Fibre Channel Coaxial Cable Driver and Loop Resiliency Circuit

MC10SX1189

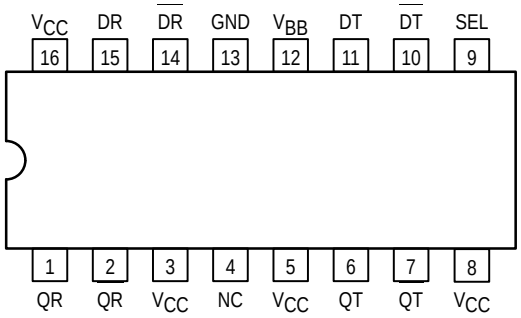
FIBRE CHANNEL COAXIAL CABLE DRIVER AND LOOP RESILIENCY CIRCUIT

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.

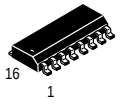
- 425ps Propagation Delay
- 1.6V Output Swing on the Cable Driving Output
- Single +5V operation
- 75kΩ Internal Input Pull Down Resistors
- >1000 Volt ESD Protection

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 1.6V 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 50Ω to V_{CC} – 3.0V instead of 50Ω to V_{CC} – 2.0V.



Pinout: 16-Lead SOIC (Top View)



D SUFFIX
PLASTIC SOIC PACKAGE
CASE 751B-05

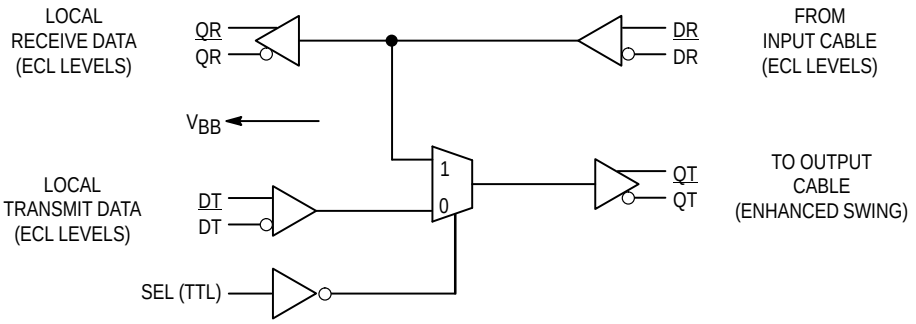
TRUTH TABLE

SEL	Function
L	DR → QT
H	DT → QT

PIN NAMES

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

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.

1. Parametric values specified at 4.75 to 5.25V.

DC CHARACTERISTICS[1]

		-40°C			0°C			25°C			85°C			
Symbol	Characteristic	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Unit
V_{OH}	Output Voltage High ($\overline{QR}$,QR) V_{CC} = 5.0V, GND = 0V (Notes 2,3)	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 ($\overline{QR}$,QR) V_{CC} = 5.0V, GND = 0V (Notes 2,3)	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 ($\overline{QT}$,QT) V_{CC} = 5.0V, GND = 0V (Notes 2,4)	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 ($\overline{QT}$,QT) V_{CC} = 5.0V, GND = 0V (Notes 2,4)	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 5)	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} = 5.0V, GND = 0V (Note 2)	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} = 5.0V, GND = 0V (Note 2)	3.05		3.50	3.05		3.52	3.05		3.52	3.05		3.56	V
V_{IH}	Input Voltage High $\overline{SEL}$	2.0			2.0			2.0			2.0			V
V_{IL}	Input Voltage Low $\overline{SEL}$			0.8			0.8			0.8			0.8	V
V_{BB}	Output Reference Voltage V_{CC} = 5.0V, GND = 0V (Note 2)	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

1. 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 500lfm is maintained.
2. Values will track 1:1 with the V_{CC} supply.
3. Outputs loaded with 50Ω to +3.0V
4. Outputs loaded with 50Ω to +2.0V
5. Outputs open circuited.

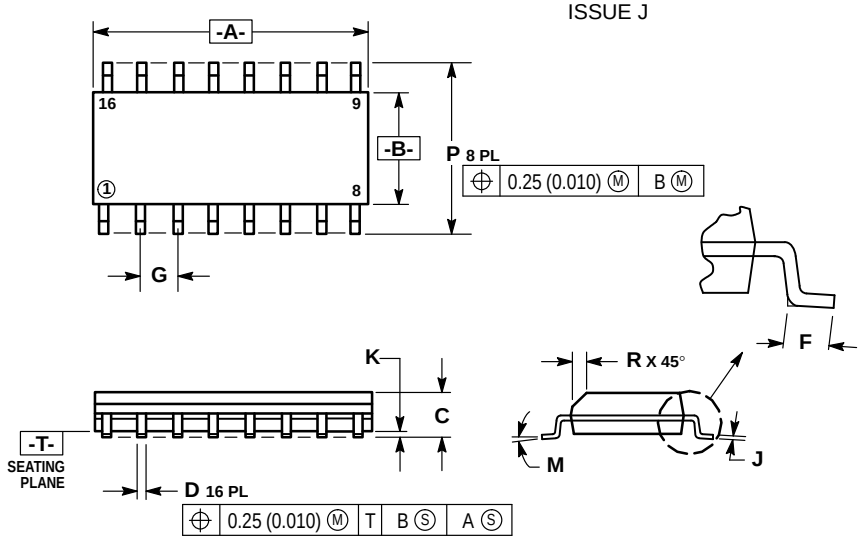
AC CHARACTERISTICS[1] (V_{CC} = 4.75 to 5.25V)

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 2
	(SE)	150	300	500	175	325	550		Note 3
	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		
t_{PLH}, t_{PHL}	Propagation Delay SEL → QT,$\overline{QT}$	450	600	850	500	650	800	ps	1.5V to 50% Pt
t_r, t_f	Rise Time, Fall Time QR,$\overline{QR}$	100	275	400	125	275	400	ps	20% to 80%
		100	275	400	125	275	400		80% to 20%
t_r, t_f	Rise Time, Fall Time QT,$\overline{QT}$	150	300	550	150	300	550	ps	20% to 80%
		150	300	550	150	300	550		80% to 20%
t_{skew}	Within Device Skew		15			15		ps	Note 4
V_{PP}	Minimum Input Swing	200			200			mV	Note 5
V_{CMR}	Common Mode Range	3.00		4.35	3.00		4.35	V	Note 6

1. 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 500lfm is maintained.
2. 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.
3. 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.
4. Duty cycle skew is the difference between t_{PLH} and t_{PHL} propagation delay through a device, Stretch input is left open.
5. Minimum input swing for which AC parameters are guaranteed.
6. 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 1.0V.

OUTLINE DIMENSIONS

D SUFFIX
PLASTIC PACKAGE
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.

	MILLIMETERS		INCHES	
DIM	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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