

MC10SX1189

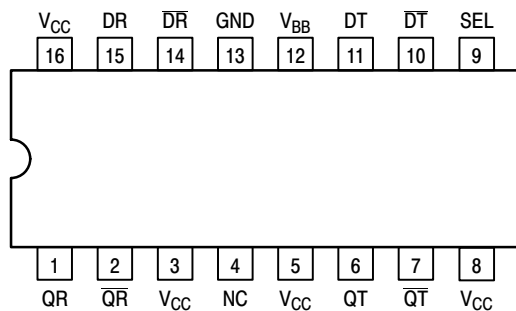
Fibre Channel Coaxial Cable Driver and Loop Resiliency Circuit

The MC10SX1189 is a differential receiver, differential transmitter specifically designed to drive coaxial cables. It incorporates the output cable drive capability of the MC10EL89 Coaxial Cable Driver with additional circuitry to multiplex the output cable drive source between the cable receiver or the local transmitter inputs. The multiplexer control circuitry is TTL compatible for ease of operation.

The MC10SX1189 is useful as a bypass element for Fibre Channel-Arbitrated Loop (FC-AL) or Serial Storage Architecture (SSA) applications, to create loop style interconnects with fault tolerant, active switches at each device node. This device is particularly useful for back panel applications where small size is desirable.

The EL89 style drive circuitry produces swings twice as large as a standard PECL output. When driving a coaxial cable, proper termination is required at both ends of the line to minimize reflections. The 1.6 V output swings allow for proper termination at both ends of the cable, while maintaining the required swing at the receiving end of the cable. Because of the larger output swings, the QT, \overline{QT} outputs are terminated into the thevenin equivalent of 50 Ω to $V_{CC} - 3.0$ V instead of 50 Ω to $V_{CC} - 2.0$ V.

- 425 ps Propagation Delay
- 1.6 V Output Swing on the Cable Driving Output
- Single +5 V operation
- 75 k Ω Internal Input Pull Down Resistors
- >1000 V ESD Protection
- Transistor Count = 102



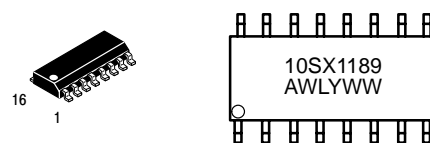
Pinout: 16-Lead SOIC (Top View)



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FIBRE CHANNEL COAXIAL CABLE DRIVER AND LOOP RESILIENCY CIRCUIT



SOIC
CASE 751B

10SX1189 = Specific Device Code
A = Assembly Location
WL = Wafer Lot
Y = Year
WW = Work Week

TRUTH TABLE

| SEL | Function |
|-----|----------|
| L | DR → QT |
| H | DT → QT |

PIN NAMES

| Pins | Function |
|----------------|--|
| DR/DR QR/QR | Differential Input from Receive Cable Buffered Differential Output from Receive Cable |
| DT/DT QT/QT | Differential Input to Transmit Cable Buffered Differential Output to Transmit Cable |
| SEL | Multiplexer Control Signal (TTL) |
| V_{CC} | Positive Power Supply |
| GND | Ground |
| V_{BB} | Reference Voltage Output |

ORDERING INFORMATION

| Device | Package | Shipping† |
|---------------|---------|--------------------|
| MC10SX1189D | SOIC | 45 Units / Rail |
| MC10SX1189DR2 | SOIC | 2500 / Tape & Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

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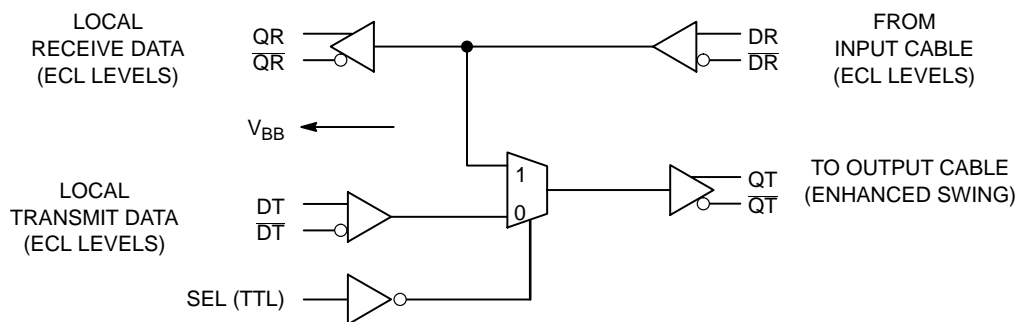


Figure 1. LOGIC DIAGRAM

ABSOLUTE MAXIMUM RATINGS*

| Symbol | Parameter | Value | Unit | |
|------------------|--|---------------------|-----------|----|
| V _{CC} | Power Supply Voltage (Referenced to GND) | 0 to +7.0 | Vdc | |
| V _{IN} | Input Voltage (Referenced to GND) | 0 to +6.0 | Vdc | |
| I _{OUT} | Output Current | Continuous Surge | 50 100 | mA |
| T _A | Operating Temperature Range | -40 to +85 | °C | |
| T _{STG} | Storage Temperature Range | -50 to +150 | °C | |
| V _{CC} | Operating Voltage Range ¹ | 4.5 to 5.5 | Vdc | |

*Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation should be restricted to the Recommended Operating Conditions.

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

1. Parametric values specified at 4.75 to 5.25 V.

DC CHARACTERISTICS (Note 2)

| Symbol | Characteristic | -40°C | | | 0°C | | | 25°C | | | 85°C | | | Unit |
|-----------------|--|-------|------|------|------|------|------|------|------|------|------|------|------|------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| V _{OH} | Output Voltage High (QR, \overline{QR}) V _{CC} = 5.0 V, GND = 0 V (Notes 3, 4) | 3.92 | 4.05 | 4.11 | 3.98 | 4.09 | 4.16 | 4.02 | 4.11 | 4.19 | 4.09 | 4.16 | 4.28 | V |
| V _{OL} | Output Voltage Low (QR, \overline{QR}) V _{CC} = 5.0 V, GND = 0 V (Notes 3, 4) | 3.05 | 3.23 | 3.35 | 3.05 | 3.24 | 3.37 | 3.05 | 3.24 | 3.37 | 3.05 | 3.25 | 3.41 | V |
| V _{OH} | Output Voltage High (QT, \overline{QT}) V _{CC} = 5.0 V, GND = 0 V (Notes 3, 5) | 3.71 | 3.89 | 4.08 | 3.79 | 3.98 | 4.17 | 3.83 | 4.02 | 4.20 | 3.90 | 4.09 | 4.28 | V |
| V _{OL} | Output Voltage Low (QT, \overline{QT}) V _{CC} = 5.0 V, GND = 0 V (Notes 3, 5) | 1.94 | 2.22 | 2.50 | 1.83 | 2.12 | 2.41 | 1.80 | 2.10 | 2.39 | 1.77 | 2.06 | 2.35 | V |
| I _{CC} | Quiescent Supply Current (Note 6) | 20 | 25 | 42 | 22 | 26 | 47 | 23 | 27 | 47 | 25 | 28 | 47 | mA |
| V _{IH} | Input Voltage High (DR, \overline{DR} & DT, \overline{DT}) V _{CC} = 5.0 V, GND = 0 V (Note 3) | 3.77 | | 4.11 | 3.83 | | 4.16 | 3.87 | | 4.19 | 3.94 | | 4.28 | V |
| V _{IL} | Input Voltage Low (DR, \overline{DR} & DT, \overline{DT}) V _{CC} = 5.0 V, GND = 0 V (Note 3) | 3.05 | | 3.50 | 3.05 | | 3.52 | 3.05 | | 3.52 | 3.05 | | 3.56 | V |
| V _{IH} | Input Voltage High SEL | 2.0 | | | 2.0 | | | 2.0 | | | 2.0 | | | V |
| V _{IL} | Input Voltage Low SEL | | | 0.8 | | | 0.8 | | | 0.8 | | | 0.8 | V |
| V _{BB} | Output Reference Voltage V _{CC} = 5.0 V, GND = 0 V (Note 3) | 3.57 | 3.63 | 3.70 | 3.62 | 3.67 | 3.73 | 3.65 | 3.70 | 3.75 | 3.69 | 3.75 | 3.81 | V |

2. 10SX circuits are designed to meet the DC specifications shown in the table after thermal equilibrium has been established. The circuit is mounted in a test socket or mounted on a printed circuit board and transverse air greater than 500 lfm is maintained.

3. Values will track 1:1 with the V_{CC} supply.

4. Outputs loaded with 50 Ω to +3.0 V

5. Outputs loaded with 50 Ω to +2.0 V

6. Outputs open circuited.

MC10SX1189

AC CHARACTERISTICS¹ ($V_{CC} = 4.75$ to 5.25 V)

| Symbol | Characteristic | -40°C | | | 0 to 85°C | | | Unit | Condition | |
|--------------------------|--------------------------------|----------------|------|-----|-----------|------|-----|------|-----------|--------------------------|
| | | Min | Typ | Max | Min | Typ | Max | | | |
| t_{PLH} , t_{PHL} | Propagation Delay to Output | DR → QR (Diff) | 175 | 300 | 450 | 225 | 325 | 500 | ps | Note 8 Note 9 |
| | | (SE) | 150 | 300 | 500 | 175 | 325 | 550 | | |
| DR → QT (Diff) | | 250 | 425 | 650 | 300 | 450 | 650 | | | |
| (SE) | | 225 | 425 | 700 | 250 | 450 | 700 | | | |
| | | DT → QT (Diff) | 225 | 400 | 650 | 275 | 425 | 650 | | |
| | | (SE) | 200 | 400 | 725 | 225 | 425 | 725 | | |
| | Propagation Delay | SEL → QT,QT | 450 | 600 | 850 | 500 | 650 | 800 | | 1.5V to 50% Pt |
| t_r , t_f | Rise Time | QR,QR | 100 | 275 | 400 | 125 | 275 | 400 | ps | 20% to 80% 80% to 20% |
| | Fall Time | | 100 | 275 | 400 | 125 | 275 | 400 | | |
| t_r , t_f | Rise Time | QT,QT | 150 | 300 | 550 | 150 | 300 | 550 | ps | 20% to 80% 80% to 20% |
| | Fall Time | | 150 | 300 | 550 | 150 | 300 | 550 | | |
| t_{skew} | Within Device Skew | | | 15 | | | 15 | | ps | Note 10 |
| V_{PP} | Minimum Input Swing | | 200 | | | 200 | | | mV | Note 11 |
| V_{CMR} | Common Mode Range | | 3.00 | | 4.35 | 3.00 | | 4.35 | V | Note 12 |

7. 10SX circuits are designed to meet the AC specifications shown in the table after thermal equilibrium has been established. The circuit is mounted in a test socket or mounted on a printed circuit board and transverse air greater than 500 lfm is maintained.

8. The differential propagation delay is defined as the delay from the crossing points of the differential input signals to the crossing point of the differential output signals.

9. The single-ended propagation delay is defined as the delay from the 50% point of the input signal to the 50% point of the output signal.

10. Duty cycle skew is the difference between t_{PLH} and t_{PHL} propagation delay through a device.

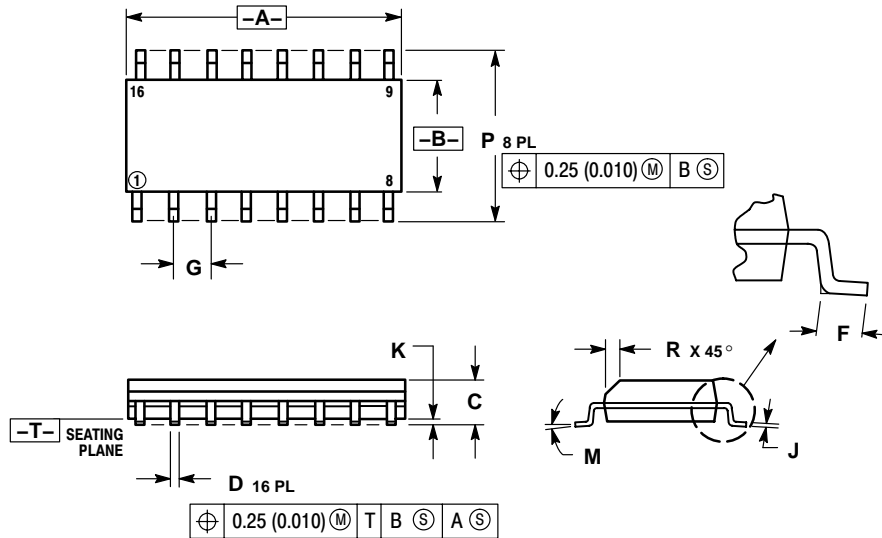
11. Minimum input swing for which AC parameters are guaranteed.

12. The CMR range is referenced to the most positive side of the differential input signal. Normal operation is obtained if the HIGH level falls within the specified range and the peak-to-peak voltage lies between $V_{PP\ Min}$ and 1.0 V.

MC10SX1189

PACKAGE DIMENSIONS

SOIC
CASE 751B-05
ISSUE J



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|-------|-----------|-------|
| | MIN | MAX | MIN | MAX |
| A | 9.80 | 10.00 | 0.386 | 0.393 |
| B | 3.80 | 4.00 | 0.150 | 0.157 |
| C | 1.35 | 1.75 | 0.054 | 0.068 |
| D | 0.35 | 0.49 | 0.014 | 0.019 |
| F | 0.40 | 1.25 | 0.016 | 0.049 |
| G | 1.27 BSC | | 0.050 BSC | |
| J | 0.19 | 0.25 | 0.008 | 0.009 |
| K | 0.10 | 0.25 | 0.004 | 0.009 |
| M | 0° | 7° | 0° | 7° |
| P | 5.80 | 6.20 | 0.229 | 0.244 |
| R | 0.25 | 0.50 | 0.010 | 0.019 |

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