

■ Pin Descriptions

Pin No.	Description	Pin No.	Description
1	Power supply 1	7	Power supply 2
2	Vertical pulse input	8	Pulse amplification
3	Vertical amplitude control	9	GND
4	50 Hz/60 Hz changeover	10	Vertical output
5	Saw-tooth wave generation	11	Power supply for vertical output
6	AC/DC feedback input	12	Prevention from oscillation

■ Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Supply voltage	V_{CC1}	15	V
	V_{CC2}	30	
Pin voltage	V_{2-9}	0 to 2.7	V
	V_{4-9}	0 to V_{1-9}	
	V_{5-9}	0 to V_{1-9}	
	V_{6-9}	0 to V_{1-9}	
	V_{10-9}	0 to 61	
	V_{11-9}	0 to 61	
Supply current	I_{CC1}	20	mA
Pin current	I_3	-0.2 to 0	mA
	I_8	-1.8 to +1.8	
	I_{10}	-2.2 to +2.2	
Power dissipation	P_D	27	W
Operating ambient temperature *	T_{opr}	-20 to +70	°C
Storage temperature *	T_{stg}	-55 to +150	°C

Note) 1. Do not apply external currents or voltages to any pins not specifically mentioned.

2. For circuit currents, '+' denotes current flowing into the IC, and '-' denotes current flowing out of the IC.

3. * : Except for the operating ambient temperature and storage temperature, all ratings are for $T_a = 25^\circ\text{C}$.

■ Recommended Operating Range

Parameter	Symbol	Range	Unit
Supply voltage	V_{CC1}	7 to 15	V
	V_{CC2}	10 to 30	

■ Electrical Characteristics at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Load short-circuit	R. short	$V_{CC2} = 26\text{ V}$	Free from breakdown			
Deflection current	I_{HP-P}	$V_{CC2} = 26\text{ V}$, $V_5 = 2.2\text{ V[p-p]}$ Sine wave 1 kHz	1.8	2.0	2.2	A[p-p]
Vertical amplifier distortion factor	T. H. D_H	$V_{CC2} = 26\text{ V}$, $V_5 = 2.2\text{ V[p-p]}$ Sine wave 1 kHz	—	2.0	5.0	%
Input threshold voltage	V_2	Refer to the "• Test method"	0.5	0.7	1.0	V
Sawtooth wave generating start voltage	V_5	Refer to the "• Test method"	3.6	4.5	5.4	V
Middle point voltage	V_{MID}		11.5	12.8	14.1	V
Idling current	I_{11}		21.0	36.0	51.0	mA
Output saturation voltage (lower)	V_{11-10}	$V_7 = \text{GND}$	—	3.0	4.0	V
Output saturation voltage (upper)	V_{10-9}	$V_7 = \text{GND}$	—	1.5	2.5	V
Pump up charging saturation voltage	V_{8-9}	$V_7 = \text{GND}$	—	0.2	0.5	V
Pump up discharging saturation voltage	V_{7-8}	$V_7 = \text{GND}$	—	3.0	4.0	V

• Test method

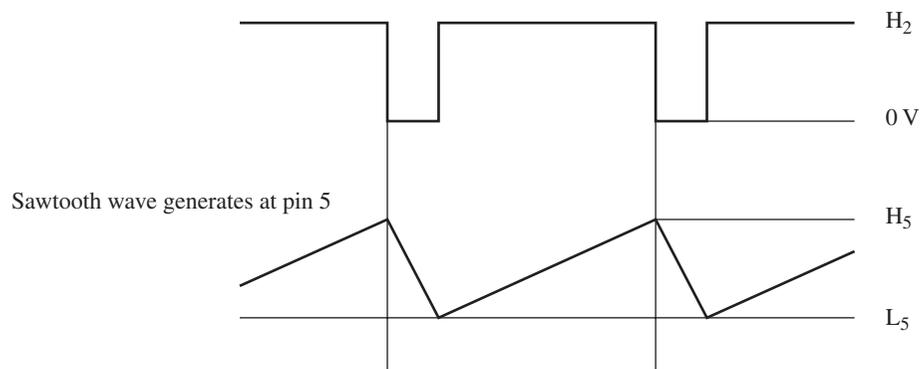
1. Input threshold voltage (V_2)

H_2 voltage at which a saw-tooth wave shown below is generated at pin 5 when H_2 voltage is gradually increased from 0 V

2. Saw-tooth wave generating start voltage (V_5)

Lower level voltage of a sawtooth wave which generates at pin 5

Input pulse of pin 2



■ Usage Notes

- Inter-pin short-circuit test result

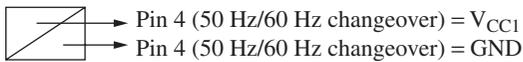
1												
2	●											
3	●	●										
4	●	▲	●	●								
5	●	●	●	●								
6	●	●	●	●	●							
7	▲	●	●	▲	▲	×	●					
8	●	●	●	●	●	●	●	●				
9	▲	●	●	▲	●	●	●	▲	●			
10	●	●	●	●	×	●	●	●	●	×		
11	●	●	●	▲	▲	×	●	●	●	●	▲	●
12	●	●	●	●	●	●	●	●	●	●	●	●
Pin No.	1	2	3	4	5	6	7	8	9	10	11	12

Test conditions: $V_{CC} = 30\text{ V}$, DC power supply (30 V, 5 A)

●: IC does not break down even if pins are short-circuited.

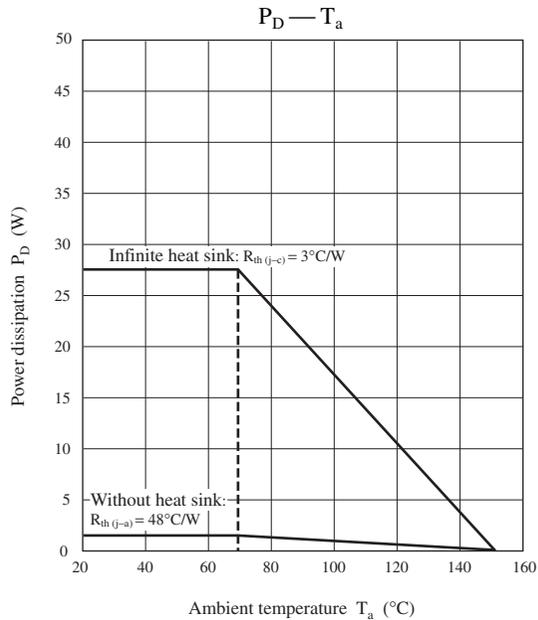
×: IC breaks down if pins are short-circuited.

▲: IC does not break down even if pins are short-circuited, but it causes over-current flows in the external power supply circuit.



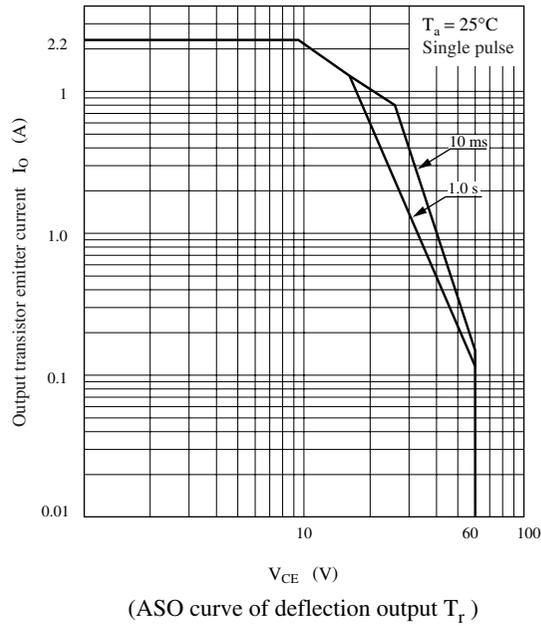
■ Technical Information

1. $P_D - T_a$ curves of HSIP012-P-0000A



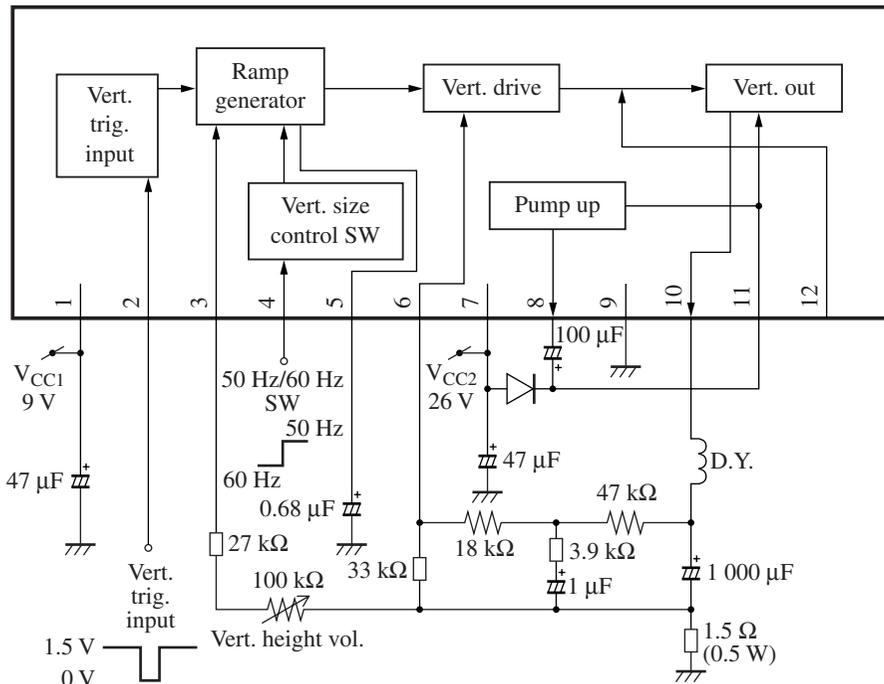
■ Technical Information (continued)

2. Area of safe operation (ASO) of output transistor forward-biased



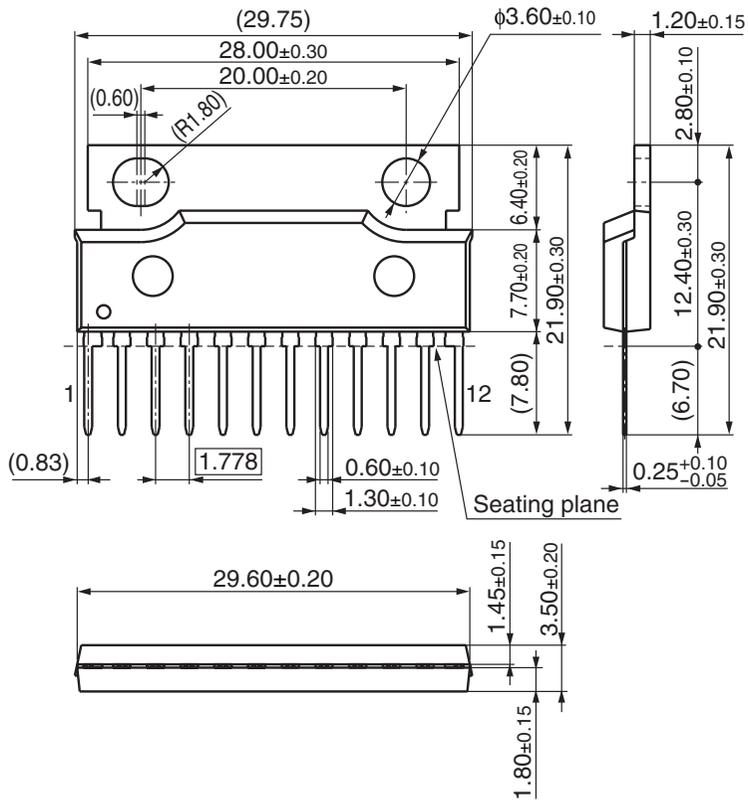
Note) The maximum value of deflection current for the actual use is suitable within ± 1.5 A[0-p] (3 A[p-p]).

■ Application Circuit Example



■ New Package Dimensions (Unit: mm)

- HSIP012-P-0000E (Lead-free package)



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