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 kΩ)			
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).

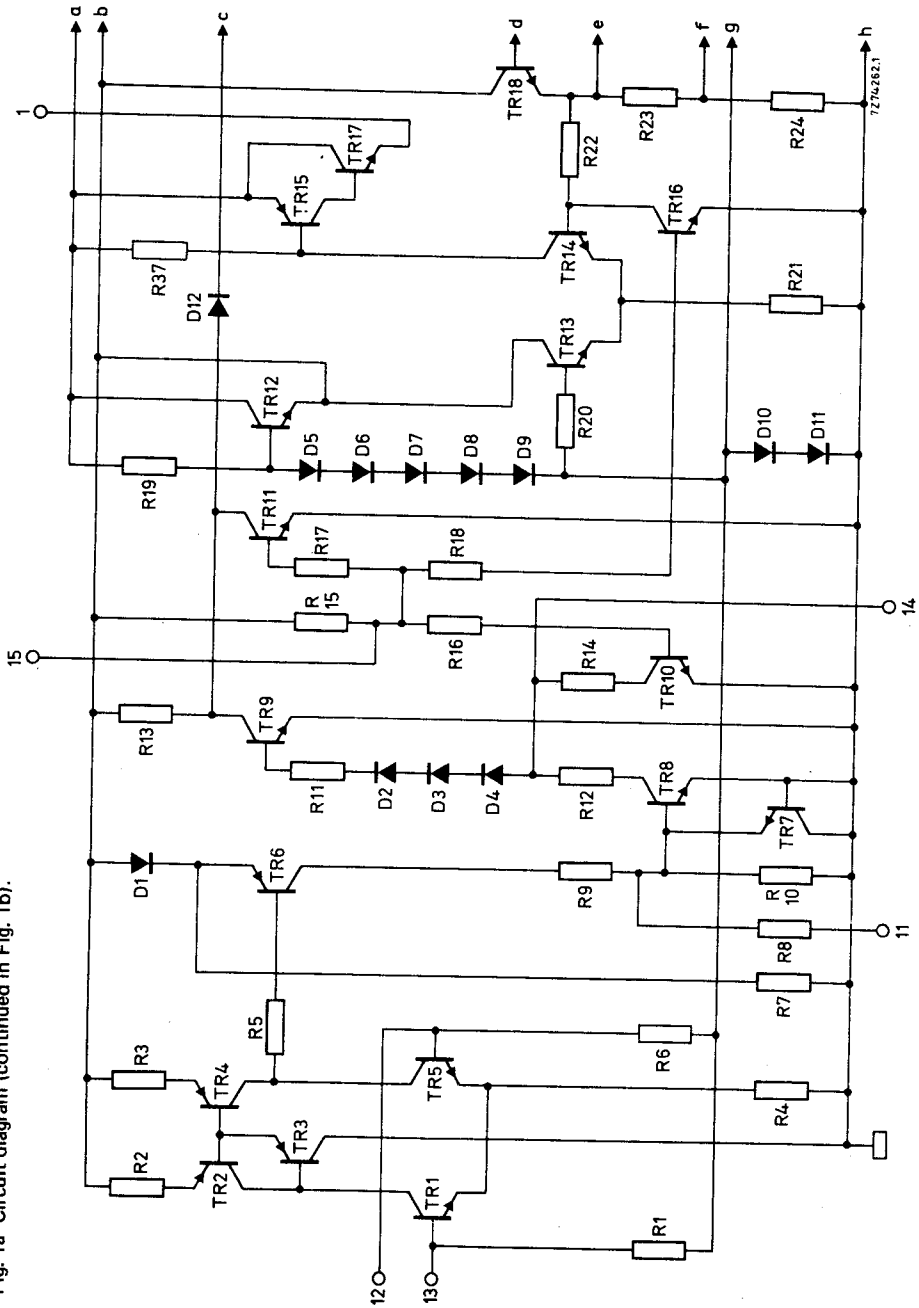


Fig. 1a Circuit diagram (continued in Fig. 1b).

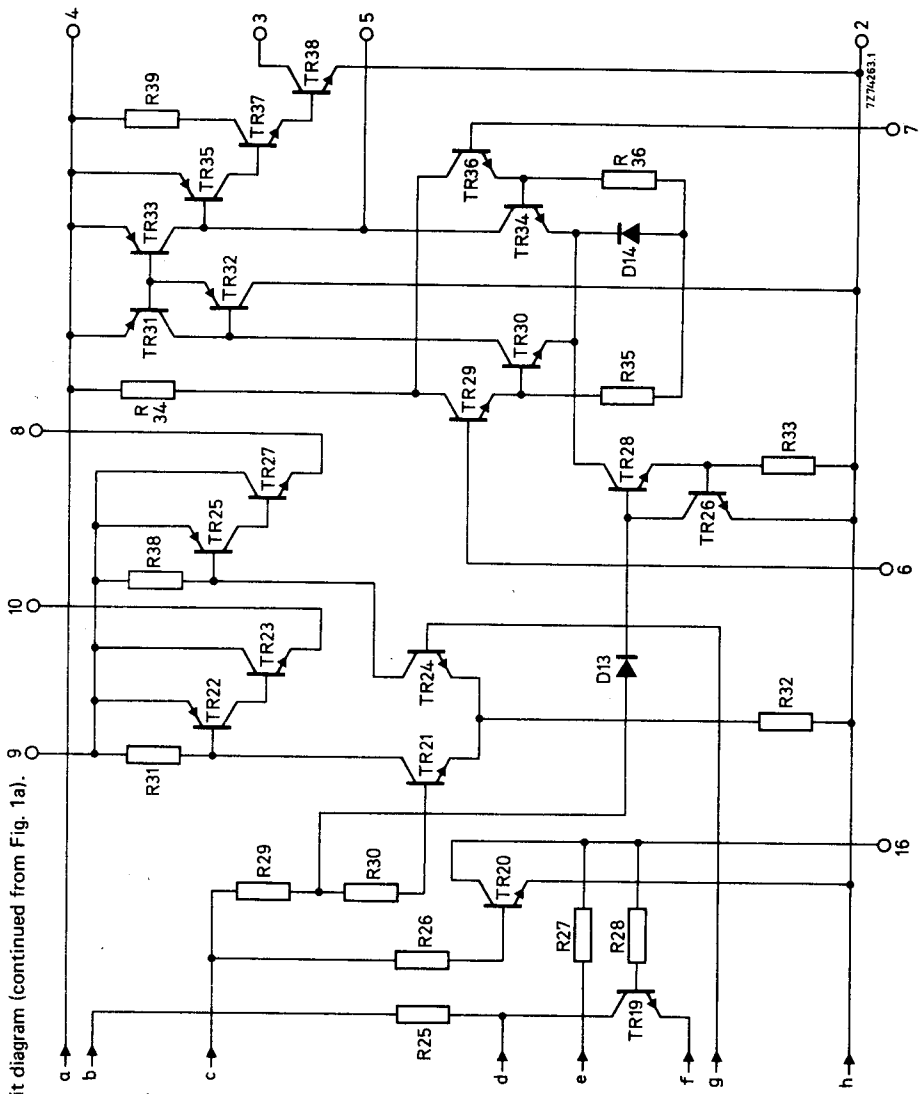


Fig. 1b Circuit diagram (continued from Fig. 1a).

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}	$\geqslant$	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
Operating ambient temperature see power derating curve Fig. 2	T_{amb}	−25 to +150	°C

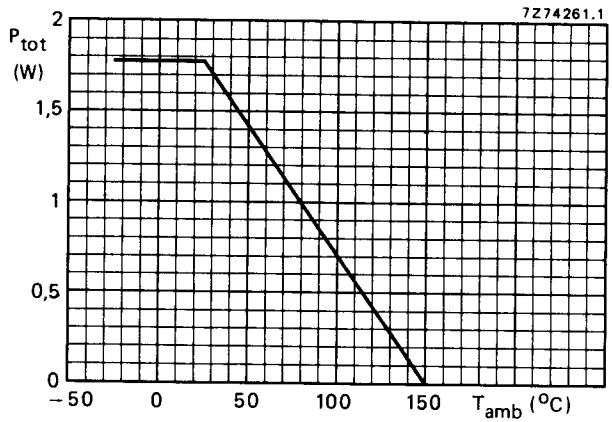


Fig. 2 Power derating curve; derating factor: 14,3 mW/°C.

CHARACTERISTICS

V_P = 14 V; T_{amb} = 25 °C unless otherwise specified (see test circuit Fig. 3).

Supply voltage range (pins 4 and 9)	V_P	6 to 22	V
	V_{4-2}	⩾ V_{9-2}	
Motor regulator			
Current consumption (R_{3-4} = 7,5 kΩ)			
radio	I_4	typ. 9	mA
playback (I_1 = 0)	I_4	typ. 12 9,5 to 17	mA mA
playback	I_4	typ. 52	mA
tape-end	I_4	typ. 32	mA
Input offset voltage at I_3 = 3 mA	$\lvert V_{7-6} \rvert$	typ. 2 < 8	mV mV
Input voltage range (common mode)	V_{6-2}; V_{7-2}	2,4 to V_P–0,2	V
Input bias current	I_6; I_7	typ. 80 < 700	nA nA
Input sensitivity (for ΔI_3 = 100 mA)	ΔV_{7-6}	< 13	mV
Operating voltage of TR38 at I_{3SM} = 600 mA	V_{3-2}	typ. 900 < 1800	mV mV
Supply voltage rejection	$\Delta V_{3-2}/\Delta V_{4-2}$	typ. 1	mV/V
Operating motor current	I_3	typ. 200 < 250	mA mA
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}	typ. 3,5 2,6 to 4,4	mV mV
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.)	$-I_8$	$\leqslant$	45 mA
Saturation voltage at $-I_{8M}$ = 80 mA	V_{8-9}	$\leqslant$	1,35 V
Preamplifier supply current (d.c.)	$-I_{10}$	$\leqslant$	20 mA
Saturation voltage at $-I_{10}$ = 20 mA	V_{10-9}	$\leqslant$	1,2 V
Lamp driver			
Output current (d.c.)	$-I_1$	$\leqslant$	40 mA
Saturation voltage at $-I_{1M}$ = 100 mA	V_{4-1}	$\leqslant$	1,85 V
D.C. voltage level	V_{15-2}	0,75 to	1,2 V

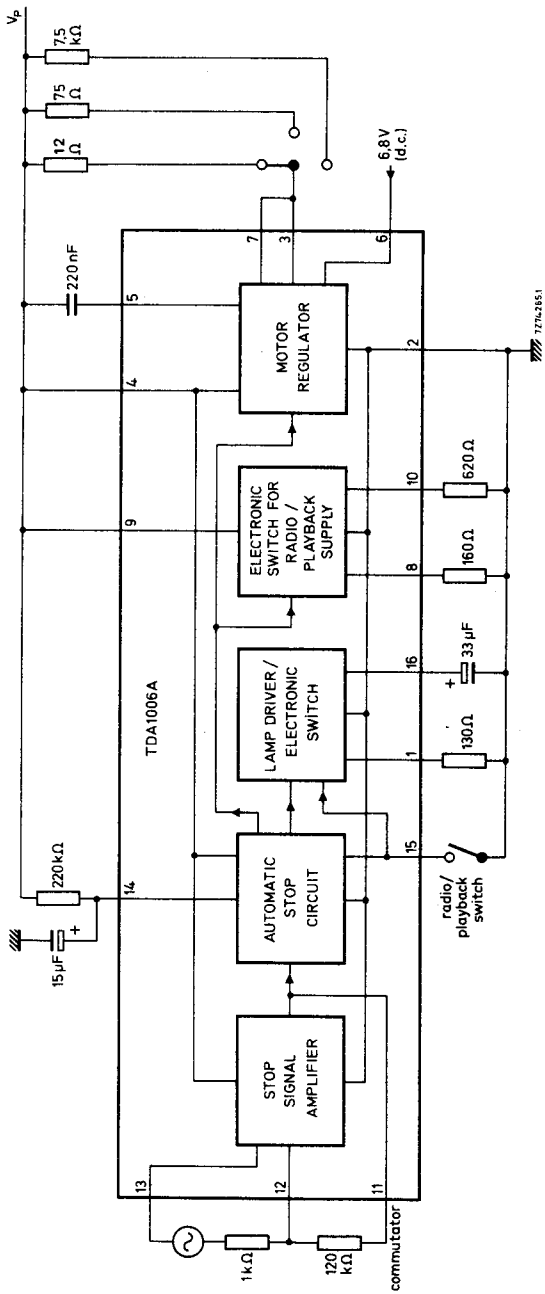
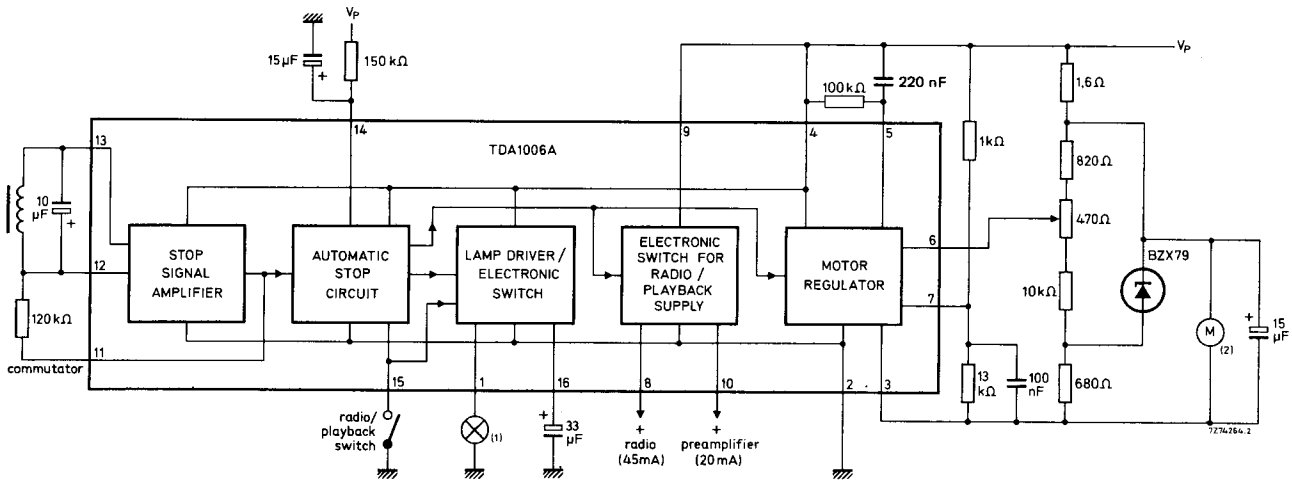


Fig. 3 Test circuit.

APPLICATION INFORMATION



(1) Radio: lamp off
Playback: lamp on
Tape-end: intermittent light

(2) D.C. motor
E_{3000} = 7,2 to 8,3 V
R_m = 27 Ω

Fig. 4 Application circuit diagram.