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NTE7015 Integrated Circuit PLL SIF & VIF for TV & VCR

Description:

The NTE7015 is a semiconductor integrated circuit consisting of an IF signal processor suitable for color TV sets and VTRs with AV.

The circuits include VIF amplifiers, video detector, VCO, APC detector, AFT, video equalizer, IF/RF AGC, SIF detector functions.

Features:

- Employment of a full synchronous detector circuit using PLL as video detector provides excellent DG, DP, 920kHz beat and cross color characteristics.
- Usage of PLL-SPLIT method to obtain intercarrier by separating video IF and audio IF processing by VCO output provides good sound sensitivity and reduces buzz. In consumer sets, intercarrier is also available from the video detector output.
- Built-in video equalizer suitable for VTRs and color TV sets equipped with video output terminals.
- Employment of quadrature detector circuit for FM detection of audio IF requires no adjustment.

Applications:

TV sets, VTR tuners

Recommended Operating Conditions:

Supply voltage range 8 to 10V
 Rated supply voltage 9V

Absolute Maximum Ratings:

($T_A = +25^\circ\text{C}$, permissible surge capacitance is 200pF, unless otherwise noted)

Supply Voltage, V_{CC} 14V
 Power Dissipation, P_D 1250mW
 Operating Temperature Range, T_{opr} -20 to $+75^\circ\text{C}$
 Storage Temperature Range, T_{stg} -40 to $+125^\circ\text{C}$
 Permissible surge (pin 8), Surge 8 $+200$, -150V
 Permissible surge (pin 9), Surge 9 $+200$, -150V
 Permissible surge (other pins) $\pm 200\text{V}$

Electrical Characteristics: ($T_A = +25^\circ\text{C}$, $V_{CC} = 9\text{V}$, unless otherwise noted)

Parameter	Symbol	Test Conditions		Test Conditions			Switch is set at 1.	Min	Typ	Max	Unit
		Input Signal VIF	SIF1	External Voltage (V)							
				V_1	V_6	V_{20}					
Circuit Current (VIF)	$I_{CC(VIF)}$	-		3	-	-	SW1=2, SW2=3	33	45	57	mA
Video detector output DC voltage 1	V_{28}	-		3	0	-	SW2=3, SW3=2	3.4	3.75	4.1	V

Electrical Characteristics (Cont'd): ($T_A = +25^\circ\text{C}$, $V_{CC} = 9\text{V}$, unless otherwise noted)

Parameter	Symbol	Test Conditions		Test Conditions			Switch is set at 1.	Min	Typ	Max	Unit
		Input Signal VIF	SIF1	External Voltage (V)							
				V_1	V_6	V_{20}					
Video detector output DC voltage 2	V_3	-	-	3	0	-	SW2=3,SW3=2	4.4	4.8	5.2	V
Video detector output 1	$V_{o\ det\ 1}$	SG1	-	3	-	-	SW2=3	1.15	1.45	1.75	V_{p-p}
Video detector output 2	$V_{o\ det\ 2}$	SG1	-	3	-	-	SW2=3	1.6	1.95	2.3	V_{p-p}
Video S/N	P/N	SG2	-	3	-	-	SW2=3,SW6=2	50	58	-	dB
Video frequency characteristics	B_W	SG3	-	3	-	-	SW2=3	5.5	7	-	MHz
Input Sensitivity	$V_{in(min)}$	SG4	-	3	-	-	SW2=3	-	46	51	$\text{dB}\mu$
Maximum permissible input	$V_{in(max)}$	SG5	-	3	-	-	SW2=3	107	110	-	$\text{dB}\mu$
AGC control range	GR	-	-	-	-	-	-	58	64	-	dB
Maximum IF AGC Voltage	V_{1H}	-	-	3	-	-	SW2=3	6.5	8.6	-	V
IF AGC Voltage (80 $\text{dB}\mu$)	$V_{I(80\text{dB}\mu)}$	SG6	-	3	-	-	SW2=3	4.3	4.9	5.5	V
Minimum IF AGC Voltage	V_{IL}	SG7	-	3	-	-	SW2=3	3.4	3.9	4.4	V
SIF det 4.5MHz output (100 $\text{dB}\mu$)	$V_{O\ SIF.1}$	SG2	SG8	3	-	-	SW2=3	104	109	114	$\text{dB}\mu$
SIF det 4.5MHz output (80 $\text{dB}\mu$)	$V_{O\ SIF.2}$	SG2	SG9	3	-	-	SW2=3	90	96	101	$\text{dB}\mu$
AFT Output Voltage	V_{16}	-	-	3	0	-	SW2=3	3.2	4.3	5.4	V
AFT detector sensitivity	μ	SG10	-	3	-	-	SW2=3	48	70	92	mV/kHz
Maximum AFT voltage	V_{16H}	SG10	-	3	-	-	SW2=3	8	8.7	-	V
Minimum RF AGC voltage	V_{16L}	SG10	-	3	-	-	SW2=3	-	0.38	1.0	V
Minimum RF AGC voltage	V_{IH}	SG2	-	2	-	-	SW2=3	7	7.85	-	V
Maximum RF AGC voltage	V_{IL}	SG2	-	4	-	-	SW2=3	-	0	1.0	V
Capture range (U) 1	CL-U1	SG11	-	3	-	-	SW2=3	0.5	1.0	-	MHz
Capture range (L) 1	CL-L1	SG11	-	3	-	-	SW2=3	1.2	1.7	-	MHz
Capture range (T)	CL-T	-	-	-	-	-	-	2.0	2.7	-	MHz
Capture range (U) 2	CL-U2	SG11	-	3	-	-	SW2=3, SW5=2	0.45	0.9	1.45	MHz
Capture range (L) 2	CL-L2	SG11	-	3	-	-	SW2=3, SW5=2	0.7	1.0	1.35	MHz

Electrical Characteristics (Cont'd): ($T_A = +25^\circ\text{C}$, $V_{CC} = 9\text{V}$, unless otherwise noted)

Parameter	Symbol	Test Conditions Input Signal VIF SIF1		Test Conditions External Voltage (V)			Switch is set at 1.	Min	Typ	Max	Unit
				V ₁	V ₆	V ₂₀					
Lock detection threshold voltage	V _{20th}	-	-	3	5	Variable	SW2=3, SW3,4,5=2	3.6	4.0	4.4	V
Minimum pin 29 voltage	V _{29L}	-	-	3	5	Variable	SW2=3, SW3,4,5=2	-	0.15	0.5	V
EQ frequency characteristics 1	FC2	SG13	-	3	-	-	SW2=3	4.2	5.7	7.2	dB
Intermodulation	IM	SG15	-	3	Variable	-	SW2=3, SW3=2	30	35	-	dB
DG	DG	SG16	-	3	-	-	SW2=3	-	2	5	%
DP	DP	SG16	-	3	-	-	SW2=3	-	2	5	deg
Black spot inverter threshold level	V _{BTH}	SG1	-	3	Variable	-	SW2=3	2.1	2.5	2.9	V
Pin 3 sync chip level	V _{BCL}	SG1	-	3	Variable	-	SW2=3, SW3=2	3.7	4.2	4.7	V
VIF input resistance	R _{in(V)}	90dB μ	-	3	-	-		-	0.95	-	k Ω
VIF input capacitance	C _{in(V)}	90dB μ	-	3	-	-		-	5	-	pF
SIF1 input resistance	R _{in(S1)}	-	90dB μ	3	-	-		-	2.1	-	k Ω
SIF1 input capacitance	C _{in(S1)}	-	90dB μ	3	-	-		-	2.5	-	pF
Parameter	Symbol	Test Conditions Input Signal VIF SIF1		Test Conditions External Voltage (V)			*Switch is set at 1.	Min	Typ	Max	Unit
				V ₁	V ₆	V ₂₀					
Circuit Current (SIF)	I _{CC(SIF)}	-		0	-	-	SW1=3,SW2=2	5.0	7.2	9.4	mA
AF output DC voltage	V ₁₉	-		0	-	-	SW1=3	4.0	4.6	5.2	V
Maximum AF output	V _{OAFMax}	SG17		0	-	-	SW1=3	530	680	830	mV _{rms}
AF Output Distortion	THD _{AF}	SG21		0	-	-	SW1=3	-	0.2	1.0	%
Input limiting sensitivity	V _{in(lim)}	SG18		0	-	-	SW1=3	-	38	46	dB μ
AMR	AMR	SG19		0	-	-	SW1=3	50	60	-	dB
AF S/N	S/N	SG20		0	-	-	SW1=3	60	75	-	dB

Pin Connection Diagram

VT Input	1	30	VZ/+31V
VOL Input	2	29	VT Output
AFS Switch	3	28	V _{CC3}
Band Input 1	4	27	Band Output 1
Band Input 2	5	26	Band Output 2
RM Output	6	25	V _{CC1}
F2	7	24	Band Output 3
PH	8	23	Band Output 4
T	9	22	VOL Output
GND 2	10	21	AFS
RM Input	11	20	GND 1
F1	12	19	RLY Control Output
RLY Control	13	18	AC Input
RST Output	14	17	Clock Output
+5V Output	15	16	V _{CC2}

