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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
- Horizontal 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:** ( $T_A = +25^\circ\text{C}$  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 ( $T_A \leq +70^\circ\text{C}$ ), $P_{tot}$ .....	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:** ( $T_A = +25^\circ\text{C}$ ,  $V_S = 12\text{V}$  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):** ( $T_A = +25^\circ\text{C}$ ,  $V_S = 12\text{V}$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Horizontal Sync Separator and Noise Gate</b>						
Input Signal (Peak-to-Peak)	$V_i$		1	3	6	V
Input Switching Voltage	$V_8$	$I_8 = 80\mu\text{A}$	-	1.5	-	V
Input Switching Current	$I_8$	$V_8 = 1.4\text{V}$	-	10	-	$\mu\text{A}$
Input Blocking Current for Noise Suppression	$I_8$		-	0.9	-	mA
Input Switching Voltage for Noise Suppression	$V_8$		-	2.1	-	V
Leakage Current	$I_8$	$V_8 = -5\text{V}$	-	-	1	$\mu\text{A}$
<b>Vertical Sync Separator</b>						
Input Signal (Peak-to-Peak)	$V_i$		1	3	6	V
Input Switching Voltage	$V_9$	$I_9 = 80\mu\text{A}$	-	1.5	-	V
Input Switching Current	$I_9$	$I_9 = 1.4\text{V}$	-	5	-	$\mu\text{A}$
Leakage Current	$I_9$	$V_9 = -5\text{V}$	-	-	1	$\mu\text{A}$
Vertical Sync Pulse Output Voltage	$V_{10}$	No load at Pin10	11	-	-	k $\Omega$
Output Resistance	$R_{10}$		-	10	-	k $\Omega$
Delay between Leading Edge of Input and Output Signals	$t_{LV}$		-	17	-	$\mu\text{s}$
Delay between Trailing Edge of Input and Output Signals	$t_{TV}$		-	50	-	$\mu\text{s}$
Vertical Sync Pulse Duration	$t_V$		-	190	-	$\mu\text{s}$
<b>Protection Circuit</b>						
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	-	k $\Omega$
Input Current	$I_4$		5	-	-	$\mu\text{A}$
<b>Flyback Pulse</b>						
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	$I_6$	$V_6 \geq 1.7\text{V}$	-	0.23	-	mA
<b>Output Pulse</b>						
Output Voltage (Peak-to-Peak)	$V_3$	$I_3 = 150\text{mA}_{P-P}$	-	10	-	V
Output Current	$I_3$	$V_3 = 5\text{V}$	-	500	-	mA
Output Resistance	$R_3$	At leading edge of output pulse	-	3	-	$\Omega$
		At trailing edge of output pulses	-	20	-	$\Omega$
Output Pulse Duration	$t_p$		20	22	26	$\mu\text{s}$
<b>Composite Blanking and Key Pulse</b>						
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	-	$\Omega$

**Electrical Characteristics (Cont'd):** ( $T_A = +25^\circ\text{C}$ ,  $V_S = 12\text{V}$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Composite Blanking and Key Pulse (Cont'd)</b>						
Phase Relation between Trailing Edge of Key Pulse and Middle of Sync Input Pulse	$t_{SK}$		-	2.7	-	$\mu\text{s}$
Key Pulse Duration	$t_K$		3.5	3.8	-	$\mu\text{s}$
Delay between Flyback Pulse and Blanking Pulse	$t_{tb}$	$V_6 = 1.7\text{V}$	-	-	0.2	$\mu\text{s}$
<b>Internal Gating Pulse</b>						
Gating Pulse Duration	$t_q$		-	7.5	-	$\mu\text{s}$
Phase Relation between Middle of Sync Pulse and Trailing and Leading Edge of Gating Pulse	$t$		-	3.75	-	$\mu\text{s}$
<b>Coincidence Detector</b>						
Output Voltage	$V_{11}$	With coincidence	-	6.8	-	V
		Without coincidence	-	-	4	V
Peak Output Current	$I_{11}$		-	0.5	-	mA
<b>VCR Switch</b>						
Input Voltage	$V_{11}$		0 to 4 or 8.5 to 12			V
Output Current	$-I_{11}$		35	-	-	$\mu\text{A}$
	$I_{11}$		0.4	-	-	mA
<b>Time Constant Switch</b>						
Output Voltage	$V_{12}$		-	3	-	V
Output Resistance	$R_{12}$	$4.5\text{V} < V_{11} < 8\text{V}$	-	100	-	$\Omega$
		$V_{11} > 8.5\text{V}$ or $V_{11} < 4\text{V}$	-	40	-	k $\Omega$
<b>Oscillator</b>						
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			-	$\pm 10$	-	%
Frequency Control Sensitivity			-	52	-	Hz/ $\mu\text{A}$
Frequency Change when $V_S$ Drops to 4V			-	-	$\pm 10$	%
<b>Oscillator-Flyback Pulse Phase Comparator</b>						
Control Voltage Range	$V_5$		9.4 to 8.2			V
Peak Control Current	$I_5$		-	-	$\pm 0.5$	mA
Input Current (Blocked Phase Detector)	$I_5$		-	-	5	$\mu\text{A}$
Permissible Delay between Output Pulse Leading Edge and Flyback Pulse Leading Edge	$t_d$		-	$t_p - t_f$	-	$\mu\text{s}$
Static Control Error			-	-	0.2	%

**Electrical Characteristics (Cont'd):** ( $T_A = +25^\circ\text{C}$ ,  $V_S = 12\text{V}$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Sync Pulse–Oscillator Phase Comparator</b>						
Control Voltage Range	$V_{13}$			4.6 to 1.4		V
Control Peak Range	$I_{13}$		-	$\pm 2$	-	mA
Phase Lock Loop			-	2	-	kHz/ $\mu\text{s}$
Catching and Holding Range	f		-	$\pm 700$	-	Hz
<b>Overall Phase Relationship</b>						
Phase Relation between Middle of Flyback Pulse and Middle of Sync Pulse	$t_o$		-	2.6	-	$\mu\text{s}$
Adjustment Sensitivity			-	65	-	mV/ $\mu\text{s}$
			-	10	-	$\mu\text{A}/\mu\text{s}$

**Pin Connection Diagram**

