

- STRUCTURE Silicon Monolithic Integrated circuit
- TYPE Low-Dropout Three-Terminal Positive Voltage Regulator
- PRODUCT SERIES BA05T
- PHYSICAL DIMENSIONS Fig-1 (Plastic Mold)
- BLOCK DIAGRAM Fig-2
- FEATURES
1. Maximum output current 1A.
 2. Voltage regulator which is stable at 5V is built-in and recommendable for regulators in VCR etc.,
 3. Output consist of PNP power transistor and low saturation voltage.
 4. Built-in over output current protection circuit prevents IC from being damaged by short.
 5. Built-in Thermal Shut Down Circuit for protecting thermal break down.
 6. This IC is not susceptible damage due to surge voltage, because it has Over Input Voltage Protection Circuit.
 7. Compact because of employment of T0220FP.

Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Supply voltage	Vcc	3.5	V
Power dissipation	Pd	2.0*	W
Operating temperature range	Topr	-40~+85	°C
Storage temperature range	Tstg	-55~+150	°C
Peak supply voltage	Vcc Peak	5.0**	V

* Derating in done at 16mW/°C for operating above Ta=25°C

** Voltage Supply built in time is less than 200msec.(tr≥1msec)

Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Input Voltage	Vcc	6.0	25.0	V
Output Current	Io	-	1	A

NOTE. The product described in this specification is a strategic product (and/or service) subject to COCOM regulations. It should not be exported without authorization from the appropriate government.

The product described in this specification is designed to be used with ordinary electronic equipment or devices (such as audio-visual equipment, office-automation equipment, communications devices, electrical appliances, and electronic toys).
Should you intend to use this product with equipment or devices which require an extremely high level of reliability and the malfunction of which would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), please be sure to consult with our sales representative in advance.

ROHM assumes no responsibility for the use of any circuits described herein, conveys no license under any patent or other right, and makes no representations that the circuits are free from patent infringement.

Design

Check

Approval

Date SEP/12/'96

Specification

Rev. A

ROHM CO., LTD.

Specification No.

TSZ02201-BA05T-1-2

ELECTRICAL CHARACTERISTICS (Unless otherwise specified, $T_a=25^{\circ}\text{C}$, $V_{cc}=10\text{V}$, $I_o=500\text{mA}$)

Parameter	Symbol	Limit			Unit	Conditions	TEST CIRCUIT
		Min	Typ	Max			
Output Voltage	V_o	4.75	5.0	5.25	V		Fig-5
Dropout Voltage	ΔV_d	—	0.3	0.5	V	$V_{cc}=0.95V_o$	Fig-7
Peak Output Current	I_o	1.0	1.5	—	A		Fig-5
Ripple Rejection	R.R.	45	55	—	dB	$f=120\text{Hz}$, $e_{in}=1\text{V}_{rms}$, $I_o=100\text{mA}$	Fig-6
Line Regulation	Reg.I	—	20	100	mV	$V_{cc}=6.0 \rightarrow 25.0\text{V}$	Fig-5
Load Regulation	Reg.L	—	50	150	mV	$I_o=5\text{mA} \rightarrow 1\text{A}$	Fig-5
Temperature Coefficient of Output Voltage*	T_{cvo}	—	± 0.02	—	%/ $^{\circ}\text{C}$	$I_o=5\text{mA}$, $T_j=0 \sim 125^{\circ}\text{C}$	Fig-5
Bias Current	I_b	—	2.5	5.0	mA	$I_o=0\text{mA}$	Fig-8
Short-Circuit Output Current	I_{os}	—	0.4	—	A	$V_{cc}=25\text{V}$	Fig-9

○ This product is not designed for protection against radioactive rays.

* Design Guarantee.(Outgoing inspection is not done on all products.)

NOTE) All characteristics are measured with a capacity across the input of $0.33\mu\text{F}$ and a capacity across the output of $22\mu\text{F}$.

Measurement is done at $T_a \doteq T_j$, and variations in the parameter of all measurement (except Temperature Coefficient of Output Voltage) caused by temperature change are not considered.

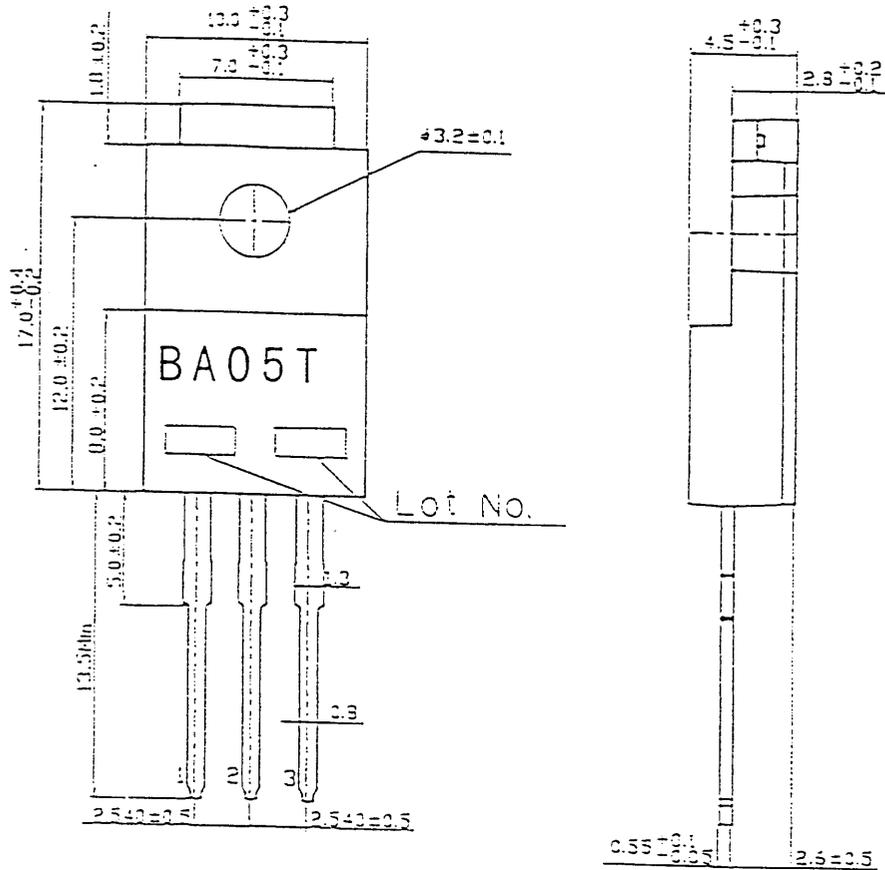
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(UNIT: mm)

1 pin : Vcc
 2 pin : GND
 3 pin : OUT

Fig-1 Physical dimensions (Plastic Mold)

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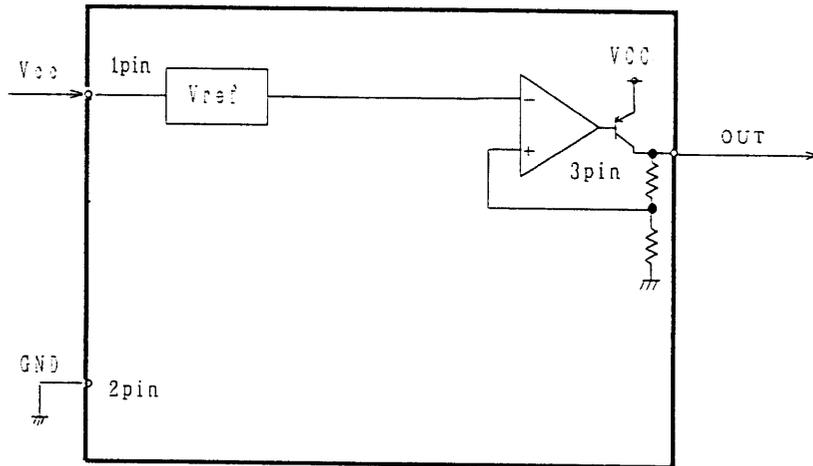


Fig-2 Block diagram

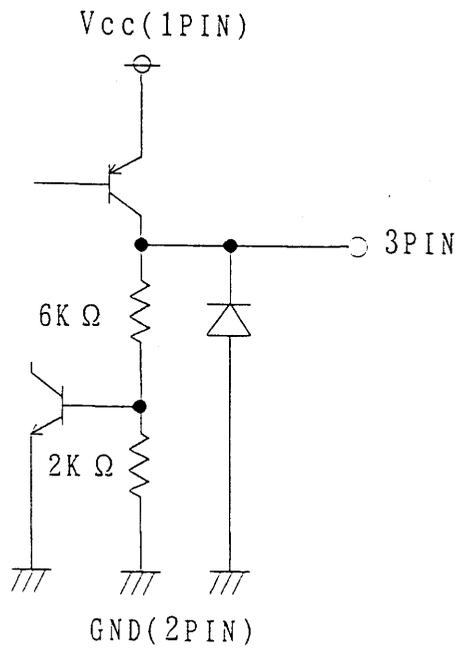


Fig-3 Output equation circuit

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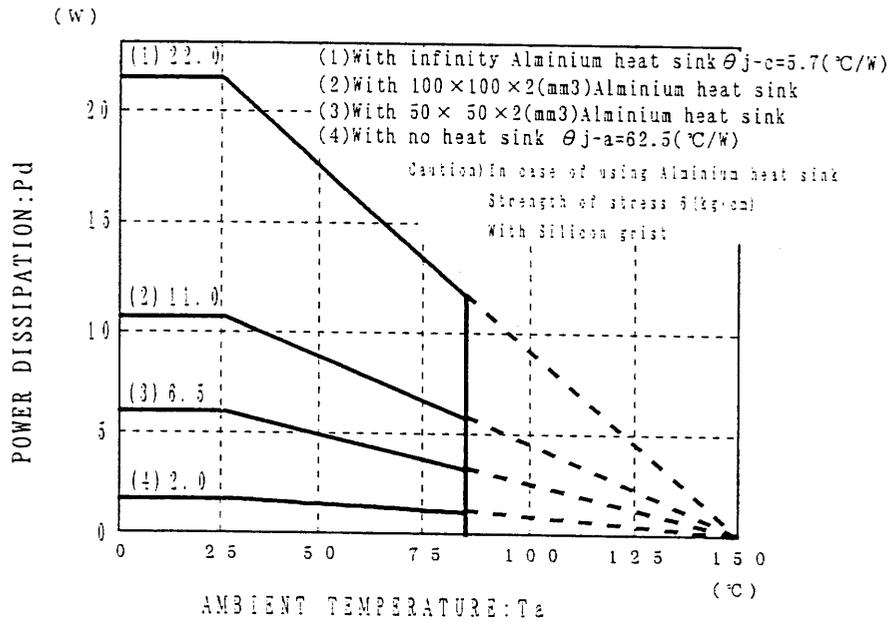
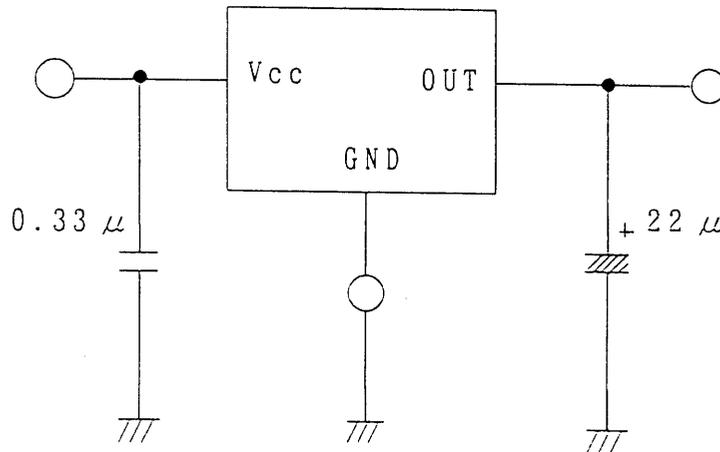
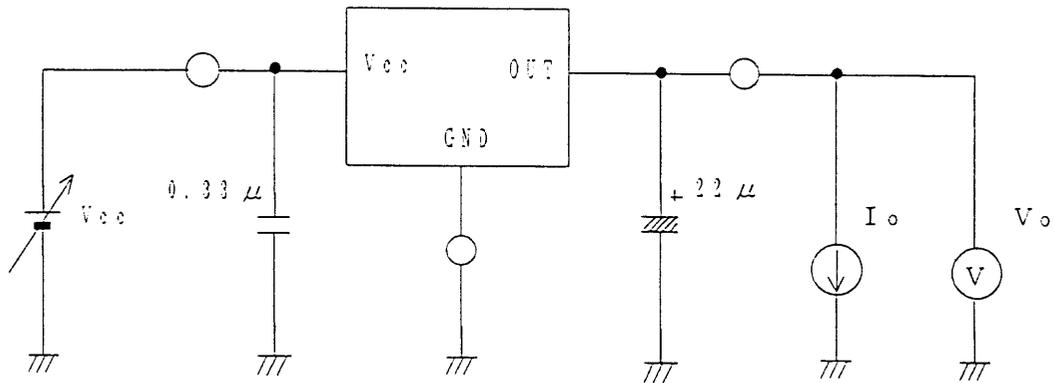


Fig-4 Thermal derating curves



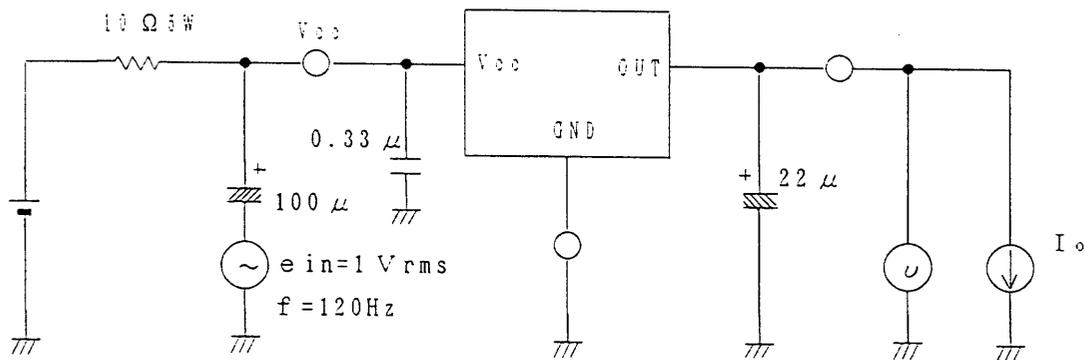
○ Standard application circuit

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Output voltage	$V_{cc} = 10\text{ V}$	$I_o = 500\text{ mA}$
Temperature Coefficient of Output Voltage	$V_{cc} = 10\text{ V}$	$I_o = 5\text{ mA}$
Line Regulation	$V_{cc} = 6.0 \rightarrow 25.0\text{ V}$	$I_o = 500\text{ mA}$
Load Regulation	$V_{cc} = 10\text{ V}$	$I_o = 5\text{ mA} \rightarrow 1\text{ A}$
Peak output current	$V_{cc} = 10\text{ V}$	

Fig-5 Measuring Circuit for Output Voltage, Temperature Coefficient of Output Voltage, Line Regulation, Load Regulation and Peak Output Current.



$V_{cc} = 10\text{ V}$

$I_o = 100\text{ mA}$

Fig-6 Measuring Circuit for Ripple Rejection

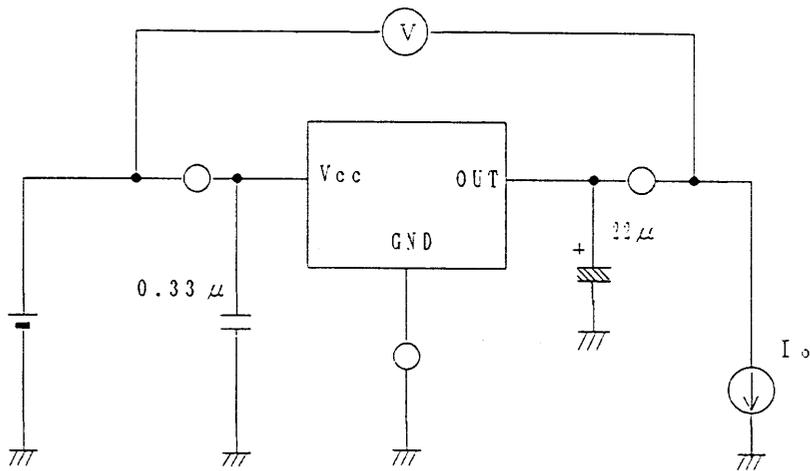
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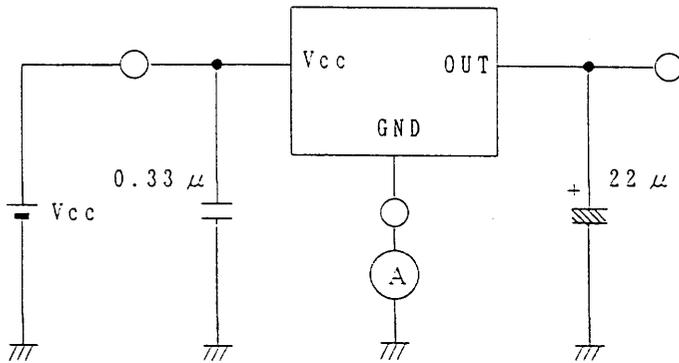
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$V_{cc} = 0.95V$ $I_o = 500mA$

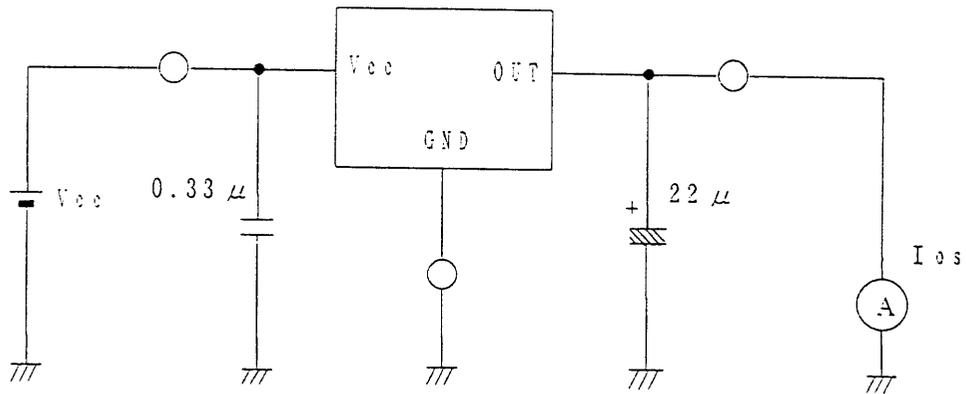
Fig-7 Measuring Circuit for Dropout Voltage



$V_{cc} = 10V$ $I_o = 0mA$

Fig-8 Measuring Circuit for Bias Current

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Vcc = 2.5 V (Output-GND short Output Current)

Fig-9 Measuring Circuit for Short-Circuit Output Current

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NOTES FOR USE

1.The application circuit is recommended for use.

Make sure to confirm the adequacy of the characteristics. When using the circuit with changes to the external circuit constants make sure to leave an adequate margin for external components including static and transitional characteristics as well as dispersion of the IC.

Note that ROHM cannot provide adequate confirmation of patents.

2.Operation supply voltage range

Functional circuit operation is guaranteed within operation ambient temperature, as long as it is within operation supply voltage range. The electrical characteristics standard value can not be guaranteed. However, there is no drastic variation in these values, as long as it is within operation supply voltage range.

3.Power dissipation

For the power dissipation, refer to the thermal derating characteristics and the approximation of IC internal power consumption shown in the attached sheet as guidelines. Also, be sure to use this IC within a power dissipation range allowing enough margin.

4.Anti-oscillating capacitor of output

Be sure to put the anti-oscillating capacity between GND and output terminals.

A tantalum electrolytic capacitor, more than $10\mu\text{F}$, should be used.

The capacitance does not change so much because of its temperature characteristics.

We recommend a capacitance of $0.33\mu\text{F}$ near by between input and GND Terminal.

5.Over-current protection circuit

The over-current protection circuits are built in at the output, according to their respective current outputs and prevent the IC from being damaged when the load is short-circuited or over-current. This protection circuit performs foldback current limiting and is designed allowing a margin not to latched by the current limitation when an over-current flows in the IC instantaneously through a large capacitor. When output is less than $1V_{\frac{r}{2}}$, it is judged as a short circuit mode and IC does not operate.

6.Built-in thermal circuit

A temperature control circuit is built in the IC to prevent the damage due to overheat. Therefore, all the outputs are turned off when the thermal circuit works and are turned on when the temperature goes down to the specified level.

7.Grounding

For the grounding shown in the application circuit, wire every ground to GND terminal (2-Pin) in a short pattern arrangement to avoid electrical disturbance.

8.Miscellaneous

This product are produced with struct quality control, but mite be destroyed in using beyond absolute maximum ratings. Once IC destroyed a failure mode cannot be defined (like Short mode, or Open mode). Therefore physical security countermeasure, like fuse, is to be given when a specific mode to be beyond absolute maximum ratings is considered.

9.Mal-function may happen when the device is used in the strong electro-magnetic field.

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