DATA SHEET

TDA6800
TDA6800T
Video modulator circuit

Product specification
File under Integrated Circuits, IC02

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Philips
Semiconductors

PHILIPS

Video modulator circuit

TDA6800
TDA6800T

GENERAL DESCRIPTION

The TDA6800 is a modulator circuit for modulation of video signals on a VHF/UHF carrier. The circuit requires a 5 V power supply and few external components for the negative modulation mode. For positive modulation an external clamp circuit is required. This circuit can be used as a general purpose modulator without additional external components.

Features

- Balanced modulator
- Symmetrical oscillator
- Video clamp circuit for negative modulation
- Frequency range 50 to 800 MHz

QUICK REFERENCE DATA

		MIN.	TYP.	MAX.	
Supply voltage range	V_{5-4}	4,5	–	5,5	V
Supply current consumption	I_5	–	9	–	mA
Video input voltage	$V_{8(p-p)}$	–	1	–	V
Input impedance	R_8	30	–	–	kΩ
Output voltage (50 MHz)	V_{6-7}	–	13	–	mV
Output voltage (600 MHz)	V_{6-7}	–	10	–	mV
Differential gain	ΔG	–	–	10	%
Differential phase	Δ_ϕ	–	–	10	deg.
Intermodulation distortion	d_{int}	–	–80	–	dB

PACKAGE OUTLINE

TDA6800 : 8-lead dual in-line; plastic (SOT97A); SOT 97-1; 1996 november 29.

TDA6800T: 8-lead mini-pack; plastic (SO8; SOT96A); SOT 96-1; 1996 november 29.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Supply voltage	V_{5-4}	max.	7 V
Input voltage	V_{8-4}	max.	4 V
Output voltage	$V_{6,\,7-4}$	max.	9 V
Storage temperature	T_{stg}	max.	125 °C
Junction temperature	T_j	max.	125 °C
Operating ambient temperature range	T_{amb}		−25 to + 85 °C

THERMAL RESISTANCE

From junction to ambient in free air

TDA6800T	$R_{th\ j-a}$	260 K/W
TDA6800	$R_{th\ j-a}$	120 K/W

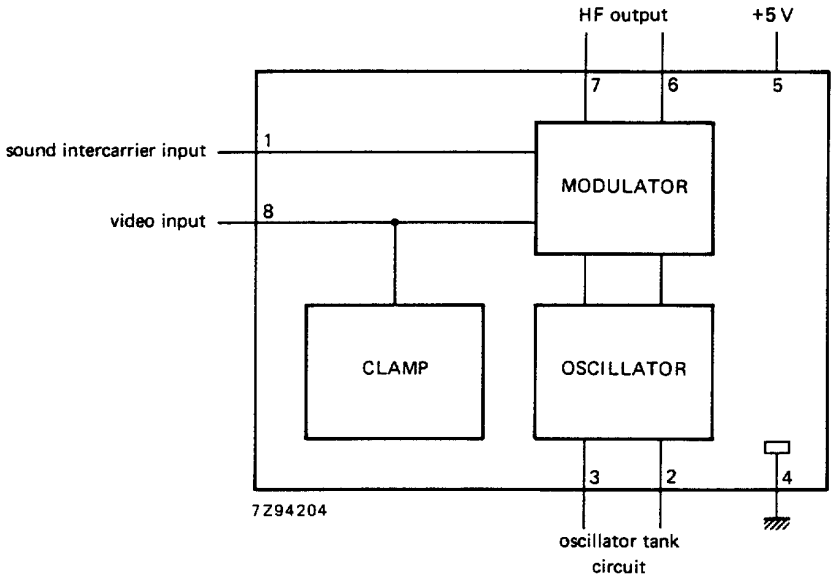


Fig.1 Block diagram TDA6800 and TDA6800T.

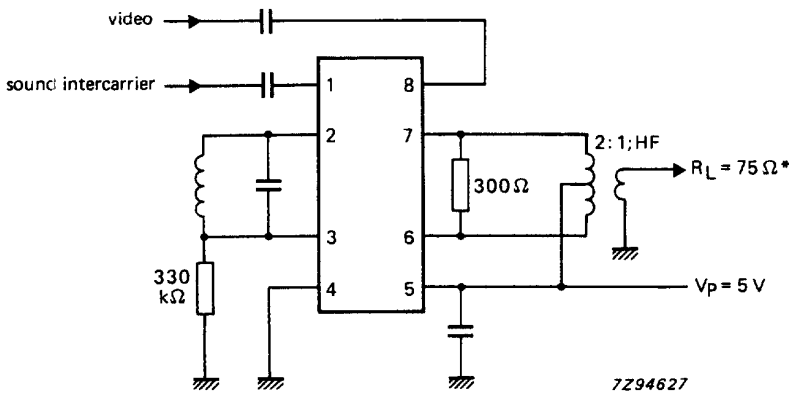
CHARACTERISTICS

V_P = 5 V; T_{amb} = 25 °C; measured in Fig.1; unless otherwise specified

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply voltage range	V_{5-4}	4,5	–	5,5	V
Supply current consumption	I_5	–	9	13	mA
Video input voltage	$V_{8(p-p)}$	–	1	–	V
Input impedance	R_8	30	–	–	kΩ
Voltage (d.c.) at video input (clamp voltage)	V_8	–	1,4	–	V
Voltage (d.c.) at sound input	V_1	–	2,5	–	V
Output voltage f = 50 MHz; R_L = 75 Ω	V_{6-7}	–	13	–	mV
Output voltage f = 600 MHz; R_L = 75 Ω	V_{6-7}	–	10	–	mV
Differential gain	Δ_G	–	–	10	%
Differential phase	Δ_ϕ	–	–	10	deg.
Intermodulation (1,1 MHz) (note 1)		–	–80	–60	dB
Frequency shift V_b = 5%, f = 600 MHz	Δ_f	–	–	100	kHz
Frequency shift V_b = 5%, f = 800 MHz	Δ_f	–	tbf	–	kHz
Frequency drift 25 to 40 °C	Δ_f	–	–	100	kHz
Frequency drift 15 to 55 °C	Δ_f	–	–	300	kHz
Positive modulation (see Fig.3)					
Residual carrier voltage	V_r	–	–	2,5	%
Cross modulation (note 2)	α	–	0,1	0,25	%

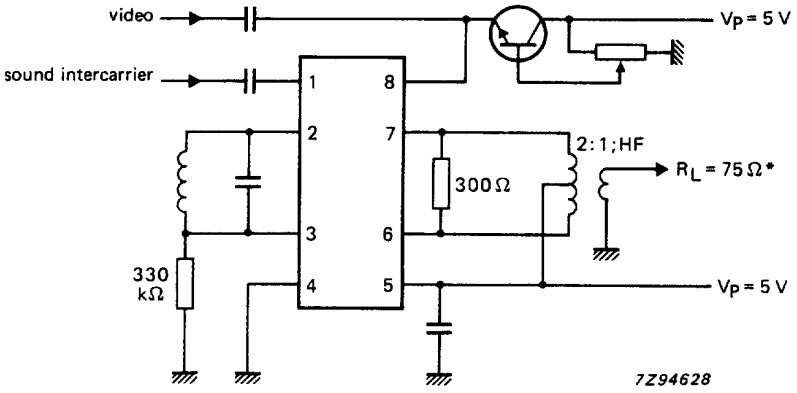
Notes

1. Input signal: d.c. 0,45 V (V_{8-4} = 1,85 V)
   4,4 MHz; input voltage (p-p) = 0,6 V
   5,5 MHz; input voltage (p-p) = 1,26 V
   measured with respect to picture carrier, at f = 600 MHz.
2. Input signal: d.c. 1 V (V_{8-4} = 3,5 V)
   5,5 MHz AM modulated, f_m = 100 kHz
   m = 0,8; input voltage (p-p) = 2,27 V (including modulation)
   measured with respect to the picture carrier, at f = 600 MHz.



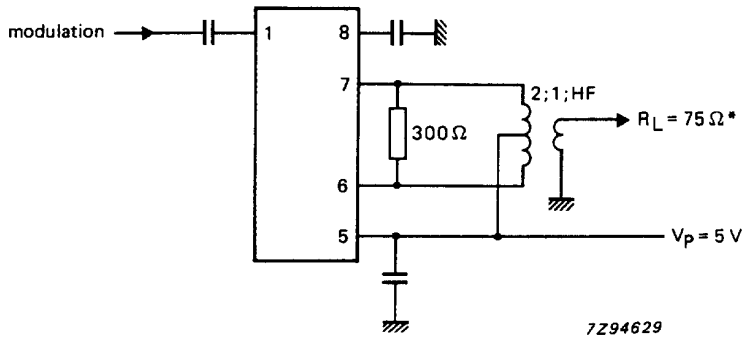
* Close to output transformer.

Fig.2 Application for negative modulation.



* Close to output transformer

Fig.3 Application for positive modulation.

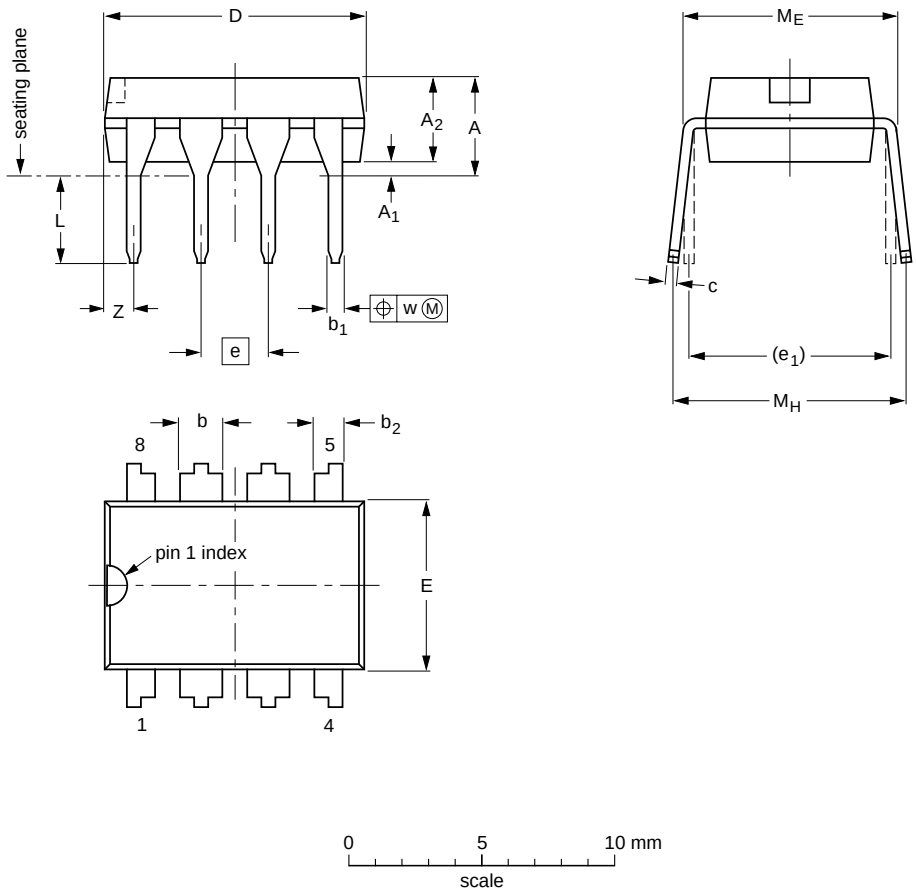


* Close to output transformer.

Fig.4 Application for general purpose modulation.

PACKAGE OUTLINES

DIP8: plastic dual in-line package; 8 leads (300 mil) **SOT97-1**



DIMENSIONS (inch dimensions are derived from the original mm dimensions)

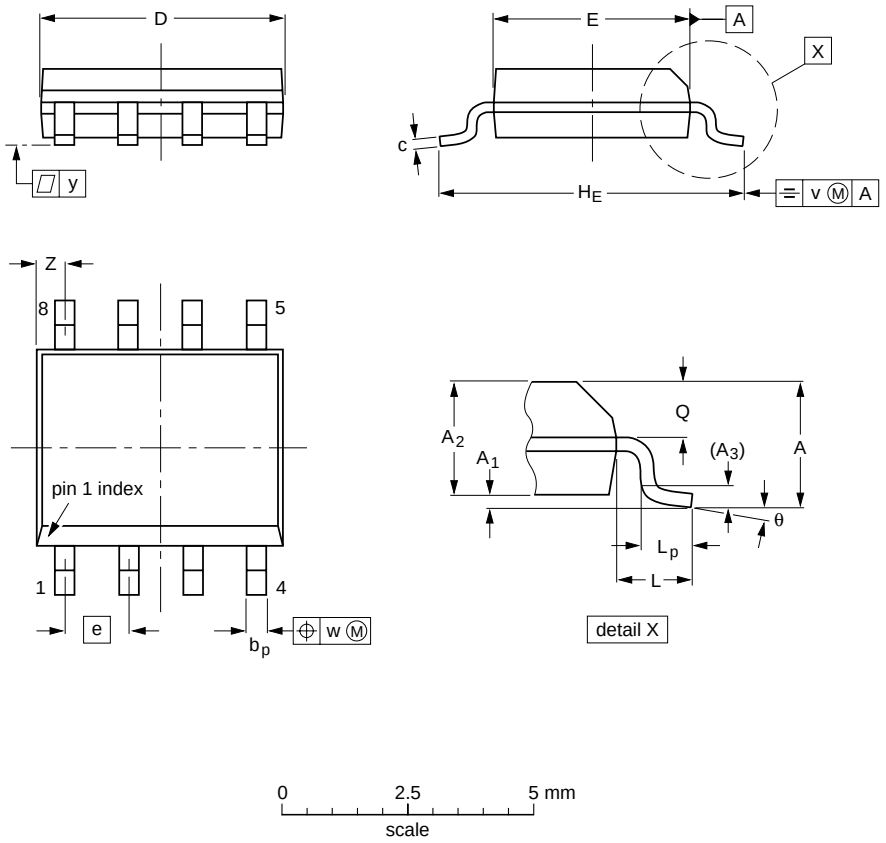
UNIT	A max.	A_1 min.	A_2 max.	b	b_1	b_2	c	D (1)	E (1)	e	e_1	L	M_E	M_H	w	Z (1) max.
mm	4.2	0.51	3.2	1.73 1.14	0.53 0.38	1.07 0.89	0.36 0.23	9.8 9.2	6.48 6.20	2.54	7.62	3.60 3.05	8.25 7.80	10.0 8.3	0.254	1.15
inches	0.17	0.020	0.13	0.068 0.045	0.021 0.015	0.042 0.035	0.014 0.009	0.39 0.36	0.26 0.24	0.10	0.30	0.14 0.12	0.32 0.31	0.39 0.33	0.01	0.045

Note

1. Plastic or metal protrusions of 0.25 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT97-1	050G01	MO-001AN				~~92-11-17~~ 95-02-04

SO8: plastic small outline package; 8 leads; body width 3.9 mm **SOT96-1**



DIMENSIONS (inch dimensions are derived from the original mm dimensions)

UNIT	A max.	A_1	A_2	A_3	b_p	c	$D^{(1)}$	$E^{(2)}$	e	H_E	L	L_p	Q	v	w	y	$Z^{(1)}$	θ
mm	1.75	0.25 0.10	1.45 1.25	0.25	0.49 0.36	0.25 0.19	5.0 4.8	4.0 3.8	1.27	6.2 5.8	1.05	1.0 0.4	0.7 0.6	0.25	0.25	0.1	0.7 0.3	8^o 0^o
inches	0.069	0.010 0.004	0.057 0.049	0.01	0.019 0.014	0.0100 0.0075	0.20 0.19	0.16 0.15	0.050	0.244 0.228	0.041	0.039 0.016	0.028 0.024	0.01	0.01	0.004	0.028 0.012	

Notes

1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.
2. Plastic or metal protrusions of 0.25 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT96-1	076E03S	MS-012AA				~~95-02-04~~ 97-05-22

SOLDERING

Introduction

There is no soldering method that is ideal for all IC packages. Wave soldering is often preferred when through-hole and surface mounted components are mixed on one printed-circuit board. However, wave soldering is not always suitable for surface mounted ICs, or for printed-circuits with high population densities. In these situations reflow soldering is often used.

This text gives a very brief insight to a complex technology. A more in-depth account of soldering ICs can be found in our *"IC Package Databook"* (order code 9398 652 90011).

DIP

SOLDERING BY DIPPING OR BY WAVE

The maximum permissible temperature of the solder is 260 °C; solder at this temperature must not be in contact with the joint for more than 5 seconds. The total contact time of successive solder waves must not exceed 5 seconds.

The device may be mounted up to the seating plane, but the temperature of the plastic body must not exceed the specified maximum storage temperature ($T_{stg\ max}$). If the printed-circuit board has been pre-heated, forced cooling may be necessary immediately after soldering to keep the temperature within the permissible limit.

REPAIRING SOLDERED JOINTS

Apply a low voltage soldering iron (less than 24 V) to the lead(s) of the package, below the seating plane or not more than 2 mm above it. If the temperature of the soldering iron bit is less than 300 °C it may remain in contact for up to 10 seconds. If the bit temperature is between 300 and 400 °C, contact may be up to 5 seconds.

SO

REFLOW SOLDERING

Reflow soldering techniques are suitable for all SO packages.

Reflow soldering requires solder paste (a suspension of fine solder particles, flux and binding agent) to be applied to the printed-circuit board by screen printing, stencilling or pressure-syringe dispensing before package placement.

Several techniques exist for reflowing; for example, thermal conduction by heated belt. Dwell times vary between 50 and 300 seconds depending on heating method. Typical reflow temperatures range from 215 to 250 °C.

Preheating is necessary to dry the paste and evaporate the binding agent. Preheating duration: 45 minutes at 45 °C.

WAVE SOLDERING

Wave soldering techniques can be used for all SO packages if the following conditions are observed:

- A double-wave (a turbulent wave with high upward pressure followed by a smooth laminar wave) soldering technique should be used.
- The longitudinal axis of the package footprint must be parallel to the solder flow.
- The package footprint must incorporate solder thieves at the downstream end.

During placement and before soldering, the package must be fixed with a droplet of adhesive. The adhesive can be applied by screen printing, pin transfer or syringe dispensing. The package can be soldered after the adhesive is cured.

Maximum permissible solder temperature is 260 °C, and maximum duration of package immersion in solder is 10 seconds, if cooled to less than 150 °C within 6 seconds. Typical dwell time is 4 seconds at 250 °C.

A mildly-activated flux will eliminate the need for removal of corrosive residues in most applications.

REPAIRING SOLDERED JOINTS

Fix the component by first soldering two diagonally-opposite end leads. Use only a low voltage soldering iron (less than 24 V) applied to the flat part of the lead. Contact time must be limited to 10 seconds at up to 300 °C. When using a dedicated tool, all other leads can be soldered in one operation within 2 to 5 seconds between 270 and 320 °C.

DEFINITIONS

Data sheet status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Limiting values	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.