

AN5137K

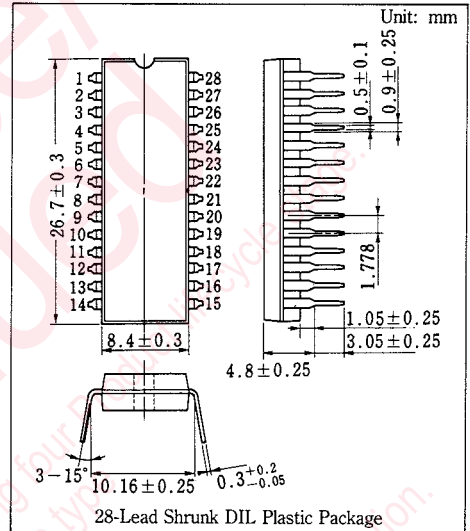
Color TV Video IF Amplifier, PLL, Detector, AGC, AFC, SIF, Circuit

Outline

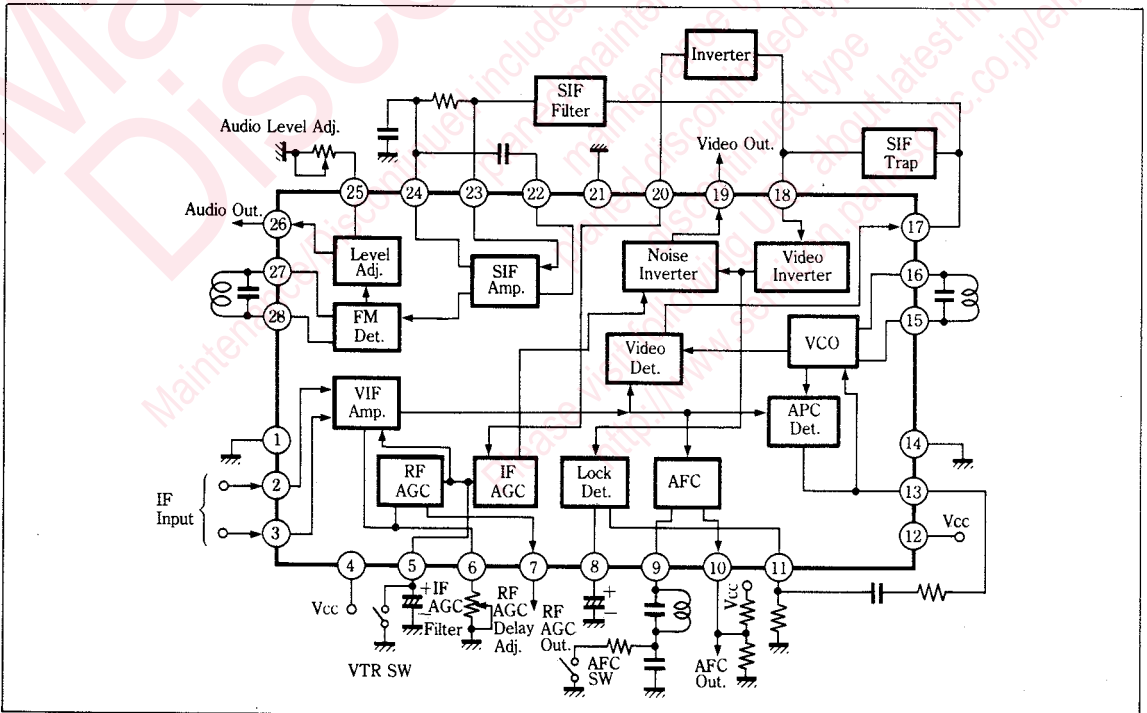
The AN5137K is an integrated circuit designed for color TV video and audio IF signal processing circuits and has the IF AGC input terminal particularly available for CATV.

Features

- PLL true synchronous detector incorporates VCO
- Quadrature sound FM detector
- IF AGC input terminal (Pin $\textcircled{20}$)



Block Diagram



■ Absolute Maximum Ratings (Ta=25°C)

Item		Symbol	Rating		Unit
Voltage	Supply Voltage	V _{cc}	13.8		V
	Circuit Voltage	V _{5-1,14,21}	V _{4,12-1,14,21}	0	V
		V _{6-1,14,21}	V _{4,12-1,14,21}	0	V
		V _{7-1,14,21}	V _{4,12-1,14,21}	0	V
		V _{10-1,14,21}	V _{4,12-1,14,21}	0	V
		V _{18-1,14,21}	V _{4,12-1,14,21}	0	V
V _{25-1,14,21}	8.0	0	V		
Current	Circuit Current	I ₁₇	- 7	+0.5	mA
		I ₁₉	- 7	+0.5	mA
		I ₂₈	- 5	+0.5	mA
Power Dissipation (Ta=70°C)		P _o	1300		mW
Temperature	Operating Ambient Temperature	T _{opr}	-20~+70		°C
	Storage Temperature	T _{stg}	-55~+150		°C

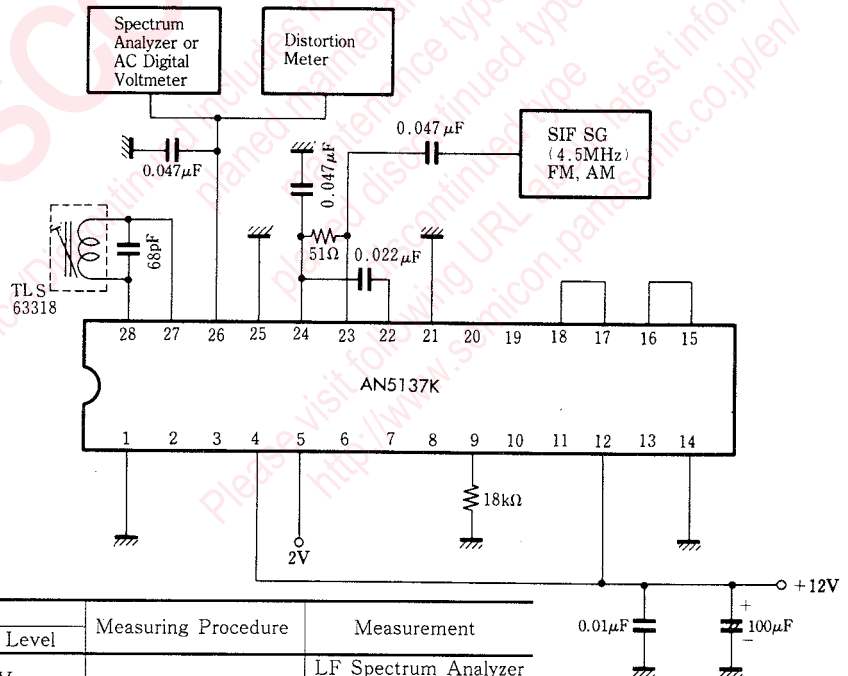
■ Electrical Characteristics (Ta=25°C)

Item	Symbol	Test Circuit	Condition	min.	typ.	max.	Unit
IF Amplifier · Detection · AGC · AFC Circuit							
Video Detector Output	V _o	1	f=58.75MHz, V _i =80dBμ, m=87.5%	1.8	2.1	2.4	V _{P-P}
Input Sensitivity	S _(IN)	1	V _o =-3dB	49	53	57	dBμ
Max. Allowable Input	V _{1(max.)}	1		103	108		dBμ
Differential Gain	DG	1	f=58.75MHz, V _i =80dBμ, m=87.5%		2	6	%
Differential Phase	DP	1	f=58.75MHz, V _i =80dBμ, m=87.5%		2	5	deg
Frequency Characteristics	f _c	1	V _o =-3dB	4.5	5	6	MHz
RF AGC Gain	G _{RFAGC}	1	f=10kHz, V _i =10mV	40	44	48	dB
AFC Phase Detector Sensitivity	μ	1	R _L =68kΩ // 82kΩ	30	40	60	mV/kHz
AFC Center Voltage	V ₁₀	1	R _L =68kΩ // 82kΩ	4.2	6.5	8.2	V
VCO · APC Circuit							
VCO Max. Variable Range (1)	Δf _{V(1)}	1	V ₁₃ =2V	+0.85	+1.5	+2.5	MHz
VCO Max. Variable Range (2)	Δf _{V(2)}	1	V ₁₃ =3V	-4.0	-2.4	-1.4	MHz
VCO Control Sensitivity	β	1		3	4.5	6	kHz/mV
APC Pull-In Range (1)	f _{APC(1)}	1		+0.85	+1.5	+2.5	MHz
APC Pull-In Range (2)	f _{APC(2)}	1		-3.5	-2.5	-1.6	MHz
SIF Circuit							
Total Detector Output	V _o	2	f _o =4.5MHz, f _m =400Hz Δf=±25kHz, V _i =100mV _{rms}	400	500	650	mV _{rms}
Input Limiting Voltage	V _{i(lim)}	2	f _o =4.5MHz, f _m =400Hz Δf=±25kHz		36	40	dBμ
DC Characteristics							
Circuit Current	I _{4+I₁₂}			50	70	90	mA

Signal	Input Signal		Measuring Procedure	Measurement	SW Condition									
	Type	Input Level			1	2	3	4	5	6	7	8	9	
V_o	f_{STD} $m=87.5\%$	80dB μ	—	Oscilloscope Output Amplitude	1	1	1	1	1	1	1	1	1	1
$S_{(IN)}$	f_{STD} $m=87.5\%$	80dB μ	Input Level Attenuation	Oscilloscope Output Amplitude	1	1	1	1	1	1	1	1	1	1
$V_{i(max)}$	f_{STD} $m=87.5\%$	80dB μ	Input Level Increase	Oscilloscope Output Amplitude	1	1	1	1	1	1	1	1	1	1
DG	f_{STD} (Staircase) $m=87.5\%$	80dB μ	—	Vector Scope DG	1	1	1	1	1	1	1	1	1	1
DP	f_{STD} (Staircase) $m=87.5\%$	80dB μ	—	Vector Scope DP	1	1	1	1	1	1	1	1	1	1
f_c	f_o f_m	80dB μ 60dB μ	—	Spectrum Analyzer Det. Output Frequency	1	1	1	1	1	1	1	1	1	1
G_{RFAGC}	f_{10K}	10mV	VR1 adj.	AC Digital Voltmeter	1	2	2	1	1	1	1	1	1	1
μ	f_{SWP}	80dB μ	—	Oscilloscope	1	1	1	1	1	1	1	1	1	1
V_{10}	No Signal	—	—	DC	1	1	1	1	1	1	1	1	1	1
$\Delta f_{V(1)}$ $\Delta f_{V(2)}$	No Signal	—	V_s held with VR1 VR3 adj.	Spectrum Analyzer VCO Frequency	1	2	1	2	3	1	1	1	1	1
β	No Signal	—	V_s held with VR1 VR3 adj.	Spectrum Analyzer VCO Frequency	1	2	1	2	3	1	1	1	1	1
$f_{APC(1)}$ $f_{APC(2)}$	f_m	80dB μ	—	Oscilloscope Input Signal Frequency	1	1	1	1	3	1	1	1	1	1

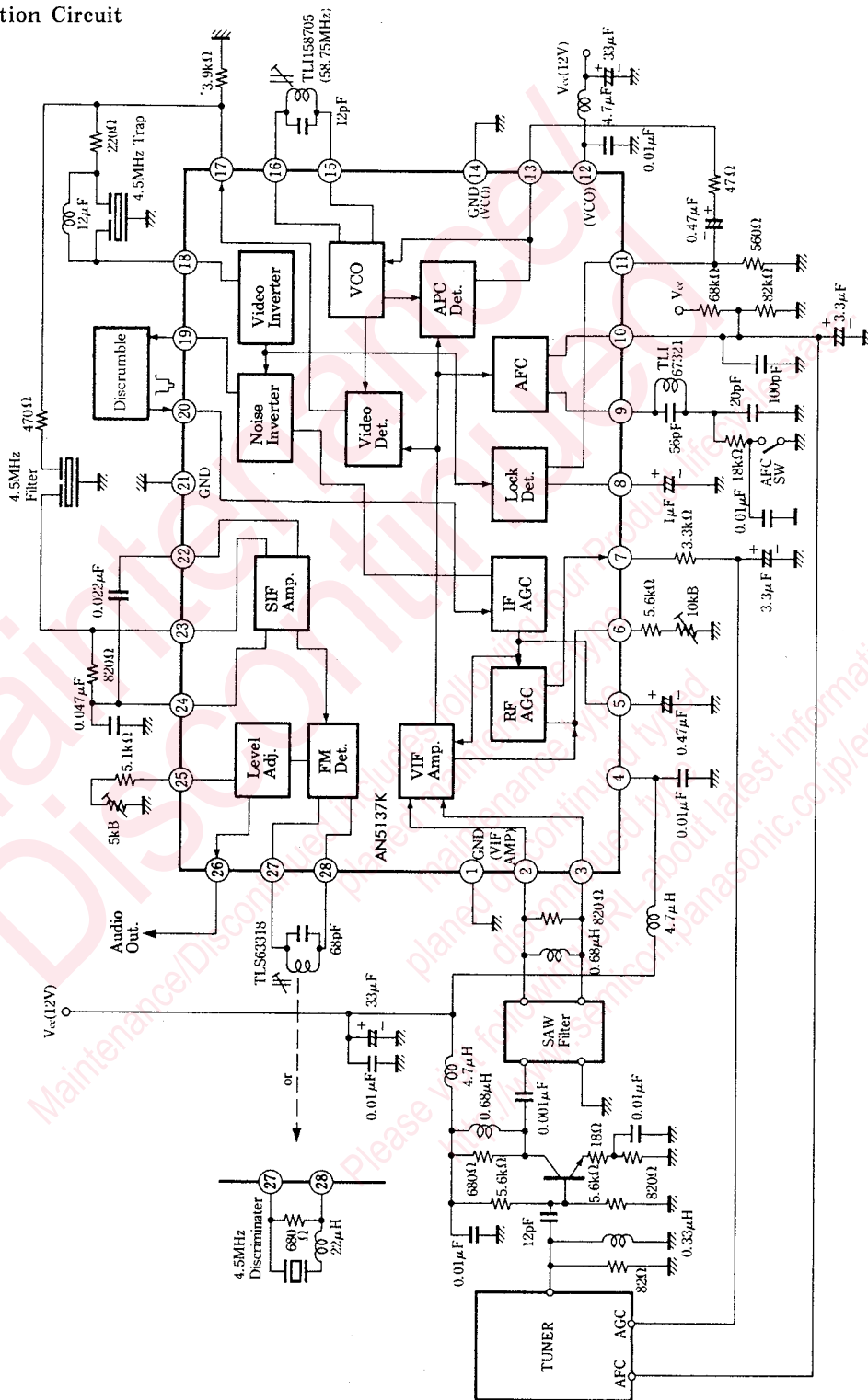
• f_{STD} : Standard TV signal • f_o : 58.75MHz • f_{10K} : 10kHz • f_m : Variable Frequency • f_{swp} : Sweep Signal

Test Circuit 2 (V_o , $V_{i(lim)}$)



Signal	Input Signal		Measuring Procedure	Measurement
	Type	Input Level		
V_o	FM $\Delta f = \pm 25kHz$	100mVrms	—	LF Spectrum Analyzer or AC Digital Voltmeter
$V_{i(lim)}$	FM $\Delta f = \pm 25kHz$	100mVrms	Input Level Attenuation	LF Spectrum Analyzer or AC Digital Voltmeter

Application Circuit



■ Pin

Pin No.	Pin Name	Pin No.	Pin Name
1	GND	15	VCO Coil
2	IF Input	16	VCO Coil
3	IF Input	17	Det. Output
4	V _{cc}	18	Video Input
5	IF AGC Filter	19	Video Output
6	RF AGC Delay Adj.	20	AGC Defeat
7	RF AGC Output	21	GND
8	Lock Det. Filter	22	SIF Input Bias
9	AFC Coil	23	SIF Input
10	AFC Output	24	SIF Input Bias
11	APC Filter SW	25	Sound Output Level Adj.
12	V _{cc} (VCO)	26	Sound Output
13	APC Filter	27	SIF Coil
14	GND (VCO)	28	SIF Coil

Reference: Different Point in the AN5135NK/the AN5138NK and the AN5136K and the AN5137K

Item	AN5135NK/5138NK	AN5136K	AN5137K
Pin ⑩	Video f Characteristics Compensating Terminal	AGC Defeat Terminal	IF AGC Input Terminal
Video Output Polarity (Pin ⑨)	Positive Polarity (\downarrow)	Negative Polarity (\uparrow)	Negative Polarity (\uparrow)
Audio Output Polarity (S Curve)	Positive Polarity (\sim)	Negative Polarity (\sim)	Negative Polarity (\sim)
VTR SW	Available	Not Available	Not Available
Applications	TV and Video Use	TV Use	CATV Discrumbler Use

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