HARRIS Semiconductor

COMPLETE DATA SHEET COMING SOON!

# CD54HC193F3A, CD54HCT193F3A

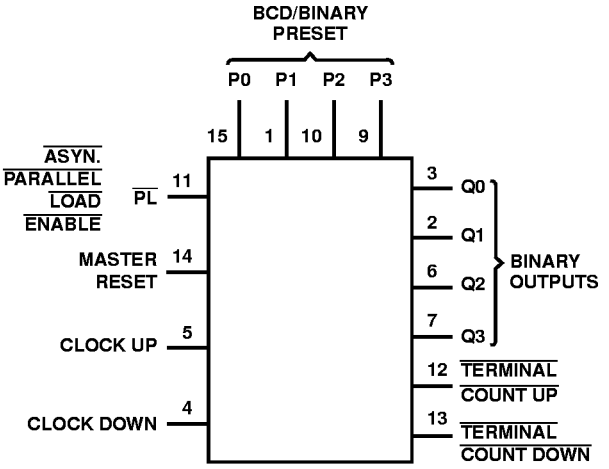
June 1997 File Number 3800

## Presettable Synchronous Up/Down Counters

The CD54HC193F3A and CD54HCT193F3A are asynchronously presettable binary up/down synchronous counters.

Presetting the counter to the number on preset data inputs (P0 - P3) is accomplished by a LOW asychronous parallel load input ($\overline{PL}$). The counter is incremented on the low-to-high transition of the Clock-Up input (and a high level on the Clock-Down input) and decremented on the low-to-high transition of the Clock-Down input (and a high level on the Clock-Up input). A high level on the MR input overrides any other input to clear the counter to its zero state. The Terminal Count Up (carry) goes low half a clock period before the zero count is reached and returns to a high level at the zero count. The Terminal Count Down (borrow) in the count-down mode likewise goes half a clock period before the maximum count (15 in the CD54HC/HCT193) and returns to high at the maximum count. Cascading is effected by connecting the carry and borrow outputs of a less significant counter to the Clock-Up and Clock-Down inputs, respectively, of the next most significant counter.

## Functional Diagram




**HCT INPUT LOAD TABLE**

| INPUT | UNIT LOAD (NOTE 1) |
|---|---|
| P0 - P3 | 0.4 |
| MR | 1.45 |
| $\overline{PL}$ | 0.85 |
| CPU, CPD | 1.45 |

NOTE:

1. Unit load is $\Delta I_{CC}$ limit specified in DC Electrical Specifications Table, e.g., 360µA Max at +25°C.



## Absolute Maximum Ratings

DC Supply Voltage, $V_{CC}$
- Voltages Referenced to GND . . . . . -0.5V to +7.0V

DC Input Voltage Range, All Inputs, $V_{IN}$ . . . . . -0.5V to $V_{CC}$ +0.5V

DC Output Voltage Range, All Outputs, $V_{OUT}$ . . -0.5V to $V_{CC}$ +0.5V

DC Input Diode Current, $I_{IK}$
- For $V_I$ < -0.5V or $V_I$ > $V_{CC}$ + 0.5V . . . . . ±20mA

DC Output Diode Current, $I_{OK}$
- For $V_O$ < -0.5V or $V_O$ > $V_{CC}$ + 0.5V . . . . . ±20mA

DC Drain Current, Per Output, $I_O$, For -0.5V < $V_O$ < $V_{CC}$ + 0.5V
- Standard Output . . . . . ±25mA
- Bus Driver Output . . . . . ±35mA

DC $V_{CC}$ or GND Current, $I_{CC}$
- Standard Output . . . . . ±50mA
- Bus Driver Output . . . . . ±70mA

Power Dissipation Per Package, $P_D$
- $T_A$ = -55°C to +100°C (Package F) . . . . . .500mW
- $T_A$ = +100°C to +125°C (Package F) . . . . . .Derate Linearly at 8mW/°C to 300mW

Operating Temperature Range, $T_A$
- Package Type F . . . . . -55°C to +125°C

Storage Temperature, $T_{STG}$ . . . . . -65°C to +150°C

Lead Temperature (During Soldering)
- At Distance 1/16in. ± 1/32in. (1.59mm ± 0.79mm)
- From Case For 10s Max . . . . . .+265°C
- Unit Inserted Into a PC Board (Min Thickness 1/16in., 1.59mm)
- With Solder Contacting Lead Tips Only . . . . . .+300°C

*CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.*

## Recommended Operating Conditions

Supply Voltage Range, $V_{CC}$
- $T_A$ = Full Package Temperature Range
- CD54HC Types . . . . . 2V to 6V
- CD54HCT Types . . . . . 4.5V to 5.5V

DC Input or Output Voltage, $V_{IN}$, $V_{OUT}$ . . . . . .0V to $V_{CC}$

Operating Temperature Range, $T_A$ . . . . . -55°C to +125°C

Input Rise and Fall Times, $t_R$, $t_F$
- at 2V . . . . . .0ns to 1000ns
- at 4.5V . . . . . .0ns to 500ns
- at 6V . . . . . .0ns to 400ns