

# AN5137K

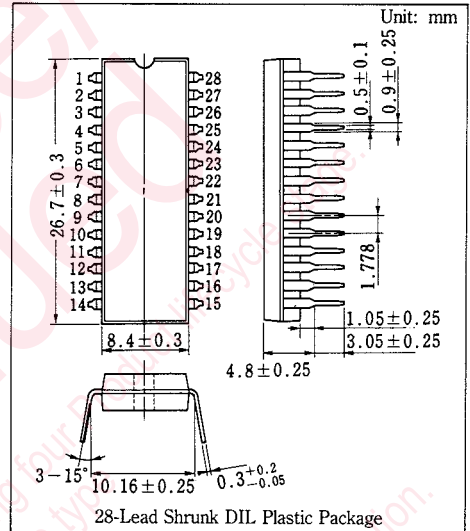
## Color TV Video IF Amplifier, PLL, Detector, AGC, AFC, SIF, Circuit

### ■ Outline

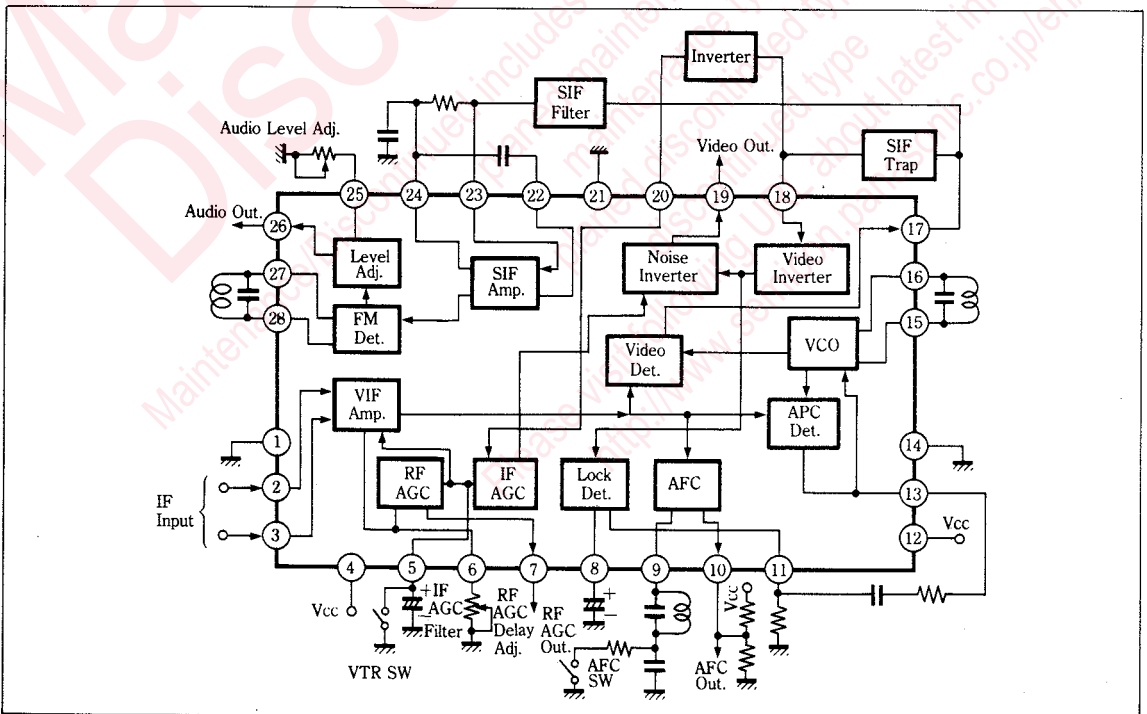
The AN5137K is an integrated circuit designed for color TV video and audio IF signal processing circuits and has the IF AGC input terminal particularly available for CATV.

### ■ Features

- PLL true synchronous detector incorporates VCO
- Quadrature sound FM detector
- IF AGC input terminal (Pin②)



### ■ Block Diagram



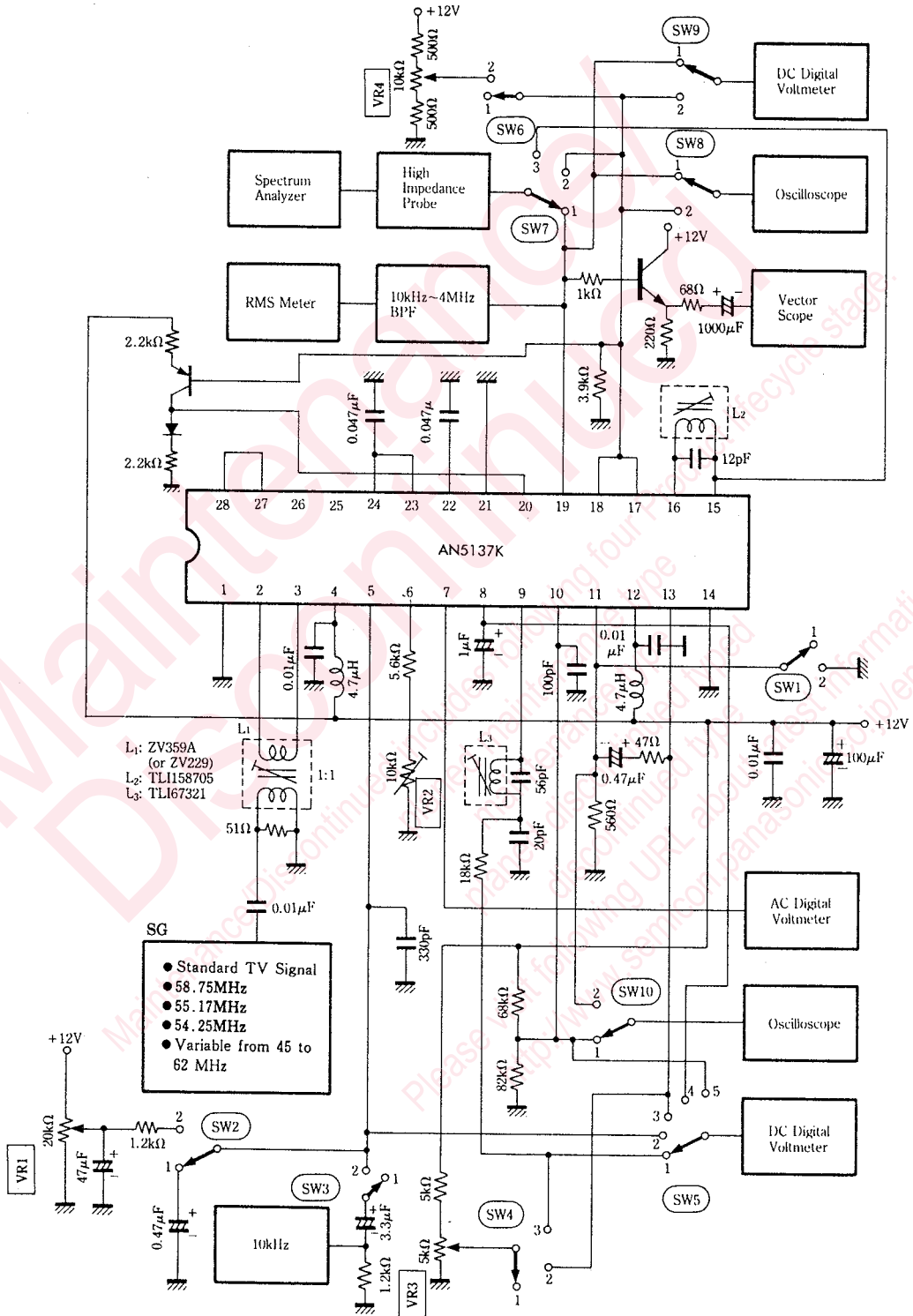
■ Absolute Maximum Ratings (Ta=25°C)

Item		Symbol	Rating		Unit
Voltage	Supply Voltage	V <sub>cc</sub>	13.8		V
	Circuit Voltage	V <sub>5-1,14,21</sub>	V <sub>4,12-1,14,21</sub>	0	V
		V <sub>6-1,14,21</sub>	V <sub>4,12-1,14,21</sub>	0	v
		V <sub>7-1,14,21</sub>	V <sub>4,12-1,14,21</sub>	0	V
		V <sub>10-1,14,21</sub>	V <sub>4,12-1,14,21</sub>	0	V
		V <sub>18-1,14,21</sub>	V <sub>4,12-1,14,21</sub>	0	V
V <sub>25-1,14,21</sub>	8.0	0	V		
Current	Circuit Current	I <sub>17</sub>	- 7	+0.5	mA
		I <sub>19</sub>	- 7	+0.5	mA
		I <sub>28</sub>	- 5	+0.5	mA
Power Dissipation (Ta=70°C)		P <sub>o</sub>	1300		mW
Temperature	Operating Ambient Temperature	T <sub>opr</sub>	-20~+70		°C
	Storage Temperature	T <sub>stg</sub>	-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 <sub>o</sub>	1	f=58.75MHz, V <sub>i</sub> =80dBμ, m=87.5%	1.8	2.1	2.4	V <sub>P-P</sub>
Input Sensitivity	S <sub>(IN)</sub>	1	V <sub>o</sub> =-3dB	49	53	57	dBμ
Max. Allowable Input	V <sub>1(max.)</sub>	1		103	108		dBμ
Differential Gain	DG	1	f=58.75MHz, V <sub>i</sub> =80dBμ, m=87.5%		2	6	%
Differential Phase	DP	1	f=58.75MHz, V <sub>i</sub> =80dBμ, m=87.5%		2	5	deg
Frequency Characteristics	f <sub>c</sub>	1	V <sub>o</sub> =-3dB	4.5	5	6	MHz
RF AGC Gain	G <sub>RFAGC</sub>	1	f=10kHz, V <sub>i</sub> =10mV	40	44	48	dB
AFC Phase Detector Sensitivity	μ	1	R <sub>L</sub> =68kΩ // 82kΩ	30	40	60	mV/kHz
AFC Center Voltage	V <sub>10</sub>	1	R <sub>L</sub> =68kΩ // 82kΩ	4.2	6.5	8.2	V
VCO · APC Circuit							
VCO Max. Variable Range (1)	Δf <sub>V(1)</sub>	1	V <sub>13</sub> =2V	+0.85	+1.5	+2.5	MHz
VCO Max. Variable Range (2)	Δf <sub>V(2)</sub>	1	V <sub>13</sub> =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 <sub>APC(1)</sub>	1		+0.85	+1.5	+2.5	MHz
APC Pull-In Range (2)	f <sub>APC(2)</sub>	1		-3.5	-2.5	-1.6	MHz
SIF Circuit							
Total Detector Output	V <sub>o</sub>	2	f <sub>o</sub> =4.5MHz, f <sub>m</sub> =400Hz Δf=±25kHz, V <sub>i</sub> =100mV <sub>rms</sub>	400	500	650	mV <sub>rms</sub>
Input Limiting Voltage	V <sub>i(lim)</sub>	2	f <sub>o</sub> =4.5MHz, f <sub>m</sub> =400Hz Δf=±25kHz		36	40	dBμ
DC Characteristics							
Circuit Current	I <sub>4+I<sub>12</sub></sub>			50	70	90	mA

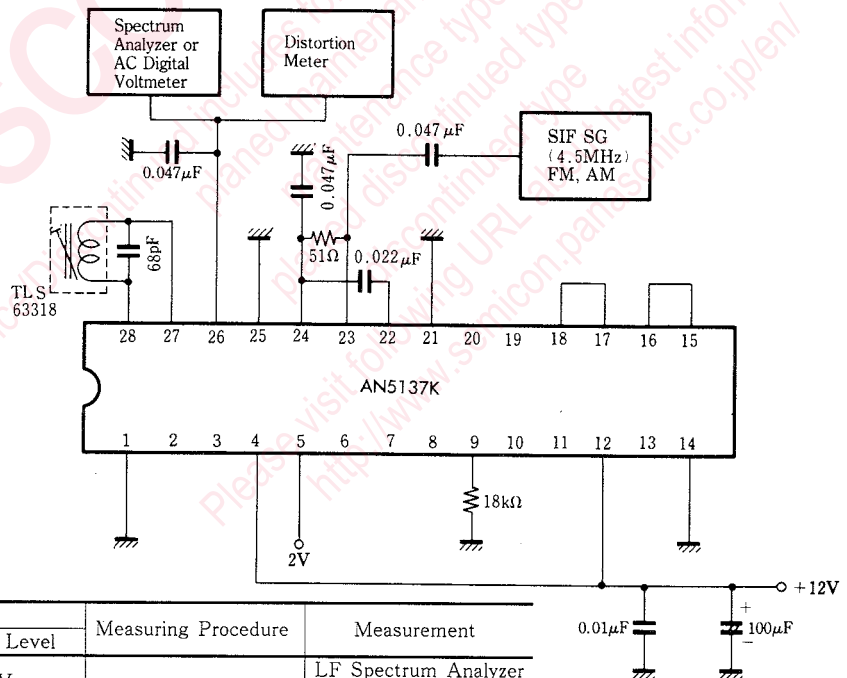
Test Circuit 1 ( $V_O$ ,  $S_{(IN)}$ ,  $V_{I(max.)}$ ,  $DG$ ,  $DP$ ,  $f_C$ ,  $G_{RFAGC}$ ,  $\mu$ ,  $V_{10}$ ,  $\Delta f_{V(1)}$ ,  $\Delta f_{V(2)}$ ,  $\beta$ ,  $f_{APC(1)}$ ,  $f_{APC(2)}$ )



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 $\mu$	—	Oscilloscope Output Amplitude	1	1	1	1	1	1	1	1	1	1
$S_{(IN)}$	$f_{STD}$ $m=87.5\%$	80dB $\mu$	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 $\mu$	Input Level Increase	Oscilloscope Output Amplitude	1	1	1	1	1	1	1	1	1	1
DG	$f_{STD}$ (Staircase) $m=87.5\%$	80dB $\mu$	—	Vector Scope DG	1	1	1	1	1	1	1	1	1	1
DP	$f_{STD}$ (Staircase) $m=87.5\%$	80dB $\mu$	—	Vector Scope DP	1	1	1	1	1	1	1	1	1	1
$f_c$	$f_o$ $f_m$	80dB $\mu$ 60dB $\mu$	—	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
$\mu$	$f_{SWP}$	80dB $\mu$	—	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
$\beta$	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 $\mu$	—	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



## ■ 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 <sub>cc</sub>	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 <sub>cc</sub> (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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