Super-mini package regulator IC

BA○○○LBSG series

The BA○○○LBSG (the "○○○" 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 other characteristics, and is ideal for cellular telephones and other compact telephones.

●Applications

Residential / industrial device power supplies for cellular telephones such as the CDMA and GSM, and for other portable communication devices

●Features

1) Internal output transistor (Io = 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 Io = 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
BA○○○LBSG	○	○	○	○	○	☆	○	☆	☆

* "○○○" indicates the output voltage value. (Example: For 2.8V output, BA028LBSG)
A star indicates a product under development.

●Absolute maximum ratings (Ta = 25°C)

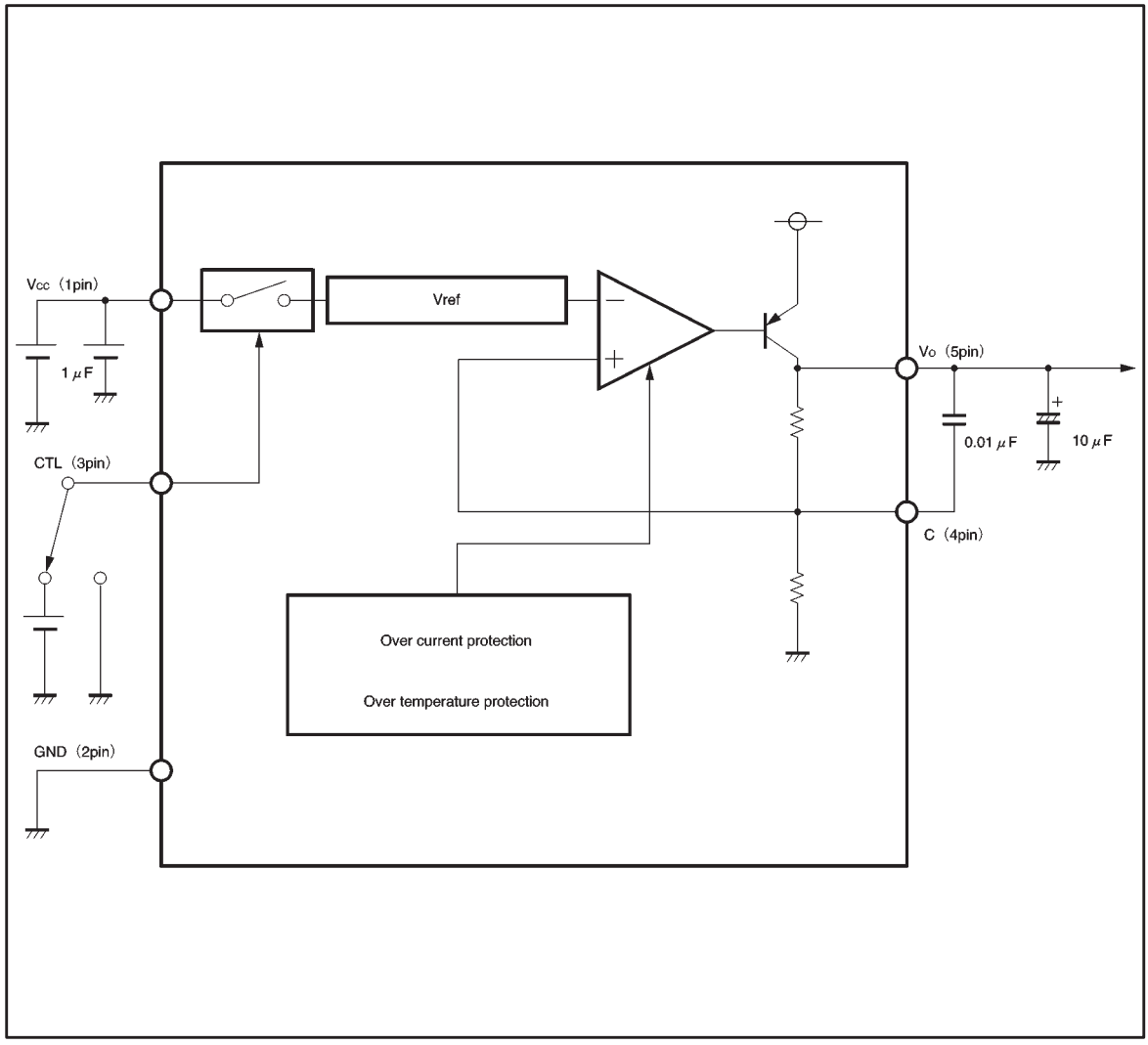
Parameter	Symbol	Limits	Unit
Applid voltage	Vcc	9	V
Power dissipation	Pd	170*	mW
Operating temperature	Topr	−40～+85	℃
Storage temperature	Tstg	−55～+125	℃

* Reduced by 1.7mW for each increase in Ta of 1℃ over 25℃

●Recommended operating conditions (Ta = 25°C)

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

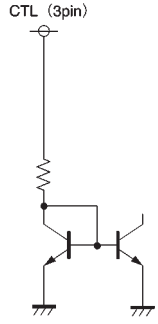
●Block diagram

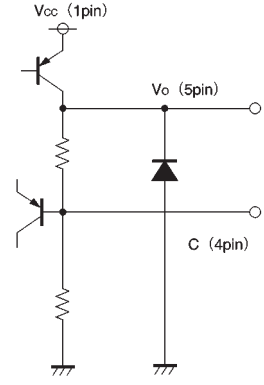


●Pin descriptions

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	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	—	nV	Io=10mA, C=0.01 μF*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=0.01 μF*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

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

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

A capacitor (0.01 μ F) 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	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	—	nV	Io=10mA, C=0.01 μF*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=0.01 μF*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

*1 In order to measure at Ta ≒ Tj (pulse measurement), fluctuations in output resulting from temperature fluctuations are not included.
*2 Design guaranteed. (Not all products have been inspected.)
A capacitor (0.01 μ F) 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	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	—	nV	Io=10mA, C=0.01 μF*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=0.01 μF*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

*1 In order to measure at Ta ≒ Tj (pulse measurement), fluctuations in output resulting from temperature fluctuations are not included.
*2 Design guaranteed. (Not all products have been inspected.)
A capacitor (0.01 μ F) 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	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	—	nV	Io=10mA, C=0.01 μF*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=0.01 μF*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

*1 In order to measure at Ta ≒ Tj (pulse measurement), fluctuations in output resulting from temperature fluctuations are not included.
*2 Design guaranteed. (Not all products have been inspected.)
A capacitor (0.01 μ F) is used between pin 4 and pin 5, to improve ripple rejection.
◎Not designed for radiation resistance.

●Application example

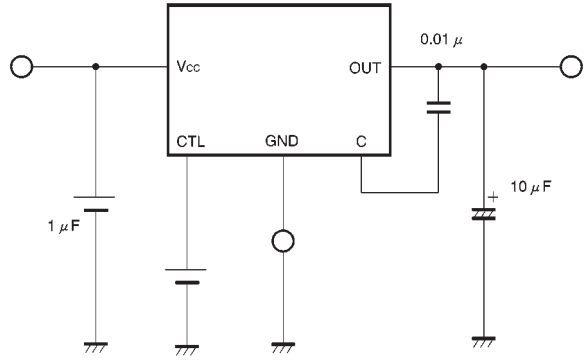


Fig.1

●Electrical characteristic curves (BA030LBSG)

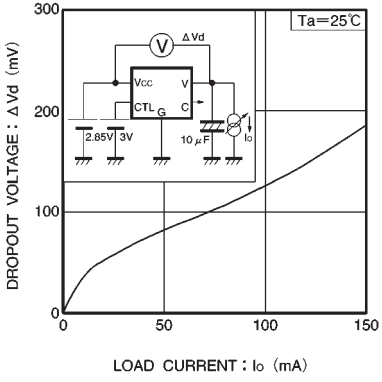


Fig.2 ΔVd vs. Io

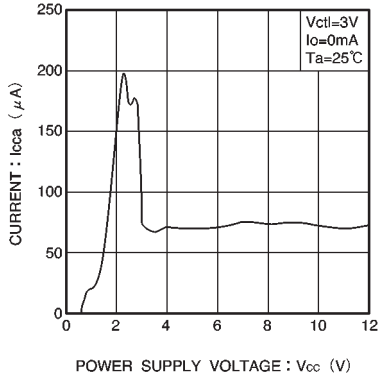


Fig.3 Icca vs. Vcc

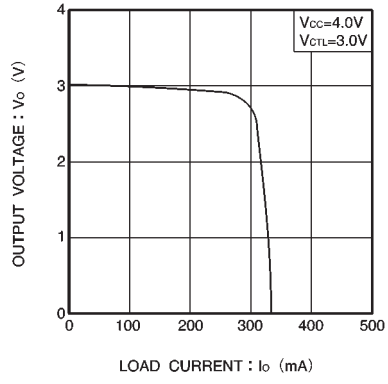


Fig.4 Io vs. Vo

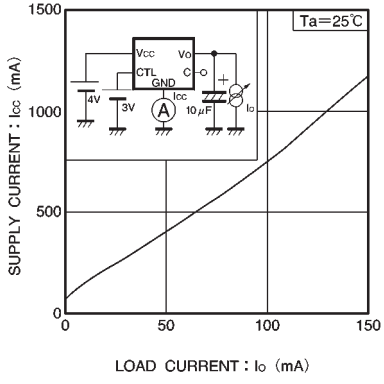


Fig.5 Icc vs. Io

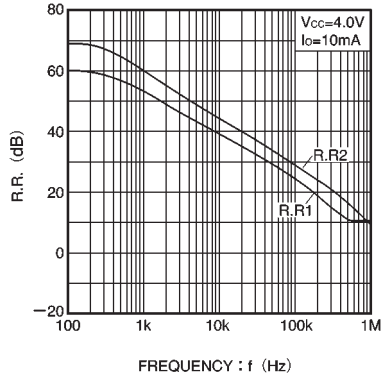
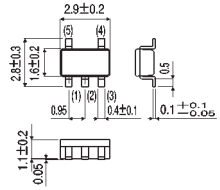


Fig.6 R.R. vs. f characteristics

●External dimensions (Units: mm)



SMP5