SGS **TDA 2170**

LINEAR INTEGRATED CIRCUIT

TV VERTICAL DEFLECTION OUTPUT CIRCUIT

The TDA 2170 is a monolithic integrated circuit in 11-lead Multiwatt® package. It is a high efficiency power booster for direct driving of vertical windings of TV yokes. It is intended for use in Colour and B & W television receivers as well as in monitors and displays. The functions incorporated are:

- power amplifier
- flyback generator
- reference voltage
- thermal protection

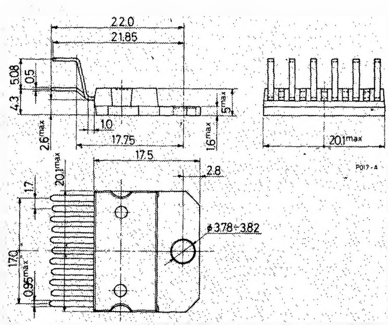
ABSOLUTE MAXIMUM RATINGS

V_s	Supply voltage (pin 4)	35	V
V_7, V_8	Flyback peak voltage	60	V
V_5	Voltage at pin 5	$+V_s$	
V_2, V_3	Amplifier input voltage	$+V_s$ -0.5	 V
I_o	Output peak current (non repetitive, t = 2 msec)	2.5	A
I_o	Output peak current at f = 50 or 60 Hz, $t \leq 10\ \mu sec$	3	A
I_o	Output peak current at f = 50 or 60 Hz, $t > 10\ \mu sec$	2	A
I_5	Pin 5 DC current at $V_7 < V_4$	100	mA
I_5	Pin 5 peak to peak flyback current at f = 50 or 60 Hz, $t_{fly} \leq 1.5$ msec	3	A
P_{tot}	Total power dissipation at $T_{case} = 60°C$	30	W
T_{stg}, T_j	Storage and junction temperature	-40 to 150	°C

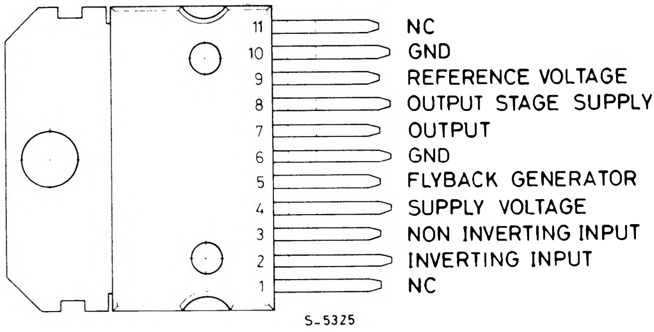
ORDERING NUMBER: TDA 2170

MECHANICAL DATA

Dimensions in mm



CONNECTION DIAGRAM
(top view)



BLOCK DIAGRAM

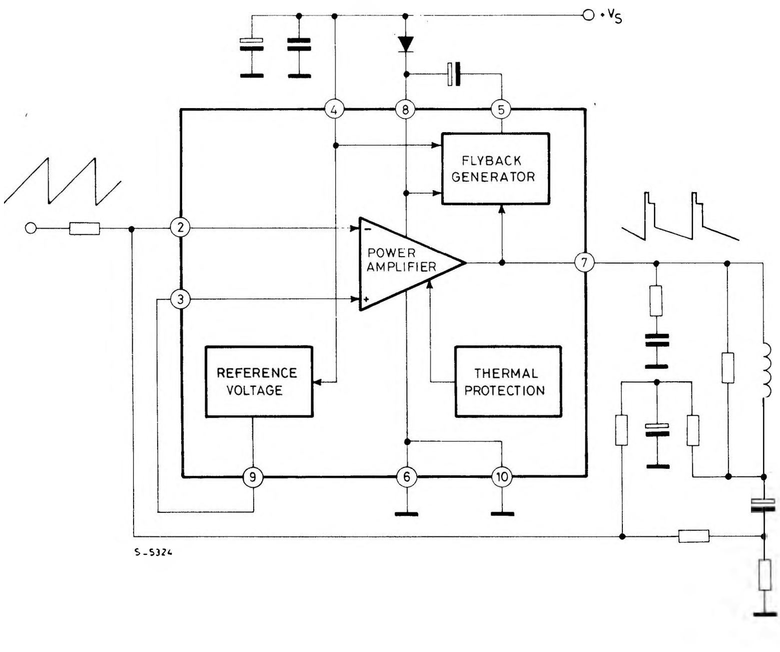
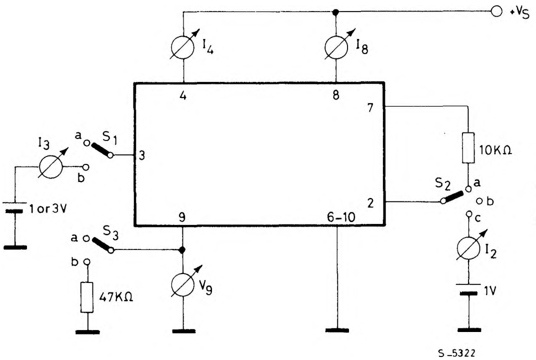


Fig. 1 - DC test circuits

Fig. 1a - Measurement of I_2; I_3; I_4; I_8; V_9; $\Delta V_9/\Delta V_s$; R9



S_1 : (a) I_2; (b) I_3, I_4 and I_8.
S_2 : (a) I_4 and I_8; (b) I_3; (c) I_2.
S_3 : (a) I_2, I_3, I_4, I_8, I_9 and V_9; (b) R9.

Fig. 1b - Measurement of $V7_H$

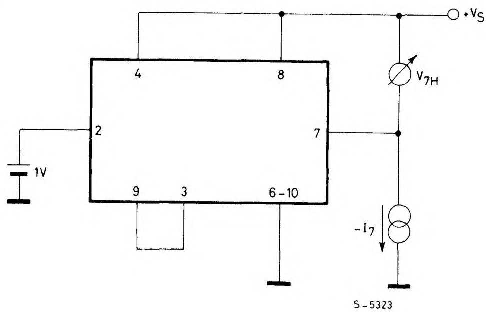
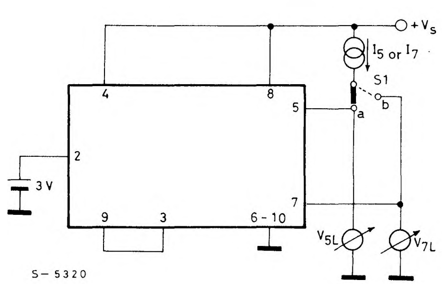
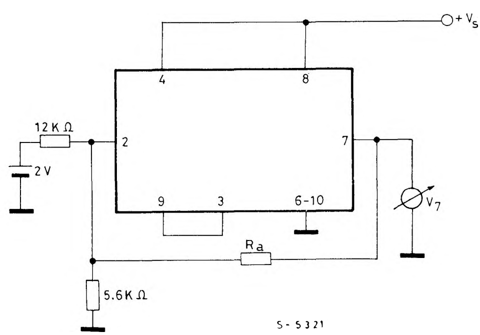


Fig. 1c - Measurement of V_{5L}; V_{7L}



S1 : (a) V_{5L}; (b) V_{7L}.

Fig. 1d - Measurement of V_7



THERMAL DATA

$R_{th\ j\text{-}case}$	Thermal resistance junction-case	max	3	°C/W
$R_{th\ j\text{-}amb}$	Thermal resistance junction-ambient	max	40	°C/W

ELECTRICAL CHARACTERISTICS (Refer to the test circuits, V_s = 35V, T_{amb}= 25°C unless otherwise specified)

Parameter		Test conditions	Min.	Typ.	Max.	Unit	Fig.
I_4	Pin 4 quiescent current	$I_5 = 0$; $I_7 = 0$; V_3= 3V		8		mA	1a
I_8	Pin 8 quiescent current	$I_5 = 0$; $I_7 = 0$; V_3= 3V		18		mA	1a
I_3	Amplifier input bias current	V_3= 1V		-0.1	-1	μA	1a
I_2	Amplifier input bias current	V_2= 1V		-0.1	-1	μA	1a
V_9	Reference voltage	$I_9 = 0$		2.2		V	1a
$\frac{\Delta V_9}{\Delta V_s}$	Reference voltage drift vs. supply voltage	V_s = 15 to 30V		0.5		mV/V	1a
V_{5L}	Pin 5 saturation voltage to GND	I_5 = 20 mA		0.5		V	1c
V_7	Quiescent output voltage	V_s = 35V; R_a = 39 KΩ		18		V	1d
		V_s = 15V; R_a = 13 KΩ		7.5		V	1d
V_{7L}	Output saturation voltage to GND	I_7 = 1.2A		1		V	1c
		I_7 = 0.7A		0.6		V	1c
V_{7H}	Output saturation voltage to supply	$-I_7$ = 1.2A		1.6		V	1b
		$-I_7$ = 0.7A		1.2		V	1b
R9	Reference voltage output resistance			2.1		KΩ	
T_j	Junction temperature for thermal shut down			140		°C	

Fig. 2 - AC test circuit

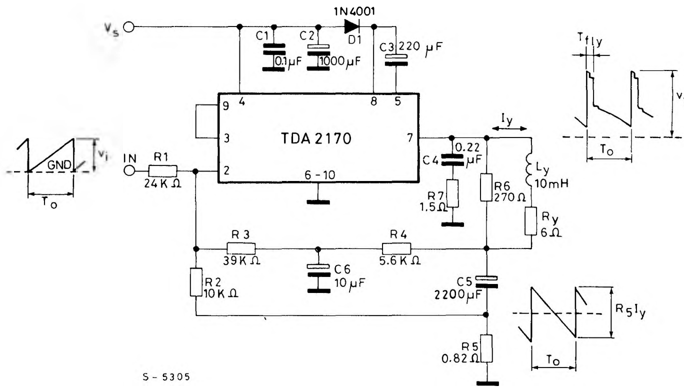
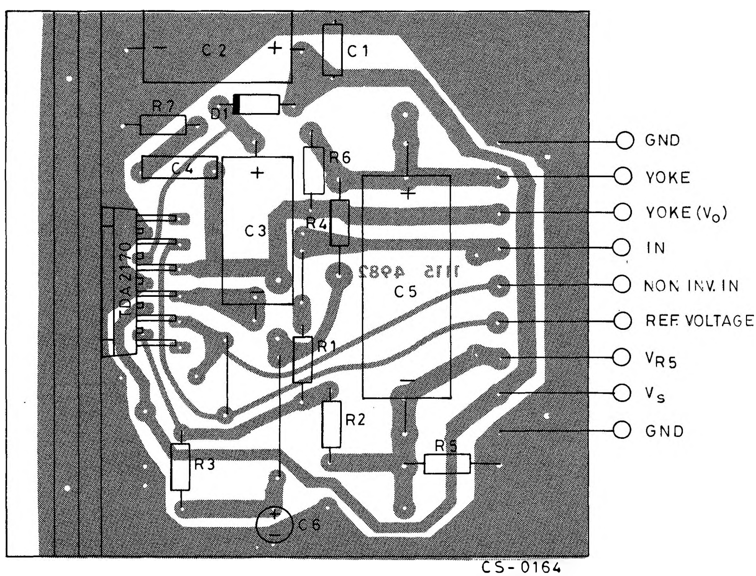


Fig. 3 - PC board and component layout (1:1 scale)



Components list for typical applications

Component	110° TVC 5.9Ω/10 mH 1.95 App	110° TVC 9.6Ω/27 mH 1.17 App	90° TVC 15Ω/30 mH 0.82 App	Unit
R1	24	18	12	KΩ
R2	10	6.8	5.6	KΩ
R3	39	22	22	KΩ
R4	5.6	5.6	5.6	KΩ
R5	0.82	1.2	2.2	Ω
R6	270	330	330	Ω
R7	1.5	1.5	1.5	Ω
D1	1N 4001	1N 4001	1N 4001	–
C1	0.1	0.1	0.1	μF
C2 el.	1000/25V	470/25V	470/25V	μF
C3 el.	220/25V	220/25V	220/25V	μF
C4	0.22	0.22	0.22	μF
C5 el.	2200/25V	1500/25V	1000/16V	μF
C6 el.	10/16V	10/16V	10/16V	μF

Typical performances

Parameter	110° TVC 5.9Ω/10 mH	110° TVC 9.6Ω/27 mH	90° TVC 15Ω/30 mH	Unit
V_s – Supply voltage	24	22.5	25	V
I_s – Current	280	175	125	mA
t_{fly} – Flyback time	0.6	1	0.7	ms
P_{tot} – Power dissip.	4.2	2.5	2.05	W
$R_{th\ c\text{-}a}$ – Heatsink	7	13	16	°C/W
T_{amb}	60	60	60	°C
$T_{j\ max}$	110	110	110	°C
T_o	20	20	20	ms
v_i	4	4	4	Vpp
v_7	50	47	52	Vp

MOUNTING INSTRUCTIONS

The power dissipated in the circuit must be removed by adding an external heatsink.
Thanks to the MULTIWATT® package attaching the heatsink is very simple, a screw or a compression spring (clip) being sufficient. Between the heatsink and the package it is better to insert a layer of silicon grease, to optimize the thermal contact; no electrical isolation is needed between the two surfaces.

Fig. 4 - Mounting examples

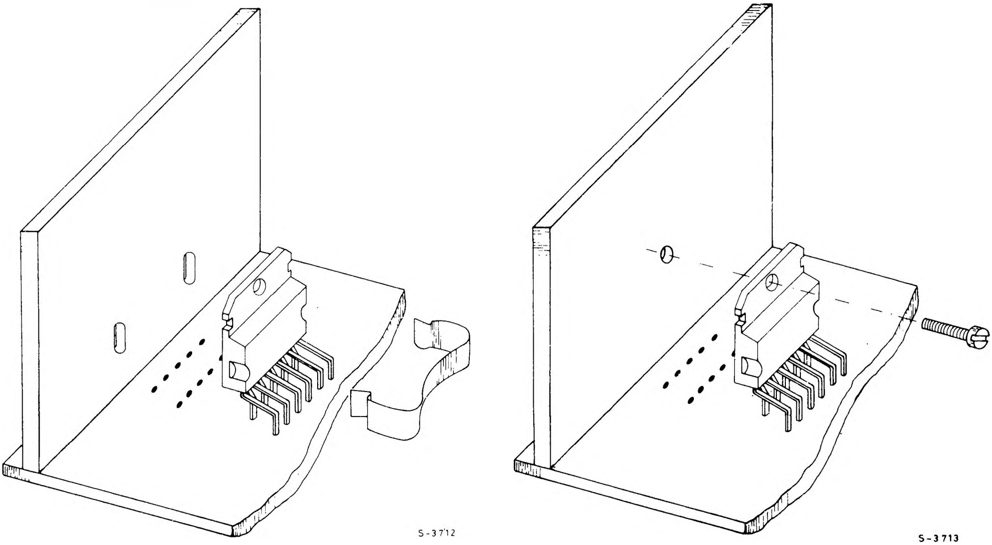


Fig. 5 - Maximum allowable power dissipation vs. ambient temperature