

## VERTICAL DEFLECTION CIRCUIT

### GENERAL DESCRIPTION

The TDA2655B is a monolithic integrated circuit for vertical deflection in colour television receivers with 90° picture tubes.

#### Features

- Synchronization circuit
- Vertical oscillator; 50/60 Hz switch
- Sawtooth generator with buffer stage
- Preamplifier with fed-out inputs
- Output stage with thermal and short-circuit protection
- Flyback generator
- Blanking pulse generator with guard circuit
- Voltage stabilizer
- Frequency detector with memory and storage

#### QUICK REFERENCE DATA

For 90° deflection; measured with respect to cooling fin (ground)

			concept 1*	concept 2*	
System supply voltages	V <sub>P1</sub>	typ.	22	22	V
	V <sub>P2</sub>	typ.	12	—	V
System supply currents	I <sub>P1</sub>	typ.	135	140	mA
	−I <sub>P2</sub>	typ.	8	—	mA
Deflection current (peak-to-peak value)	I <sub>g(p-p)</sub>	typ.	450	450	mA
Synchronization input voltage (peak-to-peak value)	V <sub>5(p-p)</sub>	min.	1	1	V

\*Concept 1: with two supply voltages ; concept 2: with one supply voltage. (See also Figs 2 and 3).

#### PACKAGE OUTLINE

12-lead DIL; plastic with metal cooling fin (SOT150).



**RATINGS**

Limiting values in accordance with the Absolute Maximum System (IEC134)

**Voltages**

with respect to cooling fin (ground)

Supply voltage (pin 11)	$V_{11} = V_p$	max.	40	V
Supply voltage output stage (pin 8)	$V_8$	max.	60	V
Pin 9	$V_9$	max.	60	V
	$-V_9$	max.	0	V
Pin 10	$V_{10}$	max.	40	V
Pin 3	$V_3$	max.	7	V
Pin 1	$V_1$	max.	40	V
Pin 6	$V_6$	max.	7	V
Pins 7 and 12	$V_7; V_{12}$	max.	24	V

**Currents**

Pin 10	$I_{10}$	max.	1,2	A
	$-I_{10}$	max.	1,5	A
Pin 5	$\pm I_5$	max.	10	mA
Pin 2	$I_2$	max.	3	mA
Pin 1	$I_1$	max.	50	mA
	$-I_1$	max.	0,1	mA
Pin 6	$-I_6$	max.	5	mA
Pin 4	$-I_4$	max.	1	mA
Pin 8, pin 9 and cooling fin		internally limited by the short-circuit protection circuit		

**Temperatures**

Total power dissipation	internally limited by the short-circuit protection circuit		
Storage temperature range	$T_{stg}$	-55 to +150 °C	
Operating ambient temperature range	$T_{amb}$	0 °C to limiting values	

**PINNING**

pin number	function	pin number	function
1.	sawtooth capacitor	7.	feedback input
2.	frequency storage information	8.	positive supply of output stage
3.	oscillator capacitor	9.	output
4.	oscillator resistor (adjustment)	10.	flyback generator output
5.	synchronization input/blanking output	11.	positive supply ( $V_p$ )
6.	sawtooth buffer stage output	12.	preamplifier input

## CHARACTERISTICS

$V_P = 22\text{ V}$ ;  $T_{\text{amb}} = 25\text{ }^\circ\text{C}$ ; these characteristics are measured with respect to cooling fin (ground), unless otherwise specified.

parameter	symbol	min.	typ.	max.	unit
<b>Supply voltage/output stage</b>					
Supply voltage	$V_{11} = V_P$	9	—	30	V
Output voltage at $I_g = 0,75\text{ A}$	$V_g$	—	1,2	1,4	V
at $-I_g = 0,75\text{ A}$	$V_g$	$(V_P - 1,9)$	$(V_P - 1,7)$	—	V
Flyback generator output voltage at $I_{10} = 0,75\text{ A}$	$V_{10}$	—	$(V_P - 2,0)$	—	V
Supply currents (without load)					
pin 11	$I_{11}$	—	10	—	mA
pin 8	$I_g$	—	3	—	mA
Output current	$\pm I_g$	—	—	1,2	A
Flyback generator peak current	$\pm I_{10}$	—	—	1,2	A
<b>Feedback</b>					
Preamplifier quiescent input currents	$-I_7 = -I_{12}$	—	0,1	—	$\mu\text{A}$
<b>Synchronization</b>					
Sync input voltage range	$V_5$	1,0	—	—	V
Synchronizing range		—	28	—	%
<b>Oscillator/sawtooth generator</b>					
Frequency setting input voltage	$V_4$	6	—	9	V
Sawtooth generator output voltage (peak value)	$V_{1(m)}$	0	$(V_P - 2)$	—	V
Sawtooth generator output current	$I_1$	—	—	30	mA
Sawtooth generator leakage current	$-I_1$	2	—	—	$\mu\text{A}$
Oscillator temperature dependency $T_{\text{case}} = 20\text{ to }100\text{ }^\circ\text{C}$	$(\Delta f/f)/\Delta T_{\text{case}}$	—	$10^{-4}$	—	$\text{K}^{-1}$
Oscillator voltage dependency $V_P = 10\text{ to }30\text{ V}$	$(\Delta f/f)/\Delta V_P$	—	$10^{-3}$	—	$\text{V}^{-1}$
<b>Blanking pulse generator</b>					
Output voltage (at $I_5 = 1\text{ mA}$ )	$V_5$	—	20	—	V
Output resistance	$R_5$	—	410	—	$\Omega$
Output current (at $V_P = 21\text{ V}$ )	$-I_5$	—	—	5	mA
Blanking pulse duration at 50 Hz sync	$t_b$	1,33	1,4	1,47	ms
<b>50/60 Hz frequency detector</b>					
Output saturation voltage (LOW level for 50 Hz)	$V_2$	—	1	—	V
Leakage current	$I_2$	—	1	—	$\mu\text{A}$

parameter	symbol	min.	typ.	max.	unit
<b>Buffer stage</b>					
Output voltage	$V_{6(m)}$	0	$(V_P - 1)$	—	V
Output current	$-I_6$	—	—	4	mA
<b>Thermal resistance</b>					
From junction to case (cooling fin)	$R_{th\ j-c}$	—	—	15	K/W
<b>Junction temperature</b>					
Switching point thermal protection	$T_j$	142	150	158	°C

**APPLICATION INFORMATION**

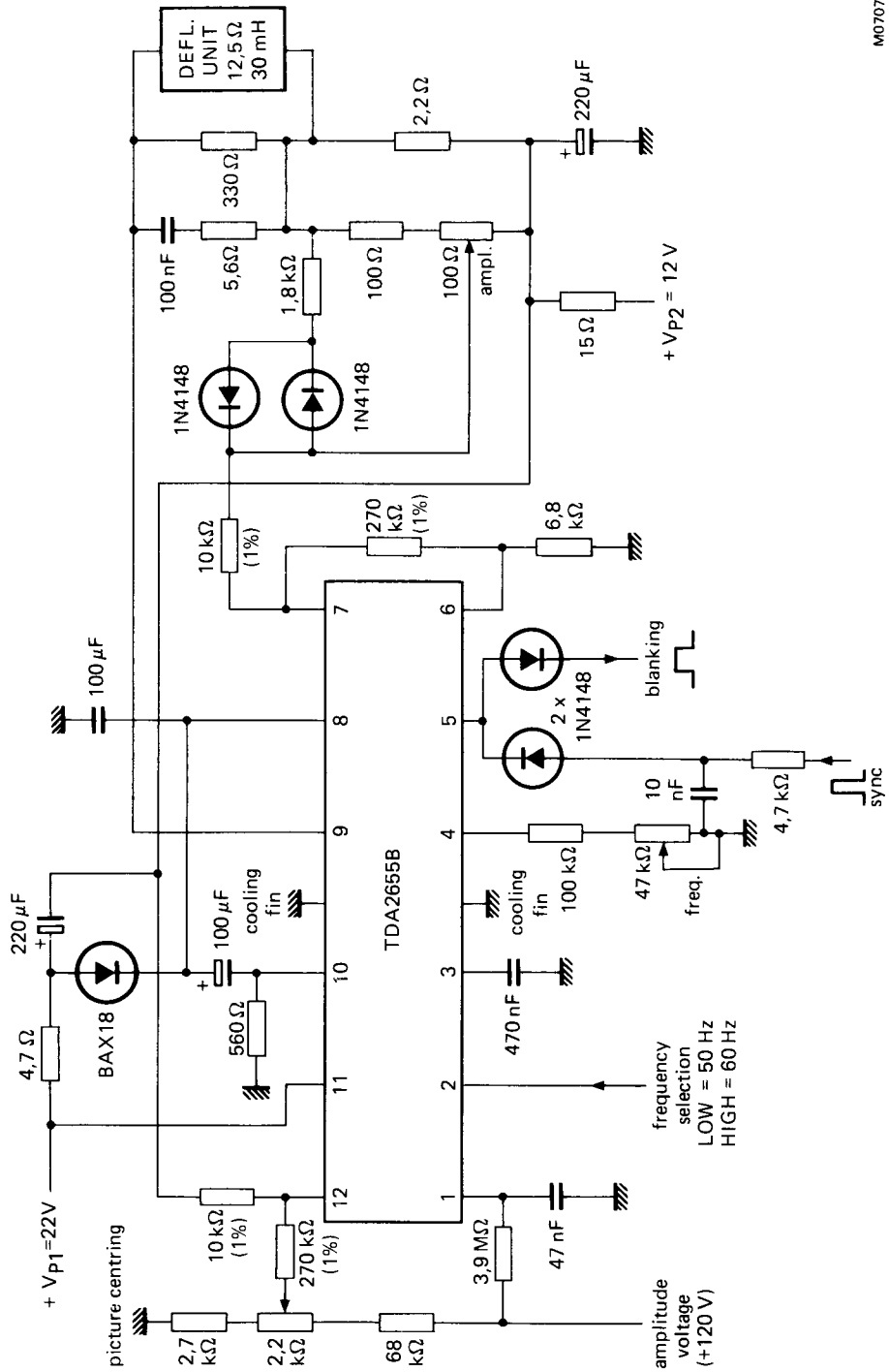
The following application data is obtained from measurements made on the circuits shown in Figs 2 and 3, application circuits for 90° deflection systems. Measurements are made with respect to the cooling fin (ground).

			Fig. 2 concept 1*	Fig. 3 concept 2*	
System supply voltages	$V_{P1}$	typ.	22	22	V
	$V_{P2}$	typ.	12	—	V
Supply currents	$I_{P1}$	typ.	135	140	mA
	$-I_{P2}$	typ.	8	—	mA
Output voltage (d.c. value)	$V_g$	typ.	12,2	13,8	V
Output voltage (peak-to-peak value)	$V_{g(p-p)}$	typ.	42	43	V
Output current (peak value)	$-I_{g(m)}$	typ.	450	450	mA
Deflection current (peak-to-peak value)	$I_{defl\ (p-p)}$	typ.	850	850	mA
Flyback time	$t_{fl}$	typ.	0,9	1,0	ms
Oscillator frequency adjustment without sync	$f_o$	typ.	46,5	46,5	Hz
Total power dissipation per package (see note)	$P_{tot}$	max.	1,8	1,8	W
Ambient temperature	$T_{amb}$	max.	70	70	°C
Thermal resistance (junction to ambient)	$R_{th\ j-a}$	max.	40	40	K/W

\*Concept 1 : with two supply voltages; concept 2 : with one supply voltage.

**Note**

Calculated with  $\Delta V_{P1}$  of +5% and  $\Delta R_{defl}$  of -7%.



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Fig. 2 Typical application circuit with two supply voltages; for use with 90° picture tubes.

