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	○	○	○	○	○	○	○	○	○

∗ "○○○" indicates the output voltage value. (Example : For 2.8V output, BA028LBSG)

●Absolute maximum ratings (Ta=25°C)

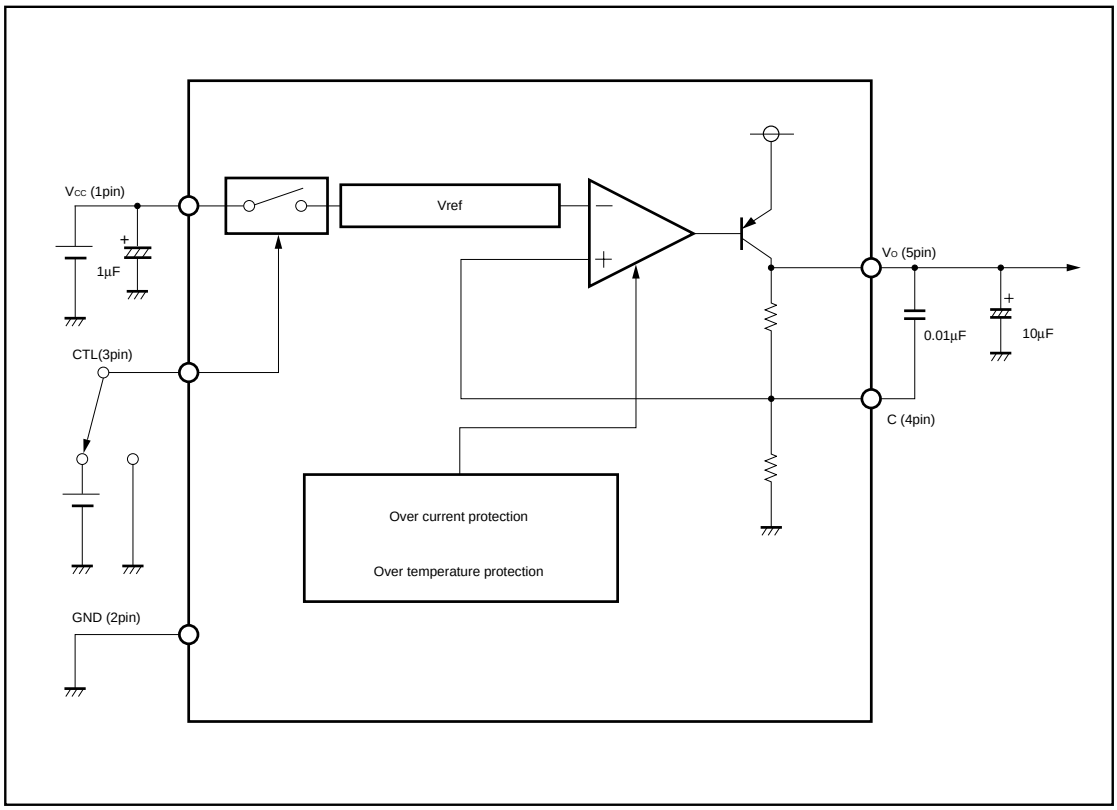
Parameter	Symbol	Limits	Unit
Applid voltage	Vcc	9	V
Power dissipation	Pd	170∗	mW
Operating temperature	Topr	−40~+85	°C
Storage temperature	Tstg	−55~+125	°C

∗ Reduced by 1.7mW for each increase in Ta of 1°C over 25°C

●Recommended operating conditions (Ta=25°C)

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

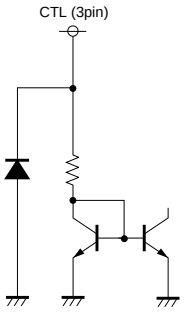
●**Block diagram**

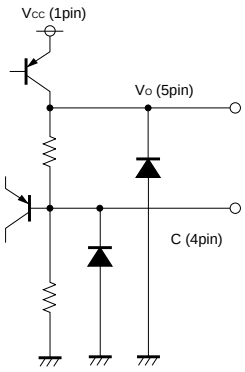


●**Pin descriptions**

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

●**Input / output circuits**





●**Electrical characteristics**

BA028LBSG (unless otherwise noted, Ta=25°C, V_{CC}=3.8V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Coniditions
Standby current	I_{CCS}	-	0	10	μA	Vctl=0V
Circuit current	I_{CCa}	-	65	150	μA	Vctl=3V, no output load
<Output block>						
Output voltage	V_O	2.73	2.80	2.87	V	Io=50mA*1
Dropout voltage	ΔVd	-	90	150	mV	Io=50mA, Vcc=0.95Vo
Output current capability	I_O	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, V_{CC}=3.9V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Coniditions
Standby current	I_{CCS}	-	0	10	μA	Vctl=0V
Circuit current	I_{CCa}	-	65	150	μA	Vctl=3V, no output load
<Output block>						
Output voltage	V_O	2.828	2.90	2.973	V	Io=50mA*1
Dropout voltage	ΔVd	-	90	150	mV	Io=50mA, Vcc=0.95Vo
Output current capability	I_O	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.

BA030LBSG (unless otherwise noted, Ta=25°C, V_{CC}=4.0V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Coniditions
Standby current	I_{CCS}	-	0	10	μA	Vctl=0V
Circuit current	I_{CCa}	-	65	150	μA	Vctl=3V, no output load
<Output block>						
Output voltage	V_O	2.925	3.00	3.075	V	Io=50mA*1
Dropout voltage	ΔVd	-	90	150	mV	Io=50mA, Vcc=0.95Vo
Output current capability	I_O	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.
◎Not designed for radiation resistance.

BA032LBSG (unless otherwise noted, Ta=25°C, V_{CC}=4.2V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Coniditions
Standby current	I_{CCS}	-	0	10	μA	Vctl=0V
Circuit current	I_{CCa}	-	65	150	μA	Vctl=3V, no output load
<Output block>						
Output voltage	V_O	3.12	3.20	3.28	V	Io=50mA*1
Dropout voltage	ΔVd	-	90	150	mV	Io=50mA, Vcc=0.95Vo
Output current capability	I_O	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.
◎Not designed for radiation resistance.

BA033LBSG (unless otherwise noted, Ta=25°C, V_{CC}=4.3V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Coniditions
Standby current	I_{CCS}	-	0	10	μA	Vctl=0V
Circuit current	I_{CCa}	-	65	150	μA	Vctl=3V, no output load
<Output block>						
Output voltage	V_O	3.218	3.30	3.382	V	Io=50mA*1
Dropout voltage	ΔVd	-	90	150	mV	Io=50mA, Vcc=0.95Vo
Output current capability	I_O	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.
◎Not designed for radiation resistance.

BA036LBSG (unless otherwise noted, Ta=25°C, V_{CC}=4.6V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Coniditions
Standby current	I_{CCS}	-	0	10	μA	Vctl=0V
Circuit current	I_{CCa}	-	65	150	μA	Vctl=3V, no output load
<Output block>						
Output voltage	V_O	3.51	3.60	3.69	V	Io=50mA*1
Dropout voltage	ΔVd	-	90	150	mV	Io=50mA, Vcc=0.95Vo
Output current capability	I_O	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.
◎Not designed for radiation resistance.

BA038LBSG (unless otherwise noted, Ta=25°C, V_{CC}=4.8V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Coniditions
Standby current	I_{CCS}	-	0	10	μA	Vctl=0V
Circuit current	I_{CCa}	-	65	150	μA	Vctl=3V, no output load
<Output block>						
Output voltage	V_O	3.705	3.80	3.895	V	Io=50mA*1
Dropout voltage	ΔVd	-	90	150	mV	Io=50mA, Vcc=0.95Vo
Output current capability	I_O	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.
◎Not designed for radiation resistance.

BA040LBSG (unless otherwise noted, Ta=25°C, V_{CC}=5.0V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Coniditions
Standby current	I_{CCS}	-	0	10	μA	Vctl=0V
Circuit current	I_{CCa}	-	65	150	μA	Vctl=3V, no output load
<Output block>						
Output voltage	V_O	3.90	4.00	4.10	V	Io=50mA*1
Dropout voltage	ΔVd	-	90	150	mV	Io=50mA, Vcc=0.95Vo
Output current capability	I_O	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.
◎Not designed for radiation resistance.

BA050LBSG (unless otherwise noted, Ta=25°C, V_{CC}=6.0V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Coniditions
Standby current	I_{CCS}	-	0	10	μA	Vctl=0V
Circuit current	I_{CCa}	-	65	150	μA	Vctl=3V, no output load
<Output block>						
Output voltage	V_O	4.875	5.00	5.125	V	Io=50mA*1
Dropout voltage	ΔVd	-	90	150	mV	Io=50mA, Vcc=0.95Vo
Output current capability	I_O	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.
◎Not designed for radiation resistance.

●Application example

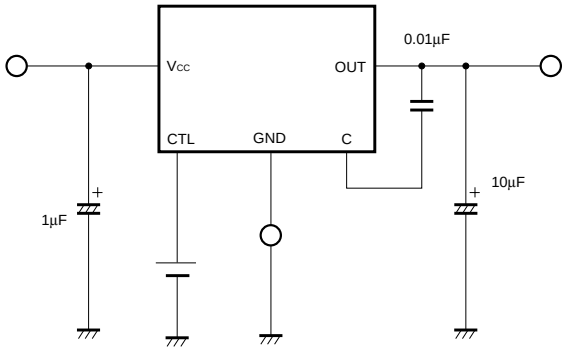


Fig.1

●**Electrical characteristic curves** (BA030LBSG)

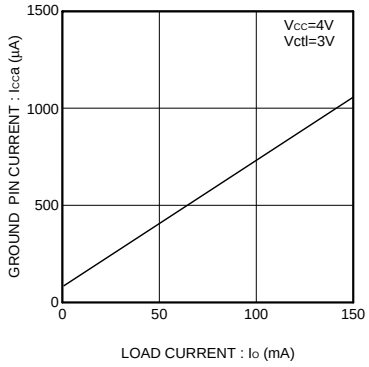


Fig.2 Icc vs. Io

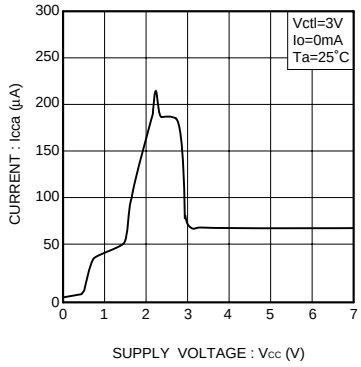


Fig.3 Icca vs. Vcc

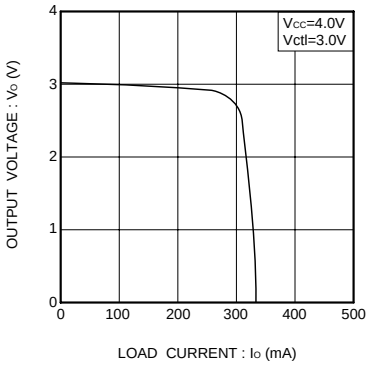


Fig.4 Io vs. Vo

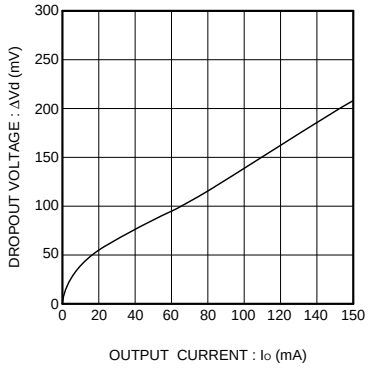


Fig.5 ΔV vs. Io

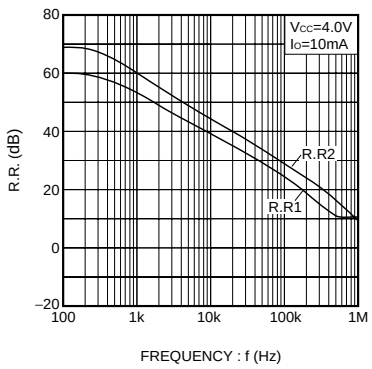
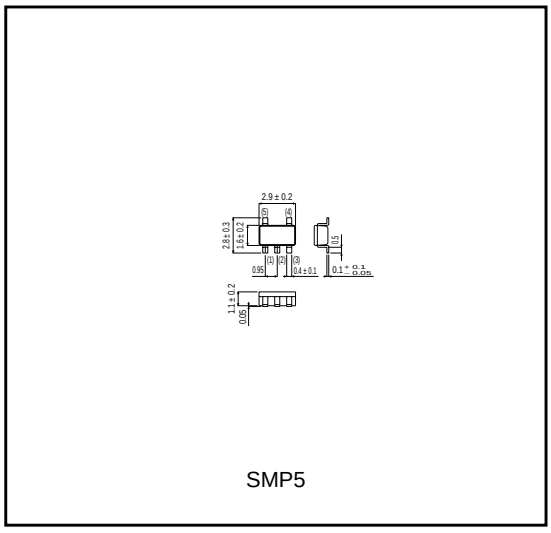


Fig.6 R.R. vs. f characteristics

●**External dimensions** (Units : mm)



SMP5

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