

## TIA/EIA-485 and M-LVDS, Power and Speed Comparison

Chris Sterzik

Interface Products

### ABSTRACT

This document includes 3.3 V RS-485 and 3.3 V M-LVDS test data to demonstrate that M-LVDS provides low power multipoint operation and faster signaling rates (speeds) than RS-485.

Multipoint is a bus configuration with multiple drivers and receivers present, as shown in Figure 1. An example of a differential multipoint standard is TIA/EIA-485 (RS-485). RS-485 is an established standard and is used in industrial, automotive, telecom, computer, and many other applications. The benefits of RS-485 include high-common mode range, high differential output signal, and the capability to drive beyond 1 km. All of these benefits lend RS-485 to applications where noise margin and distance are significant factors.

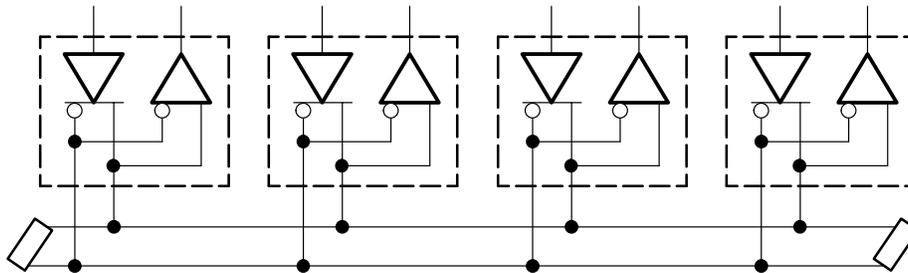


Figure 1. Multipoint Architecture

Another example of differential multipoint operation is the new M-LVDS standard, TIA/EIA-899 Electrical Characteristics of Multipoint-LVDS (M-LVDS) Interface Circuits for Multipoint Data Interchange. The M-LVDS standard is an extension of LVDS technology into the multipoint environment, providing support for speeds (signaling rates) up to 500Mbps. Devices compliant with the M-LVDS standard do not provide as much noise immunity as RS-485, but these devices can provide signaling rates that exceed RS-485 capabilities. In addition to the increased signaling rate, M-LVDS also provides multipoint operation with less power consumption than RS-485.

Figure 2 shows the power advantage the SN65MLVD200 3.3V M-LVDS transceiver has over a 3.3V RS-485 transceiver, the MAX 3485E, for the setup in Figure 3. Both devices are 3.3-V devices in the standard SN75176 footprint. Supply current measurements were taken at different signaling rates with both the receiver and driver enabled in order to calculate power. Figure 2 also shows that the M-LVDS device has a considerably higher maximum signaling rate than the RS-485 part; 100Mbps<sup>1</sup> compared to 20Mbps.

*While TIA/EIA-485 is better suited for longer distance applications, M-LVDS provides true multipoint solutions with less power usage at greater speeds.* The lower operating voltages of M-LVDS are the reason for the lower power consumption but also the reason for the restriction to shorter distances where noise coupling and differential attenuation through the interconnect media are lower.

<sup>1</sup> The 200Mbps M-LVDS devices, SN65MLVD201 and SN65MLVD203, can be found in the SN65MLVDS20x data sheet, SLLA463.

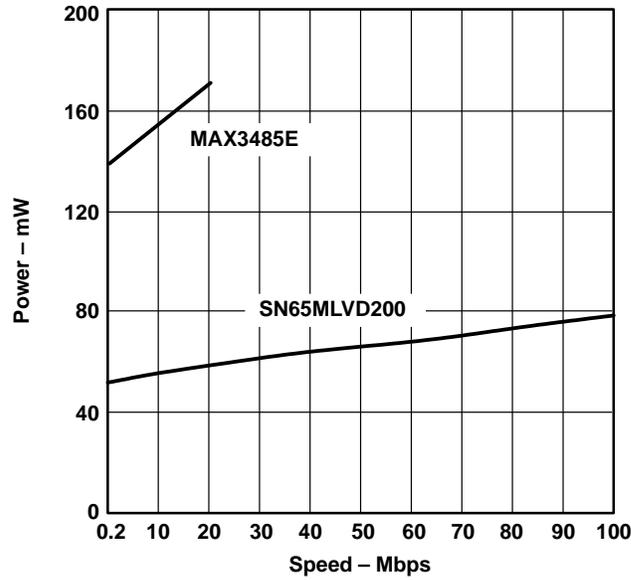


Figure 2. Power Versus Speed for SN65MLVD200 and MAX3485E

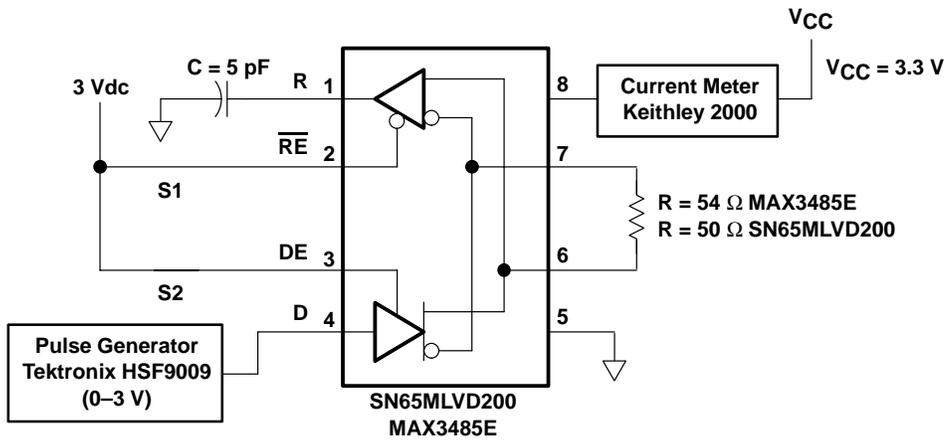


Figure 3. Test Setup

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### Mailing Address:

Texas Instruments  
Post Office Box 655303  
Dallas, Texas 75265