Low saturation voltage type regulator with ON / OFF switch
BA○○ST series

The BA○○ST series are variable, fixed output low drop-out type voltage regulators with an ON / OFF switch. These regulators are used to provide a stabilized output voltage from a fluctuating DC input voltage.

Fixed output voltages are 3V∗, 3.3V, 5V, 6V∗ 7V, 8V, 9V, 10V, 12V, and 15V∗. The maximum current capacity is 1A for each of the above voltages. (Items marked with an asterisk are under development.)

●Applications
Constant voltage power supply

●Features
1) Built-in overvoltage protection circuit, overcurrent protection circuit and thermal shutdown circuit.
2) TO220FP-5 package can be used in wide range of applications.
3) 0μA (design value) circuit current when switch is off.
4) Richly diverse lineup.
5) Low minimum I / O voltage differential.

●Product codes

Output voltage (V)	Product No.	Output voltage (V)	Product No.
Variable	BA00ST∗	8.0	BA08ST
3.0	BA03ST ∗	9.0	BA09ST
3.3	BA033ST	10.0	BA10ST
5.0	BA05ST	12.0	BA12ST
6.0	BA06ST ∗	15.0	BA15ST ∗
7.0	BA07ST		

∗ Under development.

●Absolute maximum ratings (Ta = 25°C)

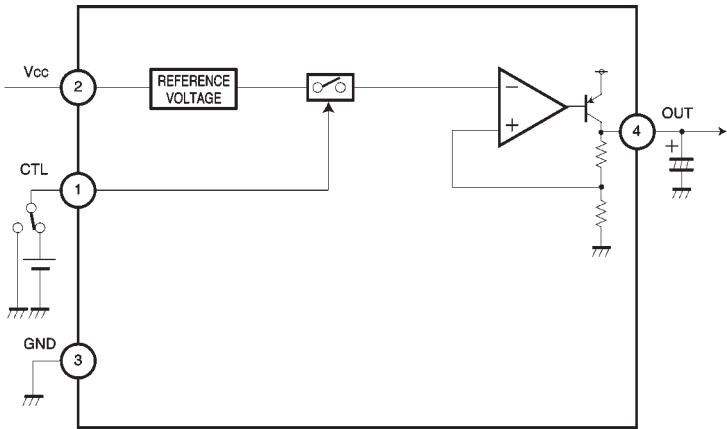| Parameter	Symbol	Limits	Unit
Power supply voltage	Vcc	35	V
Power dissipation	Pd	2000∗1	mW
Operating temperature	Topr	−40～+85	℃
Storage temperature	Tstg	−55～+150	℃
Peak applied voltage	Vsurge	50∗2	V

∗1 Reduced by 16mW for each increase 10To of 1°C over 25°C.

∗2 Voltage application time : 200 msec. or less

●Block diagram

Vcc
2
REFERENCE VOLTAGE

OUT
4
5
NF

CTL
1

GND
3
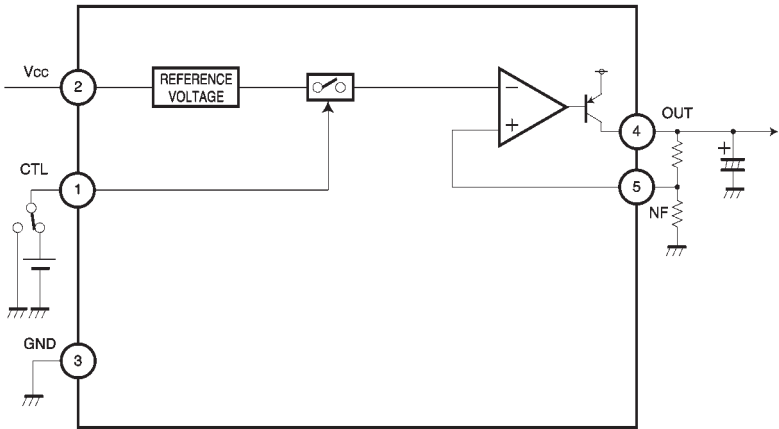
Variable output type (BA00AST)

Vcc
2
REFERENCE VOLTAGE

OUT
4

CTL
1

GND
3

Fixed output type

ROHM

●Pin descriptions

Pin No.	Pin name	Function
1	CTL	Output ON/OFF
2	Vcc	Power supply input
3	GND	Ground
4	OUT	Output
5	C	Reference power supply pin for setting voltage with the BA00ST.
	N.C.	In the BA◯◯ST Series, these are NC pins, except for the BA00ST.

●Recommended operating conditions

BA00ST

Parameter	Symbol	Min.	Typ.	Max.	Unit
Input voltage	Vcc	4	—	25	V
Output current	Io	—	—	1	A

BA03ST (under development)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Input voltage	Vcc	4	—	25	V
Output current	Io	—	—	1	A

BA033ST

Parameter	Symbol	Min.	Typ.	Max.	Unit
Input voltage	Vcc	4.3	—	25	V
Output current	Io	—	—	1	A

BA05ST

Parameter	Symbol	Min.	Typ.	Max.	Unit
Input voltage	Vcc	6	—	25	V
Output current	Io	—	—	1	A

BA06ST (under development)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Input voltage	Vcc	7	—	25	V
Output current	Io	—	—	1	A

BA07ST

Parameter	Symbol	Min.	Typ.	Max.	Unit
Input voltage	Vcc	8	—	25	V
Output current	Io	—	—	1	A

BA08ST

Parameter	Symbol	Min.	Typ.	Max.	Unit
Input voltage	Vcc	9	—	25	V
Output current	Io	—	—	1	A

BA09ST

Parameter	Symbol	Min.	Typ.	Max.	Unit
Input voltage	Vcc	10	—	25	V
Output current	Io	—	—	1	A

BA10ST

Parameter	Symbol	Min.	Typ.	Max.	Unit
Input voltage	Vcc	11	—	25	V
Output current	Io	—	—	1	A

BA12ST

Parameter	Symbol	Min.	Typ.	Max.	Unit
Input voltage	Vcc	13	—	25	V
Output current	Io	—	—	1	A

BA15ST (under development)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Input voltage	Vcc	16	—	25	V
Output current	Io	—	—	1	A

● Electrical characteristics

BA00ST (unless otherwise noted, Ta = 25°C, V_{CC} = 10V, Io = 500mA)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement circuit
Reference voltage	V_{ref}	1.200	1.225	1.250	V		Fig.1
Power save current	Ist	—	0	10	μA	OFF mode	Fig.4
Output voltage	V_O	—	5.0	—	V		Fig.1
Input stability	Reg.I	—	20	100	mV	V_{CC}=6→25V	Fig.1
Ripple rejection ratio	R.R.	45	55	—	dB	e_{IN}=1V_{rms}, f=120Hz, Io=100mA	Fig.2
Load regulation	Reg.L	—	50	150	mV	Io=5mA→1A	Fig.1
Temperature coefficient of output voltage	T_{CVO}	—	±0.01	—	%/℃	Io=5mA, Tj=0~125℃	Fig.1
Minimum I/O voltage differential	V_d	—	0.3	0.5	V	V_{CC}=0.95V_O	Fig.3
Bias current	I_b	—	2.5	5.0	mA	Io=0mA	Fig.4
Peak output current	Io-P	1.0	1.5	—	A	Tj=25℃	Fig.1
Output short-circuit current	Ios	—	0.4	—	A	V_{CC}=25V	Fig.5
ON mode voltage	Vth1	2.0	—	—	V	Output Active mode, Io=0mA	Fig.6
OFF mode voltage	Vth2	—	—	0.8	V	Output OFF mode, Io=0mA	Fig.6
Input high level current	I_{IN}	100	200	300	μA	CTL=5V, Io=0mA	Fig.6

BA03ST (unless otherwise noted, Ta = 25°C, V_{CC} = 8V, Io = 500mA) (under development)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement circuit
Power save current	I_{ST}	—	0	10	μA	OFF mode	Fig.4
Output voltage	V_{O1}	2.85	3.0	3.15	V		Fig.1
Input stability	Reg.I	—	20	100	mV	V_{CC}=4→25V	Fig.1
Ripple rejection ratio	R.R.	45	55	—	dB	e_{IN}=1V_{rms}, f=120Hz, Io=100mA	Fig.2
Load regulation	Reg.L	—	50	150	mV	Io=5mA→1A	Fig.1
Temperature coefficient of output voltage	T_{CVO}	—	±0.02	—	%/℃	Io=5mA, Tj=0~125℃	Fig.1
Minimum I/O voltage differential	V_d	—	0.3	0.5	V	V_{CC}=0.95V_O	Fig.3
Bias current	I_b	—	2.5	5.0	mA	Io=0mA	Fig.4
Peak output current	Io-P	1.0	1.5	—	A	Tj=25℃	Fig.1
Output short-circuit current	Ios	—	0.4	—	A	V_{CC}=25V	Fig.5
ON mode voltage	Vth1	2.0	—	—	V	Output Active mode, Io=0mA	Fig.6
OFF mode voltage	Vth2	—	—	0.8	V	Output OFF mode, Io=0mA	Fig.6
Input high level current	I_{IN}	100	200	300	μA	CTL=5V, Io=0mA	Fig.6

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BA033ST (unless otherwise noted, Ta = 25°C, V_{cc} = 8V, Io = 500mA)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement circuit
Power save current	I_{ST}	—	0	10	μA	OFF mode	Fig.4
Output voltage	V_{O1}	3.13	3.3	3.47	V		Fig.1
Input stability	Reg.I	—	20	100	mV	V_{cc}=4.3→25V	Fig.1
Ripple rejection ratio	R.R.	45	55	—	dB	e_{IN}=1V_{rms}, f=120Hz, Io=100mA	Fig.2
Load regulation	Reg.L	—	50	150	mV	Io=5mA→1A	Fig.1
Temperature coefficient of output voltage	T_{CVO}	—	±0.02	—	％/℃	Io=5mA, Tj=0～125℃	Fig.1
Minimum I/O voltage differential	V_d	—	0.3	0.5	V	V_{cc}=0.95V_O	Fig.3
Bias current	I_b	—	2.5	5.0	mA	Io=0mA	Fig.4
Peak output current	I_{o-p}	1.0	1.5	—	A	Tj=25℃	Fig.1
Output short-circuit current	I_{os}	—	0.4	—	A	V_{cc}=25V	Fig.5
ON mode voltage	Vth1	2.0	—	—	V	Output Active mode, Io=0mA	Fig.6
OFF mode voltage	Vth2	—	—	0.8	V	Output OFF mode, Io=0mA	Fig.6
Input high level current	I_{IN}	100	200	300	μA	CTL=5V, Io=0mA	Fig.6

BA05ST (unless otherwise noted, Ta = 25°C, V_{cc} = 10V, Io = 500mA)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Masurement circuit
Power save current	I_{ST}	—	0	10	μA	OFF mode	Fig.4
Output voltage	V_{O1}	4.75	5.0	5.25	V		Fig.1
Input stability	Reg.I	—	20	100	mV	V_{cc}=6→25V	Fig.1
Ripple rejection ratio	R.R.	45	55	—	dB	e_{IN}=1V_{rms}, f=120Hz, Io=100mA	Fig.2
Load regulation	Reg.L	—	50	150	mV	Io=5mA→1A	Fig.1
Temperature coefficient of output voltage	T_{CVO}	—	±0.02	—	％/℃	Io=5mA, Tj=0～125℃	Fig.1
Minimum I/O voltage differential	V_d	—	0.3	0.5	V	V_{cc}=4.75V	Fig.3
Bias current	I_b	—	2.5	5.0	mA	Io=0mA	Fig.4
Peak output current	I_{o-p}	1.0	1.5	—	A	Tj=25℃	Fig.1
Output short-circuit current	I_{os}	—	0.4	—	A	V_{cc}=25V	Fig.5
ON mode voltage	Vth1	2.0	—	—	V	Output Active mode, Io=0mA	Fig.6
OFF mode voltage	Vth2	—	—	0.8	V	Output OFF mode, Io=0mA	Fig.6
Input high level current	I_{IN}	100	200	300	μA	CTL=5V, Io=0mA	Fig.6

BA06ST (unless otherwise noted, Ta = 25°C, V_{cc} = 11V, Io = 500mA) (under development)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement circuit
Power save current	I_{ST}	—	0	10	μA	OFF mode	Fig.4
Output voltage	V_{O1}	5.7	6.0	6.3	V		Fig.1
Input stability	Reg.I	—	20	100	mV	V_{cc}=7→25V	Fig.1
Ripple rejection ratio	R.R.	45	55	—	dB	e_{IN}=1V_{rms}, f=120Hz, Io=100mA	Fig.2
Load regulation	Reg.L	—	50	150	mV	Io=5mA→1A	Fig.1
Temperature coefficient of output voltage	Tcvo	—	±0.02	—	% / °C	Io=5mA, Tj=0~125°C	Fig.1
Minimum I/O voltage differential	V_d	—	0.3	0.5	V	V_{cc}=5.7V	Fig.3
Bias current	I_b	—	2.5	5.0	mA	Io=0mA	Fig.4
Peak output current	Io-P	1.0	1.5	—	A	Tj=25°C	Fig.1
Output short-circuit current	Ios	—	0.4	—	A	V_{cc}=25V	Fig.5
ON mode voltage	Vth1	2.0	—	—	V	Output Active mode, Io=0mA	Fig.6
OFF mode voltage	Vth2	—	—	0.8	V	Output OFF mode, Io=0mA	Fig.6
Input high level current	I_{IN}	100	200	300	μA	CTL=5V, Io=0mA	Fig.6

BA07ST (unless otherwise noted, Ta = 25°C, V_{cc} = 12V, Io = 500mA)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement circuit
Power save current	I_{ST}	—	0	10	μA	OFF mode	Fig.4
Output voltage	V_{O1}	6.65	7.0	7.35	V		Fig.1
Input stability	Reg.I	—	20	100	mV	V_{cc}=8→25V	Fig.1
Ripple rejection ratio	R.R.	45	55	—	dB	e_{IN}=1V_{rms}, f=120Hz, Io=100mA	Fig.2
Load regulation	Reg.L	—	50	150	mV	Io=5mA→1A	Fig.1
Temperature coefficient of output voltage	Tcvo	—	±0.02	—	% / °C	Io=5mA, Tj=0~125°C	Fig.1
Minimum I/O voltage differential	V_d	—	0.3	0.5	V	V_{cc}=6.65V	Fig.3
Bias current	I_b	—	2.5	5.0	mA	Io=0mA	Fig.4
Peak output current	Io-P	1.0	1.5	—	A	Tj=25°C	Fig.1
Output short-circuit current	Ios	—	0.4	—	A	V_{cc}=25V	Fig.5
ON mode voltage	Vth1	2.0	—	—	V	Output Active mode, Io=0mA	Fig.6
OFF mode voltage	Vth2	—	—	0.8	V	Output OFF mode, Io=0mA	Fig.6
Input high level current	I_{IN}	100	200	300	μA	CTL=5V, Io=0mA	Fig.6

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BA08ST (unless otherwise noted, Ta = 25°C, Vcc = 13V, Io = 500mA)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement circuit
Power save current	I_{ST}	—	0	10	μA	OFF mode	Fig.4
Output voltage	V_{O1}	7.6	8.0	8.4	V		Fig.1
Input stability	Reg.I	—	20	100	mV	Vcc=9→25V	Fig.1
Ripple rejection ratio	R.R.	45	55	—	dB	e_{IN}=1Vrms, f=120Hz, Io=100mA	Fig.2
Load regulation	Reg.L	—	50	150	mV	Io=5mA→1A	Fig.1
Temperature coefficient of output voltage	T_{cvo}	—	±0.02	—	%/°C	Io=5mA, Tj=0~125°C	Fig.1
Minimum I/O voltage differential	V_d	—	0.3	0.5	V	Vcc=0.95Vo	Fig.3
Bias current	I_b	—	2.5	5.0	mA	Io=0mA	Fig.4
Peak output current	I_{O-P}	1.0	1.5	—	A	Tj=25°C	Fig.1
Output short-circuit current	I_{os}	—	0.4	—	A	Vcc=25V	Fig.5
ON mode voltage	Vth1	2.0	—	—	V	Output Active mode, Io=0mA	Fig.6
OFF mode voltage	Vth2	—	—	0.8	V	Output OFF mode, Io=0mA	Fig.6
Input high level current	I_{IN}	100	200	300	μA	CTL=5V, Io=0mA	Fig.6

BA09ST (unless otherwise noted, Ta = 25°C, Vcc = 14V, Io = 500mA)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement circuit
Power save current	I_{ST}	—	0	10	μA	OFF mode	Fig.4
Output voltage	V_{O1}	8.55	9.0	9.45	V		Fig.1
Input stability	Reg.I	—	20	100	mV	Vcc=10→25V	Fig.1
Ripple rejection ratio	R.R.	45	55	—	dB	e_{IN}=1Vrms, f=120Hz, Io=100mA	Fig.2
Load regulation	Reg.L	—	50	150	mV	Io=5mA→1A	Fig.1
Temperature coefficient of output voltage	T_{cvo}	—	±0.02	—	%/°C	Io=5mA, Tj=0~125°C	Fig.1
Minimum I/O voltage differential	V_d	—	0.3	0.5	V	Vcc=0.95Vo	Fig.3
Bias current	I_b	—	2.5	5.0	mA	Io=0mA	Fig.4
Peak output current	I_{O-P}	1.0	1.5	—	A	Tj=25°C	Fig.1
Output short-circuit current	I_{os}	—	0.4	—	A	Vcc=25V	Fig.5
ON mode voltage	Vth1	2.0	—	—	V	Output Active mode, Io=0mA	Fig.6
OFF mode voltage	Vth2	—	—	0.8	V	Output OFF mode, Io=0mA	Fig.6
Input high level current	I_{IN}	100	200	300	μA	CTL=5V, Io=0mA	Fig.6

BA10ST (unless otherwise noted, Ta = 25°C, V_{cc} = 15V, Io = 500mA)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement circuit
Power save current	I_{ST}	—	0	10	μA	OFF mode	Fig.4
Output voltage	V_{O1}	9.5	10	10.5	V		Fig.1
Input stability	Reg.I	—	20	100	mV	V_{cc}=11→25V	Fig.1
Ripple rejection ratio	R.R.	45	55	—	dB	e_{IN}=1V_{rms}, f=120Hz, Io=100mA	Fig.2
Load regulation	Reg.L	—	50	150	mV	Io=5mA→1A	Fig.1
Temperature coefficient of output voltage	T_{cvo}	—	±0.02	—	%/℃	Io=5mA, Tj=0~125℃	Fig.1
Minimum I/O voltage differential	V_d	—	0.3	0.5	V	V_{cc}=0.95V_O	Fig.3
Bias current	I_b	—	2.5	5.0	mA	Io=0mA	Fig.4
Peak output current	I_{O-P}	1.0	1.5	—	A	Tj=25℃	Fig.1
Output short-circuit current	I_{os}	—	0.4	—	A	V_{cc}=25V	Fig.5
ON mode voltage	Vth1	2.0	—	—	V	Output Active mode, Io=0mA	Fig.6
OFF mode voltage	Vth2	—	—	0.8	V	Output OFF mode, Io=0mA	Fig.6
Input high level current	I_{IN}	100	200	300	μA	CTL=5V, Io=0mA	Fig.6

BA12ST (unless otherwise noted, Ta = 25°C, V_{cc} = 17V, Io = 500mA)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement circuit
Power save current	I_{ST}	—	0	10	μA	OFF mode	Fig.4
Output voltage	V_{O1}	11.4	12	12.6	V		Fig.1
Input stability	Reg.I	—	20	100	mV	V_{cc}=13→25V	Fig.1
Ripple rejection ratio	R.R.	45	55	—	dB	e_{IN}=1V_{rms}, f=120Hz, Io=100mA	Fig.2
Load regulation	Reg.L	—	50	150	mV	Io=5mA→1A	Fig.1
Temperature coefficient of output voltage	T_{cvo}	—	±0.02	—	%/℃	Io=5mA, Tj=0~125℃	Fig.1
Minimum I/O voltage differential	V_d	—	0.3	0.5	V	V_{cc}=0.95V_O	Fig.3
Bias current	I_b	—	2.5	5.0	mA	Io=0mA	Fig.4
Peak output current	I_{O-P}	1.0	1.5	—	A	Tj=25℃	Fig.1
Output short-circuit current	I_{os}	—	0.4	—	A	V_{cc}=25V	Fig.5
ON mode voltage	Vth1	2.0	—	—	V	Output Active mode, Io=0mA	Fig.6
OFF mode voltage	Vth2	—	—	0.8	V	Output OFF mode, Io=0mA	Fig.6
Input high level current	I_{IN}	100	200	300	μA	CTL=5V, Io=0mA	Fig.6

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BA15ST (unless otherwise noted, Ta = 25°C, V_{cc} = 20V, Io = 500mA) (under development)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement circuit
Power save current	I_{ST}	—	0	10	μA	OFF mode	Fig.4
Output voltage	V_{O1}	14.25	15	15.75	V		Fig.1
Input stability	Reg.I	—	20	100	mV	V_{cc}=16→25V	Fig.1
Ripple rejection ratio	R.R.	45	55	—	dB	e_{IN}=1V_{rms}, f=120Hz, Io=100mA	Fig.2
Load regulation	Reg.L	—	50	150	mV	Io=5mA→1A	Fig.1
Temperature coefficient of output voltage	T_{cvo}	—	±0.02	—	％/℃	Io=5mA, Tj=0～125℃	Fig.1
Minimum I/O voltage differential	V_d	—	0.3	0.5	V	V_{cc}=0.95V_o	Fig.3
Bias current	I_b	—	2.5	5.0	mA	Io=0mA	Fig.4
Peak output current	I_{O-P}	1.0	1.5	—	A	Tj=25℃	Fig.1
Output short-circuit current	I_{os}	—	0.4	—	A	V_{cc}=25V	Fig.5
ON mode voltage	Vth1	2.0	—	—	V	Output Active mode, Io=0mA	Fig.6
OFF mode voltage	Vth2	—	—	0.8	V	Output OFF mode, Io=0mA	Fig.6
Input high level current	I_{IN}	100	200	300	μA	CTL=5V, Io=0mA	Fig.6

●Measurement circuits

(The C pin only exists on the BA00AST, For the BA00AST, place a 6.8 kΩ resistor between the OUT and C pins, and a 2.2 kΩ resistor between the C and GND pins.)
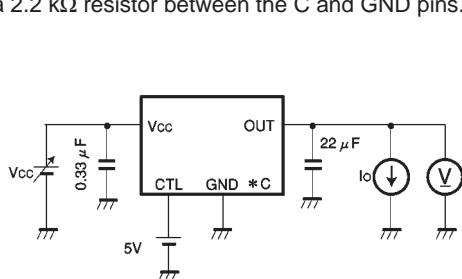
Fig.1 Measurement circuit for output voltage, input stability, load regulation, and temperature coefficient of output voltage

Ripple rejection ratio R.R. = 20 log $\left(\frac{|e_{IN}|}{|e_{OUT}|}\right)$
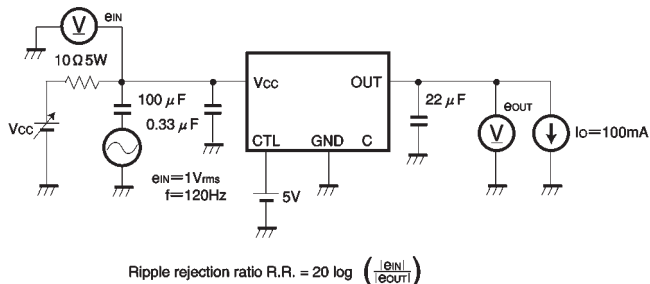
Fig.2 Measurement circuit for ripple rejection ratio
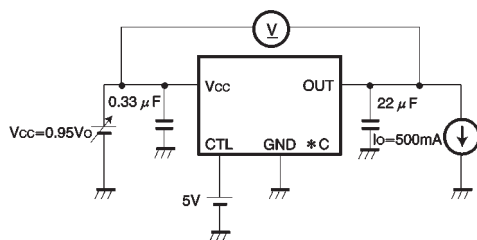
Fig.3 Measurement circuit for minimum I/O voltage differential
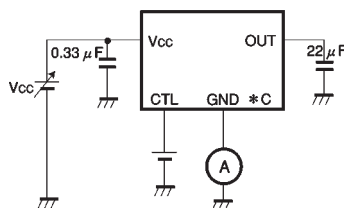
Fig.4 Measurement circuit for bias current, power save current measurement circuit
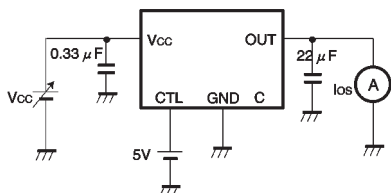
Fig.5 Measurement circuit for output short-circuit current
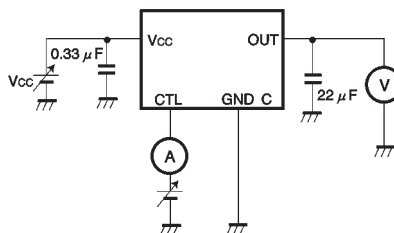
Fig.6 Measurement circuit for ON/OFF mode voltage, input high level current

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●Operation notes

(1)　Operating power supply voltage

When operating within the normal voltage range and within the ambient operating temperature range, most circuit functions are guaranteed. The rated values cannot be guaranteed for the electrical characteristics, but there are no sudden changes of the characteristics within these ranges.

(2)　Power dissipation

Heat attenuation characteristics are noted on a separate page and can be used as a guide in judging power dissipation.

If these ICs are used in such a way that the allowable power dissipation level is exceeded, an increase in the chip temperature could cause a reduction in the current capability or could otherwise adversely affect the performance of the IC. Make sure a sufficient margin is allowed so that the allowable power dissipation value is not exceeded.

(3)　Output oscillation prevention and bypass capacitor

Be sure to connect a capacitor between the output pin and GND to prevent oscillation. Since fluctuations in the valve of the capacitor due to temperature changes may cause oscillations, a tantalum electrolytic capacitor with a small internal series resistance (ESR) is recommended.

A 22μ F capacitor is recommended; however, be aware that if an extremely large capacitance is used (1000μ F or greater), then oscillations may occur at low frequencies. Therefore, be sure to perform the appropriate verifications before selecting the capacitor.

Also, we recommend connecting a 0.33μ F bypass capacitor as close as possible between the input pin and GND.

(4)　Current overload protection circuit

A current overload protection circuit is built into the out-puts, to prevent IC destruction if the load is shorted.

This protection circuit limits the current in the shape of a '7'. It is designed with a high margin, so that even if a large current suddenly flows through the large capacitor in the IC, the current is restricted and latching is prevented.

However, these protection circuits are only good for preventing damage from sudden accidents. The design should take this into consideration, so that the protection circuit is not made to operate continuously (for instance, clamping at an output of $1V_F$ or greater; below $1V_F$, the short mode circuit operates). Note that the capacitor has negative temperature characteristics, and the design should take this into consideration.

(5)　Thermal overload circuit

A built-in thermal overload circuit prevents damage from overheating. When the thermal circuit is activated, the various outputs are in the OFF state. When the temperature drops back to a constant level, the circuit is restored.

(6)　Internal circuits could be damaged if there are modes in which the electric potential of the application's input (V_{CC}) and GND are the opposite of the electric potential of the various outputs. Use of a diode or other such bypass path is recommended.

(7)　Although the manufacture of this product includes rigorous quality assurance procedures, the product may be damaged if absolute maximum ratings for voltage or operating temperature are exceeded. If damage has occurred, special modes (such as short circuit mode or open circuit mode) cannot be specified. If it is possible that such special modes may be needed, please consider using a fuse or some other mechanical safety measure.

(8)　When used within a strong magnetic field, be aware that there is a slight possibility of malfunction.
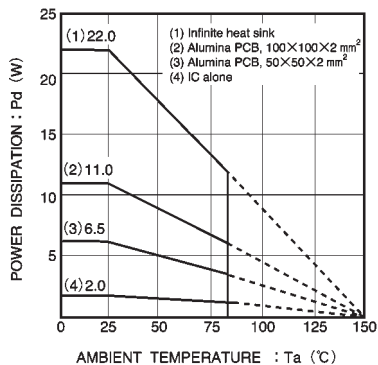
●Electrical characteristic curves

Fig. 7 Ambient temperature vs power dissipation characteristics
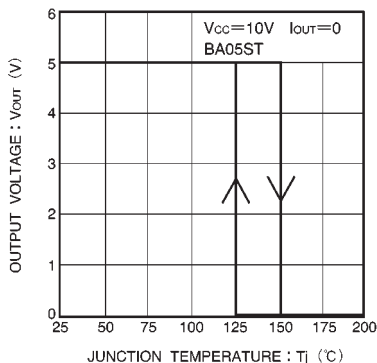

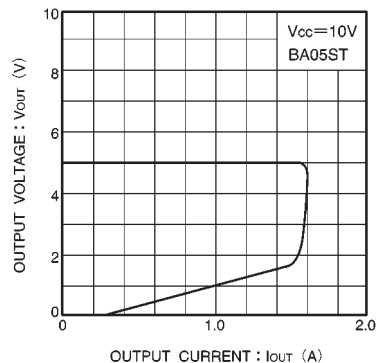Fig. 8 Thermal cutoff circuit characteristics
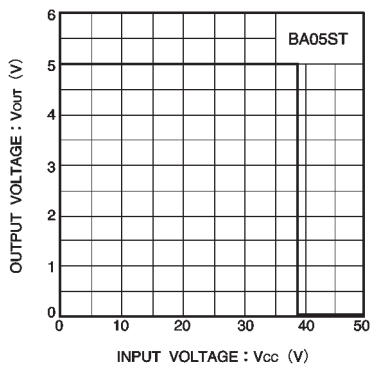

Fig. 9 Current limit characteristics

Fig. 10 Over voltage protection characteristics

●External dimensions (Units: mm)

1pin : CTL
2pin : Vcc
3pin : GND
4pin : OUT
5pin : N.C.

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