Dual comparators

BA10393 / BA10393F / BA10393N

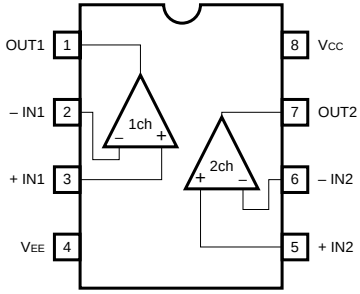
The BA10393, BA10393F, and BA10393N are dual comparators with open-collector output which allows wired OR connections.
The operating power supply voltage ranges from 2 to 36V for a single power supply and ± 1 to ± 18V for a dual power supply. The packages are as follows: DIP 8-pin (BA10393), SOP 8-pin (BA10393F), and SIP 8-pin (BA10393N).

●Features

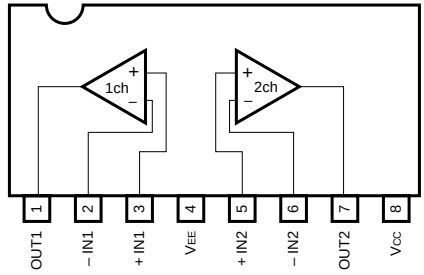
1) Wide operating voltage range.
   (Single power supply: 2 to 36V, dual power supply: ± 1 to ± 18V)
2) Low current dissipation. (0.4mA typ. at V_{CC} = 5V)
3) Low input offset voltage. (25nA typ. at V_{CC} = 5V) and low input offset voltage. (typically ±1.0mV at V_{CC} = 5V)
4) Wide common-mode input voltage. (0 to V_{CC} – 1.5V)
5) Open collector output.
6) Compatible with 393 comparators from other manufacturers.

●Block diagram

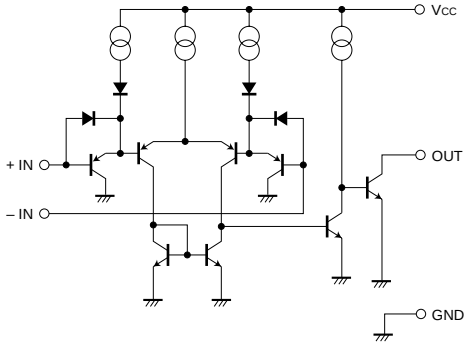
BA10393 / BA10393F



BA10393N



●Internal circuit configuration



●Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits			Unit
		BA10393	BA10393F	BA10393N	
Power supply voltage	V_{CC}	36 (± 18)	36 (± 18)	36 (± 18)	V
Power dissipation	Pd	800*	550*	900*	mW
Differential input voltage	V_{ID}	± V_{CC}	± V_{CC}	± V_{CC}	V
Common-mode input voltage	V_I	– 0.3 ~ V_{CC}	– 0.3 ~ V_{CC}	– 0.3 ~ V_{CC}	V
Operating temperature	Topr	– 40 ~ + 85	– 40 ~ + 85	– 40 ~ + 85	°C
Storage temperature	Tstg	– 55 ~ + 125	– 55 ~ + 125	– 55 ~ + 125	°C

* Refer to the Pd characteristics diagram.
The values for the BA10393F are those when it is mounted on a glass epoxy PCB (50mm × 50mm × 1.6mm).

●Electrical characteristics (unless otherwise noted, Ta = 25°C, V_{CC} = + 5V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input offset voltage	V_{IO}	—	± 1	± 5	mV	V_O = 1.4V
Input offset current	I_{IO}	—	± 5	± 50	nA	$\lvert I_{IN}^+ - I_{IN}^- \rvert$, V_O = 1.4V
Input bias current	I_B	—	25	250	nA	V_O = 1.4V
Common-mode input voltage	V_{ICM}	0	—	V_{CC} –1.5	V	
Voltage gain	A_V	93	106	—	dB	R_L = 15kΩ, V_{CC} = 15V
Quiescent current	I_Q	—	0.4	1	mA	R_L = ∞, on All Comparators
Output sink current	I_{sink}	6	16	—	mA	V_{IN}^- = + 1V, V_{IN}^+ = 0V, V_O = 1.5V
Output saturation voltage	V_{OL}	—	250	400	mV	V_{IN}^- = + 1V, V_{IN}^+ = 0V, I_{sink} = 4mA
Output leakage current	I_{leak}	—	0.1	—	nA	V_{IN}^+ = + 1V, V_{IN}^- = 0V, V_O = 5V
Response time	t_r	—	1.3	—	µs	R_L = 5.1kΩ, V_{RL} = 5V

●Electrical characteristic curves

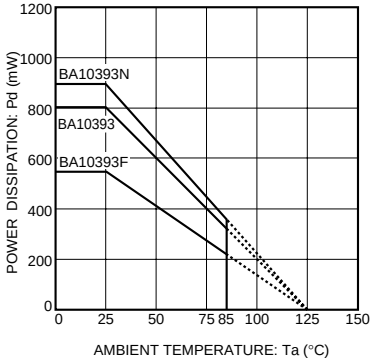


Fig. 1 Power dissipation vs. ambient temperature

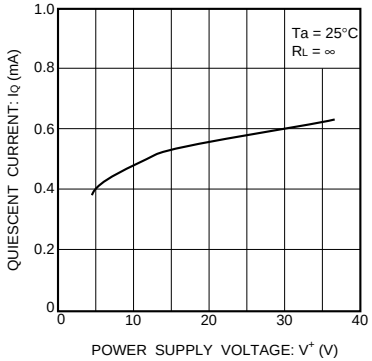


Fig. 2 Quiescent current vs. power supply voltage

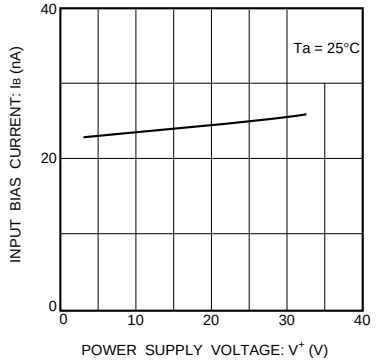


Fig. 3 Input bias current vs. power supply voltage

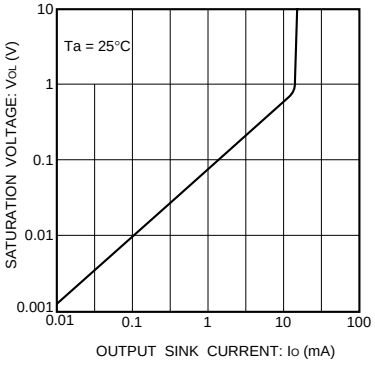


Fig. 4 Output saturation voltage vs. output current

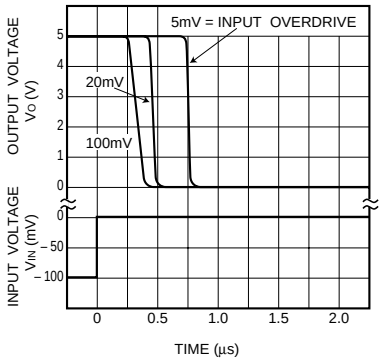


Fig. 5 Propagation characteristics (Ⅰ)

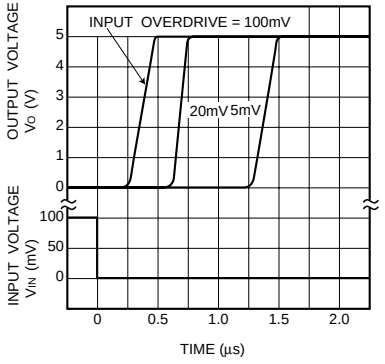


Fig. 6 Propagation characteristics (Ⅱ)

●Operation notes

(1) Handling unused circuits

If a circuit is not in use, we recommend connecting it as shown in Figure 7, so that its input is connected to the potential within the in-phase input voltage range (V_{ICM}) and the output is left open.

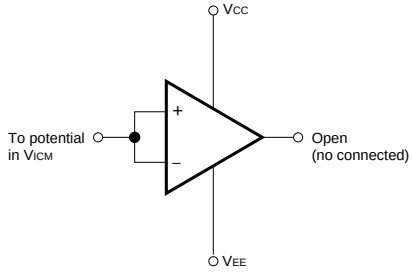
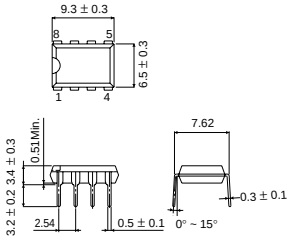


Fig. 7 Example of unused circuit connection

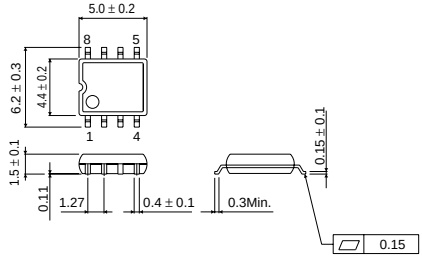
●External dimensions (Units: mm)

BA10393



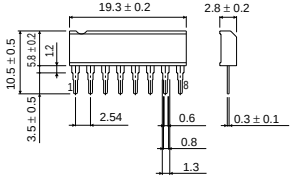
DIP8

BA10393F



SOP8

BA10393N



SIP8