AN5342FBP, AN5342K

Color TV Horizontal Aperture Correction IC

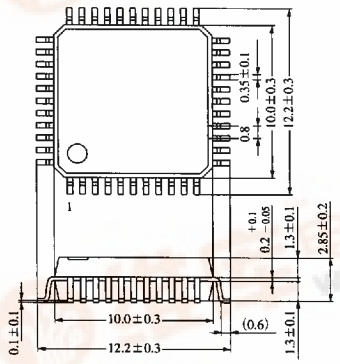
■ Overview

The AN5342FBP or AN5342K is a horizontal aperture correction IC for color TV. It provides a Y signal waveform with a preshoot or overshoot feature to emphasize horizontal outlines.

■ Features

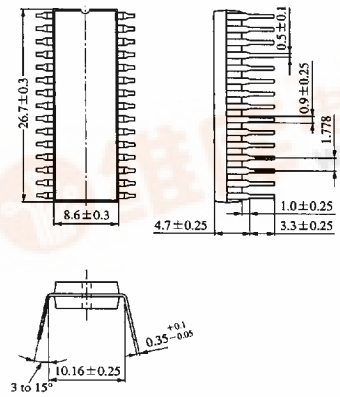
- Including a circuit to add a preshoot or overshoot to a Y signal waveform
- Dynamic sharpness control
- Built-in noise reduction circuit for Y signal
- VM signal output

AN5342FBP Unit : mm



44-Pin QFH Package (QFH044-P-1010)

AN5342K Unit : mm



30-Pin SDIP Package (SDIP030-P-0400)

ICs for TV

■ Absolute Maximum Ratings

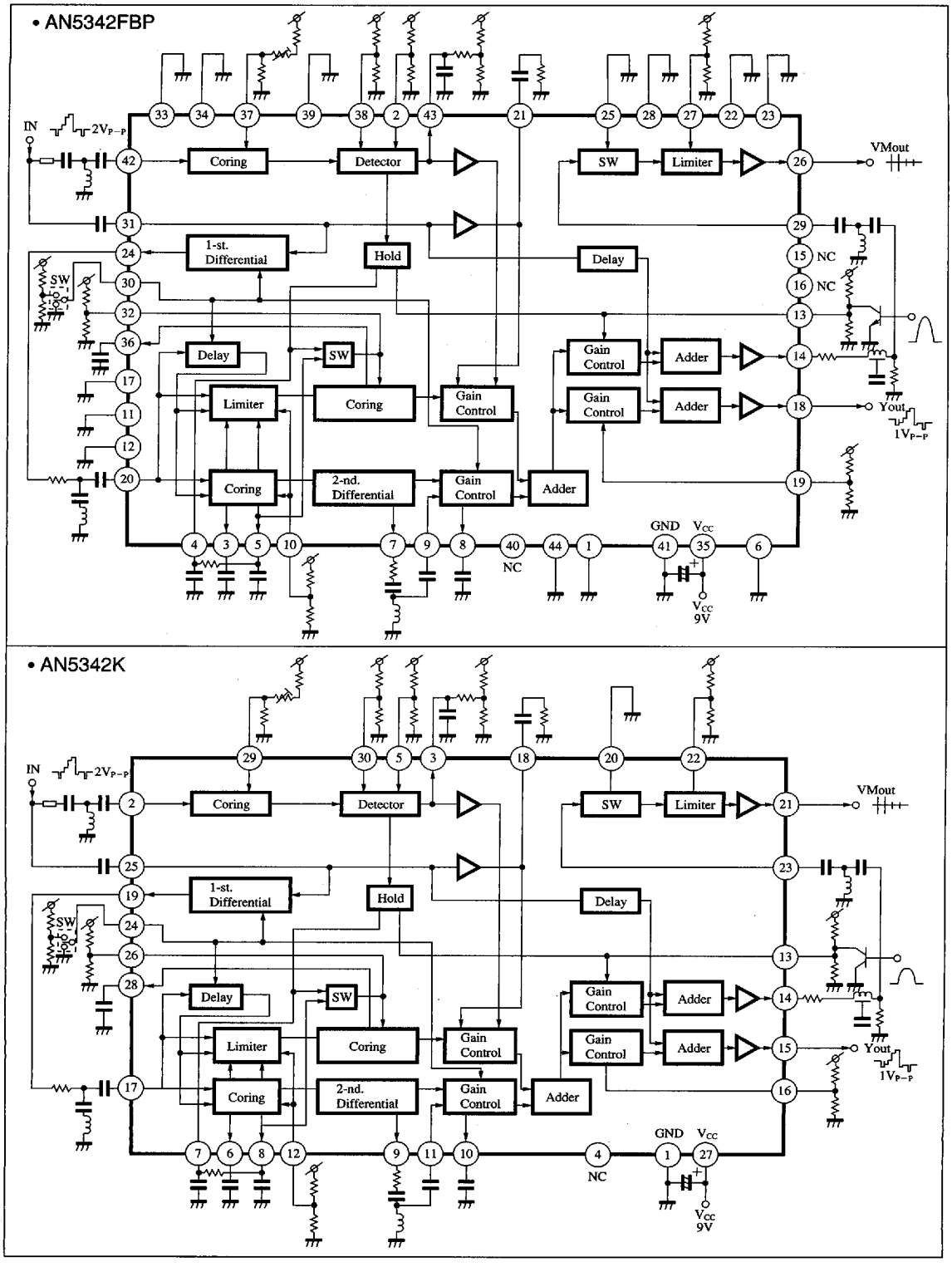
Parameter	Symbol	Rating	Unit
Supply voltage	V_{CC}	11	V
Supply current	I_{CC}	90	mA
Power dissipation Note 2)	P_D	990	mW
Operating ambient temperature Note 1)	T_{opr}	−20 to +70	℃
Storage temperature Note 1)	T_{stg}	−55 to +150	℃

Note 1) Ta=25℃ except operating ambient temperature and storage temperature.
Note 2) For only AN5342FBP, allowable power dissipation of the package at Ta=70℃.

■ Recommended Operating Range (Ta=25℃)

Parameter	Symbol	Range
Operating supply voltage range	V_{CC}	8.1V to 10.8V

■ Block Diagram



■ Pin Descriptions

• AN5342FBP

Pin No.	Pin name	Pin No.	Pin name
1	GND (lead frame)	23	GND (lead frame)
2	DSC large signal gain control	24	Pre-correction first differential output
3	Differential signal bias 1	25	Test Pin
4	Noise reduction bias	26	VM output
5	Differential signal bias 2	27	VM limiter control
6	GND (lead frame)	28	GND (lead frame)
7	Post-correction First Differential output	29	VM input
8	Apert. corr. Bias	30	Delay time switching
9	Second differential input	31	Y input
10	Apert. corr./detail level control	32	Detail coring control
11	GND (lead frame)	33	GND (lead frame)
12	GND (lead frame)	34	GND (lead frame)
13	VM peaking control	35	V_{CC}
14	Y output for VM	36	Coring Bias
15	NC	37	DSC bias
16	NC	38	DSC small signal gain control
17	GND (lead frame)	39	GND (lead frame)
18	Y output	40	NC
19	Sharpness control	41	GND (main)
20	Pre-correction first differential input	42	DSC input
21	Brightness detection	43	DSC Detection output
22	GND (lead frame)	44	GND (lead frame)

• AN5342K

Pin No.	Pin name	Pin No.	Pin name
1	GND	16	Sharpness control
2	DSC input	17	Pre-correction first differential input
3	DSC detection output	18	Brightness Detection
4	NC	19	Pre-correction first differential output
5	DSC large signal Gain control	20	Test
6	Differential signal Bias 1	21	VM output
7	Noise reduction bias	22	VM limiter control
8	Differential signal Bias 2	23	VM input
9	Post-correction first differential output	24	Delay time switching
10	Aperture correction bias	25	Y input
11	Second differential input	26	Detail coring control
12	Aperture correction/detail separation level control	27	V_{CC}
13	VM peaking control	28	Coring bias
14	Y output for VM	29	DSC bias
15	Y output	30	DSC small signal gain control

■ Electrical Characteristics (Ta=25±2℃) (AN5342FBP)

Parameter	Symbol	Condition	min	typ	max	Unit
Circuit current	I_{35}		44	55	66	mA
	I_{19}		0.4	0.7	1.2	mA
Circuit voltage	V_{42-41}		2.3	2.7	3.1	V
	V_{2-41}		4.4	4.8	5.2	V
	V_{10-41}		2.7	3.1	3.5	V
	V_{3-41}		2.6	3.2	3.8	V
	V_{5-41}		2.6	3.2	3.8	V
	V_{7-41}		1.8	2.4	3.0	V
	V_{8-41}		2.9	3.5	4.1	V
	V_{9-41}		2.3	2.7	3.1	V
	V_{13-41}		2.7	3.1	3.5	V
	V_{14-41}		3.1	3.7	4.3	V
	V_{18-41}		3.1	3.7	4.3	V
	V_{20-41}		4.4	4.9	5.3	V
	V_{21-41}		3.6	4.0	4.4	V
	V_{24-41}		5.5	6.1	6.7	V
	V_{26-41}		7.5	8.1	8.6	V
	V_{27-41}		2.2	2.6	3.0	V
	V_{29-41}		1.9	2.3	2.7	V
	V_{31-41}		4.1	4.5	4.9	V
	V_{32-41}		5.0	5.4	5.8	V
	V_{36-41}		5.0	5.6	6.2	V
	V_{38-41}		3.9	4.3	4.7	V
Y signal voltage gain (1)	ΔV_{18-41}	ΔV_{18} at $\Delta V_{31}=1V$	420	500	580	mV
Y signal voltage gain (2)	ΔV_{14-41}	ΔV_{14} at $\Delta V_{31}=1V$	420	500	580	mV
Y signal voltage gain (3)	ΔV_{21-41}	ΔV_{21} at $\Delta V_{31}=1V$	0.95	1.1	1.25	V
Delay Section						
Y signal delay time	$t_{DL\,(Y)}$	Y signal input, output deley time at DL=100ns	188	235	282	ns
Y signal frequency characteristics (1)	$e_{f\,(Y_1)}$	f=10MHz/f=1MHz at DL=100ns	−6	−4	—	dB
Y signal frequency characteristics (2)	$e_{f\,(Y_2)}$	f=10MHz/f=1MHz at DL=65ns	−6	−3	—	dB
Primary differential signal delay time	t_{DL}	DL=100ns	80	100	120	ns
Primary differential signal delay time varying amount	Δt_{DL}	Difference at delay time change over	28	35	42	ns
Aperture Correction Section						
Aperture correction signal maximum gain	$A_{v\,(L)}$	f=2MHz Output at Vin=0.5V_{P-P}	0.7	0.9	1.3	V_{P-P}
Aperture correction signal coring characteristics (1)	$e_{CO\,(L_1)}$	f=4MHz, Vin=75mV_{P-P} Output amplitude at V_{10}=1V	100	130	160	mV_{P-P}
Aperture correction signal coring characteristics (2)	$e_{CO\,(L_2)}$	f=4MHz, Vin=75mV_{P-P} Output amplitude at V_{10}=5V	—	25	50	mV_{P-P}
Aperture correction signal secondary differential gain ratio	$\Delta A_{v'\,(L)}$	f=4Hz/f=2MHz at Vin=0.5V_{P-P}	−6	−4	−2	dB
Detail Correction Section						
Detail correction signal maximum gain	$A_{v\,(S)}$	f=4MHz Input output ratio at Vin=50mV_{P-P}	16	18	21	dB

■ Electrical Characteristics (cont.) (Ta=25±2℃) (AN5342FBP)

Parameter	Symbol	Condition	min	typ	max	Unit
Detail correction signal gain control (typ.)	$\Delta A_{v\,(S)}$	f=4MHz Vin=50mV$_{P-P}$ Output ratio at V_{43}=5V→3V	−8.5	−6	−3.5	dB
Detail correction signal coring characteristics	$e_{CO\,(S)}$	f=4MHz Vin=50mV$_{P-P}$ Output ratio at V_{32}=5V→3V	−7	−4	−2	dB
Detail correction signal limiter characteristics	$\Delta e_{LT\,(S)}$	f=4MHz Vin=100mV$_{P-P}$ Output ratio at V_{10}=5V→3V	—	−5	−3	dB
Detail correction signal sharpness control	$\Delta A_{v'\,(S)}$	f=4MHz Vin=50mV$_{P-P}$ Output ratio at V_{19}=5V→3V	—	−7	−4	dB
DSC Section						
DSC output voltage (1)	$V_{LIM\,(DSC)}$	f=4MHz Output DC at Vin=27mV$_{P-P}$	2	3	4	V
DSC output voltage (2)	$V_{S\,(DSC)}$	f=4MHz Output DC at Vin=150mV$_{P-P}$	7.5	8.8	—	V
DSC output voltage (3)	$V_{L\,(DSC)}$	f=4MHz Output DC at Vin=840mV$_{P-P}$	—	0.2	1.0	V
Noise reduction characteristics	V_{NR}	f=4MHz Pin㉜ bias voltage at Vin=150mV$_{P-P}$	—	0.2	1.0	V
VM Section						
VM signal maximum gain	$A_{v\,(VM)}$	f=4MHz Output amplitude at Vin=100mV$_{P-P}$	0.6	0.9	1.4	V$_{P-P}$
VM signal limiter characteristics	$\Delta A_{v\,(VM)}$	f=4MHz Vin=100mV$_{P-P}$ Output ratio at V_{27}=5V→3V	2.5	4.0	5.5	dB
VM signal SW operation characteristics	$e_{off\,(VM)}$	f=4MHz Vin=100mV$_{P-P}$ Output ratio at V_{25}=0→2V	—	−40	−25	dB
VM signal output DC level	V_{26-41}	Difference in case between, V25=0 and V25=2V	−90	0	+90	mV
Reference Value						
Y signal delay time variation amount	$\Delta t_{DL\,(Y)}$	Delay time difference in delay time changeover	—	(35)	—	ns
Primary differential signal pulse width (1)	$\Delta t_{(DL_1)}$	Output amplitude at 125ns rise pulse inputs (DL=100ns)	—	(190)	—	ns
Primary differential signal pulse width (2)	$\Delta t_{(DL_2)}$	Output amplitude at 125ns rise pulse inputs (DL=65ns)	—	(225)	—	ns
Primary differential signal output amplitude (1)	$A_{v\,(DL_1)}$	Output amplitude at 125ns rise pulse inputs (DL=100ns)	—	(0.9)	—	V$_{P-P}$
Primary differential signal output amplitude (2)	$A_{v\,(DL_2)}$	Output amplitude at 125ns rise pulse inputs (DL=65ns)	—	(0.8)	—	V$_{P-P}$
Aperture correction signal gain difference at delay change-over	$\Delta A_{v\,(L)}$	f=2MHz, Vin=0.5V$_{P-P}$ Output ratio at V_{30}=0→3V	—	(−3)	—	dB

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

■ Electrical Characteristics (Ta=25±2℃) (AN5342K)

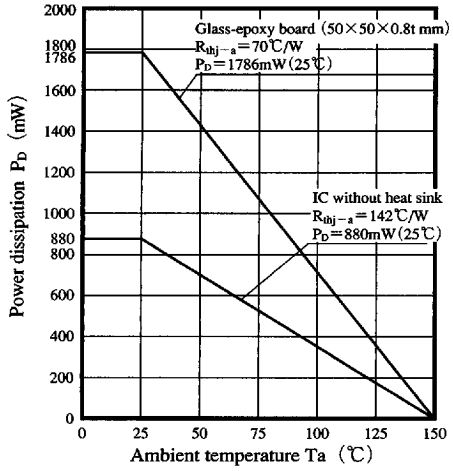
Parameter	Symbol	Condition	min	typ	max	Unit
Circuit current	I_{27}		44	55	66	mA
	I_{16}		0.4	0.7	1.2	mA
Circuit voltage	V_{2-1}		2.3	2.7	3.1	V
	V_{5-1}		4.4	4.8	5.2	V
	V_{12-1}		2.7	3.1	3.5	V
	V_{6-1}		2.6	3.2	3.8	V
	V_{8-1}		2.6	3.2	3.8	V
	V_{9-1}		1.8	2.4	3.0	V
	V_{10-1}		2.9	3.5	4.1	V
	V_{11-1}		2.3	2.7	3.1	V
	V_{13-1}		2.7	3.1	3.5	V
	V_{14-1}		3.1	3.7	4.3	V
	V_{15-1}		3.1	3.7	4.3	V
	V_{17-1}		4.4	4.9	5.3	V
	V_{18-1}		3.6	4.0	4.4	V
	V_{19-1}		5.5	6.1	6.7	V
	V_{21-1}		7.5	8.1	8.6	V
	V_{22-1}		2.2	2.6	3.0	V
	V_{23-1}		1.9	2.3	2.7	V
	V_{25-1}		4.1	4.5	4.9	V
	V_{26-1}		5.0	5.4	5.8	V
	V_{28-1}		5.0	5.6	6.2	V
	V_{30-1}		3.9	4.3	4.7	V
Y signal voltage gain (1)	ΔV_{15-1}	ΔV_{15} at $\Delta V_{25}=1V$	420	500	580	mV
Y signal voltage gain (2)	ΔV_{14-1}	ΔV_{14} at $\Delta V_{25}=1V$	420	500	580	mV
Y signal voltage gain (3)	ΔV_{18-1}	ΔV_{18} at $\Delta V_{25}=1V$	0.95	1.1	1.25	V
Delay Section						
Y signal delay time	$t_{DL\,(Y)}$	Y signal input, output deley time at DL=100ns	188	235	282	ns
Y signal frequency characteristics (1)	$e_{f\,(Y_1)}$	f=10MHz/f=1MHz at DL=100ns	−6	−4	—	dB
Y signal frequency characteristics (2)	$e_{f\,(Y_2)}$	f=10MHz/f=1MHz at DL=65ns	−6	−3	—	dB
Primary differential signal delay time	t_{DL}	DL=100ns	80	100	120	ns
Primary differential signal delay time varying amount	Δt_{DL}	Difference in delay time change-over	28	35	42	ns
Aperture Correction Section						
Aperture correction signal maximum gain	$A_{v\,(L)}$	f=2MHz Output at Vin=0.5V_{P-P}	0.7	0.9	1.3	V_{P-P}
Aperture correction signal coring characteristics (1)	$e_{CO\,(L_1)}$	f=4MHz, Vin=75mV_{P-P} Output amplitude at V_{12}=1V	100	130	160	mV_{P-P}
Aperture correction signal coring characteristics (2)	$e_{CO\,(L_2)}$	f=4MHz, Vin=75mV_{P-P} Output amplitude at V_{12}=5V	—	25	50	mV_{P-P}
Aperture correction signal secondary differential gain ratio	$\Delta A_{v'\,(L)}$	f=4MHz/f=2MHz at Vin=0.5V_{P-P}	−6	−4	−2	dB
Detail Correction Section						
Detail correction signal maximum gain	$A_{v\,(S)}$	Input output ratio at Vin=50mV_{P-P}	16	18	21	dB
Detail correction signal gain control (typ.)	$\Delta A_{v\,(S)}$	Output ratio at V_3=5V→3V	−8.5	−6	−3.5	dB

■ Electrical Characteristics (cont.) (Ta=25±2℃) (AN5342K)

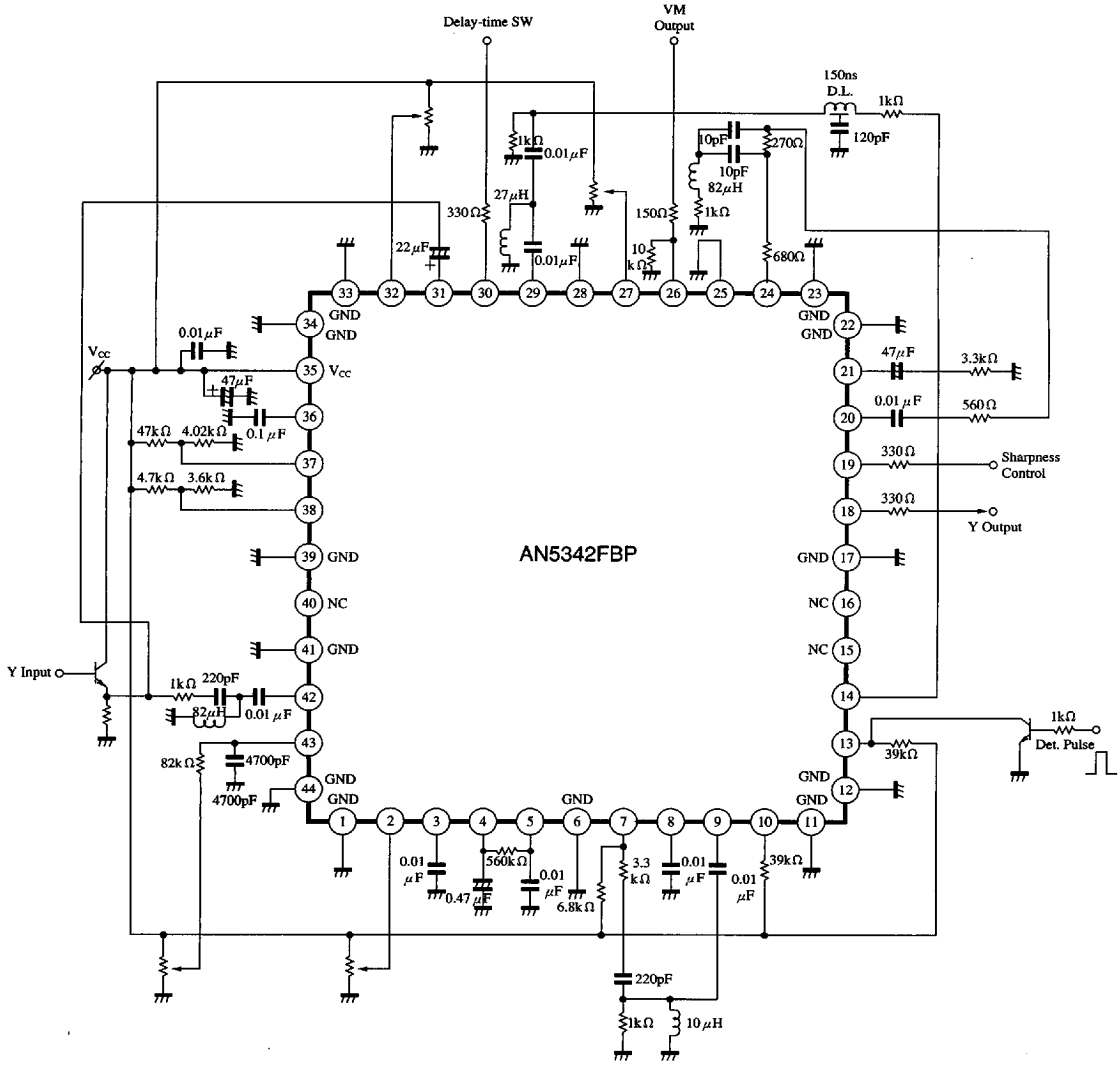
Parameter	Symbol	Condition	min	typ	max	Unit
Detail correction signal coring characteristics	$e_{CO\ (S)}$	f=4MHz, Vin=50mV$_{P-P}$ Output ratio at V_{26}=5V→3V	−7	−4	−2	dB
Detail correction signal limiter characteristics	$\Delta e_{LT\ (S)}$	f=4MHz, Vin=100mV$_{P-P}$ Output ratio at V_{12}=5V→3V	—	−5	−3	dB
Detail correction signal sharpness control	$\Delta A_{v'\ (S)}$	f=4MHz, Vin=50mV$_{P-P}$ Output ratio at V_{16}=5V→3V	—	−7	−4	dB
DSC Section						
DSC output voltage (1)	$V_{LIM\ (DSC)}$	f=4MHz Output DC at Vin=27mV$_{P-P}$	2	3	4	V
DSC output voltage (2)	$V_{S\ (DSC)}$	f=4MHz, Output DC at Vin=150mV$_{P-P}$	7.5	8.8	—	V
DSC output voltage (3)	$V_{L\ (DSC)}$	f=4MHz, Output DC at Vin=840mV$_{P-P}$	—	0.2	1.0	V
Noise reduction characteristics	V_{NR}	f=4MHz, Pin㉖ bias voltage at Vin=150mV$_{P-P}$	—	0.2	1.0	V
VM Section						
VM signal maximum gain	$A_{v\ (VM)}$	f=4MHz, Output amplitude at Vin=100mV$_{P-P}$	0.6	0.9	1.4	V$_{P-P}$
VM signal limiter characteristics	$\Delta A_{v\ (VM)}$	f=4MHz, Vin=100mV$_{P-P}$ Output ratio at V_{22}=0→2V	2.5	4.0	5.5	dB
VM signal SW operation characteristics	$e_{off\ (VM)}$	f=4MHz, Vin=100mV$_{P-P}$ Output ratio at V_{20}=5V→3V	—	−40	−25	dB
VM signal output DC level	ΔV_{21-1}	V_{CC}=9V, Pin㉑ output voltage difference at V_{20}=0V/2V	−90	0	+90	mV
Reference Value						
Y signal delay time variation amount	$\Delta t_{DL\ (Y)}$	Difference of delay time in delay time change-over	—	(35)	—	ns
Primary differential signal pulse width (1)	$\Delta t_{(DL_1)}$	Pulse width in 125ns pulse input (DL=100ns)	—	(190)	—	ns
Primary differential signal pulse width (2)	$\Delta t_{(DL_2)}$	Pulse width in 125ns pulse input (DL=65ns)	—	(225)	—	ns
Primary differential signal output amplitude (1)	$A_{v\ (DL_1)}$	Pulse width in 125ns pulse input (DL=100ns)	—	(0.9)	—	V$_{P-P}$
Primary differential signal output amplitude (2)	$A_{v\ (DL_2)}$	Pulse width in 125ns pulse input (DL=65ns)	—	(0.8)	—	V$_{P-P}$
Profile correction signal gain difference at delay change-over	$\Delta A_{v\ (L)}$	f=2Mz, Vin=0.5V$_{P-P}$ Output ratio at V_{24}=0→3V	—	(−3)	—	dB

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

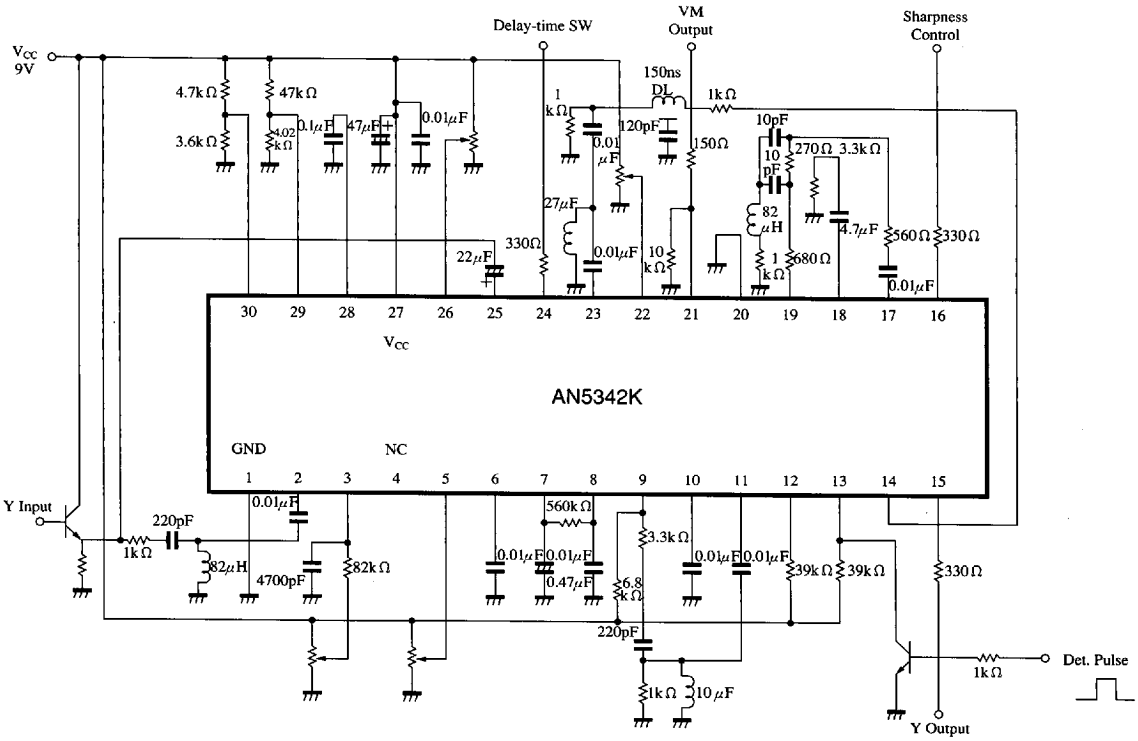
Reference $P_D - Ta$



Application Circuit of AN5342FBP



■ Application Circuit



ICs for TV