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NTE15001 Integrated Circuit VIF & SIF Circuit for VCR

Description:

The NTE15001 is an integrated circuit in a 30-Lead DIP type package containing the VIF section and SIF on a single chip. Since this device is capable of performing video detection and sound detection independently or simultaneously, it can be applied to various sets from popular type to high-grade type according to the designer's policy.

Features:

- High-Gain VIF Amp Requiring No Preamp
- High AGC Speed
- Provides Wide-Band Detection Characteristics and Meets Sound MPX Demodulation Requirements because of FM Detection being Quadrature Detection.
- Possible to use Sound REC Pin (Pin2), AUX Pin (Pin3)
- Possible to Mute Video, Sound for VCR
- Pin7 GND: Muting of both Video and Sound
- Pin29 GND: Muting of Sound Only

Functions:

- VIF Section: VIF Amp Video Det, Peak IF AGC, B/W Noise-Canceller, RF AGC, AFT, SIF DET
- SIF Section: SIF Limiter Amp, FM Det, DC ATT, AF Driver

Operating Characteristics: ($T_A = +25^\circ\text{C}$, $V_{CC} = 12\text{V}$, $f_p = 58.75\text{MHz}$, $f_s = 54.25\text{MHz}$ (VIF), $f_o = 4.5\text{MHz}$ (SIF) unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
VIH Section						
Total Circuit Current	$I_{23} + I_{24}$	DC	59	74	98	mA
Maximum RF AGC Voltage	V_{H13H}	DC	8.5	8.9	9.2	V
Minimum RF AGC Voltage	V_{13L}	DC	–	0	0.5	V
Quiescent Video Output Voltage	V_{22}	DC	5.6	6.1	6.6	V
Quiescent AFT Output	V_{17}	DC	4.5	6.5	7.5	V
Input Sensitivity	V_i	$f_m = 400\text{Hz}$ 40% AM, $V_O = 0.8V_{pp}$	30	36	42	dB μ
AGC Range	GR	$f_m = 15\text{kHz}$ 78% AM, $V_O = \pm 1\text{dB}$	60	74	–	dB

Operating Characteristics (Cont'd): ($T_A = +25^\circ\text{C}$, $V_{CC} = 12\text{V}$, $f_p = 58.75\text{MHz}$, $f_s = 54.25\text{MHz}$ (VIF), $f_o = 4.5\text{MHz}$ (SIF) unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
VIH Section (Cont'd)						
Maximum Allowable Input	V_{imax}	$f_m = 15\text{kHz}$ 78% AM, $V_O = \pm 1\text{dB}$				
Video Output Amplitude	$V_{O(22)}$	$V_i = 10\text{mV}_{rms}$, $f_m = 15\text{kHz}$ 78% AM	1.9	2.2	2.5	V_{pp}
Output S/N	S/N	$V_i = 10\text{mV}_{rms}$, CW	48	54	–	dB
Carrier Leakage	CL	$V_i = 100\text{mV}_{rms}$, $f_m = 15\text{kHz}$ 78% AM	50	57	–	dB
Maximum AFT Voltage	V_{17H}	$V_i = 10\text{mV}_{rms}$, SWEEP	11.0	11.5	12.0	V
Minimum AFT Voltage	V_{17L}	$V_i = 10\text{mV}_{rms}$, SWEEP	0	0.4	1.0	V
AFT Detection Sensitivity	Sf	$V_i = 10\text{mV}_{rms}$, SWEEP	70	100	140	mV/kHz
White Noise Threshold Level	V_{WTH}	$V_i = 10\text{mV}_{rms}$, SWEEP	6.4	6.8	7.2	V
Black Noise Threshold Level	V_{BTH}	$V_i = 10\text{mV}_{rms}$, SWEEP	1.9	2.2	2.5	V
Black Noise Clamp Level	V_{BCL}	$V_i = 10\text{mV}_{rms}$, SWEEP	3.8	4.2	4.6	V
SIF Output Signal Voltage	$V_{O(25)}$	P/S = 20dB	40	60	100	mV_{rms}
Frequency Characteristic	f_o	-3dB	6	8	–	MHz
Differential Gain	DG	$V_i = 10\text{mV}_{rms}$ 87.5, VIDEOMOD	–	4	10	%
Differential Phase	DP	$V_i + 10\text{mV}_{rms}$ 87.5%, VIDEOMOD	–	3	6	deg
Input Resistance	R_i	$V_i = 10\text{mV}_{rms}$ 87.5%, VIDEOMOD	1.0	1.5	2.0	$\text{k}\Omega$
Input Capacitance	C_i		–	3.5	7.0	pF
SIF Section						
SIF Limiting Voltage	V_{iim}	-3dB	–	200	400	μV_{rms}
Detection Output Voltage	$V_{O(2)}$	$V_i = 100\text{mV}_{rms}$, $f_m = 400\text{Hz}$, $f = \pm 25\text{kHz}$	450	680	850	mV_{rms}
Distortion	THD(2)	$V_i = 100\text{mV}_{rms}$, $f_m = 400\text{Hz}$, $f = \pm 25\text{kHz}$	–	0.5	1.0	%
AM Rejection	AMR	$V_i = 100\text{mV}_{rms}$, $f_m = 400\text{Hz}$, $f = \pm 25\text{kHz}$ 30%	50	60	–	dB
DCVR Maximum Attenuation	ATT	$V_i = 200\text{mV}_{rms}$, $f = 400\text{Hz}$	70	80	–	dB
AF Amp Gain	G_{AF}	$V_i = 100\text{mV}_{rms}$, $f = 400\text{Hz}$	18	20	22	dB
AF Amp Output Voltage	$V_{O(5)}$	$V_{O(5)}$ THD = 10%, $f = 400\text{Hz}$	3	4	–	V_{rms}

Pin Connection Diagram

Ceramic Discriminator	1	30	Ceramic Discriminator
De-Emphasis	2	29	Mute Attenuator
AF Input	3	28	Mute Switch
N.F.	4	27	Ceramic Filter
AF Output	5	26	SIF Input
GND	6	25	SIF Output
IF AGC Filter	7	24	SIF V _{CC}
Mute	8	23	VIF V _{CC}
VIF Input	9	22	Video Output
VIF Input	10	21	AFT Coil
Mute	11	20	LLD Coil
RF AGC VR	12	19	LLD Coil
RF AGC Filter	13	18	AFT Coil
IF AGC Filter	14	17	AFT Coil
Sound Trap	15	16	Sound Trap

