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1A Variable/Fixed Output LDO Regulators

BAxxBC0 Series(Fixed) BAxxBC0W Series(Fixed) BA00BC0WCP-V5(Variable)

Pb Free ROHM Electronic Components RoHS Directive Compliance

●General Description

The BAxxBC0 are low-saturation regulators with an output current of 1.0 A and an output voltage accuracy of ±2%. A broad output voltage range is offered, from 1.5V to 10V, and built-in overcurrent protection and thermal shutdown (TSD) circuits prevent damage due to short-circuiting and overloading, respectively.

●Features

- Output voltage accuracy: ±2%
  Broad output range available: 1.5 V -10 V
  (BAxxBC0 series)
- Low saturation-voltage type with PNP output
- Built-in overcurrent protection circuit
- Built-in thermal shutdown circuit
- Integrated shutdown switch (BAxxBC0WT, BAxxBC0WT-5, or BAxxBC0WFP Series, BA00BC0WCP-V5)

●Key Specifications

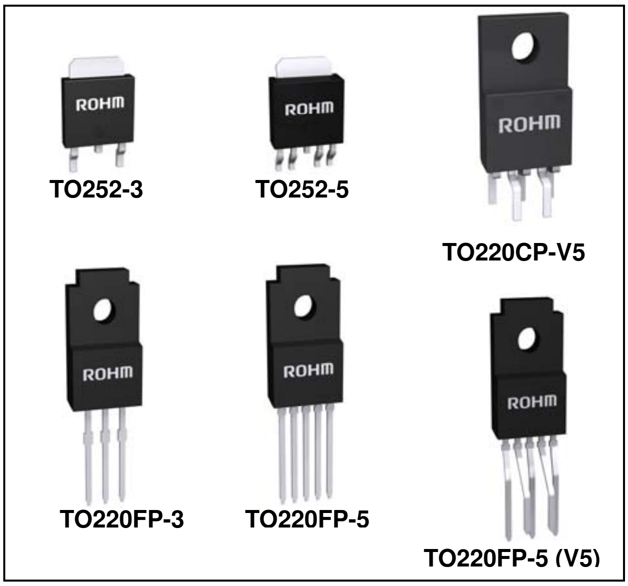
■ Input Power Supply Voltage:	16.0V(Max.)
■ Output voltage:(BA00BC0xx)	Variable
(BAxxBC0)	Fixed
■ Output current:	1A(Max.)
■ Shutdown current:	0μA(Typ.)
■ Operating temperature range:	-40℃ to +105℃

●Applications

All electronic devices that use microcontrollers and logic circuits

●Packages

	W (Typ.) x D (Typ.) x H (Max.)
TO252-3	6.50mm x 9.50mm x 2.50mm
TO252-5	6.50mm x 9.50mm x 2.50mm
TO220CP-V5	10.00mm x 20.12mm x 4.60mm
TO220FP-3	10.00mm x 30.50mm x 4.60mm
TO220FP-5	10.00mm x 30.50mm x 4.60mm
TO220FP-5(V5)	10.00mm x 31.50mm x 8.15mm



●Lineup Matrix

Part Number	Output Voltage (V)												Package
	1.5	1.8	2.5	3.0	3.3	5.0	6.0	7.0	8.0	9.0	10.0	Variable	
BAxxBC0WT	○	○	○	○	○	○	○	○	○	○	○	○	TO220FP-5
BAxxBC0WT-V5	○	○	○	-	○	○	-	-	-	○	-	○	TO220FP-5 (V5)
BAxxBC0WFP	○	○	○	○	○	○	○	○	○	○	○	○	TO252-5
BAxxBC0T	○	○	○	○	○	○	○	○	○	○	○	-	TO220FP-3
BAxxBC0FP	○	○	○	○	○	○	○	○	○	○	○	-	TO252-3
BA00BC0WCP-V5	-	-	-	-	-	-	-	-	-	-	-	○	TO220CP-V5

○Product structure：Silicon monolithic integrated circuit ○This product is not designed protection against radioactive rays.

●**Lineup**

Maximum output current(Max.)	Shutdown Switch	Package		Output voltage(Typ.)	Orderable Part Number
1A	With Switch	TO252-5	Reel of 2000	1.5 V	BA15BC0WFP-E2
				1.8 V	BA18BC0WFP-E2
				2.5 V	BA25BC0WFP-E2
				3.0 V	BA30BC0WFP-E2
				3.3 V	BA33BC0WFP-E2
				5.0 V	BA50BC0WFP-E2
				6.0 V	BA60BC0WFP-E2
				7.0 V	BA70BC0WFP-E2
				8.0 V	BA80BC0WFP-E2
				9.0 V	BA90BC0WFP-E2
				10.0 V	BAJ0BC0WFP-E2
				Variable	BA00BC0WFP-E2
		TO220FP-5	Tube of 500	1.5 V	BA15BC0WT
				1.8 V	BA18BC0WT
				2.5 V	BA25BC0WT
				3.0 V	BA30BC0WT
				3.3 V	BA33BC0WT
				5.0 V	BA50BC0WT
				6.0 V	BA60BC0WT
				7.0 V	BA70BC0WT
				8.0 V	BA80BC0WT
				9.0 V	BA90BC0WT
				10.0 V	BAJ0BC0WT
				Variable	BA00BC0WT
		TO220FP-5 (V5)	Tube of 500	1.5 V	BA15BC0WT-V5
				1.8 V	BA18BC0WT-V5
				2.5 V	BA25BC0WT-V5
				3.3 V	BA33BC0WT-V5
				5.0 V	BA50BC0WT-V5
				9.0 V	BA90BC0WT-V5
				Variable	BA00BC0WT-V5
		TO220CP-V5	Reel of 500	Variable	BA00BC0WCP-V5E2
	No Switch	TO252-3	Reel of 2000	1.5 V	BA15BC0FP-E2
				1.8 V	BA18BC0FP-E2
				2.5 V	BA25BC0FP-E2
				3.0 V	BA30BC0FP-E2
				3.3 V	BA33BC0FP-E2
				5.0 V	BA50BC0FP-E2
				6.0 V	BA60BC0FP-E2
				7.0 V	BA70BC0FP-E2
				8.0 V	BA80BC0FP-E2
				9.0 V	BA90BC0FP-E2
				10.0 V	BAJ0BC0FP-E2
		TO220FP-3	Tube of 500	1.5 V	BA15BC0T
				1.8 V	BA18BC0T
				2.5 V	BA25BC0T
				3.0 V	BA30BC0T
				3.3 V	BA33BC0T
				5.0 V	BA50BC0T
				6.0 V	BA60BC0T
				7.0 V	BA70BC0T
				8.0 V	BA80BC0T
				9.0 V	BA90BC0T
				10.0 V	BAJ0BC0T

●Block Diagrams / Standard Example Application Circuits / Pin Configurations / Pin Descriptions

[BAxxBC0T] / [BAxxBC0FP]

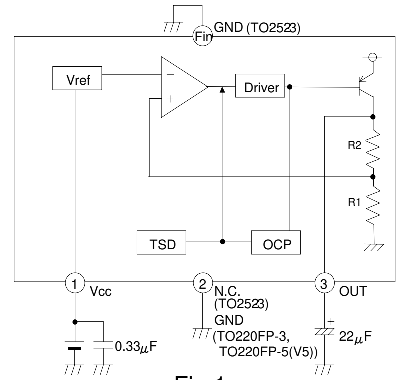
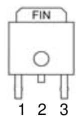
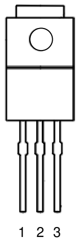


Fig.1

TOP VIEW



TO252-3



TO220FP-3

Pin No.	Pin name	Function
1	Vcc	Supply voltage input
2	N.C./GND	NC pin/GND *1
3	OUT	Voltage output
FIN	GND	GND*2

*1 NC pin for TO252-3 and GND pin for TO220FP-3 and TO220FP-5 (V5).
*2 TO252-3 only.

PIN	External capacitor setting range
Vcc (1Pin)	Approximately 0.33μF.
OUT (3Pin)	22μF to 1000μF

[BAxxBC0WT] / [BAxxBC0WT-V5] / [BAxxBC0WFP]

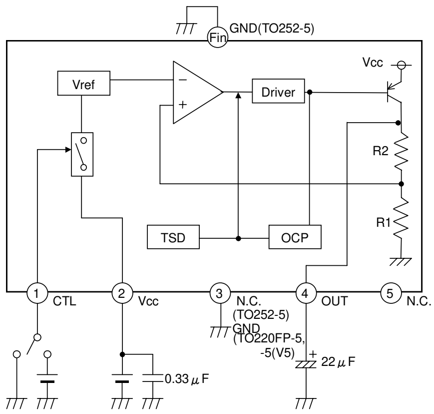
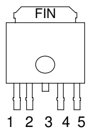
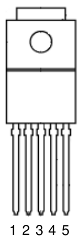


Fig.2

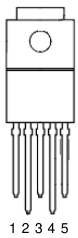
TOP VIEW



TO252-5



TO220FP-5



TO220FP-5 (V5)

Pin No.	Pin name	Function
1	CTL	Output voltage on/off control
2	Vcc	Supply voltage input
3	N.C./GND	NC pin/GND*1
4	OUT	Power supply output
5	N.C.	NC pin
FIN	GND	GND*2

*1 NC pin for TO252-5 and GND pin for TO220FP-5 and TO220FP-5 (V5).
*2 TO252-5 only.

PIN	External capacitor setting range
Vcc (2Pin)	Approximately 0.33μF.
OUT (4Pin)	22μF to 1000μF

[BA00BC0WT] / [BA00BC0WCP-V5] / [BA00BC0WFP] / [BA00BC0WT-V5]

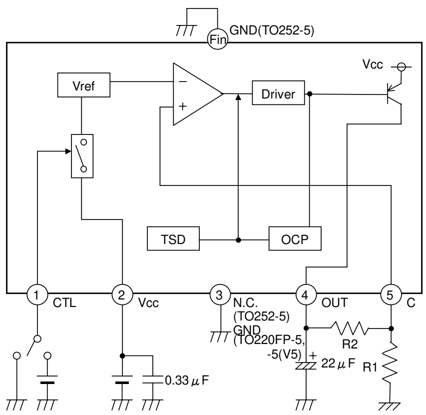
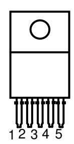
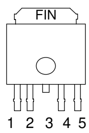


Fig.3

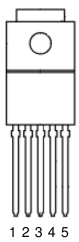
TOP VIEW



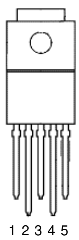
TO220CP-V5



TO252-5



TO220FP-5



TO220FP-5 (V5)

Pin No.	Pin name	Function
1	CTL	Output voltage on/off control
2	Vcc	Supply voltage input
3	N.C./GND	NC pin/GND*1
4	OUT	Power supply output
5	C	ADJ pin
FIN	GND	GND*2

*1 NC pin for TO252-5 and GND pin for TO220FP-5 and TO220FP-5 (V5).
*2 TO252-5 only.

PIN	External capacitor setting range
Vcc (2Pin)	Approximately 0.33μF.
OUT (4Pin)	22μF to 1000μF

●Absolute Maximum Ratings (Ta = 25°C)

Parameter		Symbol	Limits	Unit
Power supply voltage		V_{CC}	18*1	V
Power dissipation	TO252-3	Pd	1200*2	mW
	TO252-5		1300*3	
	TO220FP-3		2000*4	
	TO220FP-5		2000*4	
	TO220FP-5 (V5)		2000*4	
	TO220CP-V5		2000*4	
Operating temperature range		T_{opr}	−40 to +105	°C
Ambient storage temperature		T_{stg}	−55 to +150	°C
Maximum junction temperature		T_{jmax}	150	°C

*1 Must not exceed Pd.
*2 Derated at 9.6mW/°C at Ta>25°C when mounted on a glass epoxy board (70 mm × 70 mm × 1.6 mm).
*3 Derated at 10.4mW/°C at Ta>25°C when mounted on a glass epoxy board (70 mm × 70 mm × 1.6 mm).
*4 Derated at 16mW/°C at Ta> 25°C

●Recommended Operating Ratings

Parameter	Symbol	Min.	Max.	Unit
Input power supply voltage	V_{CC}*5	3.0	16.0	V
Input power supply voltage	V_{CC}*6	V_o+1.0	16.0	V
Output current	I_O	-	1	A
Variable output voltage setting value	V_O	1.5	12	V

*5 When output voltage is 1.5 V, 1.8 V, or 2.5 V. *6 When output voltage is 3.0 V or higher.

●Electrical Characteristics

BAxxBC0 Series BAxxBC0W Series (Unless otherwise specified, Ta = 25°C; V_{CTL} = 3 V; VCCDC*7)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Output voltage	V_O	V_O (T) ×0.98	V_O (T)	V_O (T) × 1.02	V	Io = 200mA
Shutdown circuit current	Isd	-	0	10	μA	V_{CTL} = 0 V while in off mode
Minimum I/O voltage difference*8	ΔVd	-	0.3	0.5	V	Io = 200mA, Vcc = 0.95 × Vo
Output current capacity	I_O	1	-	-	A	
Input stability*9	Reg.I	-	15	35	mV	Vcc= Vo+1.0V→16V, Io = 200mA
Load stability	Reg.L	-	35	75	mV	Io = 0mA →1 A
Temperature coefficient of output voltage*10	Tcvo	-	±0.02	-	%/°C	Io = 5mA、Tj = 0°C to 125℃

Vo (T): Set output voltage
*7 Vo = 1.5 V, 1.8 V, 2.5 V : Vcc = 3.3 V, Vo = 3.0 V, 3.3 V : Vcc = 5 V,
Vo = 5.0 V : Vcc : 8 V, Vo = 6.0 V : Vcc = 9 V, Vo = 8.0 V : Vcc = 11 V,
Vo = 9.0 V : Vcc = 12 V, Vo = 10.0 V : Vcc = 13 V
*8 Vo ≥ 3.3 V
*9 Change Vcc from 3.0 V to 6 V if 1.5 V ≤ Vo ≤ 2.5 V.
*10 Not 100% tested

BA00BC0W Series (Unless otherwise specified, Ta=25℃, Vcc=3.3V, V_{CTL}=3V, Io=200mA, Vo=2.5V setting)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Shutdown circuit current	Isd	-	0	10	μA	V_{CTL} = 0V while in OFF mode
Bias Current	Ib	-	0.5	0.9	mA	I_O = 0mA
Reference voltage(CTL terminal)	Vc	1.225	1.250	1.275	V	I_O = 50mA
Minimum I/O voltage difference	ΔVd	-	0.3	0.5	V	I_O = 500mA, V_{CC} = 2.5V
Output current capacity	Io	1	-	-	A	
Ripple Rejection	R.R.	44	55	-	dB	f=120Hz, ein※12=-20dBV, Io=100mA
Input stability	Reg.I	-	15	30	mV	Vcc = Vo + 1.0 V→16V, Io = 200mA
Load stability	Reg.L	-	35	75	mV	I_O = 0mA →1A
Temperature coefficient of output voltage*11	Tcvo	-	±0.02	-	%/°C	I_O = 5mA, Tj=0°C to 125°C
Output Short Current	Ios	-	0.40	-	A	Vcc=16V
CTL ON Mode Voltage	Vth1	2.0	-	-	V	ACTIVE MODE, I_O = 0mA
CTL OFF Mode Voltage	Vth2	-	-	0.8	V	OFF MODE, I_O = 0mA
CTL Input Current	Iin	40	80	130	μA	I_O = 0mA

*11 Not 100% tested *12 ein=Input Voltage Ripple

●**Typical Performance Curves** (Unless otherwise specified, Ta = 25°C, Vcc = 8 V, VCTL = 2 V, IO = 0 mA)

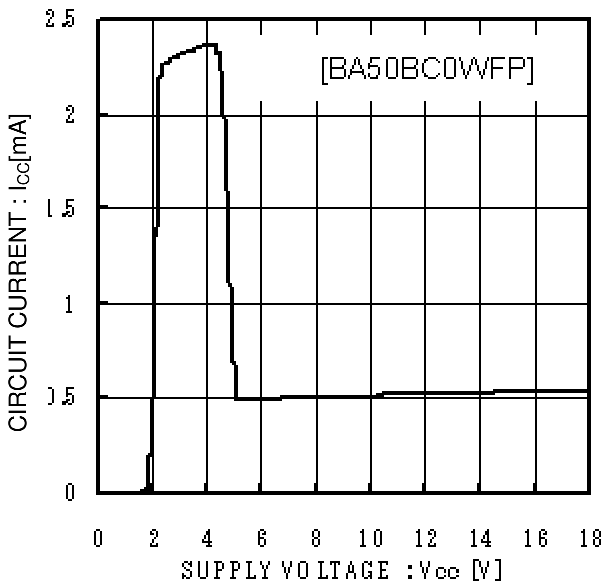


Fig.4
Circuit Current

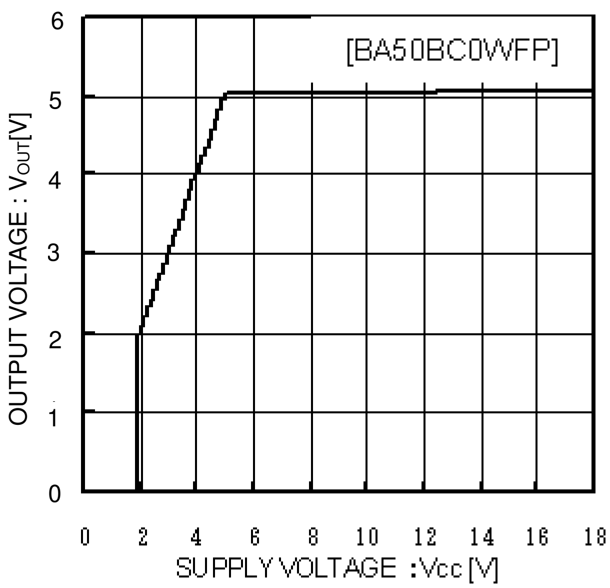


Fig.5
Input Stability (Io=0mA)

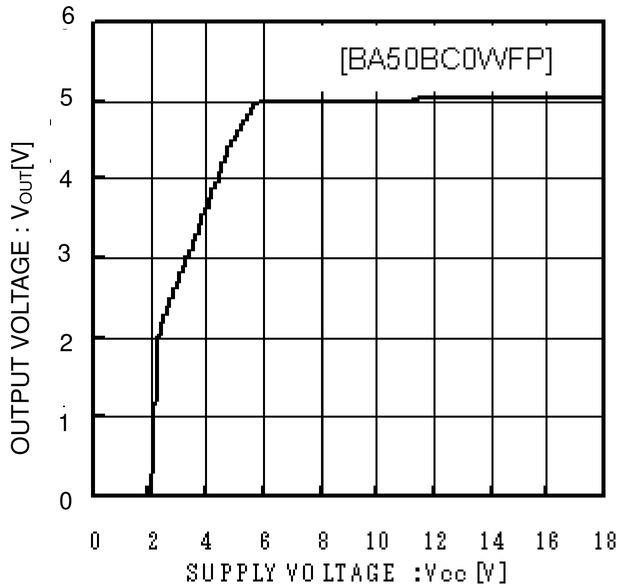


Fig.6
Input Stability (Io = 1 A)

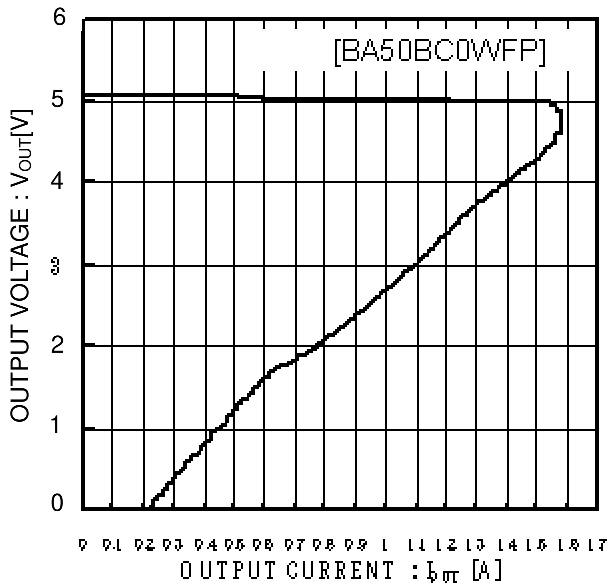


Fig.7
Load Stability

●Typical Performance Curves - continued

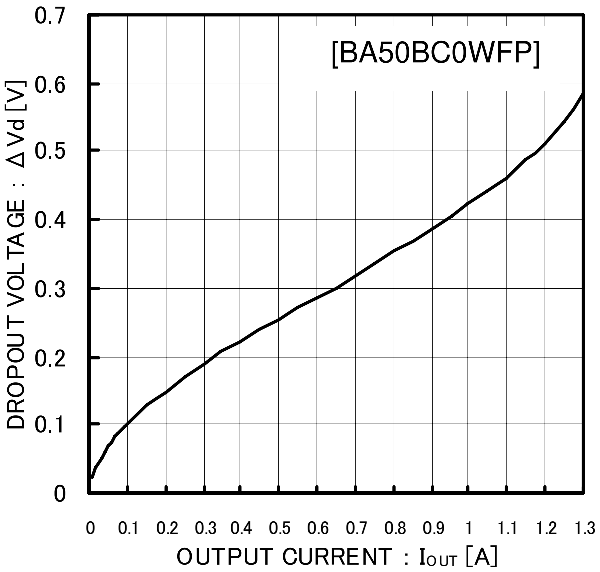


Fig.8
I/O Voltage Difference

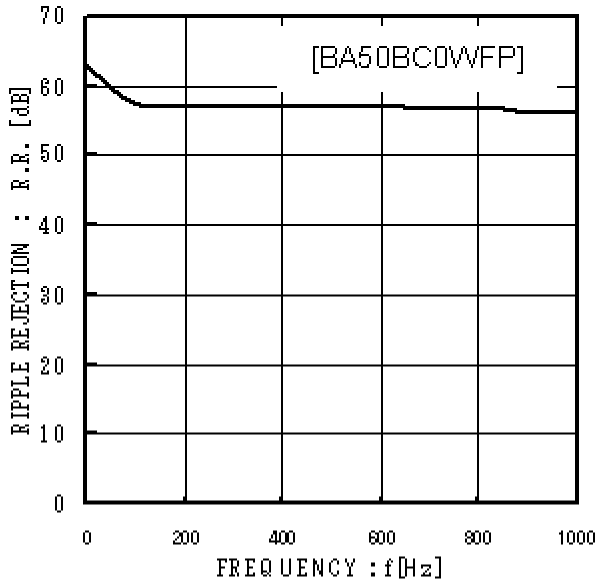


Fig.9
Ripple Rejection

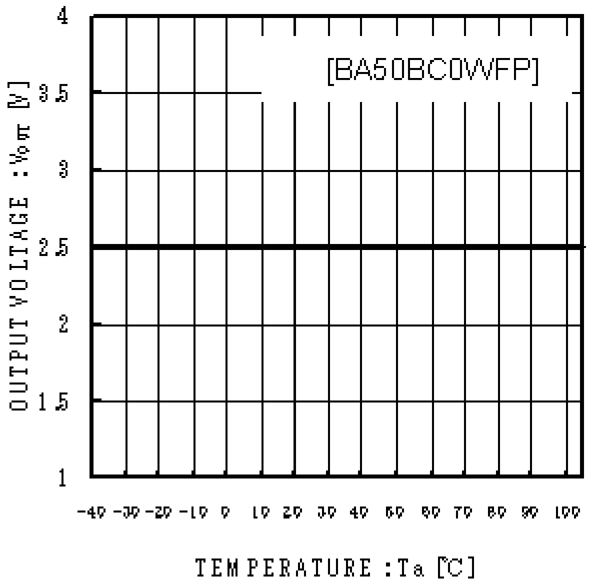


Fig.10
Output Voltage vs Temperature

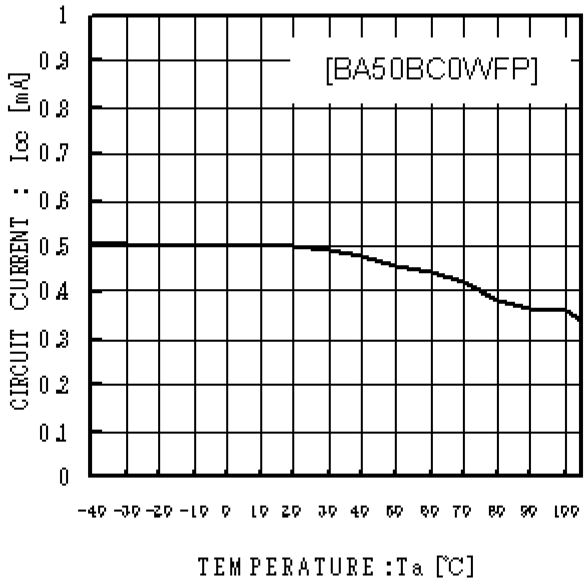


Fig.11
Circuit Current Temperature

●**Typical Performance Curves - continued**

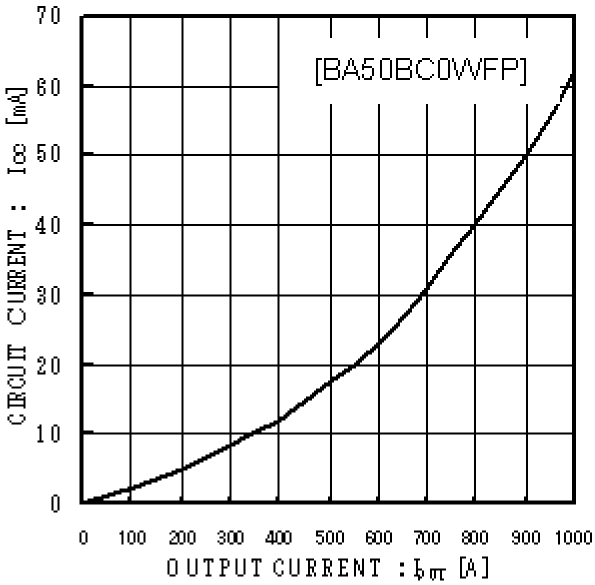


Fig.12
Circuit Current Classified by Load

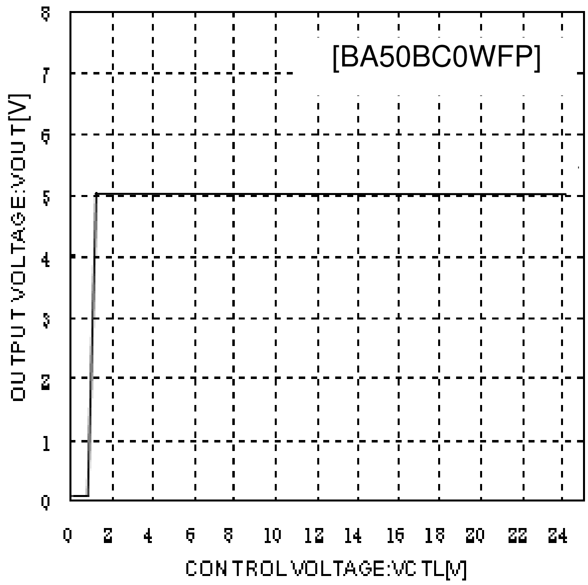


Fig.13
CTL Voltage vs Output Voltage

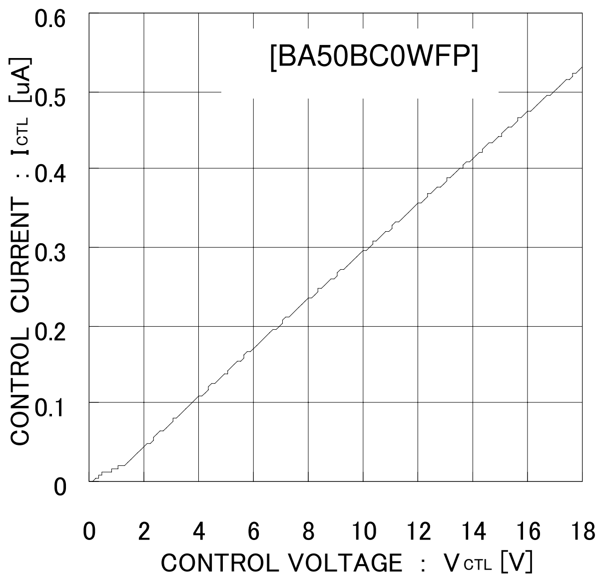


Fig.14
CTL Voltage vs CTL Current

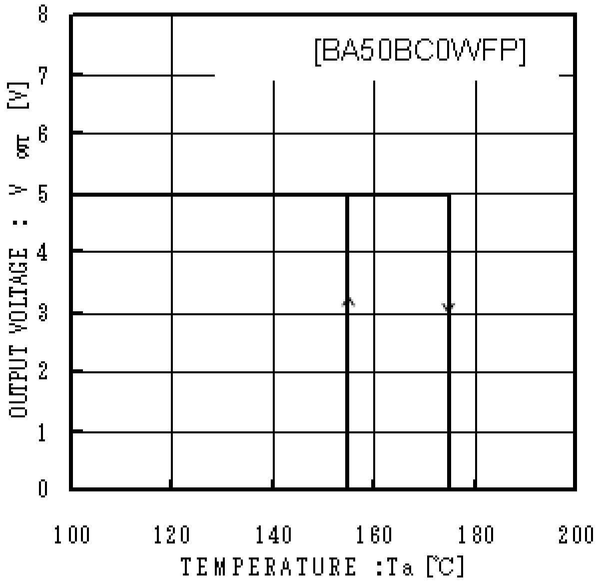


Fig.15
Thermal Shutdown Circuit

Application Information

●**I/O equivalence circuit**

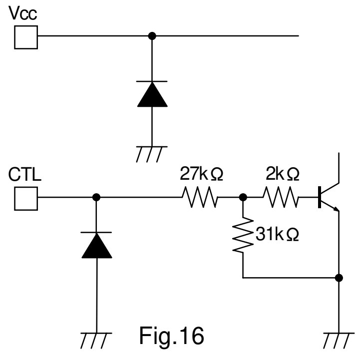


Fig.16

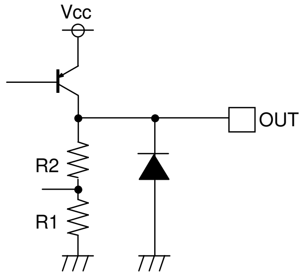


Fig.17

* For the BA00BC0WT, connect R1 and R2 externally between the C and GND pins and between the OUT and C pins.

Equation: V_O = Vc × (R1 + R2) / R1
(Vc = 1.25 V (Typ.))
The recommended R1 value is approximately 30 kΩ to 150 kΩ.

●**Power Dissipation**

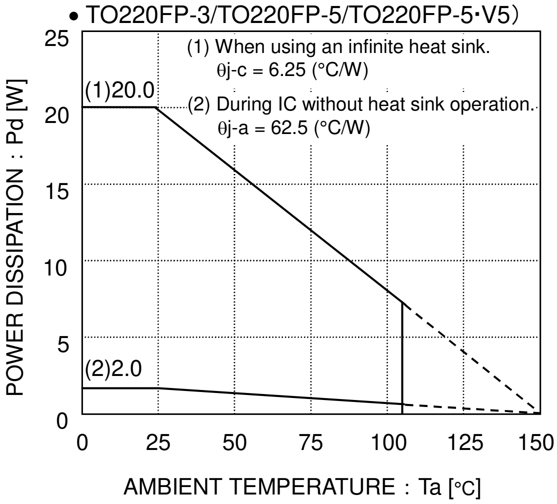


Fig.18

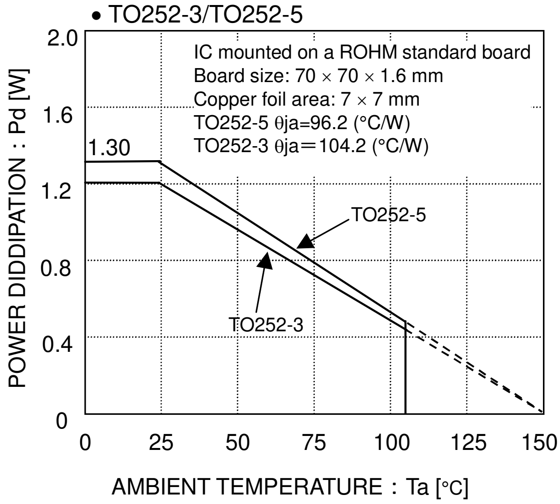


Fig.19

The characteristics of the IC are greatly influenced by the operating temperature. If the temperature exceeds the maximum junction temperature T_{jmax}, deterioration or damage may occur. Implement proper thermal designs to ensure that power dissipation is within the permissible range in order to prevent instantaneous damage resulting from heat and maintain the reliability of the IC for long-term operation.

The following method is used to calculate the power consumption Pc (W).

$$Pc = (Vcc - Vo) \times Io + Vcc \times Icca$$

Power dissipation Pd ≧ Pc

Vcc : Input voltage
Vo : Output current
I_O : Load current
Icca : Circuit current

The load current Io is calculated:

$$Io \leqq \frac{Pd - Vcc \times Icca}{Vcc - Vo}$$

Calculation Example:
Vcc = 6.0 V and Vo = 5.0 V at Ta = 85°C

$$Io \leqq \frac{0.676 - 6.0 \times Icca}{6.0 - 5.0}$$

θja = 96.2°C/W → −10.4mW/°C
25°C = 1300mW → 85°C = 676mW

Io ≦ 550mA (Icca ≈ 20mA)

Refer to the above and implement proper thermal designs so that the IC will not be used under excessive power dissipation conditions under the entire operating temperature range.
The power consumption Pc of the IC in the event of shorting (i.e. the Vo and GND pins are shorted) can be obtained from the following equation:
Pc = Vcc × (Icca + Ishort) (Ishort: short current).

●Peripheral Circuit Considerations

- Vcc pin
  Insert a capacitor (0.33µF approx.) between V_{CC} and GND.
  The capacitance will vary depending on the application. Use a suitable capacitance and implement designs with sufficient margins.

- GND pin
  Verify that there is no potential difference between the ground of the application board and the IC.
  If there is a potential difference, the set voltage will not be output accurately, resulting in unstable IC operation. Therefore, lower the impedance by designing the ground pattern as wide and as short as possible.

- CTL terminal

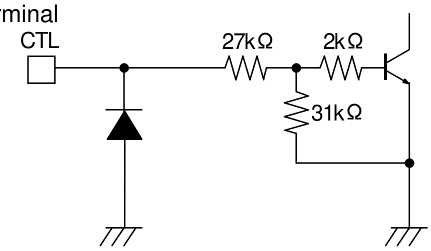


Fig.20 Input Equivalent Circuit

The CTL terminal turns on at an operating power supply voltage of 2.0 V or higher and turns off at 0.8 V or lower.
There is no particular order when turning the power supply and CTL terminals on or off.

●Vo Terminal

Insert a capacitor between the Vo and GND pins in order to prevent output oscillation.

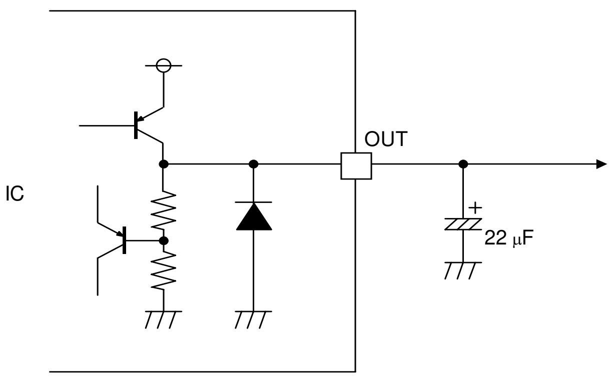


Fig.21 Output Equivalent Circuit

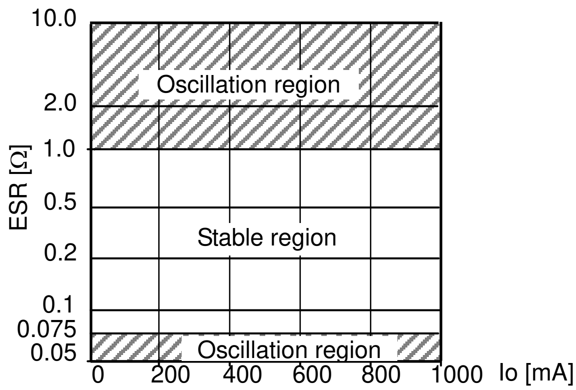


Fig.22 ESR vs. I_O (22µF)

The capacitance may vary greatly with temperature changes, thus making it impossible to completely prevent oscillation. Therefore, use a tantalum aluminum electrolytic capacitor with a low ESR (Equivalent Serial Resistance). The output will oscillate if the ESR is too high or too low, so refer to the ESR characteristics in Fig.22 and operate the IC within the stable region. Use a capacitor within a capacitance between 22µF and 1,000µF.
Below figure, it is ESR-to-Io stability Area characteristics, measured by 22µ F -ceramic-capacitor and resistor connected in series.
This characteristic is not equal value perfectly to 22µ F -aluminum electrolytic capacitor in order to measurement method.
Note, however, that the stable range suggested in the figure depends on the IC and the resistance load involved, and can vary with the board's wiring impedance, input impedance, and/or load impedance. Therefore, be certain to ascertain the final status of these items for actual use.
Keep capacitor capacitance within a range of 22µF to 1000µF. It is also recommended that a 0.33µF bypass capacitor be connected as close to the input pin-GND as location possible. However, in situations such as rapid fluctuation of the input voltage or the load, please check the operation in real application to determine proper capacitance.

●**Operational Notes**

1. Absolute maximum ratings
An excess in the absolute maximum ratings, such as supply voltage, temperature range of operating conditions, etc., can break down the devices, thus making impossible to identify breaking mode, such as a short circuit or an open circuit. If any over rated values will expect to exceed the absolute maximum ratings, consider adding circuit protection devices, such as fuses.

2. GND voltage
The potential of GND pin must be minimum potential in all operating conditions.

3. Thermal design
Use a thermal design that allows for a sufficient margin in light of the power dissipation (Pd) in actual operating conditions.

4. Inter-pin shorts and mounting errors
Use caution when positioning the IC for mounting on printed circuit boards.
The IC may be damaged if there is any connection error or if pins are shorted together.

5. Actions in strong electromagnetic field
Use caution when using the IC in the presence of a strong electromagnetic field as doing so may cause the IC to malfunction.

6. Testing on application boards
When testing the IC on an application board, connecting a capacitor to a pin with low impedance subjects the IC to stress. Always discharge capacitors after each process or step. Always turn the IC's power supply off before connecting it to or removing it from a jig or fixture during the inspection process. Ground the IC during assembly steps as an antistatic measure. Use similar precaution when transporting or storing the IC.

7. Regarding input pin of the IC
This monolithic IC contains P+ isolation and P substrate layers between adjacent elements in order to keep them isolated.
P-N junctions are formed at the intersection of these P layers with the N layers of other elements, creating a parasitic diode or transistor. For example, the relation between each potential is as follows:
When GND > PIN A and GND > PIN B, the P-N junction operates as a parasitic diode.
When GND > PIN B, the P-N junction operates as a parasitic transistor.
Parasitic diodes can occur inevitable in the structure of the IC. The operation of parasitic diodes can result in mutual interference among circuits, operational faults, or physical damage. Accordingly, methods by which parasitic diodes operate, such as applying a voltage that is lower than the GND (P substrate) voltage to an input pin, should not be used.

8. Ground Wiring Pattern
When using both small signal and large current GND patterns, it is recommended to isolate the two ground patterns, placing a single ground point at the ground potential of application so that the pattern wiring resistance and voltage variations caused by large currents do not cause variations in the small signal ground voltage. Be careful not to change the GND wiring pattern of any external components, either.

9. Thermal shutdown circuit
The IC incorporates a built-in thermal shutdown circuit (TSD circuit). The thermal shutdown circuit (TSD circuit) is designed only to shut the IC off to prevent thermal runaway. It is not designed to protect the IC or guarantee its operation. Do not continue to use the IC after operating this circuit or use the IC in an environment where the operation of this circuit is assumed.

10. Overcurrent Protection Circuit
An overcurrent protection circuit is incorporated in order to prevention destruction due to short-time overload currents. Continued use of the protection circuits should be avoided. Please note that the current increases negatively impact the temperature.

11. Damage to the internal circuit or element may occur when the polarity of the Vcc pin is opposite to that of the other pins in applications. (I.e. Vcc is shorted with the GND pin while an external capacitor is charged.) Use a maximum capacitance of 1000µF for the output pins. Inserting a diode to prevent back-current flow in series with Vcc or bypass diodes between Vcc and each pin is recommended.

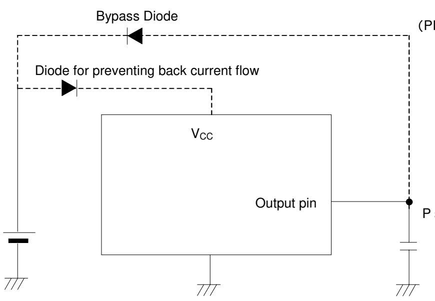


Fig.23 Bypass Diode

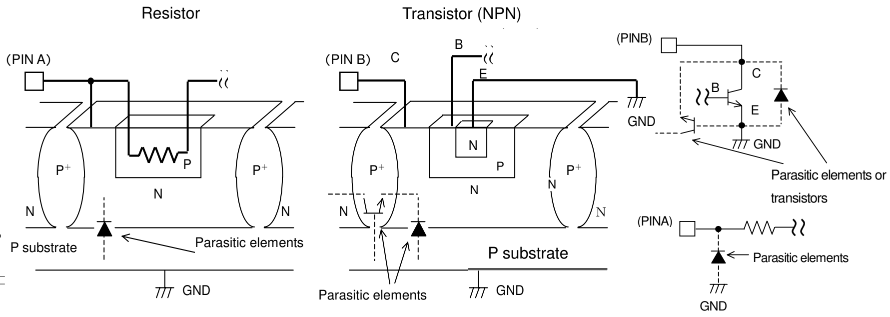


Fig.24 Example of Simple Bipolar IC Architecture

Status of this document
The Japanese version of this document is formal specification. A customer may use this translation version only for a reference to help reading the formal version.
If there are any differences in translation version of this document formal version takes priority.

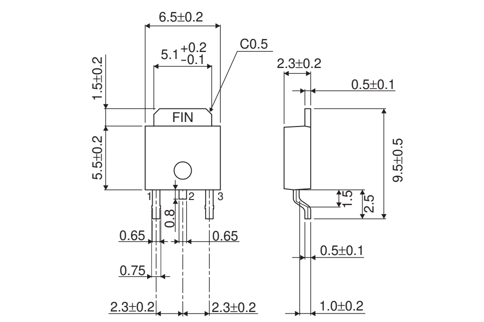
●Ordering Information

B	A	x	x	B	C	0	x	x	x	-	E2

Part Number	Output voltage	Current capacity	Shutdown switch	Packages	Packaging and forming specification
	00:Variable Other:Fixed	BC0 : 1A	W : Include None:Without	FP : TO252-3 TO252-5 T : TO220FP-3 TO220FP-5 TO220FP-5(V5) CP : TO220CP-V5	E2: Embossed tape and reel None: Container tube

●Physical Dimension Tape and Reel Information

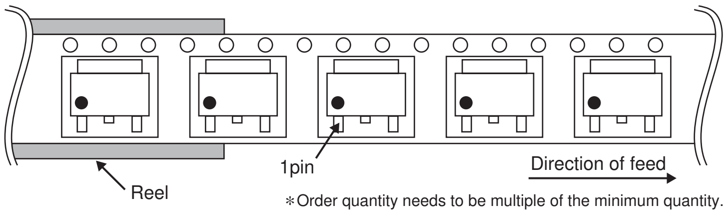
TO252-3



(Unit : mm)

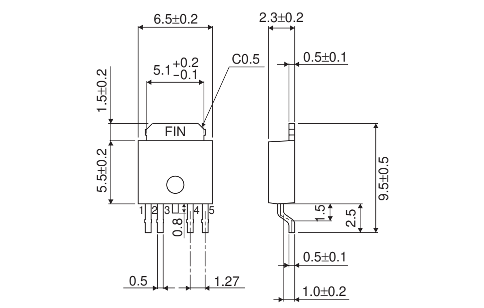
<Tape and Reel information>

Tape	Embossed carrier tape
Quantity	2000pcs
Direction of feed	E2 (The direction is the 1pin of product is at the lower left when you hold reel on the left hand and you pull out the tape on the right hand)



*Order quantity needs to be multiple of the minimum quantity.

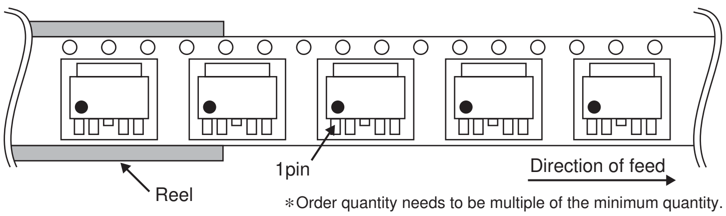
TO252-5



(Unit : mm)

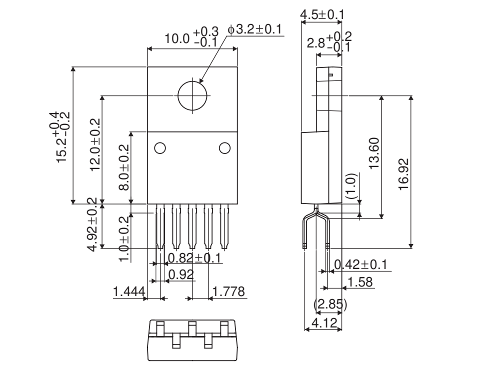
<Tape and Reel information>

Tape	Embossed carrier tape
Quantity	2000pcs
Direction of feed	E2 (The direction is the 1pin of product is at the lower left when you hold reel on the left hand and you pull out the tape on the right hand)



*Order quantity needs to be multiple of the minimum quantity.

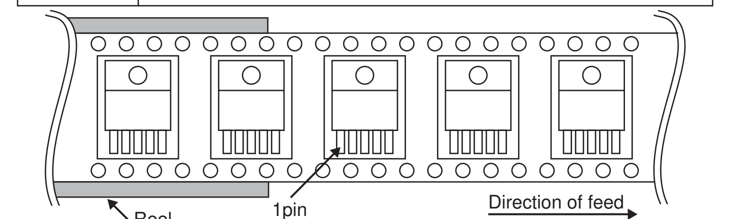
TO220CP-V5



(Unit : mm)

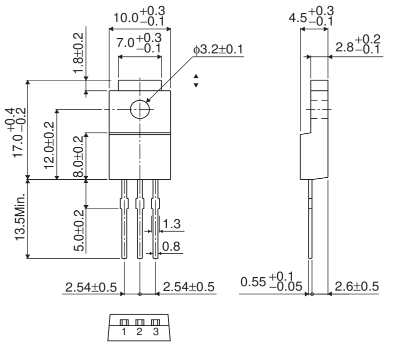
<Tape and Reel information>

Tape	Embossed carrier tape
Quantity	500pcs
Direction of feed	E2 (The direction is the 1pin of product is at the lower left when you hold reel on the left hand and you pull out the tape on the right hand)



*Order quantity needs to be multiple of the minimum quantity.

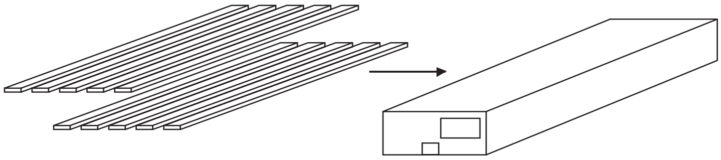
TO220FP-3



(Unit : mm)

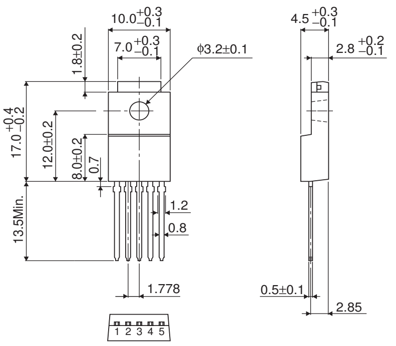
<Tape and Reel information>

Container	Tube
Quantity	500pcs
Direction of feed	Direction of products is fixed in a container tube



∗Order quantity needs to be multiple of the minimum quantity.

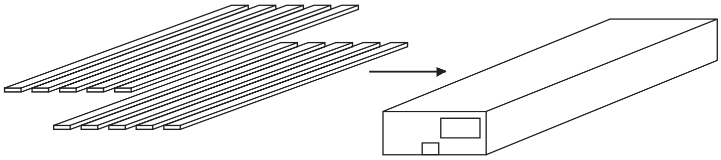
TO220FP-5



(Unit : mm)

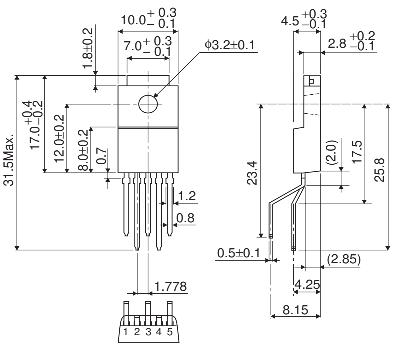
<Tape and Reel information>

Container	Tube
Quantity	500pcs
Direction of feed	Direction of products is fixed in a container tube



∗Order quantity needs to be multiple of the minimum quantity.

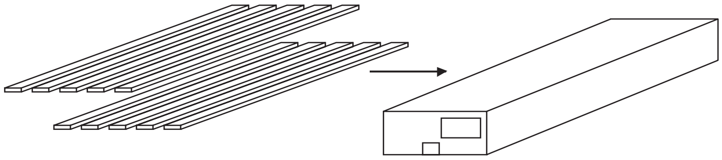
TO220FP-5(V5)



(Unit : mm)

<Tape and Reel information>

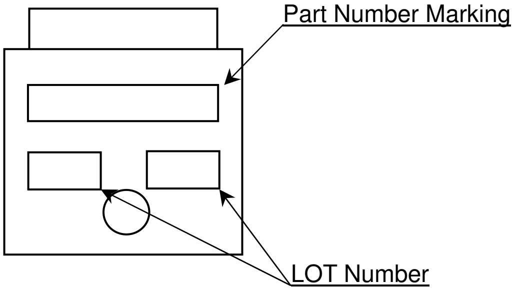
Container	Tube
Quantity	500pcs
Direction of feed	Direction of products is fixed in a container tube



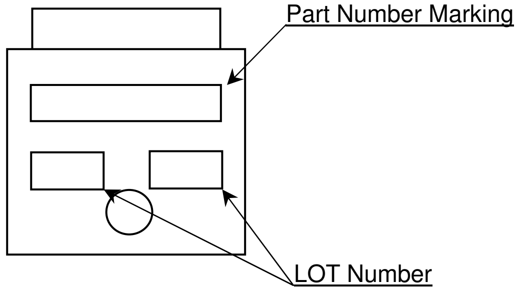
∗Order quantity needs to be multiple of the minimum quantity.

● **Marking Diagrams**

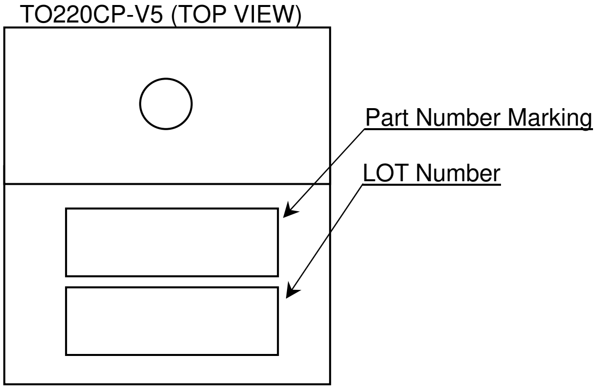
TO252-3
(TOP VIEW)



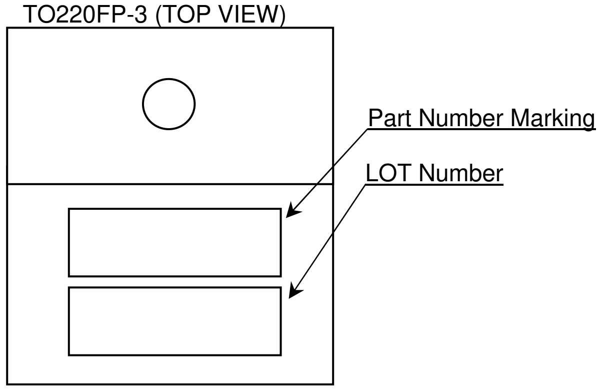
TO252-5
(TOP VIEW)



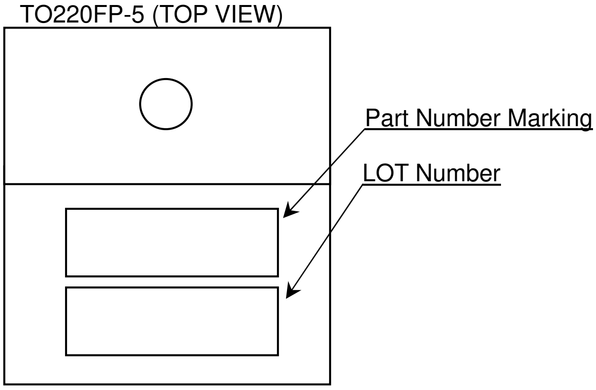
TO220CP-V5 (TOP VIEW)



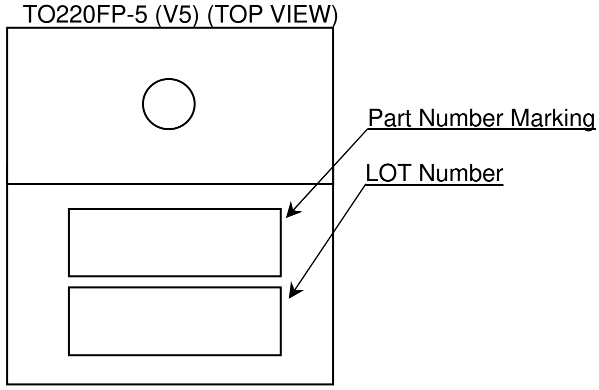
TO220FP-3 (TOP VIEW)



TO220FP-5 (TOP VIEW)



TO220FP-5 (V5) (TOP VIEW)



Orderable Part Number	Package	Part Number Marking
BA15BC0WFP-E2	TO252-5	15BC0W
BA18BC0WFP-E2		18BC0W
BA25BC0WFP-E2		25BC0W
BA30BC0WFP-E2		30BC0W
BA33BC0WFP-E2		33BC0W
BA50BC0WFP-E2		50BC0W
BA60BC0WFP-E2		60BC0W
BA70BC0WFP-E2		70BC0W
BA80BC0WFP-E2		80BC0W
BA90BC0WFP-E2		90BC0W
BAJ0BC0WFP-E2		J0BC0W
BA00BC0WFP-E2		00BC0W
BA15BC0WT	TO220FP-5	15BC0W
BA18BC0WT		18BC0W
BA25BC0WT		25BC0W
BA30BC0WT		30BC0W
BA33BC0WT		33BC0W
BA50BC0WT		50BC0W
BA60BC0WT		60BC0W
BA70BC0WT		70BC0W
BA80BC0WT		80BC0W
BA90BC0WT		90BC0W
BAJ0BC0WT		J0BC0W
BA00BC0WT		00BC0W
BA15BC0WT-V5	TO220FP-5 (V5)	15BC0W
BA18BC0WT-V5		18BC0W
BA25BC0WT-V5		25BC0W
BA33BC0WT-V5		33BC0W
BA50BC0WT-V5		50BC0W
BA90BC0WT-V5		90BC0W
BA00BC0WT-V5		00BC0W
BA00BC0WCP-V5E2	TO220CP-V5	00BC0W
BA15BC0FP-E2	TO252-3	BA15BC0
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BA70BC0T		BA70BC0
BA80BC0T		BA80BC0
BA90BC0T		BA90BC0
BAJ0BC0T		BAJ0BC0

●Revision History

Date	Revision	Changes
26.Jun.2012	001	New Release

Notice

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   [a] Use of our Products in any types of liquid, including water, oils, chemicals, and organic solvents
   [b] Use of our Products outdoors or in places where the Products are exposed to direct sunlight or dust
   [c] Use of our Products in places where the Products are exposed to sea wind or corrosive gases, including Cl_2, H_2S, NH_3, SO_2, and NO_2
   [d] Use of our Products in places where the Products are exposed to static electricity or electromagnetic waves
   [e] Use of our Products in proximity to heat-producing components, plastic cords, or other flammable items
   [f] Sealing or coating our Products with resin or other coating materials
   [g] Use of our Products without cleaning residue of flux (even if you use no-clean type fluxes, cleaning residue of flux is recommended); or Washing our Products by using water or water-soluble cleaning agents for cleaning residue after soldering
   [h] Use of the Products in places subject to dew condensation

4) The Products are not subject to radiation-proof design.

5) Please verify and confirm characteristics of the final or mounted products in using the Products.

6) In particular, if a transient load (a large amount of load applied in a short period of time, such as pulse) is applied, confirmation of performance characteristics after on-board mounting is strongly recommended. Avoid applying power exceeding normal rated power; exceeding the power rating under steady-state loading condition may negatively affect product performance and reliability.

7) De-rate Power Dissipation (Pd) depending on Ambient temperature (Ta). When used in sealed area, confirm the actual ambient temperature.

8) Confirm that operation temperature is within the specified range described in the product specification.

9) ROHM shall not be in any way responsible or liable for failure induced under deviant condition from what is defined in this document.

●Precaution for Mounting / Circuit board design

1) When a highly active halogenous (chlorine, bromine, etc.) flux is used, the residue of flux may negatively affect product performance and reliability.

2) In principle, the reflow soldering method must be used; if flow soldering method is preferred, please consult with the ROHM representative in advance.

For details, please refer to ROHM Mounting specification

●Precautions Regarding Application Examples and External Circuits

1) If change is made to the constant of an external circuit, please allow a sufficient margin considering variations of the characteristics of the Products and external components, including transient characteristics, as well as static characteristics.

2) You agree that application notes, reference designs, and associated data and information contained in this document are presented only as guidance for Products use. Therefore, in case you use such information, you are solely responsible for it and you must exercise your own independent verification and judgment in the use of such information contained in this document. ROHM shall not be in any way responsible or liable for any damages, expenses or losses incurred by you or third parties arising from the use of such information.

●Precaution for Electrostatic

This Product is electrostatic sensitive product, which may be damaged due to electrostatic discharge. Please take proper caution in your manufacturing process and storage so that voltage exceeding the Products maximum rating will not be applied to Products. Please take special care under dry condition (e.g. Grounding of human body / equipment / solder iron, isolation from charged objects, setting of Ionizer, friction prevention and temperature / humidity control).

●Precaution for Storage / Transportation

1) Product performance and soldered connections may deteriorate if the Products are stored in the places where:
   [a] the Products are exposed to sea winds or corrosive gases, including Cl2, H2S, NH3, SO2, and NO2
   [b] the temperature or humidity exceeds those recommended by ROHM
   [c] the Products are exposed to direct sunshine or condensation
   [d] the Products are exposed to high Electrostatic

2) Even under ROHM recommended storage condition, solderability of products out of recommended storage time period may be degraded. It is strongly recommended to confirm solderability before using Products of which storage time is exceeding the recommended storage time period.

3) Store / transport cartons in the correct direction, which is indicated on a carton with a symbol. Otherwise bent leads may occur due to excessive stress applied when dropping of a carton.

4) Use Products within the specified time after opening a humidity barrier bag. Baking is required before using Products of which storage time is exceeding the recommended storage time period.

●Precaution for Product Label

QR code printed on ROHM Products label is for ROHM's internal use only.

●Precaution for Disposition

When disposing Products please dispose them properly using an authorized industry waste company.

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