

# MC10SX1190

## Product Preview

# Fibre Channel Coaxial Cable Driver and Loop Resiliency Circuit

The MC10SX1190 is a differential receiver, differential transmitter specifically designed to drive coaxial cables. It incorporates the output cable drive capability of the MC10EP89 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 MC10SX1190 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 EP89 style drive circuitry produces swings approximately 70% larger than a standard PECL output. When driving a coaxial cable, proper termination is required at both ends of the line to minimize reflections. The 1.4V 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  $\overline{QT}$ ,  $\overline{QT}$  outputs are terminated into the thevenin equivalent of  $50\Omega$  to  $V_{CC} - 3.0V$  instead of  $50\Omega$  to  $V_{CC} - 2.0V$ .

- 2.5 Gbps Operation
- 425ps Propagation Delay
- 1.4V Output Swing on the Cable Driving Output
- PECL Mode: 3.0V to 5.5V  $V_{CC}$ , with  $V_{EE} = 0V$
- ECL Mode: 0V  $V_{CC}$ , with  $V_{EE} = -3.0V$  to  $-5.5V$
- 75k $\Omega$  Internal Input Pull Down Resistors
- >1000 Volt ESD Protection

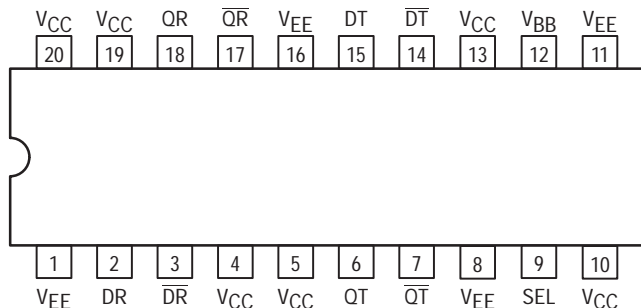
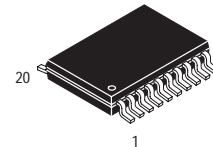


Figure 1. 20-Lead TSSOP Pinout: (Top View)

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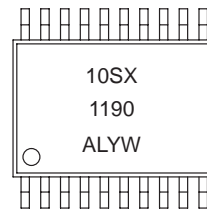


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**TSSOP-20  
DT SUFFIX  
CASE 948E**

### MARKING DIAGRAM



A = Assembly Location  
L = Wafer Lot  
Y = Year  
W = Work Week

\*For additional information, see Application Note AND8002/D

### PIN DESCRIPTION

PIN	FUNCTION
DR/ $\overline{DR}$	ECL Diff. Inputs from Receive Cable
QR/ $\overline{QR}$	ECL Buffered Differential Outputs from Receive Cable
DT/ $\overline{DT}$	ECL Differential Input to Transmit Cable
QT/ $\overline{QT}$	ECL Buffered Differential Output to Transmit Cable
SEL	TTL Multiplexer Control Signal
VBB	Reference Voltage Output
VCC	ECL Positive Supply
VEE	ECL Negative, 0 Supply

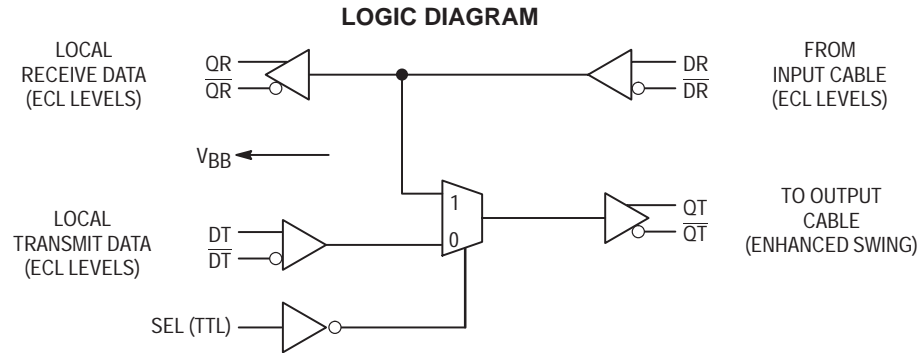
### TRUTH TABLE

SEL	Function
L	DR QT
H	DT QT

### ORDERING INFORMATION

Device	Package	Shipping
MC10SX1190DT	TSSOP-20	75 Units/Rail

# MC10SX1190



## ABSOLUTE MAXIMUM RATINGS\*

Symbol	Parameter	Value	Unit	
$V_{CC}$	Power Supply Voltage ( $V_{EE} = 0V$ )	0 to +6.0	Vdc	
$V_{EE}$	Power Supply Voltage ( $V_{CC} = 0V$ )	-6.0 to 0	Vdc	
$V_{IN}$	Input Voltage ( $V_{EE} = 0V$ , $V_{IN}$ not more positive than $V_{CC}$ )	0 to +6.0	Vdc	
$V_{IN}$	Input Voltage ( $V_{CC} = 0V$ , $V_{IN}$ not more negative than $V_{EE}$ )	-6.0 to 0	Vdc	
$I_{OUT}$	Output Current	Continuous Surge	50 100	mA
$\theta_{JA}$	Thermal Resistance (Junction-to-Ambient)	Still Air 500 LFPM	90 60	$^{\circ}C/W$
$\theta_{JC}$	Thermal Resistance (Junction-to-Case)		30 to 35	$^{\circ}C/W$
$T_A$	Operating Temperature Range		-40 to +85	$^{\circ}C$
$T_{STG}$	Storage Temperature Range		-50 to +150	$^{\circ}C$

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

# MC10SX1190

## DC CHARACTERISTICS (Note 1)

Symbol	Characteristic	-40°C			0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
V <sub>OH</sub>	Output Voltage High (QR, $\overline{QR}$ ) V <sub>CC</sub> = 5.0V, V <sub>EE</sub> = 0V (Notes 2,3)		4.01			4.04			4.06			4.16		V
V <sub>OL</sub>	Output Voltage Low (QR, $\overline{QR}$ ) V <sub>CC</sub> = 5.0V, V <sub>EE</sub> = 0V (Notes 2,3)		3.23			3.26			3.28			3.33		V
V <sub>OH</sub>	Output Voltage High (QT, $\overline{QT}$ ) V <sub>CC</sub> = 5.0V, V <sub>EE</sub> = 0V (Notes 2,4)		3.94			3.98			4.04			4.13		V
V <sub>OL</sub>	Output Voltage Low (QT, $\overline{QT}$ ) V <sub>CC</sub> = 5.0V, V <sub>EE</sub> = 0V (Notes 2,4)		2.51			2.49			2.48			2.47		V
I <sub>CC</sub>	Quiescent Supply Current (Note 5)								55					mA
V <sub>IH</sub>	Input Voltage High (DR, $\overline{DR}$ & DT, $\overline{DT}$ ) V <sub>CC</sub> = 5.0V, V <sub>EE</sub> = 0V (Note 2)	3.77		4.11	3.83		4.16	3.87		4.19	3.94		4.28	V
V <sub>IL</sub>	Input Voltage Low (DR, $\overline{DR}$ & DT, $\overline{DT}$ ) V <sub>CC</sub> = 5.0V, V <sub>EE</sub> = 0V (Note 2)	3.05		3.50	3.05		3.52	3.05		3.52	3.05		3.56	V
V <sub>IH</sub>	Input Voltage High SEL (Note 6)	2.0			2.0			2.0			2.0			V
V <sub>IL</sub>	Input Voltage Low SEL (Note 6)			0.8			0.8			0.8			0.8	V
V <sub>BB</sub>	Output Reference Voltage V <sub>CC</sub> = 5.0V, V <sub>EE</sub> = 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

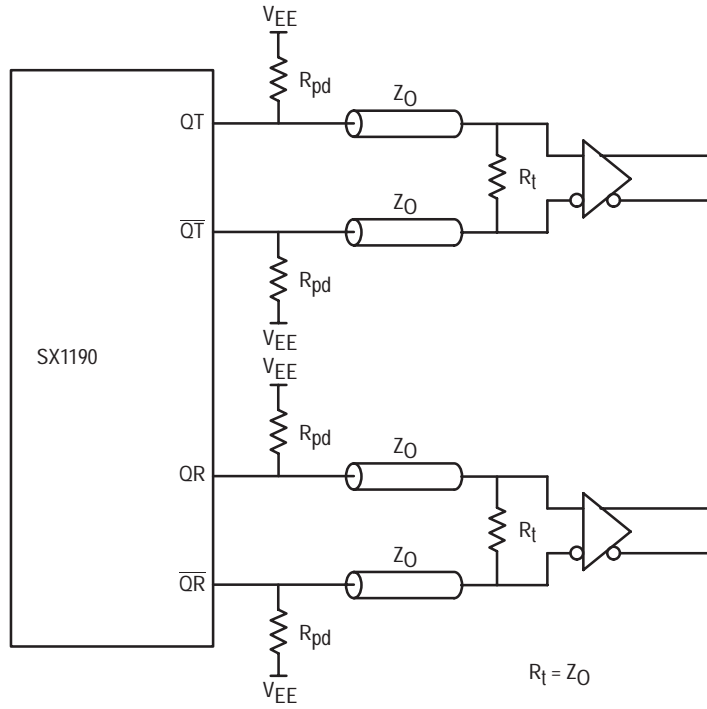
- 10SX circuits are designed to meet the DC specifications shown in the table after thermal equilibrium has been established. The circuit is mounted in a test socket or mounted on a printed circuit board and transverse air greater than 500lfm is maintained.
- Values will track 1:1 with the V<sub>CC</sub> supply.
- Outputs loaded with 50Ω to +3.0V
- Outputs loaded with 50Ω to +2.0V
- Outputs open circuited.
- TTL signal threshold is 1.5V above V<sub>EE</sub>.

## AC CHARACTERISTICS (Note 1 & 7)

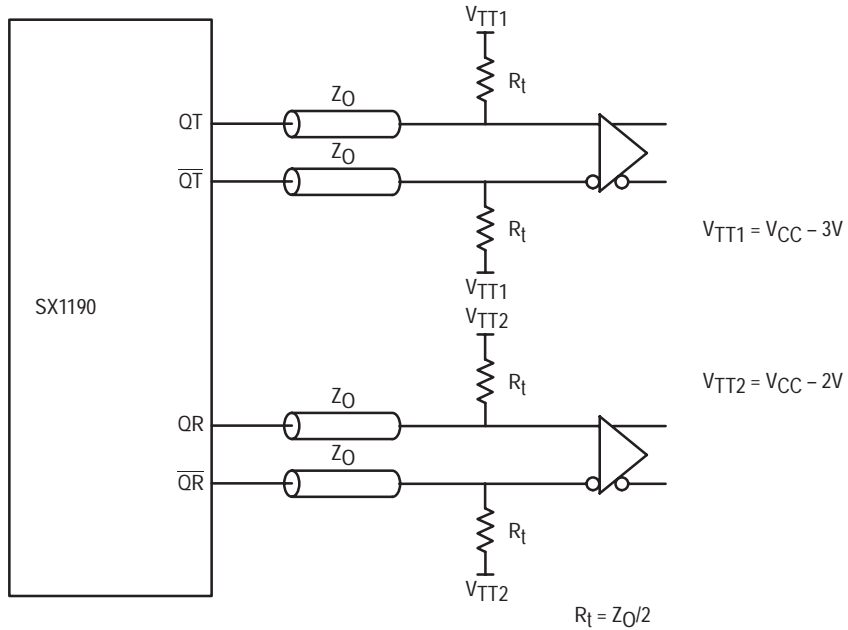
Symbol	Characteristic	-40°C			0 to 85°C			Unit	Condition
		Min	Typ	Max	Min	Typ	Max		
t <sub>PLH</sub> , t <sub>PHL</sub>	Propagation Delay DR QR (Diff) to Output (SE)					240		ps	Note 2 Note 3
						240			
						425			
	DR QT (Diff) (SE)					425			
	DT QT (Diff) (SE)					425			
t <sub>PLH</sub> , t <sub>PHL</sub>	Propagation Delay SEL QT, $\overline{QT}$	450	600	850	500	650	800	ps	1.5V to 50% Pt
t <sub>r</sub> , t <sub>f</sub>	Rise Time QR, $\overline{QR}$					118		ps	20% to 80% 80% to 20%
	Fall Time					118			
t <sub>r</sub> , t <sub>f</sub>	Rise Time QT, $\overline{QT}$					230		ps	20% to 80% 80% to 20%
	Fall Time					230			
t <sub>skew</sub>	Within Device Skew		15			15		ps	Note 4
V <sub>PP</sub>	Minimum Input Swing	200			200			mV	Note 5
V <sub>CMR</sub>	Common Mode Range	3.0		4.35	3.0		4.35	V	Note 6
f <sub>max</sub>	Maximum Operation Frequency	2.5			2.5			Gb/s	

- 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.
- 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.
- 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.
- Duty cycle skew is the difference between t<sub>PLH</sub> and t<sub>PHL</sub> propagation delay through a device.
- Minimum input swing for which AC parameters are guaranteed.
- 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<sub>PP Min</sub> and 1.0V.
- Data taken at V<sub>CC, nom</sub> = 3.3V.

# MC10SX1190



Typical value for  $R_{pd}$  is  $160\Omega$  to  $260\Omega$ , depending on the application. The minimum value of  $R_{pd}$  should not be less than  $50\Omega$ .

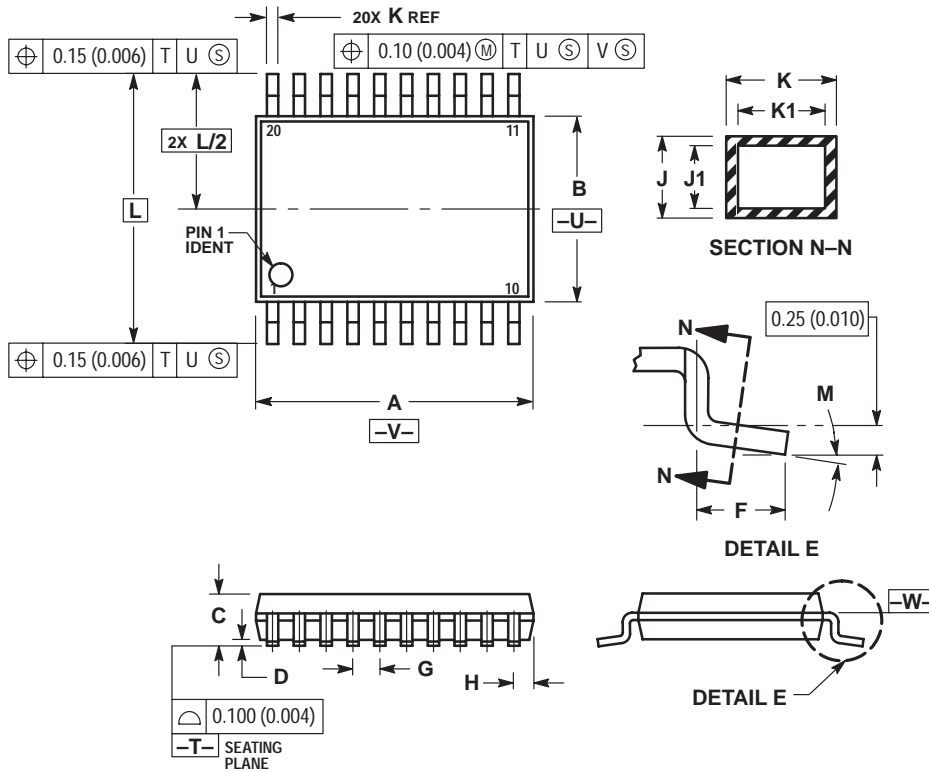


**Figure 2. SX1190 Termination Configuration**

# MC10SX1190

## PACKAGE DIMENSIONS

DT SUFFIX  
 PLASTIC PACKAGE  
 CASE 948E-02  
 ISSUE A




NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25 (0.010) PER SIDE.
5. DIMENSION K DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 (0.003) TOTAL IN EXCESS OF THE K DIMENSION AT MAXIMUM MATERIAL CONDITION.
6. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
7. DIMENSION A AND B ARE TO BE DETERMINED AT DATUM PLANE -W-.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	6.40	6.60	0.252	0.260
B	4.30	4.50	0.169	0.177
C	---	1.20	---	0.047
D	0.05	0.15	0.002	0.006
F	0.50	0.75	0.020	0.030
G	0.65 BSC		0.026 BSC	
H	0.27	0.37	0.011	0.015
J	0.09	0.20	0.004	0.008
J1	0.09	0.16	0.004	0.006
K	0.19	0.30	0.007	0.012
K1	0.19	0.25	0.007	0.010
L	6.40 BSC		0.252 BSC	
M	0°	8°	0°	8°

**Notes**

**Notes**

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