ROHM

Structure	Silicon Monolithic Integrated Circuit
Product Name	Flash LED Driver for mobile phone with camera
Type	**BD7700GU**
Features	Flash(300mA max.)/Torch(60mA max.)/Indicate(1mA max.) available for camera. Built-in 3ch high side current driver Automatically transition mode(x1.0, x1.5,x2.0) charge pump type DC/DC converter

○Absolute Maximum Ratings (Ta= 25 °C)

Parameter	Symbol	Rating	Unit	Condition
Maximum applied voltage	VMAX	7.0	V	
Input voltage	Vdin	GND-0.3 ~ VBAT+0.3	V	
Power dissipation	Pd	1062.5	mW	Note1
Operating temperature range	Topr	-30 ~ +85	°C	
Storage temperature range	Tstg	-55 ~ +150	°C	

(Note1) The measurement value which was mounted on the PCB by ROHM.
（50mm x 58mm x 1.75mm glass epoxy Board）
Temperature deleting : 8.5 mW/°C from Ta>25°C

○Operating conditions (Ta= = -30 ~ 85 °C)

Parameter	Symbol	Rating			Unit	Condition
		Min.	Typ.	Max.		
Battery Power Supply voltage	VBAT	2.7	3.6	5.5	V	

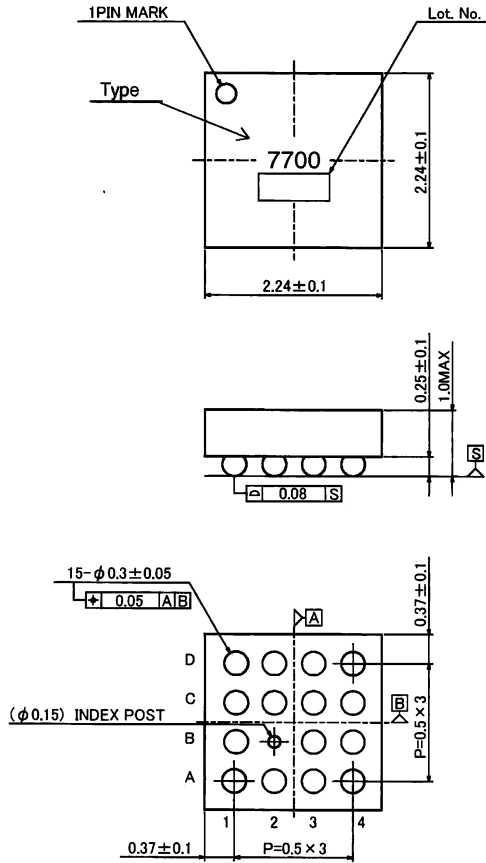This product isn't designed to protect itself against radioactive rays.

○Electrical Characteristics

(Unless otherwise noted, Ta = 25°C, VBAT=3.6V)

Parameter	Symbol	Rating			Units	Condition
		Min.	Typ.	Max.		
Logic control terminal						
Low threshold voltage	VthL	-	-	0.4	V	CNT0 and CNT1 port
High threshold voltage	VthH	1.2	-	VBAT	V	CNT0 and CNT1 port
High level Input current	IinH	-	18.3	33	μA	CNT0 or CNT1 = 5.5V,VBAT=5.5V
Low level Input current	IinL	-1	0	-	μA	CNT0 or CNT1 = 0V
DC/DC Converter						
Quiescent Current	Iq	-	0.1	1.0	μA	CNT0 and CNT1 = '0'
Flash Current Accuracy	Iflash	-15	0	15	%	at 100mA (LED1=3V,LED2,3=2.5V, or LED2=3V,LED1,3=2.5V, or LED3=3V,LED1,2=2.5V)
Torch Current Accuracy	Itorch	-15	0	15	%	at 20mA (LED1=3V,LED2,3=2.5V, or LED2=3V,LED1,3=2.5V, or LED3=3V,LED1,2=2.5V)
Indicate Current Accuracy	Iind	-30	0	30	%	at 1mA, LED2 Terminal(Note2)
Current Consumption 1	Idd1	-	1.0	2.0	mA	x1.0 mode, LED current = 0mA, VLED=3.0V
Current Consumption 2	Idd2	-	6.0	9.0	mA	x1.5 mode, LED current = 0mA, VLED=4.0V
Current Consumption 3	Idd3	-	9.0	12.0	mA	x2.0 mode, LED current = 0mA, VBAT=3.0V, VLED=5.0V
ISET Voltage	Viset	0.5	0.6	0.7	V	RSET= 120kohm
Switching frequency	fsw	1.0	1.25	1.5	MHz	
Sat Voltage	Vsat	150	250	350	mV	Vsat=(VOUT-Max.LED Voltage) (LED2=3V, LED1,3=2.5V)
Over voltage protection	Vovp	5.5	-	-	V	
Under voltage lock-out	Vuvlo	1.8	2.0	2.2	V	VBAT falling edge
Start up time	Tstart	-	-	3	ms	Stand by → Torch,Flash,Indicate (Iflash, Itorch =±15%, Iind =±30%)

(Note2) Indicate mode is able to use LED2 Terminal only.

○External dimensions

1PIN MARK

Lot. No.

Type

7700

2.24±0.1

2.24±0.1

0.25±0.1
1.0MAX

0.08 S

15-φ0.3±0.05

0.05 A B

0.37±0.1

(φ0.15) INDEX POST

P=0.5×3

D
C
B
A

1 2 3 4

0.37±0.1   P=0.5×3

VCSP85H2 (15pin)   (Unit : mm)

○Terminals

PIN	PIN Name	PIN	PIN Name
C4	VBAT	B1	ISET
A2	VBAT	D4	C1P
C2	CNT0	D1	C1N
C3	CNT1	D3	C2P
B4	VOUT	D2	C2N
A4	LED1	C1	GND
A3	LED2	A1	GND
B3	LED3		

○Block diagram

REV. A
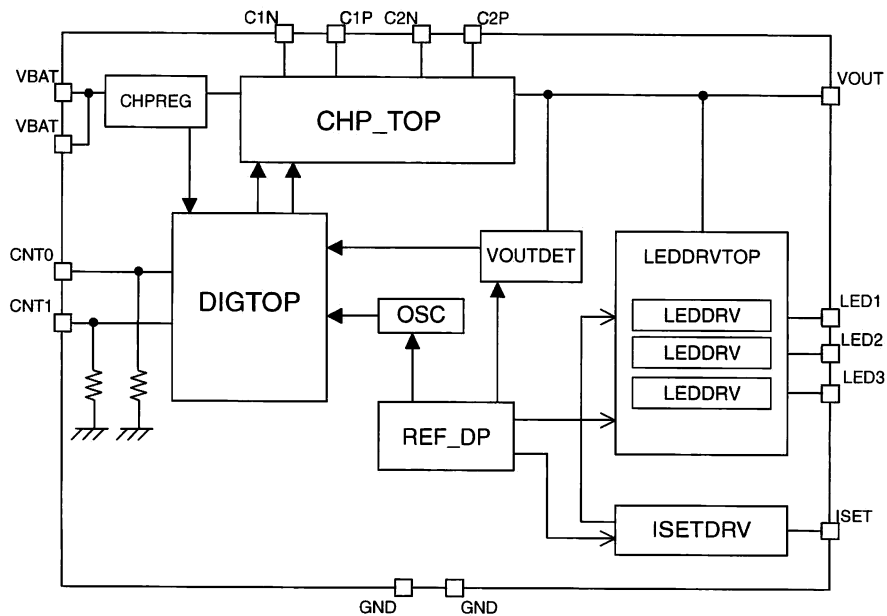
○Cautions on use

(1) Absolute Maximum Ratings

An excess in the absolute maximum ratings, such as supply voltage, temperature range of operating conditions, etc., can break down devices, thus making impossible to identify breaking mode such as a short circuit or an open circuit. If any special mode exceeding the absolute maximum ratings is assumed, consideration should be given to take physical safety measures including the use of fuses, etc.

(2) Power supply and GND line

Design PCB pattern to provide low impedance for the wiring between the power supply and the GND lines. Pay attention to the interference by common impedance of layout pattern when there are plural power supplies and GND lines. Especially, when there are GND pattern for small signal and GND pattern for large current included the external circuits, please separate each GND pattern. Furthermore, for all power supply terminals to ICs, mount a capacitor between the power supply and the GND terminal. At the same time, in order to use a capacitor, thoroughly check to be sure the characteristics of the capacitor to be used present no problem including the occurrence of capacity dropout at a low temperature, thus determining the constant.

(3) GND voltage

Make setting of the potential of the GND terminal so that it will be maintained at the minimum in any operating state. Furthermore, check to be sure no terminals are at a potential lower than the GND voltage including an actual electric transient.

(4) Short circuit between terminals and erroneous mounting

In order to mount ICs on a set PCB, pay thorough attention to the direction and offset of the ICs. Erroneous mounting can break down the ICs. Furthermore, if a short circuit occurs due to foreign matters entering between terminals or between the terminal and the power supply or the GND terminal, the ICs can break down.

(5) Operation in strong electromagnetic field

Be noted that using ICs in the strong electromagnetic field can malfunction them.

(6) Input terminals

In terms of the construction of IC, parasitic elements are inevitably formed in relation to potential. The operation of the parasitic element can cause interference with circuit operation, thus resulting in a malfunction and then breakdown of the input terminal. Therefore, pay thorough attention not to handle the input terminals, such as to apply to the input terminals a voltage lower than the GND respectively, so that any parasitic element will operate. Furthermore, do not apply a voltage to the input terminals when no power supply voltage is applied to the IC. In addition, even if the power supply voltage is applied, apply to the input terminals a voltage lower than the power supply voltage or within the guaranteed value of electrical characteristics.

(7) External capacitor

In order to use a ceramic capacitor as the external capacitor, determine the constant with consideration given to a degradation in the nominal capacitance due to DC bias and changes in the capacitance due to temperature, etc.

(8) Thermal shutdown circuit (TSD)

This LSI builds in a thermal shutdown (TSD) circuit. When junction temperatures become detection temperature or higher, the thermal shutdown circuit operates and turns a switch OFF. The thermal shutdown circuit, which is aimed at isolating the LSI from thermal runaway as much as possible, is not aimed at the protection or guarantee of the LSI. Therefore, do not continuously use the LSI with this circuit operating or use the LSI assuming its operation.

(9) Thermal design

Perform thermal design in which there are adequate margins by taking into account the permissible dissipation (Pd) in actual states of use.

(10) Other cautions on use

Please consult supplementary documents such as technical notebook, function manual and application design guide of this LSI.

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