



# CD54HC138/3A

# CD54HCT138/3A

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## 3-to-8-Line Decoder/Demultiplexer

### Description

The CD54HC138/3A and CD54HCT138/3A are high-speed silicon-gate CMOS decoders well suited to memory address decoding or data routing application. Both circuits feature low power consumption usually associated with CMOS circuitry, yet have speeds comparable to low-power Schottky TTL logic. The circuits have three binary select inputs (A0, A1, and A2). If the device is enabled, these inputs determine which one of the eight normally high outputs will go low.

Two active low and one active high enables ( $\overline{E1}$ ,  $\overline{E2}$ , and E3) are provided to ease the cascading of decoders. The decoder's outputs can drive 10 low-power Schottky TTL equivalent loads.

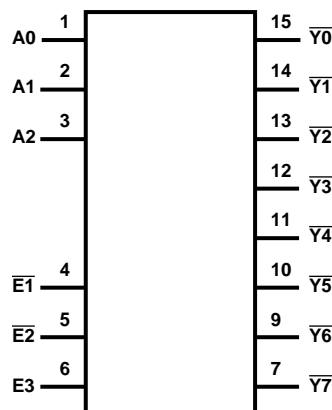
HCT INPUT LOAD TABLE

INPUT	UNIT LOAD (NOTE 1)
A0 - A2	1.5
$\overline{E1}$ , $\overline{E2}$	1.25
E3	1

## NOTE:

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

### Functional Diagram



### 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  $V_I > V_{CC} + 0.5V$  .....  $\pm 20mA$

DC Output Diode Current,  $I_{OK}$

For  $V_O < -0.5V$  or  $V_O > V_{CC} + 0.5V$  .....  $\pm 20mA$

DC Drain Current, Per Output,  $I_O$ , For  $-0.5V < V_O < V_{CC} + 0.5V$

Standard Output .....  $\pm 25mA$

Bus Driver Output .....  $\pm 35mA$

DC  $V_{CC}$  or GND Current,  $I_{CC}$

Standard Output .....  $\pm 50mA$

Bus Driver Output .....  $\pm 70mA$

Power Dissipation Per Package,  $P_D$ 

$T_A = -55^\circ C$  to  $+100^\circ C$  (Package F) ..... 500mW

$T_A = +100^\circ C$  to  $+125^\circ C$  (Package F) ..... Derate Linearly at  
8mW/ $^\circ C$  to 300mW

Operating Temperature Range,  $T_A$ 

Package Type F .....  $-55^\circ C$  to  $+125^\circ C$

Storage Temperature,  $T_{STG}$  .....  $-65^\circ C$  to  $+150^\circ C$

Lead Temperature (During Soldering)

At Distance 1/16in.  $\pm$  1/32in. (1.59mm  $\pm$  0.79mm)

From Case For 10s Max .....  $+265^\circ C$

Unit Inserted Into a PC Board (Min Thickness 1/16in., 1.59mm)

With Solder Contacting Lead Tips Only .....  $+300^\circ C$

**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,  $T_A$  .....  $-55^\circ C$  to  $+125^\circ C$

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