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IEEE1394 ONE PORT CABLE TERMINATION NETWORK WITH ESD PROTECTION DIODES

MAIN APPLICATIONS

IEEE1394 line termination on:

- Desktops
- Notebooks
- Digital Camcorders
- External storage drive
- Set Top Box

FEATURES

- Line termination for 2 twisted pairs TPA and TPB
- The device complies with IEEE1394 requirement for differential and common mode impedance on TPA and TPB line
- Monolithic device with complete termination for one IEEE1394 connection

DESCRIPTION

The ST1394-01SC6 is an integrated termination network that optimizes board layout of the PHY layer in IEEE1394 one port cable application. This monolithic device is tested according to ESD requirement described in IEC61000-4-2 standard level 2. ST1394-01SC6 device ruggedness limits overvoltage at the 1394 transceiver inputs and outputs below acceptable limits. The ST1394-01SC6 implements IEEE1394 recommendation for line termination of TPA and TPB differential lines. Excellent matching of the termination resistor will minimize common mode noise that is needed to improve communication speed.

BENEFITS

- Resistor matching between TPA / TPB lines.
- Resistor matching between TPA+ / TPA-
- Single chip device versus 11 discretes
- No need for additional overvoltage protection device
- High level of integration

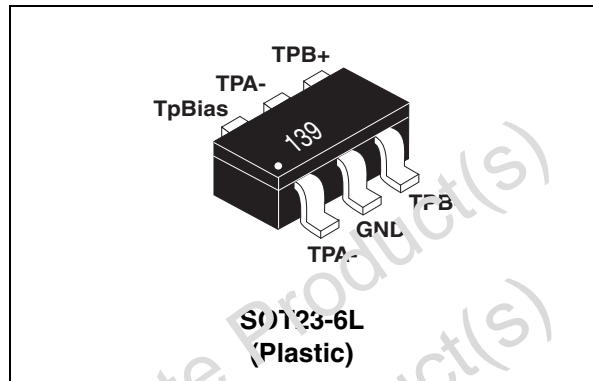
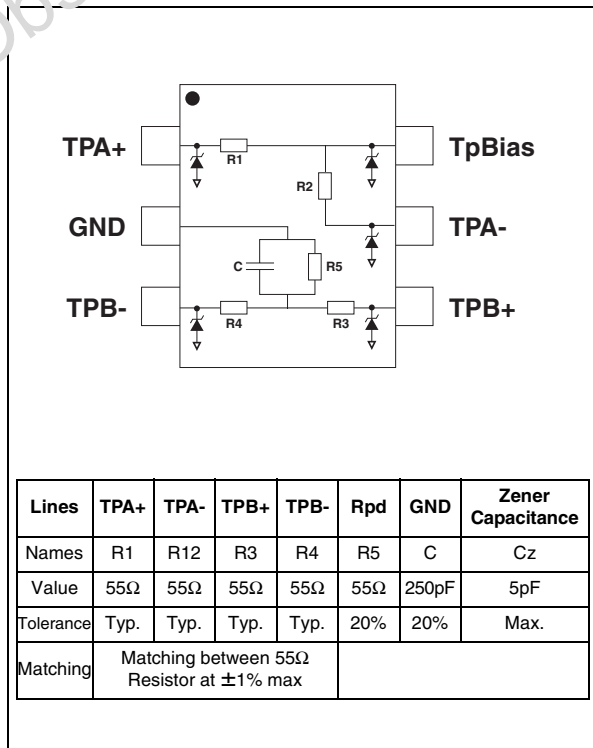


Table 1. Order Code

Part Number	Marking
ST1394-01SC6	139

Figure 1: Pinout Configuration



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**Table 2: Absolute Ratings** ( $T_{amb} = 25^{\circ}\text{C}$ )

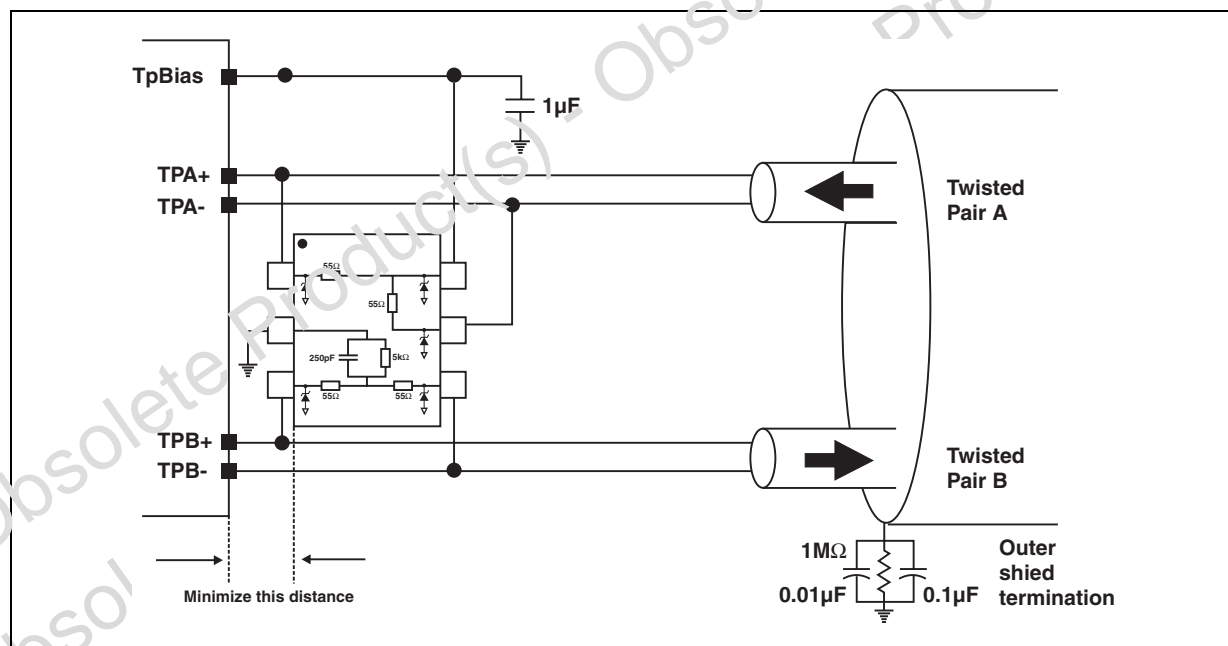
Symbol	Parameter and test conditions	Value	Unit
$T_{stg}$	Storage temperature range	- 55 to + 150	$^{\circ}\text{C}$
$T_j$	Maximum junction temperature	+ 150	$^{\circ}\text{C}$
TL	Lead solder temperature (10 second duration)	260	$^{\circ}\text{C}$

**Table 3: Electrical Characteristics** ( $T_{amb} = 25^{\circ}\text{C}$ )

Symbol	Parameter	Min.	Typ.	Max.	Unit
R1, R2, R3, R4	Bus termination resistors (note 1)		55		$\Omega$
$C_Z$	Zener capacitance			5	pF
$R_{pd}$	Pull down resistor		5		k $\Omega$
C	Capacitor in parallel with $R_{pd}$		250		pF
(R1+R2), (R3+R4)	Bus termination impedance	102	110	118	$\Omega$

Note 1: matching between 55 $\Omega$  resistors is better than  $\pm 1\%$ .

**Figure 2: Functional Diagram**



**APPLICATION INFORMATION**

The functional diagram here above presents a IEEE1394-a cable and shows how to connect the ST1394-01SC6 in order to correctly terminate and filter the TPA and TPB lines.

## TECHNICAL INFORMATION: Frequency behavior of data and strobe signals

Figure 3: Measurement conditions

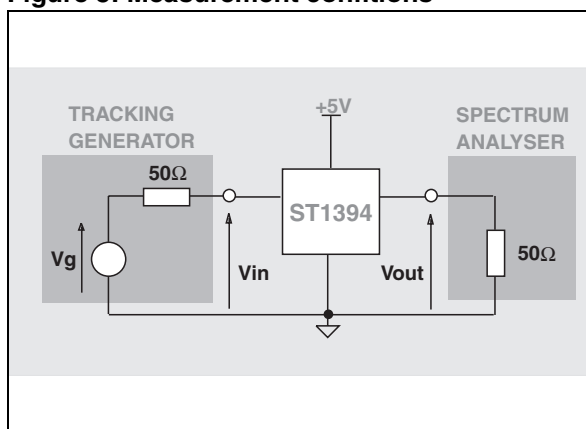


Figure 4: Test Board

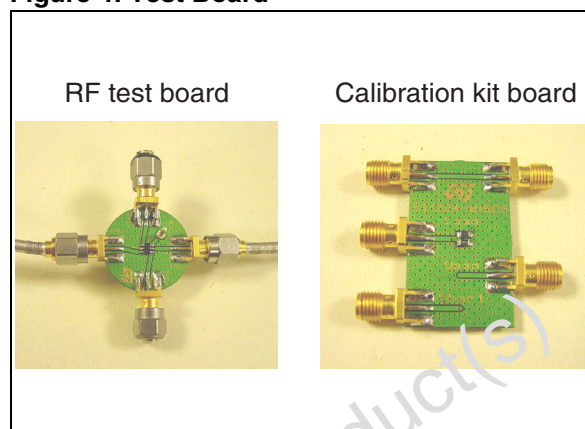


Figure 5: TPA line: comparison between Aplac model and device

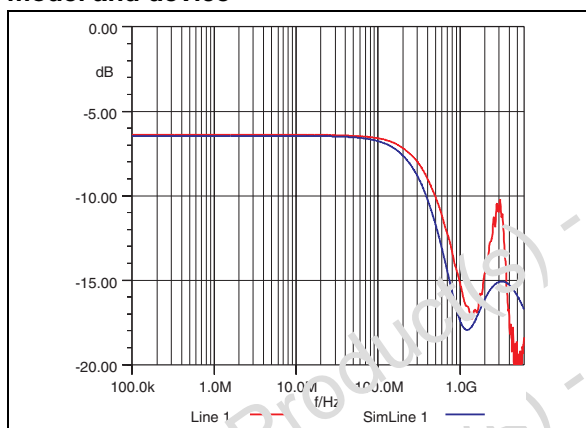
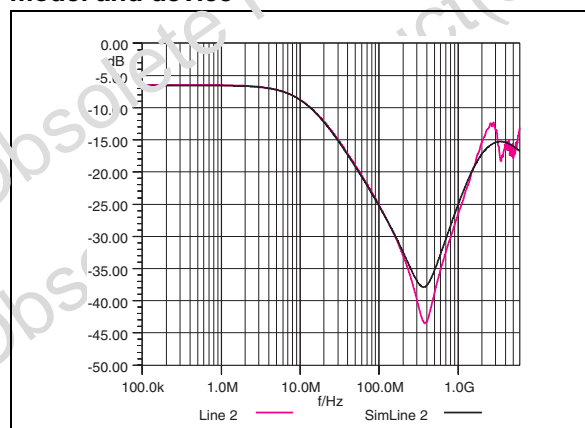
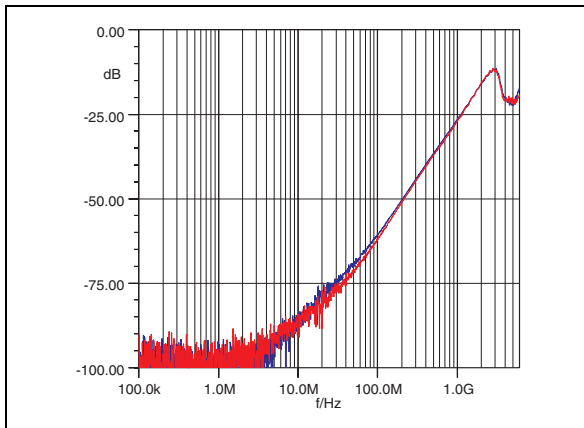


Figure 6: TPB line: comparison between Aplac model and device



**Note:** For a convenience reason, frequency response have been carried out on both TPA and TPB lines as if TPA+ and TPA- or TPB+ and TPB- were respectively Inputs and Outputs lines

**Figure 7: Crosstalk between TPA and TPB lines**



**Figure 8: CST1394 APLAC model**

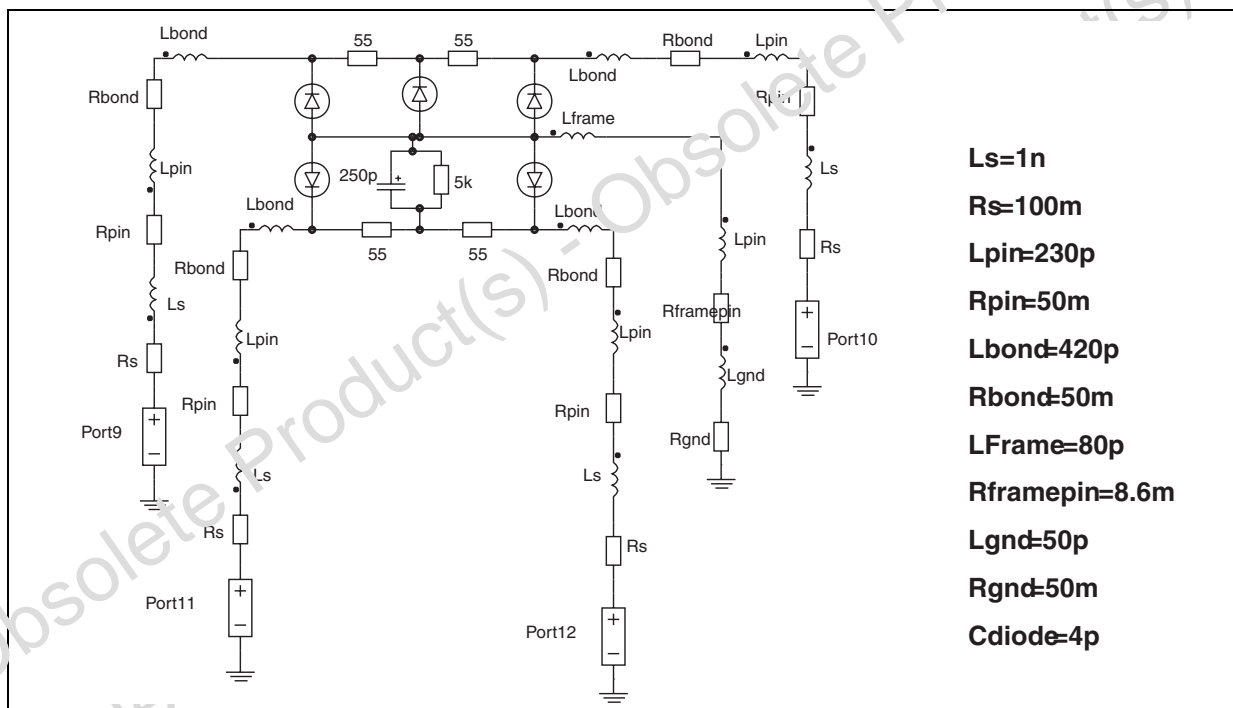


Figure 9: SOT23-6L Package Mechanical Data

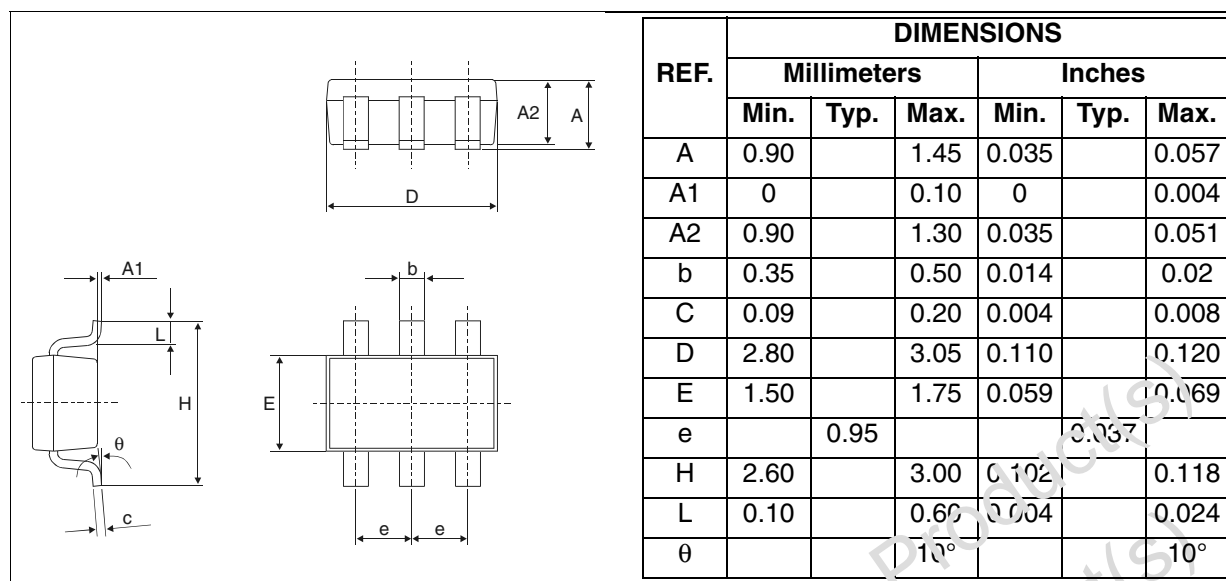


Figure 10: SOT23-6L Foot print dimensions (in millimeters)

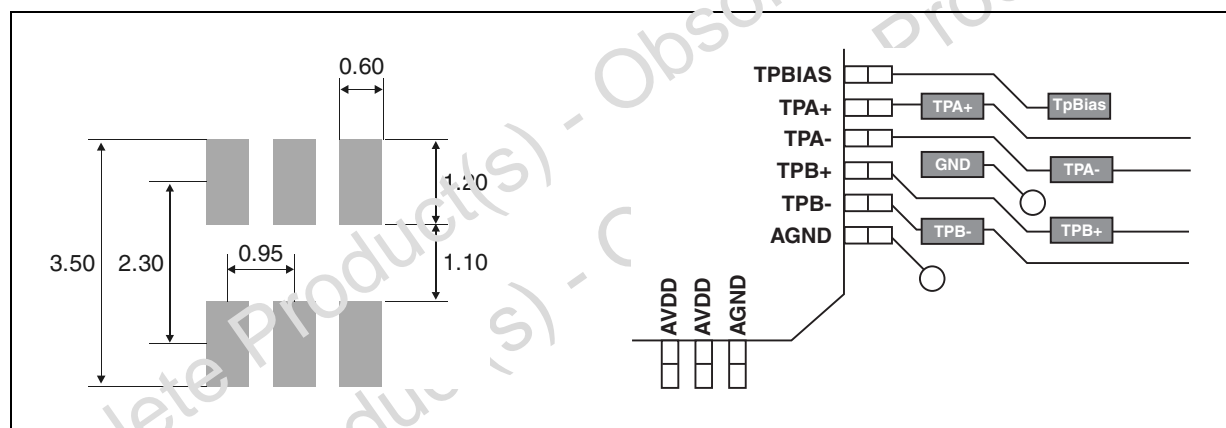


Table 4: Ordering Information

Ordering code	Marking	Package	Weight	Base qty	Delivery mode
ST1394-01SC6	139	SOT23-6L	16.7 mg	3000	Tape & reel

**Note:** More informations are available in the application note:  
AN1783: "HOW TO MAKE FIRE-WIRE COMMUNICATION PORT SAFE?"

Table 5: Revision History

Date	Revision	Description of Changes
Jul-2003	1A	First issue.
28-Oct-2004	2	SOT23-6L package dimensions change for reference "D" from 3.0 millimeters (0.118 inches) to 3.05 millimeters (0.120 inches).

Obsolete Product(s) - Obsolete Product(s)  
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