AN5715K, AN5715S

Low Voltage VIF and SIF Circuits

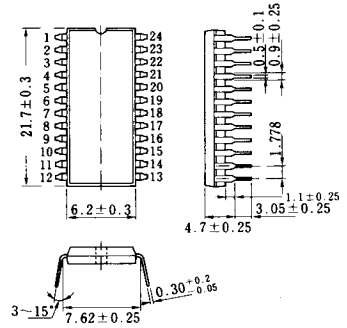
■ Outline

The AN5715K and the AN5715S are integrated circuits designed for low voltage video IF signal and Sound signal processing circuits.

■ Features

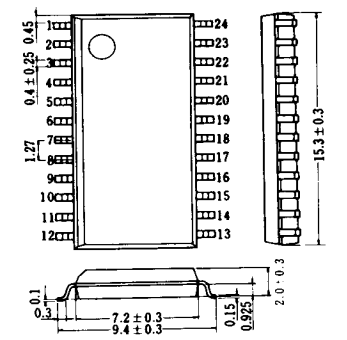
- Highly stable operation over a wide range of supply voltages.
  (Supply voltage minimum : 3.7V)
- A wider range of gain reduction (IF AGC)
- High performance by using phase compensation type synchronous detector

AN5715K Unit : mm



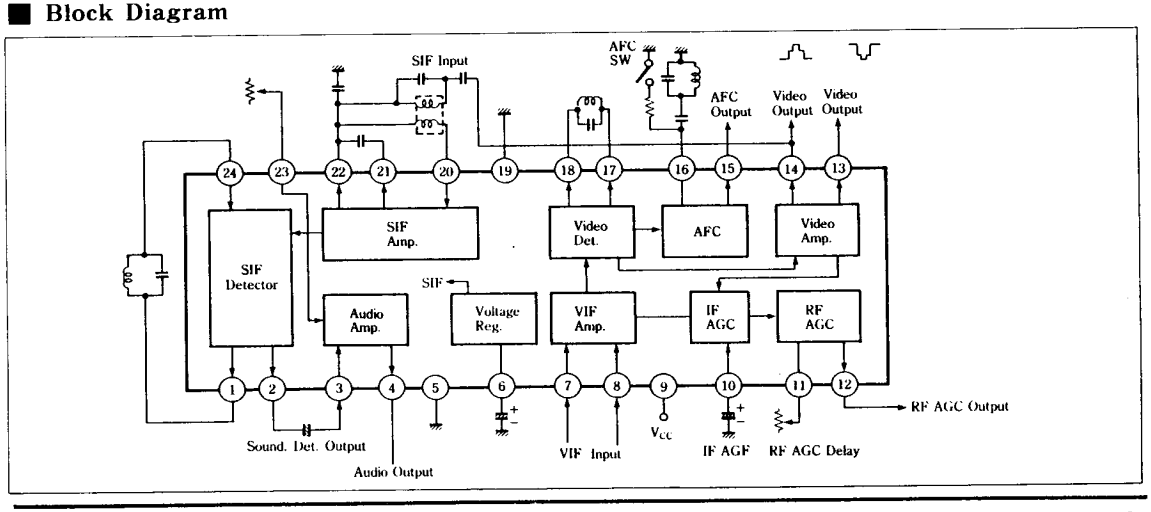
24-Lead Shrunk DIL Plastic Package

AN5715S



24-Lead PANAFLAT Package (SO-24D)

■ Block Diagram



■ Pin

Pin No.	Pin Name	Pin No.	Pin Name
1	SIF Det. Coil	13	Video Output(Positive)
2	SIF Det. Output	14	Video Output(Negative)
3	Audio Input	15	AFC Output
4	Audio Output	16	AFC Coil
5	GND	17	Video Det. Coil
6	Reference Bias	18	Video Det. Coil
7	IF Input	19	GND
8	IF Input	20	SIF Input
9	V_{CC}	21	SIF Input Bias
10	IF · AGC Filter	22	Feedback
11	RF · AGC Delay	23	Audio Adjust
12	RF AGC Output	24	SIF Det. Coil

■ Absolute Maximum Ratings (Ta=25℃)

Item	Symbol	Rating	Unit
Supply voltage	V_{CC}	6.5	V
Supply Current	I_{CC} (I_9)	55	mA
Power Dissipation	P_D	520	mW
Operating Ambient Temperature	T_{opr}	−20~+70	℃
Storage Temperature	T_{stg}	−40~+125	℃

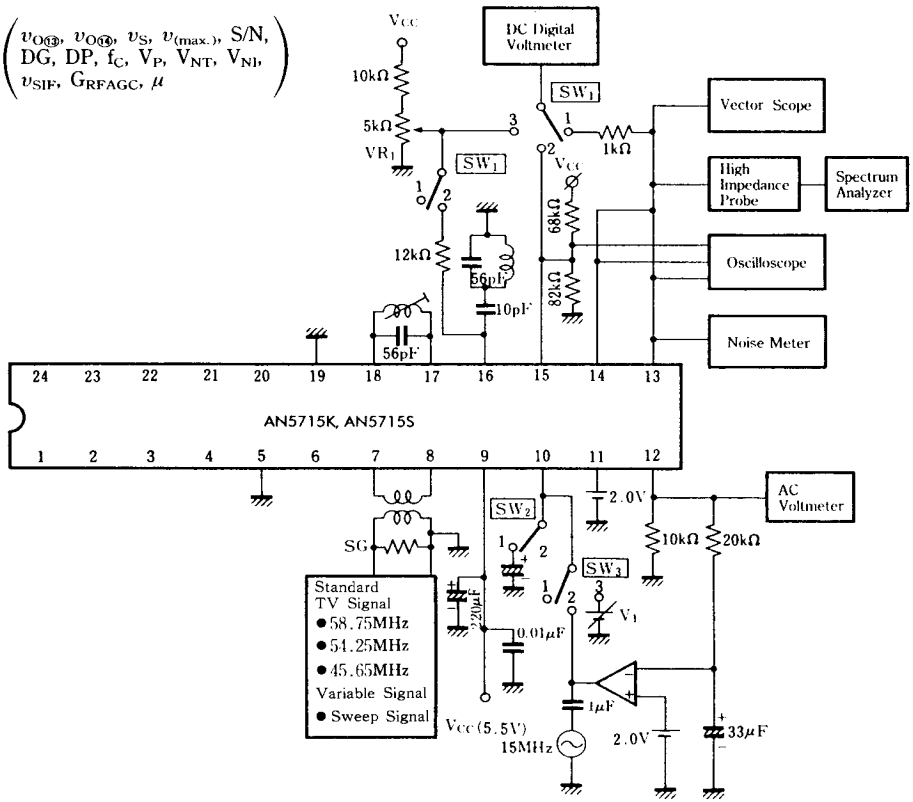
■ Electrical Characteristics (V_{CC}=5.5V, Ta=25℃)

Item	Symbol	Test Circuit	Condition	min.	typ.	max.	Unit
Circuit Current	I_9			21	32	42	mA
Video IF Det. AFC							
Video Det. Output(1)	$v_{O⑬}$	1	m=87.5%	0.77	0.9	1.03	V_{P-P}
Video Det. Output(2)	$v_{O⑭}$	1	m=87.5%	0.77	0.9	1.03	V_{P-P}
Input Sensitivity	v_S	1	v_O=−3dB	35	41	46	dBμ
Max. Allowable Input	$v_{(max.)}$	1	v_O>+0dB	105	115		dBμ
Signal to Noise Ratio	S/N	1	v_{in}=80dBμ	42	50		dB
Differential Gain	DG	1	v_{in}=80dBμ		9	15	%
Differential Phase	DP	1	v_{in}=80dBμ		4	8	deg.
Video Frequency Band	f_C	1	v_O=−3dB	5	6.5		MHz
Sync. Peak Voltage	V_P	1		1.5	1.8	2.1	V
Noise Inverter Det. Level	V_{NT}	1		1.0	1.3	1.6	V
Noise Inverter Pull-in Level	V_{NI}	1		2.0	2.25	2.5	V
Sound IF Output	v_{SIF}	1	P/S=20dB	89	95	101	dBμ
Input Resistance (Pin⑦)	$R_{i⑦}$	2	f=58.75MHz	1.1	1.4	1.7	kΩ
Input Capacitance (Pin⑦)	$C_{i⑦}$	2	f=58.75MHz	1.8	2.4	3.0	pF
Output Resistance (Pin⑬)	$R_{O⑬}$	3	f=500kHz	35	110	180	Ω
Output Resistance (Pin⑭)	$R_{O⑭}$	3	f=500kHz	50	180	300	Ω
RF AGC Voltage Gain	G_{RFAGC}	1	f=15kHz	28	34	40	dB
Phase Detector Sensitivity	μ	1	R_L=68kΩ//82kΩ	25	40	75	mV/kHz

■ Electrical Characteristics (V_{CC}=5.5V, Ta=25℃) (Cont'd)

Item	Symbol	Test Circuit	Condition	min.	typ.	max.	Unit
Audio Circuit							
Composite Det. Output	$v_{O②}$	4	f_O=4.5MHz, f_m=1kHz Δf=±25kHz, v_i=100mVrms	70	110	160	mVrms
Input Limiting Voltage	$v_{i(lim)}$	4	v_O=−3dB	35	41	47	dBμ
Det. Signal Distortion	$THD_②$	4	f_O=4.5MHz, f_m=1kHz Δ=±25kHz, v_i=100mVrms		0.4	1.0	%
AM Rejection	AMR	4	m=30%	43	55		dB
Input Impedance	$R_{i⑳}$	5	f=4.5MHz	30	70	250	kΩ
	$C_{i⑳}$	5	f=4.5MHz	1.2	3.8	6.2	pF
Detector Input Impedance	$R_{d①}$	6	f=4.5MHz	1.0	1.4	2.0	kΩ
	$C_{d①}$	6	f=4.5MHz	20	39	70	pF
	$R_{d㉔}$	6	f=4.5MHz	1.0	1.45	2.0	kΩ
	$C_{d㉔}$	6	f=4.5MHz	20	40	70	pF
Audio Circuit Gain	$v_{O④}$	7	f=1kHz, v_{in}=100mVrms	4.0	7.3	11	dB
Audio Circuit Distortion	$THD_④$	7	f=1kHz, v_{in}=100mVrms		0.8	2.0	%
Max. Attenuation	A_{tk}	7	f=1kHz, v_{in}=100mVrms	80			dB
Ripple Rejection Ratio	RR	7	v_{in}=300mVrms f=60Hz, VR: max.	26	32		dB

Test Circuit 1 ($v_{O⑬}$, $v_{O⑭}$, v_S, $v_{(max.)}$, S/N, DG, DP, f_C, V_P, V_{NT}, V_{NI}, v_{SIF}, G_{RFAGC}, μ)



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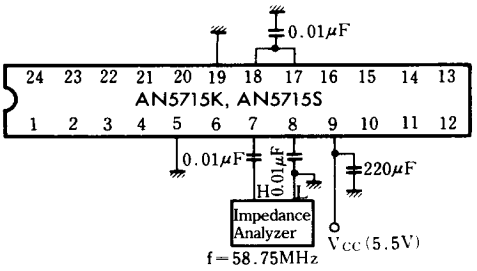
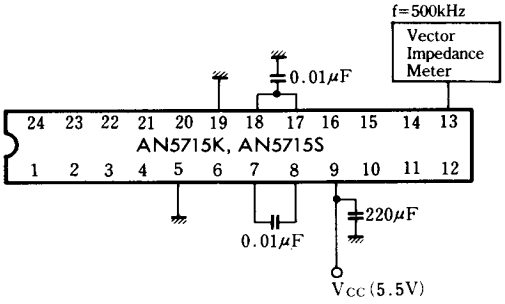
Test Circuit 1 Measuring Conditions Table

Symbol	Measuring. Procedure	Inpact Signal	Measurement	Condition of SW			
				SW1	SW2	SW3	SW4
$v_{O⑬}$	—	Standard TV Signal	Oscilloscope Output Amplification	1	1	1	1
$v_{O⑭}$	—	Standard TV Signal	Oscilloscope Output Amplification	1	1	1	1
v_S	Input Level Attenuation	Standard TV Signal	Oscilloscope Output Amplification	1	1	1	1
v_{max}	Input Level Attenuation	Standard TV Signal	Oscilloscope	1	1	1	1
S/N	—	58.75MHz 80dBμ	10kHz~4MHz, BPF Noise Meter	1	1	1	1
DG	—	Standard TV Signal (Staircase Wave) 80dBμ	Vector Scope	1	1	1	1
DP	—	Standard TV Signal (Staircase Wave) 80dBμ	Vector Scope	1	1	1	1
f_C	$v_⑯$ Hold with V_1 Output-3dB	58.75MHz+Variable 80dBμ, 60dBμ	Spectrum Analyzer Input Frequency Difference	1	2	3	1
V_P	—	Standard TV Signal	Oscilloscope Sync. Top Level	1	1	1	1
V_{NT}	V_1 Adjustment	Sweep Signal	Oscilloscope	1	2	3	1
V_{NI}	V_1 Adjustment	Sweep Signal	Oscilloscope	1	2	3	1
v_{SIF}	$v_⑯$ Hold with V_1	58.75MHz, 80dBμ 54.25MHz, 60dBμ	Spectrum Analyzer	1	2	3	1
$G_{RF\,AGC}$		15kHz, 1mVrms	AC Voltmeter	1	2	2	1
μ	$v_⑯$ Hold with V_1	Variable Signal, 80dBμ	DC Voltmeter	2	2	3	1

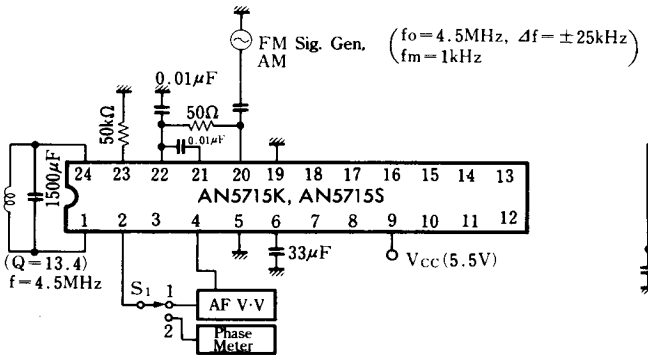
Test Circuit 2 ($R_{i⑦}$, $C_{i⑦}$)



Test Circuit 3 ($R_{O⑬}$, $R_{O⑭}$)

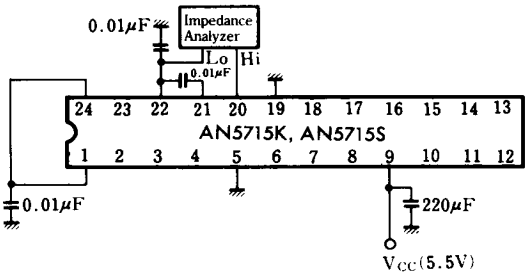


Test Circuit 4 ($v_{O②}$, $v_{i(lim)}$, $THD_②$, AMR)

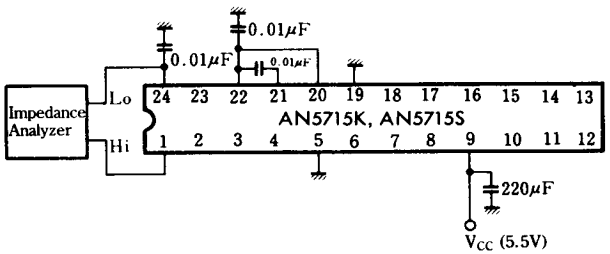


Item	S_1
$v_{O②}$	1
$v_{i(lim)}$	1
$THD_②$	2
AMR	1

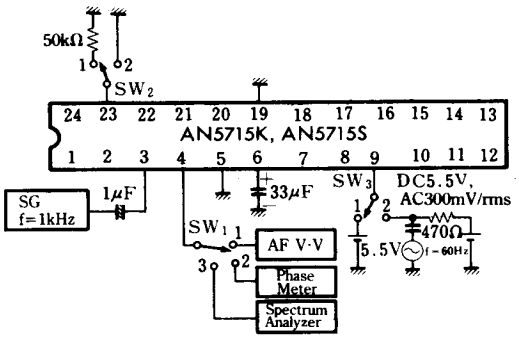
Test Circuit 5 ($R_{i㉔}$, $C_{i㉔}$)



Test Circuit 6 ($R_{d①}$, $C_{d①}$, $R_{d㉔}$, $C_{d㉔}$)



Test Circuit 7 ($v_{O④}$, $THD_④$, A_{tk}, RR)



Item	S_1	S_2	S_3
$v_{O④}$	1	1	1
$THD_④$	2	1	1
A_{tk}	3	2	1
RR	1	1	2