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## **NTE7129** **Integrated Circuit** **IF Signal Processing (Super PLL-II VIF + SIF)** **Circuit for TVs & VCRs**

### **Description:**

The NTE7129 is an intercarrier-type VIF + SIF integrated circuit in a 24-Lead DIP type package that supports excellent sound and image quality. The pin assignment of the NTE7129 is identical to that of the NTE7130, allowing the NTE7130 to be used for split systems while the NTE7129 is used for intercarrier systems. In addition, the NTE7129 suppresses Nyquist buzz interference by using a PLL (Phase-Lock Loop) detection system with a buzz canceller in order to provide the best sound quality possible.

### **Features:**

- Excellent Buzz and Buzz-Beat Characteristics due to PLL
- Built-In APC Time Constant Switch
- Duplicate Time Constant System Suited for High-Speed AGC
- Excellent DG and DP Characteristics
- RF AGC Adjustment is Simple

### **Functions:**

#### **VIF Block**

- VIF Amplifier
- VCO
- APC Filter
- B/W NC
- AFT
- IF AGC
- PLL Detector
- Equalizer Amplifier
- Lock Detection
- RF AGC
- APC Detector
- Buzz Cancellor

#### **SIF Block**

- Limiter Amplifier
- FM Quadrature Detector

#### **Mute**

- Audio Mute (Pin2)
- IS-15 Switch (Pin13)
- AV Mute (Pin4)

**Absolute Maximum Ratings:** ( $T_A = +25^\circ\text{C}$  unless otherwise specified)

Maximum Supply Voltage, $V_{CCmax}$	13.8V
Allowable Power Dissipation ( $T_A \leq +50^\circ\text{C}$ ), $P_{dmax}$	1200mW
Circuit Voltage, $V_3, V_{13}$	$V_{CC}$
Circuit Voltage, $V_{14}$	$V_{CC}$
Circuit Current, $I_1$	-1mA
Circuit Current, $I_{17}$	-10mA
Circuit Current, $I_{21}$	-3mA
Circuit Current, $I_{10}$	3mA
Operating Temperature Range (Note 2), $T_{opr}$	$-20^\circ$ to $+70^\circ\text{C}$
Storage Temperature Range, $T_{stg}$	$-55^\circ$ to $+150^\circ\text{C}$

Note 1. The current that flows into the IC is positive (no signal); the current that flows out of the IC is negative.

Note 2.  $T_{opr} = -20^\circ$  to  $+75^\circ\text{C}$  at  $V_{CC} = 9\text{V}$ .

**Recommended Operating Conditions:** ( $T_A = +25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Recommended Supply Voltage	$V_{CC}$			9 or 12		V
Operating Supply Voltage Range	$V_{CCop}$		8.2	-	13.2	V

Note 3. Always turn on the protective resistance when drawing a line directly out from the IC at usage. (Pin2, Pin11, Pin12, etc.)

Note 4. A capacitor with favorable humidity characteristics should be used for Pin13. (ex. OS capacitor)

Note 5. Pin8 (N.C.) should always be open.

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit	
<b>VIF Block</b>							
Circuit Current	$I_9$	$V_{13} = 5\text{V}, S1 = \text{ON}$		42	48	57	mA
			$V_{CC} = 9\text{V}$	36	41	49	mA
No-Signal Video Output Voltage	$V_{21}$	$V_{13} = 5\text{V}, S1 = \text{ON}$		6.6	7.0	7.4	V
			$V_{CC} = 9\text{V}$	5.0	5.4	5.8	V
Maximum RF AGC Voltage	$V_{10H}$	$V_{13} = 7\text{V}, S1 = \text{OFF}$		10.6	11.0	11.4	V
			$V_{CC} = 9\text{V}$	7.6	8.0	8.4	V
Minimum RF AGC Voltage	$V_{10L}$	$V_{13} = 7\text{V}, S1 = \text{ON}$		-	0	0.5	V
			$V_{CC} = 9\text{V}$	-	0	0.5	V
No-Signal AFT Voltage	$V_{14}$	$V_{13} = 5\text{V}, S1 = \text{ON}$		3.0	5.9	8.0	V
			$V_{CC} = 9\text{V}$	2.6	4.5	6.0	V
Input Sensitivity	$V_i$	$S1 = \text{OFF}$		33	39	45	dB/ $\mu\text{V}$
			$V_{CC} = 9\text{V}$	37	43	49	dB/ $\mu\text{V}$
AGC Range	GR	$S1 = \text{ON}$	60	66	-	dB	
Maximum Allowable Input	$V_{i,max}$	$S1 = \text{ON}$	100	105	-	dB/ $\mu\text{V}$	
Video Output Amplitude	$V_O(\text{video})$	$S1 = \text{ON}$		1.95	2.25	2.55	$V_{P-P}$
			$V_{CC} = 9\text{V}$	1.5	1.75	2.0	$V_{P-P}$
Output S/N	S/N	$S1 = \text{ON}$	49	55	-	dB	

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit	
<b>VIF Block (Cont'd)</b>							
Sync Signal Tip Voltage	$V_{21}(\text{tip})$	$V_i = 10\text{mV}$ , $S1 = \text{ON}$		4.15	4.45	4.75	V
			$V_{CC} = 9\text{V}$	3.25	3.55	3.85	V
920kHz Beat Level	$I_{920}$	$P = 0$ , $C = -4\text{dB}$ , $S = -14\text{dB}$ , $S1 = \text{ON}$	37	43	–	dB	
Frequency Characteristics	$f_c$	$P = 0$ , $S = -14\text{dB}$	6	8	–	MHz	
Differential Gain	DG	$V_i = 10\text{mV}$ , 87.5% MOD, $f_p = 58.75\text{MHz}$	–	3	6	%	
Differential Phase	DP		–	2	5	deg	
Maximum AFT Voltage	$V_{14H}$			11.0	11.5	12.0	V
			$V_{CC} = 9\text{V}$	8.0	8.5	9.0	V
Minimum AFT Voltage	$V_{14L}$			0	0.4	1.0	V
			$V_{CC} = 9\text{V}$	–	0.3	1.0	V
White Noise Threshold Voltage	$V_{WTH}$			8.9	9.3	9.7	V
			$V_{CC} = 9\text{V}$	6.8	7.2	7.6	V
White Noise Clamp Voltage	$V_{WCL}$			5.3	5.7	6.1	V
			$V_{CC} = 9\text{V}$	4.0	4.4	4.8	V
Black Noise Threshold Voltage	$V_{BTH}$	$S1 = \text{ON}$		3.4	3.7	4.0	V
			$V_{CC} = 9\text{V}$	2.5	2.8	3.1	V
Black Noise Clamp Voltage	$V_{BCL}$	$S1 = \text{ON}$		5.3	5.7	6.1	V
			$V_{CC} = 9\text{V}$	3.7	4.1	4.5	V
AFT Detection Sensitivity	$S_f$			50	70	100	mV/kHz
			$V_{CC} = 9\text{V}$	30	43	60	mV/kHz
VIF Input Resistance	$R_i$ (VIF)	$f = 58.75\text{MHz}$	0.8	1.3	1.75	$k\Omega$	
VIF Input Capacitance	$C_i$ (VIF)	$f = 58.75\text{MHz}$	–	3.0	6.0	pF	
APC Pull-In Range	$f_{PU-2}$	$S1 = \text{ON}$	0.6	1.6	–	MHz	
	$f_{PL-2}$		–	–1.6	–0.8	MHz	
VCO Maximum Variable Range	$\Delta f_U$	$V_{18} = 3\text{V}$ , $S1 = \text{ON}$	0.6	1.6	–	MHz	
	$\Delta f_L$		–	–1.6	–0.8	MHz	
VCO Control Sensitivity	$\beta$	$V_{18} = 5\text{V to } 2.6\text{V}$	1.5	3.1	6.2	kHz/mV	
SIF Output Signal Voltage	$V_O$ (SIF)	$P/S = 20\text{dB}$		120	170	240	$\text{mV}_{\text{rms}}$
			$V_{CC} = 9\text{V}$	90	130	180	$\text{mV}_{\text{rms}}$
<b>SIF Block (<math>V_{13} = 5\text{V}</math>)</b>							
SIF Limiting Sensitivity	$V_l$ (lim)		–	33	39	dB/ $\mu\text{V}$	
FM Detection Output Voltage	$V_O$			400	600	790	$\text{mV}_{\text{rms}}$
			$V_{CC} = 9\text{V}$	400	600	790	$\text{mV}_{\text{rms}}$
AMR	AMR		40	49	–	dB	
Total Harmonic Distortion	THD		–	0.5	1.0	%	
SIF S/N	S/N (SIF)		60	78	–	dB	

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Mute Defeat</b>						
AFT Defeat Start Voltage	VD <sub>11</sub>		0.5	2.3	-	V
		V <sub>CC</sub> = 9V	0.5	1.6	-	V
AV Mute	V <sub>4TH</sub>		0.5	1.9	-	V
		V <sub>CC</sub> = 9V	0.5	1.1	-	V
FM Mute	V <sub>2TH</sub>		0.5	2.0	-	V
		V <sub>CC</sub> = 9V	0.5	1.9	-	V
AFT Defeat Voltage	VD <sub>14</sub>		5.4	6.0	6.6	V
		V <sub>CC</sub> = 9V	3.9	4.5	5.1	V

**Pin Connection Diagram**

