Texas Instruments

Advanced System Logic SPOTLIGHT

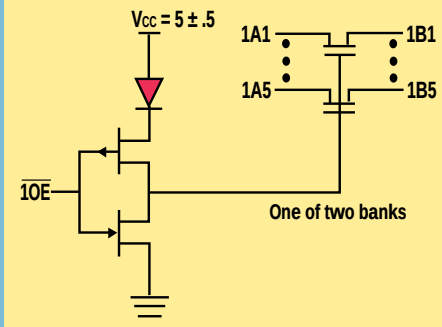
CBTD3384 features

- 250 ps switching speed
- Bi-directional level translation

  5V TTL <-> 3.3V LVTTL
  5V CMOS -> 3.3V LVTTL
- Internal diode to V_{CC}
- 5V V_{CC}

CBTD3384 for Single-Device 5.0V to 3.3V translation

TI CBTD 3384



5V to 3.3V Translation with CBTD

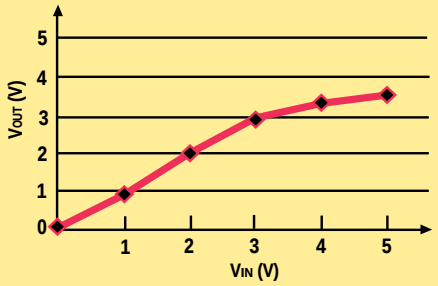


figure 1

Detailed V_{OH} versus V_{CC}

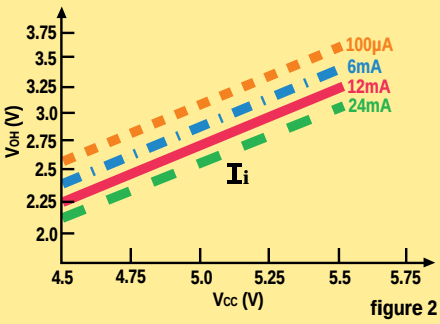


figure 2

Today's market often forces designers to mix low-cost TTL technology with high performance 3.3V technologies. Whatever your reason for mixed voltage translation, you need it done fast!

A new device from Texas Instruments will make your transition easy. Introducing the CBTD3384 — the missing link in level translation. With an ultra-fast switching speed of 250 ps, the TI CBTD3384 is the answer.

The CBTD3384 is equipped with an internal diode to Vcc. It eliminates the need for additional parts and saves board space. The single-chip solution allows bi-directional level translation between 5V TTL and LVTTL, or uni-directional translation from 5V CMOS to LVTTL with virtually no propagation delay.

Whether your operating voltage is 5V CMOS or 5V TTL, the CBTD3384 can translate the signal to LVTTL levels. The internal diode drops the 5V signal to approximately 4.3V. In addition, the transistor's gate-to-source voltage drop of 1V brings Vout to 3.3V. Also, CBTD3384 does not affect the LVTTL signals. Hence compatibility with the 5V TTL levels is maintained. Even with the diode and the gate-to-source voltage drop, the CBTD3384 allows a maximum swing up to 3.3V, which satisfies the Vih requirements for TTL, thereby rendering a bi-directional 5V TTL/LVTTL translator/interface. (see figure 1)

The diode's characteristics vary with respect to Vcc , through current (Ii), and temperature. The crossbar switch, operating under normal conditions and various through currents, maintains an acceptable Voh above the 2.0 Vih required by standard TTL specifications. (see Figure 2)