PROVISINAL INFORMATION

M52759SP

UNIFORMITY FOR CRT DISPLAY MONITOR

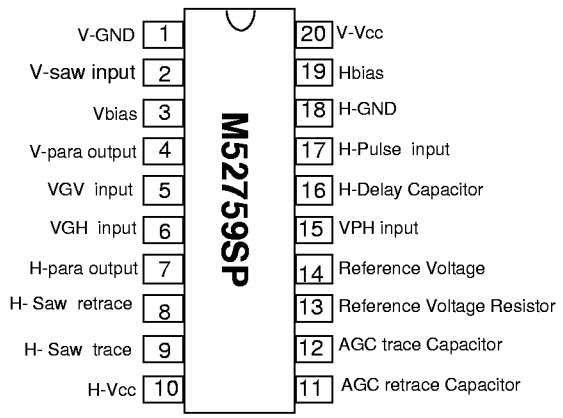
DESCRIPTION

M52759SP is Semiconductor Integrated Circuit for uniformity of CRT Display Monitor.
It generates horizontal and vertical parabola waves and is able to revise contrast of CRT Display Monitor if it is used with Video Pre. Amp. M52742SP that has uniformity circuit .

FEATURES

- It can control phase of horizontal wave.
- It can changes the parabola wave unbalance .
- It contains the horizontal saw wave generator and Auto Gain Control circuit , so that it is able to keep the amplitude constant if frequency change.
- It can changes the parabola wave unbalance .
- Frequency Band Width: horizontal 24 to 120kHz
  vertical 50 to 185Hz
- Input: horizontal 5Vp-p Pulse
  vertical 3.2 Vp-p V Saw

PIN CONFIGURATION (TOP VIEW)



Package:20P4B

STRUCTURE

Bipolar Silicon Monolisic IC

APPLICATION

CRT Display Monitor

Supply voltage range

11.5V to 12.5V

Rated supply voltage

12V

Application Example

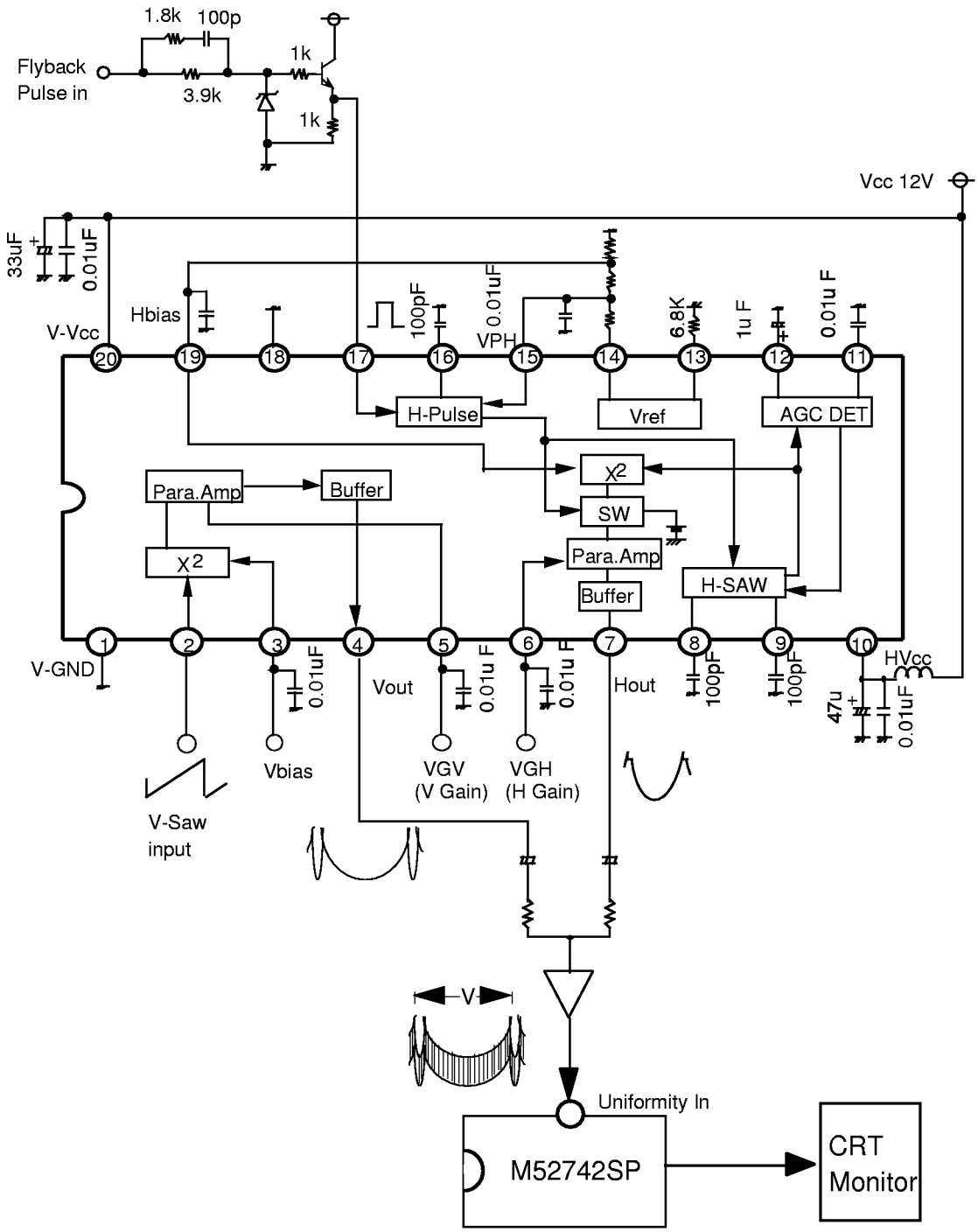


FIG1. BLOCK DIAGRAM

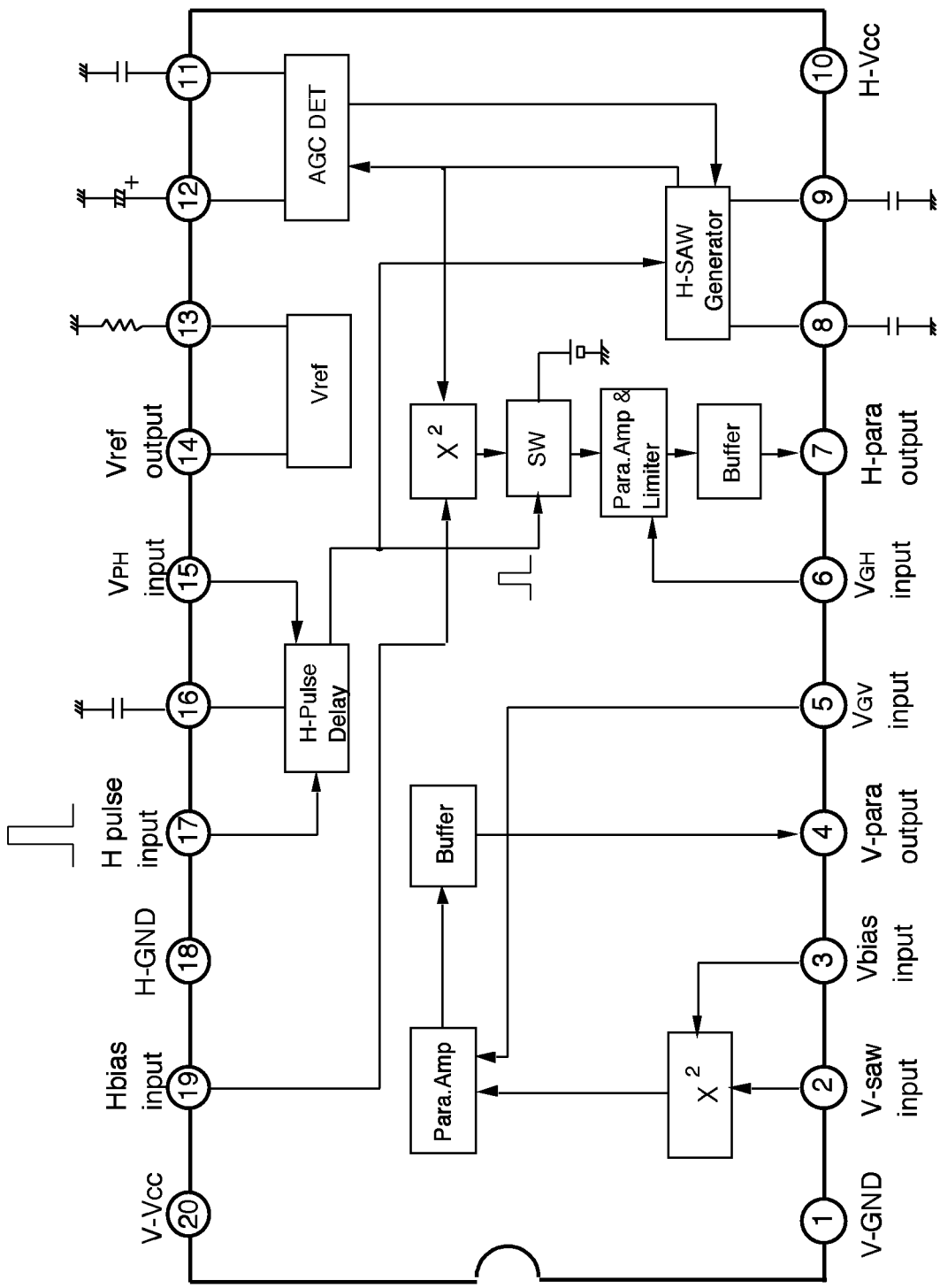
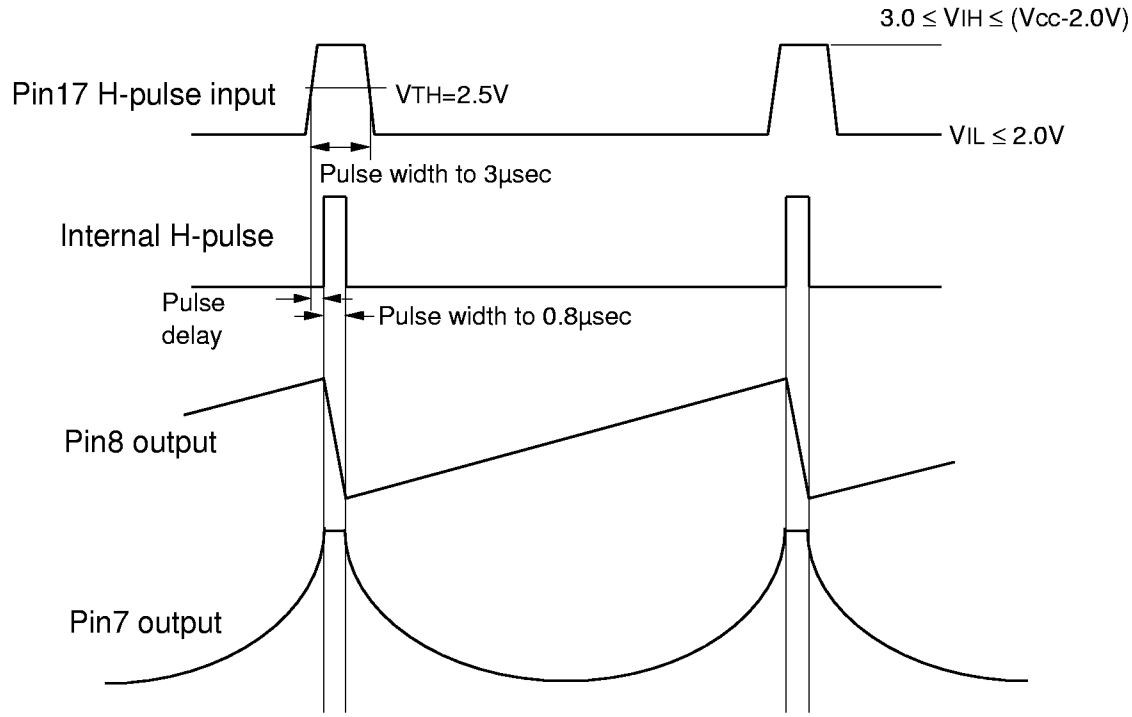
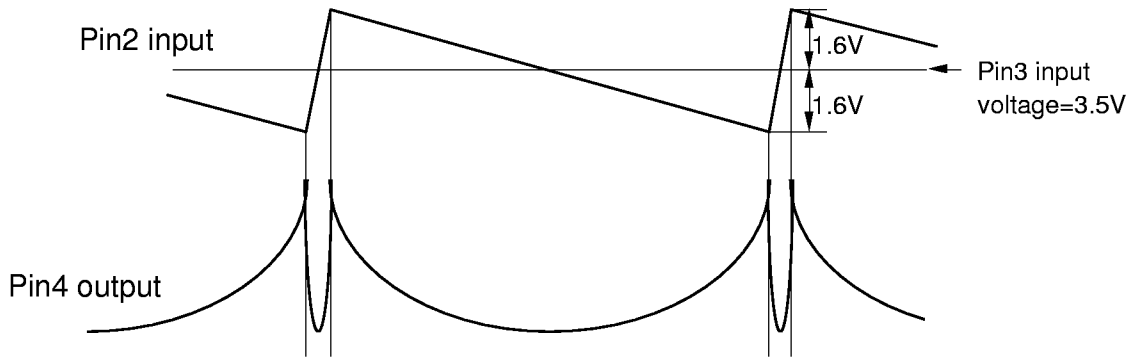


FIG2. TIMING CHART

HORIZONTAL BLOCK



VERTICAL BLOCK

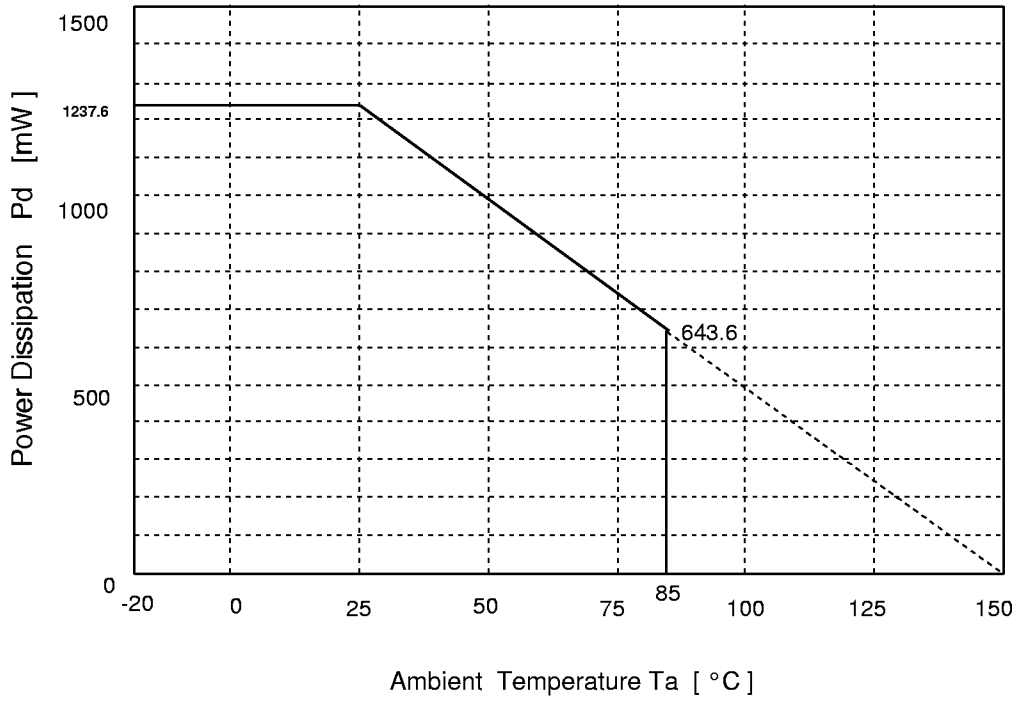


1.ABSOLUTE MAXIMUM RATING

(Ta = 25°C, Surge capacity=200pF)

Parameter	Symbol	Min.	Typ	Max	Unit
Supply voltage	Vcc	-	-	13.0	V
Power dissipation	Pd	-	-	1237.6	mW
Operating temperature	Topr	-20	-	+85	°C
Storage temperature	Tstg	-40	-	+150	°C
Recommended operating voltage	Vopr	-	12.0	-	V
Recommended operating voltage range	Vopr'	11.5	-	12.5	V
Surge	Vsurge	±200	-	-	V

Fig.3 THERMAL DERATING



2.ELECTRICAL CHARACTERISTICS

(Ta=25°C, Vcc=12V, unless otherwise noted)

No	Parameter	Symbol	Test conditions	Pin	Limits			Unit
					MIN	TYP	MAX	
1	Circuit current1	I_{CCH}	⑩ Measure	⑩	15.1	21.5	27.9	mA
2	Circuit current2	I_{CCV}	⑳ Measure	⑳	5.2	7.4	9.6	mA
3	Reference voltage output	V_{REF}	⑭ Measure	⑭	6.75	6.95	7.15	V
4	Reference voltage temperature drift	D_{REF}	⑭ Measure	⑭	—	49	—	ppm/deg

HORIZONTAL BLOCK

No	Parameter	Symbol	Test conditions	Pin	Limit			Unit
					MIN	STYP	MAX	
5	H-pulse low input range	V_{IL}	⑥2.4V in⑦Measure⑮3.0V in ⑰fH=96KHz H-pulse in⑲6.1V in	⑦	0.0	—	2.0	V
6	H-pulse high input range	V_{IH}	⑥2.4V in⑦Measure⑮3.0V in ⑰fH=96KHz H-pulse in⑲6.1V in	⑦	3.0	—	VCC -2.0	V
7	H-pulse low input current	I_{IL}	⑰0V in,measure	⑰	-5.0	-0.6	-0.1	µA
8	H-pulse high input current	I_{IH}	⑰5V in,measure	⑰	-1.0	0.0	1.0	µA
9	H parabola width	T_W	⑥2.4V in⑦Measure⑮3.0V in ⑰fH=96KHz H-pulse in⑲6.1V in	⑦	0.6	0.8	1.0	µsec
10	H parabola delay 1	T_{D1}	⑥2.4V in⑦Measure⑮0V in ⑰fH=96KHz H-pulse in⑲6.1V in	⑦	0.1	0.3	0.5	µsec
11	H parabola delay 2	T_{D2}	⑥2.4V in⑦Measure⑮1.3V in ⑰fH=96KHz H-pulse in⑲6.1V in	⑦	0.4	0.6	0.8	µsec
12	H parabola delay 3	T_{D3}	⑥2.4V in⑦Measure⑮4.0V in ⑰fH=96KHz H-pulse in⑲6.1V in	⑦	2.9	3.1	3.3	µsec
13	Delay temperature drift	D_D	⑥2.4V in⑦Measure⑮3.0V in ⑰fH=96KHz H-pulse in⑲6.1V in	⑦	—	0.08	—	ns/deg
14	Pin⑮input current	$I_{⑮}$	⑰2.5V in,measure	⑮	-5.0	-0.3	-0.1	µA

No	Parameter	Symbol	Test conditions	Pin	Limits			Unit
					MIN	TYP	MAX	
15	H para. unbalance control1	UHP1	⑥1.8V in ⑦Measure ⑮0V in ⑰fH=96KHz H-pulse in ⑲5.7V in	⑦	-2.6	-2.2	-1.8	V
16	H para. unbalance control2	UHP2	⑥2.4V in ⑦Measure ⑮0V in ⑰fH=96KHz H-pulse in ⑲6.1V in	⑦	0.1	0.5	0.9	V
17	H para. unbalance control3	UHP3	⑥1.8V in ⑦Measure ⑮0V in ⑰fH=96KHz H-pulse in ⑲6.4V in	⑦	1.7	2.1	2.5	V
18	H para. unbalance Vcc. character1	VUHP1	⑥2.4V in ⑦Measure ⑮0V in ⑩⑳11.5V in ⑰fH=96KHz H-pulse in ⑲6.1V in	⑦	-0.2	0.0	0.2	V
19	H para. unbalance Vcc. character2	VUHP2	⑥2.4V in ⑦Measure ⑮0V in ⑩⑳12.5V in ⑰fH=96KHz H-pulse in ⑲6.1V in	⑦	-0.2	0.0	0.2	V
20	H para. unbalance temperature drift	DUHP	⑥2.4V in ⑦Measure ⑮0V in ⑰fH=96KHz H-pulse in ⑲6.1V in	⑦	—	-2.2	—	mV /deg
21	H para. gain control1	GHP1	⑥1.0V in ⑦Measure ⑮3.0V in ⑰fH=96KHz H-pulse in ⑲6.1V in	⑦	0.2	0.4	0.6	Vp-p
22	H para. gain control2	GHP2	⑥2.5V in ⑦Measure ⑮3.0V in ⑰fH=96KHz H-pulse in ⑲6.1V in	⑦	2.9	3.3	3.7	Vp-p
23	H para. gain control3	GHP3	⑥4.0V in ⑦Measure ⑮3.0V in ⑰fH=96KHz H-pulse in ⑲6.1V in	⑦	5.3	6.0	6.7	Vp-p
24	H para. freq. characteristics1	FHP1	⑥4.0V in ⑦Measure ⑮3.0V in ⑰fH=24KHz H-pulse in ⑲6.1V in	⑦	-0.2	0.0	0.2	V
25	H para. freq. characteristics2	FHP2	⑥4.0V in ⑦Measure ⑮3.0V in ⑰fH=120KHz H-pulse in ⑲6.1V in	⑦	-0.2	0.0	0.2	V
26	H para. Vcc. characteristics1	VVHP1	⑥4.0V in ⑦Measure ⑮3.0V in ⑩⑳11.5V in ⑰fH=96KHz H-pulse in ⑲6.1V in	⑦	-0.2	0.0	0.2	V
27	H para. Vcc. characteristics2	VVHP2	⑥4.0V in ⑦Measure ⑮3.0V in ⑩⑳12.5V in ⑰fH=96KHz H-pulse in ⑲6.1V in	⑦	-0.2	0.0	0.2	V
28	H para. size temperature drift	DHP	⑥4.0V in ⑦Measure ⑮3.0V in ⑰fH=96KHz H-pulse in ⑲6.1V in	⑦	—	-1.3	—	mV/deg
29	Pin⑥ input current	$I_{⑥}$	⑥2.4V in,measure	⑥	-5.0	-0.3	-0.1	μA
30	Pin⑲ input current	$I_{⑲}$	⑲6.1V in,measure	⑲	0.1	0.3	5.0	μA

VERTICAL BLOCK

No	Parameter	Symbol	Test conditions	Pin	Limits			Unit
					MIN	TYP	MAX	
31	V parabola accuracy 1	A_{VP1}	② 3.5V in ③ 3.5V in ④ Measure ⑤ 2.3V in	④	4.5	5.0	5.5	V
32	V parabola accuracy 2	A_{VP2}	② 1.9V in ③ 3.5V in ④ Measure ⑤ 2.3V in	④	2.5	3.0	3.5	V
33	V parabola accuracy 3	A_{VP3}	② 2.7V in ③ 3.5V in ④ Measure ⑤ 2.3V in	④	20	25	30	%
34	V parabola accuracy 4	A_{VP4}	② 4.3V in ③ 3.5V in ④ Measure ⑤ 2.3V in	④	20	25	30	%
35	V parabola accuracy 5	A_{VP5}	② 5.1V in ③ 3.5V in ④ Measure ⑤ 2.3V in	④	90	100	110	%
36	V para. unbalance control1	U_{VP1}	② fv=70Hz, 3.2Vpp saw wave in ③ 2.8V in ④ Measure ⑤ 1.6V in	④	-2.8	-2.5	-2.2	V
37	V para. unbalance control2	U_{VP2}	② fv=70Hz, 3.2Vpp saw wave in ③ 3.5V in ④ Measure ⑤ 2.3V in	④	-0.3	0	0.3	V
38	V para. unbalance control3	U_{VP3}	② fv=70Hz, 3.2Vpp saw wave in ③ 4.2V in ④ Measure ⑤ 1.6V in	④	2.2	2.5	2.8	V
39	V unbalance. Vcc. characteristics 1	V_{UVP1}	② fv=70Hz, 3.2Vpp saw wave in ③ 3.5V in ④ Measure ⑤ 2.3V in ⑩ ⑳ 11.5V in	④	-0.1	0.0	0.1	V
40	V unbalance. Vcc. characteristics 2	V_{UVP2}	② fv=70Hz, 3.2Vpp saw wave in ③ 3.5V in ④ Measure ⑤ 2.3V in ⑩ ⑳ 12.5V in	④	-0.1	0.0	0.1	V
41	V unbalance. temperature drift	D_{UVP}	② fv=70Hz, 3.2Vpp saw wave in ③ 3.5V in ④ Measure ⑤ 2.3V in	④	—	0.5	—	mV/deg
42	V parabola amplitude 1	G_{VP1}	② fv=70Hz, 3.2Vpp saw wave in ③ 3.5V in ④ Measure ⑤ 1.0V in	④	0	0	0.3	Vp-p
43	V parabola amplitude 2	G_{VP2}	② fv=70Hz, 3.2Vpp saw wave in ③ 3.5V in ④ Measure ⑤ 2.0V in	④	2.1	2.4	2.7	Vp-p
44	V parabola amplitude 3	G_{VP3}	② fv=70Hz, 3.2Vpp saw wave in ③ 3.5V in ④ Measure ⑤ 3.0V in	④	4.2	4.7	5.2	Vp-p
45	V para. freq. characteristics 1	F_{VP1}	② fv=50Hz, 3.2Vpp saw wave in ③ 3.5V in ④ Measure ⑤ 3.0V in	④	-0.1	0.0	0.1	V
46	V para. freq. characteristics 2	F_{VP2}	② fv=185Hz, 3.2Vpp saw wave in ③ 3.5V in ④ Measure ⑤ 3.0V in	④	-0.1	0.0	0.1	V
47	V para. Vcc. characteristics 1	V_{VP1}	② fv=70Hz, 3.2Vpp saw wave in ③ 3.5V in ④ Measure ⑤ 3.0V in ⑩ ⑳ 11.5V in	④	-0.1	0.0	0.1	V
48	V para. Vcc. characteristics 2	V_{VP2}	② fv=70Hz, 3.2Vpp saw wave in ③ 3.5V in ④ Measure ⑤ 3.0V in ⑩ ⑳ 12.5V in	④	-0.1	0.0	0.1	V
49	V para. temperature drift	D_{VP}	② fv=70Hz, 3.2Vpp saw wave in ③ 3.5V in ④ Measure ⑤ 3.0V in	④	—	-2.2	—	mV/deg
50	Pin ② input current	$I_{②}$	② 3.5V in,measure	②	-5.0	-0.3	-0.1	µA
51	Pin ③ input current	$I_{③}$	③ 3.5V in,measure	③	-5.0	-0.3	-0.1	µA
52	Pin ⑤ input current	$I_{⑤}$	⑤ 2.3V in,measure	⑤	-5.0	-0.3	-0.1	µA

Switch and Voltage Condition

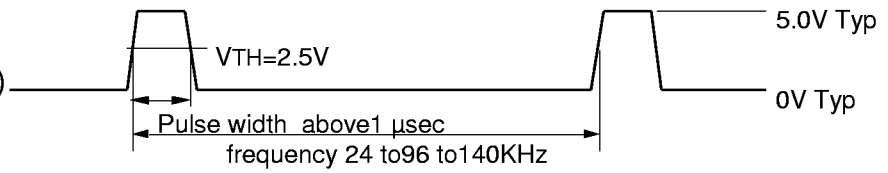
No	Symbol	Switch									Voltage [V]							
		SW2	SW3	SW5	SW6	SW10	SW15	SW17	SW19	SW20	Vcc	V2	V3	V5	V6	V15	V17	V19
1	I_{CCH}	a	a	a	a	b	a	b	a	a	12.0	3.5	3.5	2.5	2.4	3.0	0	6.1
2	I_{CCV}					a				b								
3	V_{REF}									a								
4	D_{REF}							↓									↓	
5	V_{IL}							a									-	
6	V_{IH}							↓									↓	
7	I_{IL}							b									0	
8	I_{IH}							↓									5.0	
9	T_W							a								↓	-	
10	T_{D1}															0		
11	T_{D2}															1.3		
12	T_{D3}															4.0		
13	D_D						↓	↓								3.0	↓	
14	$I_{⑮}$						b	b							↓	-	0	↓
15	U_{HP1}						a	a							1.8	0	-	5.7
16	U_{HP2}														2.4			6.1
17	U_{HP3}										↓				1.8			6.4
18	V_{UHP1}										11.5				2.4			6.1
19	V_{UHP2}										12.5							
20	D_{UHP}										12.0				↓	↓		
21	G_{HP1}														1.0	3.0		
22	G_{HP2}														2.5			
23	G_{HP3}														4.0			
24	F_{HP1}																	
25	F_{HP2}										↓							
26	V_{VHP1}										11.5							
27	V_{VHP2}										12.5							
28	D_{HP}				↓			↓			12.0				↓		↓	
29	$I_{⑥}$				b			b	↓						-		0	↓
30	$I_{⑲}$	↓	↓	↓	a	↓	↓	↓	b	↓	↓	↓	↓	↓	2.4	↓	↓	-

No	Symbol	Switch									Voltage [V]							
		SW2	SW3	SW5	SW6	SW10	SW15	SW17	SW19	SW20	Vcc	V2	V3	V5	V6	V15	V17	V19
31	A_{VP1}	a	a	a	a	a	a	b	a	a	12.0	3.5	3.5	2.3	2.4	3.0	0	6.1
32	A_{VP2}											1.9						
33	A_{VP3}											2.7						
34	A_{VP4}											4.3						
35	A_{VP5}	↓										5.1	↓	↓				
36	U_{VP1}	b										-	2.8	1.6				
37	U_{VP2}												3.5	2.3				
38	U_{VP3}										↓		4.2	1.6				
39	V_{UVP1}										11.5		3.5	2.3				
40	V_{UVP2}										12.5							
41	D_{UVP}										12.0			↓				
42	G_{VP1}													1.0				
43	G_{VP2}													2.0				
44	G_{VP3}													3.0				
45	F_{VP1}																	
46	F_{VP2}										↓							
47	V_{VP1}										11.5							
48	V_{VP1}										12.5							
49	D_{VP}	↓									12.0	↓		↓				
50	I②	c	↓									3.5		2.3				
51	I③	a	b	↓										↓				
52	I⑤	↓	a	b	↓	↓	↓	↓	↓	↓	↓	↓	↓	-	↓	↓	↓	↓

Input Signal

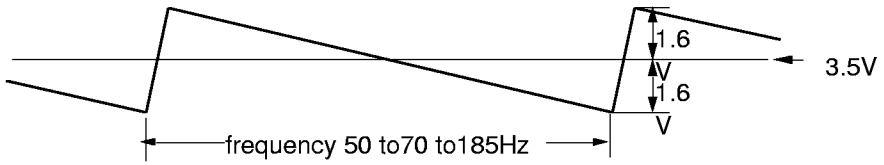
PG

(Input Signal to Pin ⑰)



SG

(Input Signal to Pin ②)



The way to measure

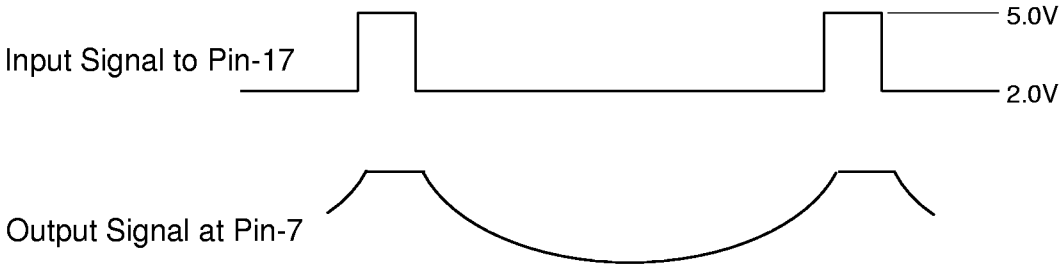
No1.I_{CCH} Measure the input current to Pin-10.

No2.I_{CCV} Measure the input current to Pin-20.

No3.V_{REF} Measure the output voltage at Pin-14

No4.V_{REF} Measure temperature drift of Pin-14 .(-20°C to 85°C)

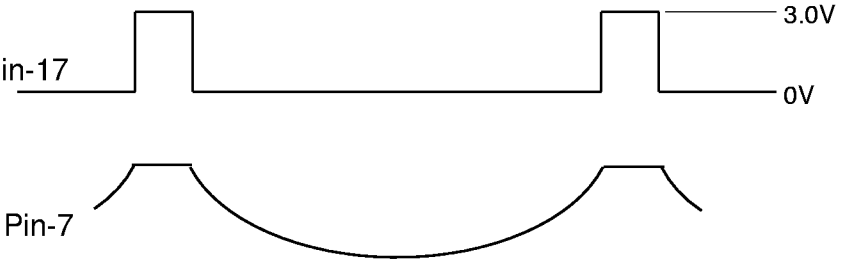
No5.V_{IL} Input Signal to Pin-17



Input horizontal pulse which low level is 2V in Pin-17 and confirm output horizontal signal at Pin-7.

No6.V_{IH}

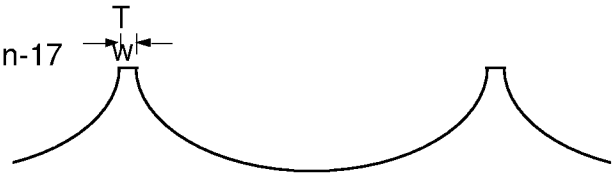
Input Signal to Pin-17



Input horizontal pulse which high level is 3V in Pin-17 and confirm
output horizontal signal at Pin-7.

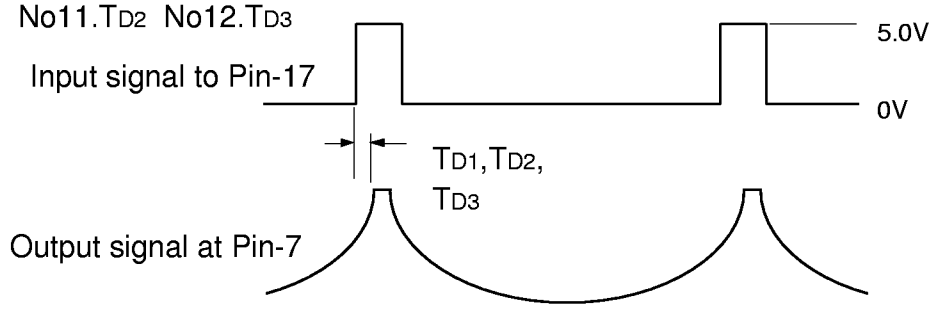
No9.Tw

Input Signal to Pin-17



Measure the time width of retrace period at Pin-7.

No10.T_{D1} No11.T_{D2} No12.T_{D3}

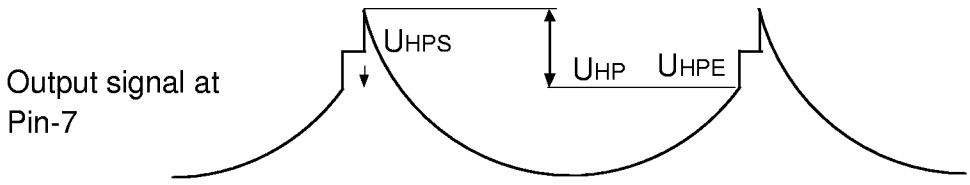


Measure the delay time from rise time of input signal to start of retrace period of output signal when the voltage of Pin-15 is 0V,1.3V,and 4V.

NO13.D D Measure the temperature drift of the delay time.(-20°C to 85°C)

NO14.I_{-15} Measure the input current to Pin-15 when the voltage of Pin-15 is 2.5V.

No15.U_{HP1} No16.U_{HP2} No17.U_{HP3}



U_{HPS} is defined as the voltage of parabola start point . U_{HPE} is defined as the voltage of parabola end point .U_{HP1} U_{HP2} U_{HP3} is defined as follows

$$U_{HP1}\ U_{HP2}\ U_{HP3} = U_{HPS} - U_{HPE}$$

Measure the unbalance of parabola waveform at Pin-4 when the voltage of Pin-19 is 5.7V,6.1V,and 6.4V. Pin-6 is controled so that the amplitude of parabola is 3Vp-p constant.

No18. V_{UHP1} When the supply voltage of Pin-10,20 is 11.5V,the unbalance of parabola waveform at Pin-7 is defined as $U_{HP11.5V}$.

$$V_{UHP1} = U_{HP2} - U_{HP11.5V}$$

No19. V_{UHP2} When the supply voltage of Pin-10,20 is 12.5V,the unbalance of parabola waveform at Pin-7 is defined as $U_{HP12.5V}$.

$$V_{UHP2} = U_{HP2} - U_{HP12.5V}$$

No20. D_{UHP} Measure temperature drift of U_{HP2} . (-20°C to 85°C)

No21. G_{HP1} Measure the amplitude of parabola waveform at Pin-7 and it is defined as $HP_{-6,1.0V}$

No22. G_{HP2} The amplitude of parabola waveform at Pin-7 is defined as $HP_{-6,2.5V}$.

No23. G_{HP2} The amplitude of parabola waveform at Pin-7 is defined as $HP_{-6,4.0V}$.

NO24. F_{HP1} When the frequency of input signal in Pin-17 is 96kHz ,the amplitude of parabola waveform at Pin-7 is defined as HP_{96KHZ}. When the frequency of input signal is 24kHz ,the amplitude of parabola waveform is defined as HP_{24KHZ}.

$$F_{HP1} = HP_{96KHZ} - HP_{24KHZ}$$

NO25. F_{HP2} When the frequency of input signal in Pin-17 is 140kHz ,the amplitude of parabola waveform at Pin-7 is defined as HP_{120KHZ}.

$$F_{HP2} = HP_{96KHZ} - HP_{140KHZ}$$

NO26. V_{VHP1} When the supply voltage of Pin-10,20 is 12.0V,the amplitude of parabola waveform at Pin-7 is defined as $HP_{12.0V}$. When the supply voltage is 11.5V,the amplitude of parabola waveform is defined as $HP_{11.5V}$.

$$V_{VHP1} = HP_{12.0V} - HP_{11.5V}$$

NO27. V_{VHP2} When the supply voltage of Pin-10,20 is 12.5V,the amplitude of parabola waveform at Pin-7 is defined as $HP_{12.5V}$.

$$V_{VHP2} = HP_{12.0V} - HP_{12.5V}$$

No28. D_{HP} Measure the temperature drift of HP_{96KHz}. (-20°C to 85°C)

No29. I_{-6} Measure the input current to Pin-6 when voltage of Pin-6 is 2.4V.

No30. I_{-19} Measure the input current to Pin-19 when voltage of Pin-19 is 6.1V.

No31. A_{VP1} Measure the output voltage at Pin-4and it is defined as $V_{P-2,3.5V}$.

No32. A_{VP2} The output voltage at Pin-4 is defined as $V_{P-2,1.9V}$.

$$A_{VP2} = V_{P-2,1.9V} - V_{P-2,3.5V}$$

No33. A_{VP3} The output voltage at Pin-4 is defined as $V_{P-2,2.7V}$.

$$A_{VP3} = \frac{V_{P-2,2.7V} - V_{P-2,3.5V}}{V_{P-2,1.9V} - V_{P-2,3.5V}} \times 100 \ (\%)$$

No34. A_{VP4} The output voltage at Pin-4 is defined as $V_{P-2,4.3V}$.

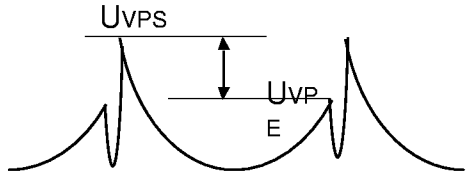
$$A_{VP4} = \frac{V_{P-2,4.3V} - V_{P-2,3.5V}}{V_{P-2,1.9V} - V_{P-2,3.5V}} \times 100 \ (\%)$$

No35. A_{VP5} The output voltage at Pin-4 is defined as $V_{P-2,5.1V}$.

$$A_{VP5} = \frac{V_{P-2,5.1V} - V_{P-2,3.5V}}{V_{P-2,1.9V} - V_{P-2,3.5V}} \times 100 \ (\%)$$

No36. U_{VP1} No37. U_{VP2} No38. U_{VP3}

Output signal at Pin-7



U_{VPS} is defined as the voltage of parabola start point . U_{VPE} is defined as the voltage of parabola end point .U_{VP1} U_{VP2} U_{VP3} is defined as follows

$$U_{VP1}\ U_{VP2}\ U_{VP3} = U_{VPS} - U_{VPE}$$

Measure the unbalance of parabola waveform at Pin-4 when the voltage of Pin-3 is 2.8V,3.5V,and 4.2V. Pin-5 is controled so that the amplitude of parabola is 3Vp-p constant

No39. V_{VP1} When the supply voltage of Pin-10,20 is 11.5V,the unbalance of parabola waveform at Pin-4 is defined as $U_{VP11.5V}$.

$$V_{UHP1} = U_{VP2} - U_{VP11.5V}$$

No40. V_{VP2} When the supply voltage of Pin-10,20 is 12.5V,the unbalance of parabola waveform at Pin-4 is defined as $U_{VP12.5V}$.

$$V_{UVP2} = U_{VP2} - U_{VP12.5V}$$

No41. D_{VP} Measure temperature drift of U_{VP2} .(-20°C to 85°C)

No42.G_{VP1} No43.G_{VP2}
No44.G_{VP3} Measure the amplitude of parabola waveform at Pin-4 when the voltage of Pin-5 is 1V,2V,and 3V.

No45.F_{VP1} When the frequency of input signal in Pin-2 is 70Hz ,the amplitude of parabola waveform at Pin-4is defined as VP_{70Hz}. When the frequency of input signal is 50Hz ,the amplitude of parabola waveform is defined as VP_{50Hz}.

$$F_{VP1} = VP_{70Hz} - VP_{50Hz}$$

No46.F_{VP2} When the frequency of input signal in Pin-2 is185Hz ,the amplitude of parabola waveform at Pin-4 is defined as VP_{185Hz}.

$$F_{VP2} = VP_{70Hz} - VP_{185Hz}$$

No47.V_{VP1} When the voltage of Pin-10,20 is 12.0V,the amplitude of parabola waveform is defined as $VP_{12.0V}$. When the voltage is 11.5V,the amplitude of parabola waveform is defined as $VP_{11.5V}$.

$$V_{VP1} = VP_{12.0V} - VP_{11.5V}$$

No48.V_{VP2} When the voltage of Pin-10,20 is 12.5V,the amplitude of parabola waveform is defined as $VP_{12.5V}$.

$$V_{VP2} = VP_{12.0V} - VP_{12.5V}$$

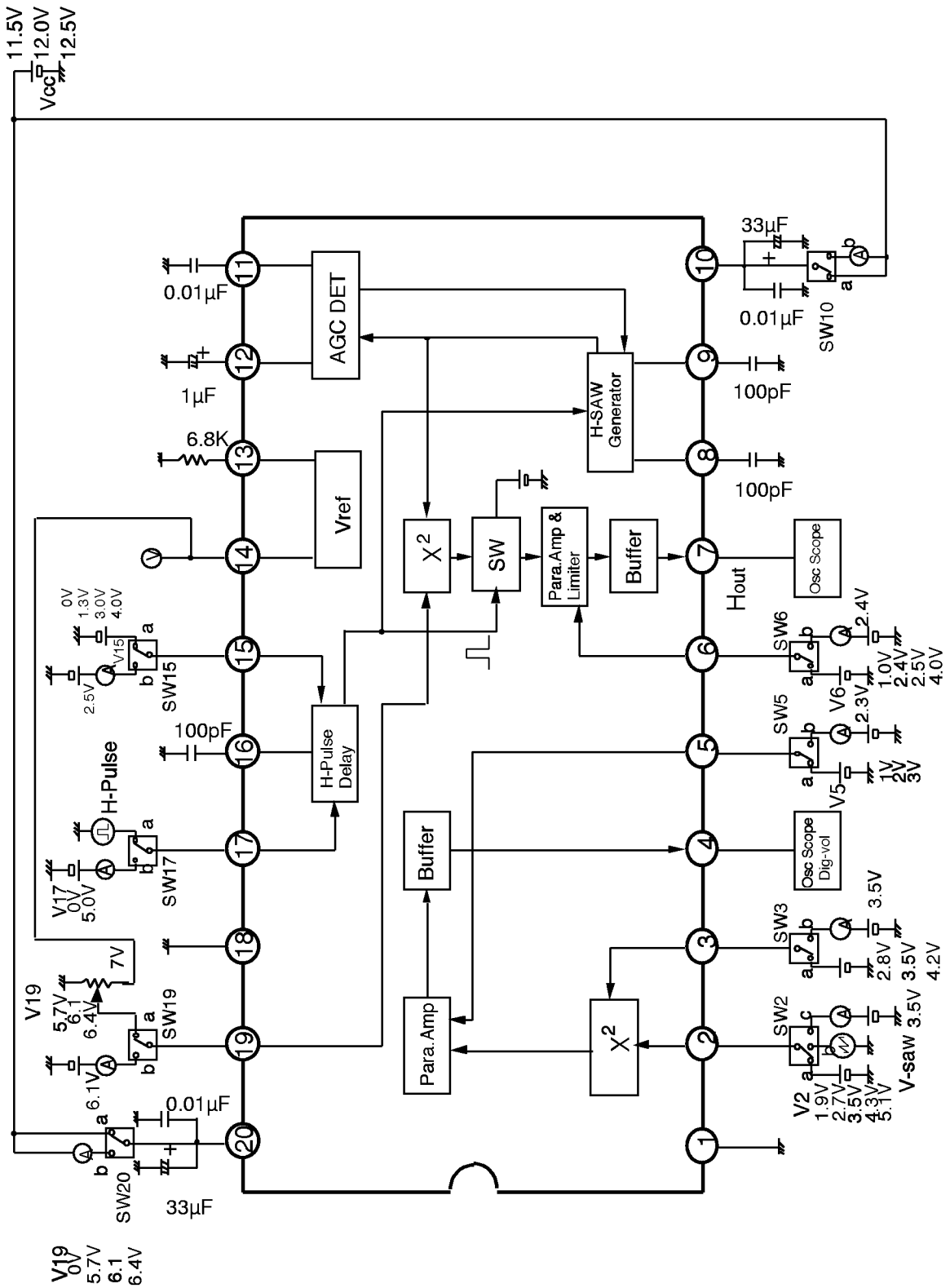
No49.Du_{VP} Measure temperature drift of VP_{70Hz}. (-20°C to 85°C)

No50.I_{-2} Measure the input current to Pin-2 when the voltage of Pin-2 is 3.5V.

No51.I_{-3} Measure the input current to Pin-3when the voltage of Pin-3 is 3.5V.

No52.I_{-5} Measure the input current to Pin-5when the voltage of Pin-5 is 2.4V.

TEST CIRCUIT

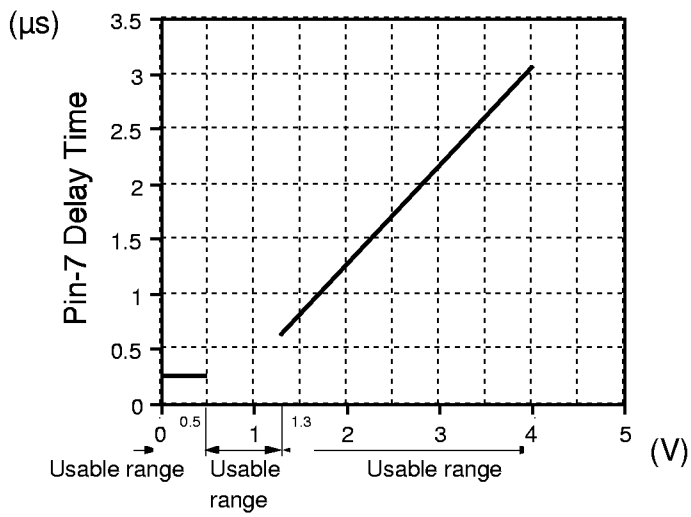


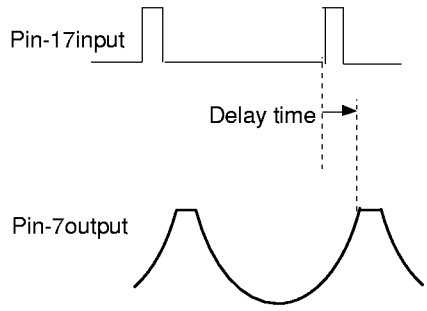
3.TYPICAL CHARACTERISTICS

Note:This is not final characteristics.

Horizontal Block

Delay control voltage vs Delay time

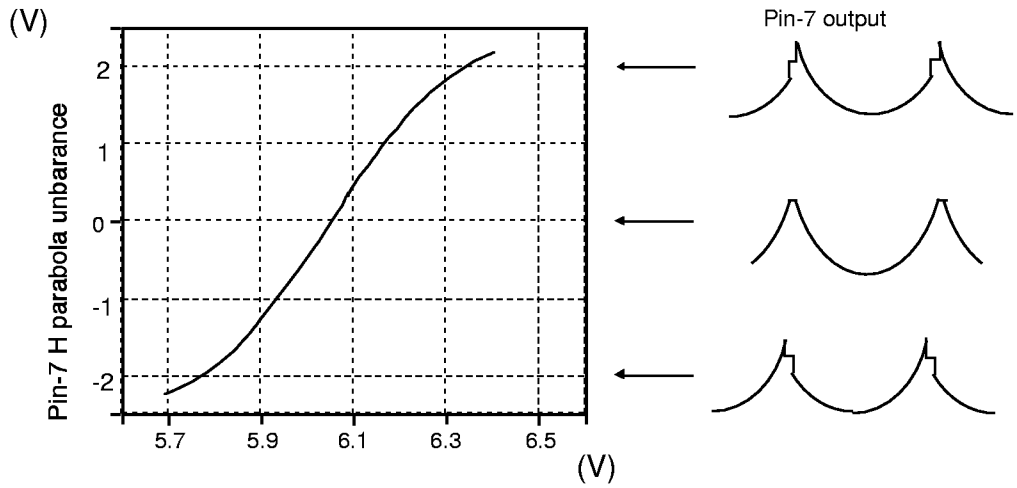




Pin-15 Delay control voltage

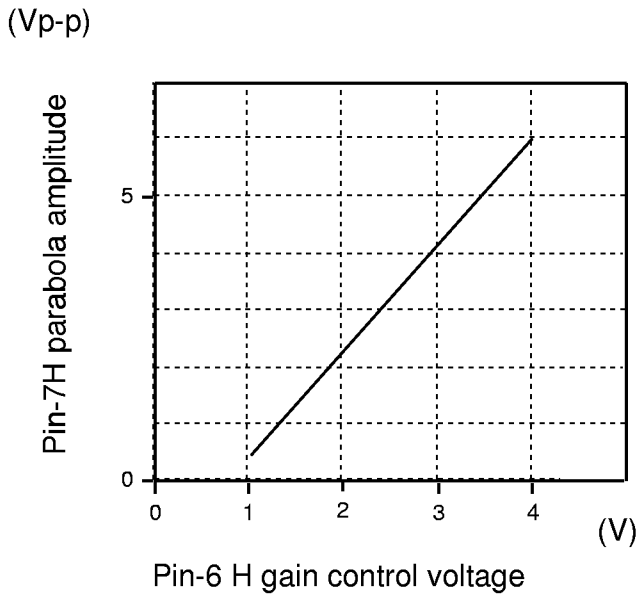
H unbarance control bias voltage vs H parabola unbarance

Pin-6 is controled as the amplitude of parabola is 3Vp-p constant



Pin-19 H unbarance control bias voltage

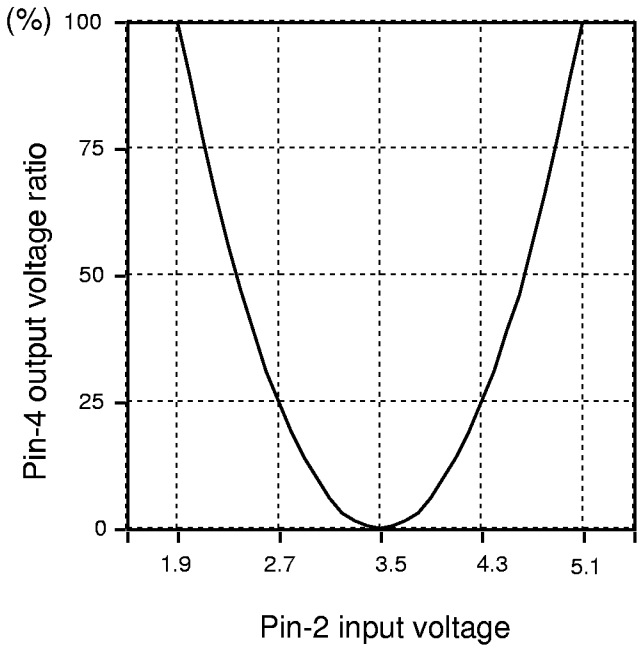
H gain control voltage vs H parabola amplitude



Pin-19 = 6.1V const.

Vertical Block

V para DC output voltage ratio



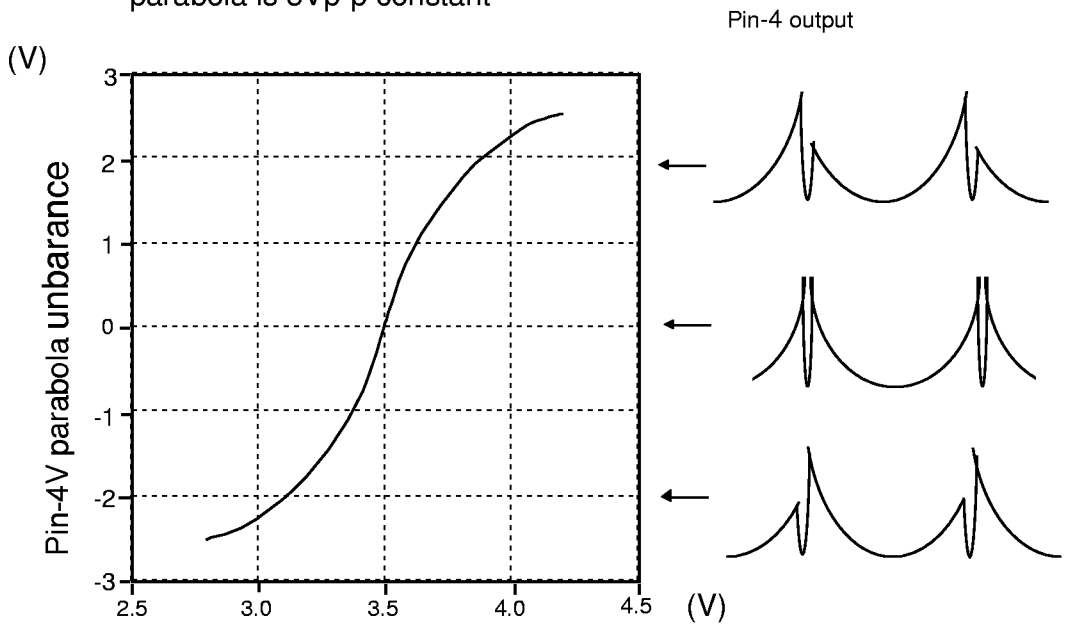
Pin-3=3.5V const.
Pin-5=2.3V const.

Output ratio

$$= \frac{\text{Pin-4out - Pin-4out@Pin-4=3.5V}}{\text{Pin-4out@Pin-2=1.9V - Pin-4out@Pin-2=3.5V}} \times 100\ (\%)$$

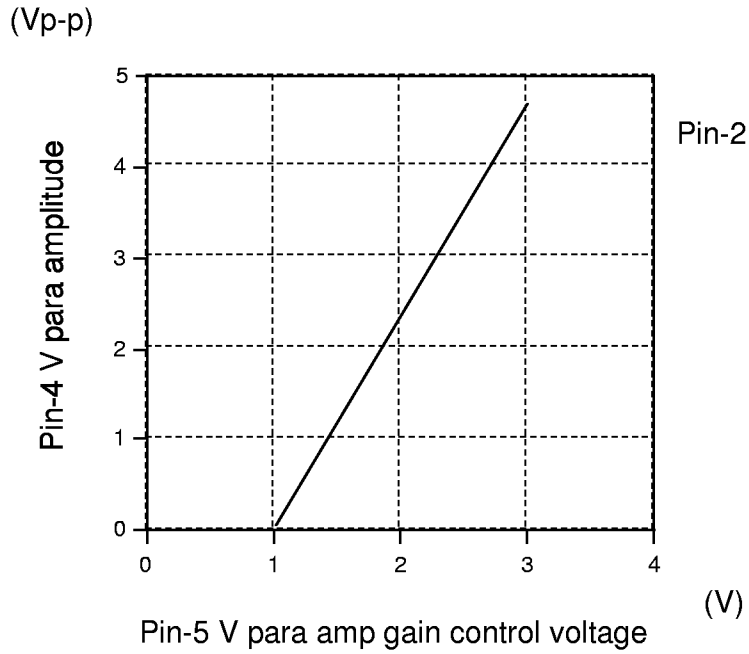
V unbarance control bias voltage vs V parabola unbarance

Pin-5 is controled as the amplitude of parabola is 3Vp-p constant



Pin-3 V unbarance control bias voltage

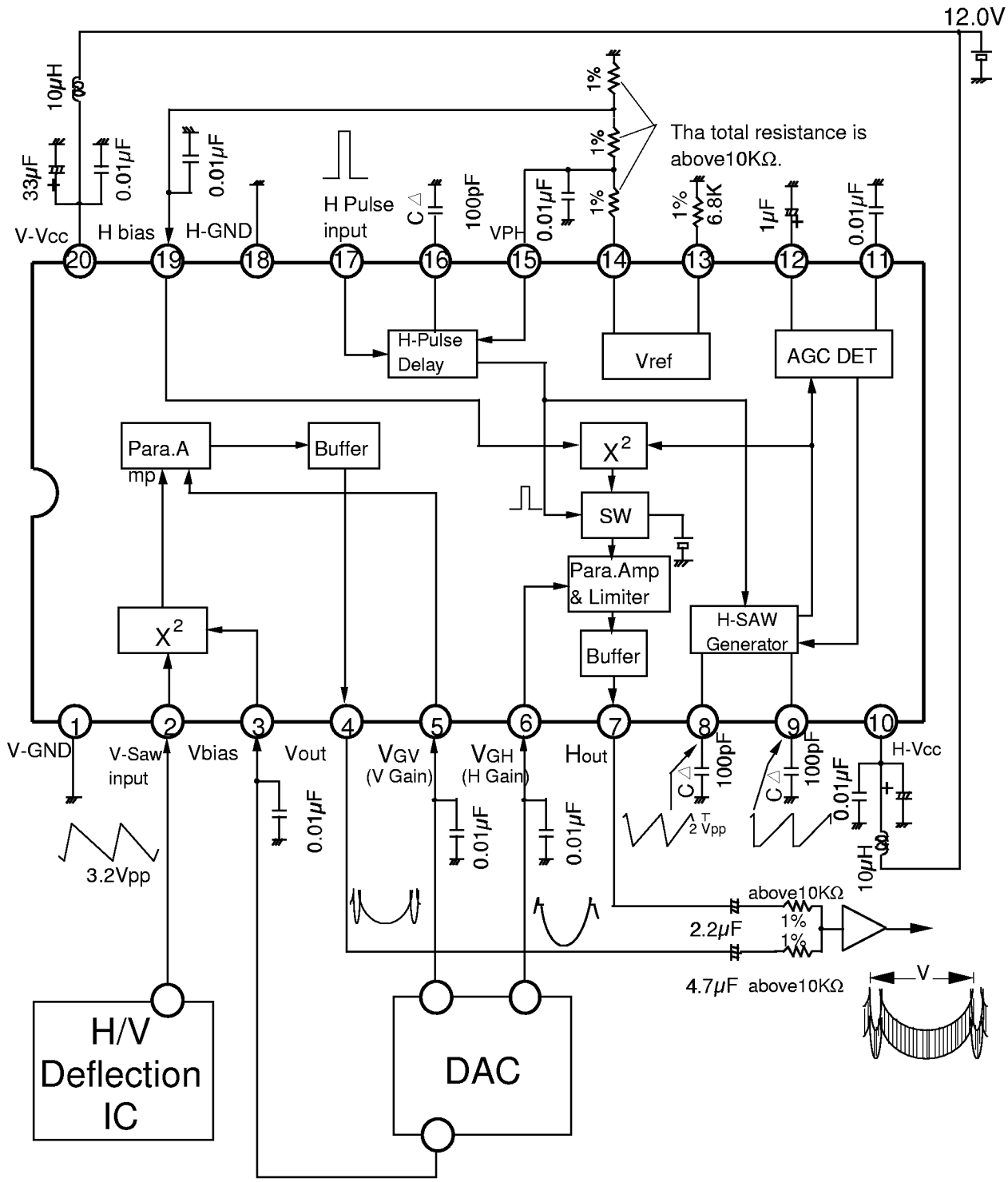
V para amp gain control voltage vs output amplitude



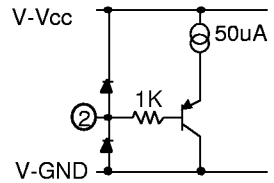
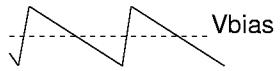
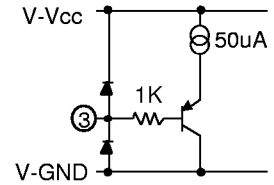
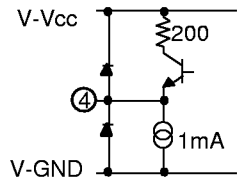
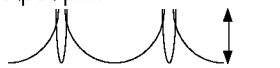
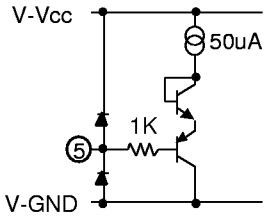
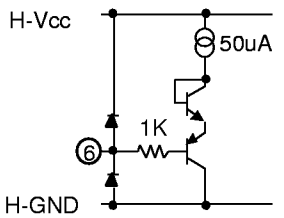
Pin-2 3.2Vpp sawtooth wave input

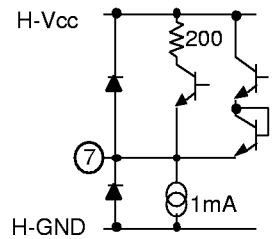
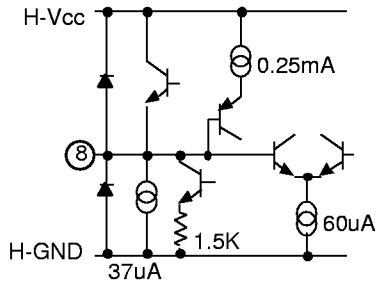
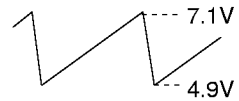
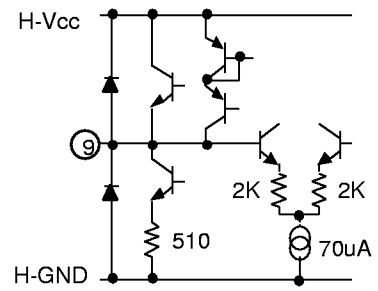
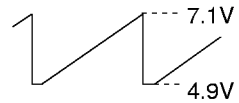
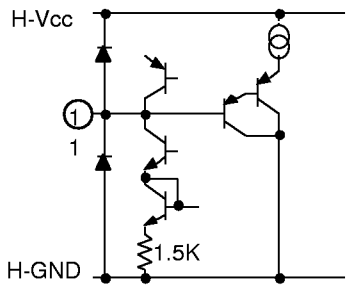
Pin-5 V para amp gain control voltage

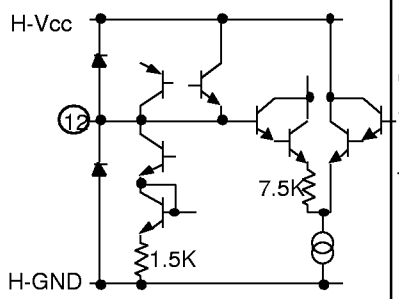
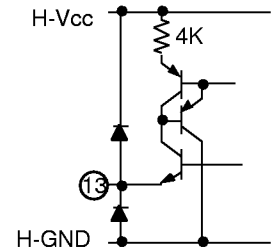
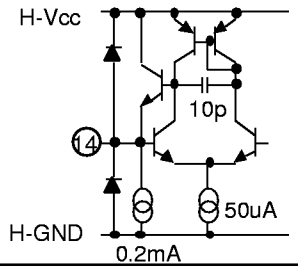
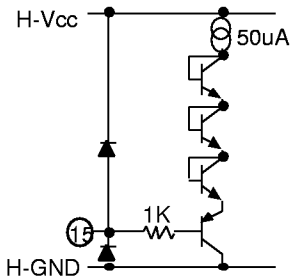
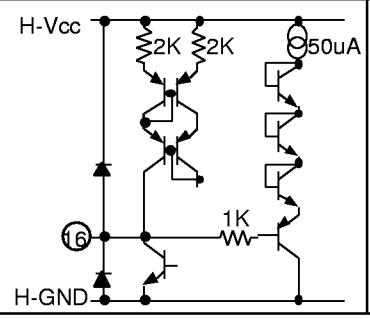
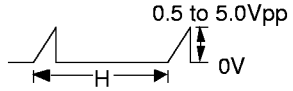
APPLICATION EXAMPLE

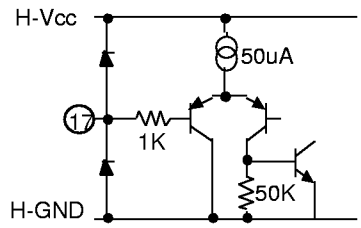
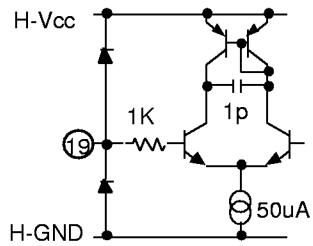


4.DESCRIPTION OF PIN

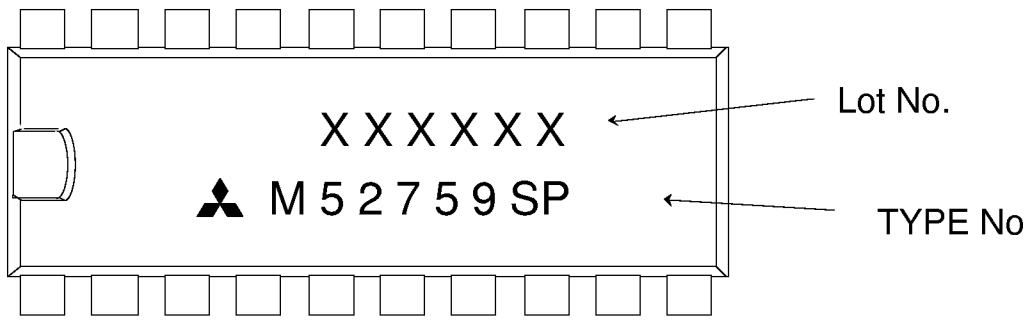
Pin NO	Name	DC Voltage	Equivalent circuit of pin	Remarks
1	V-GND			GND of vertical block
2	Vsawi	3.5V		Vertical sawtooth wave input pin. 
3	Vbias	2.8 to 4.2V		Vertical parabola unbarance control bias voltage input pin. Input voltage range is 2.8 to 4.2V
4	Vout	5V (Bottom)		Vertical parabola wave output pin.  Bottom voltage=5V(fixed) Amplitude is possible to control by pin-5
5	VGV	1.0 to 3.0V		Vertical parabola wave gain control voltage input pin.Input voltage range is 1.0 to 3.0V.
6	VGH	1.0 to 4.0V		Horizontal parabola wave gain control voltage input pin.Input voltage range is 1.0 to 4.0V.

Pin NO	Name	DC Voltage	Equivalent circuit of pin	Remarks
7	Hout	2.4 to 9.2V		horizontal parabola wave output pin.  Amplitude is possible to control by pin-6.
8	Cret	7.1V (Top) 4.9V (Bottom)		Connection pin of horizon -tal retrace capacitor. Recommended capaci- tance is 100pF. 
9	Ctrc	7.1V (Top) 4.9V (Bottom)		Connection pin of horizon -tal trace capacitor. Recommended capaci- tance is 100pF. 
10	H-Vcc	12.0V		Vcc of horizontal block.
11	CAGCr	2.5V		Connection pin of horizon -tal sawtooth wave AGC retrace capacitor. Recommended capaci- tance is 0.01µF

Pin NO	Name	DC Voltage	Equivalent circuit of pin	Remarks
12	CAGC	4.0V		Connection pin of horizon -tal AGC capacitor. Recommended capaci- tance is 1μF.
13	Vrefr	1.28V		Connection pin of reference current source resister. Recommended resistance is 6.8KΩ.
14	Vrefo	7.0V		Reference voltage output for horizontal pulse delay circuit. Should be connect more than 10kΩ external resister.
15	VPH	0 to 0.5V 1.34. to V		Delay adjustment voltage input pin of horizontal pulse.Input voltage range is 1.3 to 4.0V.At 0 to 0.5V, delay is minimized. (0.5 to 1.3V is unusable range.)
16	Chpd	0V (Bottom)		Connection pin of horizon -tal pulse delay timing capacitor.Recommended capacitance is 100pF. 

Pin NO	Name	DC Voltage	Equivalent circuit of pin	Remarks
17	HPin			Horizontal pulse input pin. Low input level is less than 2.0V,and high is 3.0 to 10V(at Vcc=12V).
18	H-GND			GND of horizontal block
19	Hbias	5.7 to 6.4V		Horizontal parabolall unbarance control bias voltage input pin.Input Voltage range is 5.7 to 6.4V.
20	V-Vcc	12.0V		Vcc of vertical block

5. MARK



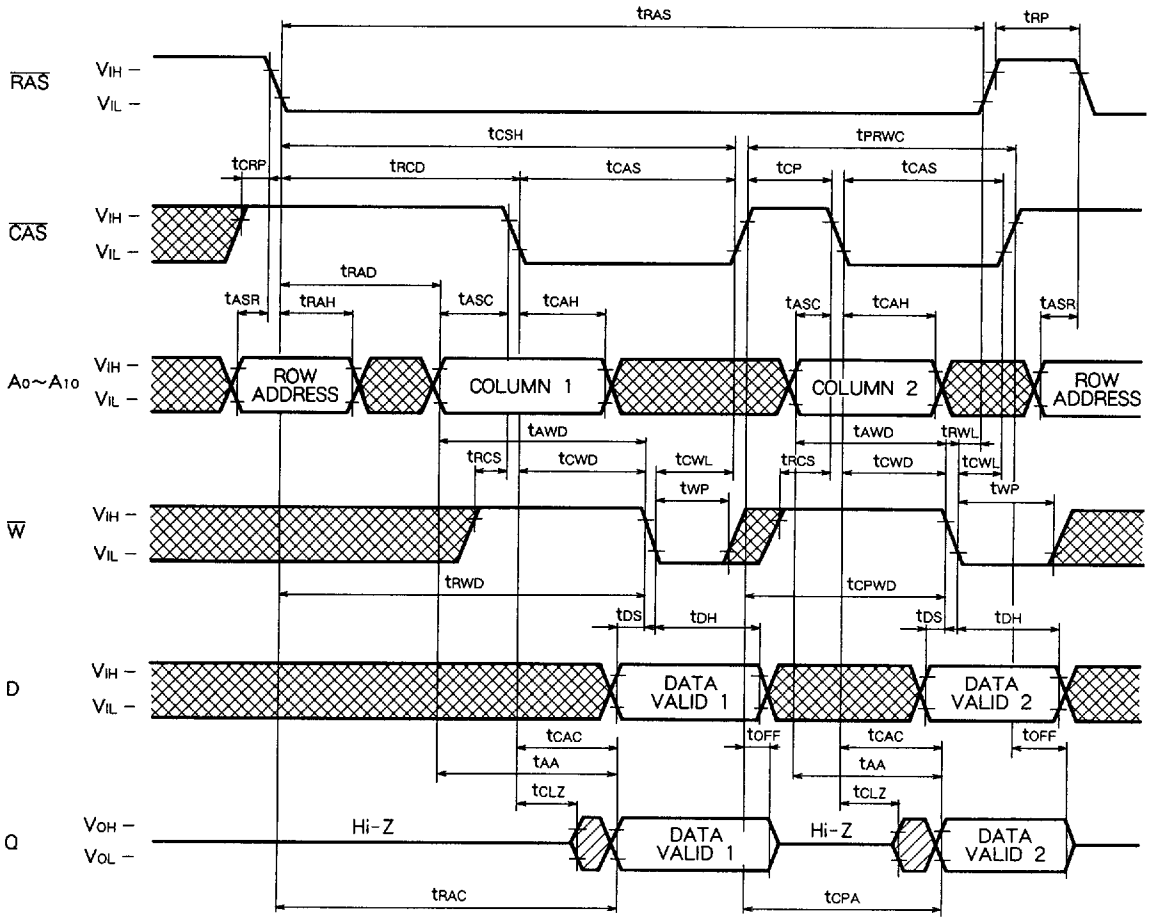
6. Material

Frame	Copper alloy
Lead plating	Solder plating
Resin	Epoxy resin

7. Factory of massproduction

FUKUOKA Fuctory

Fast-Page-Mode Read-Write, Read-Modify-Write Cycle



Self Refresh Cycle* (Note 30)