

# DATA SHEET

## **TDA3825**

Single FM TV-sound demodulator  
circuit

Product specification  
File under Integrated Circuits, IC02

September 1988

## 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)						
	$V_P = 5.0\text{ V}$	$I_P$	–	16	–	mA
	$V_P = 12\text{ V}$	$I_P$	–	18	–	mA
<b>FM demodulator</b>						
AF output voltage (pin 5) (RMS value)	$\Delta f = 50\text{ kHz};$ $Q_B = 11$	$V_{5-1}$	–	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	%
<b>Source selector</b>						
AF output voltage (pin 12) (RMS value)	THD $\leq 0.1\%$ ; $V_u = 6\text{ dB}$	$V_{12-1}$	–	1.0	–	V

### PACKAGE OUTLINE

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

Single FM TV-sound demodulator circuit

TDA3825

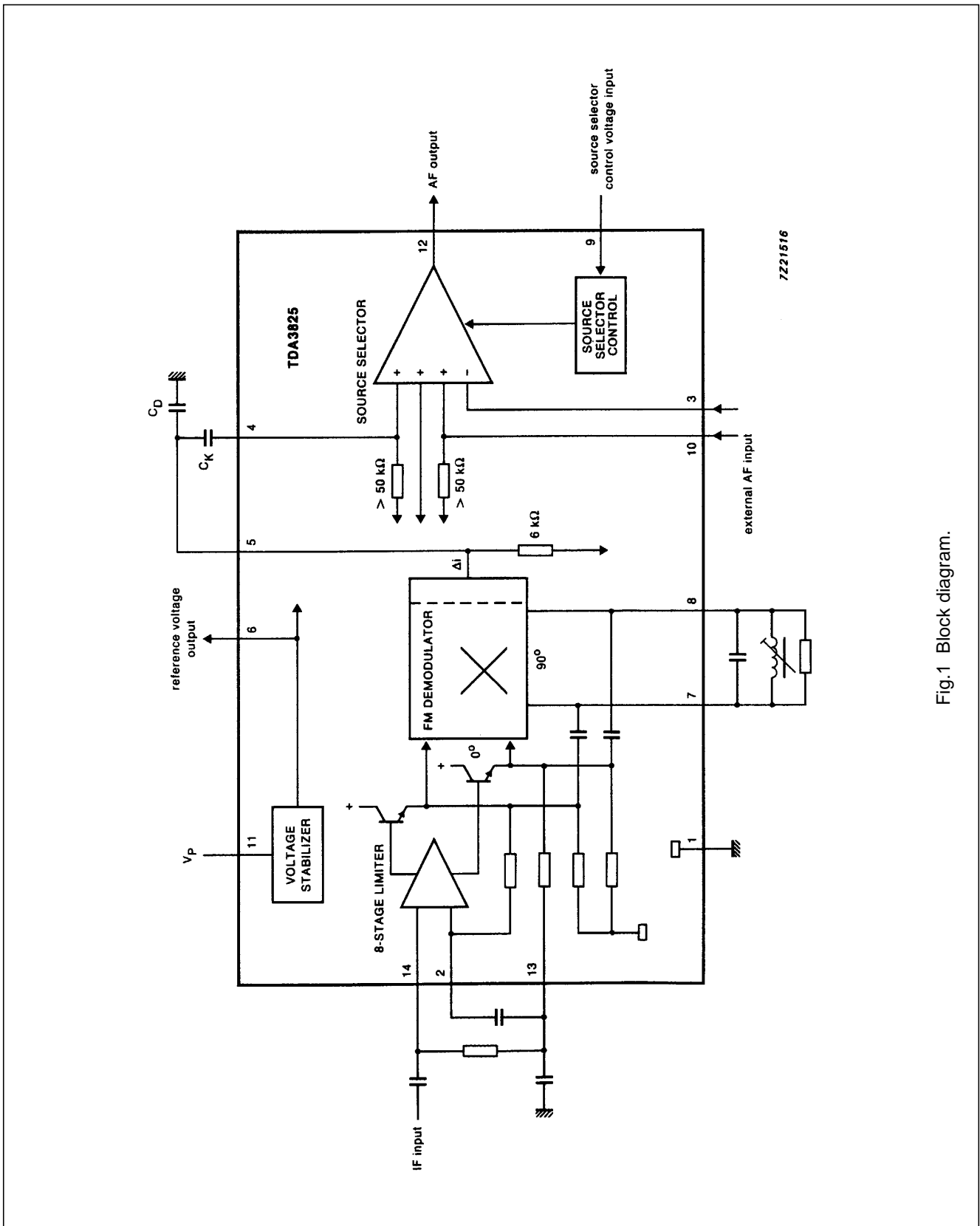


Fig.1 Block diagram.

## Single FM TV-sound demodulator circuit

TDA3825

**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	–	$k\Omega$
Total power dissipation		$P_{tot}$	–	400	mW
Storage temperature range		$T_{stg}$	–25	+ 125	$^{\circ}C$
Operating ambient temperature range		$T_{amb}$	0	+ 70	$^{\circ}C$

## Single FM TV-sound demodulator circuit

TDA3825

**CHARACTERISTICS**

$V_P = 5\text{ V}$ ;  $T_{amb} = 25\text{ }^\circ\text{C}$ ;  $V_i = 10\text{ mV}$ ;  $f_o = 5.5\text{ MHz}$ ;  $f_{AF} = 1\text{ kHz}$ ;  $\Delta f = 50\text{ kHz}$ ; 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
<b>Limiting amplifier</b>						
Input voltage (pin 14) (RMS value)						
	3 dB signal reduction	$V_{14-1}$	—	—	200	mV
		$V_{14-1}$	—	—	50	$\mu\text{V}$
<b>DC voltages</b>						
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	—	—	k $\Omega$
Input capacitance		$C_{14-13}$	—	—	6	pF
<b>FM demodulator</b>						
<b>DC voltages</b>						
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	$f_{AM} = 400\text{ Hz}$ ; $m = 0.3$ ; $V_i = 500\text{ }\mu\text{V(rms)}$	$\alpha_{AM}$	50	—	—	dB
Total harmonic distortion		THD	—	0.3	0.5	%
Output impedance (pin 5)		$ Z_{5-1} $	—	6	—	k $\Omega$
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	$B_{noise} = 20\text{ kHz}$	$(S + N)/N$	75	80	—	dB
Residual RF signal (pin 5) (RMS value)	$2 \times f_o$ without de-emphasis	$V_{5-1}$	—	30	—	mV
Ripple rejection	$f_R = 70\text{ Hz}$ ; $V_R = 100\text{ mV}_{(p-p)}$	$\alpha_R$	40	45	—	dB
<b>Source selector (pin 12)</b>						
Open loop gain		$G_{ol}$	50	60	—	dB
Noise output voltage (RMS value)	$B_{noise} = 20\text{ kHz}$	$V_{12-1}$	—	20	—	$\mu\text{V}$

## Single FM TV-sound demodulator circuit

## TDA3825

PARAMETER	CONDITIONS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Slew rate		$\frac{\Delta V_{12-1}}{\Delta t}$	2	—	—	V/ $\mu$ s
Maximum AF output voltage (RMS value)	THD $\leq$ 0.1%; $V_u = 6$ dB	$V_{12-1}$	1.1	—	—	V
Input impedance (pin 4)		$ Z_{4-1} $	50	—	—	k $\Omega$
(pin 10)		$ Z_{10-1} $	50	—	—	k $\Omega$
–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	k $\Omega$
(pin 3 to pin 12)		$R_{3-12}$	0	—	—	$\Omega$
DC output voltage		$V_{12-1}$	—	2.27	—	V
AF suppression for mute		$\alpha_{mute}$	70	76	—	dB
Crosstalk attenuation		$\alpha_{4/10}$	64	70	—	dB
Offset voltage between any two source selector positions		$V_{12-6}$	—	—	50	mV
<b>Source selector control</b>	see Fig.3					
Source control voltage (pin 9)						
Mute active						
input voltage		$V_{9-1}$	0	—	$1/3 V_P - 1$	V
input current		$I_9$	10	—	500	$\mu$ A
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	$\mu$ A
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	$\mu$ A
Input voltage at pin 9 for $I_9 = 0$ $\mu$ A		$V_{9-1}$	—	$\frac{V_P - 0.7}{2}$	—	V
<b>Reference source (pin 6)</b>						
Reference voltage input		$V_{ref}$	2.17	2.27	2.37	V
Output current		$ I_6 $	—	250	—	$\mu$ A

Single FM TV-sound demodulator circuit

TDA3825

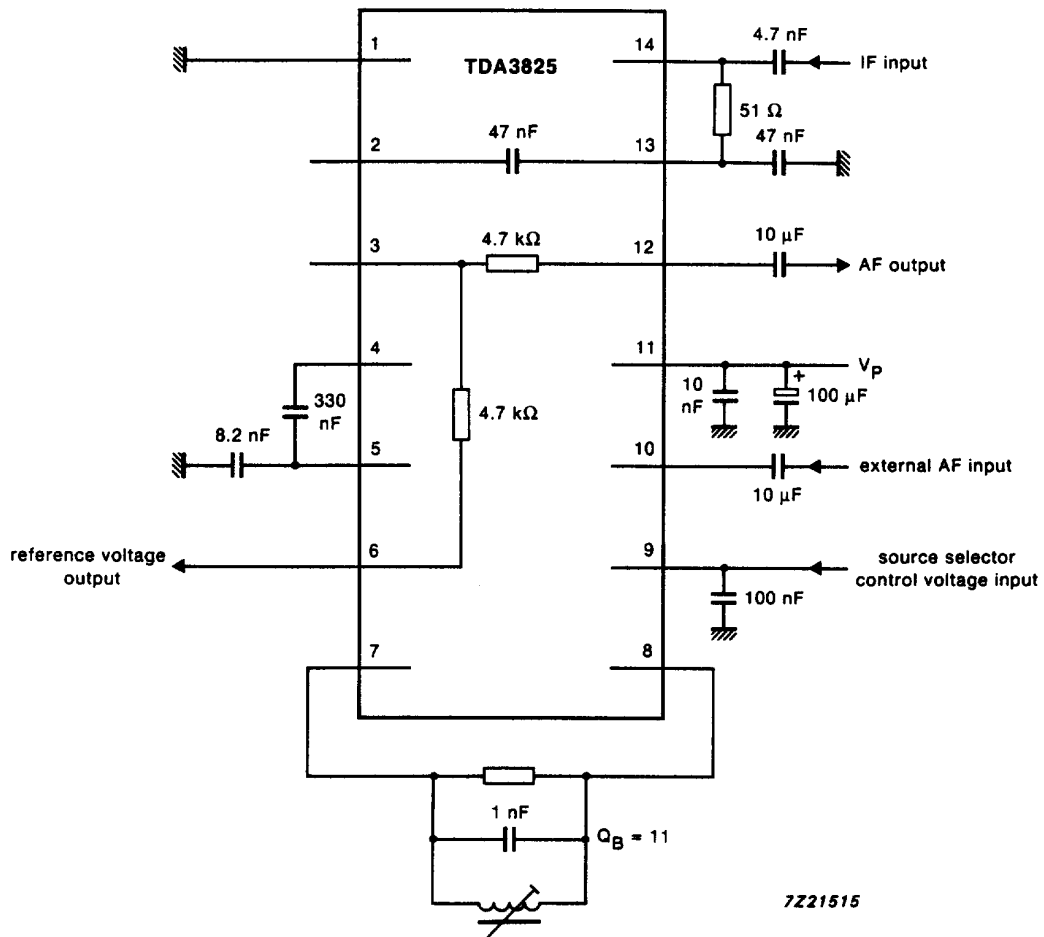


Fig.2 Test circuit.

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TDA3825

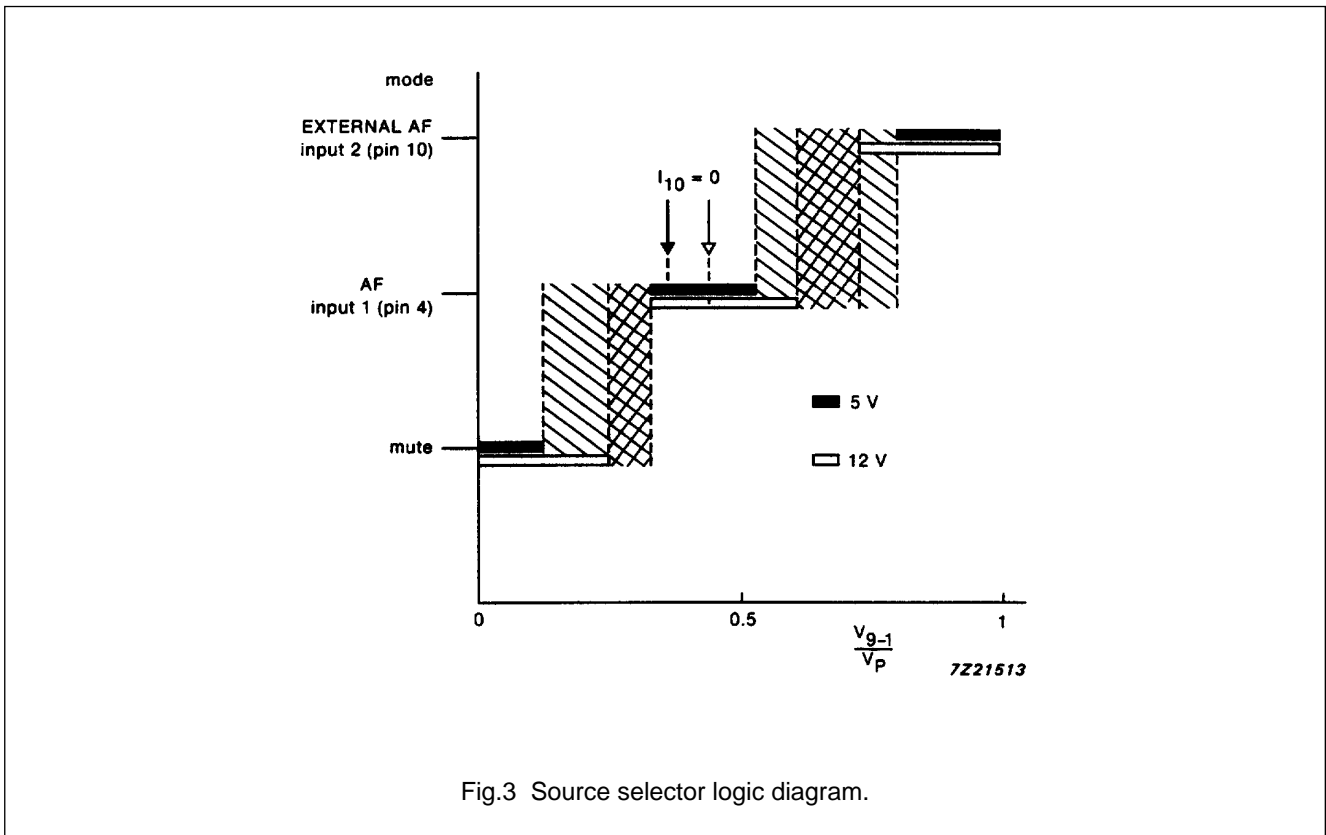


Fig.3 Source selector logic diagram.



Single FM TV-sound demodulator circuit

TDA3825

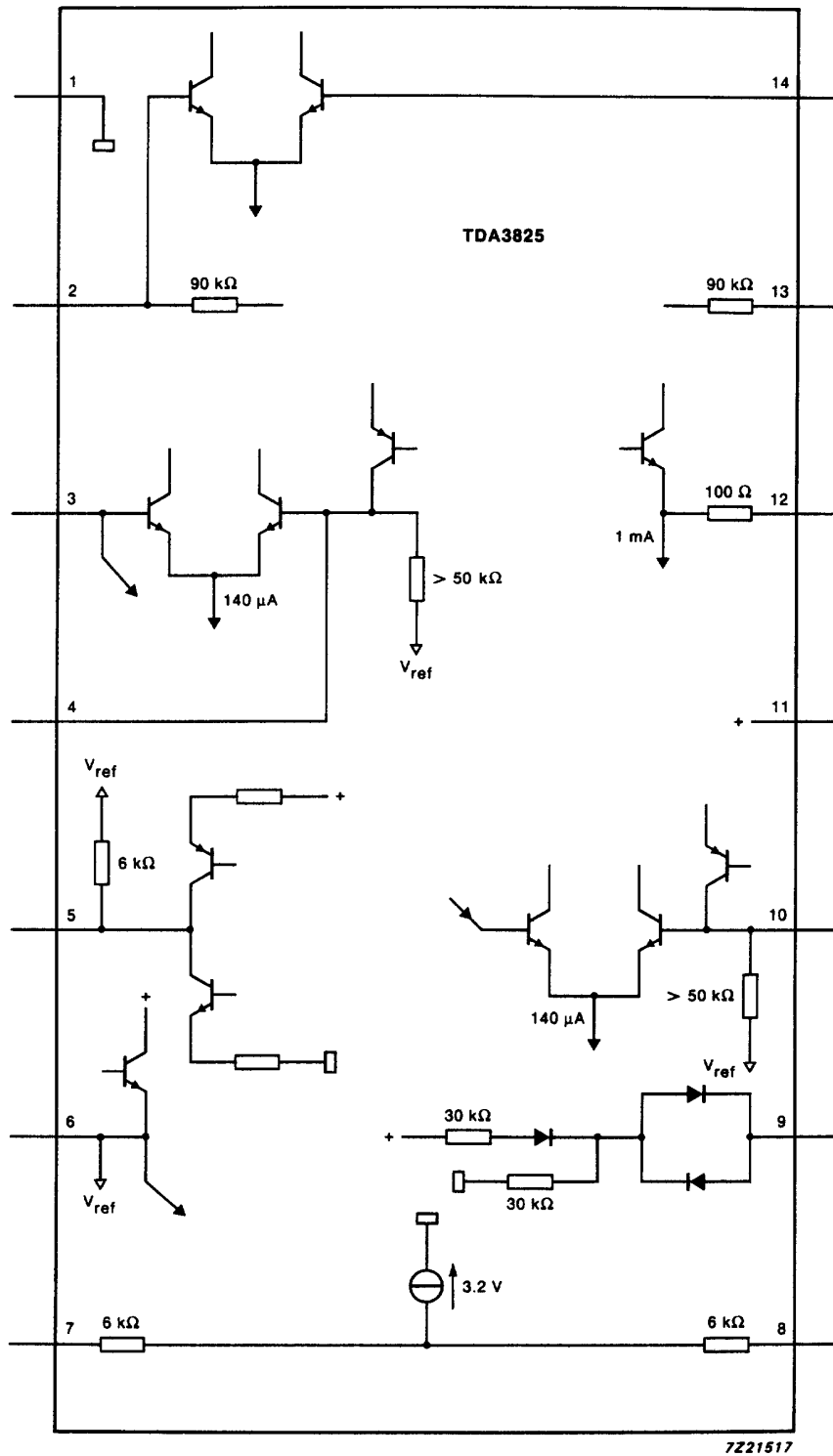


Fig.4 Input/output loading diagram.

Single FM TV-sound demodulator circuit

TDA3825

APPLICATION INFORMATION

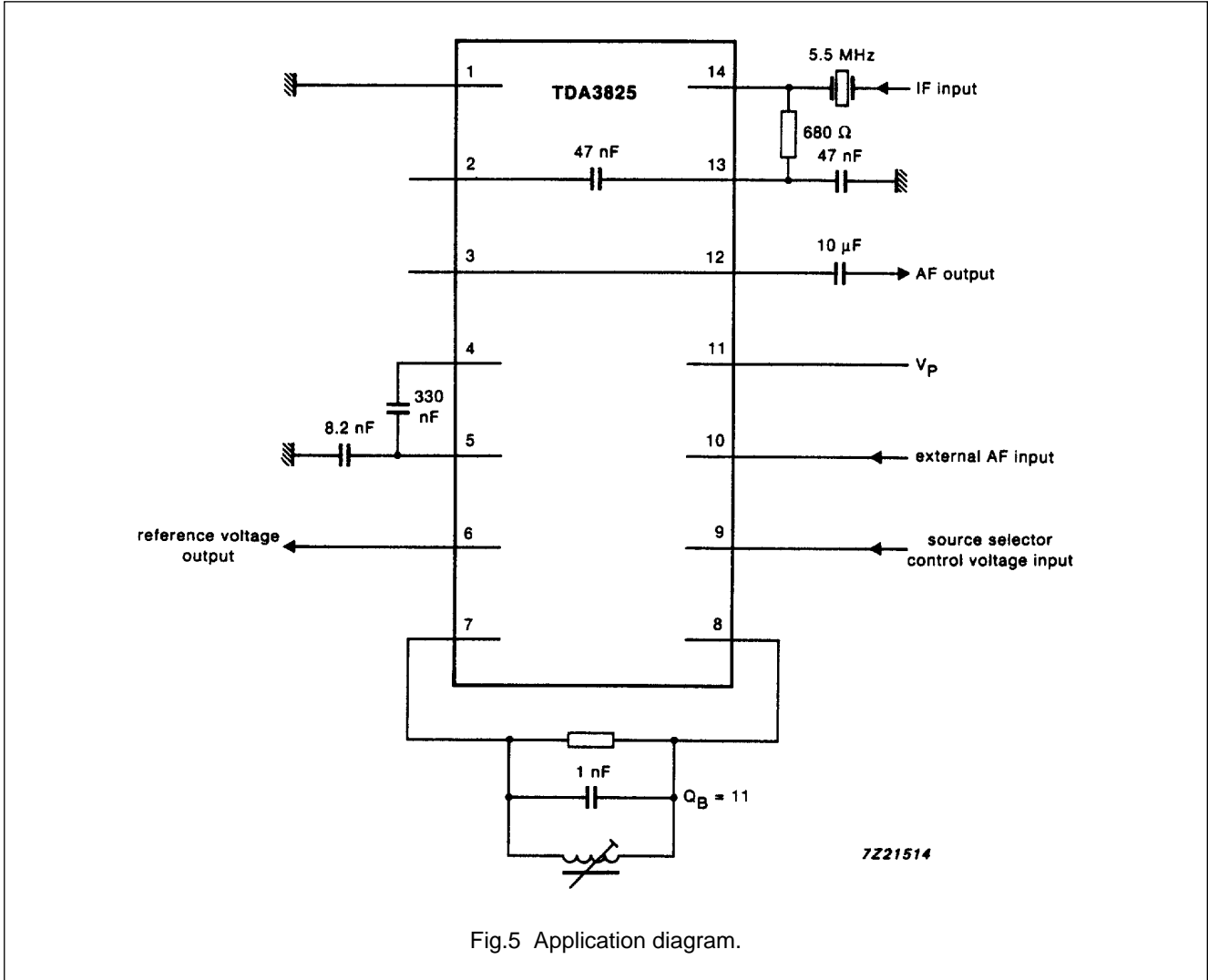


Fig.5 Application diagram.

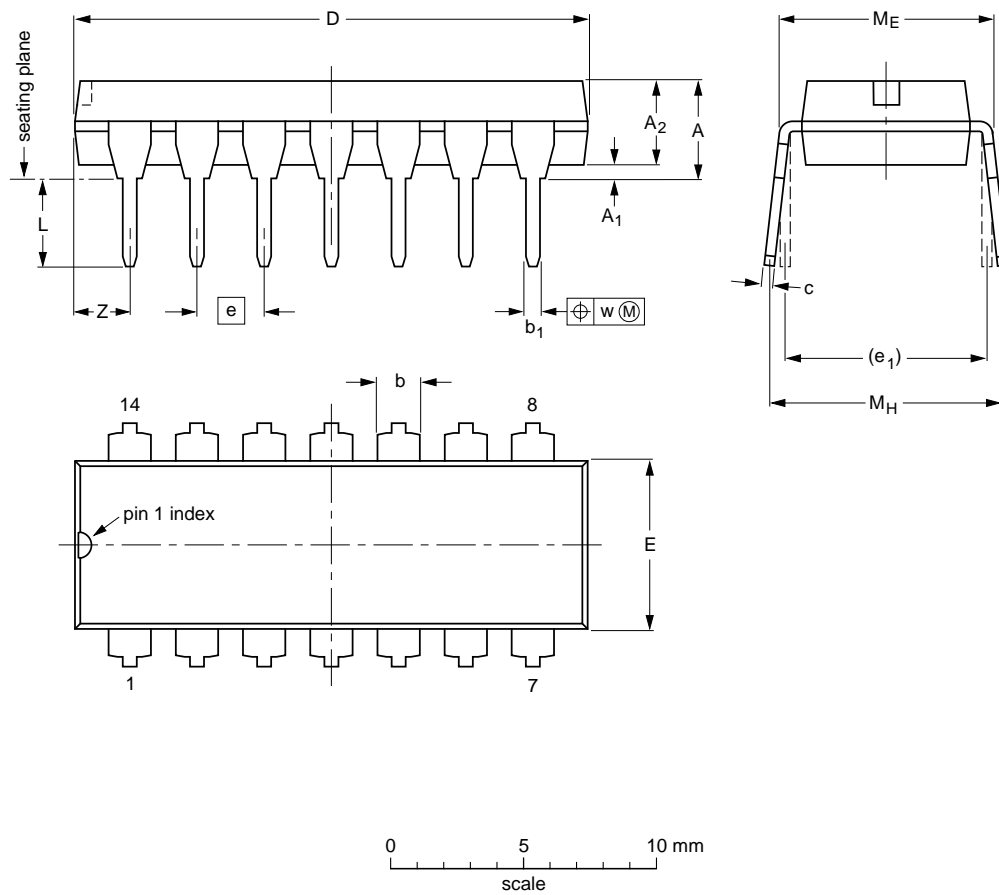
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TDA3825

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 <sub>1</sub> min.	A <sub>2</sub> max.	b	b <sub>1</sub>	c	D <sup>(1)</sup>	E <sup>(1)</sup>	e	e <sub>1</sub>	L	M <sub>E</sub>	M <sub>H</sub>	w	Z <sup>(1)</sup> 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

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TDA3825

## 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

<b>Data sheet status</b>	
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.
<b>Limiting values</b>	
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.	
<b>Application information</b>	
Where application information is given, it is advisory and does not form part of the specification.	

## LIFE SUPPORT APPLICATIONS

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