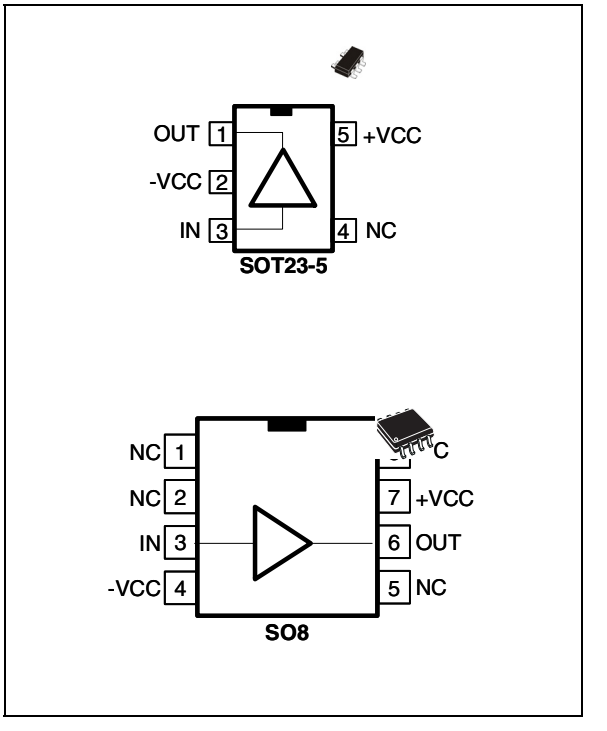
TSH340

300-MHz Single Supply Video Buffer Negative In/Out Rail

PRELIMINARY DATA

- **Gain flatness of 220MHz**
- **Bandwidth: 300MHz**
- **Single supply operation down to 3V**
- **Tested on 5V power supply**
- **Negative input & output rail**
- **Very low harmonic distortion**
- **Slew rate: 780V/µs typ., 540V/µs min.**
- **Input noise: 3nV/√Hz**
- **Specified for 150Ω load**
- **Internal gain of 6dB**

Pin Connections (top view)



Description

The TSH340 is a video buffer featuring a gain of 6dB. A large bandwidth of 300MHz for only 9.4mA of quiescent current allows the TSH340 to achieve a gain flatness of 220MHz. Its structure features a very high slew rate of 540V/µs minimum guaranteed by test. Associated to a very good THD these characteristics are particularly intended in the high quality video systems.

The TSH340 is available in tiny SOT23-5 and SO8 plastic packages for size saving consideration.

Applications

- **High end video systems**
- **High definition TV (HDTV)**
- **Broadcast and graphic video**
- **Multimedia products**

Order Codes

Part Number	Temperature Range	Package	Packaging	Marking
TSH340ILT	-40°C to +85°C	SOT23-5	Tape & Reel	K306
TSH340ID		SO-8	Tube	TSH350I
TSH340IDT			Tape & Reel	TSH350I

This is preliminary information on a new product now in development or undergoing evaluation. Details are subject to change without notice.

1 Absolute Maximum Ratings

Table 1. Key parameters and their absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{CC}	Supply voltage [1]	6	V
V_{in}	Input Voltage Range [2]	TBD	V
T_{oper}	Operating Free Air Temperature Range	-40 to +85	°C
T_{std}	Storage Temperature	-65 to +150	°C
T_j	Maximum Junction Temperature	150	°C
R_{thjc}	Thermal Resistance Junction to Case SOT23-5 SO8	 80 75	°C/W
R_{thja}	Thermal Resistance Junction to Ambient Area SOT23-5 SO8	 250 175	°C/W
$P_{max.}$	Maximum Power Dissipation (@Ta=25°C) for Tj=150°C SOT23-5 SO8	 500 715	mW
ESD	CDM: Charged Device Model	TBD	kV
	HBM: Human Body Model	TBD	kV
	MM: Machine Model	TBD	V
	Output Short Circuit	3	

1) All voltage values, except differential voltage are with respect to network terminal.

2) The magnitude of input and output voltage must never exceed V_{CC} +0.3V.

3) An output current limitation protects the circuit from transient currents. Short-circuits can cause excessive heating.

Destructive dissipation can result from short circuit on amplifiers.

Table 2. Operating Conditions

Symbol	Parameter	Value	Unit
V_{CC}	Power Supply Voltage	3 to 5.5[1]	V
Vicm	Common Mode Input Voltage	-0.4 to 3	V

1) Tested in full production at 0V/5V single power supply

2 Electrical Characteristics

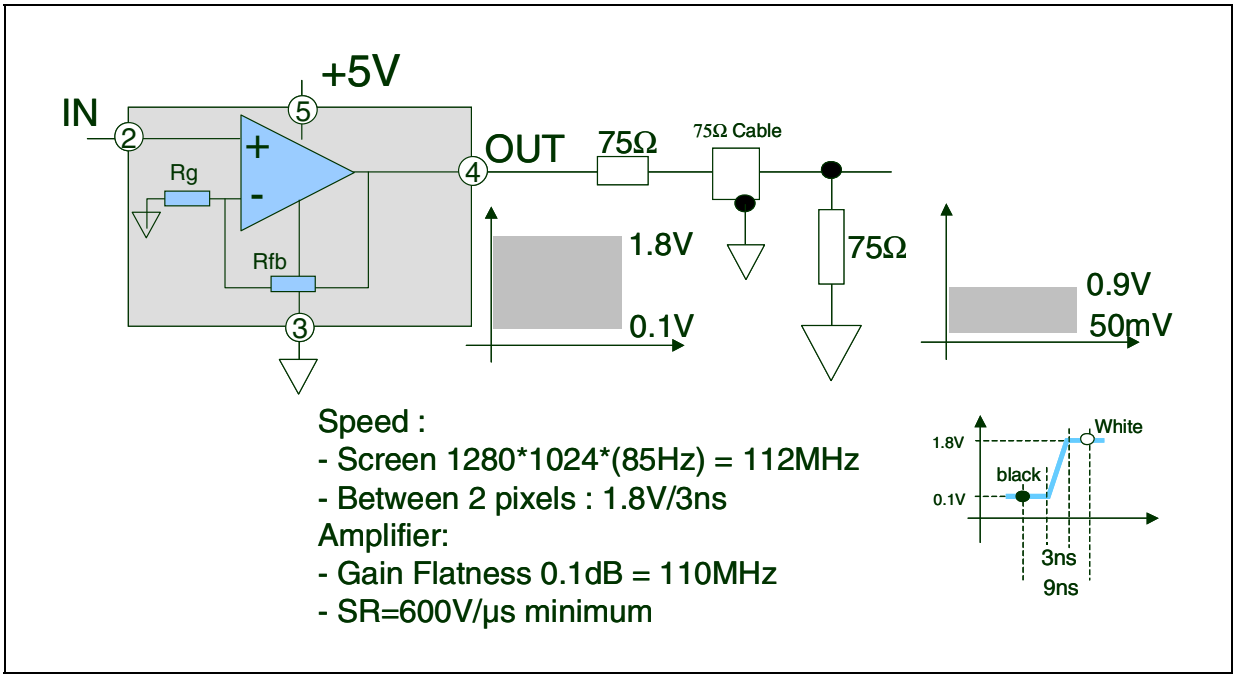
Table 3. V_{CC} = +5V, T_{amb} = 25°C (unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
DC PERFORMANCE						
V_{OS}	Output Offset Voltage[1]	no Load, T_{amb}		1.8	TBD	mV
		-40°C < T_{amb} < +85°C		TBD		
I_{ib}	Input Bias Current	T_{amb}, V_{icm}=0.6V		-6	-16	µA
		-40°C < T_{amb} < +85°C		-32		
PSR	Power Supply Rejection Ratio	ΔV_{cc}=200mVp-p, F=1MHz		-90		dB
	20 log ($\Delta V_{cc}/\Delta V_{out}$)	-40°C < T_{amb} < +85°C		TBD		
ICC	Total Supply Current	no Load, V_{IN}=100mV		9.4	TBD	mA
G	DC Voltage Gain	RL = 150Ω	TBD	2	TBD	V/V
Rin	Input Resistance	T_{amb}		TBD		W
Cin	Input Capacitance	T_{amb}		TBD		pF
DYNAMIC PERFORMANCE and OUTPUT CHARACTERISTIC						
Bw	-3dB Bandwidth	Small Signal Vout=20mVp V_{icm}=0.6V, RL = 150Ω	180	300		MHz
	Gain Flatness @ 0.1dB	Small Signal Vout=20mVp V_{icm}=0.6V, RL = 150Ω		63		
FPBW	Full Power Bandwidth	V_{icm}=0.6V, V_{OUT} = 2Vp-p, R_L = 150Ω	TBD	220		MHz
SR	Slew Rate	Vicm=0.6V, V_{OUT} = 2Vp-p, R_L = 150Ω		780		V/µs
V_{OH}	High Level Output Voltage	R_L = 150Ω	3.8	3.87		V
V_{OL}	Low Level Output Voltage	R_L = 150Ω		45	52	mV
I_{OUT}	Output Short Circuit Current (Isource)	T_{amb}	50	95		mA
		-40°C < T_{amb} < +85°C		42		
ΔG	Differential Gain	R_L = 150Ω		TBD		%
DF	Differential Phase	R_L = 150Ω		TBD		°
NOISE AND DISTORTION						
eN	Equivalent Input Noise Voltage	F = 100kHz		7		nV/√Hz
iN	Equivalent Input Noise Current	F = 100kHz		TBD		pA/√Hz
HD2	2nd Harmonic Distortion	V_{OUT} = 2Vp-p, R_L = 150Ω F= 10MHz,		-88		dBc
HD3	3rd Harmonic Distortion	V_{OUT} = 1Vp-p, R_L = 150Ω F= 10MHz,		-72		dBc

1) Output Offset Voltage is determined from the following expression: V_{OUT}=G.V_{IN}+V_{OS}

3 Application Schematic

Figure 1. High-end video driver

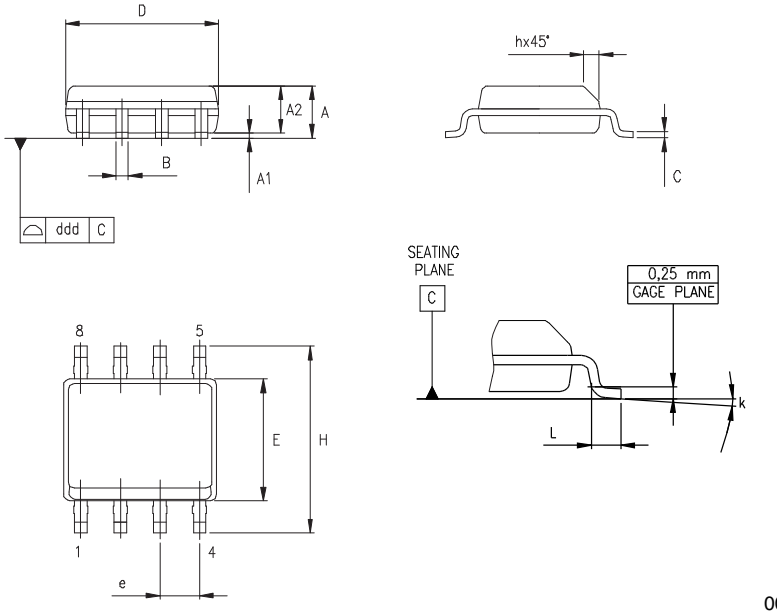


4 Package Mechanical Data

4.1 SO-8 Package

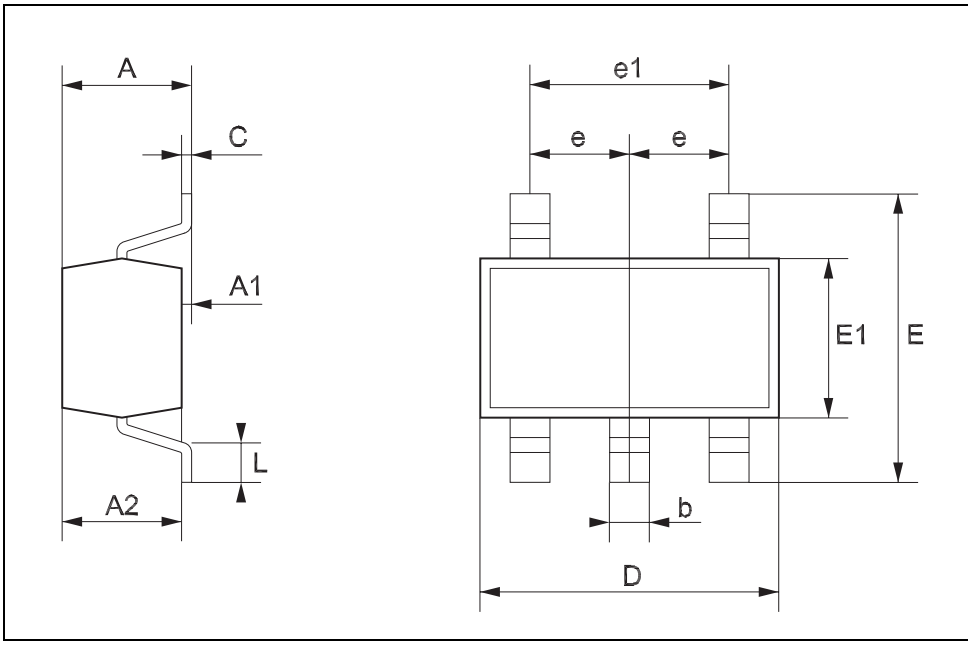
SO-8 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	1.35		1.75	0.053		0.069
A1	0.10		0.25	0.04		0.010
A2	1.10		1.65	0.043		0.065
B	0.33		0.51	0.013		0.020
C	0.19		0.25	0.007		0.010
D	4.80		5.00	0.189		0.197
E	3.80		4.00	0.150		0.157
e		1.27			0.050	
H	5.80		6.20	0.228		0.244
h	0.25		0.50	0.010		0.020
L	0.40		1.27	0.016		0.050
k	8° (max.)					
ddd			0.1			0.04



4.2 5 pins - Tiny Package (SOT23)

SOT23-5L MECHANICAL DATA						
DIM.	mm.			mils		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	0.90		1.45	35.4		57.1
A1	0.00		0.15	0.0		5.9
A2	0.90		1.30	35.4		51.2
b	0.35		0.50	13.7		19.7
C	0.09		0.20	3.5		7.8
D	2.80		3.00	110.2		118.1
E	2.60		3.00	102.3		118.1
E1	1.50		1.75	59.0		68.8
e		0.95			37.4	
e1		1.9			74.8	
L	0.35		0.55	13.7		21.6



5 Revision History

Date	Revision	Description of Changes
01 Jan. 2005	1	First release corresponding to Preliminary Data version of datasheet.

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics
All other names are the property of their respective owners

© 2005 STMicroelectronics - All rights reserved

STMicroelectronics group of companies
Australia - Belgium - Brazil - Canada - China - Czech Repubic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America
www.st.com