ST1394

IPAD™ 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

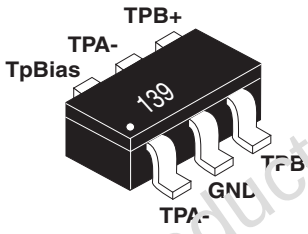
- Line termination for 2 twisted pairs TPA and TPB
- The device complies with IEEE1394 requirement for differential and common more impedance on TPA and TPB line
- Monolithic device with complete termination for one IEEE1394 connection

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 tranceiver 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 devise versus 11 discretes
- No need for additional overvoltage protection device
- High level of integration

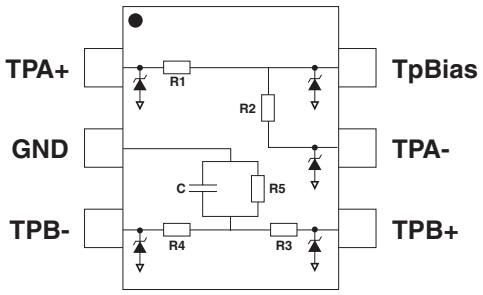


SOT23-6L
(Plastic)

Table 1. Order Code

Part Number	Marking
ST1394-01SC6	139

Figure 1: Pinout Configuration



Lines	TPA+	TPA-	TPB+	TPB-	Rpd	GND	Zener Capacitance
Names	R1	R12	R3	R4	R5	C	Cz
Value	55Ω	55Ω	55Ω	55Ω	55Ω	250pF	5pF
Tolerance	Typ.	Typ.	Typ.	Typ.	20%	20%	Max.
Matching	Matching between 55Ω Resistor at ±1% max						

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Table 2: Absolute Ratings (T_{amb} = 25°C)

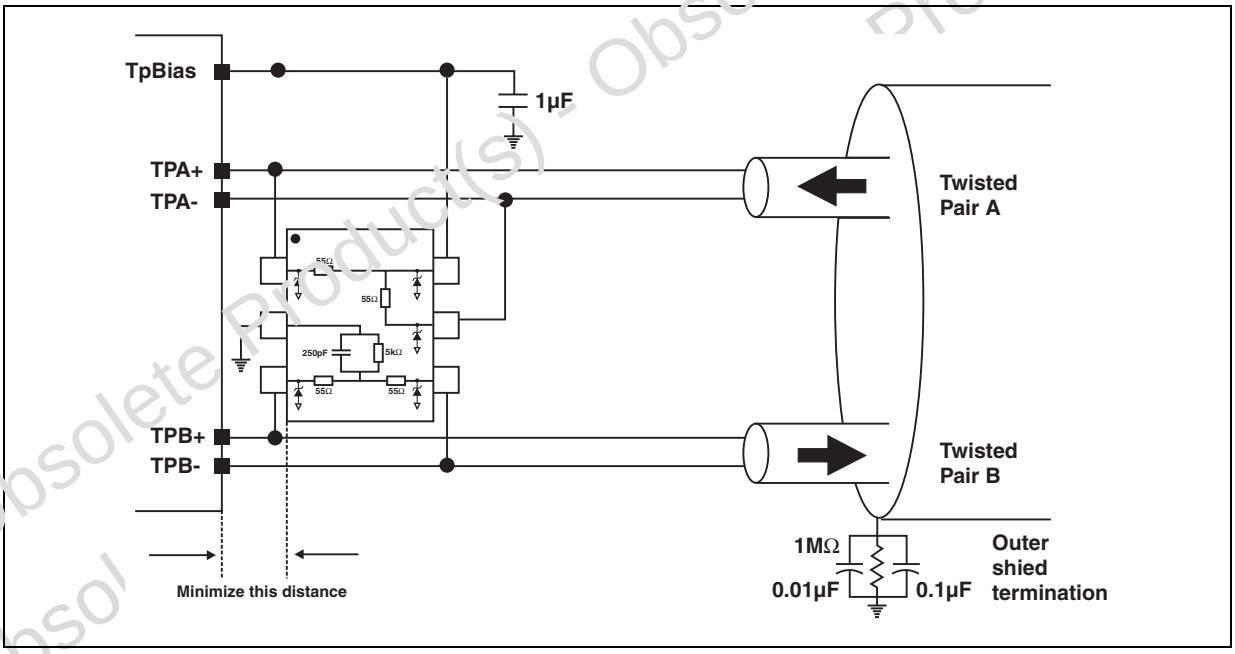
Symbol	Parameter and test conditions	Value	Unit
T_{stg}	Storage temperature range	- 55 to + 150	°C
T_j	Maximum junction temperature	+ 150	°C
TL	Lead solder temperature (10 second duration)	260	°C

Table 3: Electrical Characteristics (T_{amb} = 25°C)

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

Note 1: matching between 55Ω resistors is better than ± 1%.

Figure 2: Functionnal 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 confitions

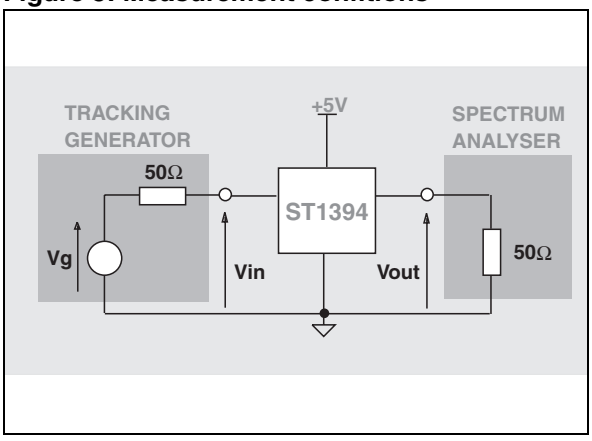


Figure 4: Test Board

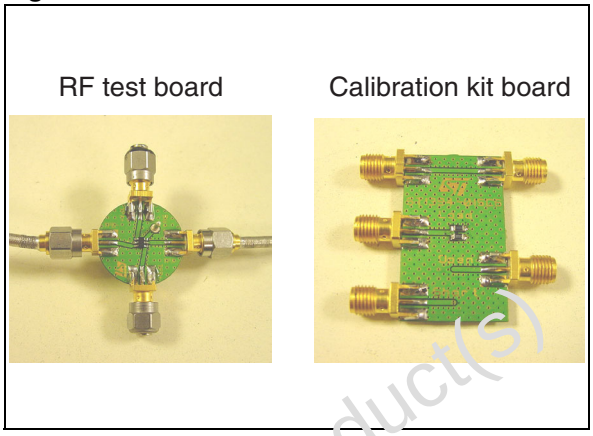


Figure 5: TPA line: comparison between Aplac model and device

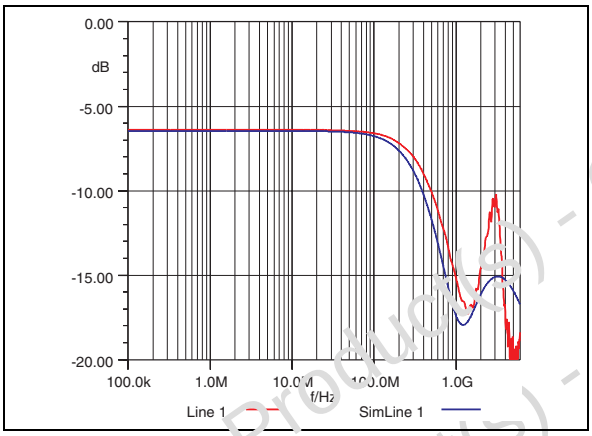
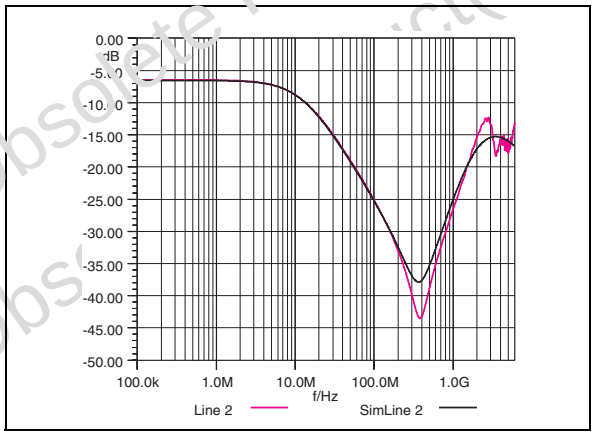


Figure 6: TPB line: comparison between Aplac model and device



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

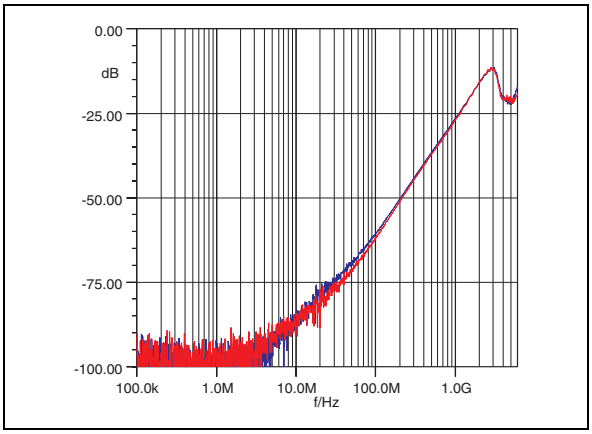


Figure 8: CST1394 APLAC model

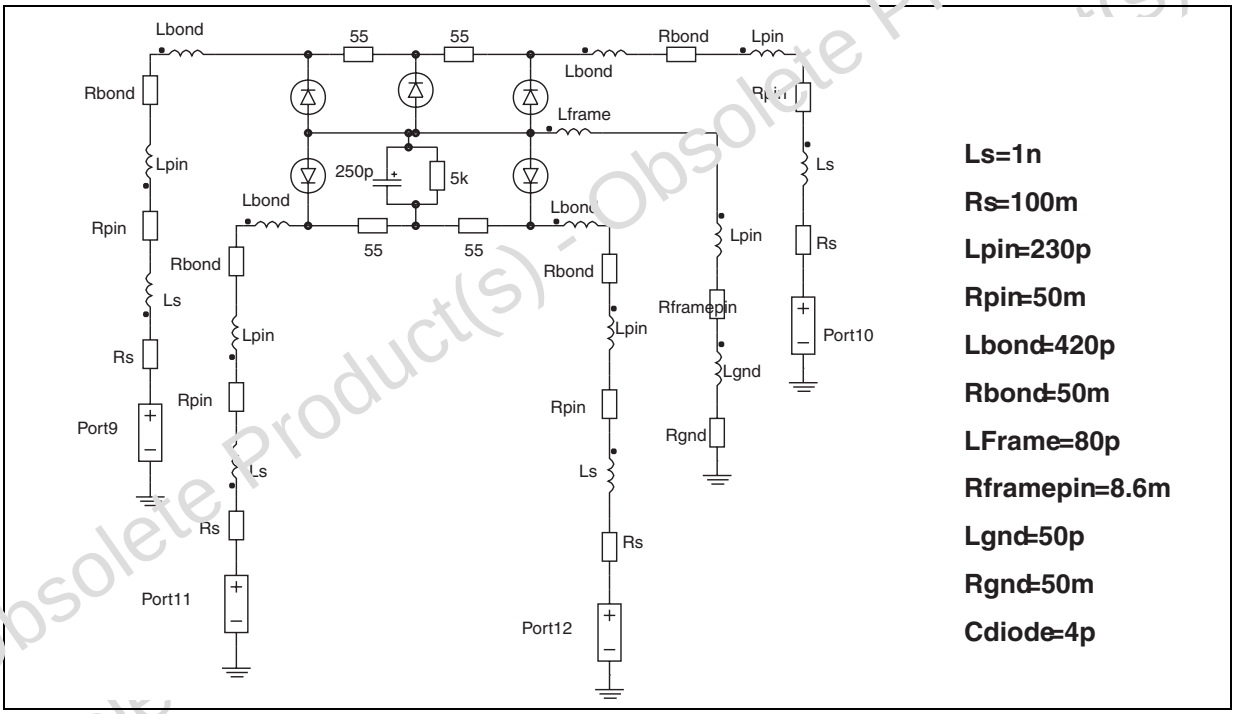
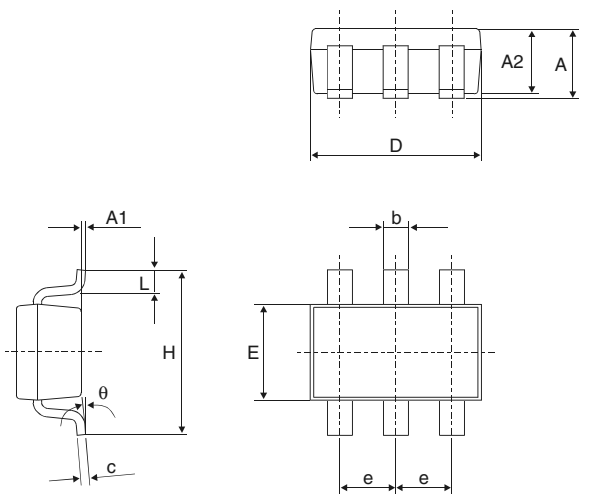


Figure 9: SOT23-6L Package Mechanical Data



REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90		1.45	0.035		0.057
A1	0		0.10	0		0.004
A2	0.90		1.30	0.035		0.051
b	0.35		0.50	0.014		0.02
C	0.09		0.20	0.004		0.008
D	2.80		3.05	0.110		0.120
E	1.50		1.75	0.059		0.069
e		0.95			0.037	
H	2.60		3.00	0.102		0.118
L	0.10		0.60	0.004		0.024
θ			10°			10°

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

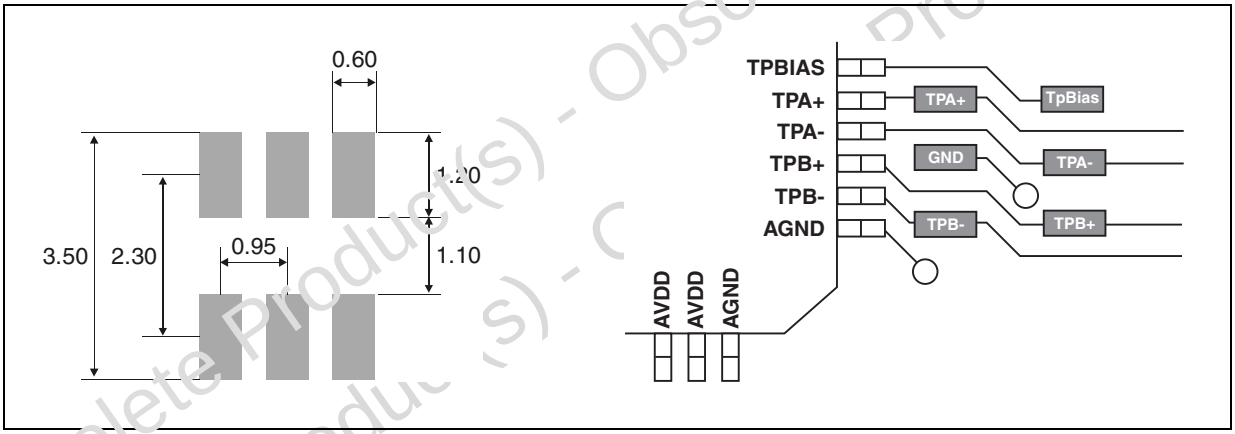


Table 4: Ordering Information

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).