AN5151N

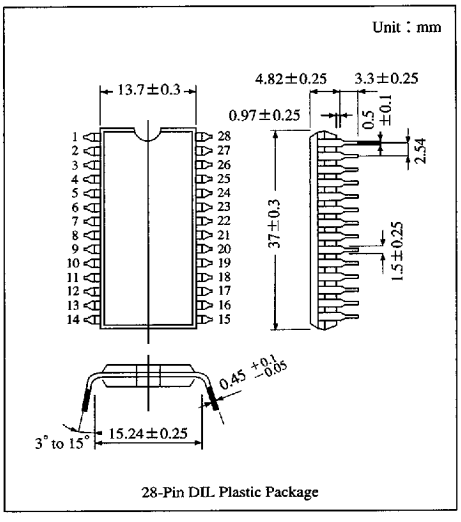
VIF, SIF, Video, Synchronous Signal Processor IC

■ Overview

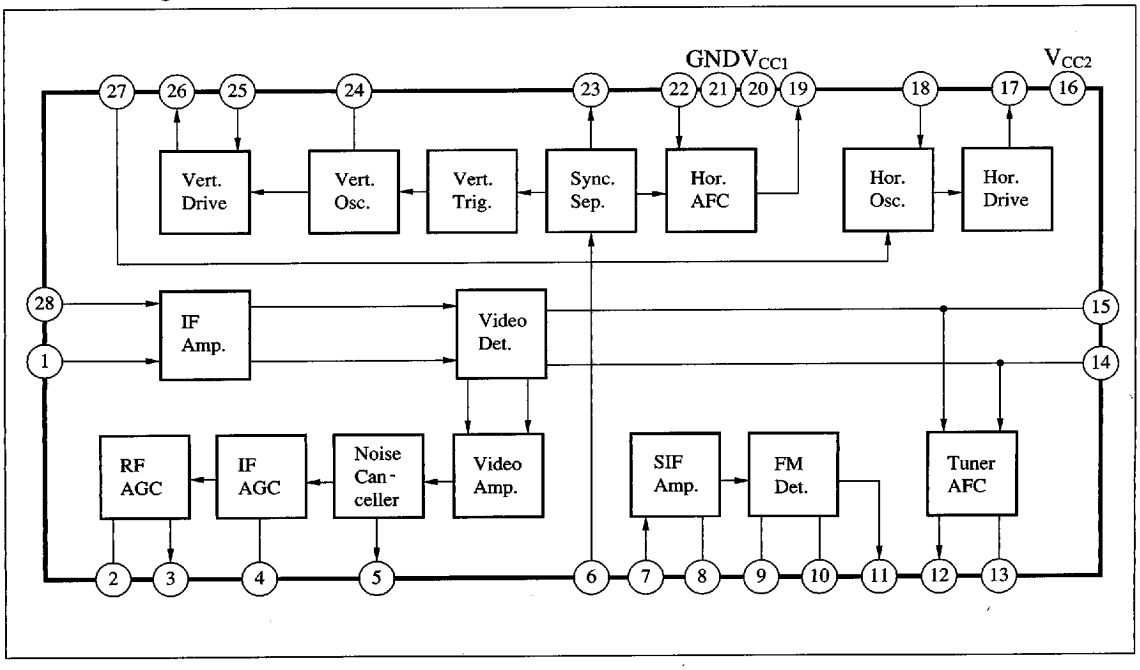
The AN5151N is single-chip integrated circuit designed for processing all the small signals (except chroma signal) .

■ Features

- High density technology makes it possible to integrate video IF circuit, tuner AFC circuit, sound IF circuit and deflection-jungle circuit on a signal chip
- Forward RF AGC
- Supply voltage range : 8 to 12V (typ. 10V)
- Usable for both B/W and CTV.
- 28-pin dual-in-line plastic package



■ Block Diagram



■ Absolute Maximum Ratings (Ta=25℃)

Parameter	Symbol	Rating		Unit
Supply voltage	V_{CC} (V_{20-21})	12		V
Supply current	I_{20}	85		mA
	I_{16}	15		mA
Circuit voltage	$V_{2,3,4,24-21}$	V_{20-21}	0	V
	V_{8-21}	5.5	0	V
	V_{13-21}	4.2	0	V
	V_{17-21}	V_{16-21}	0	V
Circuit current	$I_{5,6,11,23,26}$	+0.3	−10	mA
	I_{19}	+0.6	−0.6	mA
	I_{25}	+10	0	mA
	I_{17}	+10	−4	mA
Power dissipation (Ta=70℃)	P_D	1,100		mW
Operating ambient temperature	T_{opr}	−20 to +70		℃
Storage temperature	T_{stg}	−55 to +150		℃

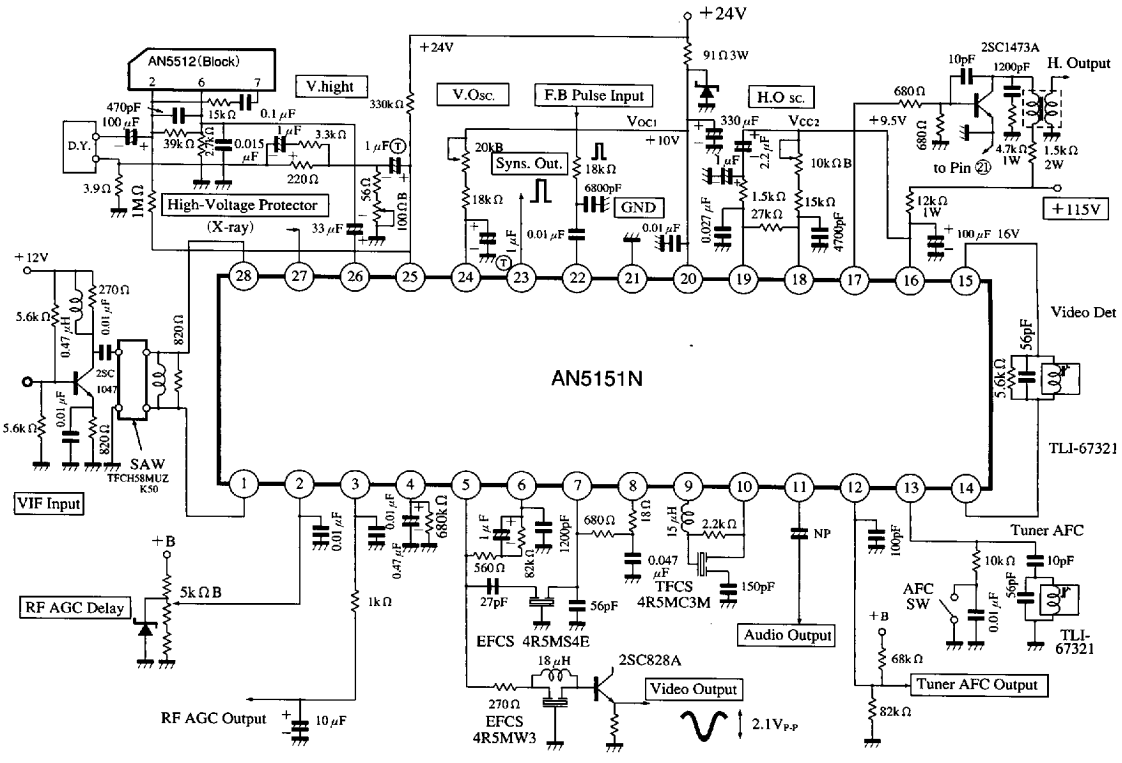
■ Electrical Characteristics (Ta=25℃)

Parameter	Symbol	Condition	min	typ	max	Unit
VIF						
Video detector output	V_O	m=87.5%	1.8	2.1	2.4	V_{p-p}
Input sensitivity	V_S	V_O=−3dB	—	50	55	dBμ
Max. tolerant input	$V_{I(max.)}$	V_O>+0dB	105	110	—	dBμ
Signal to noise ratio	S/N	V_i=80dBμ	51	56	—	dB
Differential gain	DG	m=87.5%	—	4	8	%
Differential phase	DP	m=87.5%	—	3	6	deg
Video frequency characteristics	fc	V_O=−3dB	4.5	6.0	8.0	MHz
Sync. top voltage	V_P		1.9	2.3	2.7	V
Noise inverter det. level	V_{NT}		1.0	1.4	1.8	V
Noise inverter pull-in level	V_{NI}		3.0	3.4	3.8	V
Audio IF output	V_{SIF}	P/S=20dB	100	104	107	dBμ
Input resistance (Pin①)	R_{il}	f=58.75MHz	0.8	1.0	1.2	kΩ
Input capacitance (Pin①)	C_{il}	f=58.75MHz	3.0	4.0	5.0	pF
Output resistance (Pin⑤)	R_{o5}	f=500kHz	30	50	150	Ω
RF AGC gain	G_{RFAGC}	f=10kHz, V_4=5mV	37	42	48	dB
RF AGC Max. voltage	$V_{3(max)}$		8.2	8.8	9.4	V
RF AGC Min. voltage	$V_{3(min)}$		3.6	4.2	4.8	V
AFC center voltage	V_{12}		4.0	5.4	6.0	V
AFC defeat SW operating voltage	$V_{AFC\ SW}$	R_S=10kΩ	0.5	2.6	3.0	V
AFC Max. output voltage	$V_{12(max)}$		8.5	9.6	10.0	V
AFC Min. output voltage	$V_{12(min)}$		0	0.7	1.2	V
Phase detector sensitivity	μ	R_L=68kΩ//82kΩ	30	50	90	mV/kHz

■ Electrical Characteristics (cont.) (Ta=25℃)

Parameter	Symbol	Condition	min	typ	max	Unit
SIF						
Total detector output	V_O	f_o=4.5,MHz, f_m=400Hz Δf=±25kHz, V_i=100mV_{rms}	200	300	440	mV_{rms}
Input limiting voltage	$V_{i(lim)}$	f_o=4.5MHz, f_m=400Hz Δf=±25kHz	—	280	450	μV_{rms}
Det. signal distortion	THD	f_o=4.5MHz, f_m=400Hz Δf=±25kHz, V_i=100mV_{rms}	—	0.6	1.0	%
AM rejection	AMR		43	55	—	dB
Input impedance	R_{i7}	f=4.5MHz	6	20	100	kΩ
	C_{i7}		1.3	4.3	7.3	pF
Detector input impedance	R_{D9}	f=4.5MHz	2.0	5.1	8.1	kΩ
	C_{D9}		2.1	5.1	8.1	pF
	R_{D10}		50	200	—	kΩ
	C_{D10}		2.9	3.4	3.9	pF
Deflection						
SYNC SEP Horizontal pulse width (1)	τ_{sync1}	Video input 2.5V_{PP}, APL=50%, V_{CC1}=10V	4.8	5.1	5.4	μs
SYNC SEP Horizontal pulse width (2)	τ_{sync2}	Video input 1.0V_{PP}, APL=50%, V_{CC1}=10V	4.9	5.2	5.5	μs
Horizontal AFC Horizontal pulse width (1)	τ_{sync3}	Video input 2.5V_{PP}, APL=50% V_{CC1}=10V	4.8	5.1	5.4	μs
Horizontal AFC Horizontal pulse width (2)	τ_{sync4}	Video input 1.0V_{PP}, APL=50% V_{CC1}=10V	4.9	5.2	5.5	μs
Vertical free oscillation Start supply voltage	$V_{fvo.5}$	V_{CC1} when fvo is 40 to 60 Hz and output is 0.7 V_{PP} or more	—	4.9	6	V
Vertical free oscillation Frequency	fvo	Oscillation frequency at $R_{OSC(V)}$=30kΩ, V_{CC1}=10V	54.5	57.5	60.5	Hz
Vertical oscillation pulse width	τ_{VO}	Oscillation pluse width at $R_{OSC(V)}$=30kΩ, V_{CC1}=10V	470	650	830	μs
Vertical frequency variation vs supply voltage	$\Delta f_{VO}/V_{CC}$	Difference to fvo at V_{CC1}=12V and 8V	0	1.0	1.3	Hz
Vertical pull-in range	fpv	Video input 2V_{PP}, V_{CC1}=10V	39	43	47	Hz
Horizontal oscillation start supply voltage	$V_{fHO.S}$	Pin⑯ voltage when f_{HO} is 10 to 20 kHz and output is 1V_{PP} or more	—	3.7	5	V
Horizontal oscillation frequency	f_{HO}	Oscillation frequency at $R_{OSC(H)}$=21kΩ, +B=20V	15.0	15.75	16.25	kHz
Horizontal oscillation pulse width	τ_{HO}	Oscillation frequency at $R_{OSC(H)}$=21kΩ, −B=20V	21	24	27	μs
Horizontal frequency variation vs supply voltage	$\Delta f_{HO}/V_{CC}$	Difference to oscillation frequency at V_{CC2}=10V and 8V	0	50	100	Hz
Horizontal oscillation control sensitivity	β	Variation of oscillation frequency when ΔI_1±100μA is flowed in	73	81	89	Hz/μA
Phase detection sensitivity	μ_P	Video input 2V_{PP} R(μ)=2.14kΩ, μ=V_{19}×10	13.5	16.5	19.5	μA/μs
X-ray Protector operating voltage	V_{27-21}		0.81	0.87	0.93	V
X-ray Protector input resistance	R_{27}		16	19	22.5	kΩ

Application Circuit



Pin Descriptions

Pin No.	Pin name	Pin No.	Pin name
1	VIF input	15	Video det. coil (2)
2	RF AGC delay adj.	16	V_{CC2} (2)
3	RF AGC output	17	Hor. output
4	IF AGC	18	Hor. osc.
5	Video output	19	Hor. AFC output
6	Sync. sep. input	20	V_{CC1}
7	SIF input	21	GND
8	Input bias	22	FB pulse input
9	SIF output	23	Sync. sep. output
10	SIF det. input	24	Vert. osc.
11	Sound output	25	Vert. saw-tooth
12	Tuner AFC output	26	Vert. output
13	Tuner AFC coil	27	Over voltage protection
14	Video det. coil (1)	28	VIF input (2)