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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 TO220FP.

Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Supply voltage	Vcc	35	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	50※※	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.

Design	Check	Approval	Date SEP/12/'96	Specification Rev. A
			ROHM CO., LTD.	Specification No. TSZ02201-BA05T-1-2

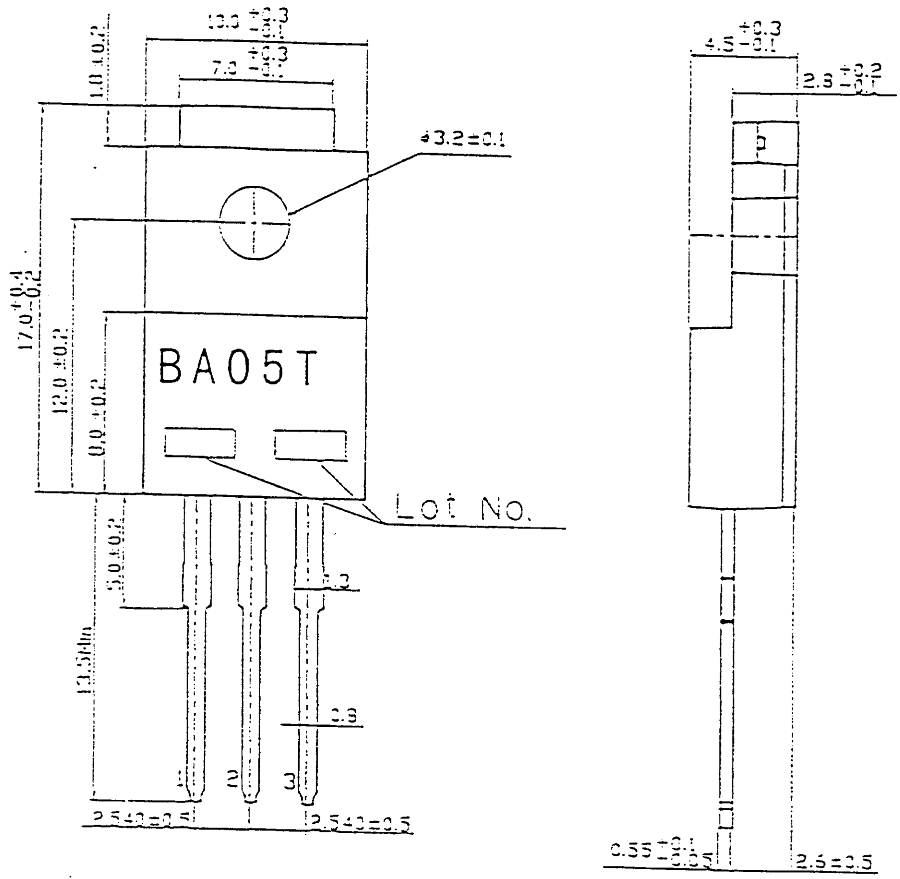
ELECTRICAL CHARACTERISTICS (Unless otherwise specified, Ta=25°C, Vcc=10V, Io=500mA)

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	ΔVd	–	0.3	0.5	V	Vcc=0.95Vo	Fig-7
Peak Output Current	Io	1.0	1.5	–	A		Fig-5
Ripple Rejection	R.R.	45	55	–	dB	f=120Hz, ein=1Vrms, Io=100mA	Fig-6
Line Regulation	Reg.I	–	20	100	mV	Vcc=6.0→25.0V	Fig-5
Load Regulation	Reg.L	–	50	150	mV	I_o=5mA→1A	Fig-5
Temperature Coefficient of Output Voltage※	T_{cvo}	–	±0.02	–	%/°C	I_o=5mA, T_j=0～125°C	Fig-5
Bias Current	Ib	–	2.5	5.0	mA	Io=0mA	Fig-8
Short-Circuit Output Current	I_{os}	–	0.4	–	A	Vcc=25V	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 0.33μF and a capacity across the output of 22μF.
Measurement is done at Ta≒Tj, and variations in the parameter of all measurement (except Temperature Coefficient of Output Voltage) caused by temperature change are not considered.



(UNIT: mm)

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

Fig-1 Physical dimensions (Plastic Mold)

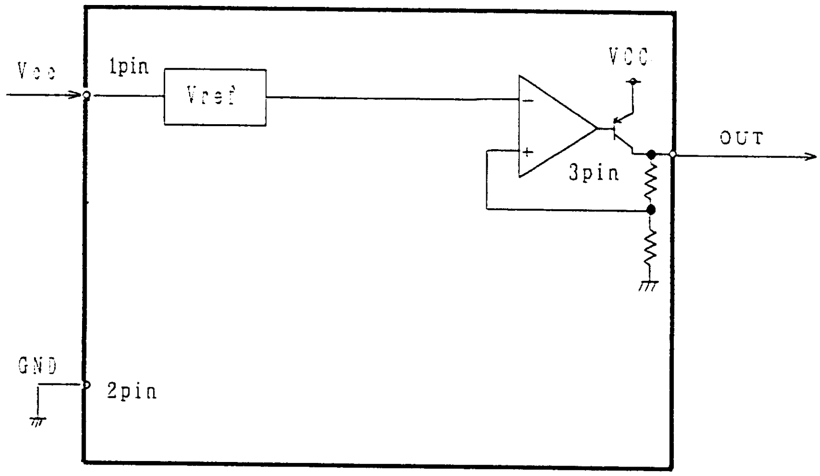


Fig-2 Block diagram

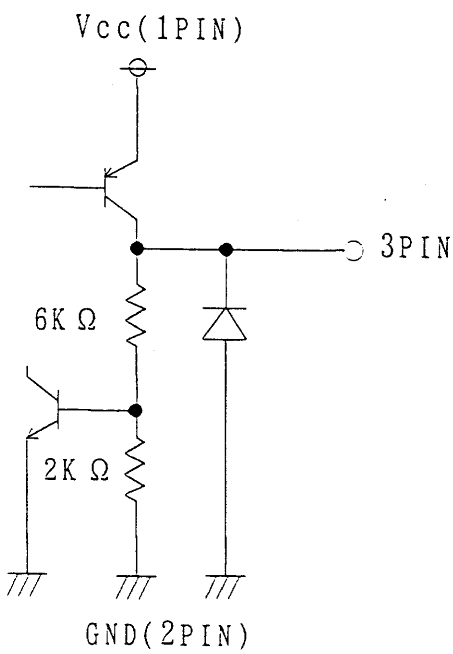


Fig-3 Output equation circuit

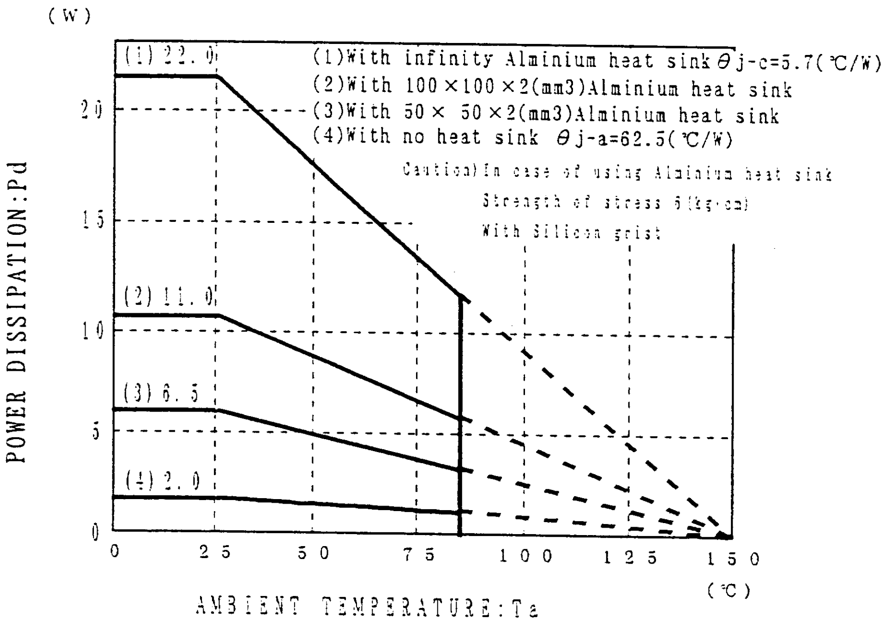
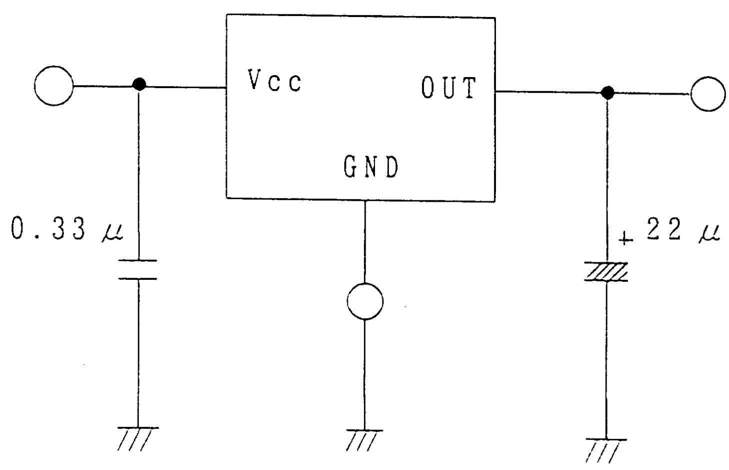
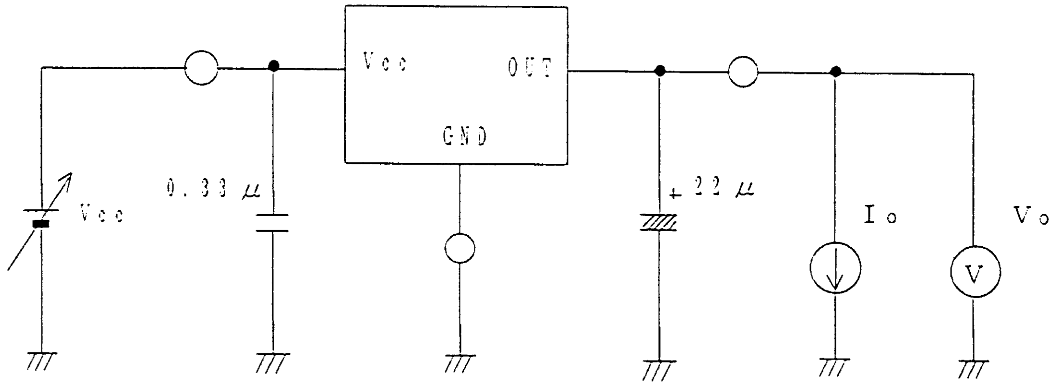


Fig-4 Thermal derating curves

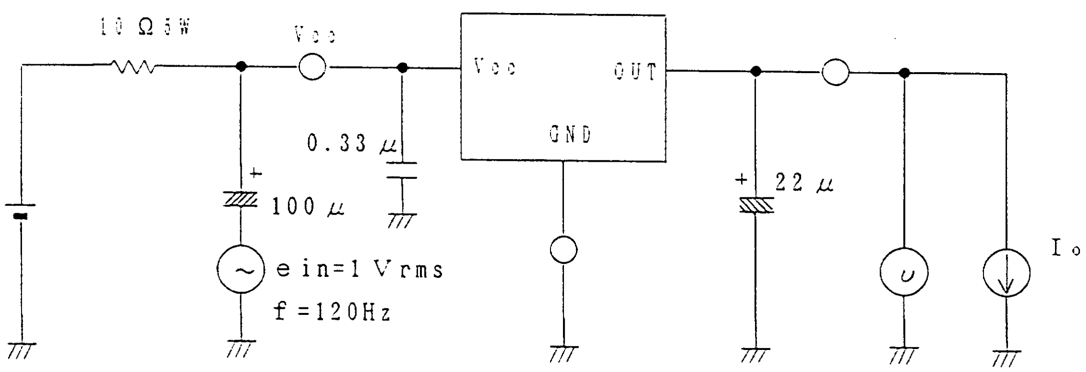


○ Standard application circuit



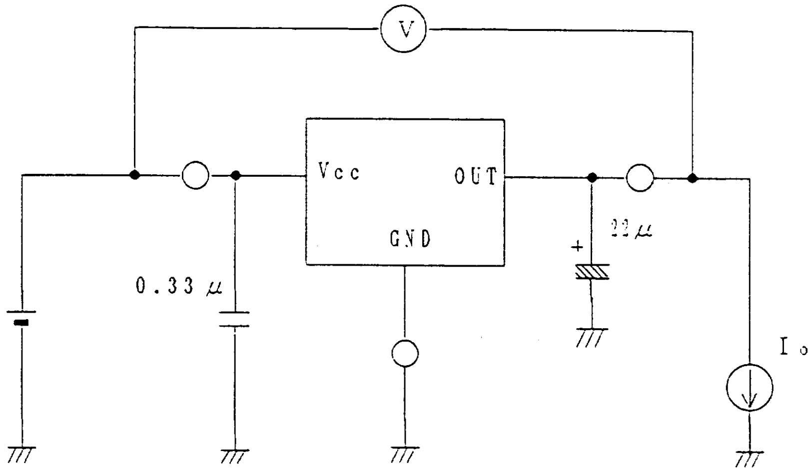
Output voltage	Vcc=10V	Io=500mA
Temperature Coefficient of Output Voltage	Vcc=10V	Io=5mA
Line Regulation	Vcc=6.0→25.0V	Io=500mA
Load Regulation	Vcc=10V	Io=5mA→1A
Peak output current	Vcc=10V	

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



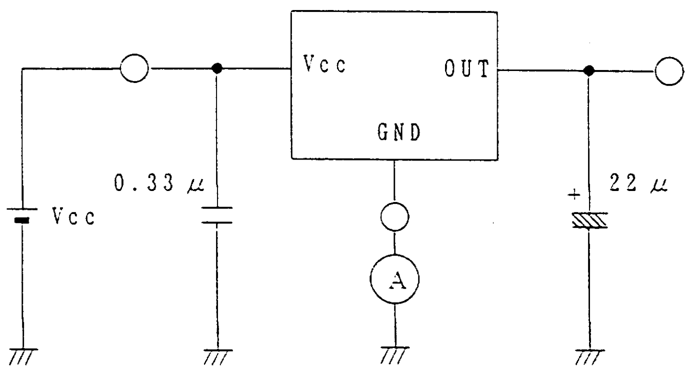
Vcc=10V Io=100mA

Fig-6 Measuring Circuit for Ripple Rejection



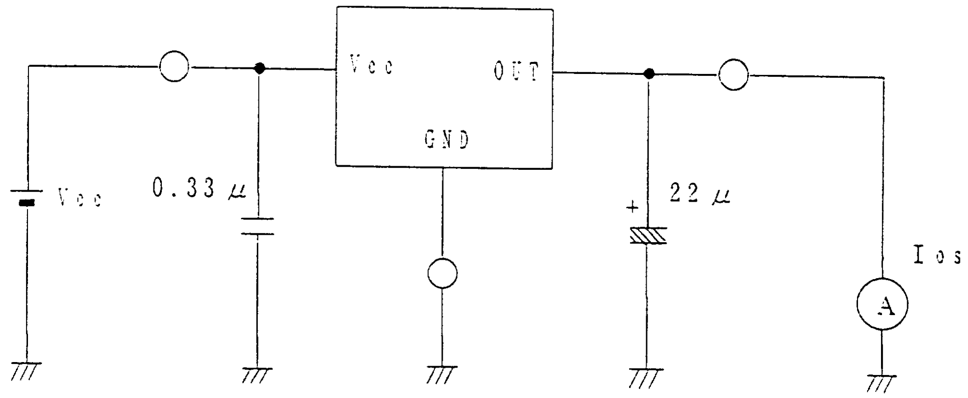
Vcc＝0．95V　　　　Io＝500mA

Fig-7 Measuring Circuit for Dropout Voltage



Vcc＝10V　　　　Io＝0mA

Fig-8 Measuring Circuit for Bias Current



Vcc=25V (Output-GND short Output Current)

Fig-9 Measuring Circuit for Short-Circuit Output Current

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 10μF, should be used.
The capacitance does not change so much because of its temperature characteristics.
We recommend a capacitance of 0.33μF 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_F, 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.