Signetics

TDA2595
Horizontal Combination

Product Specification

Linear Products

DESCRIPTION

The TDA2595 is a monolithic integrated circuit intended for use in color television receivers.

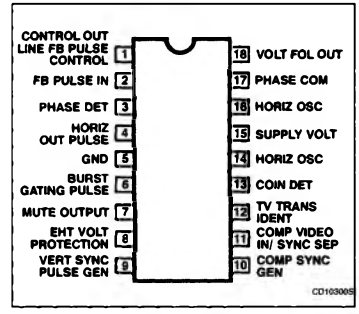
FEATURES

- Positive video input; capacitively coupled (source impedance $< 200\Omega$)
- Adaptive sync separator; slicing level at 50% of sync amplitude
- Internal vertical pulse separator with double slope integrator
- Output stage for vertical sync pulse or composite sync depending on the load; both are switched off at muting
- φ_1 phase control between horizontal sync and oscillator
- Coincidence detector φ_3 for automatic time constant switching; overruled by the VCR switch
- Time constant switch between two external time constants for loop gain; both controlled by the coincidence detector φ_3
- φ_1 gating pulse controlled by coincidence detector φ_3
- Mute circuit depending on TV transmitter identification
- φ_2 phase control between line flyback and oscillator; the slicing levels for φ_2 control and horizontal blanking can be set separately
- Burst keying and horizontal blanking pulse generation, in combination with clamping of the vertical blanking pulse (three-level sandcastle)
- Horizontal drive output with constant duty cycle inhibited by the protection circuit or the supply voltage sensor
- Detector for too low supply voltage
- Protection circuit for switching off the horizontal drive output continuously if the input voltage is below 4V or higher than 8V
- Line flyback control causing the horizontal blanking level at the sandcastle output continuously in case of a missing flyback pulse
- Spot suppressor controlled by the line flyback control

APPLICATIONS

- Television receivers
- Video receivers

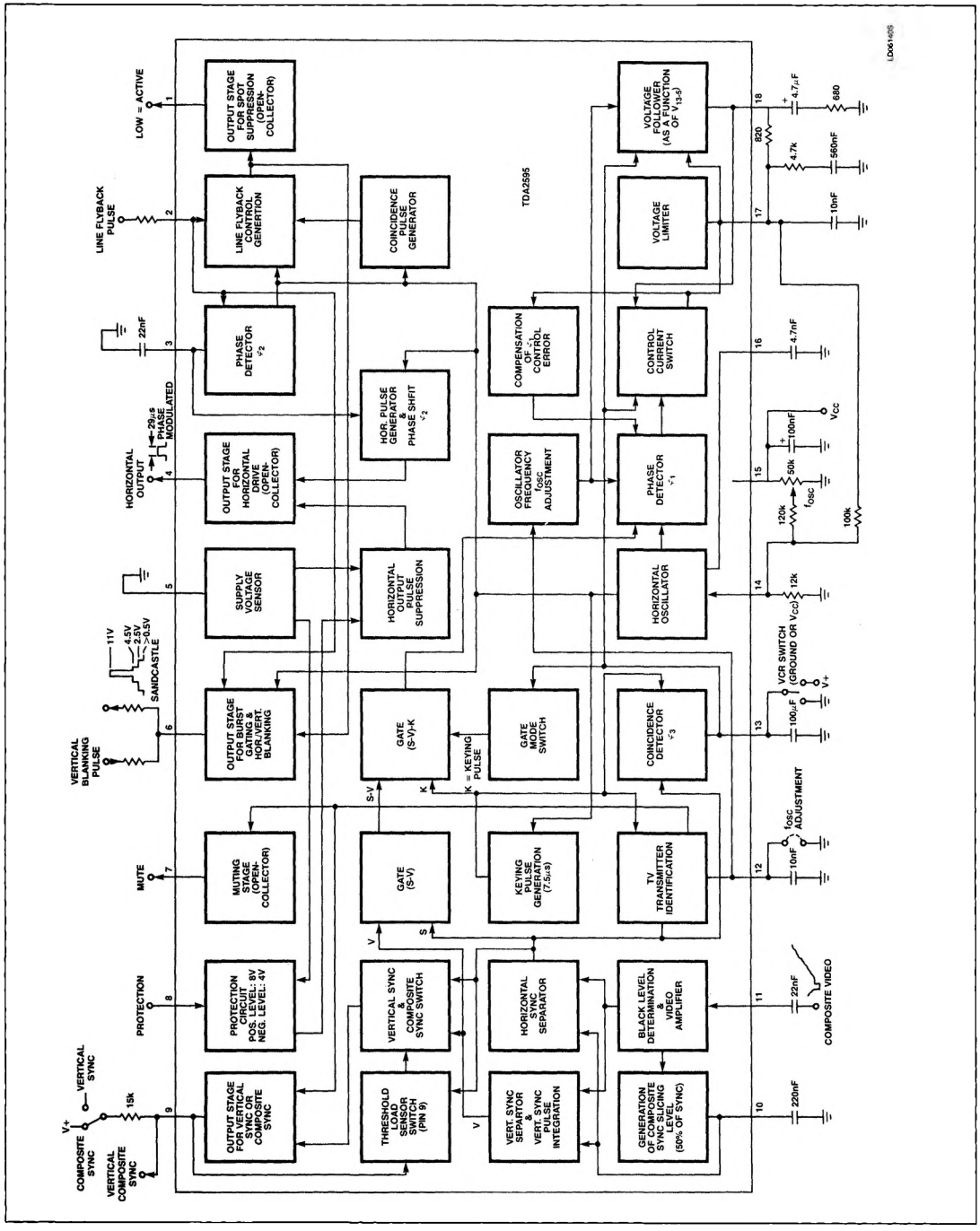
PIN CONFIGURATION



ORDERING INFORMATION

DESCRIPTION	TEMPERATURE RANGE	ORDER CODE
18-Pin Plastic DIP (SOT-102CS)	-20°C to +70°C	TDA2595N

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

SYMBOL	DESCRIPTION	RATING	UNIT
$V_{15-5} = V_{CC}$	Supply voltage (Pin 15)	13.2	V
	Voltages at:		
$V_{1;4;7-5}$	Pins 1, 4 and 7	18	V
$V_{8;13;18-5}$	Pins 8, 13 and 18	V_{CC}	V
V_{11-5}	Pin 11 (range)	−0.5 to +6	V
	Currents at:		
I_1	Pin 1	10	mA
$\pm I_{2M}$	Pin 2 (peak value)	10	mA
I_4	Pin 4	100	mA
$\pm I_{6M}$	Pin 6 (peak value)	6	mA
I_7	Pin 7	10	mA
I_8	Pin 8 (range)	−5 to +1	mA
I_9	Pin 9 (range)	−10 to +3	mA
$\pm I_{18}$	Pin 18	10	mA
P_{TOT}	Total power dissipation	800	mW
T_{STG}	Storage temperature range	−65 to +150	°C
T_A	Operating ambient temperature range	−20 to +70	°C

DC AND AC ELECTRICAL CHARACTERISTICS $V_{CC} = 12V$; $T_A = 25°C$, unless otherwise specified.

SYMBOL	PARAMETER	LIMITS			UNIT
		Min	Typ	Max	
Composite video input and sync separator (Pin 11) (internal black level determination)					
$V_{11-5(P-P)}$	Input signal (positive video; standard signal; peak-to-peak value)	0.2	1	3	V
$V_{11-5(P-P)}$	Sync pulse amplitude (independent of video content)	50			mV
R_G	Generator resistance			200	Ω
	Input current during				
I_{11}	Video		5		μA
$-I_{11}$	Sync pulse		40		μA
$-I_{11}$	Black level		30		μA
Composite sync generation (Pin 10) horizontal slicing level at 50% of the sync pulse amplitude					
	Capacitor current during				
I_{10}	Video		12		μA
$-I_{10}$	Sync pulse		170		μA
Vertical sync pulse generation (Pin 9) slicing level at 25% (50% between black level and horizontal slicing level)					
V_{9-5}	Output voltage	10			V
t_P	Pulse duration		190		μs
t_D	Delay with respect to the vertical sync pulse (leading edge)		45		μs
	Pulse-mode control				
	Output current for vertical sync pulse (dual integrated)	No current applied at Pin 9			
	Output current for horizontal and vertical sync pulse (non-integrated separated signal)	Current applied via a resistor of 15kΩ from V_{CC} to Pin 9			

DC AND AC ELECTRICAL CHARACTERISTICS (Continued) V_{CC} = 12V; T_A = 25°C, unless otherwise specified.

SYMBOL	PARAMETER	LIMITS			UNIT
		Min	Typ	Max	
Horizontal oscillator (Pins 14 and 16)					
f_{OSC}	Frequency; free-running		15.625		kHz
V_{14-5}	Reference voltage for f_{OSC}		6		V
$\Delta f_{OSC}/\Delta I_{14}$	Frequency control sensitivity		31		Hz/μA
Δf_{OSC}	Adjustment range of circuit Figure 1		±10		%
Δf_{OSC}	Spread of frequency			5	%
$\frac{\Delta f_{OSC}/f_{OSC}}{\Delta V_{15-5}/V_{15-5}}$	Frequency dependency (excluding tolerance of external components) with supply voltage (V_{CC} = 12V)		±0.05		%
Δf_{OSC}	with supply voltage drop of 5V			10	%
TC	with temperature			$\pm 10^{-4}$	$°C^{-1}$
	Capacitor current during:				
$-I_{16}$	Charging		1024		μA
I_{16}	Discharging		313		μA
	Sawtooth voltage timing (Pin 14)				
t_R	Rise time		49		μs
t_F	Fall time		15		μs
Horizontal output pulse (Pin 4)					
V_{4-5}	Output voltage Low at I_4 = 30mA			0.5	V
t_P	Pulse duration (High)		29 ±1.5		μs
V_{CC}	Supply voltage for switching off the output pulse (Pin 15)		4		V
Phase comparison φ_1 (Pin 17)					
V_{17-5}	Control voltage range	3.55		8.3	V
I_{17}	Leakage current at V_{17-5} = 3.55 to 8.3V			1	μA
$\pm I_{17}$	Control current for external time constant switch	1.8	2	2.2	mA
$\pm I_{17}$	Control current at $V_{18-5} = V_{15-5}$ and $V_{13-5} < 2V$ or $V_{13-5} > 9.5V$		8		mA
$\pm I_{17}$	Control current at $V_{18-5} = V_{15-5}$ and V_{13-5} = 2 to 9.5V	1.8	2	2.2	mA
	Horizontal oscillator control				
S_φ	Control sensitivity	6			kHz/μs
Δf_{OSC}	Catching and holding range		±680		Hz
Δf_{OSC}	Spread of catching and holding range		±10		%
t_P	Internal keying pulse at V_{13-5} = 2.9 to 9.5V		7.5		μs
	Time constant switch				
V_{13-5}	Slow time constant	9.5		2	V
V_{13-5}	Fast time constant	2		9.5	V
$\pm V_{17-18}$	Impedance converter offset voltage (slow time constant)			3	mV
	Output resistance				
R_{18-5}	Slow time constant			10	Ω
R_{18-5}	Fast time constant	high impedance			
I_{18}	Leakage current			1	μA

DC AND AC ELECTRICAL CHARACTERISTICS (Continued) V_{CC} = 12V; T_A = 25°C, unless otherwise specified.

SYMBOL	PARAMETER	LIMITS			UNIT
		Min	Typ	Max	
Coincidence detector φ_3 (Pin 13)					
	Output voltage				
V_{13-5}	without coincidence with composite video signal			1	V
V_{13-5}	without coincidence without composite video signal (noise)			2	V
V_{13-5}	With coincidence with composite video signal		6		V
	Output current				
I_{13}	without coincidence with composite video signal		50		μA
$-I_{13}$	with coincidence with composite video signal		300		μA
	Switching current				
I_{13}	at $V_{13-5} = V_{CC} - 0.5V$			100	μA
$I_{13(av)}$	at V_{13-5} = 0.5V (average value)			100	μA
Phase comparison φ_2 (Pins 2 and 3)[1]					
Δt	Phase relation between middle of the horizontal sync pulse and the middle of the line flyback pulse at $t_{FP} \approx 12\mu s$[2]		2.6 ± 0.7		μs
ΔI/Δt	If additional adjustment is required, it can be arranged by applying a current at Pin 3, such that for applied current:		30		μA/μs
Input for line flyback pulse (Pin 2)					
V_{2-5}	Switching level for φ_2 comparison		3		V
V_{2-5}	Switching level for horizontal blanking and flyback control		3		V
V_{2-5}	Input voltage limiting		−0.7 +4.5		V V
	Switching current				
I_2	at horizontal flyback	0.01	1		mA
I_2	at horizontal scan			2	μA
Phase detector output (Pin 3)					
$\pm I_3$	Control current for φ_2		1		mA
$\Delta t_{\varphi 2}$	Control range		19		μs
$\Delta t/\Delta t_d$	Static control error			0.2	%
I_3	Leakage current			5	μA
Burst gating pulse (Pin 6)[3]					
V_{6-5}	Output voltage	10	11		V
t_P	Pulse duration	3.7	4	4.3	μs
$t_{\varphi 6}$	Phase relation between middle of sync pulse at the input and the leading edge of the burst gating pulse at V_{6-5} = 7V	2.15	2.65	3.15	μs
I_6	Output trailing edge current		2		mA

DC AND AC ELECTRICAL CHARACTERISTICS (Continued) V_{CC} = 12V; T_A = 25°C, unless otherwise specified.

SYMBOL	PARAMETER	LIMITS			UNIT
		Min	Typ	Max	
Horizontal blanking pulse (Pin 6)[3]					
V_{6-5}	Output voltage	4.2	4.5	4.9	V
I_6	Output trailing edge current		2		mA
V_{6-5sat}	Saturation voltage at horizontal scan			0.5	V
Clamping circuit for vertical blanking pulse (Pin 6)[3]					
V_{6-5}	Output voltage at I_6 = 2.8mA	2.15	2.5	3	V
I_{6min}	Minimum output current at V_{6-5} > 2.15V		2.3		mA
I_{6max}	Maximum output current at V_{6-5} < 3V		3.3		mA
TV transmitter identification (Pin 12)					
V_{12-5} V_{12-5}	Output voltage no TV transmitter TV transmitter identified	 7		1	 V V
Mute output (Pin 7)					
V_{7-5}	Output voltage at I_7 = 3mA; no TV transmitter			0.5	V
R_{7-5}	Output resistance at I_7 = 3mA; no TV transmitter			100	Ω
I_7	Output leakage current at V_{12-5} > 3V; TV transmitter identified			5	μA
Protection circuit (beam current/EHT voltage protection) (Pin 8)					
V_{8-5}	No-load voltage for I_8 = 0 (operative condition)		6		V
V_{8-5}	Threshold at positive-going voltage		8 ±0.8		V
V_{8-5}	Threshold at negative-going voltage		4 ±0.4		V
$\pm I_8$	Current limiting for V_{8-5} = 1 to 8.5V		60		μA
R_{8-5}	Input resistance for V_{8-5} > 8.5V		3		kΩ
t_d	Response delay of threshold switch		10		μs
Control output of line flyback pulse control (Pin 1)					
V_{1-5sat}	Saturation voltage at standard operation; I_1 = 3mA			0.5	V
I_1	Output leakage current in case of break in transmission			5	μA

NOTES:
1. Phase comparison between horizontal oscillator and the line flyback pulse. Generation of a phase-modulated (φ_2) horizontal output pulse with constant duration.
2. t_{FP} is the line flyback pulse duration.
3. Three-level sandcastle pulse.