

## SYNCHRO AND HORIZONTAL DEFLECTION CONTROL FOR COLOR TV SET

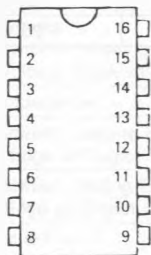
- LINE OSCILLATOR (two levels switching)
- PHASE COMPARISON BETWEEN SYNCHRO-PULSE AND OSCILLATOR VOLTAGE  $\varnothing 1$ , ENABLED BY AN INTERNAL PULSE, (better parasitic immunity)
- PHASE COMPARISON BETWEEN THE FLY-BACK PULSES AND THE OSCILLATOR VOLTAGE  $\varnothing 2$
- COINCIDENCE DETECTOR PROVIDING A LARGE HOLD-IN-RANGE
- FILTER CHARACTERISTICS AND GATE SWITCHING FOR VIDEO RECORDER APPLICATION
- NOISE GATED SYNCHRO SEPARATOR
- FRAME PULSE SEPARATOR
- BLANKING AND SAND CASTLE OUTPUT PULSES
- HORIZONTAL POWER STAGE PHASE LAGGING CIRCUIT
- SWITCHING OF CONTROL OUTPUT PULSE WIDTH
- SEPARATED SUPPLY VOLTAGE OUTPUT STAGE ALLOWING DIRECT DRIVE OF SCR'S CIRCUIT
- SECURITY CIRCUIT MAKES THE OUTPUT PULSE SUPPRESSED WHEN LOW SUPPLY VOLTAGE

### DESCRIPTION

The TDA2593 is a circuit intended for the horizontal deflection of color TV sets, supplied with transistors or SCR'S.



### PIN CONNECTIONS



- 1 - Supply Voltage
- 2 - Output stage supply voltage
- 3 - Output pulse
- 4 - Selection of output pulse duration
- 5 - Decoupling
- 6 - Reference pulse (fly-back) for The 2nd phase comparator
- 7 - Sand castle pulse
- 8 - Vertical synchro output
- 9 - Synchro separator output
- 10 - Noise separator input
- 11 - V.C.R. switching
- 12 - Time constant switching
- 13 - First phase comparator output
- 14 - Ramp oscillator capacitance
- 15 - Adjustment of the charge current
- 16 - Ground

E88TDA2593-01

## MAIN CHARACTERISTICS

Symbol	Parameter	Typ.	Unit
V(1-16)	Supply Voltage	12	V
I(1)	Supply Current	30	mA
<b>Input Signals</b>			
V(9-16) (pp)	Synchro Separator Input Voltage	3 to 4	V
V(10-16) (pp)	Noise Separators Input Voltage	3 to 4	V
V(4-16)	Control Voltage of the Output Pulse Switching Circuit $t = 7 \mu\text{s}$ (thyristor) $t = 14 \mu\text{s} + t_d$ (transistor) $t = 0$ (V(3-16) = 0)	9.4 to V(1-16)	V
V(4-16)		0 to 3.5	V
V(4-16)		5.4 to 5.6	V
<b>Output Signals</b>			
V(8-16) (pp)	Frame Synchro Pulse	11	V
V(7-16) (pp)	Sandcastle Pulse	11	V
V(3-16) (pp)	Horizontal Driver Stage Control Pulse	10.5	V

## ABSOLUTE MAXIMUM RATINGS

Maximum Ratings According to CEI 134 Data Sheet

Symbol	Parameter	Value	Unit
V(1-16)	Supply Voltage to Pin 1	13.2	V
V(2-16)	Supply Voltage to Pin 2	18	V
V(4-16)	Voltage to Pin 4	13.2	V
V(9-16)	Voltage to Pin 9	$\pm 6$	V
V(10-16)	Voltage to Pin 10	$\pm 6$	V
V(11-16)	Voltage to Pin 11	13.2	V
$I_{2M} = -I_{3M}$	Current at Pins 2 and 3 (with thyristor)	650	mA
$I_{2M} = I_{3M}$	Current at Pins 2 and 3 (with transistor)	400	mA
I(4)	Current to Pin 4	1	mA
I(6)	Current to Pin 6	$\pm 10$	mA
I(7)	Current to Pin 7	- 10	mA
I(11)	Current to Pin 11	2	mA
$P_{Tot}$	Power Dissipation	800	mW
$T_{amb}$	Operating Ambient Temperature	- 20 to + 70	$^{\circ}\text{C}$
$T_{stg}$	Storage Temperature	- 25 to + 125	$^{\circ}\text{C}$

## ELECTRICAL OPERATING CHARACTERISTICS

 $T_{amb} = 25\text{ }^{\circ}\text{C}$ ,  $V_1\text{--}V_{16} = 12\text{ V}$  (unless otherwise specified).

Symbol	Parameter	Min.	Typ.	Max.	Unit
V(9-16)	Input Signals Synchro Separator (pin 9) Input Threshold Voltage		0.8		V
I(9)	Input Threshold Current			5	$\mu\text{A}$
I(9)	On-state Input Current		5 to 100		$\mu\text{A}$
I(9)	Disconnect Input Current	100	150		$\mu\text{A}$
I(9)	Off-state Input Current ( $V(9\text{--}16) = -5\text{ V}$ )			-1	$\mu\text{A}$
V(9)	Video Input Signal (positive synchro pulses) (note 1)		3 to 4		Vpp
V(10-16)	Noise Separator (pin 10) Input Threshold Voltage		1.4		V
I(10)	Input Threshold Current	100	150		$\mu\text{A}$
I(10)	Input Current		5 to 100		$\mu\text{A}$
I(10)	Off-state Input Current ( $V(10\text{--}16) = -5\text{ V}$ )			-1	$\mu\text{A}$
V(10)	Video Input Signal (positive synchro pulses) (note 1)		3 to 4		Vpp
V(10)	Allowed superimposed parasitic signal			7	V
V(6-16)	Fly-back Pulse (pin 6) Input Threshold Voltage		1.4		V
V(6)	Input Limitation Level		-0.7 and +1.4		V
I(6)	Input Current	0.01	1	2	mA
V(4-16)	Output Pulse Width Control Switch (pin 4) Input Voltage $t = 7\text{ }\mu\text{s}$ (thyristor)		9.4 to $V(1\text{--}16)$		V
V(4-16)	$t = 14\text{ }\mu\text{s} + t_d$ (transistor)		0 to 3.5		V
V(4-16)	$t = 0$ ( $V_3\text{--}16 = 0$ ) (note 2)		5.4 to 6.6		V
I(4)	Input Current $t = 7\text{ }\mu\text{s}$ (thyristor)	200			$\mu\text{A}$
I(4)	$t = 14\text{ }\mu\text{s} + t_1$ (transistor)	200			$\mu\text{A}$
I(4)	$t = 0$ ( $V_3\text{--}16 = 0$ )		0		$\mu\text{A}$
V(11-16)	Video Recorder Switch (pin 11) Input Voltage (pin 11 low level) (pin 11 to + $V_{CC}$ )		0 to 2.5 9 to $V(1\text{--}16)$		V V
I(11)	Input Current (pin 11 low level)			200	$\mu\text{A}$
I(11)	(pin 11 to + $V_{CC}$ )			2	mA
V(8-16)	Output Signals Frame Synchro Pulses (positive) (pin 8) Output Voltage (peak value)	10	11		V
R(8)	Output Impedance		2		k $\Omega$
$t_{on}$	Delay Between Leading Edge of Input Signal and Leading Edge of Output Signal		15		$\mu\text{s}$
$t_{off}$	Delay Between Trailing Edge of Input Signal and Trailing Edge of Output Signal		15		$\mu\text{s}$

Notes : 1. Allowed range 1 to 7 V.  
2. Or pin 4 not connected.

**ELECTRICAL OPERATING CHARACTERISTICS (cont'd)**T<sub>amb</sub> = 25 °C, V<sub>1</sub>-V<sub>16</sub> = 12 V (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit
V(7-16)	Sandcastle Pulse (positive) (pin7) Output Voltage (peak value)	10	11		V
R(7)	Output Impedance		70		Ω
I(7)	Output Current During Trailing Edge		2		mA
t <sub>7</sub>	Sandcastle Pulse Width (V <sub>7</sub> = 7 V)	3.7		4.3	μs
Δ <sub>1</sub>	Phase Between Middle Input Synchro Pulse and Leading Edge of Sandcastle Pulse (V <sub>7</sub> = 7 V)	2.15		3.15	μs
V(7-16)	Fly-back Blanking Pulse (pin 7) Output Voltage (peak value)	4		5	V
R(7)	Output Impedance		70		Ω
I(7)	Output Current During Trailing Edge		2		mA
V(3-16)	Control Pulse for Horizontal Driver (positive) (pin 3) Output Voltage (peak value)		10.5		V
R(3)	Output Impedance (leading edge)		2.5		Ω
R(3)	Output Impedance (trailing edge)		20		Ω
t <sub>3</sub>	Control Pulse Width V <sub>4</sub> = 9.4 to V(1-16)	5.5		8.5	μs
t <sub>3</sub>	Control Pulse Width V <sub>4</sub> = 0 to 4 V (note 3)		14 + t <sub>c</sub>		μs
V(1-16)	Control pulse is disabled for		4		V
t <sub>2</sub>	Overall Phase Relation Ship Phase Between Middle Synchro Pulse and Middle Fly-back Pulse t <sub>r</sub> = 12 μs (note 4)	1.9		3.3	μs
ΔI/Δt	Sensitivity to Current Adjust		30		μA/μs
V(14-16)	Oscillator (pins 14 and 15)				
V(14-16)	Threshold Voltage (low level)		4.4		V
	Threshold Voltage (high level)		7.6		V
I(14)	Current Generator		± 0.47		mA
f	Free Running Frequency (C <sub>osc</sub> = 4700 pF R <sub>osc</sub> = 12 kΩ)		15625		Hz
Δf	Tolerance on Frequency (note 5)			± 5	%
Δf/15	Frequency Control Sensitivity		31		Hz/μA
Δf	Spread of Frequency		± 10		%
$\frac{\Delta f/f}{\Delta V/V \text{ nom.}}$	Influence of Supply Voltage on Frequency (note 5)			± 0.05	%
Δf	Frequency change when decreasing the supply down to 5 V V(1-16) = 5V (note 5)			± 10	%
T	Frequency Temperature Coefficient (note 5)			± 10 <sup>-4</sup>	Hz/°C
V(13-16)	Phase Comparator Ø 1 (pin 13) Control Voltage Range		3.8 to 8.2		V
I(13)	Control Current (peak value)		± 1.9 to ±		mA
I(13)	Off-state Current (V (13-16) = 4 to 8 V)		2.3	- 1	μA

Notes : 3 With t<sub>r</sub> = 12 μs.

4 The adjustment of overall phase relation (and output pulse leading edge position) is automatically performed by phase comparator Ø 2. If additional adjustment is needed, a current have to be imposed at pin 5.

5. Tolerance of peripheral components not included.

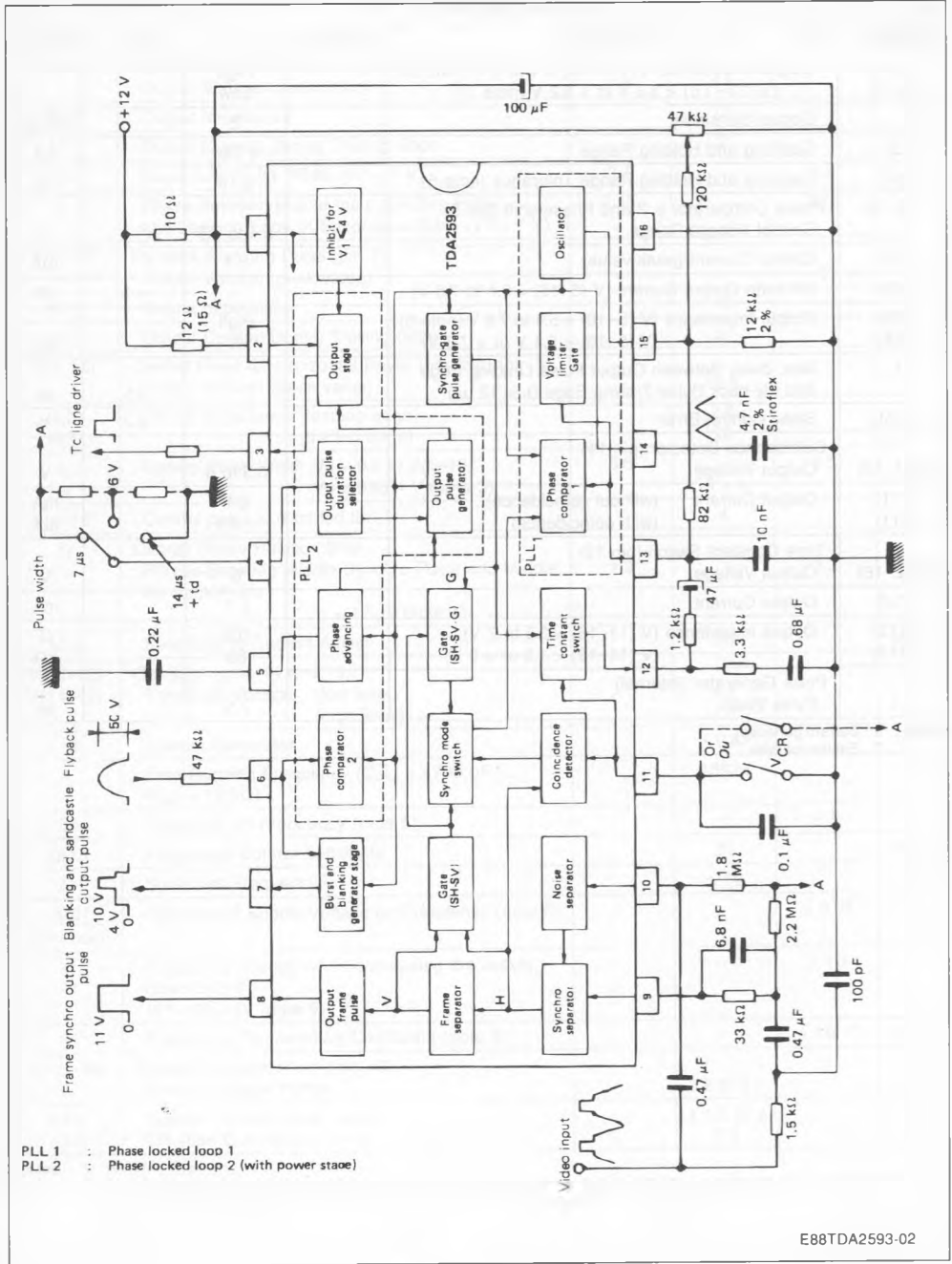
**ELECTRICAL OPERATING CHARACTERISTICS** (cont'd)

$T_{amb} = 25\text{ }^{\circ}\text{C}$ ,  $V_1 - V_{16} = 12\text{ V}$  (unless otherwise specified).

Symbol	Parameter	Min.	Typ.	Max.	Unit
R(13) R(13)	Output Impedance ( $V(13-16) = 4\text{ to }8\text{ V}$ (note 6)) ( $V(13-16) < 3.8\text{ V}$ or $> 8.2\text{ V}$ (note 7))		High Low		
	Control Sensibility		2		kHz/ $\mu$ s
$\Delta f$	Catching and Holding Range		$\pm 780$		Hz
$\Delta f/f$	Catching and Holding Range Tolerance (note 5)		$\pm 10$		%
V(5-16)	Phase Comparator $\phi$ 2 and Phase-shift (pin 5) Control Voltage Range		5.4 to 7.6		V
I(5)	Control Current (peak value)		$\pm 1$		mA
I(5)	Off-state Output Current ( $V(5-16) = 5.4\text{ to }7.6\text{ V}$ )			- 5	$\mu$ A
R(5) R(5)	Output Impedance ( $V(5-16) = 5.4\text{ to }7.6\text{ V}$ (note 6)) ( $V(5-16) < 5.4\text{ V}$ or $> 7.6\text{ V}$ )		High 8		k $\Omega$
$t_d$	Max. delay Between Output Pulse Leading Edge and Fly-back Pulse Trailing Edge ( $t_r = 12\text{ }\mu$ s)			15	$\mu$ s
$\Delta_T/\Delta t_d$	Static Control Error			0.2	%
V(11-16)	Coincidence Detector (pin 11) Output Voltage		0.5 to 6		V
I(11) I(11)	Output Current (without coincidence) (with coincidence)		0.1 - 0.5		mA mA
V(12-16)	Time Constant Switch (pin 12) Output Voltage		6		V
I(12)	Output Current		$\pm 1$		mA
R(12) R(12)	Output Impedance ( $V(11-16) = 2.5\text{ to }7\text{ V}$ ) ( $V(11-16) < 1.5\text{ V}$ or $> 9\text{ V}$ )		100 60		$\Omega$ k $\Omega$
t	Pulse Generator (internal) Pulse Width		7.5		$\mu$ s

Notes : 6. Current generator.  
7. Emitter-follower.

BLOCK DIAGRAM AND TYPICAL APPLICATION



E88TDA2593-02

## PACKAGE MECHANICAL DATA

16 PINS – PLASTIC DIP

