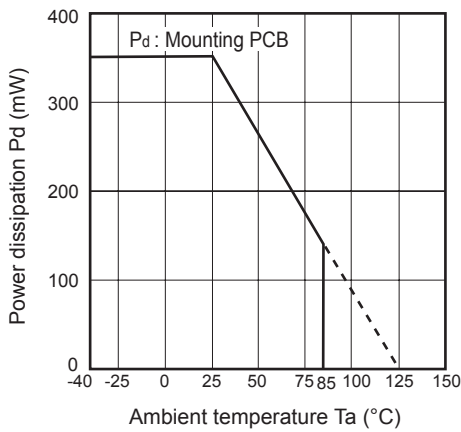


Fig.3 Reference Voltage Fluctuation vs. Junction Temperature

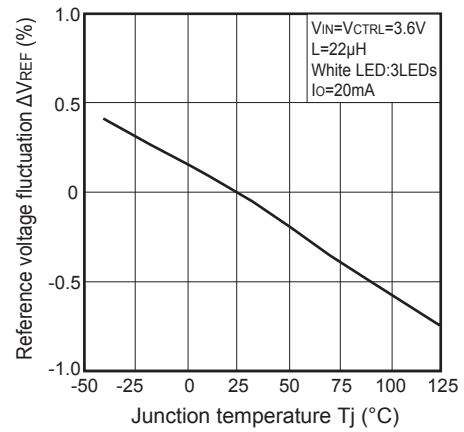


Fig.4 Reference Voltage Fluctuation vs. Input voltage

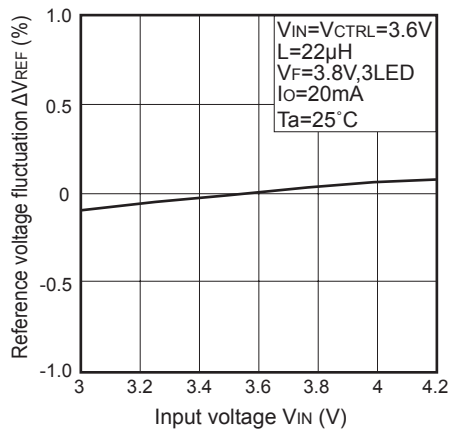


Fig.5 Efficiency vs. LED Current

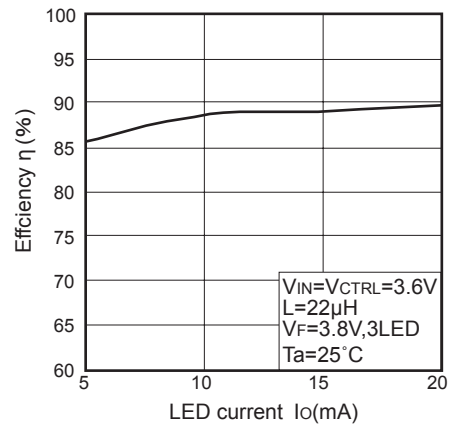


Fig.6 Efficiency vs. Input Voltage

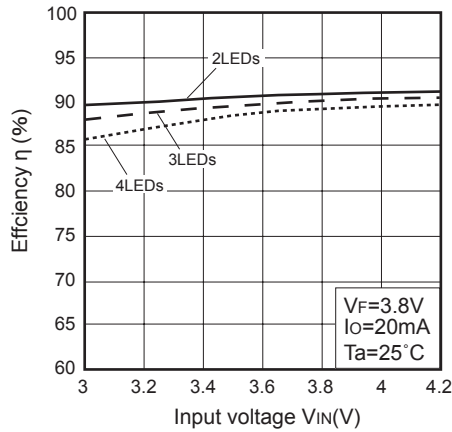


Fig.7 Oscillation Frequency Fluctuation vs. Junction Temperature

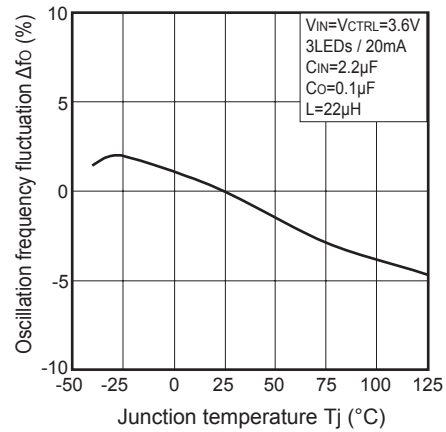


Fig.8 On-Resistance vs. Junction Temperature

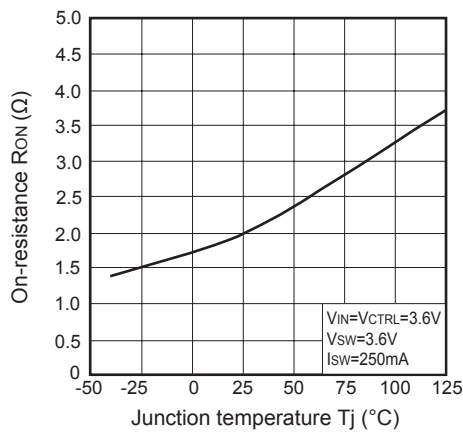
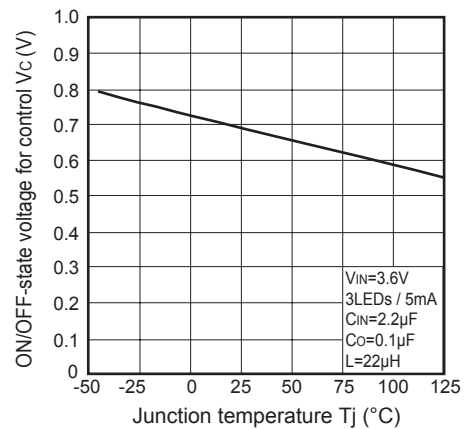


Fig.9 ON/OFF-state Voltage for Control vs. Junction Temperature



### Current-limit

This product monitors the switch current at every cycle and limits the switch current not to exceed the overcurrent detection level.

Please set the white LED current under the maximum LED current shown in the graph indicated below within the range of input voltage ( $V_{IN}$ ) you use.

Fig.10 Use Range of White LED

