

MOTOR REGULATOR WITH AUTOMATIC TAPE-END INDICATOR

The TDA1006A is for use in car radio tape-decks

The circuit incorporates the following functions:

- capstan motor speed control;
- an electronic motor stop in conjunction with hysteresis slip-coupling or commutator pulses;
- an automatic switch from playback to radio at tape-end;
- playback indication with lamp;
- tape-end indication with intermittent light.

QUICK REFERENCE DATA

Supply voltage range	V_p	6 to 22 V
Ambient temperature	T_{amb}	typ. 25 °C
Supply voltage	V_p	typ. 14 V

Motor regulator

Current consumption ($R_{3-4} = 7,5 \text{ k}\Omega$)

radio	I_4	typ. 9 mA
playback ($I_1 = 0$)	I_4	typ. 12 mA
playback	I_4	typ. 52 mA
tape-end	I_4	typ. 32 mA
Operating motor current	I_3	typ. 200 mA
Supply voltage rejection	$\Delta V_{3-2}/\Delta V_{4-2}$	typ. 1 mV/V

Automatic stop circuit

Input current	I_{14}	> 25 μA
Input voltage at commutator	V_{11-2}	-6 to +6 V

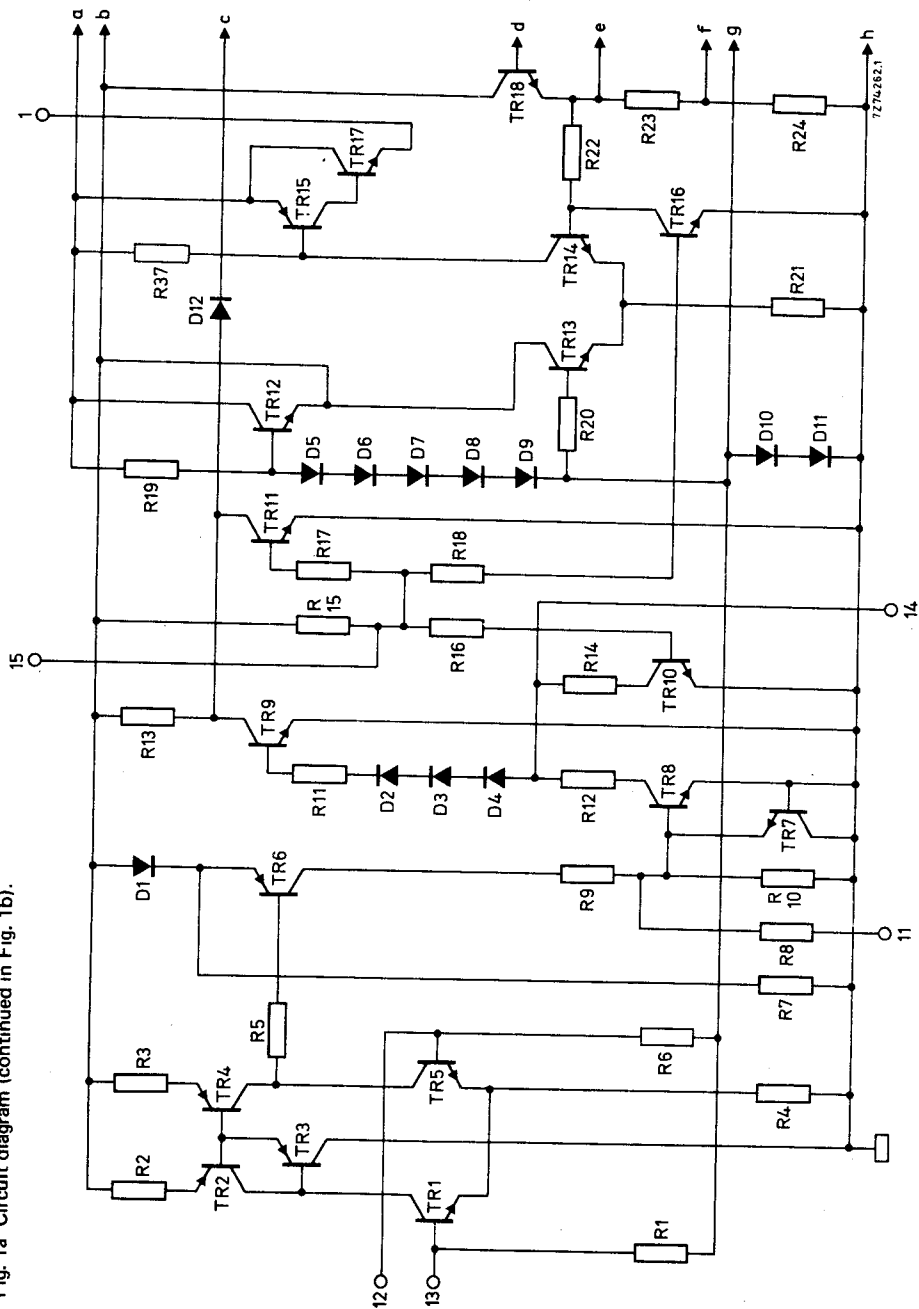


PACKAGE OUTLINE

16-lead DIL; plastic power (SOT-38BE-2).



Fig. 1a Circuit diagram (continued in Fig. 1b).



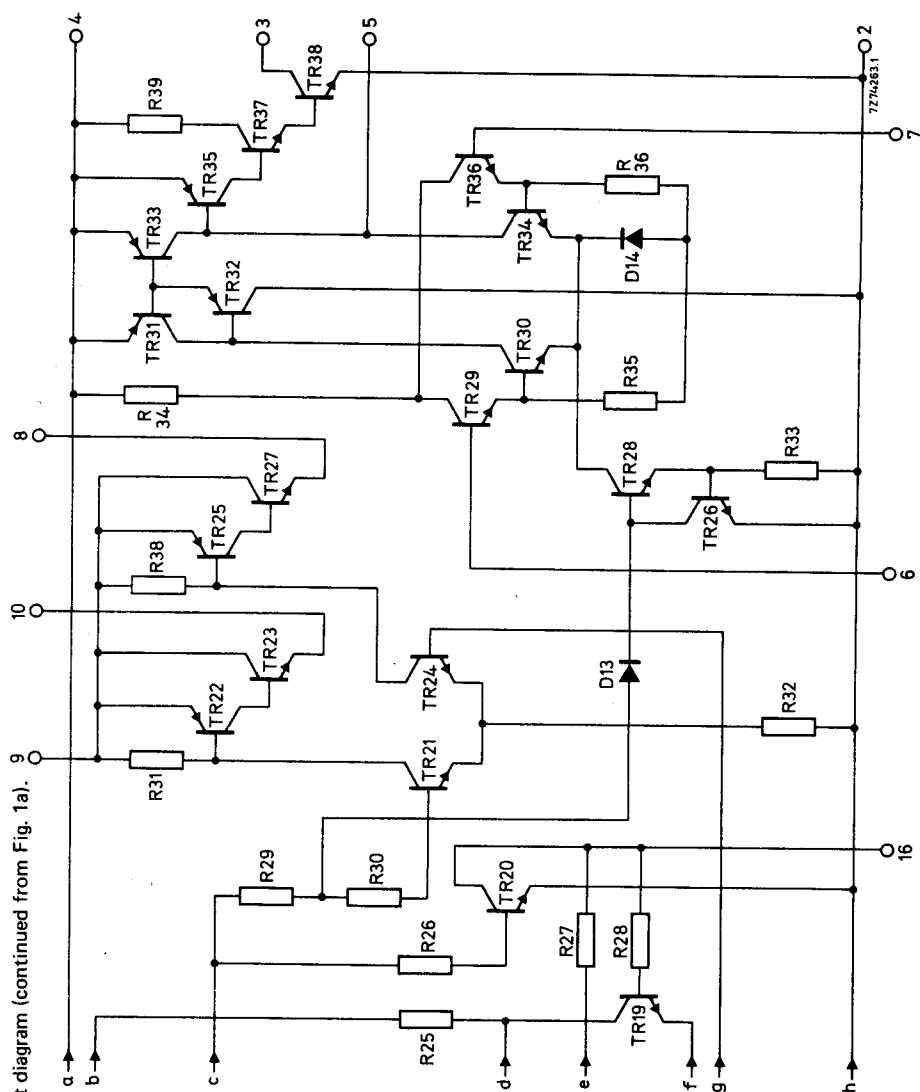


Fig. 1b Circuit diagram (continued from Fig. 1a).

RATINGS

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

Supply voltage

pin 4	V ₄₋₂	max.	24 V
pin 9	V ₉₋₂	max.	24 V
	V ₄₋₂	≥	V ₉₋₂

Output current

pin 1 (d.c. value)	-I ₁	max.	40 mA
(peak value)	-I _{1M}	max.	100 mA
pin 3 (d.c. value)	I ₃	max.	250 mA
(non-repetitive peak value)	I _{3SM}	max.	600 mA
pin 8 (d.c. value)	-I ₈	max.	45 mA
(peak value)	-I _{8M}	max.	80 mA
pin 10 (d.c. value)	-I ₁₀	max.	20 mA
(peak value)	-I _{10M}	max.	20 mA

Storage temperature

T _{stg}	-65 to +150 °C
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Operating ambient temperature

see power derating curve Fig. 2

T _{amb}	-25 to +150 °C
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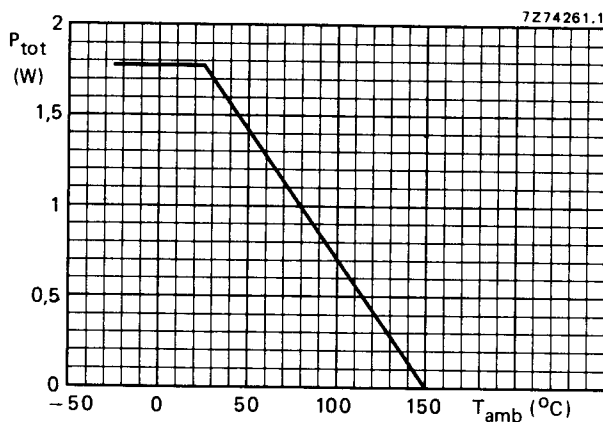


Fig. 2 Power derating curve; derating factor: 14,3 mW/°C.

CHARACTERISTICS

$V_P = 14\text{ V}$; $T_{\text{amb}} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified (see test circuit Fig. 3).

Supply voltage range (pins 4 and 9)	V_P V_{4-2}	$\geq$	6 to 22 V V_{9-2}
Motor regulator			
Current consumption ($R_{3-4} = 7,5\text{ k}\Omega$) radio	I_4	typ.	9 mA
playback ($I_1 = 0$)	I_4	$\left\{ \begin{array}{l} \text{typ.} \\ 9,5 \text{ to } 17 \end{array} \right.$	$\left\{ \begin{array}{l} 12 \text{ mA} \\ 9,5 \text{ to } 17 \text{ mA} \end{array} \right.$
playback	I_4	typ.	52 mA
tape-end	I_4	typ.	32 mA
Input offset voltage at $I_3 = 3\text{ mA}$	$ V_{7-6} $	$\left\{ \begin{array}{l} \text{typ.} \\ < \end{array} \right.$	$\left\{ \begin{array}{l} 2 \text{ mV} \\ 8 \text{ mV} \end{array} \right.$
Input voltage range (common mode)	$V_{6-2}; V_{7-2}$	2,4 to $V_P - 0,2\text{ V}$	
Input bias current	$I_6; I_7$	$\left\{ \begin{array}{l} \text{typ.} \\ < \end{array} \right.$	$\left\{ \begin{array}{l} 80 \text{ nA} \\ 700 \text{ nA} \end{array} \right.$
Input sensitivity (for $\Delta I_3 = 100\text{ mA}$)	ΔV_{7-6}	<	13 mV
Operating voltage of TR38 at $I_{3SM} = 600\text{ mA}$	V_{3-2}	$\left\{ \begin{array}{l} \text{typ.} \\ < \end{array} \right.$	$\left\{ \begin{array}{l} 900 \text{ mV} \\ 1800 \text{ mV} \end{array} \right.$
Supply voltage rejection	$\Delta V_{3-2}/\Delta V_{4-2}$	typ.	1 mV/V
Operating motor current	I_3	$\left\{ \begin{array}{l} \text{typ.} \\ < \end{array} \right.$	$\left\{ \begin{array}{l} 200 \text{ mA} \\ 250 \text{ mA} \end{array} \right.$
Automatic motor 'stop' circuit			
Input current	I_{14}	>	25 μA
Voltage when TR20 is not conducting (pin 16; peak-to-peak value)	$V_{16-2(p-p)}$	0,9 to 1,4 V	
Voltage when TR20 is conducting (pin 16)	V_{16-2}	<	250 mV
Input voltage at commutator (pin 11)	V_{11-2}	-6 to +6 V	
Stop signal amplifier			
Differential input voltage	V_{12-13}	$\left\{ \begin{array}{l} \text{typ.} \\ 2,6 \text{ to } 4,4 \end{array} \right.$	$\left\{ \begin{array}{l} 3,5 \text{ mV} \\ 2,6 \text{ to } 4,4 \text{ mV} \end{array} \right.$
Voltage without input signal	V_{11-2}	85 to 170 mV	
Input voltage (r.m.s. value)	$V_{12-13(rms)}$	>	10 mV



CHARACTERISTICS (continued)

Radio and preamplifier supply

Radio supply current (d.c.)	$-I_8$	$\leq$	45 mA
Saturation voltage at $-I_{8M} = 80$ mA	V_{8-9}	$\leq$	1,35 V
Preamplifier supply current (d.c.)	$-I_{10}$	$\leq$	20 mA
Saturation voltage at $-I_{10} = 20$ mA	V_{10-9}	$\leq$	1,2 V

Lamp driver

Output current (d.c.)	$-I_1$	$\leq$	40 mA
Saturation voltage at $-I_{1M} = 100$ mA	V_{4-1}	$\leq$	1,85 V
D.C. voltage level	V_{15-2}		0,75 to 1,2 V



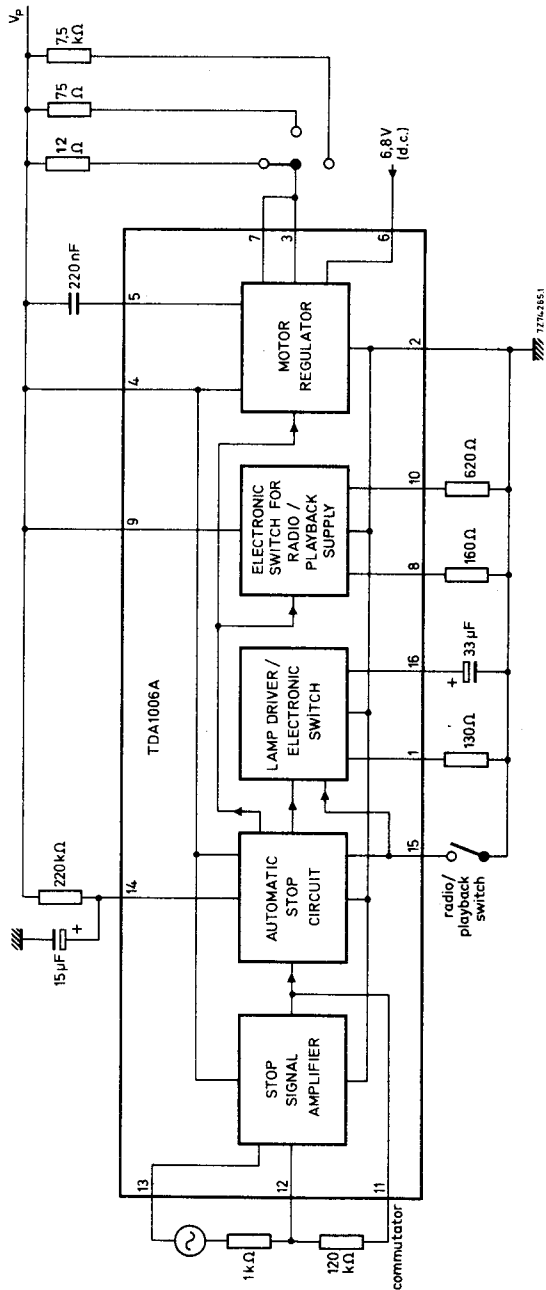
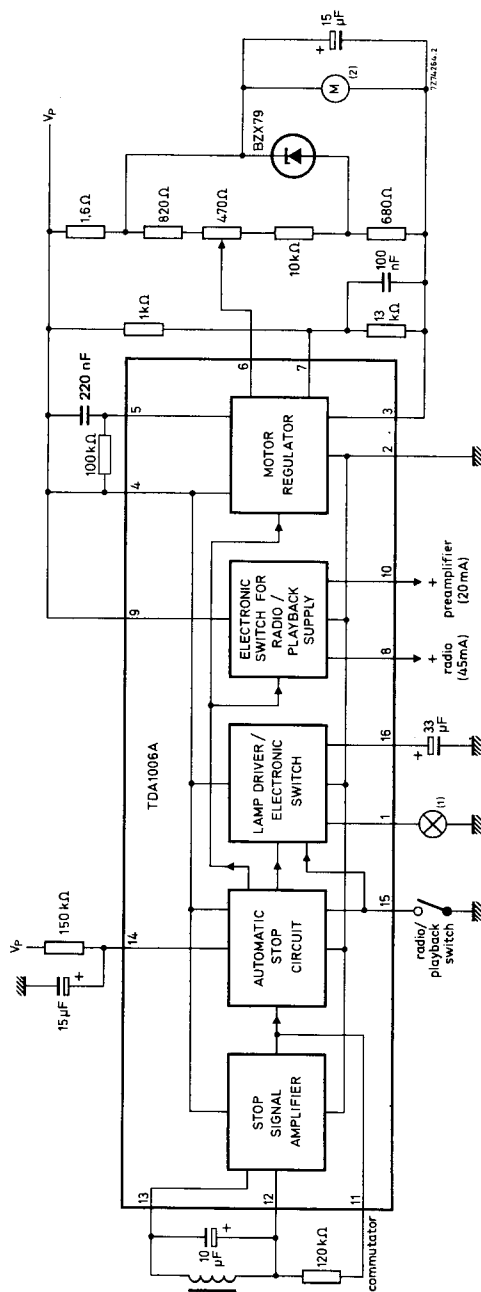


Fig. 3 Test circuit.



APPLICATION INFORMATION



- (1) Radio: lamp off
 Playback: lamp on
 Tape-end: intermittent light
- (2) D.C. motor
 $E_{3000} = 7,2 \text{ to } 8,3 \text{ V}$
 $R_m = 27 \Omega$

Fig. 4 Application circuit diagram.