

Super-mini package regulator IC

BAOOOLBSG series

The BAOOOLBSG (the “OOO” indicates the output voltage value) is a low-saturation series regulator IC employing the super-mini mold package of the SMP5 (2916 package). Equipped with a power-saving function that reduces current consumption, it also offers outstanding ripple rejection and characteristics, and is ideal for cellular telephones and other.

●Applications

Residential / industrial device power supplies for cellular telephone such as the CDMA and GSM, and for other portable.

●Features

- 1) Internal output transistor ($I_o=150mA$)
- 2) Internal temperature protection circuit
- 3) Power-saving function enables designs with low current consumption
- 4) High level of ripple rejection (R.R.=66dB)
- 5) SMP5 super-mini package enables space-saving designs
- 6) Low I/O voltage differential (90mV Typ. at $I_o=50mA$)

●Super-mini regulator lineup

Series	Output voltage (V)								
	2.8	2.9	3.0	3.2	3.3	3.6	3.8	4.0	5.0
BAOOOLBSG	○	○	○	○	○	○	○	○	○

* “OOO” indicates the output voltage value. (Example : For 2.8V output, BA028LBSG)

●Absolute maximum ratings ($T_a=25^{\circ}C$)

Parameter	Symbol	Limits	Unit
Applid voltage	Vcc	9	V
Power dissipation	Pd	170*	mW
Operating temperature	Topr	-40~+85	°C
Storage temperature	Tstg	-55~+125	°C

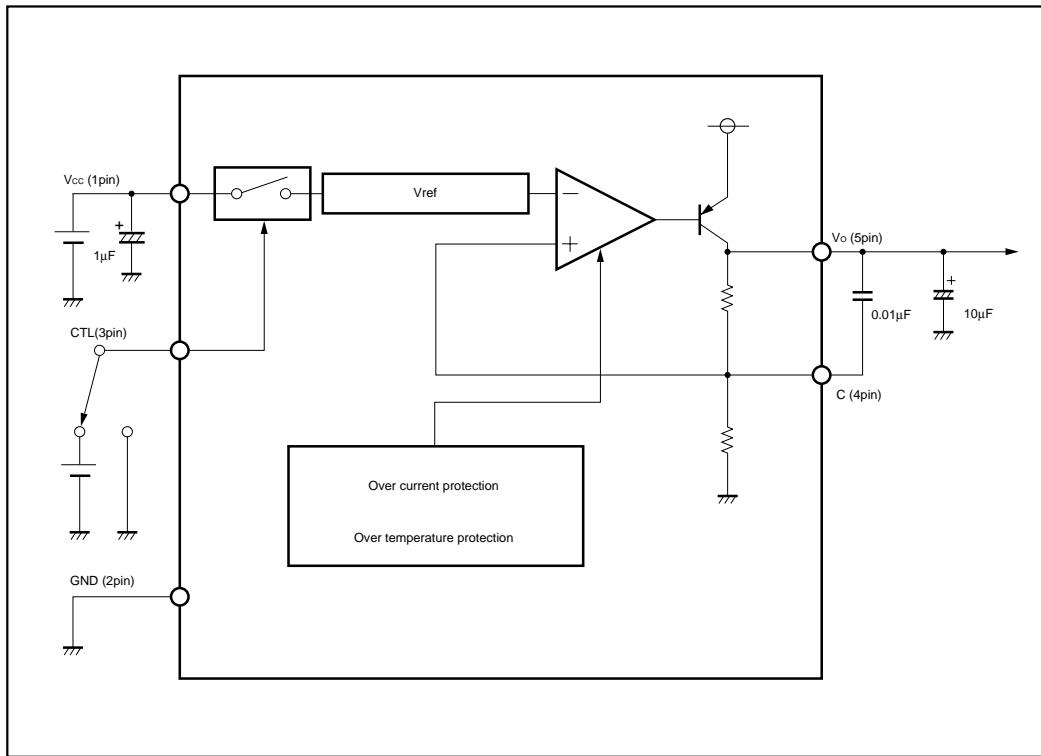
* Reduced by 1.7mW for each increase in T_a of 1°C over 25°C

●Recommended operating conditions ($T_a=25^{\circ}C$)

Parameter	Symbol	Limits	Unit
Operating power supply voltage	Vcc (input)	2.5~7.0	V

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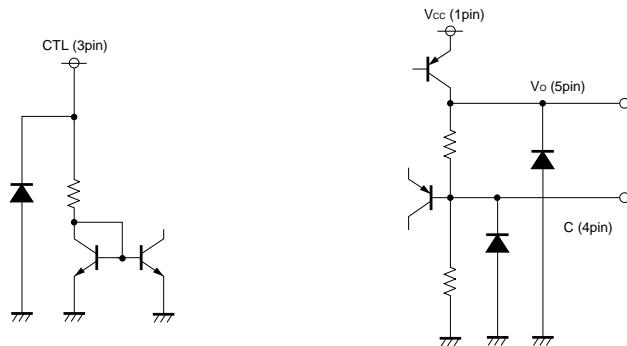
● Block diagram



● Pin descriptions

Pin No.	Pin name	Function
1	Vcc	Power supply
2	GND	Ground
3	CTL	Power-save function
4	C	Ripple improvement
5	OUT	Output

● Input / output circuits



BAOOOLBSG series

Regulator IC

●Electrical characteristics

BA028LBSG (unless otherwise noted, Ta=25°C, Vcc=3.8V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Standby current	Iccs	-	0	10	µA	Vctl=0V
Circuit current	Icca	-	65	150	µA	Vctl=3V, no output load
<Output block>						
Output voltage	Vo	2.73	2.80	2.87	V	Io=50mA*1
Dropout voltage	ΔVd	-	90	150	mV	Io=50mA, Vcc=0.95Vo
Output current capability	Io	150	280	-	mA	-
Load regulation	Reg.L	-	40	80	mV	Io=1~50mA*1
Input regulation	Reg.I	-	3	30	mV	Io=10mA, Vcc=3.8~7V*1
Output noise voltage	en	-	56	-	µV	Io=10mA, C=0.01µF*2
Ripple rejection 1	R.R1	50	58	-	dB	Io=10mA, f=400Hz
Ripple rejection 2	R.R2	-	66	-	dB	Io=10mA, f=400Hz, C=0.01µF*2
<Power-save block>						
CTL OFF voltage	Voff	-	-	0.6	V	-
CTL ON voltage	Von	2.4	-	-	V	-
CTL inflow current	Ictl	-	6.0	15	µA	Vctl=3V

* In order to measure at Ta=Tj (pulse measurement), fluctuations in output resulting from temperature fluctuations are not included.

* Design guaranteed. (Not all products have been inspected.)

A capacitor (0.01µF) is used between pin 4 and pin 5, to improve ripple rejection.

◎Not designed for radiation resistance.

BA029LBSG (unless otherwise noted, Ta=25°C, Vcc=3.9V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Standby current	Iccs	-	0	10	µA	Vctl=0V
Circuit current	Icca	-	65	150	µA	Vctl=3V, no output load
<Output block>						
Output voltage	Vo	2.828	2.90	2.973	V	Io=50mA*1
Dropout voltage	ΔVd	-	90	150	mV	Io=50mA, Vcc=0.95Vo
Output current capability	Io	150	280	-	mA	-
Load regulation	Reg.L	-	40	80	mV	Io=1~50mA*1
Input regulation	Reg.I	-	3	30	mV	Vcc=3.9~7V
Output noise voltage	en	-	56	-	µV	Io=10mA, C=0.01µF*2
Ripple rejection 1	R.R1	45	58	-	dB	Io=10mA, f=400Hz
Ripple rejection 2	R.R2	-	66	-	dB	Io=10mA, f=400Hz, C=0.01µF*2
<Power-save block>						
CTL OFF voltage	Voff	-	-	0.6	V	-
CTL ON voltage	Von	2.4	-	-	V	-
CTL inflow current	Ictl	-	6.0	15	µA	Vctl=3V

* In order to measure at Ta=Tj (pulse measurement), fluctuations in output resulting from temperature fluctuations are not included.

* Design guaranteed. (Not all products have been inspected.)

A capacitor (0.01µF) is used between pin 4 and pin 5, to improve ripple rejection.

◎Not designed for radiation resistance.

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BAOOOLBSG series

Regulator IC

BA030LBSG (unless otherwise noted, Ta=25°C, Vcc=4.0V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Coniditions
Standby current	Iccs	-	0	10	µA	Vctl=0V
Circuit current	Icca	-	65	150	µA	Vctl=3V, no output load
<Output block>						
Output voltage	Vo	2.925	3.00	3.075	V	Io=50mA*1
Dropout voltage	ΔVd	-	90	150	mV	Io=50mA, Vcc=0.95Vo
Output current capability	Io	150	280	-	mA	-
Load regulation	Reg.L	-	40	80	mV	Io=1~50mA*1
Input regulation	Reg.I	-	3	30	mV	Io=10mA, Vcc=4.0~7V*1
Output noise voltage	en	-	56	-	µV	Io=10mA, C=0.01µF*2
Ripple rejection 1	R.R1	50	58	-	dB	Io=10mA, f=400Hz
Ripple rejection 2	R.R2	-	66	-	dB	Io=10mA, f=400Hz, C=0.01µF*2
<Power-save block>						
CTL OFF voltage	Voff	-	-	0.6	V	-
CTL ON voltage	Von	2.4	-	-	V	-
CTL inflow current	Ictl	-	6.0	15	µA	Vctl=3V

* In order to measure at Ta=Tj (pulse measurement), fluctuations in output resulting from temperature fluctuations are not included.

* Design guaranteed. (Not all products have been inspected.)

A capacitor (0.01µF) is used between pin 4 and pin 5, to improve ripple rejection.

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BA032LBSG (unless otherwise noted, Ta=25°C, Vcc=4.2V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Coniditions
Standby current	Iccs	-	0	10	µA	Vctl=0V
Circuit current	Icca	-	65	150	µA	Vctl=3V, no output load
<Output block>						
Output voltage	Vo	3.12	3.20	3.28	V	Io=50mA*1
Dropout voltage	ΔVd	-	90	150	mV	Io=50mA, Vcc=0.95Vo
Output current capability	Io	150	280	-	mA	-
Load regulation	Reg.L	-	40	80	mV	Io=1~50mA*1
Input regulation	Reg.I	-	3	30	mV	Io=10mA, Vcc=4.2~7V*1
Output noise voltage	en	-	56	-	µV	Io=10mA, C=0.01µF*2
Ripple rejection 1	R.R1	50	58	-	dB	Io=10mA, f=400Hz
Ripple rejection 2	R.R2	-	66	-	dB	Io=10mA, f=400Hz, C=0.01µF*2
<Power-save block>						
CTL OFF voltage	Voff	-	-	0.6	V	-
CTL ON voltage	Von	2.4	-	-	V	-
CTL inflow current	Ictl	-	6.0	15	µA	Vctl=3V

* In order to measure at Ta=Tj (pulse measurement), fluctuations in output resulting from temperature fluctuations are not included.

* Design guaranteed. (Not all products have been inspected.)

A capacitor (0.01µF) is used between pin 4 and pin 5, to improve ripple rejection.

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BAOOOLBSG series

Regulator IC

BA033LBSG (unless otherwise noted, Ta=25°C, Vcc=4.3V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Coniditions
Standby current	Iccs	-	0	10	µA	Vctl=0V
Circuit current	Icca	-	65	150	µA	Vctl=3V, no output load
<Output block>						
Output voltage	Vo	3.218	3.30	3.382	V	Io=50mA*1
Dropout voltage	ΔVd	-	90	150	mV	Io=50mA, Vcc=0.95Vo
Output current capability	Io	150	280	-	mA	-
Load regulation	Reg.L	-	40	80	mV	Io=1~50mA*1
Input regulation	Reg.I	-	3	30	mV	Vcc=4.3~7V
Output noise voltage	en	-	56	-	µV	Io=10mA, C=0.01µF*2
Ripple rejection 1	R.R1	45	58	-	dB	Io=10mA, f=400Hz
Ripple rejection 2	R.R2	-	66	-	dB	Io=10mA, f=400Hz, C=0.01µF*2
<Power-save block>						
CTL OFF voltage	Voff	-	-	0.6	V	-
CTL ON voltage	Von	2.4	-	-	V	-
CTL inflow current	Ictl	-	6.0	15	µA	Vctl=3V

* In order to measure at Ta=Tj (pulse measurement), fluctuations in output resulting from temperature fluctuations are not included.

* Design guaranteed. (Not all products have been inspected.)

A capacitor (0.01µF) is used between pin 4 and pin 5, to improve ripple rejection.

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BA036LBSG (unless otherwise noted, Ta=25°C, Vcc=4.6V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Coniditions
Standby current	Iccs	-	0	10	µA	Vctl=0V
Circuit current	Icca	-	65	150	µA	Vctl=3V, no output load
<Output block>						
Output voltage	Vo	3.51	3.60	3.69	V	Io=50mA*1
Dropout voltage	ΔVd	-	90	150	mV	Io=50mA, Vcc=0.95Vo
Output current capability	Io	150	280	-	mA	-
Load regulation	Reg.L	-	40	80	mV	Io=1~50mA*1
Input regulation	Reg.I	-	3	30	mV	Vcc=4.6~7V
Output noise voltage	en	-	56	-	µV	Io=10mA, C=0.01µF*2
Ripple rejection 1	R.R1	45	56	-	dB	Io=10mA, f=400Hz
Ripple rejection 2	R.R2	-	66	-	dB	Io=10mA, f=400Hz, C=0.01µF*2
<Power-save block>						
CTL OFF voltage	Voff	-	-	0.6	V	-
CTL ON voltage	Von	2.4	-	-	V	-
CTL inflow current	Ictl	-	6.0	15	µA	Vctl=3V

* In order to measure at Ta=Tj (pulse measurement), fluctuations in output resulting from temperature fluctuations are not included.

* Design guaranteed. (Not all products have been inspected.)

A capacitor (0.01µF) is used between pin 4 and pin 5, to improve ripple rejection.

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BAOOOLBSG series

Regulator IC

BA038LBSG (unless otherwise noted, Ta=25°C, Vcc=4.8V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Coniditions
Standby current	Iccs	-	0	10	µA	Vctl=0V
Circuit current	Icca	-	65	150	µA	Vctl=3V, no output load
<Output block>						
Output voltage	Vo	3.705	3.80	3.895	V	Io=50mA*1
Dropout voltage	ΔVd	-	90	150	mV	Io=50mA, Vcc=0.95Vo
Output current capability	Io	150	280	-	mA	-
Load regulation	Reg.L	-	40	80	mV	Io=1~50mA*1
Input regulation	Reg.I	-	3	30	mV	Io=10mA, Vcc=4.8~7V*1
Output noise voltage	en	-	56	-	µV	Io=10mA, C=0.01µF*2
Ripple rejection 1	R.R1	50	56	-	dB	Io=10mA, f=400Hz
Ripple rejection 2	R.R2	-	66	-	dB	Io=10mA, f=400Hz, C=0.01µF*2
<Power-save block>						
CTL OFF voltage	Voff	-	-	0.6	V	-
CTL ON voltage	Von	2.4	-	-	V	-
CTL inflow current	Ictl	-	6.0	15	µA	Vctl=3V

* In order to measure at Ta=Tj (pulse measurement), fluctuations in output resulting from temperature fluctuations are not included.

* Design guaranteed. (Not all products have been inspected.)

A capacitor (0.01µF) is used between pin 4 and pin 5, to improve ripple rejection.

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BA040LBSG (unless otherwise noted, Ta=25°C, Vcc=5.0V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Coniditions
Standby current	Iccs	-	0	10	µA	Vctl=0V
Circuit current	Icca	-	65	150	µA	Vctl=3V, no output load
<Output block>						
Output voltage	Vo	3.90	4.00	4.10	V	Io=50mA*1
Dropout voltage	ΔVd	-	90	150	mV	Io=50mA, Vcc=0.95Vo
Output current capability	Io	150	280	-	mA	-
Load regulation	Reg.L	-	40	80	mV	Io=1~50mA*1
Input regulation	Reg.I	-	3	30	mV	Vcc=5.0~7V
Output noise voltage	en	-	56	-	µV	Io=10mA, C=0.01µF*2
Ripple rejection 1	R.R1	45	56	-	dB	Io=10mA, f=400Hz
Ripple rejection 2	R.R2	-	66	-	dB	Io=10mA, f=400Hz, C=0.01µF*2
<Power-save block>						
CTL OFF voltage	Voff	-	-	0.6	V	-
CTL ON voltage	Von	2.4	-	-	V	-
CTL inflow current	Ictl	-	6.0	15	µA	Vctl=3V

* In order to measure at Ta=Tj (pulse measurement), fluctuations in output resulting from temperature fluctuations are not included.

* Design guaranteed. (Not all products have been inspected.)

A capacitor (0.01µF) is used between pin 4 and pin 5, to improve ripple rejection.

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BAOOOLBSG series

Regulator IC

BA050LBSG (unless otherwise noted, Ta=25°C, Vcc=6.0V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Standby current	Iccs	-	0	10	µA	Vctl=0V
Circuit current	Icca	-	65	150	µA	Vctl=3V, no output load
<Output block>						
Output voltage	Vo	4.875	5.00	5.125	V	Io=50mA*1
Dropout voltage	ΔVd	-	90	150	mV	Io=50mA, Vcc=0.95Vo
Output current capability	Io	150	280	-	mA	-
Load regulation	Reg.L	-	40	80	mV	Io=1~50mA*1
Input regulation	Reg.I	-	3	30	mV	Vcc=6.0~7V
Output noise voltage	en	-	56	-	µV	Io=10mA, C=0.01µF*2
Ripple rejection 1	R.R1	45	54	-	dB	Io=10mA, f=400Hz
Ripple rejection 2	R.R2	-	66	-	dB	Io=10mA, f=400Hz, C=0.01µF*2
<Power-save block>						
CTL OFF voltage	Voff	-	-	0.6	V	-
CTL ON voltage	Von	2.4	-	-	V	-
CTL inflow current	Ictl	-	6.0	15	µA	Vctl=3V

* In order to measure at Ta=Tj (pulse measurement), fluctuations in output resulting from temperature fluctuations are not included.

* Design guaranteed. (Not all products have been inspected.)

A capacitor (0.01µF) is used between pin 4 and pin 5, to improve ripple rejection.

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●Application example

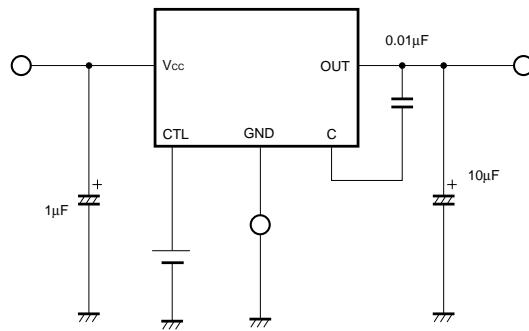
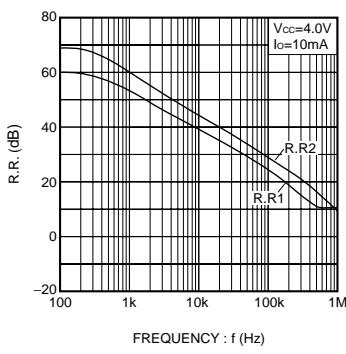
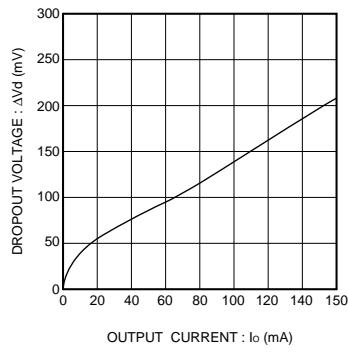
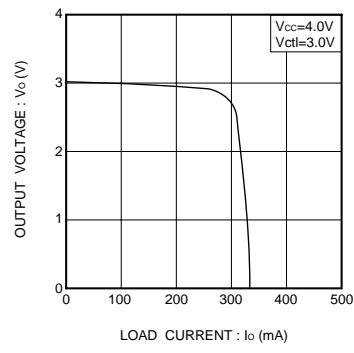
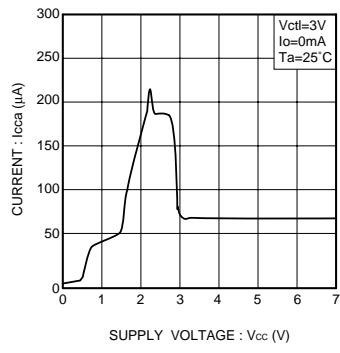
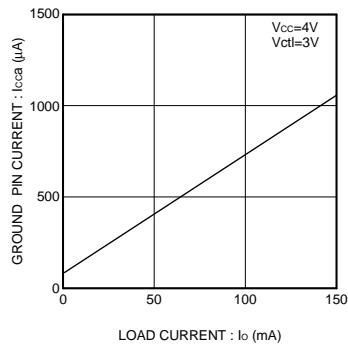


Fig.1

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Regulator IC

● Electrical characteristic curves (BAO30LBSG)



● External dimensions (Units : mm)

