

## MULTIFUNCTION SYSTEM FOR TAPE PLAYERS

NOT FOR NEW DESIGN

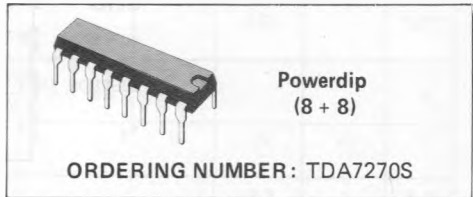
The TDA7270S is a multifunction monolithic integrated circuit in a 16-lead dual in-line plastic package specially designed for use in car radios cassette players, but suitable for all applications requiring tape playback.

It has the following functions:

- Motor speed regulator
- Automatic stop
- Manual stop
- Pause
- Cassette ejection
- Radio - Playback automatic switching.

The circuit incorporates also:

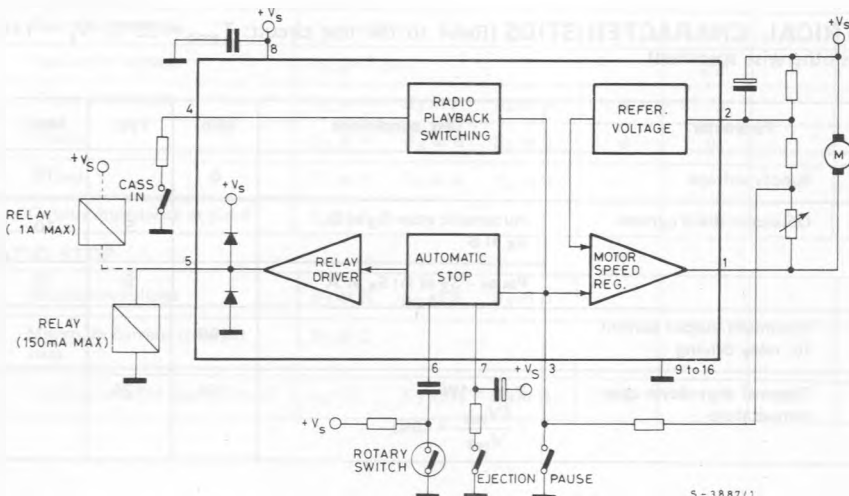
- Thermal protection
- Short circuit protection to ground (all the pins).



### ABSOLUTE MAXIMUM RATINGS

$V_s$	Supply voltage	20	V
$I_1$	Sink peak current at pin 1	2	A
$I_5$	Sink peak current at pin 5	2	A
$P_{tot}$	Power dissipation at $T_{amb} \leq 80^\circ\text{C}$	1	W
$T_{stg}, T_j$	Storage and junction temperature	-40 to 150	$^\circ\text{C}$

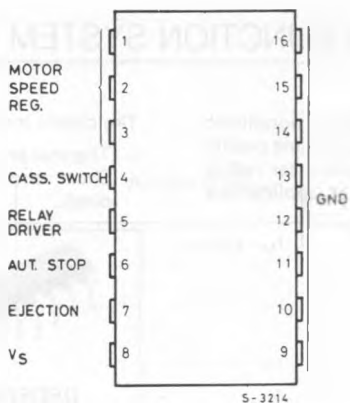
### BLOCK DIAGRAM



S-3887/1

## CONNECTION DIAGRAM

(Top view)



## THERMAL DATA

$R_{th\ j-amb}$	Thermal resistance junction-ambient	max	70	°C/W
$R_{th\ j-case}$	Thermal resistance junction-pins	max	15	°C/W

ELECTRICAL CHARACTERISTICS (Refer to the test circuit;  $T_{amb} = 25^{\circ}\text{C}$ ;  $V_s = 14\text{V}$ ;  $S_7$  at B, unless otherwise specified)

Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_s$ Supply voltage		6		18	V
$I_d$ Quiescent drain current	Automatic stop- $S_3$ at B; $S_4$ at B		5	10	mA
	Pause - $S_3$ at A; $S_4$ at A		9	15	
$I_s$ Maximum output current for relay driving		150			mA
$T_{sd}$ Thermal shut-down case temperature	$P_{tot} = 1\text{W}$ ( $\frac{\Delta V_{ref}}{V_{ref}} = -5\%$ )	105	125		°C

## ELECTRICAL CHARACTERISTICS (continued)

Parameter	Test conditions	Min.	Typ.	Max.	Unit
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## MOTOR SPEED CONTROL

$I_{MS}$	Starting current (pin 1)		1			A
$V_{ref}$	Reference voltage (pin 2-3)	$I_M = 100 \text{ mA}$	1.15	1.25	1.35	V
$\frac{\Delta V_{ref}}{V_{ref}} / \Delta V_s$		$I_M = 100 \text{ mA}$ $V_s = 8 \text{ to } 18 \text{ V}$		0.1	0.4	%/V
$\frac{\Delta V_{ref}}{V_{ref}} / \Delta I_M$		$I_M = 50 \text{ to } 400 \text{ mA}$		0.01	0.03	%/mA
$\frac{\Delta V_{ref}}{V_{ref}} / \Delta T$		$I_M = 100 \text{ mA}$ $T_{amb} = -20 \text{ to } 70^\circ \text{C}$		0.01		%/°C
$V_2$	Operating voltage	$I_M = 100 \text{ mA}$ $\frac{\Delta V_{ref}}{V_{ref}} = -5\%$	2.4			V
K	Reflection coeff. (K= $I_M/I_T$ see fig. 12)	$I_M = 100 \text{ mA}$	18	20	22	—
$\frac{\Delta K}{K} / \Delta V_s$		$I_M = 100 \text{ mA}$ $V_s = 8 \text{ V to } 18 \text{ V}$		0.3	1	%/V
$\frac{\Delta K}{K} / \Delta I_M$		$I_M = 50 \text{ to } 400 \text{ mA}$		0.005	0.02	%/mA
$\frac{\Delta K}{K} / \Delta T$		$I_M = 100 \text{ mA}$ $T_{amb} = -20 \text{ to } 70^\circ \text{C}$		0.01		%/°C

## PAUSE

$I_3$	Current consumption	$S_4$ at A	1.4			mA
$V_{B-1}$		$S_4$ at A			0.2	V

## EJECTION

$I_7$		$S_2$ in A	20			$\mu\text{A}$
$V_{5-8}$	Saturation voltage	$I_5 = 100 \text{ mA}$		2.1	3	V
$V_5$	Saturation voltage	$I_{5-8} = 1.5 \text{ A}$		2.2	3	V
$V_4$	(Pause condition)	$S_1$ at A $S_3$ at A $S_4$ at A	6			V
$V_4$	(Radio)	$S_1$ at A $S_3$ at B $S_4$ at B	6	9		V
$V_4$	(Tape)	$S_1$ at A $S_3$ at A $S_4$ at B			1.7	V
$R_o$	Output impedance at pin 4	$S_3$ at B		16	22	$\text{k}\Omega$

## AUTOMATIC STOP

$V_{B-1}$	Saturation voltage	$S_1$ at B $S_2$ at B $S_3$ at B			1	$\mu\text{A}$
$I_6$	Minimum current to avoid stop	$S_1$ at C			1	$\mu\text{A}$
$I_{7-8}$	Load current for delay circuit	$I_6 = 0$ $S_7$ at A $S_2$ at B	10.5	15	19.5	$\mu\text{A}$

APPLICATION INFORMATION

The TDA7270S incorporates four different functional blocks:

- 1) Motor speed control.
- 2) Autostop circuit.
- 3) Radio/Playback switching
- 4) Relay driver.

The **motor speed control** is a conventional circuit providing correction for the internal losses of the motor. Fig. 1 shows the external circuit. The values of  $R_T$ ,  $R_S$  and  $R_K$  determine the regulation characteristics and motor speed.

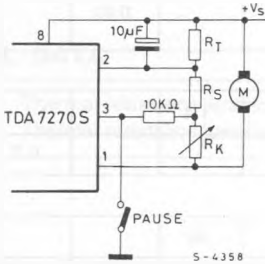
$$R_T = K \cdot R_M$$

where  $K$  = the IC regulator reflection coefficient and  $R_M$  = motor internal resistance.

The following condition must be always satisfied

$$R_S \leq 4 R_T$$

Fig. 1



The voltage applied across the motor is given by

$$V_{8-1} = V_{ref} \left[ 1 + \frac{R_T}{R_S} \left( 1 + \frac{1}{K} \right) + \frac{R_K}{R_S} \right]$$

and this is proportional to  $R_K$  which therefore adjust the speed.

The voltage between pin 2 and the supply must not fall below 0.3V and so

$$\left[ V_{ref \min} \left( \frac{R_T}{R_S} \right) + I_{M \min} \left( \frac{R_T}{K_{max}} \right) \right] > 0.3V$$

The "pause" condition corresponds to  $V_3 < 50mV$ ; in this condition the motor will stop ( $V_{1-8} < 0.2V$ ), the capacitor  $C_2$  on the autostop circuit (see below) will no longer be charged and the pin 4 (cassette/radio switch output) will be pulled high.

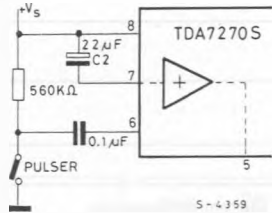
The **autostop circuit** is shown in Fig. 2

In normal operation the capacitor  $C_2$  ( $22\mu F$ ) is slowly charged by a constant current drawn by pin 7 of  $15\mu A$ , and each time the pulser (a switch on the cassette take-up speed shaft) closes,  $C_2$  is discharged. If the cassette stops, and the pulse stops, the voltage on pin 7 falls.

This switches the power amplifier state and pin 5 goes low. Pin 5 can be used for one of two purposes:

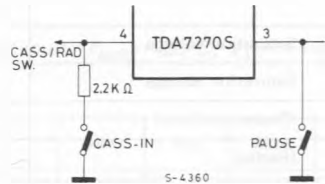
- 1) to drive a stop warning light connected from pin 5 supply  $V_S$ ;
- 2) to actuate a solenoid wired either to ground (to release the cassette) or to supply (to eject the cassette).

Fig. 2



The **pause and/or cassette/radio switching** shown in Fig. 3 has an input/output on pin 4. If pin 4 is not used it should be grounded.

Fig. 3



This pin has the following logic.

Cass IN	Pause	Pin 4	Function
Open	Open	> 6V	motor off / radio on
Open	Close	> 6V	motor off / radio on
Close	Open	< 1.7V	motor on / cass. on
Close	Close	> 6V	pause / radio on