

AN5101SC

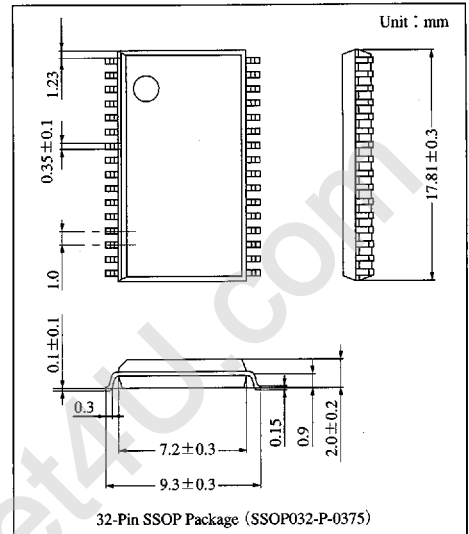
VIF/SIF Signal Processor IC for TV and VCR

Overview

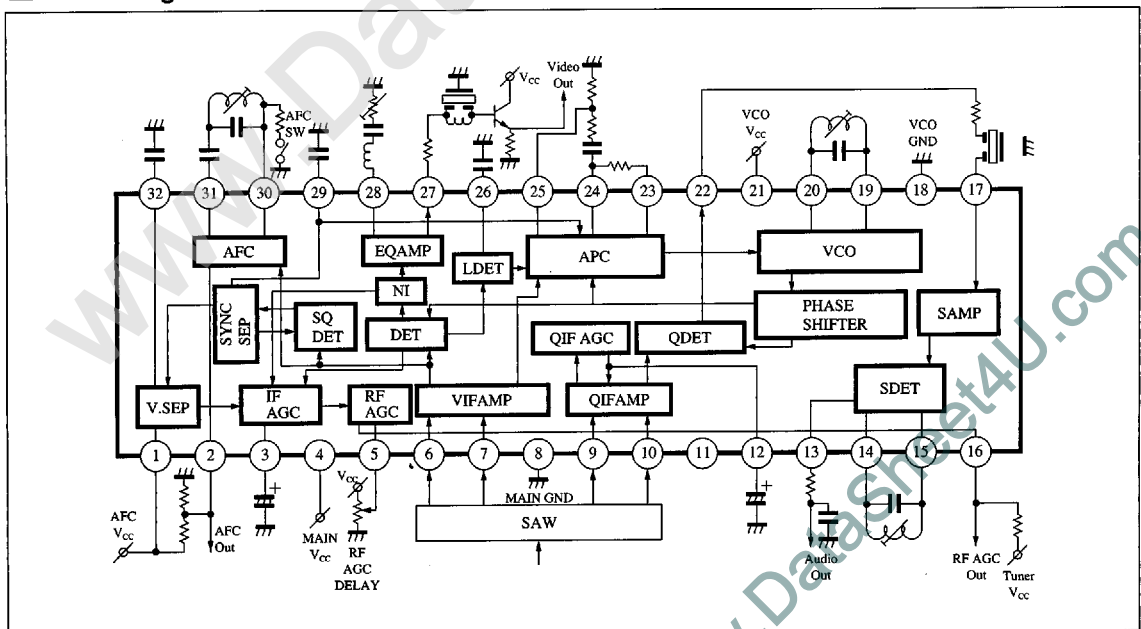
The AN5101SC is a VIF/SIF signal processor IC for TV and VCR.

Features

- Including a quasi-separate sound circuit for better audio performance
- Adopting the gated-PLL technique for better second-sound-channel buzz-beat characteristics (for sound multiplex broadcasting service) or enhancement of video over-modulation characteristics.
- Low power consumption : $P_C=240\text{mW}$ typ. at $V_{CC}=5.0\text{V}$



Block Diagram



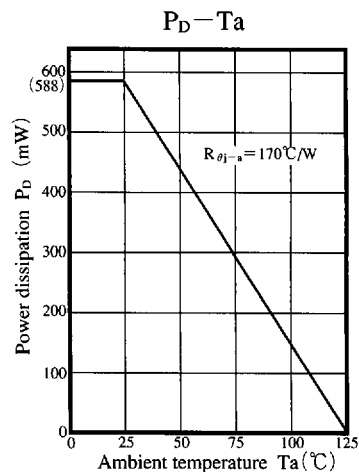
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Pin Descriptions

Pin No.	Pin name	Pin No.	Pin name
1	Power supply V _{CC1} (for AFC output)	17	SIF input
2	AFC output	18	GND (for VCO)
3	VIF AGC filter	19	VCO coil
4	Power supply V _{CC2} (for MAIN)	20	VCO coil
5	RF AGC DELAY adj.	21	Power supply V _{CC3} (for VCO)
6	VIF input	22	QIF detection output
7	VIF input	23	APC detection output
8	GND (for MAIN)	24	VCO control
9	QIF input	25	APC time constant switching
10	QIF input	26	Lock detection
11	NC	27	Video detection output
12	QIF AGC filter	28	Feedback
13	Audio output	29	Sync. signal separation
14	SIF coil	30	AFC coil
15	SIF coil	31	AFC coil
16	RF AGC output	32	Vert. sync. signal separation

Reference



ICs for TV

Absolute Maximum Ratings

Parameter	Symbol	Rating		Unit
Supply voltage	V _{CC}	V _{CC2,3}	6.0	V
		V _{CC1}	12.5	
Supply current	I _{CC}	I _{CC2,3}	65.0	mA
		I _{CC1}	1.8	
Circuit voltage	V _{16-8,18}	0 to 12.5		V
	V _{25-8,18}	0 to 12.5		V
Power dissipation ^{Note 2)}	P _D	320		mW
Operating ambient temperature ^{Note 1)}	T _{opr}	-20 to +70		°C
Storage temperature ^{Note 1)}	T _{stg}	-55 to +125		°C

Note 1) T_a = 25°C except operating ambient temperature and storage temperature.

Note 2) Allowable power dissipation of the package at T_a = 70°C.

Recommended Operating Range (T_a = 25°C)

Parameter	Symbol	Range
Operating supply voltage range	V _{CC2,3}	4.5V to 5.5V
	V _{CC1}	V _{CC2,3} to 12.2V

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Electrical Characteristics ($V_{CC}=5V, T_a=25\pm 2^\circ C$)

Parameter	Symbol	Condition	min	typ	max	Unit
VIF AMP DET Section						
Video detection output	V_{O27}	Typical color signal (white color contained) $m=87.5\%$, $v_{in}=80dB\mu$	1.7	2.0	2.3	V_{P-P}
Video frequency characteristics	f_e	Attenuation value at 8MHz	-4.0	-1.0	+0	dB
Synchronous peak voltage	V_P		1.1	1.3	1.5	V
PLL Section						
APC pull-in range <h>	f_{Ph}		1.0	—	—	MHz
APC pull-in range <l>	f_{Pl}		—	—	-1.0	MHz
VCO control sensitivity	β	$V_{24}=2.3$ to $2.5V$	1.5	2.0	2.5	kHz/mV
AGC Section						
RF AGC operation sensitivity	$v_{RF AGC}$		0	1.0	3.0	dB
RF AGC maximum pull-in current	$I_{16 max.}$		1.5	2.1	2.7	mA
RF AGC minimum pull-in current	$I_{16 min.}$		-3.0	0	3.0	μA
AFC Section						
AFC discrimination sensitivity	μ_{AFC}	$R_L=150k\Omega//150k\Omega$	18	26	34	mV/kHz
AFC center voltage	I_2		5.0	6.0	7.0	V
AFC maximum output voltage	$V_{2max.}$	$f=f_0-500kHz$	10.5	11.2	—	V
AFC minimum output voltage	$V_{2min.}$	$f=f_0+500kHz$	—	0.7	1.5	V
QIF AMP DET Section						
QDET output level	v_{QDET}		95	100	105	dB μ
SIF Section						
Sound detection output	V_{O13}	$f_0=4.5MHz$ $v_{in}=100dB\mu$ $\Delta f=\pm 25kHz$ $f_m=400Hz$ $R_D=6.8k\Omega$	327	385	443	mVrms
DC Characteristics						
Circuit current (1) (Pin④, Pin⑫)	I_{4+21}		36.5	46.5	56.5	mA
Circuit current (2) (Pin①)	I_1		0.8	1.1	1.4	mA
VIF input pin voltage	$V_{6,7}$		2.6	3.0	3.4	V
QIF input pin voltage	$V_{9,10}$		2.6	3.0	3.4	V
Audio output pin voltage	V_{13}		1.5	2.0	2.5	V
SIF coil pin voltage	$V_{14,15}$		4.0	4.2	4.5	V
SIF input pin voltage	V_{17}		1.2	1.5	1.8	V
VCO coil pin voltage	$V_{19,20}$		2.7	3.2	3.7	V
QDET output pin voltage	V_{22}		2.5	2.9	3.3	V
VCO control pin voltage	V_{24}		2.0	2.45	2.9	V
APC time constant switching pin	V_{25}		4.5	5.0	—	V
Video detection output pin voltage	V_{27}		3.2	3.7	4.2	V
AFC coil pin voltage	$V_{30,31}$		2.4	2.8	3.2	V
VIF AMP DET Section						
Input sensitivity	v_{SV}	$V_{O27}=-3dB$	—	(42)	(46)	dB μ
Maximum tolerant input	$v_{max.v}$		(97)	(102)	—	dB μ
SN ratio	S/N		(50)	(55)	—	dB
Differential gain	DG		—	(2)	(5)	%
Differential phase	DP		—	(2)	(5)	deg
Black noise detection level	ΔV_{BN}	$V_{BN}-V_P$	—	(-0.85)	—	V

Note) The characteristics value in parentheses is not a guaranteed value, but reference one on design.

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Electrical Characteristics (cont.) ($V_{CC}=5V$, $T_a=25\pm 2^\circ C$)

Parameter	Symbol	Condition	min	typ	max	Unit
Black noise clamp level	ΔV_{BNC}	$V_{BNC} - V_P$	—	(0.6)	—	V
White noise clamp level	ΔV_{WNC}	$V_{WNC} - V_P$	—	(1.9)	—	V
Intermodulation	IM		(45)	(50)	—	dB
Input resistance (Pin⑥)	R_{i6}		—	(1.2)	—	k Ω
Input capacitance (Pin⑥)	C_{i6}		—	(3.2)	—	pF
Output resistance (Pin⑳)	R_{O27}		—	(10)	—	Ω

PLL Section

VCO maximum variable range (1)	Δf_{VU}	$V_{24}=1.0V$	(1.8)	—	—	MHz
VCO maximum variable range (2)	Δf_{VD}	$V_{24}=4.0V$	—	—	(-1.8)	MHz
VCO frequency SW ON drift	Δf_{VON}	3 minute after SW ON	(-0.1)	(0)	(+0.1)	MHz
VCO frequency temperature drift	Δf_{VT}	$-20^\circ C$ to $+70^\circ C$	—	(-0.2)	—	MHz
VCO reference oscillation level	v_{VCO}		(100)	(106)	(112)	dB μ
VCO 2nd harmonics level	v_{VCO2}		—	(70)	—	dB μ

AGC Section

RFAGC Delay point temperature drift	Δv_{RFDT}	$-20^\circ C$ to $+70^\circ C$	—	(+1)	—	dB
Noise canceller operation voltage (W)	$\Delta V_{NC(W)}$	$V_{NC(W)} - V_P$	—	(2.6)	—	V
Noise canceller operation voltage (B)	$\Delta V_{NC(B)}$	$V_{NC(B)} - V_P$	—	(-0.85)	—	V
IF AGC filter charge current	I_{3C}		(-15.0)	(-8.5)	(-4.0)	μA
IF AGC filter discharge current	I_{3D}		(340)	(470)	(600)	μA

AFC Section

AFC defeat SW operation voltage	V_{AFC-SW}		—	(0.9)	—	V
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QIF AMP DET

Input sensitivity	v_{SQ}	$v_{QDET} = -3dB$	—	(46)	(50)	dB μ
Maximum tolerant input	$v_{max,Q}$		(99)	(104)	—	dB μ
Input resistance (Pin⑨)	R_{i9}	$f=54.25MHz$	—	(1.2)	—	k Ω
Input capacitance (Pin⑨)	C_{i9}	$f=54.25MHz$	—	(3.2)	—	pF
Output resistance (Pin㉑)	R_{O22}	$f=4.5MHz$	—	(170)	—	Ω

SIF Section

Input limiting voltage	$v_{i(lim)}$	$V_{O13} = -3dB$	—	(37)	—	dB μ
AM rejection ratio	AMR	$v_{in} = 90dB\mu$	(45)	(55)	—	dB
Total harmonics distortion	THD		—	(0.15)	—	%
Input resistance (Pin⑰)	R_{i17}	$f=4.5MHz$	—	(1.1)	—	k Ω
Input capacitance (Pin⑰)	C_{i17}	$f=4.5MHz$	—	(8.0)	—	pF
Detector input resistance (Pin⑬)	R_{i13}	$f=4.5MHz$	—	(10)	—	k Ω
Detector input capacitance (Pin⑬)	C_{i13}	$f=4.5MHz$	—	(25)	—	pF
Output resistance (Pin㉒)	R_{O12}	$f=500kHz$	—	(400)	—	Ω

Note) The characteristics value in parentheses is not a guaranteed value, but reference one on design.