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NTE1784
Integrated Circuit
TV Horizontal Processor

Description:

The NTE1784 is an integrated circuit in a 16–Lead DIP type package designed for use as a horizontal processor circuit for B/W and color television receivers.

Features:

- Noise Gated Horizontal Sync Separator
- Noise Gated Vertical Sync Separator
- Horizonyal Oscillator with Frequency Range Limiter
- Phase Comparator between Sync Pulses and Oscillator Pulses (PLL)
- Phase Comparator between Flyback Pulses and Oscillator Pulses (PLL)
- Loop Gain and Time Constant Switching (VCR)
- Composite Blanking and Key Pulse Generator
- Protection Circuits
- Output Stages with High Current Capability

Absolute Maximum Ratings: (T_A = +25°C unless otherwise specified)

Supply Voltage (Pin1), V_S 15V
Circuit Voltage, V_2 . . . . . 18V
Circuit Voltage, V_4, V_{11} . . . . . V_S
Circuit Voltage, V_8 . . . . . V_S to –6V
Circuit Voltage, V_9 . . . . . +6V to –6V
Peak Circuit Current, I_2 . . . . . 1A
Peak Circuit Current, I_3 . . . . . 500mA
Circuit Current, I_6, I_{10} 30mA
Circuit Current, I_7 . . . . . 20mA
Total Power Dissipation ($T_A \le +70°C$), P_{tot} 1W
Operating Junction Temperature Range, T_J . . . . . –40° to +150°C
Storage Temperature Range, T_{stg} . . . . . –40° to +150°C
Maximum Thermal Resistance, Junction–to–Ambient, R_{thJA} . . . . . 80°C/W

Electrical Characteristics: (T_A = +25°C, V_S = 12V unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Supply Voltage	V_S		10.0	12.0	13.2	V
		Output pulses at Pin2 and Pin3 OFF	–	–	4	V
Supply Current	I_S	I_3 = 0	–	40	52	mA

Electrical Characteristics (Cont'd): (T_A = +25°C, V_S = 12V unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Horizontal Sync Separator and Noise Gate						
Input Signal (Peak–to–Peak)	V_i		1	3	6	V
Input Switching Voltage	V_8	I_8 = 80µA	–	1.5	–	V
Input Switching Current	I_8	V_8 = 1.4V	–	10	–	µA
Input Blocking Current for Noise Suppression	I_8		–	0.9	–	mA
Input Switching Voltage for Noise Suppression	V_8		–	2.1	–	V
Leakage Current	I_8	V_8 = –5V	–	–	1	µA
Vertical Sync Separator						
Input Signal (Peak–to–Peak)	V_i		1	3	6	V
Input Switching Voltage	V_9	I_9 = 80µA	–	1.5	–	V
Input Switching Current	I_9	I_9 = 1.4V	–	5	–	µA
Leakage Current	I_9	V_9 = –5V	–	–	1	µA
Vertical Sync Pulse Output Voltage	V_{10}	No load at Pin10	11	–	–	kΩ
Output Resistance	R_{10}		–	10	–	kΩ
Delay between Leading Edge of Input and Output Signals	t_{LV}		–	17	–	µs
Delay between Trailing Edge of Input and Output Signals	t_{TV}		–	50	–	µs
Vertical Sync Pulse Duration	t_V		–	190	–	µs
Protection Circuit						
Input Voltage for Switching Off the Output Pulses	V_4	Output pulses OFF	–	–	0.5	V
		Output pulses ON	1	–	–	V
Input Resistance	R_4		–	200	–	kΩ
Input Current	I_4		5	–	–	µA
Flyback Pulse						
Input Threshold Voltage of Blanking 'Generator	V_6		–	1.5	–	V
Input Threshold Voltage of Phase Comparator	V_6		–	7.6	–	V
Input Switching Current	I_6	$V_6 \geq 1.7V$	–	0.23	–	mA
Output Pulse						
Output Voltage (Peak–to–Peak)	V_3	$I_3 = 150mA_{P–P}$	–	10	–	V
Output Current	I_3	V_3 = 5V	–	500	–	mA
Output Resistance	R_3	At leading edge of output pulse	–	3	–	Ω
		At trailing edge of output pulses	–	20	–	Ω
Output Pulse Duration	t_p		20	22	26	µs
Composite Blanking and Key Pulse						
Key Pulse Output Peak Voltage	V_{7K}		9	11	–	V
Blanking Pulse Output Voltage	V_{7B}		4.2	4.5	4.8	V
Output Resistance	R_7		–	100	–	Ω

Electrical Characteristics (Cont'd): (T_A = +25°C, V_S = 12V unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Composite Blanking and Key Pulse (Cont'd)						
Phase Relation between Trailing Edge of Key Pulse and Middle of Sync Input Pulse	t_{SK}		–	2.7	–	µs
Key Pulse Duration	t_K		3.5	3.8	–	µs
Delay between Flyback Pulse and Blanking Pulse	t_{tb}	V_6 = 1.7V	–	–	0.2	µs
Internal Gating Pulse						
Gating Pulse Duration	t_q		–	7.5	–	µs
Phase Relation between Middle of Sync Pulse and Trailing and Leading Edge of Gating Pulse	t		–	3.75	–	µs
Coincidence Detector						
Output Voltage	V_{11}	With coincidence	–	6.8	–	V
		Without coincidence	–	–	4	V
Peak Output Current	I_{11}		–	0.5	–	mA
VCR Switch						
Input Voltage	V_{11}		0 to 4 or 8.5 to 12			V
Output Current	$-I_{11}$		35	–	–	µA
	I_{11}		0.4	–	–	mA
Time Constant Switch						
Output Voltage	V_{12}		–	3	–	V
Output Resistance	R_{12}	4.5V < V_{11} < 8V	–	100	–	Ω
		V_{11} > 8.5V or V_{11} < 4V	–	40	–	kΩ
Oscillator						
Low Level Threshold Voltage	V_{14}		–	5.4	–	V
High Level Threshold Voltage	V_{14}		–	8.2	–	V
Charge Current	I_{14}		–	0.6	–	mA
Discharge Current	I_{14}		–	0.3	–	mA
Current Source Supply Voltage	V_{15}		–	3	–	V
Current Source Supply Current	I_{15}		–	0.3	–	mA
Free–Running Frequency	f_o		–	15625	–	Hz
Adjustment Range			–	±10	–	%
Frequency Control Sensitivity			–	52	–	Hz/µA
Frequency Change when V_S Drops to 4V			–	–	±10	%
Oscillator–Flyback Pulse Phase Comparator						
Control Voltage Range	V_5		9.4 to 8.2			V
Peak Control Current	I_5		–	–	±0.5	mA
Input Current (Blocked Phase Detector)	I_5		–	–	5	µA
Permissible Delay between Output Pulse Leading Edge and Flyback Pulse Leading Edge	t_d		–	$t_p - t_f$	–	µs
Static Control Error			–	–	0.2	%

Electrical Characteristics (Cont'd): (T_A = +25°C, V_S = 12V unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Sync Pulse–Oscillator Phase Comparator						
Control Voltage Range	V_{13}		4.6 to 1.4			V
Control Peak Range	I_{13}		–	±2	–	mA
Phase Lock Loop			–	2	–	kHz/µs
Catching and Holding Range	f		–	±700	–	Hz
Overall Phase Relationship						
Phase Relation between Middle of Flyback Pulse and Middle of Sync Pulse	t_o		–	2.6	–	µs
Adjustment Sensitivity			–	65	–	mV/µs
			–	10	–	µA/µs

Pin Connection Diagram