

To our customers,

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April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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## Bi-CMOS Logic IC HD74BC Series

### Outline

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The HD74BC Series provides high-speed operation and high current drivability equivalent to high speed bipolar logic ICs in addition to the CMOS's advantage of low power dissipation.

High speed bipolar standard logic IC which consists of eight bits have been generally used for memory bus buffers or system bus I/O buffers of information industry equipments. However, seen in the recent OA equipments, both high speed data processing and low power dissipation to expand battery life are required as well as down-sizing and lightning.

Fueled by those demands, standard logic ICs are also preferably;

1. Low power dissipation
2. High current drivability
3. 16 bits available in the future
4. Surface-mount available

To meet those market needs, Renesas developed Bi-CMOS bus interface series taking the Bi-CMOS process technology providing bipolar transistor's high current drivability and CMOS's low power dissipation.

### 1. Features

Adopting the HD74BC series can decrease the power dissipation without changing the system design because it shows fast switching speed of 4.5 ns in typical and high current drivability of 64 mA for address buffer circuits with large memory and multi-bits of system bus I/O circuits interfacing mother board and address board, still reducing the power dissipation to a fifth of high-speed bipolar logic ICs in 10 MHz operation. And, surface-mount packages are available for high-density mounting to equipments.

All the outputs in HD74BC series are buffered to have voltage and current specifications common in family. A schottky barrier clamp diode is added between each input/output pin and GND to suppress the undershoot caused by impedance mismatching in noisy systems. Additionally, the HD74BC series has the following two features.

- (1) Designed to bring input pins high impedance state at equipments power off, it has no current flow into power supply via input pins and avoids a waste of battery. As still against the conventional CMOS structured inputs, current does not flow even if voltage over supply voltage is applied at power on, which protects a device from latch-up phenomena.
- (2) Since all the input terminals are pulled-up to the voltage equal to output high level by resistors and diodes, terminals can be treated as same as high-speed bipolar logic without considering that inputs are CMOS-structured.

### 2. Basic Circuit Construction

Figure 1 shows a basic in Bi-CMOS bus interface series. Enable and control circuits and input parts are constructed by CMOS and bipolar transistors are used only in the output part. This construction can remarkably save the power dissipation except output being low level.

In the HD74BC series, resistors and diodes are connected to pull up all inputs to  $V_{OH}$  level. Therefore, unused pins can be open as bipolar inputs in spite of being constructed by CMOS, though around 120  $\mu$ A of current flows at low input.

As against pulling-up by resistors only raising outputs up to supply voltage and causing noise due to the large output voltage swing at output falling transition, the HD74BC series set the pull-up voltage at  $V_{OH}$  level to minimize the influence against quiescent outputs at the output transition.

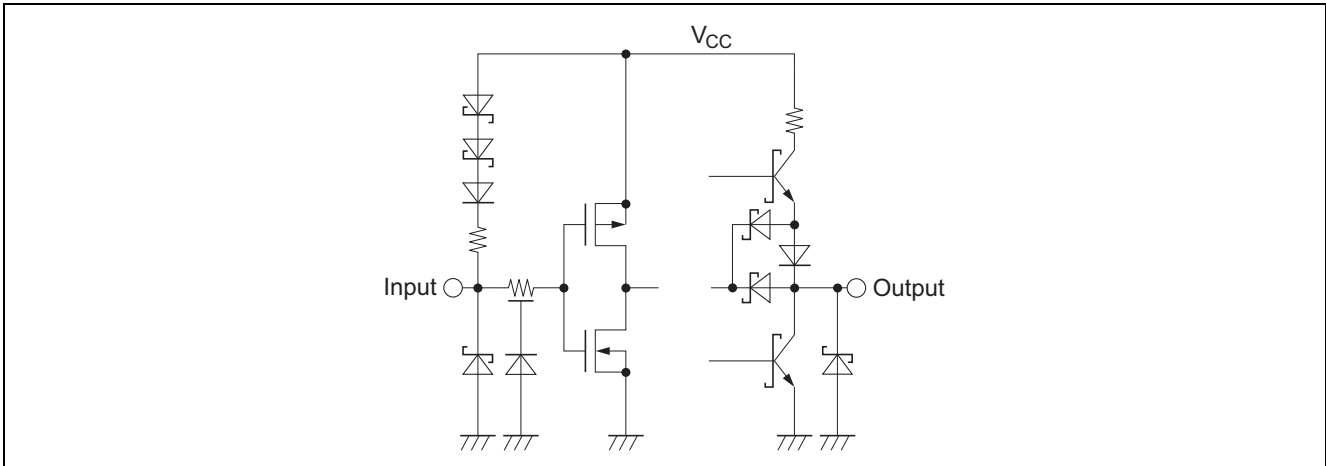


Figure 1 Basic Circuit Construction

### Revision Record

Rev.	Date	Description	
		Page	Summary
1.00	Jul.09.04	—	First edition issued

**Keep safety first in your circuit designs!**

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