

Audio level sensor

BA335

The BA335 is a sensor amplifier which consists of three blocks : a small signal audio amplifier, a hysteresis comparator, and a driver. Housed in a 9-pin SIP package, it is optimal for tape recorder end detection and tape mute detection.

●Applications

Tape end detection
Tape mute detection

●Features

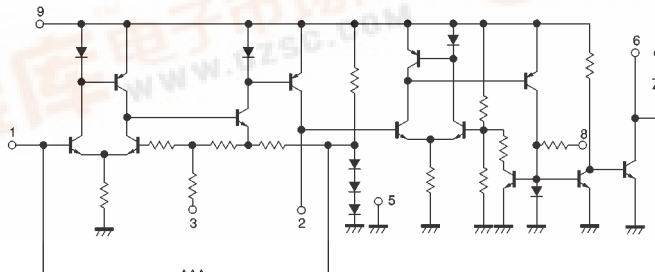
- 1) Built-in comparator with stable hysteresis under power supply voltage and temperature fluctuations.
- 2) Built-in transistor and diode capable of driving an inductive load at 600mA.
- 3) Time delays can be created as needed with an external CR circuit.

●Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits	Unit
Power supply voltage	V _{CC}	15	V
Power dissipation	P _d	500*	mW
Operating temperature	T _{opr}	-20~+75	°C
Storage temperature	T _{stg}	-50~+125	°C
Maximum transistor collector current	I _{F Max.}	750	mA
Maximum diode forward current	I _{C Max.}	750	mA

* Reduced by 5.0mW for each increase in Ta of 1°C over 25°C.

●Internal circuit schematic



● Electrical characteristics (unless otherwise noted, $T_a = 25^\circ\text{C}$ and $V_{CC} = 9.0\text{V}$)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Quiescent current	I_Q	—	6	13	mA	—
Output transistor leak current	I_{L1}	—	—	100	μA	—
Output diode leak current	I_{L2}	—	—	100	μA	—
Output transistor saturation voltage	$V_{CE(sat)}$	—	1.5	2.0	V	$I_C=600\text{mA}$
Output diode forward voltage	V_F	—	1.5	2.0	V	$I_F=600\text{mA}$
Input discrimination off level	V_{IN}	-54	-50	-43	dBm	$f=1\text{kHz}$
Comparator on level	V_{TH1}	3.0	3.5	4.0	V	—
Comparator off level	V_{TH2}	1.8	2.2	2.6	V	—
Pin 8 high level	V_{P8}	0.45	0.55	—	V	—

● Measurement circuit

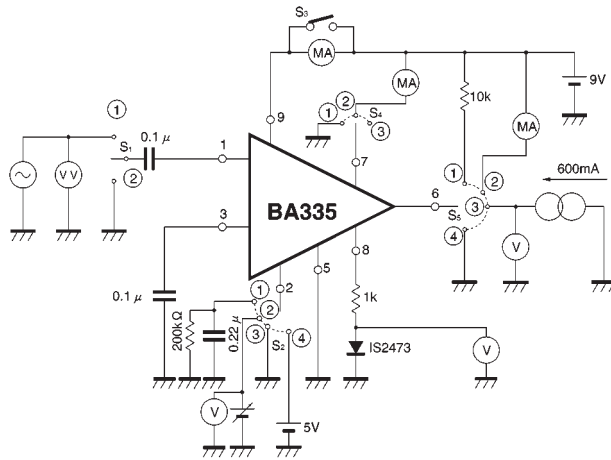


Fig. 1

	S1	S2	S3	S4	S5	
I_{CC1}	2	1	Open	3	1	Current test
I_{L1}	2	4	Short	2	2	Pin 7 current test
I_{L2}	2	4	Short	2	2	Pin 6 current test
$V_{CE(sat)}$	2	3	Short	3	3	Pin 6 voltage test
V_F	2	4	Short	1	3	Pin 6 voltage test
V_{IN}	1	1	Short	3	1	V.V test when Pin 6 inverted
$V \rightarrow H1$	2	2	Short	3	1	Pin 2 voltage test when Pin 6 inverted
$V \rightarrow H2$	2	2	Short	3	1	Pin 2 voltage test when Pin 6 inverted
V_{P8}	2	4	Short	3	1	Pin 8 voltage test

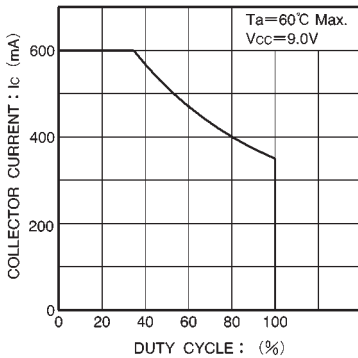


Fig. 2 Ic duty cycle characteristics

● Attached components

C₁ : Input coupling capacitor. 1 to 2.2μF recommended.

C₂ : AC bypass capacitor. 0.1 to 0.47μF recommended.

R₁, C₃ : Resistor and capacitor for setting time delay.

R₂, C₄ : Resistor and capacitor for ripple filter.

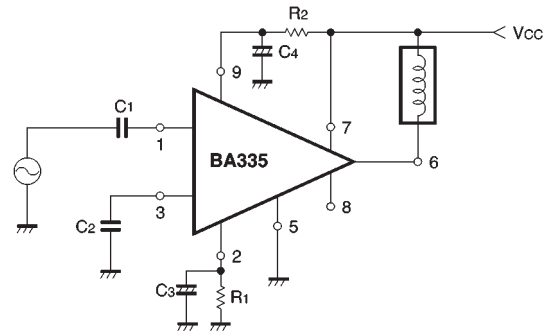


Fig. 3

● Input characteristics

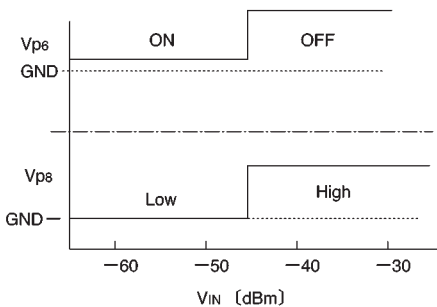


Fig. 4

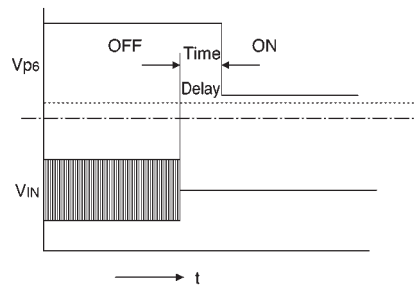


Fig. 5

As shown in Fig. 4, V_{P6} and V_{P8} invert when the input reaches approximately -45dBm. V_{P8} is designed to be able to directly drive the NPN small signal transistor at this time. When on, V_{P6} is capable of accepting a maximum of 600mA of current (this will vary as shown in the duty cycle table). A continuous ON should last for no more than 3 seconds.

Time delay using the hysteresis comparator is as follows. When an input signal of -45dBm or more goes to nothing ceases, the electrical potential of Pin 2 begins to fall due to the CR circuit connected to Pin 2. The time until the hysteresis comparator inverts is the time delay. When deciding the values of the capacitor and resistor, select a resistor value from 100 to 500kΩ.

● Electrical characteristic curves

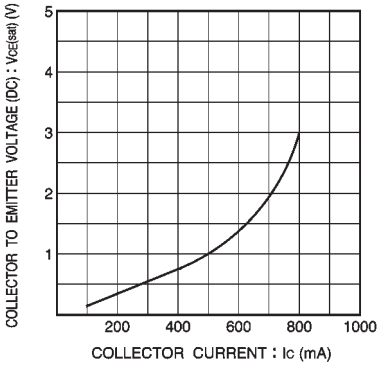


Fig.6 Output transistor saturation voltage vs. collector current

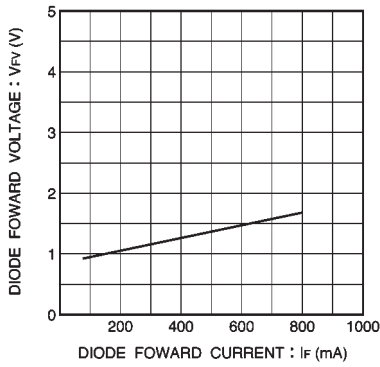


Fig. 7 Output diode forward voltage vs. input voltage

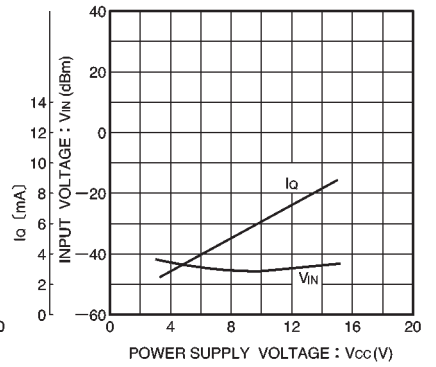


Fig. 8 Quiescent current and input voltage vs. power supply voltage

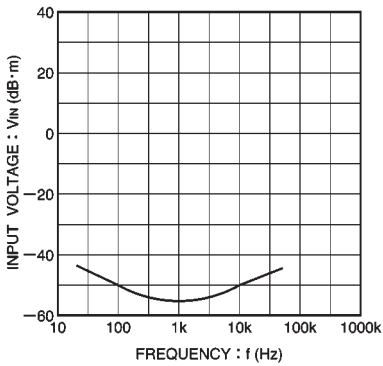


Fig. 9 Input voltage vs. frequency

● External dimensions (Units: mm)

