DATA SHEET

TDA3825
Single FM TV-sound demodulator circuit

Product specification
File under Integrated Circuits, IC02

September 1988

Philips
Semiconductors

PHILIPS

Single FM TV-sound demodulator circuit TDA3825

GENERAL DESCRIPTION

The TDA3825 is a single FM demodulator system with external AF input and mute.

Features

- Supply voltage range from 4.5 V to 13.2 V
- AC coupled AF stage
- Multiple input AF operational amplifier with offset compensation
- External AF input
- High AF output voltage with low distortion
- AF gain of 0 dB without external components
- Frequency response can be determined by external components
- High ripple rejection
- Low switching noise between AF and mute

QUICK REFERENCE DATA

PARAMETER	CONDITIONS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply voltage (pin 11)		V_P	4.5	5.0	13.2	V
Supply current (pin 11)						
	V_P = 5.0 V	I_P	–	16	–	mA
	V_P = 12 V	I_P	–	18	–	mA
FM demodulator						
AF output voltage (pin 5)						
(RMS value)	Δf = 50 kHz; Q_B = 11	V_{5-1}	–	0.5	–	V
Signal plus weighted-noise						
to weighted-noise ratio		(S + W)/W	65	70	–	dB
Total harmonic distortion		THD	–	0.3	0.5	%
Source selector						
AF output voltage (pin 12)						
(RMS value)	THD ≤ 0.1%; V_u = 6 dB	V_{12-1}	–	1.0	–	V

PACKAGE OUTLINE

14-lead DIL; plastic (SOT27); SOT27-1; 1996 November 25.

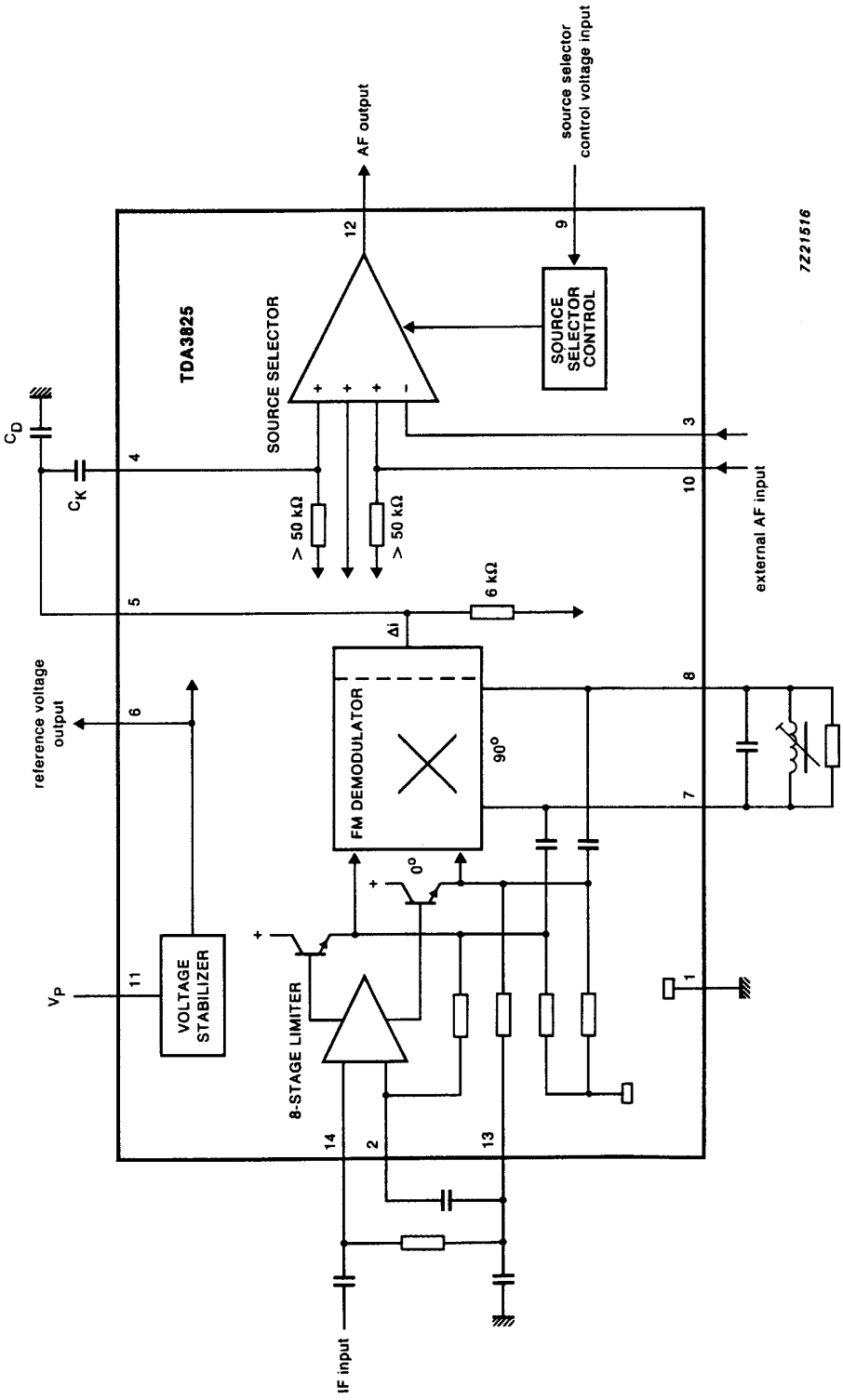


Fig.1 Block diagram.

RATINGS

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

PARAMETER	CONDITIONS	SYMBOL	MIN.	MAX.	UNIT
Supply voltage (pin 11)		V_P	4.5	13.2	V
External DC load resistance		R_L	5	–	kΩ
Total power dissipation		P_{tot}	–	400	mW
Storage temperature range		T_{stg}	−25	+ 125	°C
Operating ambient temperature range		T_{amb}	0	+ 70	°C

CHARACTERISTICS

V_P = 5 V; T_{amb} = 25 °C; V_i = 10 mV; f_o = 5.5 MHz; f_{AF} = 1 kHz; Δf = 50 kHz; all parameters were measured with the test circuit of Fig. 2; unless otherwise specified

PARAMETER	CONDITIONS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply voltage (pin 11)		V_P	4.5	5.0	13.2	V
Total current consumption		I_{tot}	–	16	20	mA
Limiting amplifier						
Input voltage (pin 14)						
(RMS value)						
		V_{14-1}	–	–	200	mV
	3 dB signal reduction	V_{14-1}	–	–	50	μV
DC voltages						
pin 2		V_{2-1}	–	2	–	V
pin 13		V_{13-1}	–	2	–	V
pin 14		V_{14-1}	–	2	–	V
Input resistance		R_{14-13}	15	–	–	kΩ
Input capacitance		C_{14-13}	–	–	6	pF
FM demodulator						
DC voltages						
pin 7		V_{7-1}	–	3.2	–	V
pin 8		V_{8-1}	–	3.2	–	V
AF output voltage (pin 5)						
(RMS value)	Q_B = 11	V_{5-1}	–	0.5	–	V
AM suppression	f_{AM} = 400 Hz; m = 0.3; V_i = 500 μV(rms)	α_{AM}	50	–	–	dB
Total harmonic distortion		THD	–	0.3	0.5	%
Output impedance (pin 5)		$\lvert Z_{5-1} \rvert$	–	6	–	kΩ
Signal plus weighted-noise to weighted-noise ratio	in accordance with DIN4505; CCIR468-3	(S + W)/W	65	70	–	dB
Signal plus noise-to-noise ratio	B_{noise} = 20 kHz	(S + N)/N	75	80	–	dB
Residual RF signal (pin 5)						
(RMS value)	2 x f_o without de-emphasis	V_{5-1}	–	30	–	mV
Ripple rejection	f_R = 70 Hz; V_R = 100 $mV_{(p-p)}$	αR	40	45	–	dB
Source selector (pin 12)						
Open loop gain		G_{ol}	50	60	–	dB
Noise output voltage						
(RMS value)	B_{noise} = 20 kHz	V_{12-1}	–	20	–	μV

PARAMETER	CONDITIONS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Slew rate		$\frac{\Delta V_{12-1}}{\Delta t}$	2	–	–	V/μs
Maximum AF output voltage (RMS value)	THD ≤ 0.1%; V_u = 6 dB	V_{12-1}	1.1	–	–	V
Input impedance						
(pin 4)		$\lvert Z_{4-1} \rvert$	50	–	–	kΩ
(pin 10)		$\lvert Z_{10-1} \rvert$	50	–	–	kΩ
–1 dB small signal bandwidth		B_{af}	100	–	–	kHz
DC output current		I_{12}	–	–	1	mA
Output load capacitance		C_L	–	–	500	pF
Feedback resistor						
(pin 3 to pin 6)		R_{3-6}	–	–	10	kΩ
(pin 3 to pin 12)		R_{3-12}	0	–	–	Ω
DC output voltage		V_{12-1}	–	2.27	–	V
AF suppression for mute		α_{mute}	70	76	–	dB
Crosstalk attenuation		$\alpha_{4/10}$	64	70	–	dB
Offset voltage between any two source selector positions		V_{12-6}	–	–	50	mV
Source selector control	see Fig.3					
Source coltrol voltage (pin 9)						
Mute active						
input voltage		V_{9-1}	0	–	$1/3V_P$–1	V
input current		I_9	10	–	500	μA
Input 1 active (pin 4)						
input voltage		V_{9-1}	1/3 V_P	–	2/3 V_P–0.7	V
input current		I_9	–200	–	+200	μA
Input 2 active (pin 10)						
input voltage		V_{9-1}	2/3 V_P + 0.7	–	V_P	V
input current		I_9	–600	–	–40	μA
Input voltage at pin 9 for I_9 = 0 μA		V_{9-1}	–	$\frac{V_P - 0.7}{2}$	–	V
Reference source (pin 6)						
Reference voltage input		V_{ref}	2.17	2.27	2.37	V
Output current		$\lvert I_6 \rvert$	–	250	–	μA

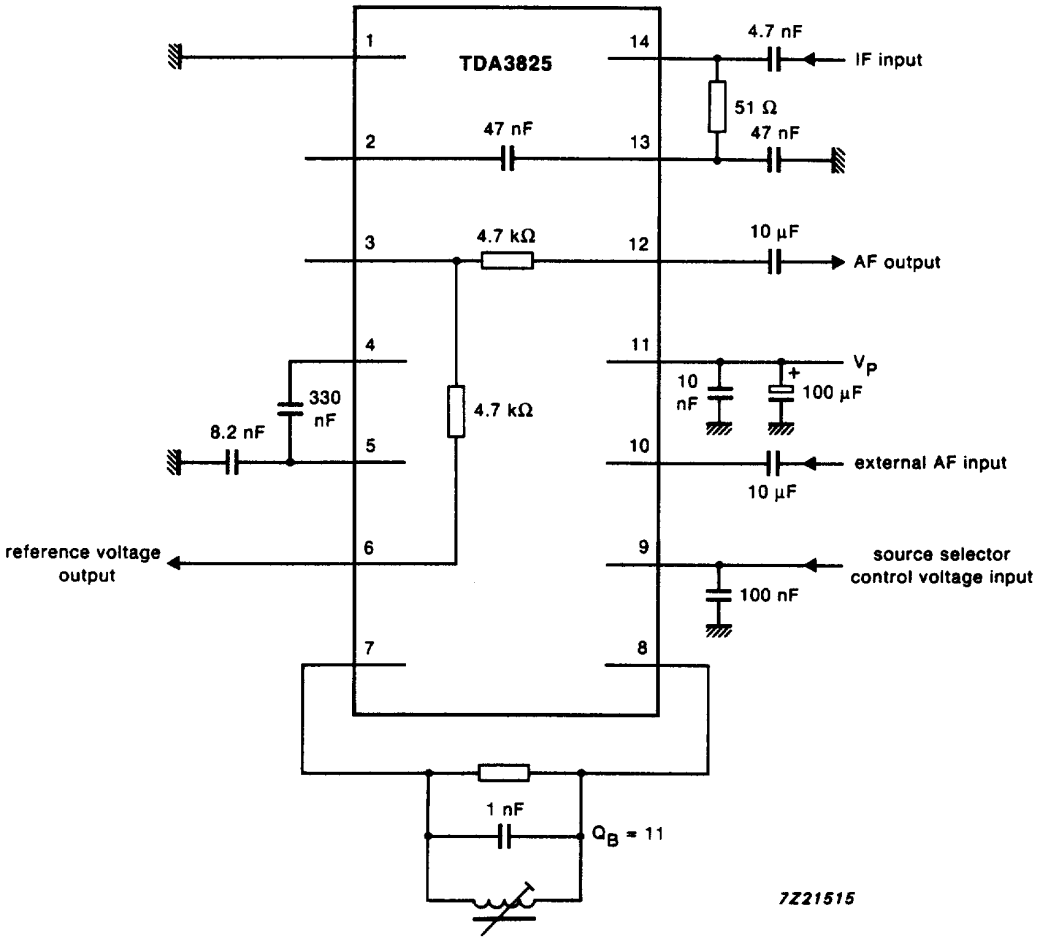


Fig.2 Test circuit.

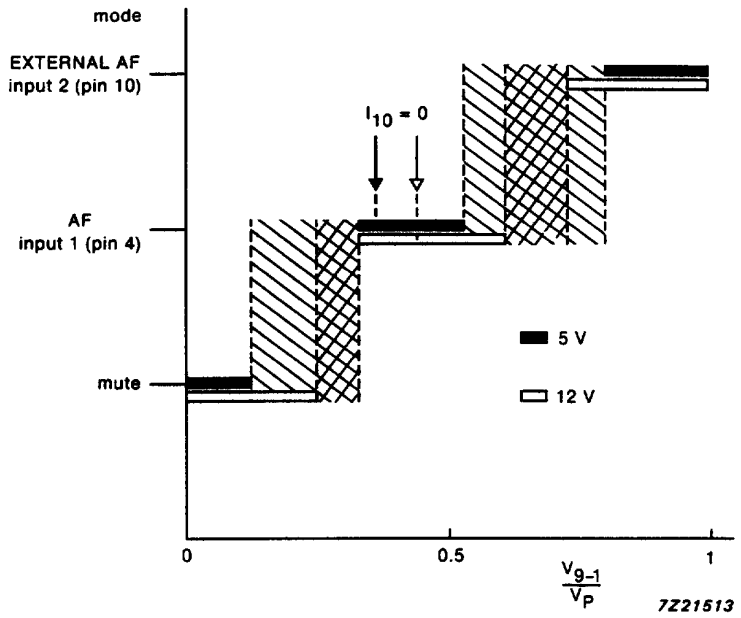


Fig.3 Source selector logic diagram.

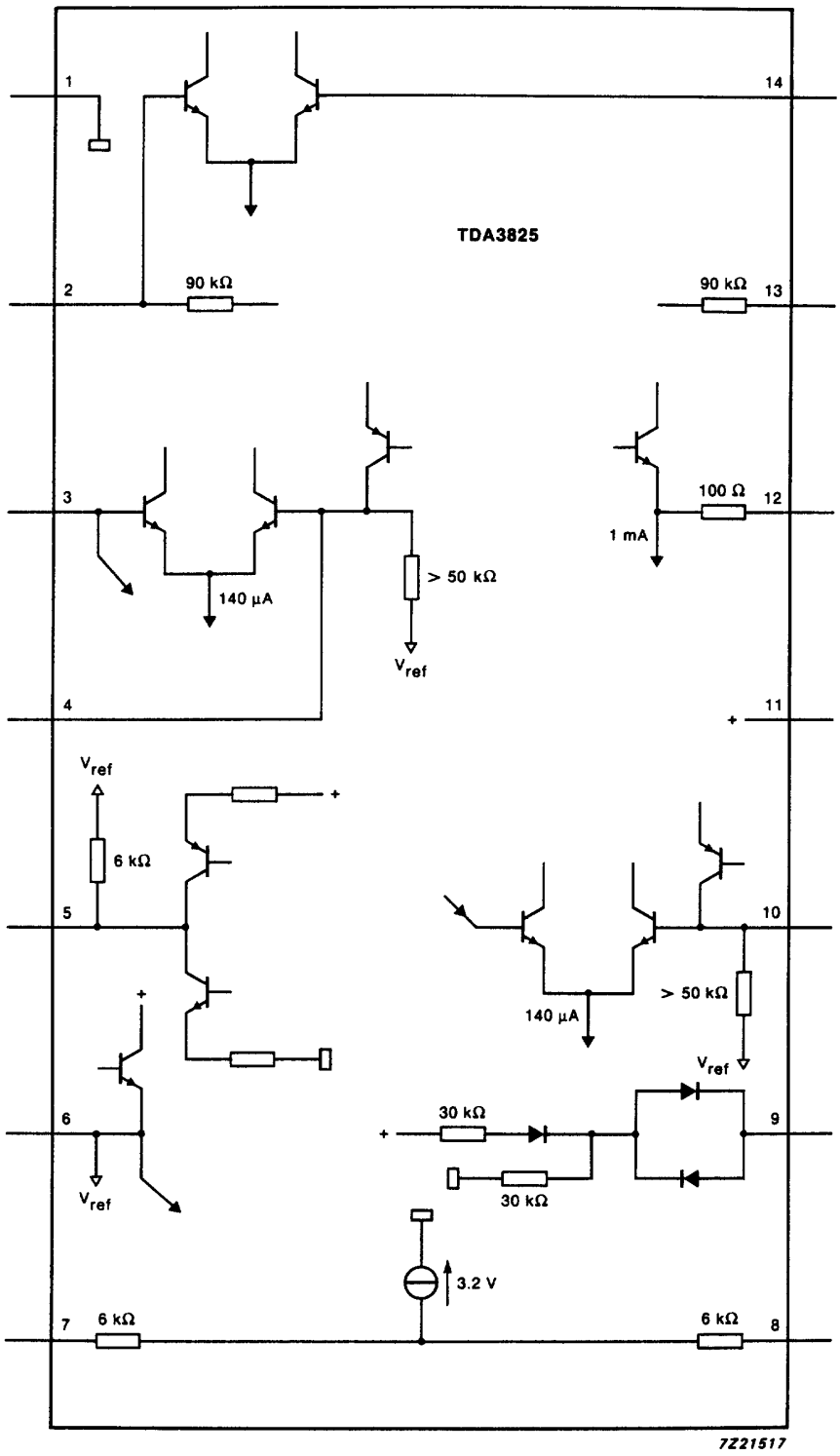


Fig.4 Input/output loading diagram.

APPLICATION INFORMATION

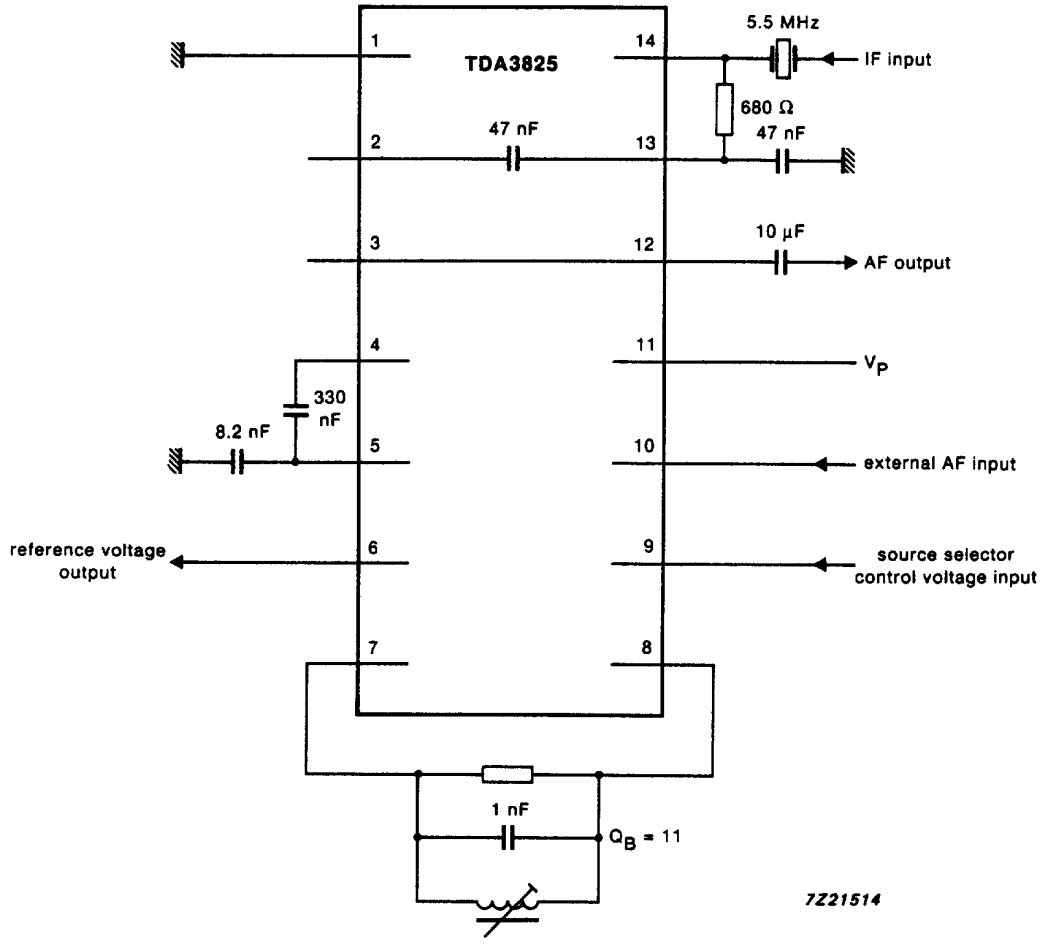
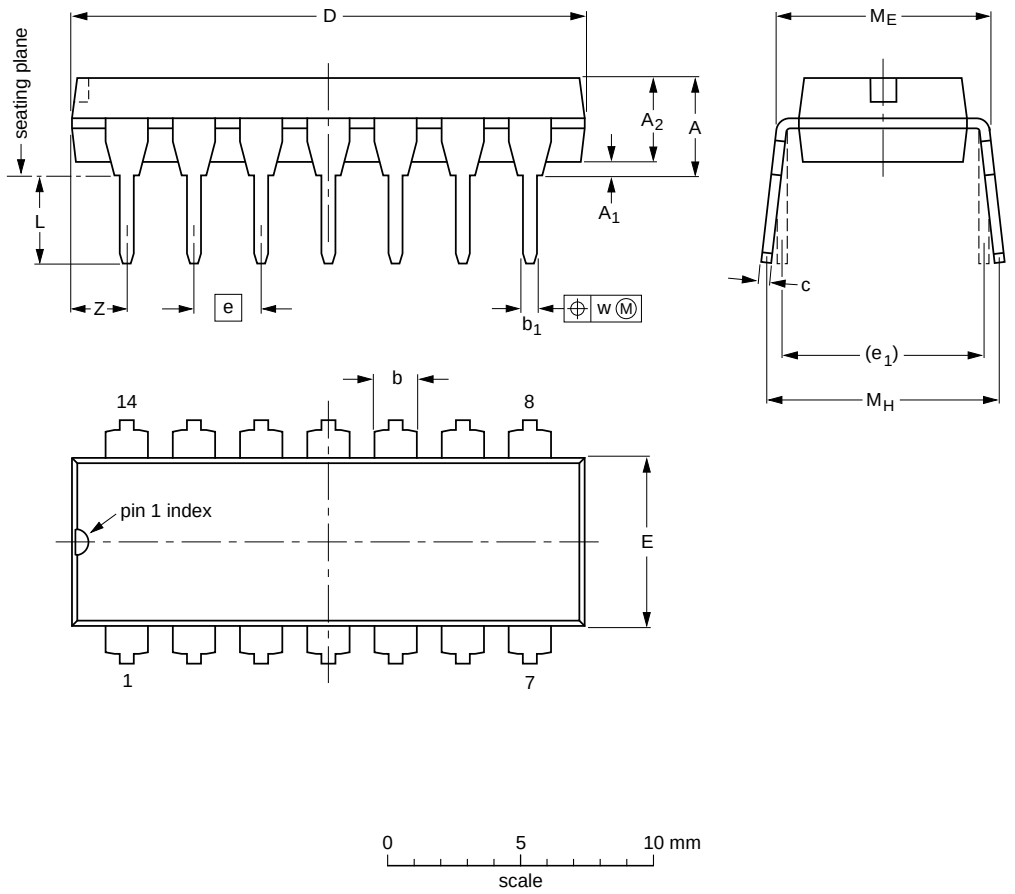


Fig.5 Application diagram.

PACKAGE OUTLINE

DIP14: plastic dual in-line package; 14 leads (300 mil) **SOT27-1**



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

UNIT	A max.	A_1 min.	A_2 max.	b	b_1	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 1.13	0.53 0.38	0.36 0.23	19.50 18.55	6.48 6.20	2.54	7.62	3.60 3.05	8.25 7.80	10.0 8.3	0.254	2.2
inches	0.17	0.020	0.13	0.068 0.044	0.021 0.015	0.014 0.009	0.77 0.73	0.26 0.24	0.10	0.30	0.14 0.12	0.32 0.31	0.39 0.33	0.01	0.087

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			
SOT27-1	050G04	MO-001AA				~~92-11-17~~ 95-03-11

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).

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.

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.