M52723ASP

Dynamic Focus

REJ03F0191-0201
Rev.2.01
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Description

The M52723ASP is semiconductor integrated circuit for Multi-Sync display monitors.

It generates horizontal and vertical parabola waves, and it can revise focus of CRT monitors.

Features

- It can control phase of horizontal wave.
- 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 change the parabola wave inretrace period to constant voltage in order to reduce load at the amplitude after IC.

Application

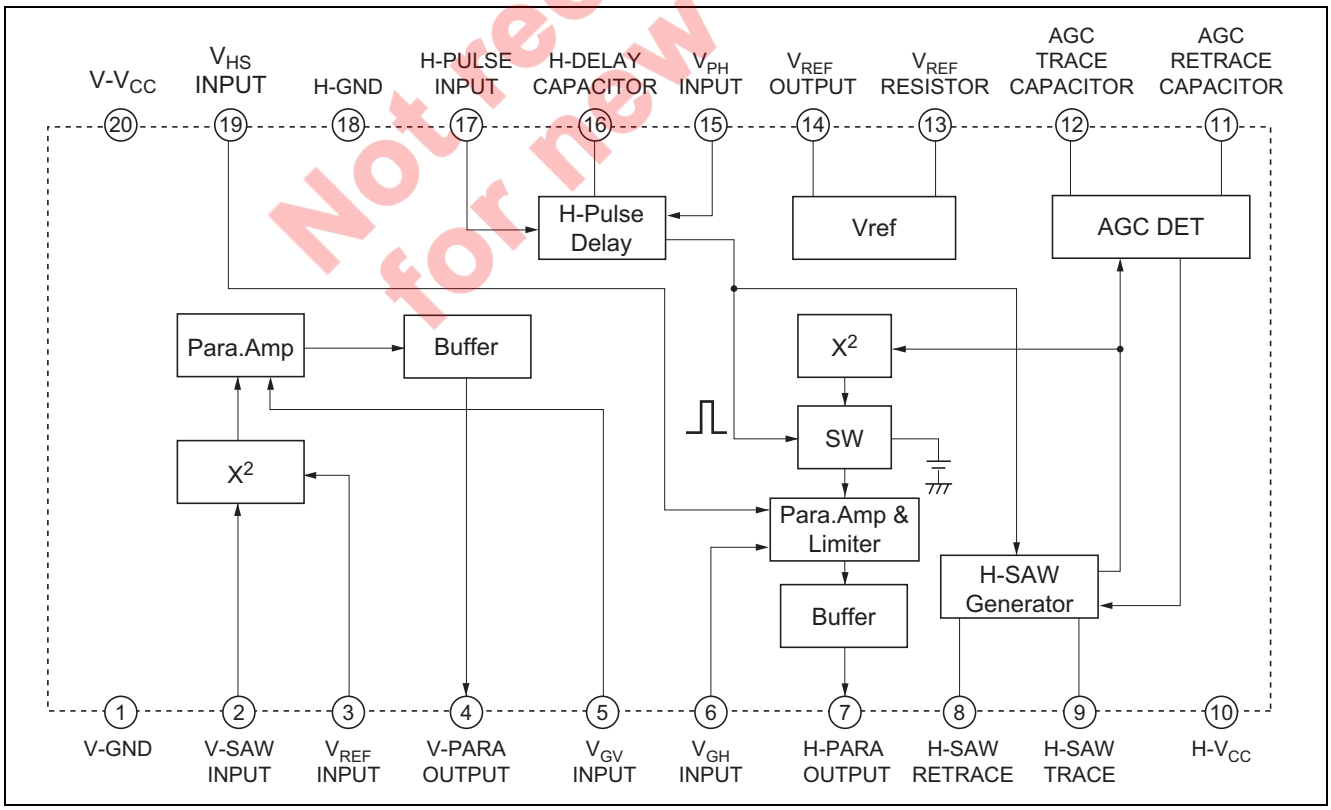
CRT display monitor

Recommended Operating Condition

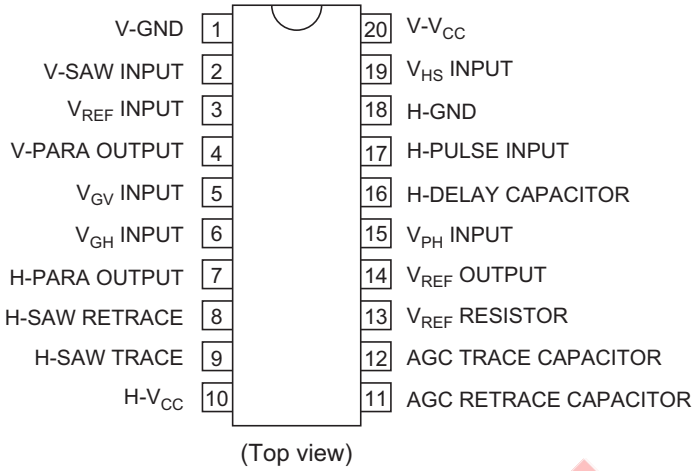
Supply voltage range: 11.5 to 12.5 V

Rated supply voltage: 12 V

Block Diagram



Pin Arrangement



Outline: PRDP0020BA-A (20P4B)

Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings			Unit
		Min	Typ	Max	
Supply voltage	V_{CC}	—	—	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

Electrical Characteristics

(Ta = 25°C, V_{CC} = 12 V, unless otherwise noted)

Item	Symbol	Limits			Unit	Test Conditions	Pin No.
		Min	Typ	Max			
Circuit current 1	I_{CCH}	15.1	21.5	27.9	mA	(10) Measure	10
Circuit current 2	I_{CCV}	5.2	7.4	9.6	mA	(20) Measure	20
Reference voltage output	V_{REF}	6.75	6.95	7.15	V	(14) Measure	14
Reference voltage temperature drift	D_{REF}	—	49	—	ppm/deg	(14) Measure	14
Horizontal Block							
H-pulse low input range	V_{IL}	0.0	—	2.0	V	(6) 4.0 V in (7) Measure (15) 3.0 V in (17) fH = 50 kHz H-pulse in (19) 3.2 V in	7
H-pulse high input range	V_{IH}	3.0	—	V_{CC} –2.0	V	(6) 4.0 V in (7) Measure (15) 3.0 V in (17) fH = 50 kHz H-pulse in (19) 3.2 V in	7
H-pulse low input current	I_{IL}	–5.0	–0.6	–0.1	µA	(17) 0 V in, measure	17
H-pulse high input current	I_{IH}	–1.0	0.0	1.0	µA	(17) 5 V in, measure	17
H parabola width	T_W	0.50	0.70	0.90	µs	(6) 4.0 V in (7) Measure (15) 3.0 V in (17) fH = 50 kHz H-pulse in (19) 3.2 V in	7
H parabola delay 1	T_{D1}	–0.09	0.09	0.35	µs	(6) 4.0 V in (7) Measure (15) 0 V in (17) fH = 50 kHz H-pulse in (19) 3.2 V in	7
H parabola delay 2	T_{D2}	0.19	0.41	0.65	µs	(6) 4.0 V in (7) Measure (15) 1.5 V in (17) fH = 50 kHz H-pulse in (19) 3.2 V in	7
H parabola delay 3	T_{D3}	2.65	2.95	3.20	µs	(6) 4.0 V in (7) Measure (15) 4.0 V in (17) fH = 50 kHz H-pulse in (19) 3.2 V in	7
Delay temperature drift	D_D	—	–0.08	—	ns/deg	(6) 4.0 V in (7) Measure (15) 3.0 V in (17) fH = 50 kHz H-pulse in (19) 3.2 V in	7
Pin15 input current	I_{15}	–5.0	–0.4	–0.1	µA	(15) 2.5 V in, measure	15
H parabola amplitude	V_{HP}	7.5	8.2	8.9	V_{P-P}	(6) 2.5 V in (7) Measure (15) 3.0 V in (17) fH = 50 kHz H-pulse in (19) 4.0 V in	7

Electrical Characteristics (cont.)

Item	Symbol	Limits			Unit	Test Conditions	Pin No.
		Min	Typ	Max			
H para. freq. characteristics 1	F_{HP1}	–0.2	0.0	0.2	V	(6) 2.5 V in (7) Measure (15) 3.0 V in (17) fH = 24 kHz H-pulse in (19) 4.0 V in	7
H para. freq. characteristics 2	F_{HP2}	–0.2	0.0	0.2	V	(6) 2.5 V in (7) Measure (15) 3.0 V in (17) fH = 110 kHz H-pulse in (19) 4.0 V	7
H para. V_{CC} characteristics 1	V_{VHP1}	–0.1	0.0	0.1	V	(6) 2.5 V in (7) Measure (15) 3.0 V in (10) (20) 11.5 V in (17) fH = 50 kHz H-pulse in (19) 4.0 V in	7
H para. V_{CC} characteristics 2	V_{VHP2}	–0.1	0.0	0.1	V	(6) 2.5 V in (7) Measure (15) 3.0 V in (10) (20) 12.5 V in (17) fH = 50 kHz H-pulse in (19) 4.0 V	7
H para. size temperature drift	D_{HP}	—	–275	—	ppm/deg	(6) 2.5 V in (7) Measure (15) 3.0 V in (17) fH = 50 kHz H-pulse in (19) 4.0 V in	7
H para. size control 1	S_{HP1}	7.5	8.2	8.9	V_{P-P}	(6) 2.5 V in (7) Measure (15) 3.0 V in (17) fH = 50 kHz H-pulse in (19) 4.0 V in	7
H para. size control 2	S_{HP2}	20	25	30	%	(6) 2.5 V in (7) Measure (15) 3.0 V in (17) fH = 50 kHz H-pulse in (19) 2.0 V in	7
H para. size control 3	S_{HP3}	–5	0	5	%	(6) 2.5 V in (7) Measure (15) 3.0 V in (17) fH = 50 kHz H-pulse in (19) 0 V in	7

Electrical Characteristics (cont.)

Item	Symbol	Limits			Unit	Test Conditions	Pin No.
		Min	Typ	Max			
H para. gain control 1	G_{HP1}	0.7	0.9	1.1	V_{P-P}	(6) 1.0 V in (7) Measure (15) 3.0 V in (17) fH = 50 kHz H-pulse in (19) 4.0 V in	7
H para. gain control 2	G_{HP2}	4.2	4.7	5.2	—	(6) 2.5 V in (7) Measure (15) 3.0 V in (17) fH = 50 kHz H-pulse in (19) 4.0 V in	7
H para. gain control 3	G_{HP3}	8.36	8.76	9.16	V_{P-P}	(6) 4.0 V in (7) Measure (15) 3.0 V in (17) fH = 50 kHz H-pulse in (19) 4.0 V in	7
H para. limit size temperature drift	D_{LI}	—	106	—	ppm/deg	(6) 4.0 V in (7) Measure (15) 3.0 V in (17) fH = 50 kHz H-pulse in (19) 4.0 V in	7
Pin6 input current	I_6	–5.0	–0.4	–0.1	µA	(16) 2.5 V in, measure	6
Pin19 input current	I_{19}	–5.0	–0.4	–0.1	µA	(19) 2.0 V in, measure	19
Vertical Block							
V parabola accuracy 1	A_{VP1}	9.5	10.0	10.5	V	(2) 1.9 V in (3) 3.5 V in (4) Measure (5) 4.0 V in	4
V parabola accuracy 2	A_{VP2}	6.23	6.73	7.23	V	(2) 2.7 V in (3) 3.5 V in (4) Measure (5) 4.0 V in	4
V parabola accuracy 3	A_{VP3}	20	25	30	%	(2) 3.5 V in (3) 3.5 V in (4) Measure (5) 4.0 V in	4
V parabola accuracy 4	A_{VP4}	20	25	30	%	(2) 4.3 V in (3) 3.5 V in (4) Measure (5) 4.0 V in	4
V parabola accuracy 5	A_{VP5}	90	100	110	%	(2) 5.1 V in (3) 3.5 V in (4) Measure (5) 4.0 V in	4
V parabola amplitude 1	G_{VP1}	0.0	0.0	0.1	V_{P-P}	(2) f_V = 70 Hz, 3.2 V_{P-P} saw wave in (3) 3.5 V in (4) measure (5) 1.0 V in	4

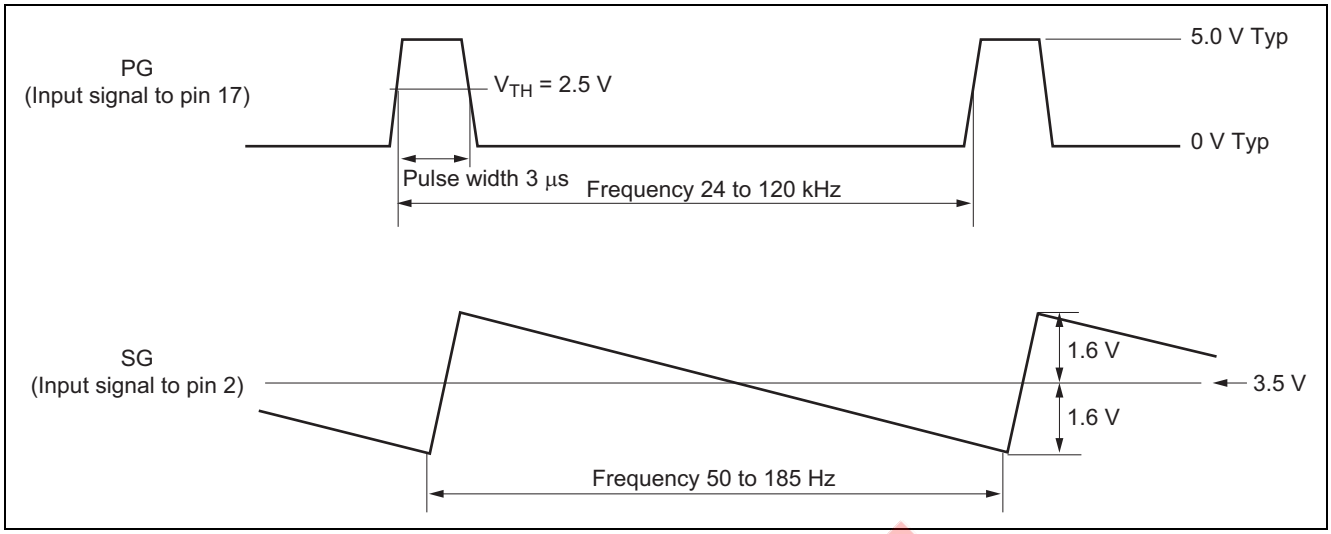
Electrical Characteristics (cont.)

Item	Symbol	Limits			Unit	Test Conditions	Pin No.
		Min.	Typ.	Max.			
V parabola amplitude 2	G_{VP2}	2.77	3.12	3.47	V_{P-P}	(2) f_V = 70 Hz, 3.2 V_{P-P} saw wave in (3) 3.5 V in (4) measure (5) 2.5 V in	4
V parabola amplitude 3	G_{VP3}	6.26	6.56	6.86	V_{P-P}	(2) f_V = 70 Hz, 3.2 V_{P-P} saw wave in (3) 3.5 V in (4) measure (5) 4.0 V in	4
V para. freq. characteristics 1	F_{VP1}	–0.1	0.0	0.1	V	(2) f_V = 50 Hz, 3.2 V_{P-P} saw wave in (3) 3.5 V in (4) measure (5) 4.0 V in	4
V para. freq. characteristics 2	F_{VP2}	–0.1	0.0	0.1	V	(2) f_V = 185 Hz, 3.2 V_{P-P} saw wave in (3) 3.5 V in (4) measure (5) 4.0 V in	4
V para. V_{CC}. characteristics 1	V_{VP1}	–0.1	0.0	0.1	V	(2) f_V = 70 Hz, 3.2 V_{P-P} saw wave in (3) 3.5 V in (4) measure (5) 4.0 V in	4
V para. V_{CC}. characteristics 2	V_{VP2}	–0.1	0.0	0.1	V	(2) f_V = 70 Hz, 3.2 V_{P-P} saw wave in (3) 3.5 V in (4) measure (5) 4.0 V in	4
V para. V_{CC}. temperature drift	D_{VP}	—	–325	—	ppm/deg	(2) f_V = 70 Hz, 3.2 V_{P-P} saw wave in (3) 3.5 V in (4) measure (5) 4.0 V in	4
Pin2 input current	I_2	–5.0	–0.4	–0.1	µA	(2) 3.5 V in, measure	2
Pin3 input current	I_3	–5.0	–0.4	–0.1	µA	(3) 3.5 V in, measure	3
Pin5 input current	I_5	–5.0	–0.4	–0.1	µA	(5) 2.5 V in, measure	5

Switch and Voltage Condition

Symbol	Switch									Voltage (V)						
	SW2	SW3	SW5	SW6	SW10	SW15	SW17	SW19	SW20	V_{CC}	V2	V5	V6	V15	V17	V19
I_{CCH}	a	a	a	a	b	a	b	a	a	12.0	3.5	2.5	2.5	3.0	0	2.0
I_{CCV}					a				b							
V_{REF}									a							
D_{REF}																
V_{IL}							a						4.0		—	3.2
V_{IH}																
I_{IL}							b						2.5		0	2.0
I_{IH}															5.0	
T_W							a						4.0		—	3.2
T_{D1}														0		
T_{D2}														1.5		
T_{D3}														4.0		
D_D														3.0		
I_{15}						b	b						2.5	—	0	2.0
V_{HP}						a	a							3.0	—	4.0
F_{HP1}																
F_{HP2}																
V_{VHP1}										11.5						
V_{VHP2}										12.5						
D_{HP}										12.0						
S_{HP1}																4.0
S_{HP2}																2.0
S_{HP3}																0
G_{HP1}													1.0			4.0
G_{HP2}													2.5			
G_{HP3}													4.0			
D_{LI}																4.0
I_6				b			b						—		0	2.0
I_{19}				a				b					2.5			—
A_{VP1}								a				4.0				2.0
A_{VP2}											1.9					
A_{VP3}											2.7					
A_{VP4}											4.3					
A_{VP5}											5.1					
G_{VP1}	b										—	1.0				
G_{VP2}												2.5				
G_{VP3}												4.0				
F_{VP1}																
F_{VP2}																
V_{VP1}										11.5						
V_{VP2}										12.5						
D_{VP}										12.0						
I_2	c										3.5	2.5				
I_3	a	b														
I_5		a	b									—				

Input Signal



Electrical Characteristics Test Method

I_{CCH} Circuit Current1

Measure the input current to pin 10.

I_{CCV} Circuit Current2

Measure the input current to pin 20.

V_{REF} Reference Voltage Output

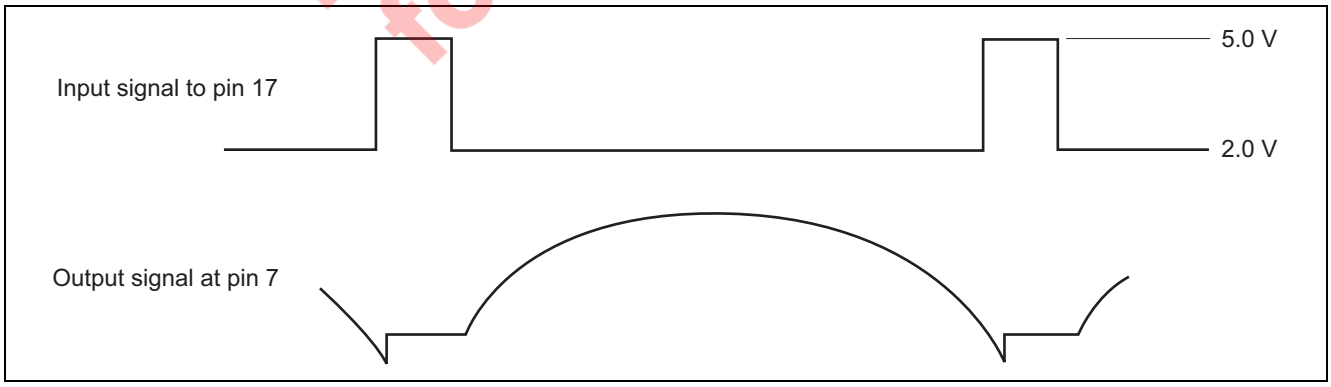
Measure the output voltage at pin 14.

D_{REF} Reference Voltage Temperature Drift

Measure temperature drift of pin 14. (–20°C to 85°C)

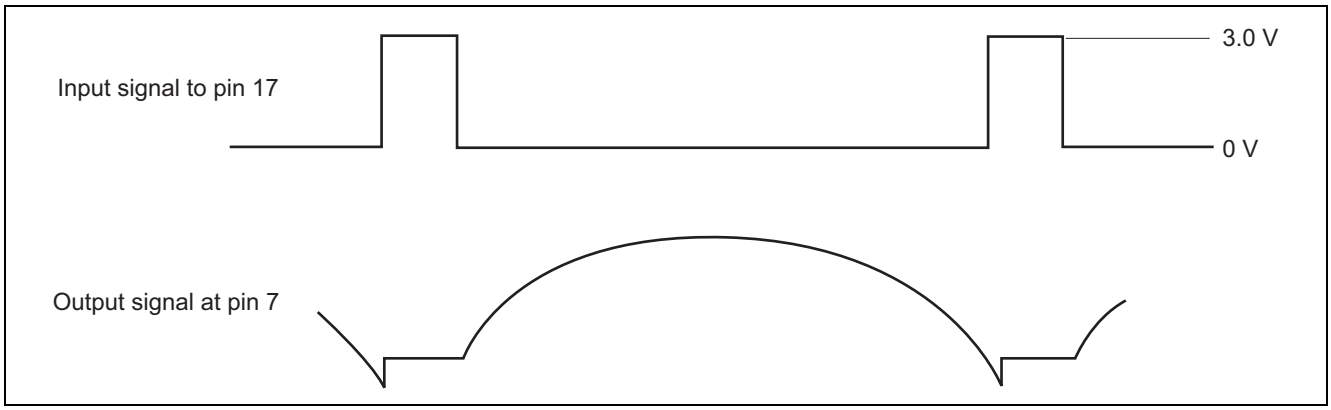
V_{IL} H-pulse Low Input Range

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



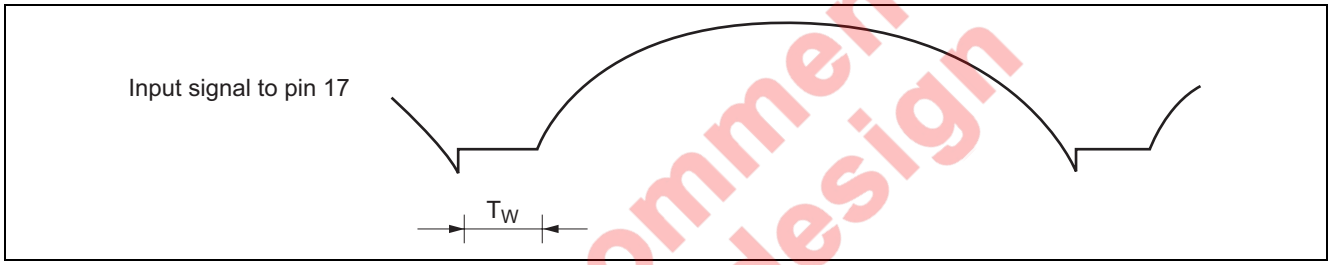
V_{IH} H-pulse High Input Range

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



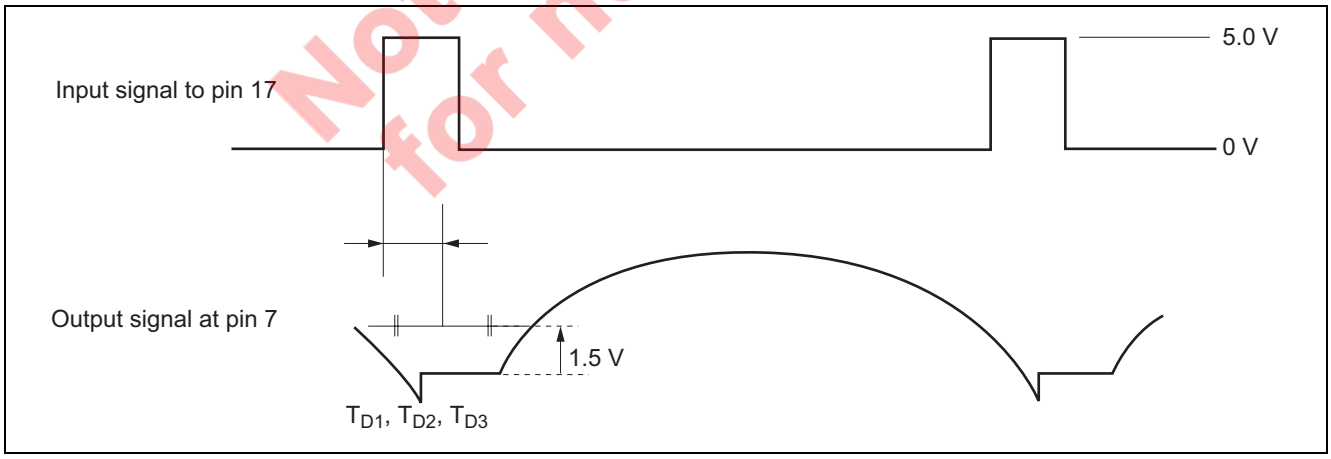
T_W H Parabola Width

Measure the time width of retrace period at pin 7.



T_{D1} H Parabola Delay1, T_{D2} H Parabola Delay2, T_{D3} H Parabola Delay3

Measure the delay time from rise time of input signal to middle point of raise waveform point and down waveform point which voltage is retrace voltage +1.5 V when the voltage of pin 15 is 0 V, 1.5 V, and 4 V.



D_D Delay Temperature Drift

Measure the temperature drift of the delay time. (–20°C to 85°C)

I_{15} Pin 15 Input Current

Measure the input current to pin15 when the voltage of pin 15 is 2.5 V.

V_{HP} H Parabola Amplitude

Measure the amplitude of parabola waveform at pin 7 and it is defined $HP_{50\ kHz}$.

F_{HP1} H Para. Freq. Characteristics1

When the frequency of input signal in pin 17 is 24 kHz, the amplitude of parabola waveform at pin 7 is defined as $HP_{24\ kHz}$.

$$F_{HP1} = HP_{50\ kHz} - HP_{24\ kHz}$$

F_{HP2} H Para. Freq. Characteristics2

When the frequency of input signal in pin 17 is 120 kHz, the amplitude of parabola waveform at pin 7 is defined as $HP_{120\ kHz.}$

$$F_{HP2} = HP_{50\ kHz} - HP_{120\ kHz}$$

V_{VHP1} H Para. V_{CC}. Characteristics1

When the supply voltage of pin 10, 20 is 11.5 V, the amplitude of parabola waveform at pin 7 is defined as $HP_{11.5\ V}$.

$$V_{VHP1} = HP_{50\ kHz} - HP_{11.5\ V}$$

V_{VHP2} H Para. V_{CC}. Characteristics2

When the supply voltage of pin 10, 20 is 12.5 V, the amplitude of parabola waveform at pin 7 is defined as $HP_{12.5\ V}$.

$$V_{VHP2} = HP_{50\ kHz} - HP_{12.5\ V}$$

D_{HP} H Para. Size. Temperature Drift

Measure the temperature drift of $HP_{50\ kHz}$. (–20°C to 85°C)

S_{HP1} H Para. Size. Control1

Measure the amplitude of parabola waveform at pin 7 and it is defined as $HP_{19\ 4.0\ V}$.

S_{HP2} H Para. Size. Control2

The amplitude of parabola waveform at pin 7 is defined as $HP_{19\ 2.0\ V}$.

$$S_{HP2} = \frac{HP_{19\ 2.0\ V}}{HP_{19\ 4.0\ V}} \times 100\ (\%)$$

S_{HP3} H Para. Size. Control3

The amplitude of parabola waveform at pin 7 is defined as $HP_{19\ 0\ V}$.

$$S_{HP3} = \frac{HP_{19\ 0\ V}}{HP_{19\ 4.0\ V}} \times 100\ (\%)$$

G_{HP1} H Para. Gain Control1

Measure the amplitude of parabola waveform at pin 7 and it is defined as $HP_{6\ 1.0\ V}$.

G_{HP2} H Para. Gain Control2

The amplitude of parabola waveform at pin 7 is defined as $HP_{6\ 2.5\ V}$.

$$G_{HP2} = \frac{HP_{6\ 2.5\ V} - HP_{6\ 1.0\ V}}{1.5}$$

G_{HP3} H Para. Gain Control3

Measure the amplitude of parabola waveform at pin 7. (Limit level)

D_{LI} H Para. Limit Size Temperature Drift

Measure temperature drift of G_{HP3}. (–20°C to 85°C)

I_6 Pin 6 Input Current

Measure the input current to pin 6 when voltage of pin 6 is 2.5 V.

I_{19} Pin 19 Input Current

Measure the input current to pin 19 when voltage of pin 19 is 2 V.

A_{VP1} V Parabola Accuracy1

Measure the output voltage at pin 4 and it is defined as $VP_{2\ 3.5\ V}$.

A_{VP2} V Parabola Accuracy2

The output voltage at pin 4 is defined as $VP_{2\ 1.9\ V}$.

$$A_{VP2} = VP_{2\ 3.5\ V} - VP_{2\ 1.9\ V}$$

A_{VP3} V Parabola Accuracy3

The output voltage at pin 4 is defined as $VP_{2\ 2.7\ V}$.

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

A_{VP4} V Parabola Accuracy4

The output voltage at pin 4 is defined as $VP_{2\ 4.3\ V}$.

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

A_{VP5} V Parabola Accuracy5

The output voltage at pin 4 is defined as $VP_{2\ 5.1\ V}$.

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

G_{VP1} V Parabola Amplitude1, G_{VP2} V Parabola Amplitude2, G_{VP3} V Parabola Amplitude3

Measure the amplitude of parabola waveform at pin 4 when the voltage of pin 5 is 0 V, 2.5 V, and 4 V.

When the voltage of pin 5 is 4 V, the amplitude of parabola waveform is defined as $VP_{70\ Hz}$.

F_{VP1} V Para. Freq. Characteristics1

When the frequency of input signal in pin 2 is 50 Hz, the amplitude of parabola waveform at pin 4 is defined as $VP_{50\ Hz}$.

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

F_{VP2} V Para. Freq. Characteristics2

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

V_{VP1} V Para. V_{CC}. Characteristics1

When the voltage of pin 10, 20 is 11.5 V, the amplitude of parabola waveform is defined as $VP_{11.5\ V}$.

$$V_{VP1} = VP_{70\ Hz} - VP_{11.5\ V}$$

V_{VP2} V Para. V_{CC}. Characteristics2

When the voltage of pin 10, 20 is 12.5 V, the amplitude of parabola waveform is defined as $VP_{12.5\ V}$.

$$V_{VP2} = VP_{70\ Hz} - VP_{12.5\ V}$$

D_{VP} V Para. Temperature Drift

Measure temperature drift of $VP_{70\ Hz}$. (−20°C to 85°C)

I_2 Pin 2 Input Current

Measure the input current to pin 2 when the voltage of pin 2 is 3.5 V.

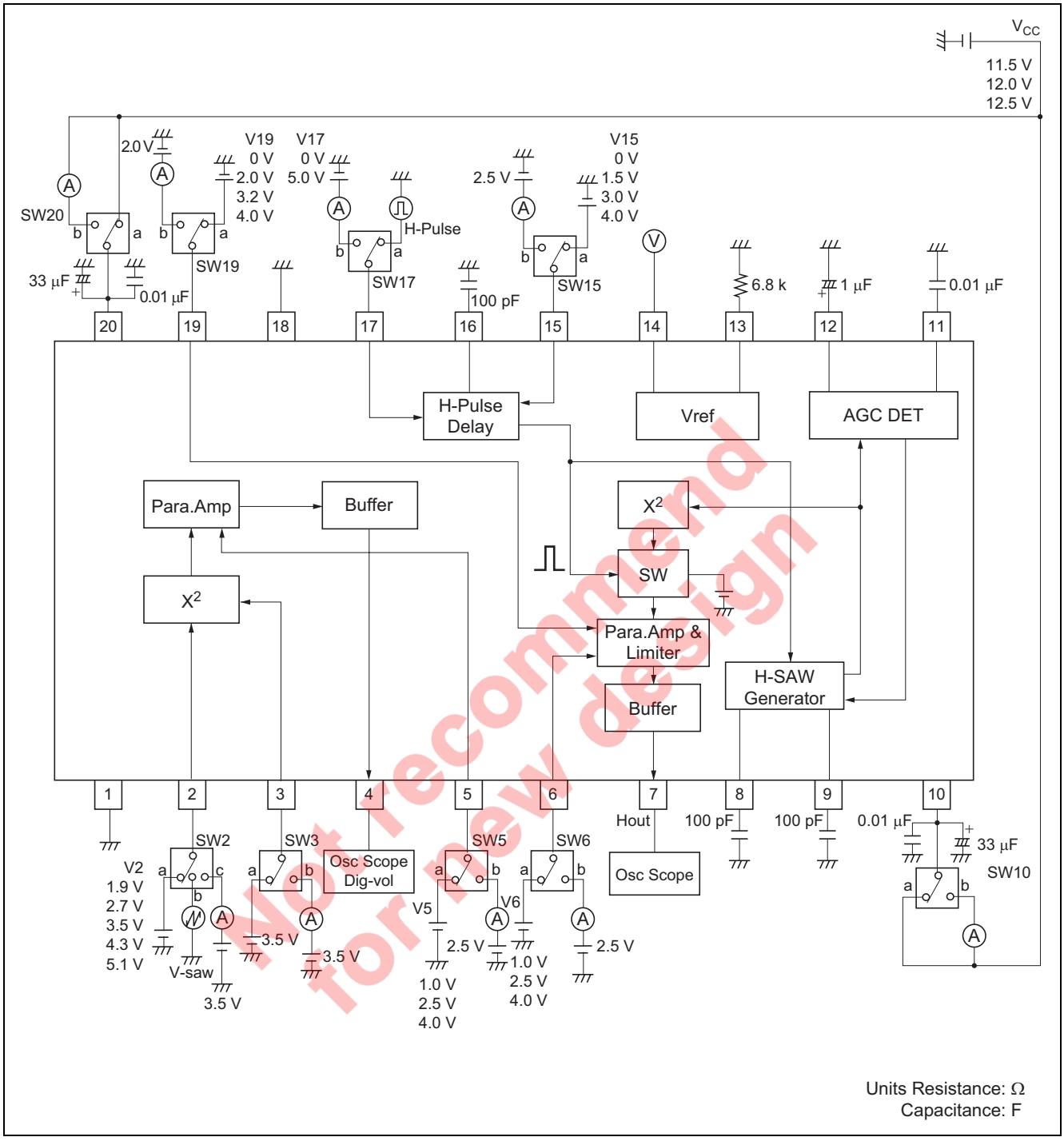
I_3 Pin 3 Input Current

Measure the input current to pin 3 when the voltage of pin 3 is 3.5 V.

I_5 Pin 5 Input Current

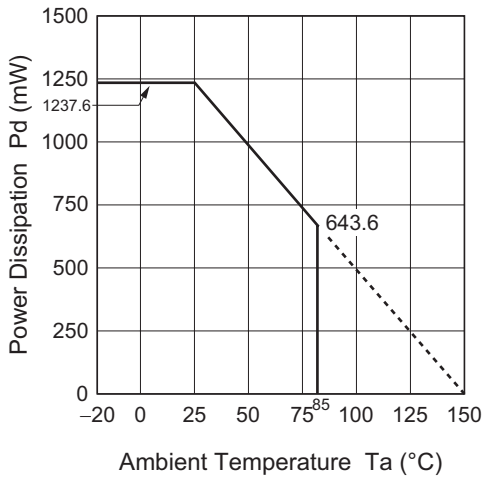
Measure the input current to pin 5 when the voltage of pin 5 is 3.5 V.

Test Circuit

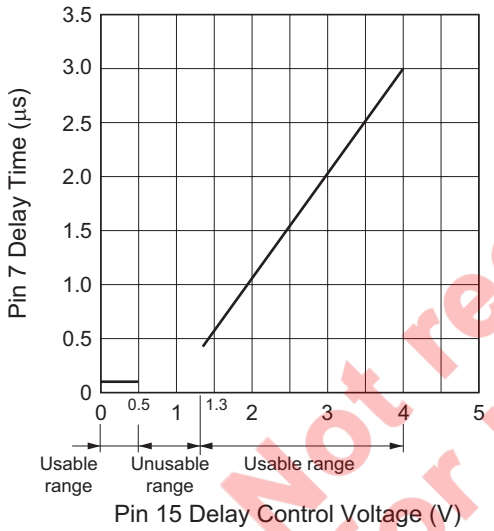


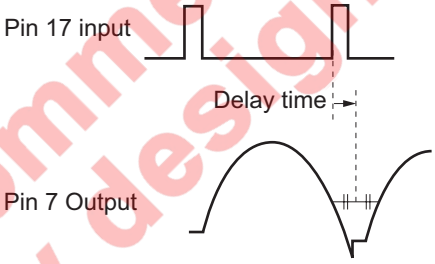
Typical Characteristics

Thermal Derating (Maximum Rating)

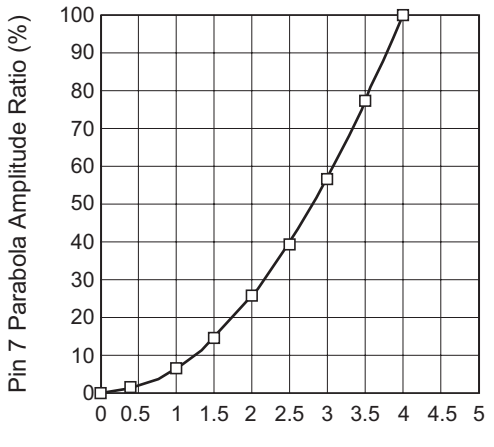


Delay Control Voltage vs. Delay Time





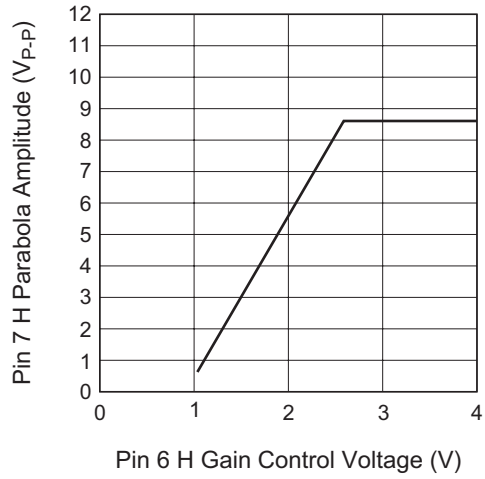
H Size Control Voltage vs.
H Parabola Amplitude Ratio



Pin 6 = 2.5 V const.

$$\text{Amplitude ratio} = \frac{\text{Pin 7 output level}}{\text{Pin 7 output level at pin 19 = 4.0 V}} \times 100\ (\%)$$

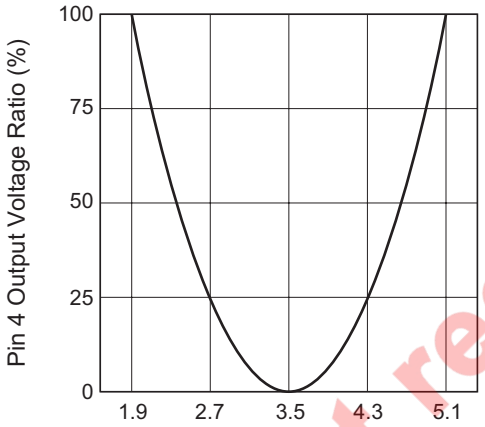
H Gain Control Voltage vs.
H Parabola Amplitude



8.76 V_{P-P} (Limiting level)

Pin 19 = 4.0 V const.

V Para DC Output Voltage Ratio



Pin 3 = 3.5 V const.
Pin 5 = 4.0 V const.

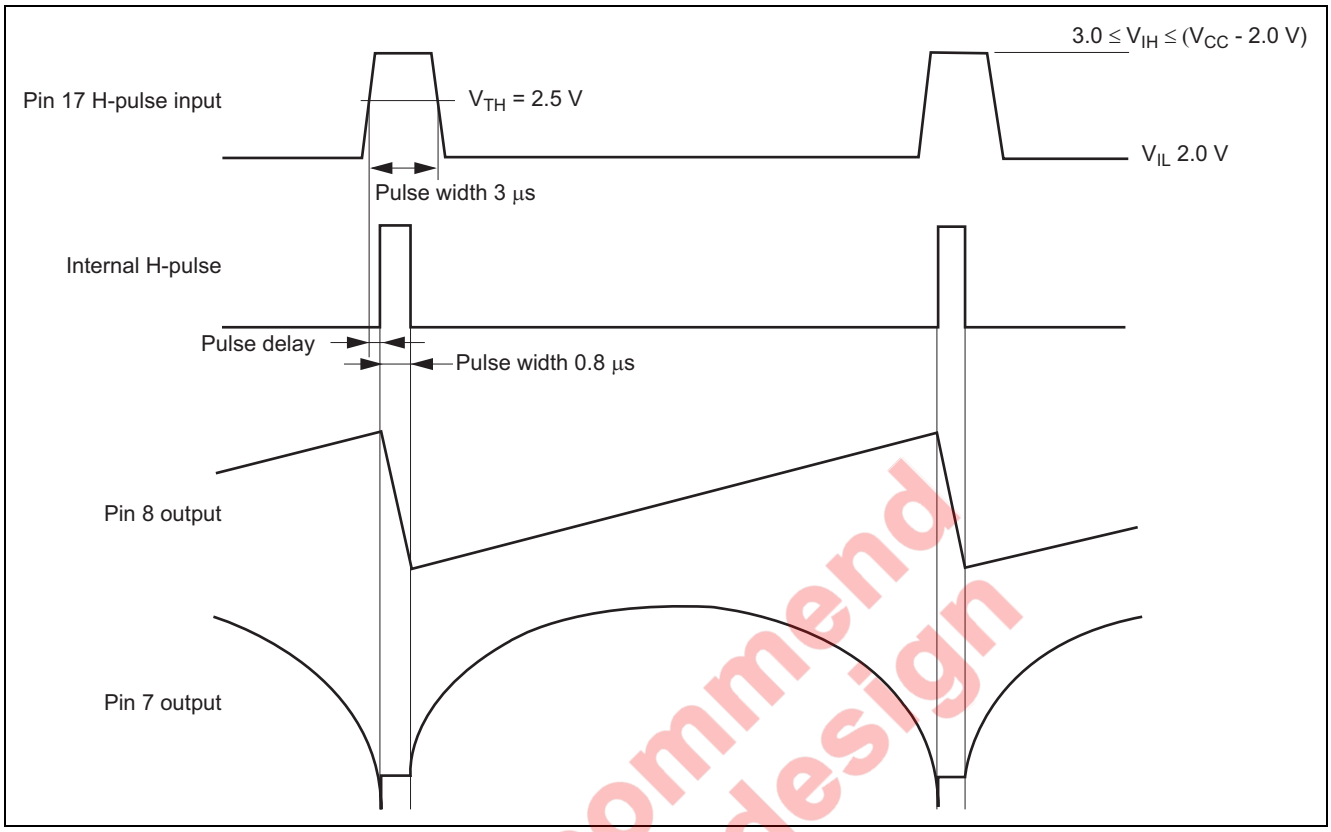
$$\text{Output ratio} = \frac{\text{Pin4out (Pin 2 = 3.5 V)} - \text{Pin4out}}{\text{Pin4out (Pin 2 = 3.5 V)} - \text{Pin4out (Pin 2 = 1.9 V)}} \times 100\ (\%)$$

V Para Amp Gain Control Voltage vs.
Output Amplitude

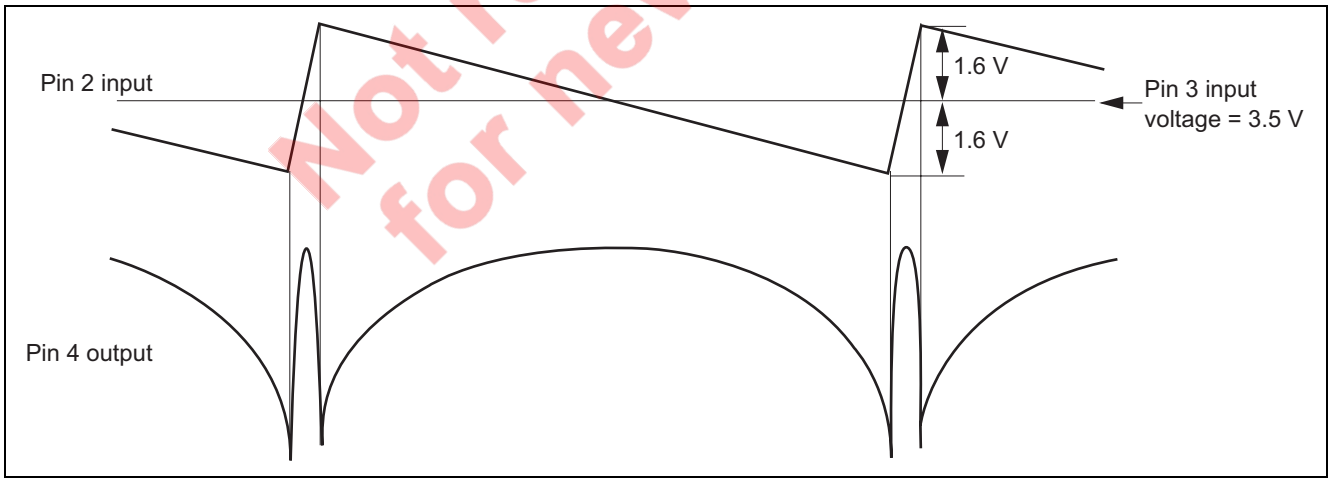
Pin 2 3.2 V_{P-P} sawtooth wave input

Timing Chart

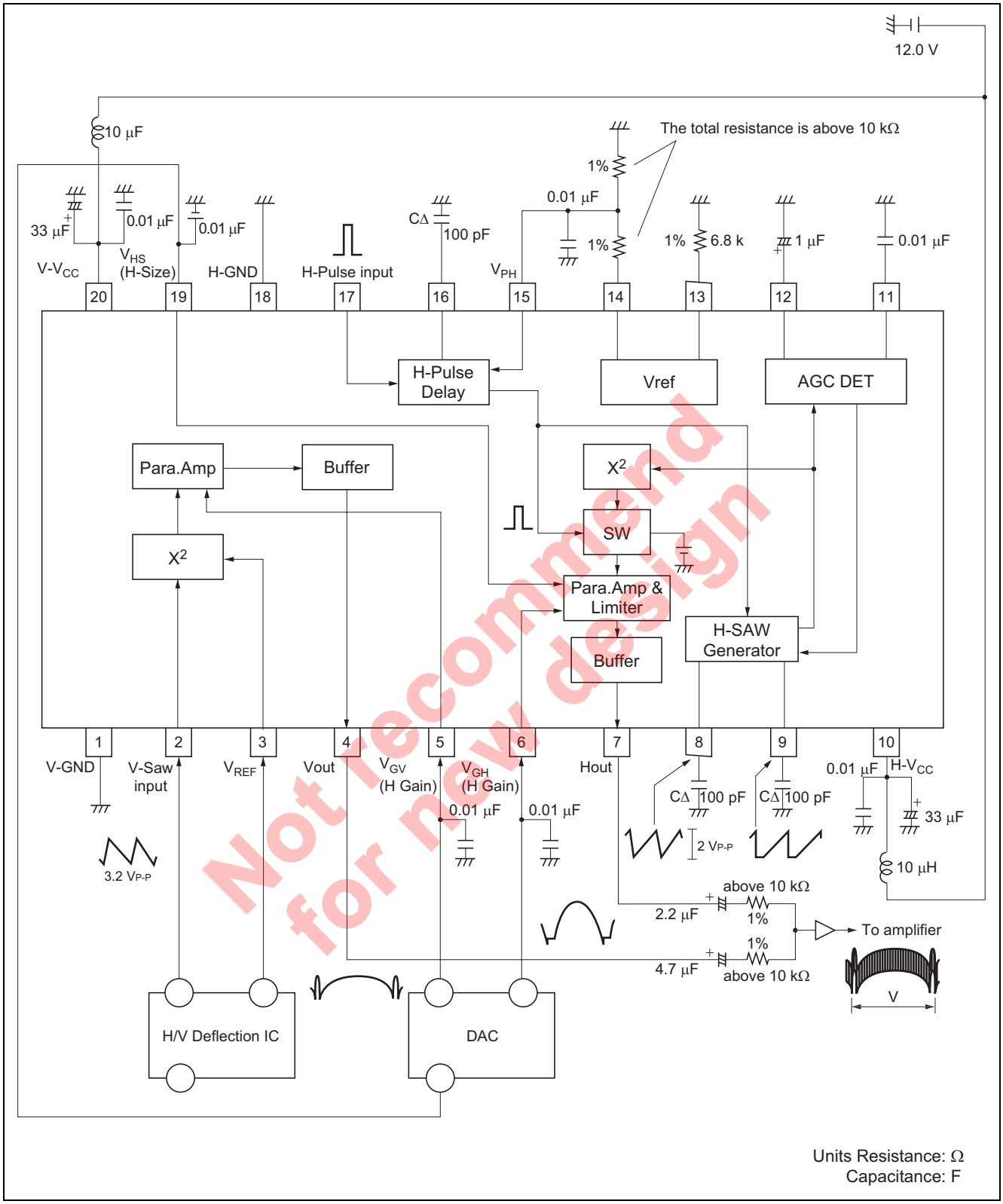
Horizontal Block



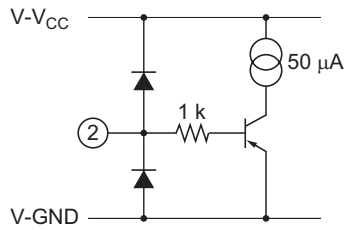
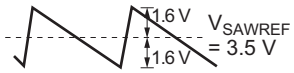
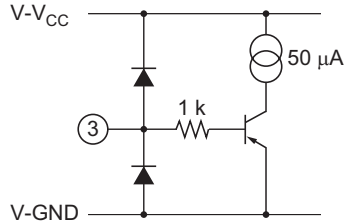
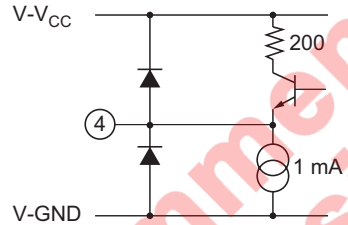
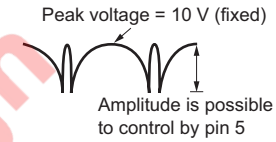
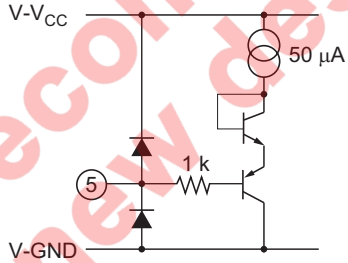
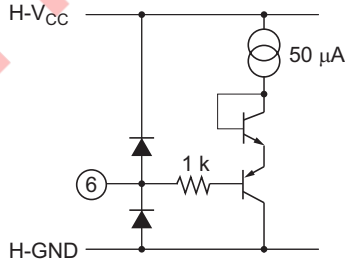
Vertical Block



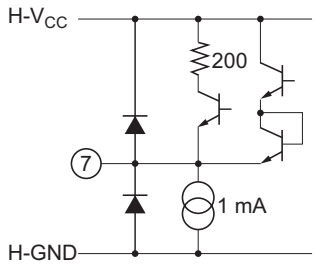
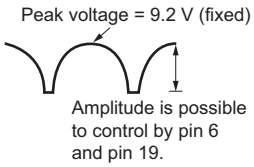
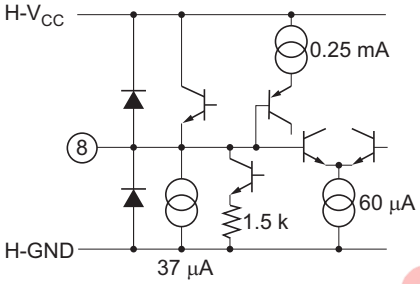
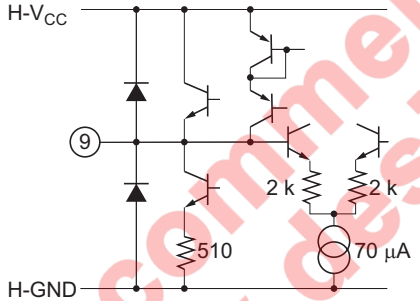
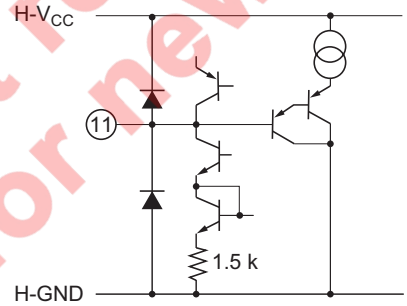
Application Example



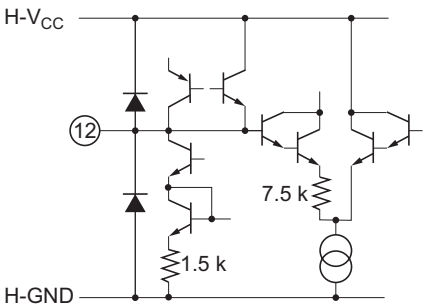
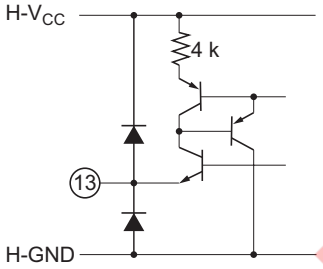
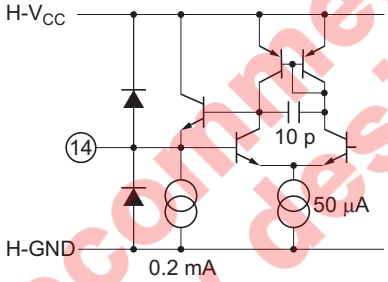
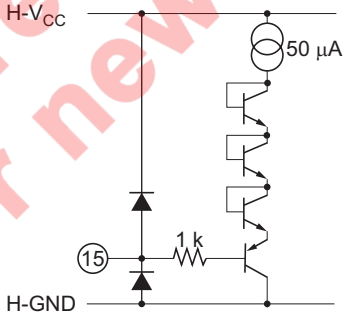
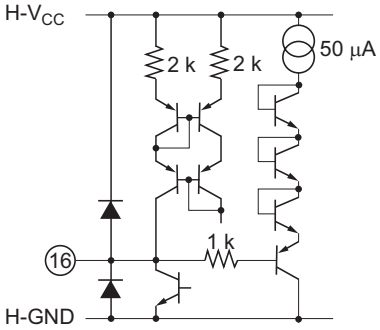
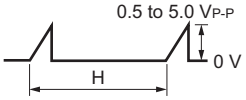
Pin Description

Pin No.	Name	DC Voltage (V)	Peripheral Circuit	Function
1	V-GND	—	—	GND of vertical block
2	Vsawi	3.5 V		Vertical sawtooth wave input pin. 
3	Vsawref	3.5 V		Vertical reference voltage input pin. (3.5 V)
4	Vout	10 V (Peak)		Vertical parabola wave output pin. 
5	V_{GV}	1.0 to 4.0 V		Vertical parabola wave gain control voltage input pin. Input voltage range is 1.0 to 4.0 V.
6	V_{GH}	1.0 to 4.0 V		Horizontal parabola wave gain control voltage input pin. Input voltage range is 1.0 to 4.0 V.

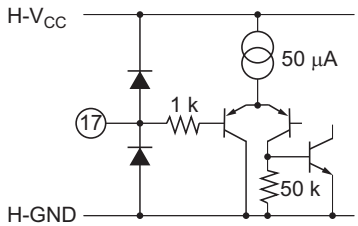
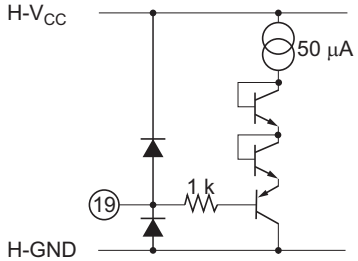
Pin Description (cont.)

Pin No.	Name	DC Voltage (V)	Peripheral Circuit	Function
7	Hout	9.2 V (Peak)		Horizontal parabola wave output pin. 
8	Cret	7.1 V (Top) 4.9 V (Bottom)		Connection pin of horizontal retrace capacitor. Recommended capacitance is 100 pF. 
9	Ctrc	7.1 V (Top) 4.9 V (Bottom)		Connection pin of horizontal trace capacitor. Recommended capacitance is 100 pF. 
10	H-V_{CC}	12.0 V		V_{CC} of horizontal block.
11	C_{AGCr}	2.5 V		Connection pin of horizontal sawtooth wave AGC retrace capacitor. Recommended capacitance is 0.01 µF.

Pin Description (cont.)

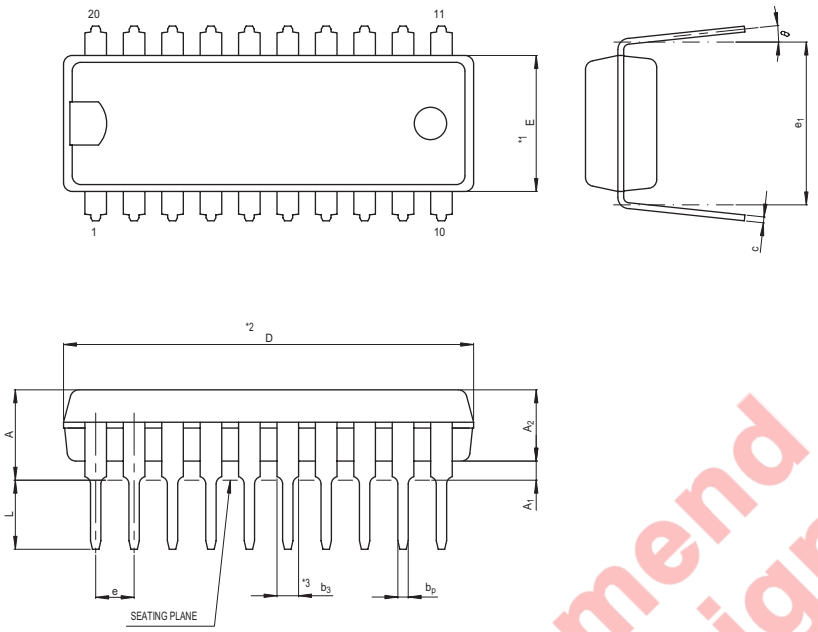
Pin No.	Name	DC Voltage (V)	Peripheral Circuit	Function
12	C_{AGC}	4.0 V		Connection pin of horizontal AGC capacitor. Recommended capacitance is 1 μF.
13	V_{REFR}	1.28 V		Connection pin of reference current source resister. Recommended resistance is 6.8 kΩ.
14	V_{REFO}	7.0 V		Reference voltage output for horizontal pulse delay circuit. Should be connect more than 10 kΩ external resister.
15	V_{PH}	0 to 0.5 V 1.3 to 4.0 V		Delay adjustment voltage input pin of horizontal pulse. Input voltage range is 1.3 to 4.0 V. At 0 to 0.5 V, delay is minimized. (0.5 to 1.3 V is unusable range.)
16	Chpd	0 V (Bottom)		Connection pin of horizontal pulse delay timing capacitor. Recommended capacitance is 100 pF. 

Pin Description (cont.)

Pin No.	Name	DC Voltage (V)	Peripheral Circuit	Function
17	HPin	—		Horizontal pulse input pin. Low input level is less than 2.0 V, and high is 3.0 to 10 V. (at V_{CC} = 12 V)
18	H-GND	—	—	GND of horizontal block
19	V_{HS}	0 to 4 V		Horizontal size control voltage input pin. Input voltage range is 0 to 4 V.
20	V-V_{CC}	12.0 V	—	V_{CC} of vertical block

Package Dimensions

JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-SDIP20-6.3x19-1.78	PRDP0020BA-A	20P4B	1.0g



NOTE)
1. DIMENSIONS "*1" AND "*2" DO NOT INCLUDE MOLD FLASH.
2. DIMENSION "*3" DOES NOT INCLUDE TRIM OFFSET.

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
e_1	7.32	7.62	7.92
D	18.8	19.0	19.2
E	6.15	6.3	6.45
A	—	—	4.5
A_1	0.51	—	—
A_2	—	3.3	—
b_p	0.38	0.48	0.58
b_3	0.9	1.0	1.3
c	0.22	0.27	0.34
θ	0°	—	15°
e	1.528	1.778	2.028
L	3.0	—	—

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Colophon .7.2