

## DATA COMMUNICATIONS

### 18-Line Plug and Play SCSI Terminator

The IMP5225 SCSI terminator is part of IMP's family of high-performance SCSI terminators, which are designed to deliver true UltraSCSI performance. The BiCMOS design offers superior performance over first generation linear passive and active techniques. IMP's new architecture employs high-speed adaptive elements for each channel, thereby providing the fastest response possible — typically 35MHz, which is 100 times faster than the older linear regulator/terminator approach. Products using the older regulator/resistor architecture have bandwidths which are dominated by the reference stabilization output capacitor and are therefore limited to 500kHz (see further discussion in the Functional Description section). The IMP architecture eliminates the output compensation capacitor required in linear regulator/resistor designs.

The IMP5225 architecture tolerates marginal system designs. A key improvement offered by the IMP5225 lies in its ability to insure reliable, error-free communications even in systems which do not adhere to recommended SCSI hardware design guidelines, such as the use of improper cable lengths and impedances. Frequently, this situation is not controlled by the peripheral or host designer.

The IMP5225 has two disconnect pins for SCSI Plug and Play (PnP) applications. To enter the disconnect mode, the disconnect pins must be driven LOW thereby disconnecting the IMP5225 from the SCSI bus. Quiescent current is less than 150 $\mu$ A when disabled.

Reduced component count is inherent in the IMP5225 architecture. Traditional termination techniques require large stabilization and

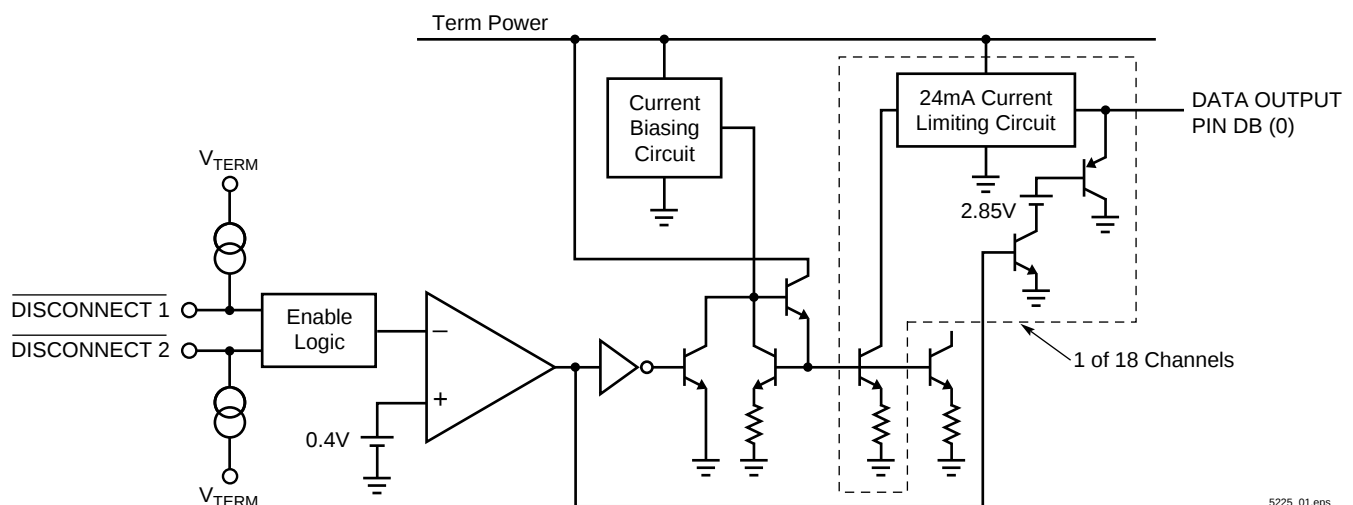
### Key Features

- ◆ SCSI Plug and Play
  - Dual active LOW disconnect pins
- ◆ Ultra-Fast response for Fast-20 SCSI
- ◆ 35MHz channel bandwidth
- ◆ Sleep-mode current less than 150 $\mu$ A
  - Disconnects terminator from lows
- ◆ NO external compensation capacitors
- ◆ Compatible with active negation drivers
- ◆ Compatible with passive and active terminations
- ◆ Approved for use with SCSI 1, 2, 3 and Ultra SCSI
- ◆ Hot swap compatible
- ◆ Pin-for-pin compatible with LX5225, LX5205 and UC5607

transient protection capacitors of up to 20 $\mu$ F in value and size. The IMP5225 architecture does not require these components, allowing all the cost savings associated with inventory, board space, assembly, reliability, and component costs.

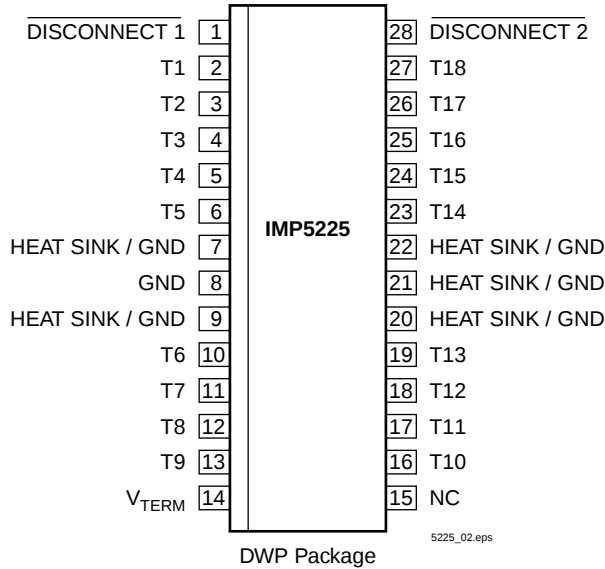
The IMP5225 is a superior pin-for-pin replacement for the LX5225, LX5205, UC5607.

### Block Diagrams



## Pin Configuration

### SOWB-28



## Ordering Information

| Part Number  | Temperature Range | Package                            |
|--------------|-------------------|------------------------------------|
| IMP5225CDWP  | 0°C to 70°C       | 28-pin Plastic SOWB                |
| IMP5225CDWPT | 0°C to 70°C       | Tape and Reel, 28-pin Plastic SOWB |

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## Absolute Maximum Ratings<sup>1</sup>

TermPwr Voltage ..... +7V  
 Signal Line Voltage ..... 0V to +7V  
 Differential Voltage ..... 0V to 6.5V  
 Operating Junction Temperature  
 Plastic (DWP Package) ..... 150°C

Storage Temperature Range ..... -65°C to 150°C  
 Lead Temperature (Soldering, 10 sec.) ..... 300°C

Note: 1. Exceeding these ratings could cause damage to the device. All voltages are with respect to Ground. Currents are positive into, negative out of the specified terminal.

## Thermal Data

DWP Package:

Thermal Resistance Junction-to-Leads,  $\theta_{JL}$  ..... 18°C/W  
 Thermal Resistance Junction-to-Ambient,  $\theta_{JA}$  ..... 40°C/W

Junction Temperature Calculation:  $T_J = T_A + (P_D \times \theta_{JA})$ .

The  $\theta_{JA}$  numbers are guidelines for the thermal performance of the device/pc-board system. All of the ambient airflow is assumed.

## Recommended Operating Conditions

| Parameter                                       | Symbol     | Min | Typ | Max        | Units |
|-------------------------------------------------|------------|-----|-----|------------|-------|
| TermPwr Voltage                                 | $V_{TERM}$ | 4.0 |     | 5.5        | V     |
| Signal Line Voltage                             |            | 0   |     | 5.0        | V     |
| Disconnect Input Voltage                        |            | 0   |     | $V_{TERM}$ | V     |
| Operating Junction Temperature Range – IMP5225C |            | 0   |     | 125        | °C    |

Note: 2. Recommended operating conditions indicate the range over which the device is functional.

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## Electrical Characteristics

Unless otherwise specified, these specifications apply at an ambient operating temperature of  $T_A = 25^\circ\text{C}$ . TermPwr = 4.75V. Low duty cycle pulse testing techniques are used which maintains junction and case temperatures equal to the ambient temperature.

| Parameter                             | Symbol     | Conditions                                                      | Min  | Typ  | Max | Units         |
|---------------------------------------|------------|-----------------------------------------------------------------|------|------|-----|---------------|
| Output High Voltage                   | $V_{OUT}$  |                                                                 | 2.65 | 2.85 |     | V             |
| TermPwr Supply Current                | $I_{CC}$   | All data lines = Open                                           |      | 10   | 15  | mA            |
|                                       |            | All data lines = 0.2V                                           |      | 424  | 450 |               |
|                                       |            | $\overline{\text{DISCONNECT}}$ Pins < 0.8V                      |      | 50   | 150 | $\mu\text{A}$ |
| Output Current                        | $I_{OUT}$  | $V_{OUT} = 0.5\text{V}$                                         | -20  | -22  | -24 | mA            |
| Disconnect Input Current              | $I_{IN}$   | $\overline{\text{DISCONNECT}}$ Pins = 0V                        |      |      | -10 | $\mu\text{A}$ |
| Output Leakage Current                | $I_{OL}$   | $\overline{\text{DISCONNECT}}$ Pins < 0.8V, $V_O = 0.2\text{V}$ |      |      | 1   | $\mu\text{A}$ |
| Channel Bandwidth                     | BW         |                                                                 |      | 35   |     | MHz           |
| Termination Sink Current, per Channel | $I_{SINK}$ | $V_{OUT} = 4\text{V}$                                           | 7    |      |     | mA            |

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## Application Information

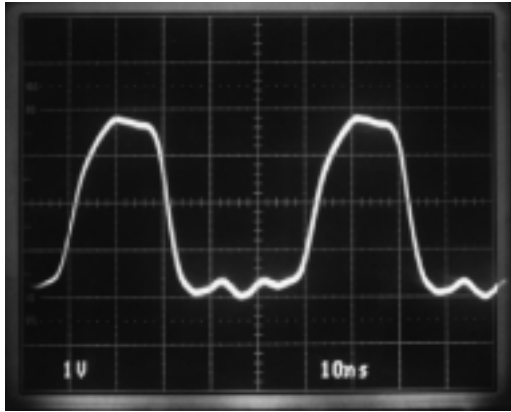


Figure 1. Receiving Waveform – 20MHz

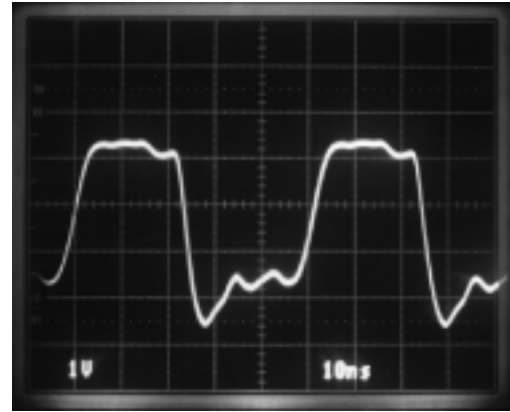


Figure 2. Driving Waveform – 20MHz

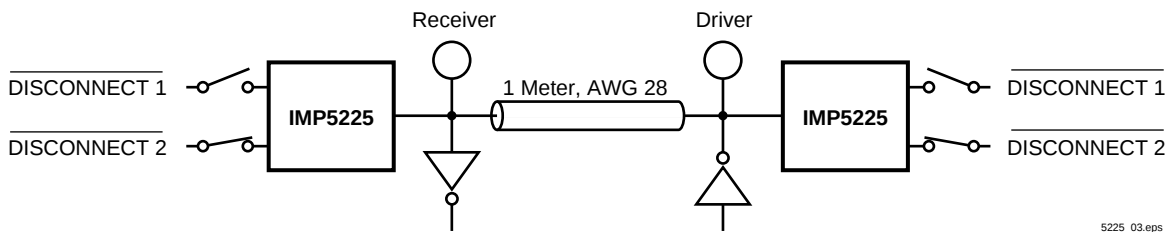


Figure 3.

Cable transmission theory suggests to optimize signal speed and quality, the termination should act both as an ideal voltage reference when the line is released (deasserted) and as an ideal current source when the line is active (asserted). Common active terminators which consist of linear regulators in series with resistors (typically 110Ω) are a compromise. With conventional linear terminators as the line voltage increases the amount of current decreases linearly by the equation;

$$\frac{(V_{REF} - V_{LINE})}{R} = I.$$

The IMP5225, with its unique new architecture, applies the maximum amount of current regardless of line voltage until the termination high threshold (2.85V) is reached.

Acting as a near ideal line terminator, the IMP5225 closely reproduces the optimum case when the device is enabled. To enable the device the DISC1 and DISC2 pins are pulled HIGH. During this mode of operation, quiescent current is 10mA, and the device will respond to line demands by delivering 24mA on assertion and by imposing 2.85V on deassertion.

In order to disable the device, the DISC1 and DISC2 pins must be driven LOW. In the disable mode, the device is in a sleep state with quiescent current less than 150μA. When disabled, all outputs are in a high impedance state. Sleep mode can be used for power conservation or to remove the terminator from the SCSI chain.

An additional feature of the IMP5225 is its compatibility with active negation drivers.

Table 1. Power Up/ Power Down Function Table

| DISCONNECT 1 | DISCONNECT 2 | Outputs  | Maximum Quiescent Current |
|--------------|--------------|----------|---------------------------|
| H            | H            | Disabled | 15mA                      |
| H            | L            | Enabled  | 15mA                      |
| L            | H            | Enabled  | 15mA                      |
| L            | L            | Disabled | 150μA                     |
| Open         | Open         | Disabled | 150μA                     |

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## Application Information

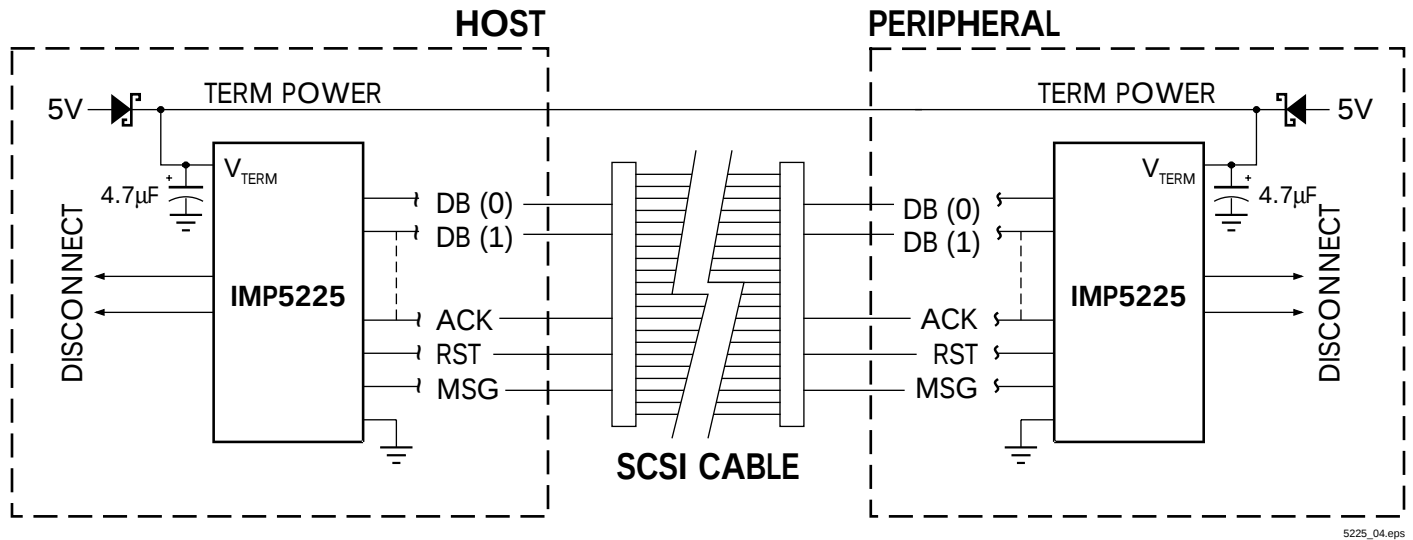
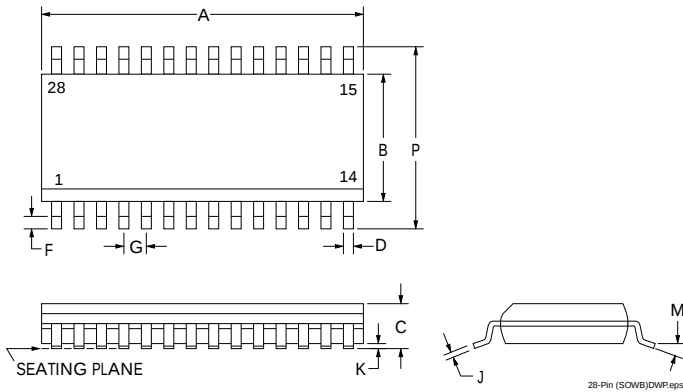


Figure 4. Application Schematic

## Package Dimensions

SOWB (28-Pin)



| Inches         |           |       | Millimeters |       |
|----------------|-----------|-------|-------------|-------|
|                | Min       | Max   | Min         | Max   |
| SOWB (28-Pin)* |           |       |             |       |
| A              | 0.698     | 0.713 | 17.70       | 18.10 |
| B              | 0.291     | 0.299 | 7.40        | 7.60  |
| C              | 0.093     | 0.104 | 2.35        | 2.65  |
| D              | 0.013     | 0.018 | 0.33        | 0.51  |
| F              | 0.016     | 0.050 | 0.40        | 1.27  |
| G              | 0.050 BSC |       | 1.27 BSC    |       |
| J              | 0.009     | 0.013 | 0.23        | 0.32  |
| K              | 0.004     | 0.012 | 0.10        | 0.30  |
| M              | 0°        | 8°    | 0°          | 8°    |
| P              | 0.394     | 0.419 | 10.00       | 10.65 |

\* JEDEC Drawing MO-013AE

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