

**Dual Interface Buffers**

- Dual 2-Input NAND/AND/OR/NOR
- Dual 4-Input AND/NAND with Expander

**Features**

High Current Sink Capability – 250mA – Drives Relays, Lamps, Solenoids, Memories, Clock Lines

CMOS Compatible Inputs –  $i_{IL} < 0.6\text{mA}$  at  $V_{CC} = 10\text{V}$

Wide Operating Supply Range – 10 to 16V

High Noise Immunity – 3.5V Min at  $V_{CC} = 11\text{V}$

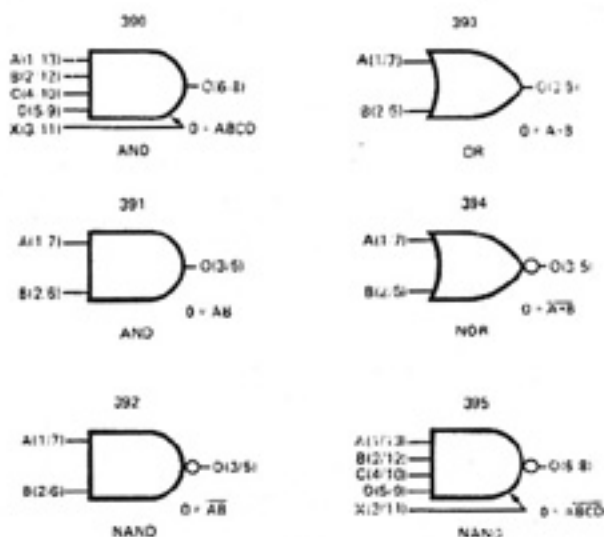
Full Range of Logic Functions Available

Dual Configuration – Saves Board Space, Package Count

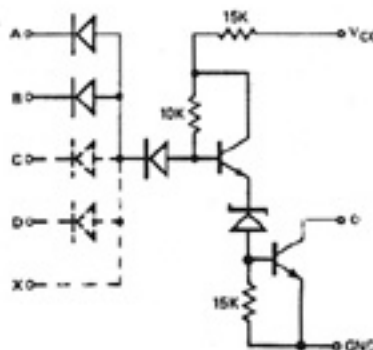
**General Description**

The HINIL 390 to 395 Dual Interface Buffers offer open collector NPN transistor outputs with 20V sustaining voltage and high current sink capacity. Low input current and wide supply voltage range make these buffers ideal for interfacing with CMOS or with other HINIL logic.

**Logic Diagram (1/2 Circuit Shown)**



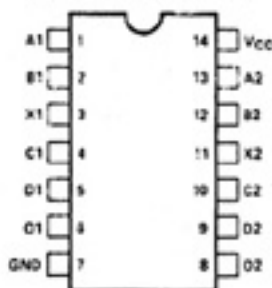
**Equivalent Circuit**



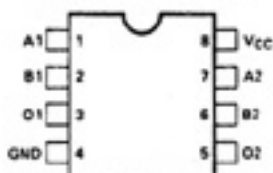
**Connection Diagrams**

Order Part Numbers:  
 390AL/CL, 395AL/CL  
 ( $-30^{\circ}\text{C} < T_A < +70^{\circ}\text{C}$ )

**L Package**  
 14 Lead Ceramic DIP



**L Package**  
 8 Lead Ceramic DIP



Order Part Numbers:  
 391AL/CL, 392AL/CL  
 393AL/CL, 394AL/CL  
 ( $-30^{\circ}\text{C} < T_A < +70^{\circ}\text{C}$ )

**Absolute Maximum Ratings**

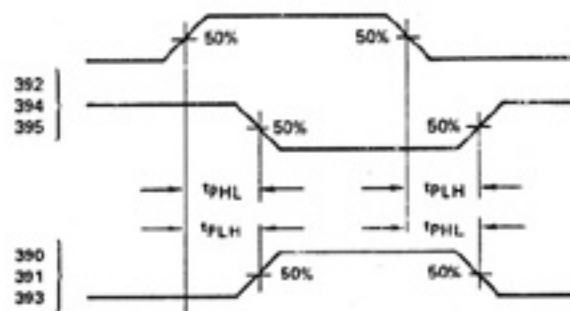
Continuous Supply Voltage, $V_{CC}$	16.5V
Operating Supply Voltage Range, $V_{CC}$	10 to 16V
Pulsed Supply Voltage (less than 100ms)	18.0V
Output Voltage to GND ( $I_O$ less than 100 $\mu$ A)	30V
Input Voltage (any input)	-0.5 to +18V
Continuous Output Sink Current	250mA
Surge Output Sink Current (less than 100ms at 25°C $T_A$ )	300mA
Storage Temperature Range	-65°C to +150°C
Operating Temperature Range	-30°C to +70°C

**Electrical Characteristics** ( $V_{CC}$  = 10 to 16V across applicable temperature range, unless otherwise specified)

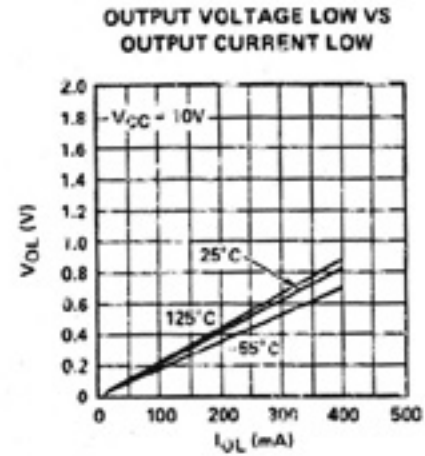
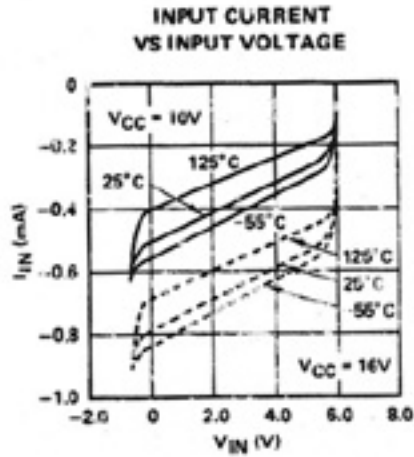
Parameter	Definition	Limit	Conditions
$V_{IH}$	Input High Voltage	6.5V Max	$V_{CC}$ = 10-16V
$V_{IL}$	Input Low Voltage	5V Min	$V_{CC}$ = 10-16V
$V_{OL}$	Output Low Voltage	0.7V Max	$I_{OL}$ = 250mA, $V_{CC}$ = 10V, with $V_{INH}$ = 6.5V and $V_{INL}$ = 5.0V
$I_{IH}$	Input High Current	10 $\mu$ A Max	$V_{CC}$ = 16V, $V_{IN}$ = 16V
$I_{IL}$	Input Low Current	-1mA Max	$V_{CC}$ = 16V, $V_{IN}$ = 1.5V
		-0.6mA	$V_{CC}$ = 10V, $V_{IN}$ = 1.5V
$I_{CC}$	Supply Current	40mA Max	$V_{CC}$ = 16V
$I_{CEX}$	Open Collector Cutoff Current	100 $\mu$ A Max	$V_{CC}$ = 16V, $V_{CEX}$ = 30V
$V_{(BR)CER}$	Output Transistor Sustaining Voltage	20V Min	$V_{CC}$ = 16V, $I_{OH}$ = 10mA

**AC Characteristics**

$t_{PLH}$	Propagation Delay, Output low to high	500ns Max	$I_O$ = 200mA, $R_L$ = 50 $\Omega$ $C_L$ = 15pF
$t_{PHL}$	Propagation Delay, Output high to low	200ns Max	$I_O$ = 200mA, $R_L$ = 50 $\Omega$ $C_L$ = 15pF

**Switching Waveforms**

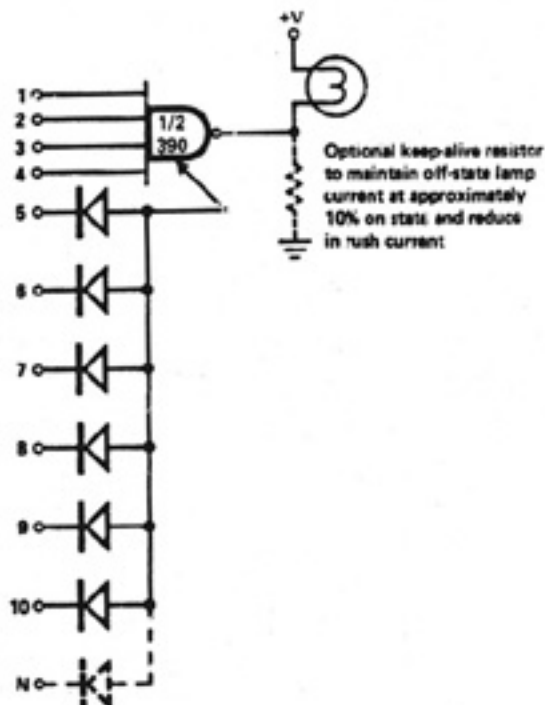
## Typical Performance Characteristics



## Typical Applications

### Multi-Input Short Circuit Indicator

If any of the N inputs are short circuited to ground the indicator lamp will turn on.



### CMOS Super Output Buffer

390 series devices can be used to add extra output drive to CMOS circuitry. With inductive loads a kickback diode is recommended to prevent high voltage surges from damaging the device when it switches high.

