Dual comparators

BA10393/BA10393F/BA10393N

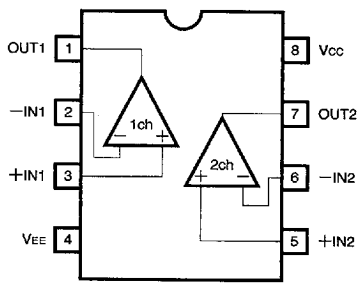
The BA10393, BA10393F, and BA10393N are dual comparators with open-collector output which allows wired OR connections.
The operating power supply voltage ranges from 2 to 36V for a single power supply and ±1 to ±18V for a dual power supply. The packages are as follows : DIP 8-pin (BA10393), SOP 8-pin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

●Features

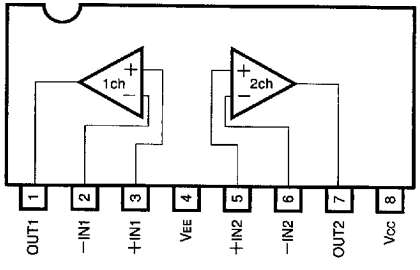
1) Wide operating voltage range.
(Single power supply : 2 to 36V, dual power supply : ±1 to ±18V)
2) Low current consumption. (0.4mA typ. at V_{CC} = 5V)
3) Low input offset voltage (25nA typ. at V_{CC} = 5V) and low input offset voltage (typically ±1.0mV at V_{CC} = 5V)
4) Wide common mode input voltage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

●Block diagram

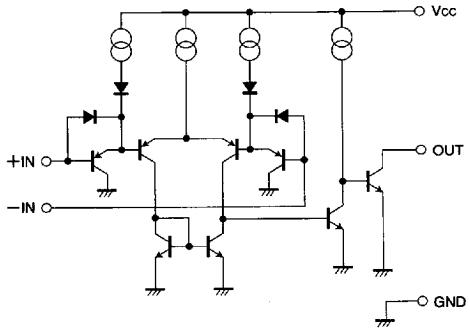
BA10393/BA10393F



BA10393N



●Internal circuit configuration diagram



●Absolute maximum ratings (Ta=25℃)

Parameter	Symbol	Limits			Unit
		BA10393	BA10393F	BA10393N	
Power supply voltage	Vcc	36 (±18)	36 (±18)	36 (±18)	V
Power dissipation	Pd	600*	550*	900*	mW
Differential input voltage	VID	±Vcc	±Vcc	±Vcc	V
In-phase input voltage	VI	−0.3~Vcc	−0.3~Vcc	−0.3~Vcc	V
Operating temperature	Topr	−40~85	−40~85	−40~85	℃
Storage temperature	Tstg	−55~125	−55~125	−55~125	℃

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

●Electrical characteristics (unless otherwise noted, Ta=25℃, Vcc=+5V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input offset voltage	VIO	—	1	5	mV	VO=1.4V
Input offset current	IIO	—	5	50	nA	$\lvert I_{IN}^{+} - I_{IN}^{-} \rvert$, VO=1.4V
Input bias current	IB	—	25	250	nA	VO=1.4V
Common mode input voltage range	VICM	0	—	Vcc−1.5	V	—
Voltage gain	AV	93	106	—	dB	RL=15kΩ
Quiescent circuit current	IQ	—	0.4	1	mA	RL=∞, on All Comparators
Output sink current	Isink	6	16	—	mA	V_{IN}^{-}=+1V, V_{IN}^{+}=0V, VO=1.5V
Output saturation voltage	VOL	—	250	400	mV	V_{IN}^{-}=+1V, V_{IN}^{+}=0V, Isink=4mA
Output leakage current	Ileak	—	0.1	—	nA	V_{IN}^{+}=+1V, V_{IN}^{-}=0V, VO=5V
Response time	tr	—	1.3	—	μs	RL=5.1kΩ, VRL=5V

●Application examples

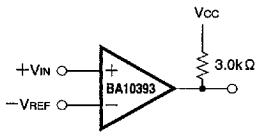


Fig.1 (a) Basic Comparator

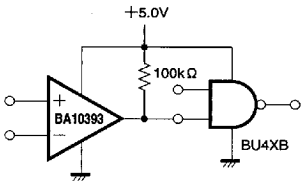


Fig.1 (b) Driving COMS

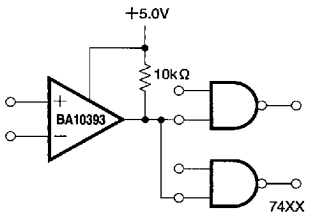


Fig.1 (c) Driving TTL

●Electrical characteristic curves

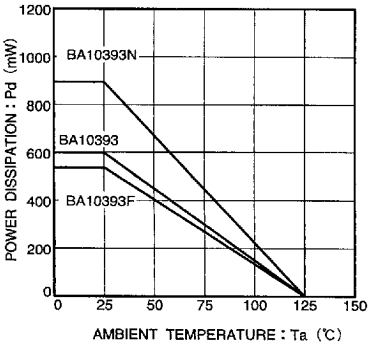


Fig. 2 Power dissipation - ambient temperature characteristic

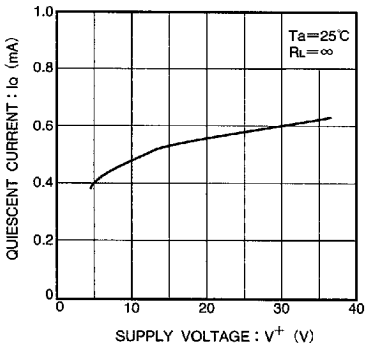


Fig. 3 Quiescent current - power supply voltage characteristic

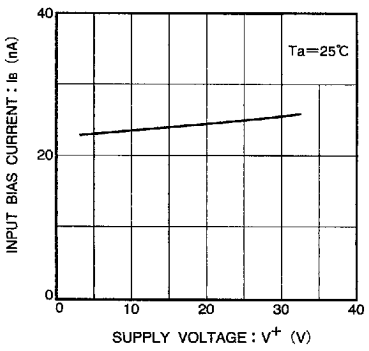


Fig. 4 Input bias current - power supply voltage characteristic

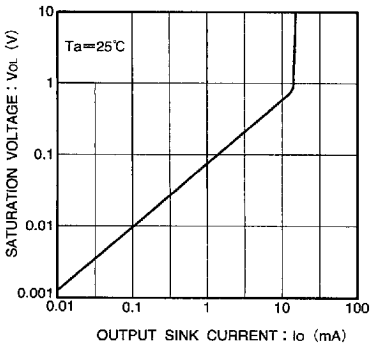


Fig. 5 Output saturation voltage - output current characteristic

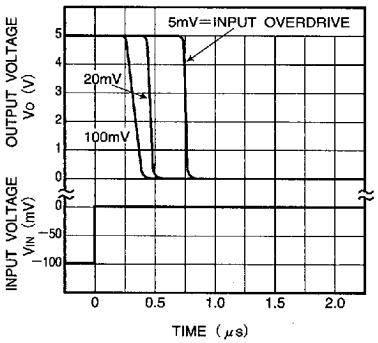


Fig. 6 Propagation characteristic I

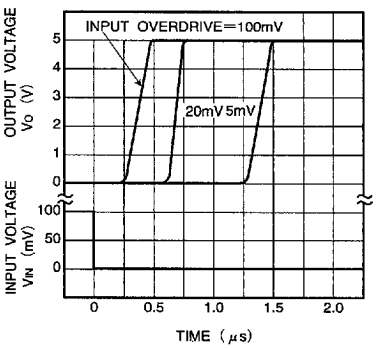


Fig. 7 Propagation characteristic II

●Operating notes

- How to handle an unused circuit

If a circuit is not in use, we recommend connecting it as shown in Figure 8, so that its input is connected to the potential within the in-phase input voltage range (V_{ICM}) and the output is left open.

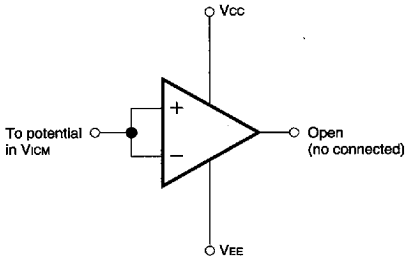
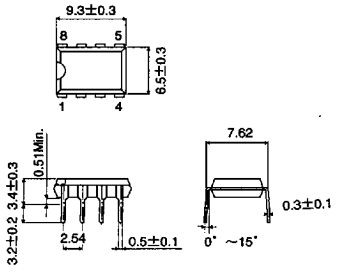


Fig. 8 Example of unused circuit connection

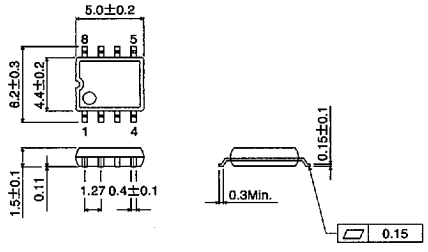
●External dimensions (Units: mm)

BA10393



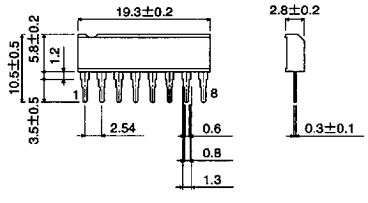
DIP8

BA10393F



SOP8

BA10393N



SIP8