

AN5342FBP, AN5342K

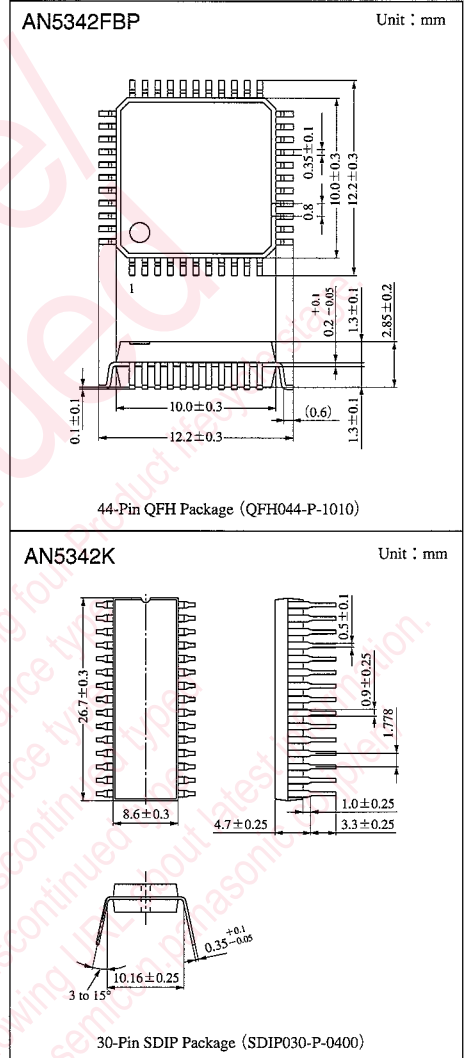
Color TV Horizontal Aperture Correction IC

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



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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	°C
Storage temperature ^{Note 1)}	T _{stg}	-55 to +150	°C

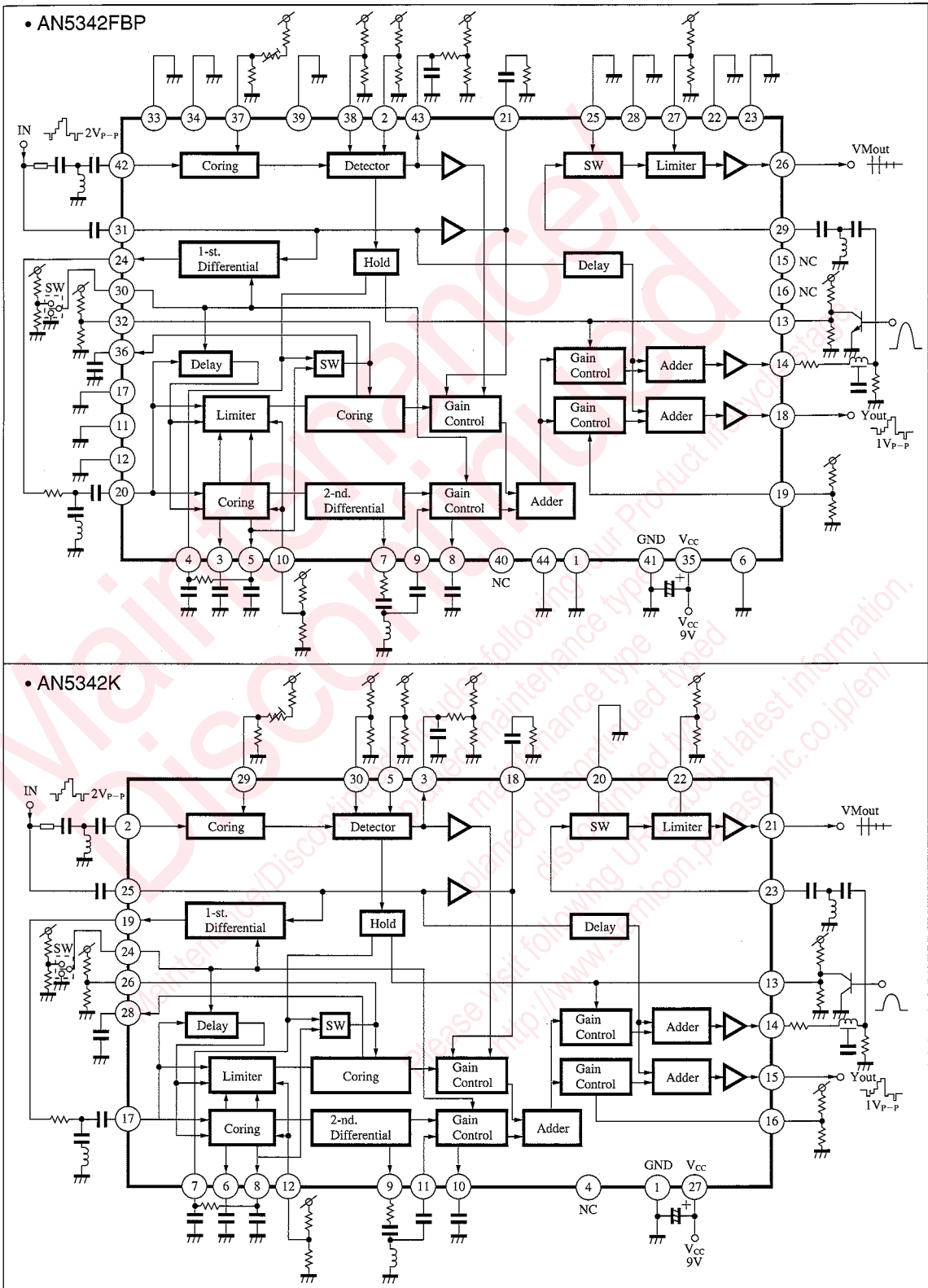
Note 1) T_a=25°C except operating ambient temperature and storage temperature.

Note 2) For only AN5342FBP, 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 _{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

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Electrical Characteristics (Ta = 25 ± 2°C) (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 delay 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.) ($T_a=25\pm 2^\circ\text{C}$) (AN5342FBP)

Parameter	Symbol	Condition	min	typ	max	Unit
Detail correction signal gain control (typ.)	$\Delta A_v (S)$	$f=4\text{MHz}$ $V_{in}=50\text{mV}_{P-P}$ Output ratio at $V_{43}=5\text{V}\rightarrow 3\text{V}$	-8.5	-6	-3.5	dB
Detail correction signal coring characteristics	$e_{CO} (S)$	$f=4\text{MHz}$ $V_{in}=50\text{mV}_{P-P}$ Output ratio at $V_{32}=5\text{V}\rightarrow 3\text{V}$	-7	-4	-2	dB
Detail correction signal limiter characteristics	$\Delta e_{LT} (S)$	$f=4\text{MHz}$ $V_{in}=100\text{mV}_{P-P}$ Output ratio at $V_{10}=5\text{V}\rightarrow 3\text{V}$	—	-5	-3	dB
Detail correction signal sharpness control	$\Delta A_v' (S)$	$f=4\text{MHz}$ $V_{in}=50\text{mV}_{P-P}$ Output ratio at $V_{19}=5\text{V}\rightarrow 3\text{V}$	—	-7	-4	dB

DSC Section

DSC output voltage (1)	$V_{LIM} (DSC)$	$f=4\text{MHz}$ Output DC at $V_{in}=27\text{mV}_{P-P}$	2	3	4	V
DSC output voltage (2)	$V_S (DSC)$	$f=4\text{MHz}$ Output DC at $V_{in}=150\text{mV}_{P-P}$	7.5	8.8	—	V
DSC output voltage (3)	$V_L (DSC)$	$f=4\text{MHz}$ Output DC at $V_{in}=840\text{mV}_{P-P}$	—	0.2	1.0	V
Noise reduction characteristics	V_{NR}	$f=4\text{MHz}$ $\text{Pin}\textcircled{2}$ bias voltage at $V_{in}=150\text{mV}_{P-P}$	—	0.2	1.0	V

VM Section

VM signal maximum gain	$A_v (VM)$	$f=4\text{MHz}$ Output amplitude at $V_{in}=100\text{mV}_{P-P}$	0.6	0.9	1.4	V_{P-P}
VM signal limiter characteristics	$\Delta A_v (VM)$	$f=4\text{MHz}$ $V_{in}=100\text{mV}_{P-P}$ Output ratio at $V_{27}=5\text{V}\rightarrow 3\text{V}$	2.5	4.0	5.5	dB
VM signal SW operation characteristics	$e_{off} (VM)$	$f=4\text{MHz}$ $V_{in}=100\text{mV}_{P-P}$ Output ratio at $V_{25}=0\rightarrow 2\text{V}$	—	-40	-25	dB
VM signal output DC level	V_{26-41}	Difference in case between, $V_{25}=0$ and $V_{25}=2\text{V}$	-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	$\Delta A_v (L)$	$f=2\text{MHz}$, $V_{in}=0.5\text{V}_{P-P}$ Output ratio at $V_{30}=0\rightarrow 3\text{V}$	—	(-3)	—	dB

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

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Electrical Characteristics ($T_a = 25 \pm 2^\circ\text{C}$) (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 $\Delta V_{25} = 1\text{V}$	420	500	580	mV
Y signal voltage gain (2)	ΔV_{14-1}	ΔV_{14} at $\Delta V_{25} = 1\text{V}$	420	500	580	mV
Y signal voltage gain (3)	ΔV_{18-1}	ΔV_{18} at $\Delta V_{25} = 1\text{V}$	0.95	1.1	1.25	V
Delay Section						
Y signal delay time	$t_{DL}(Y)$	Y signal input, output delay time at $DL = 100\text{ns}$	188	235	282	ns
Y signal frequency characteristics (1)	$e_r(Y_1)$	$f = 10\text{MHz}/f = 1\text{MHz}$ at $DL = 100\text{ns}$	-6	-4	—	dB
Y signal frequency characteristics (2)	$e_r(Y_2)$	$f = 10\text{MHz}/f = 1\text{MHz}$ at $DL = 65\text{ns}$	-6	-3	—	dB
Primary differential signal delay time	t_{DL}	$DL = 100\text{ns}$	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	$A_v(L)$	$f = 2\text{MHz}$ Output at $V_{in} = 0.5V_{P-P}$	0.7	0.9	1.3	V_{P-P}
Aperture correction signal coring characteristics (1)	$e_{CO}(L_1)$	$f = 4\text{MHz}$, $V_{in} = 75mV_{P-P}$ Output amplitude at $V_{12} = 1\text{V}$	100	130	160	mV_{P-P}
Aperture correction signal coring characteristics (2)	$e_{CO}(L_2)$	$f = 4\text{MHz}$, $V_{in} = 75mV_{P-P}$ Output amplitude at $V_{12} = 5\text{V}$	—	25	50	mV_{P-P}
Aperture correction signal secondary differential gain ratio	$\Delta A_v'(L)$	$f = 4\text{MHz}/f = 2\text{MHz}$ at $V_{in} = 0.5V_{P-P}$	-6	-4	-2	dB
Detail Correction Section						
Detail correction signal maximum gain	$A_v(S)$	Input output ratio at $V_{in} = 50mV_{P-P}$	16	18	21	dB
Detail correction signal gain control (typ.)	$\Delta A_v(S)$	Output ratio at $V_3 = 5V \rightarrow 3V$	-8.5	-6	-3.5	dB

Electrical Characteristics (cont.) ($T_a = 25 \pm 2^\circ\text{C}$) (AN5342K)

Parameter	Symbol	Condition	min	typ	max	Unit
Detail correction signal coring characteristics	e_{CO} (s)	$f=4\text{MHz}$, $V_{in}=50\text{mV}_{P-P}$ Output ratio at $V_{26}=5\text{V} \rightarrow 3\text{V}$	-7	-4	-2	dB
Detail correction signal limiter characteristics	Δe_{LT} (s)	$f=4\text{MHz}$, $V_{in}=100\text{mV}_{P-P}$ Output ratio at $V_{12}=5\text{V} \rightarrow 3\text{V}$	—	-5	-3	dB
Detail correction signal sharpness control	$\Delta A_v'$ (s)	$f=4\text{MHz}$, $V_{in}=50\text{mV}_{P-P}$ Output ratio at $V_{16}=5\text{V} \rightarrow 3\text{V}$	—	-7	-4	dB

DSC Section

DSC output voltage (1)	V_{LIM} (DSC)	$f=4\text{MHz}$ Output DC at $V_{in}=27\text{mV}_{P-P}$	2	3	4	V
DSC output voltage (2)	V_S (DSC)	$f=4\text{MHz}$, Output DC at $V_{in}=150\text{mV}_{P-P}$	7.5	8.8	—	V
DSC output voltage (3)	V_L (DSC)	$f=4\text{MHz}$, Output DC at $V_{in}=840\text{mV}_{P-P}$	—	0.2	1.0	V
Noise reduction characteristics	V_{NR}	$f=4\text{MHz}$, $\text{Pin} \textcircled{2}$ bias voltage at $V_{in}=150\text{mV}_{P-P}$	—	0.2	1.0	V

VM Section

VM signal maximum gain	A_v (VM)	$f=4\text{MHz}$, Output amplitude at $V_{in}=100\text{mV}_{P-P}$	0.6	0.9	1.4	V_{P-P}
VM signal limiter characteristics	ΔA_v (VM)	$f=4\text{MHz}$, $V_{in}=100\text{mV}_{P-P}$ Output ratio at $V_{22}=0 \rightarrow 2\text{V}$	2.5	4.0	5.5	dB
VM signal SW operation characteristics	e_{off} (VM)	$f=4\text{MHz}$, $V_{in}=100\text{mV}_{P-P}$ Output ratio at $V_{20}=5\text{V} \rightarrow 3\text{V}$	—	-40	-25	dB
VM signal output DC level	ΔV_{21-1}	$V_{CC}=9\text{V}$, $\text{Pin} \textcircled{2}$ output voltage difference at $V_{20}=0\text{V}/2\text{V}$	-90	0	+90	mV

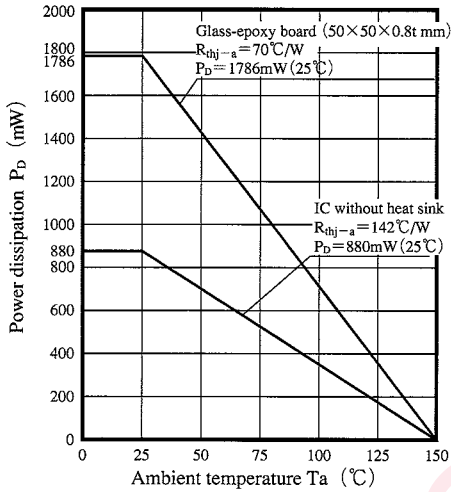
Reference Value

Y signal delay time variation amount	Δt_{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	ΔA_v (L)	$f=2\text{MHz}$, $V_{in}=0.5\text{V}_{P-P}$ Output ratio at $V_{24}=0 \rightarrow 3\text{V}$	—	(-3)	—	dB

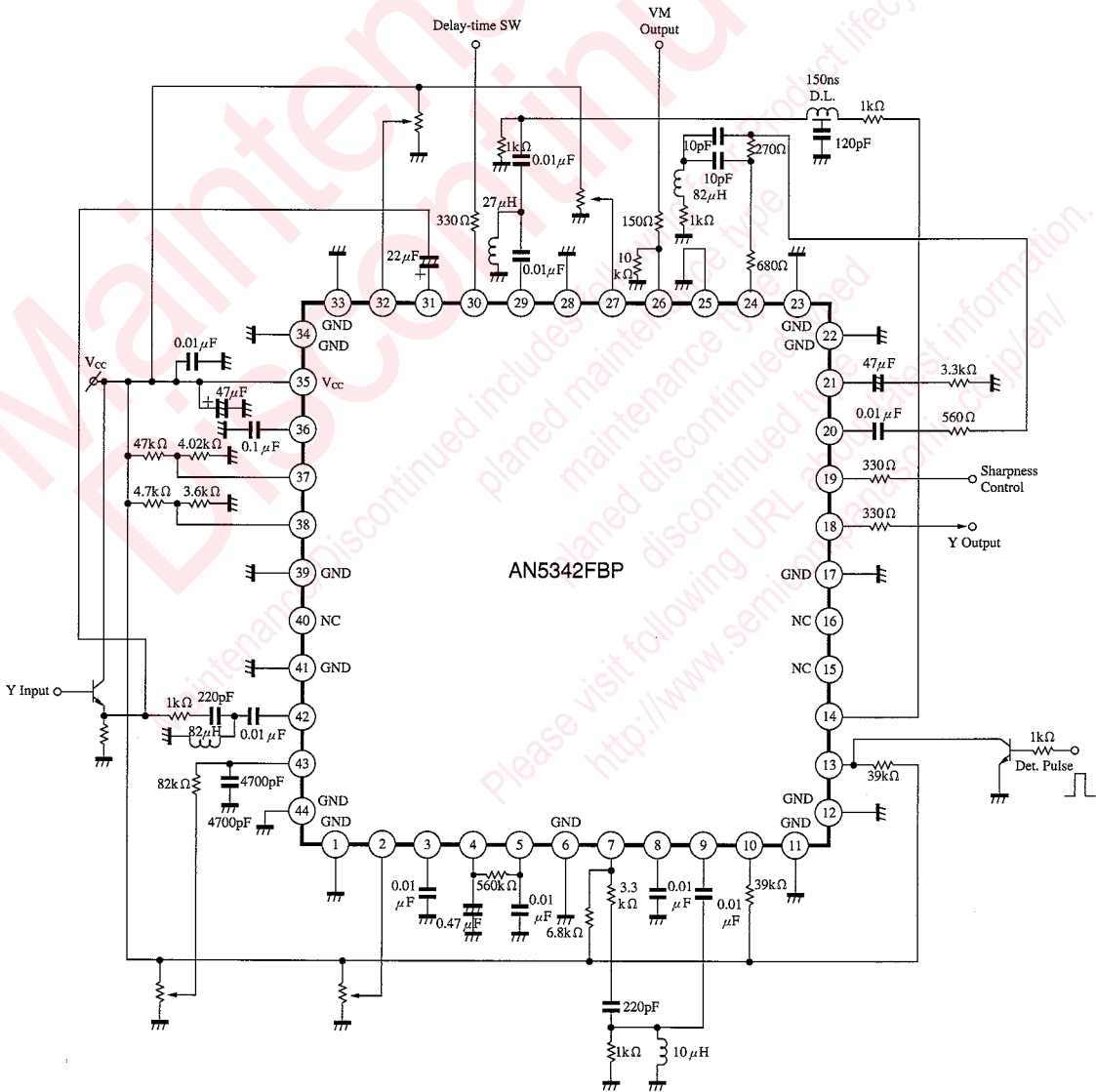
Note) The characteristics value in parentheses is not a guaranteed value, but reference one on design.

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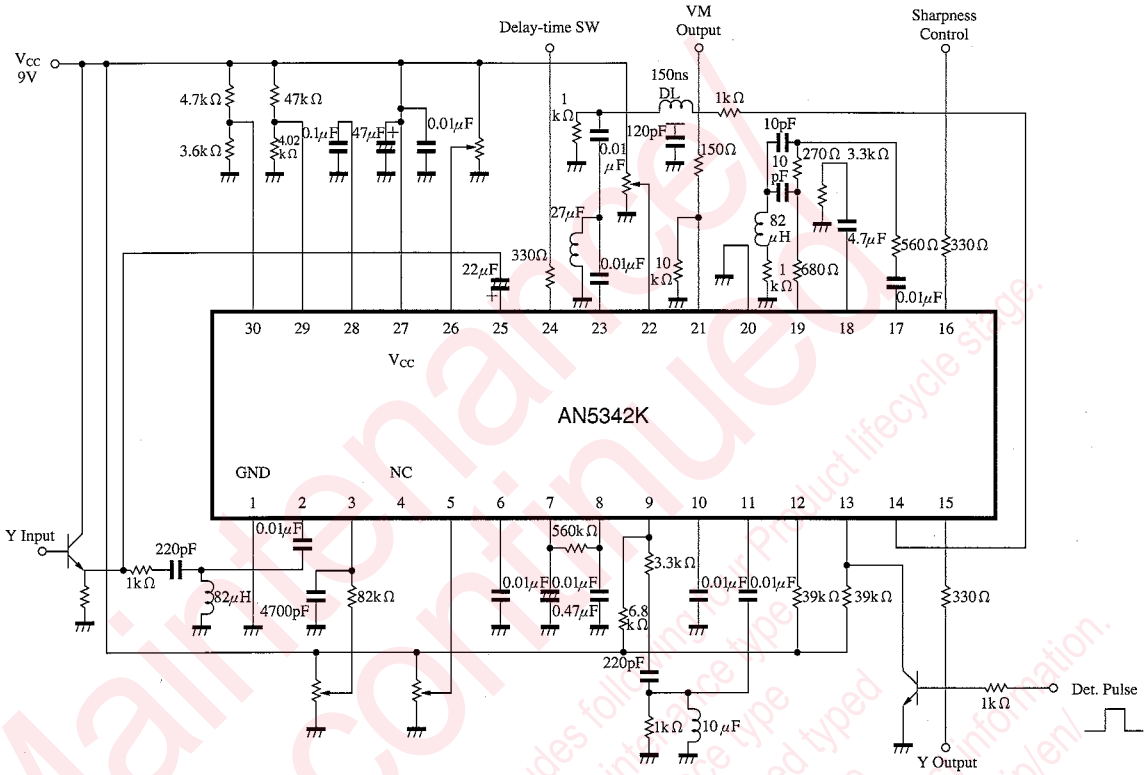
Reference $P_D - T_a$



Application Circuit of AN5342FBP



■ Application Circuit



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