Structure: Silicon Monolithic Integrated Circuit

Under Development

Product Name: Power supply for CCD camera of mobile phone

Type: **BD6028GU**

Features: A system power supply for the CCD camera module

○Absolute Maximum Ratings (Ta=25 °C)

Parameter	Symbol	Rating	Unit	Condition
Maximum Applied Voltage 1	VMAX1	20(*1)	V	
Maximum Applied Voltage 2	VMAX2	18(*2)	V	
Maximum Applied Voltage 3	VMAX3	15(*3)	V	
Maximum Applied Voltage 4	VMAX4	-13.5(*4)	V	
Power Dissipation	Pd	1938(TBD)	mW	
Operating Temperature Range	Topr	-30 to 85	°C	
Storage Temperature Range	Tstg	-55 to 150	°C	

(*1) SW, VPLUS1, VPLUS2 pin
(*2) VDD3 pin
(*3) VDD4 pin
(*4) Except Note1~Note3 pin
(*5) TBD

○Recommended operating conditions (Ta=-30 to 85 °C)

Parameter	Symbol	Rating			Unit	Condition
		Min.	Typ.	Max.		
VBAT power supply voltage	VBAT	2.7	3.6	4.5	V	
VIO power supply voltage	VIO	1.62	3.0	3.3	V	

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

Status of this document
The Japanese version of this document is the formal specification.
A customer may use this translation version only for a reference to help reading the formal version.
If there are any differences in translation version of this document, formal version takes priority.

Application example
- ROHM cannot provide adequate confirmation of patents.
- The product described in this specification is designed to be used with ordinary electronic equipment or devices (such as audio-visual equipment,
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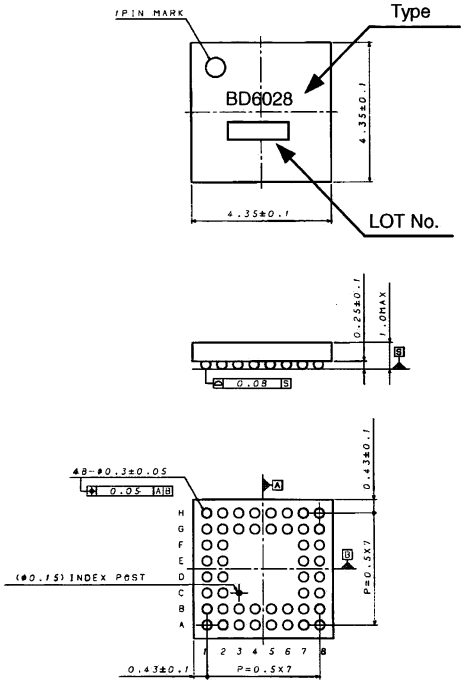
○Electrical Characteristics

Unless otherwise specified, Ta=25 °C, VBAT=3.6V

Parameter	Symbol	Spec			Unit	Condition
		Min.	Typ.	Max.		
Circuit Current						
VBAT Circuit current 1	IBAT1	-	0.1	3.0	μA	RST=0V, VIO=0V
VBAT Circuit current 2	IBAT2	-	0.5	3.0	μA	RST=0V
VBAT Circuit current 3	IBAT3	-	90	135	μA	REG1:ON, Io=0mA
VBAT Circuit current 4	IBAT4	-	90	135	μA	REG2:ON, Io=0mA
VBAT Circuit current 5	IBAT5	-	90	135	μA	REG5:ON, Io=0mA
VBAT Circuit current 6	IBAT6	-	90	135	μA	REG6:ON, Io=0mA
VBAT Circuit current 7	IBAT7	-	90	135	μA	REGA:ON, Io=0mA
VBAT Circuit current 8	IBAT8	-	110	165	μA	REGM:ON, Io=0mA
VBAT Circuit current 9	IBAT9	-	9	14	mA	SWREG3:ON,REG3:ON, SWREG4:ON, Io=0mA
SWREG4 (Inverted DC/DC)						
Output voltage 1	VoPD1	-8.4	-8.0	-7.6	V	Io=100mA
Output voltage 2	VoPD2	-7.9	-7.5	-7.1	V	Io=100mA
Output voltage 3	VoPD3	-7.4	-7.0	-6.6	V	Io=100mA
Output voltage 4	VoPD4	-6.4	-6.0	-5.6	V	Io=100mA
REG1 (1.2V/1.8V/2.5V LDO)						
Output voltage 1	Vo11	1.14	1.2	1.26	V	Io=100mA
Output voltage 2	Vo12	1.74	1.8	1.86	V	Io=100mA
Output voltage 3	Vo13	2.45	2.5	2.55	V	Io=100mA
REG2 (2.8V/3.0V/3.1V/3.3V LDO)						
Output voltage 1	Vo21	2.64	2.7	2.76	V	Io=50mA
Output voltage 2	Vo22	2.94	3.0	3.06	V	Io=50mA
Output voltage 3	Vo23	3.04	3.1	3.16	V	Io=50mA
Output voltage 4	Vo24	3.23	3.3	3.37	V	Io=50mA
REG3 (15.5V/15V/13V/12V LDO)						
Output voltage 1	Vo31	15.05	15.5	15.95	V	Io=60mA
Output voltage 2	Vo32	14.55	15.0	15.45	V	Io=60mA
Output voltage 3	Vo33	12.55	13.0	13.45	V	Io=60mA
Output voltage 4	Vo34	11.55	12.0	12.45	V	Io=60mA
REG5 (1.8V/2.8V/3.0V LDO)						
Output voltage 1	Vo51	1.74	1.8	1.86	V	Io=80mA
Output voltage 2	Vo52	2.74	2.8	2.86	V	Io=80mA
Output voltage 3	Vo53	2.94	3.0	3.06	V	Io=80mA
REG6 (2.7V/3.0V/3.1V/3.3V LDO)						
Output voltage 1	Vo61	2.64	2.7	2.76	V	Io=200mA
Output voltage 2	Vo62	2.94	3.0	3.06	V	Io=200mA
Output voltage 3	Vo63	3.04	3.1	3.16	V	Io=200mA
Output voltage 4	Vo64	3.23	3.3	3.37	V	Io=200mA
REGA (2.8V/3.0V/3.1V/3.3V LDO)						
Output voltage 1	VoA1	2.74	2.8	2.86	V	Io=150mA
Output voltage 2	VoA2	2.94	3.0	3.06	V	Io=150mA
Output voltage 3	VoA3	3.04	3.1	3.16	V	Io=150mA
Output voltage 4	VoA4	3.23	3.3	3.37	V	Io=150mA

○External dimensions

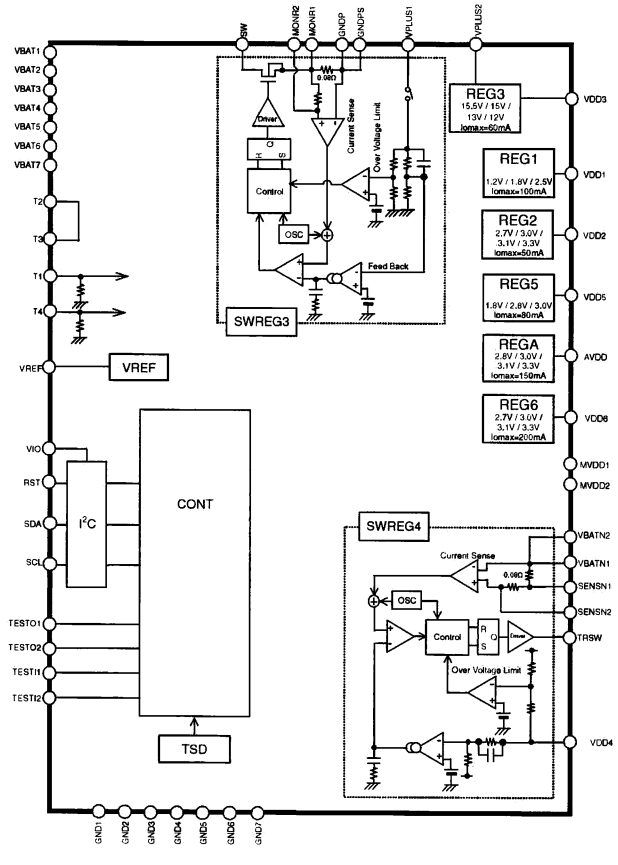


VCSP85H4 (48PIN) (Unit : mm)

○Terminals

PIN	PIN Name	PIN	PIN Name	PIN	PIN Name
A1	T1	D1	VDD2	H1	T4
A2	GND1	D2	SCL	H2	VDD3
A3	VBATN2	D7	VBAT3	H3	VPLUS1
A4	SENSN1	D8	VDD1	H4	GNDP
A5	TRSW	E1	GND7	H5	MONR2
A6	GND2	E2	SDA	H6	SW
A7	VDD4	E7	VREF	H7	GND6
A8	T2	E8	GND5	H8	T3
B1	MVDD2	F1	RST		
B2	MVDD1	F2	VIO		
B3	VBATN1	F7	VBAT4		
B4	SENSN2	F8	VDD5		
B5	VBAT1	G1	TESTI1		
B6	GND3	G2	TESTI2		
B7	TESTO1	G3	VPLUS2		
B8	GND4	G4	GNDPS		
C1	VBAT6	G5	MONR1		
C2	VBAT7	G6	VBAT5		
C7	VBAT2	G7	TESTO2		
C8	VDD6	G8	AVDD		

○Block diagram



○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) LDO

Use each output of LDO by the independence. Don't use under the condition that each output is short-circuited because it has the possibility that a operation becomes unstable.

(11) DC/DC converter

Please select the low DCR inductors to decrease power loss for DC/DC converter.

(12) 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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As of 18th. April 2005