AN5125

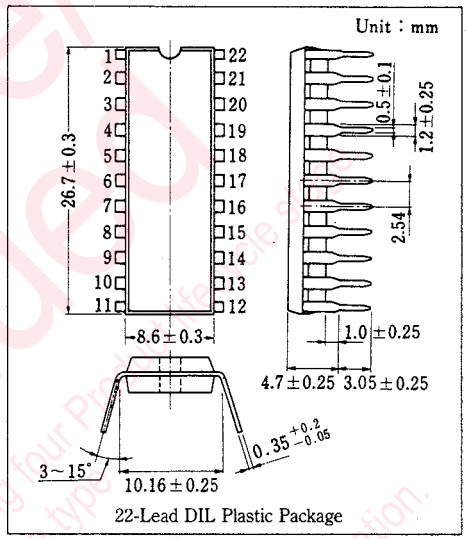
Color TV Video IF Amplifier, PLL Detector, AGC, AFC Circuit

■ Outline

The AN5125 is an integrated circuit designed for color TV video IF signal processing circuit.

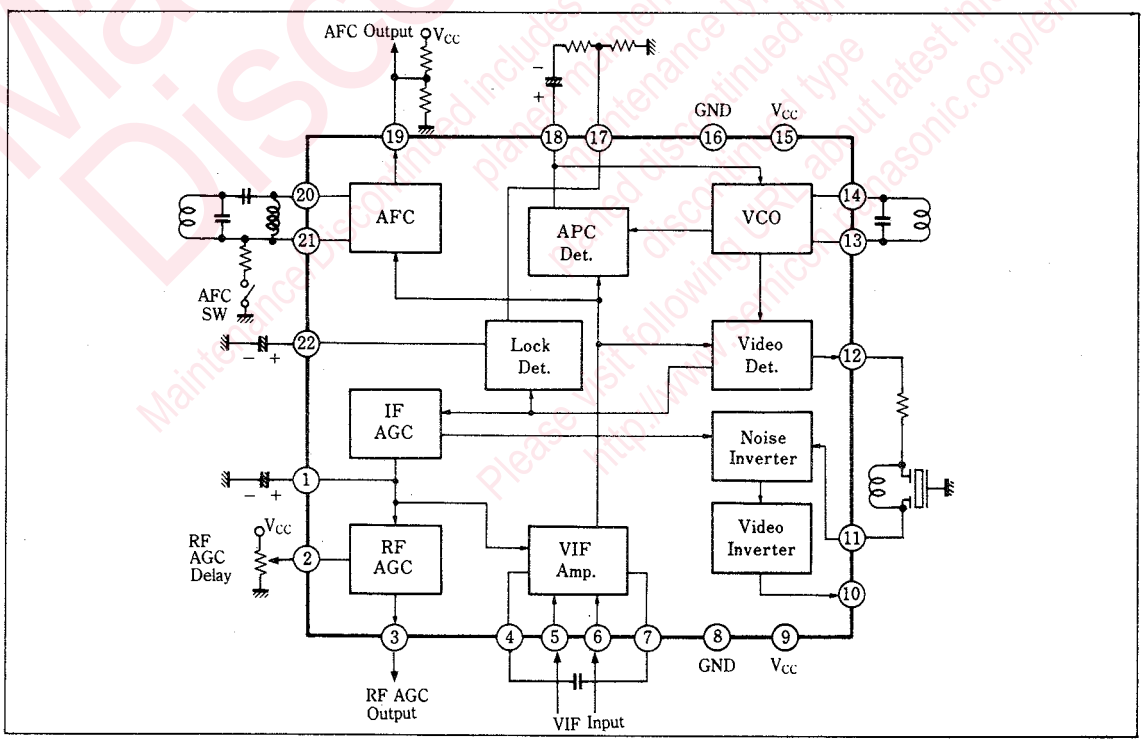
■ Features

- High density one-chip integration of video IF amplifier, PLL detector, video pre-amplifier, AGC and AFC circuits
- PLL true synchronous detector incorporates VCO
- Wide Pull-in range by time-constant auto-changer of PLL loop-filter
- Selective transformerless AFC circuit



22-Lead DIL Plastic Package

■ Block Diagram



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■ Absolute Maximum Ratings (Ta=25℃)

Item		Symbol	Rating		Unit
Voltage	Supply Voltage	V_{CC}	14.4		V
	Circuit Voltage	$V_{1-8,16}$	$V_{9-8,16}$	0	V
		$V_{2-8,16}$	$V_{9-8,16}$	0	V
		$V_{3-8,16}$	$V_{9-8,16}$	0	V
		$V_{11-8,16}$	$V_{9-8,16}$	0	V
		$V_{19-8,16}$	$V_{9-8,16}$	0	V
Current	Circuit Current	I_{10}	−10	0.5	mA
		I_{12}	−10	1	mA
		I_{17}	− 2	5	mA
Power Dissipation (Ta=70℃)		P_D	1100		mW
Temperature	Operating Ambient Temperature	T_{opr}	−20～+70		℃
	Storage Temperature	T_{stg}	−55～+150		℃

■ Electrical Characteristics (V_{CC}=12V, Ta=25℃)

Item	Symbol	Test Circuit	Condition	min.	typ.	max.	Unit
IF Amplifier Detector							
Video Detector Output (1)	$V_{O(1)}$	1	f=58.75MHz, V_i=80dBμ, m=87.5%	1.8	2.05	2.3	V_{P-P}
Video Detector Output (2)	$V_{O(2)}$	1	f=58.75MHz, V_i=80dBμ, m=110%	2.1	2.6	3.1	V_{P-P}
Input Sensitivity	$S_{(IN)}$	1	V_O=−3dB	51	55	60	dBμ
Max. Allowable Input	$V_{I(max.)}$	1		101	104		dBμ
Differential Gain (1)	DG(1)	1	f=58.75%, V_i=80dBμ, m=87.5%		2	6	%
Differential Gain (2)	DG(2)	1	f=58.75%, V_i=80dBμ, m=110%		5	13	%
Differential Phase (1)	DP(1)	1	f=58.75%, V_i=80dBμ, m=87.5%		2	5	deg
Differential Phase (2)	DP(2)	1	f=58.75%, V_i=80dBμ, m=110%		5	12	deg
Output Voltage (SIF)	$V_{O(3)}$	1	P/S=20dB	98	101	104	dBμ
AGC Circuit							
RF AGC Voltage Gain	G_V	1	f=10kHz, V_i=10mV	33	37	41	dB
AFC Circuit							
Phase Detector Sensitivity	μ	1	R_L=30kΩ//39kΩ	28	35	45	mV/kHz
AFC Center Voltage	V_{19}	1	R_L=30kΩ//39kΩ	5.3	6.6	7.3	V
VCO Circuit							
Max. Variable Range (1)	$\Delta f_{V(1)}$	1	V_{18}=2V	0.85	1.1		MHz
Max. Variable Range (2)	$\Delta f_{V(2)}$	1	V_{18}=3V		-1.6	-1.3	MHz
Control Sensitivity	β	1		2.9	3.3	3.7	kHz/mV
APC Circuit							
APC Pull-in Range (1)	$f_{APC(1)}$	1	APC filter SW is set to OFF.	+0.8	+1.0	+1.5	MHz
APC Pull-in Range (2)	$f_{APC(2)}$	1	APC filter SW is set to OFF.	-2.5	-2.0	-1.7	MHz
Serial Characteristics							
Circuit Current (1)	I_9			45	54	68	mA
Circuit Current (2)	I_{15}			7	9	12	mA

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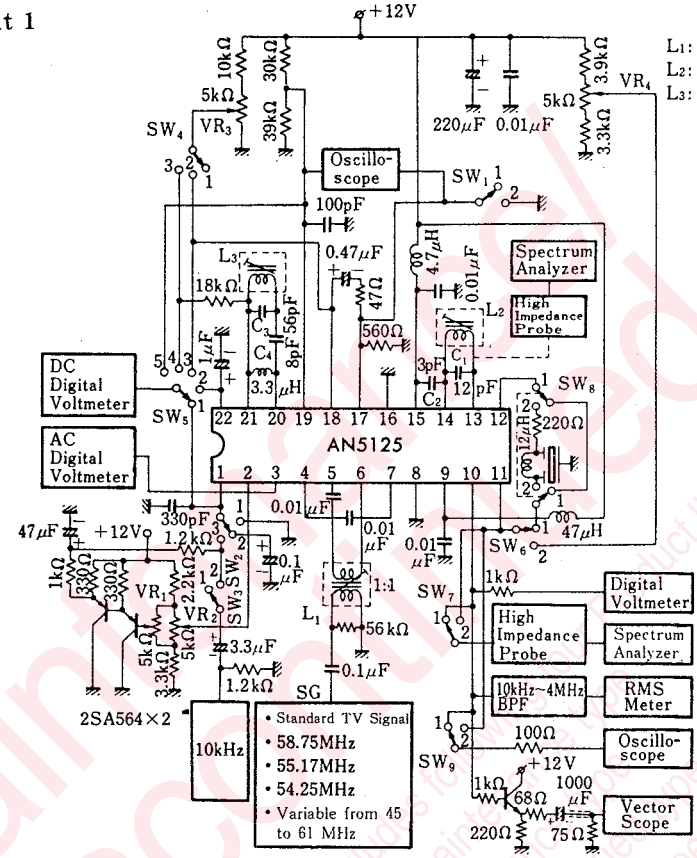
Test Circuit 1



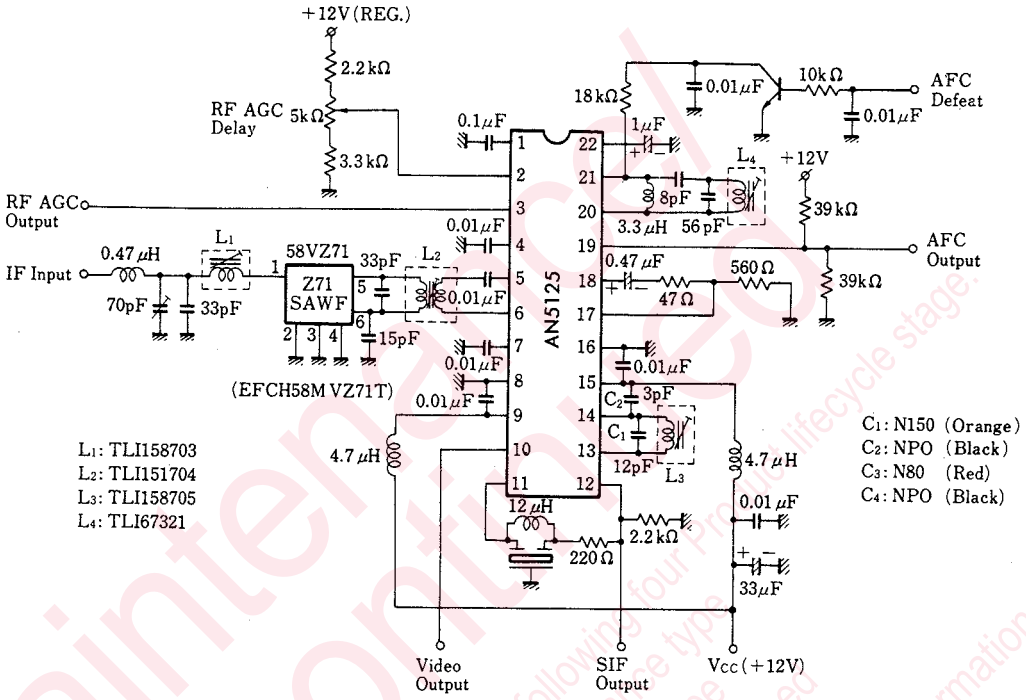
L_1: ZV229
L_2: TLI158705
L_3: TLI67321

C_1: N150 (Orange)
C_2: NPO (Black)
C_3: N80 (Red)
C_4: NPO (Black)

Symbol	Input Signal Type		Measuring Procedure	Measurement	SW Condition 1	2	3	4	5	6	7	8	9
$V_{O(1)}$	f_{STD} m=87.5%	80dBμ		Oscilloscope Output Amp.	1	2	1	1	1	1	1	1	1
$V_{O(2)}$	f_{STD} m=110%	80dBμ		Oscilloscope Output Amp.	1	2	1	1	1	1	1	1	1
S(IN)	f_{STD} m=87.5%	80dBμ	Input Level Attention	Oscilloscope Output Amp.	1	2	1	1	1	1	1	1	1
$V_{(max.)}$	f_{STD} m=87.5%	80dBμ	Input Level Increase	Oscilloscope Output Amp.	1	2	1	1	1	1	1	1	1
$DG_{(1)}$	f_{STD}(Staircase) m=87.5%	80dBμ		Vector Scope DG	1	2	1	1	1	1	1	1	1
$DG_{(2)}$	f_{STD}(Staircase) m=110%	80dBμ		Vector Scope DG	1	2	1	1	1	1	1	1	1
$DP_{(1)}$	f_{STD}(Staircase) m=87.5%	80dBμ		Vector Scope DP	1	2	1	1	1	1	1	1	1
$DP_{(2)}$	f_{STD}(Staircase) m=110%	80dBμ		Vector Scope DP	1	2	1	1	1	1	1	1	1
$V_{O(3)}$	f_O f_S	80dBμ 60dBμ	V_I held with VR1	Spectrum Analyzer 4.5MHz Level	1	3	2	1	1	1	2	1	1
G_V	f_{lok}	10mV	VR1 Adj.	AC Digital Voltmeter	1	3	1	1	1	1	1	1	1
μ	f_m	80dBμ	V_I held with VR1	DC Digital Voltmeter	1	3	1	1	5	1	1	1	1
Δf_V	No Signal		VR3 Adj.	Spectrum Analyzer VCO Frequency	1	1	1	2	3	1	1	1	1
β	No Signal		VR3 Adj.	Spectrum Analyzer VCO Frequency	1	1	1	2	3	1	1	1	1
f_{APC}	f_m	80dBμ		Oscilloscope Input Signal Frequency	1	2	1	1	2	1	1	1	1

• f_{STD}: Standard TV signal • f_m: Variable frequency

■ Application Circuit



■ Pin

Pin No.	Pin Name	Pin No.	Pin Name
1	IF AGC Filter	12	Det. Output
2	RF AGC Delay Adj.	13	VCO Coil
3	RF AGC Output	14	VCO Coil
4	Input Bias	15	Vcc(VCO)
5	IF Input	16	GND(VCO)
6	IF Input	17	APC Filter SW
7	Input Bias	18	APC Filter
8	GND	19	AFC Output
9	Vcc	20	AFC Coil
10	Video Output	21	AFC Coil
11	Video Input	22	Lock Det. Filter

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