

# DATA SHEET

Part No.	AN15524A
Package Code No.	T0220-7A

SEMICONDUCTOR COMPANY  
MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.

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# AN15524A

## Silicon Monolithic Bipolar IC

### ■ Overview

AN15524A are ICs for CRT vertical deflection output. AN15524A can directly drive a deflection coil with saw wave output from a signal processing IC.

With its maximum output current of 1.6 A[p-p], AN15524A are suitable for the use of driving of 14 inch to 21 inch monitors.

### ■ Features

- Vertical output circuit
- Built-in pump up circuit
- Built-in thermal protection circuit
- Absolute maximum rating 70 V
- Maximum output current 1.6 A[p-p]

### ■ Applications

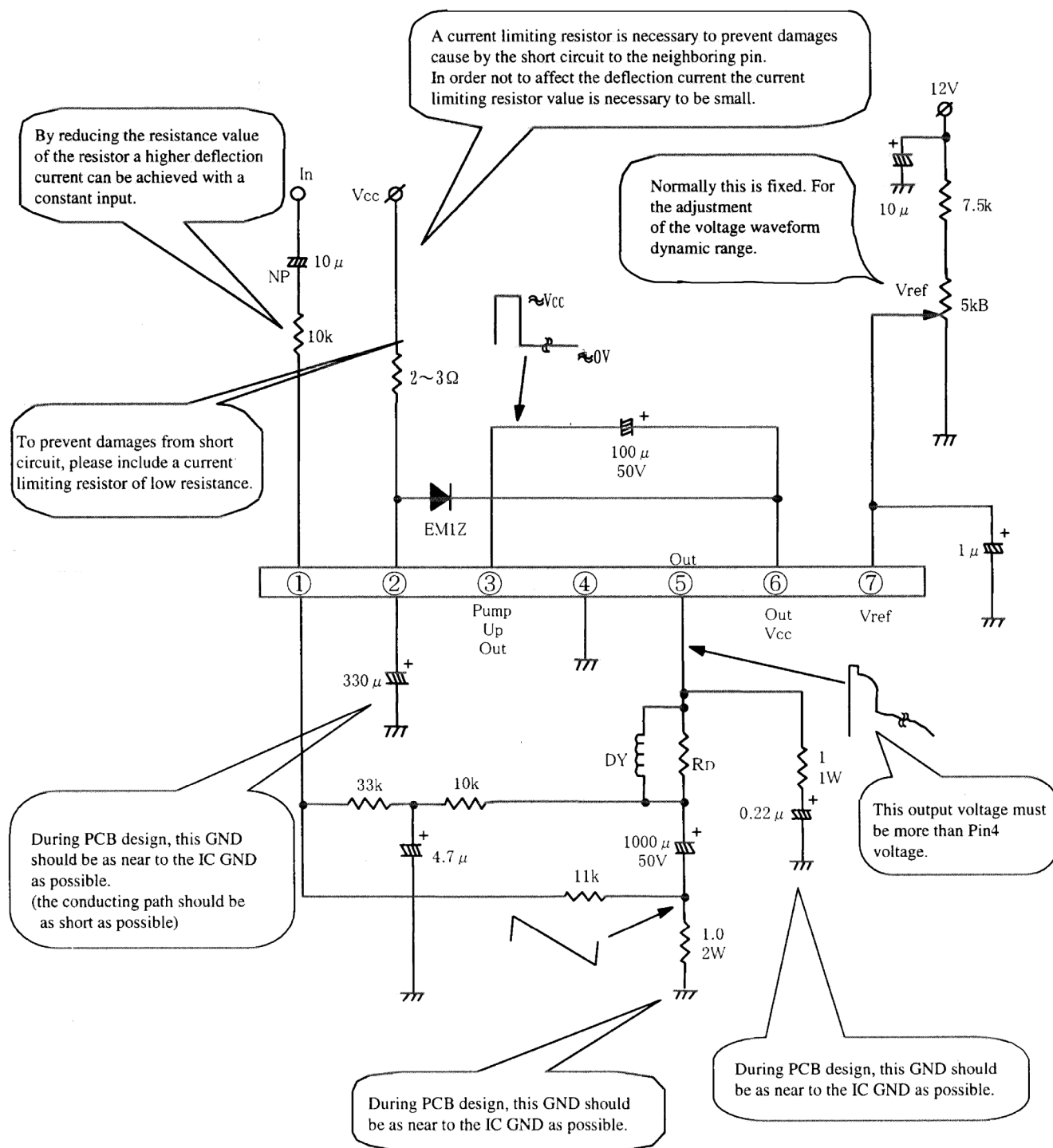
- CRT vertical output
- TV sets and displays

### ■ Package

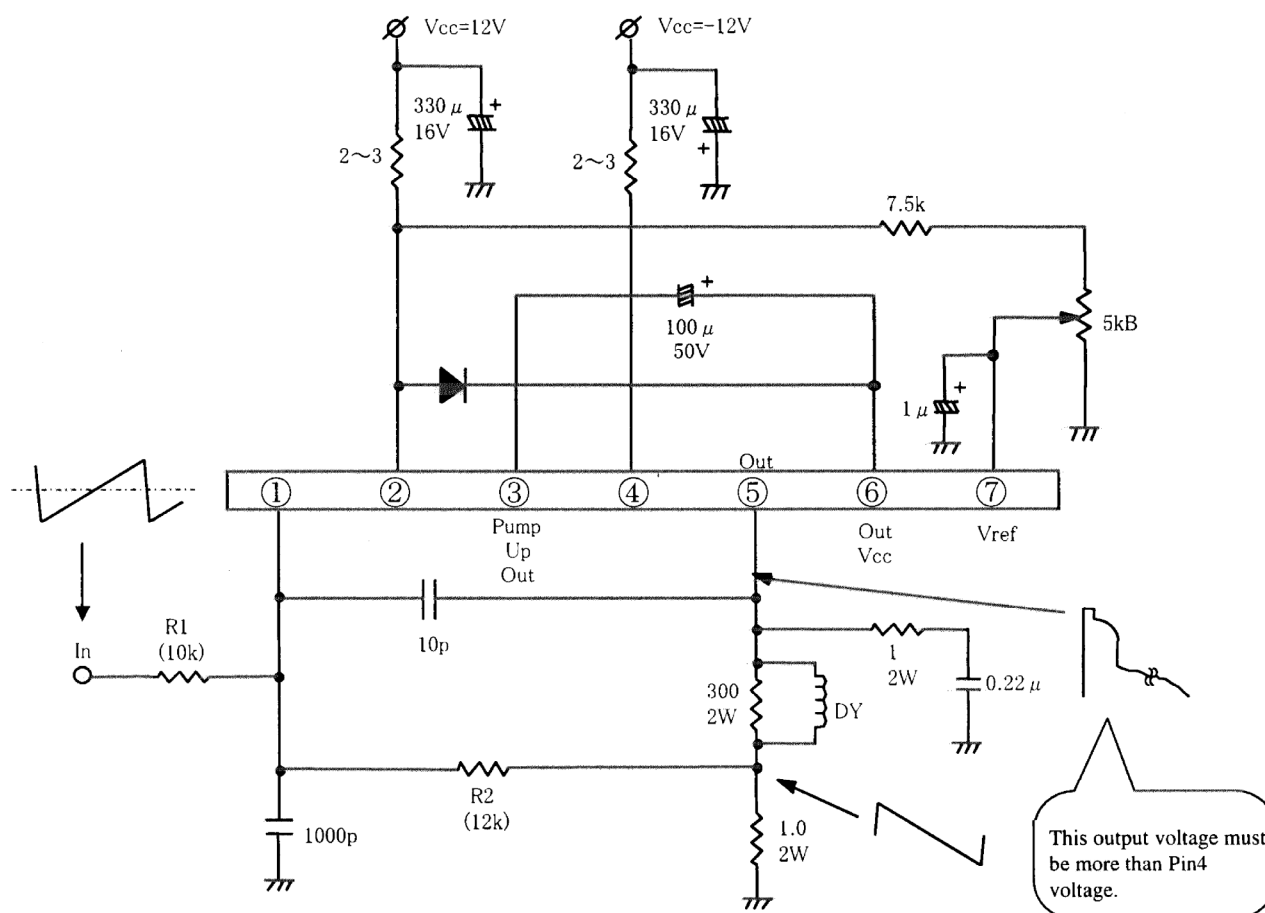
- T0220-7pin Plastic Package with Fin

# Application Circuit Example

## •AC Coupling

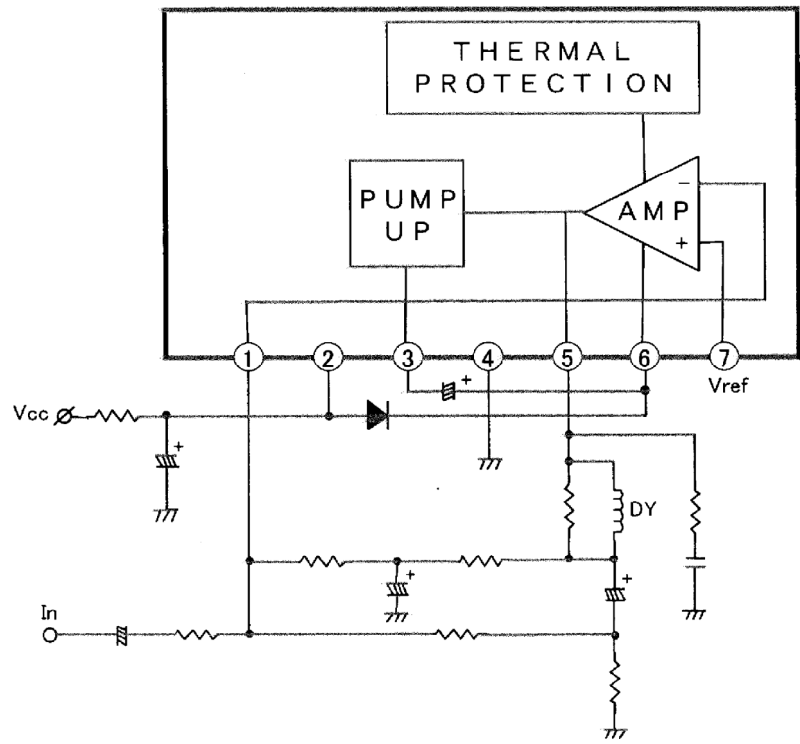


■ Application Circuit Example (continued)  
 • DC Coupling



In order to get required gain, it is necessary to adjust the  $R1$  and  $R2$ .

■ Block Diagram



■ Pin Descriptions

Pin No.	Pin name
1	Inverting input
2	Power supply
3	Pump-up output
4	GND
5	Vertical output
6	Vertical output power supply
7	Non-inverting input

# ■ Absolute Maximum Ratings

A	Absolute Maximum Ratings					
No.	Parameter	Symbol	Rating		Unit	Note
1	Storage temperature	T <sub>stg</sub>	− 55 to +150		°C	* 1
2	Operating ambient temperature	T <sub>opr</sub>	− 20 to +70		°C	* 1
3	Operating ambient atmospheric pressure	P <sub>opr</sub>	1.013 × 10 <sup>5</sup> ± 0.61 × 10 <sup>5</sup>		Pa	
4	Operating constant gravity	G <sub>opr</sub>	9 810		m/S <sup>2</sup>	
5	Operating shock	S <sub>opr</sub>	4 900		m/S <sup>2</sup>	
6	Supply voltage	V <sub>CC2</sub>	35		V	
7	Supply current	I <sub>CC2</sub>	360		mA	
8	Power dissipation	P <sub>D</sub>	1.5		W	* 2
9	Circuit voltage	V <sub>5-4</sub> , V <sub>6-4</sub>	0	70	V	
10	Circuit voltage	V <sub>7-4</sub> , V <sub>1-4</sub>	0	V <sub>2-4</sub>	V	
11	Circuit current	I <sub>5</sub> , I <sub>3</sub>	− 1.5	1.5	A[o-p]	

Note) \*1: Expect for the operating ambient temperature and storage temperature , all ratings are for  $T_a = 25^\circ\text{C}$ .

Note) \*2: The power dissipation shall be at  $T_a = 70^\circ\text{C}$  in free air, without heat sink. (refer to sheet no. 13)

# ■ Operating Supply Voltage Range

Parameter	Symbol	Range	Unit	Note
Operating supply voltage range	$V_{\text{CC2}}$	12 to 30	V	
Deflection output current	$I_{5\text{p-p}}$	to 1.6	A [p-p]	

■ Electrical Characteristics at 25°C ± 2°C

B No.	Parameter	Symbol	Test circuits	Conditions	Limits			Unit	Note
					Min	Typ	Max		
1	Mid-point current	$V_{MID}$	2	$V_{CC} = 24\text{ V}$	11.5	12	12.5	V	
2	Output saturation voltage (Lower)	$V_{5-4}$	3	$V_{CC} = 24\text{ V}$ $I_5 = 0.8\text{ A}$	—	1.5	2.5	V	
3	Output saturation voltage (Upper)	$V_{6-5}$	4	$V_{CC} = 24\text{ V}$ $I_5 = -0.8\text{ A}$	—	2.4	3.4	V	
4	Pump-up charge saturation voltage	$V_{3-4}$	5	$V_{CC} = 24\text{ V}$ $I_3 = 20\text{ mA}$	—	0.8	1.2	V	
5	Pump-up discharge saturation voltage	$V_{2-3}$	6	$V_{CC} = 24\text{ V}$ $I_3 = -0.8\text{ A}$	—	1.8	2.8	V	

• Design reference data

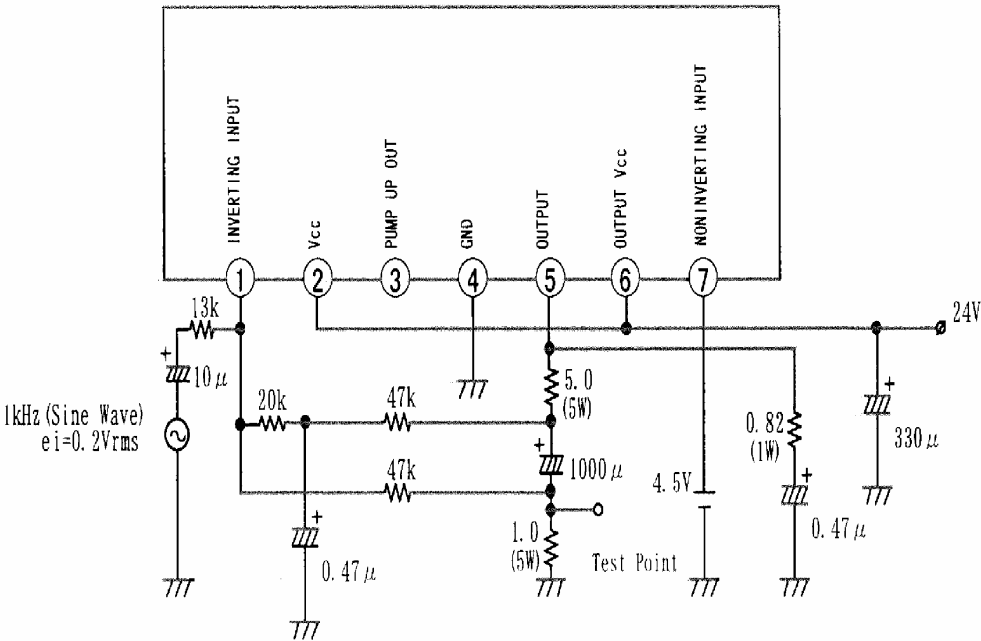
b No.	Parameter	Symbol	Test circuits	Conditions	Reference			Unit	Note
					Min	Typ	Max		
1	Idling current	$I_6$	2	$V_{CC} = 24\text{ V}$	5	—	50	mA	
2	Thermal protection operating temperature	$T_t$	1	$V_{CC} = 24\text{ V}$ Temperature at output shutdown	150	—	—	°C	

Note) The above characteristics are theoretical values for designing and not guarantee by 100% inspection.

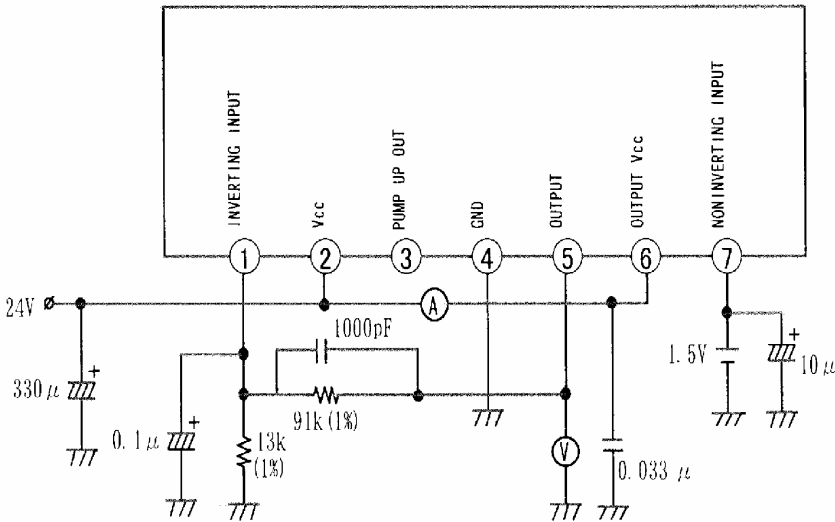


■ Description of Test Circuits Test Methods

Test Circuit – 1 (Thermal Production Operating Temperature)

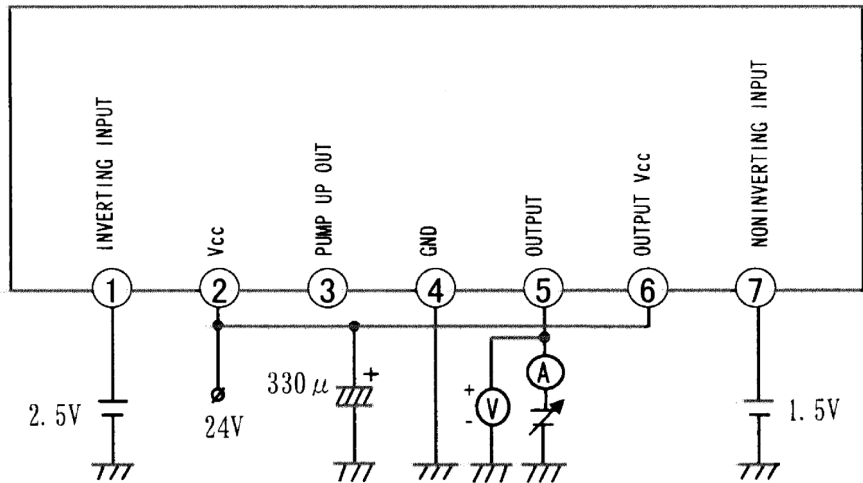


Test Circuit – 2 (Mid-point Voltage, Idling Current)



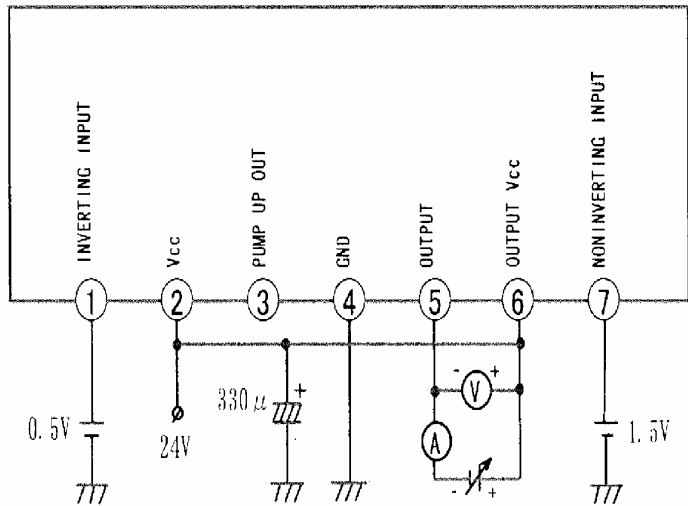
■ Description of Test Circuits Test Methods (continued)

Test Circuit – 3 (Output Saturation Voltage (Lower) )



Monitor the voltage when the current is 0.8 A.

Test Circuit – 4 (Output Saturation Voltage (Upper) )



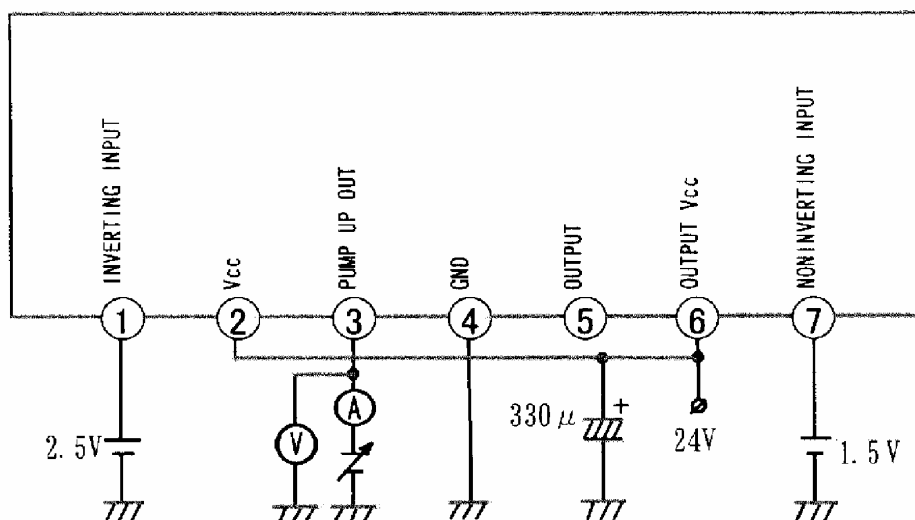
Monitor the voltage when the current is 0.8 A.

Note) : In case an external power supply is used, set the GND terminal open (floating).

# ■ Description of Test Circuits Test Methods (continued)

Test Circuit – 5

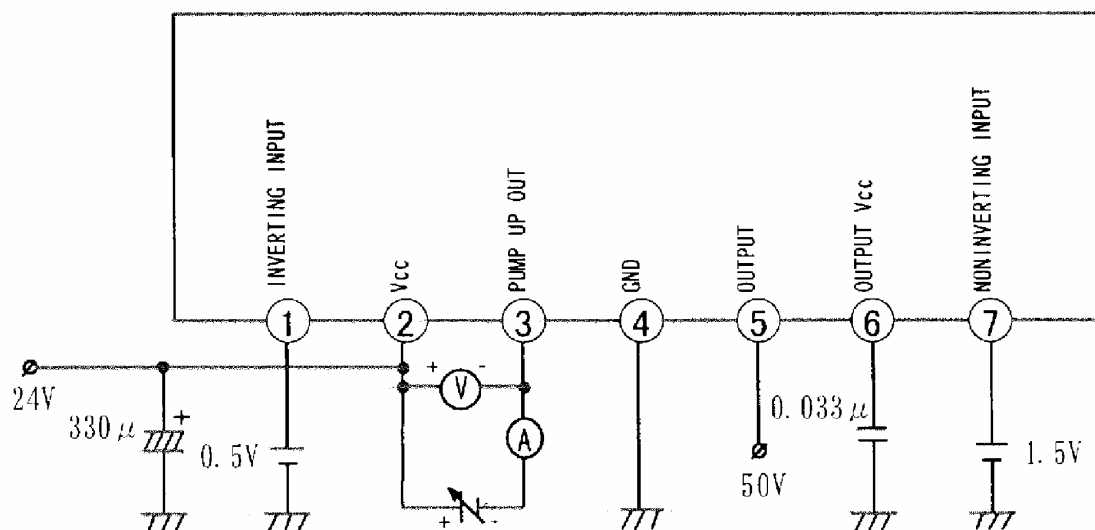
( Pump-up Charge Saturation Voltage )



Monitor the voltage when the current is 20 mA.

Test Circuit – 6

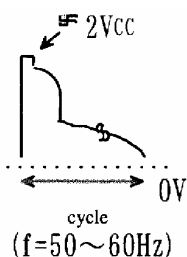
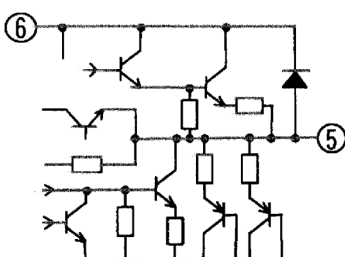
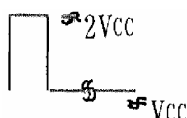
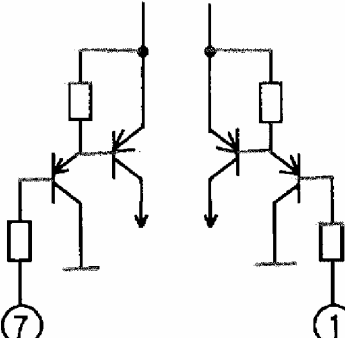


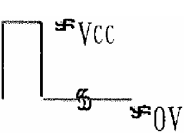
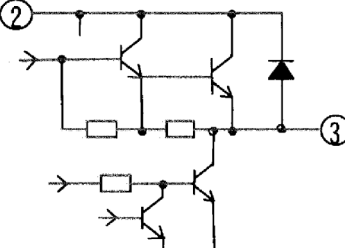
( Pump-up Discharge Saturation Voltage )



Monitor the voltage when the current is 0.8 A.

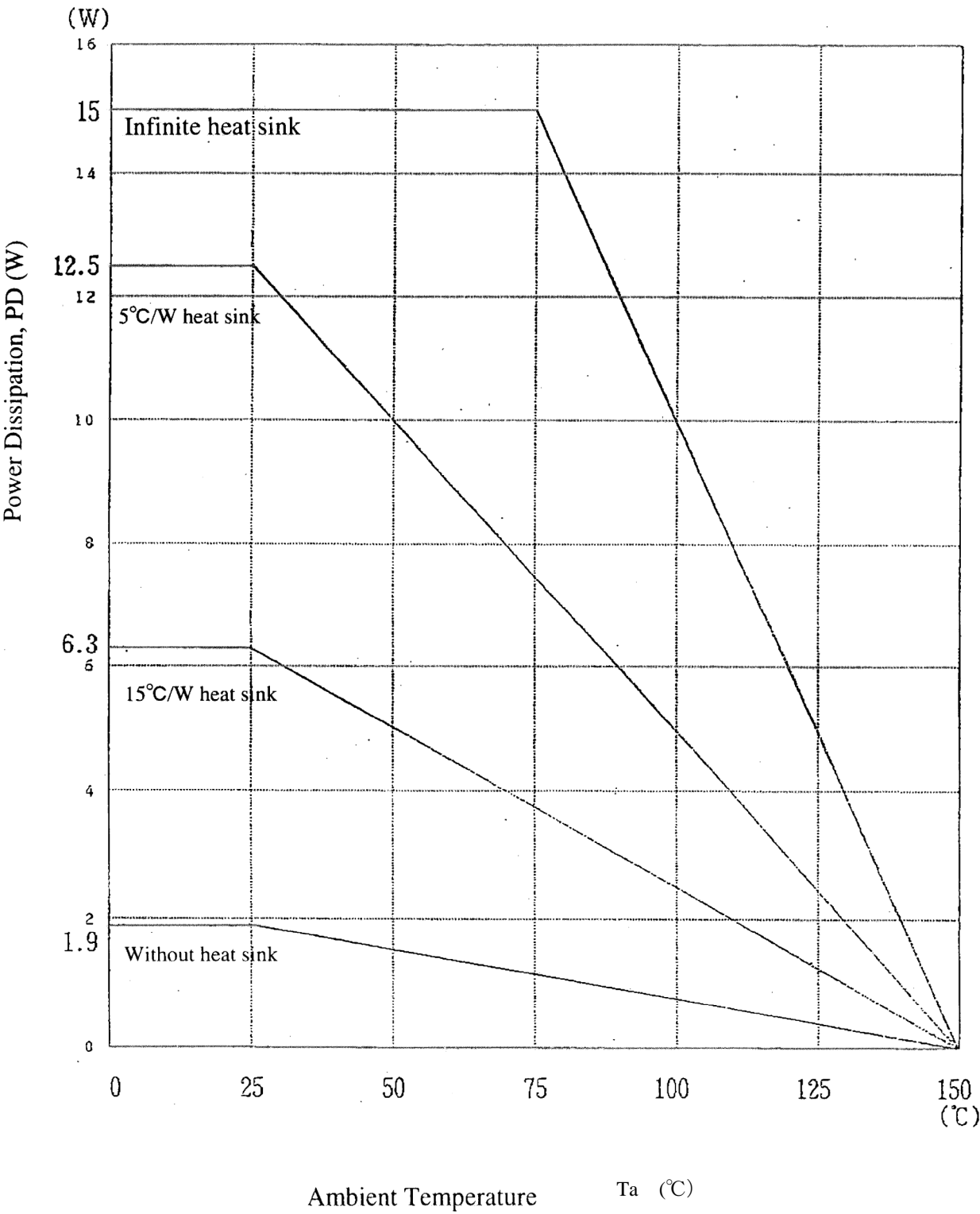
Note) : In case an external power supply is used, set the GND terminal open (floating).

## ■ Technical Data

Pin No.	Pin name	Pin voltage (V)	Function	Equivalent circuit
4	GND	DC	—	—
5	Vertical output		A vertical deflection coil is connected and 1 A to 2 A of deflection current is provided through the pin. At this time, output voltage must be more than Pin 4 voltage.	
6	Vertical output power supply		About $V_{CC} \times 2$ for flyback period and $V_{CC} - V_D$ for the other period are supplied.	—
7	Non inverting input	DC External bias	About 2 V is supplied. Very high sensitivity may cause abnormal oscillation.	
1	Inverting input		Input signal and CR network for feedback are connected. Very high sensitivity.	
2	Power supply	DC	10 V to 29 V is supplied.	—
3	Pump-up output		A capacitor connected between this pin and pin 6 is charged and discharge during flyback pulse in order to supply about $V_{CC} \times 2$ to pin 6.	

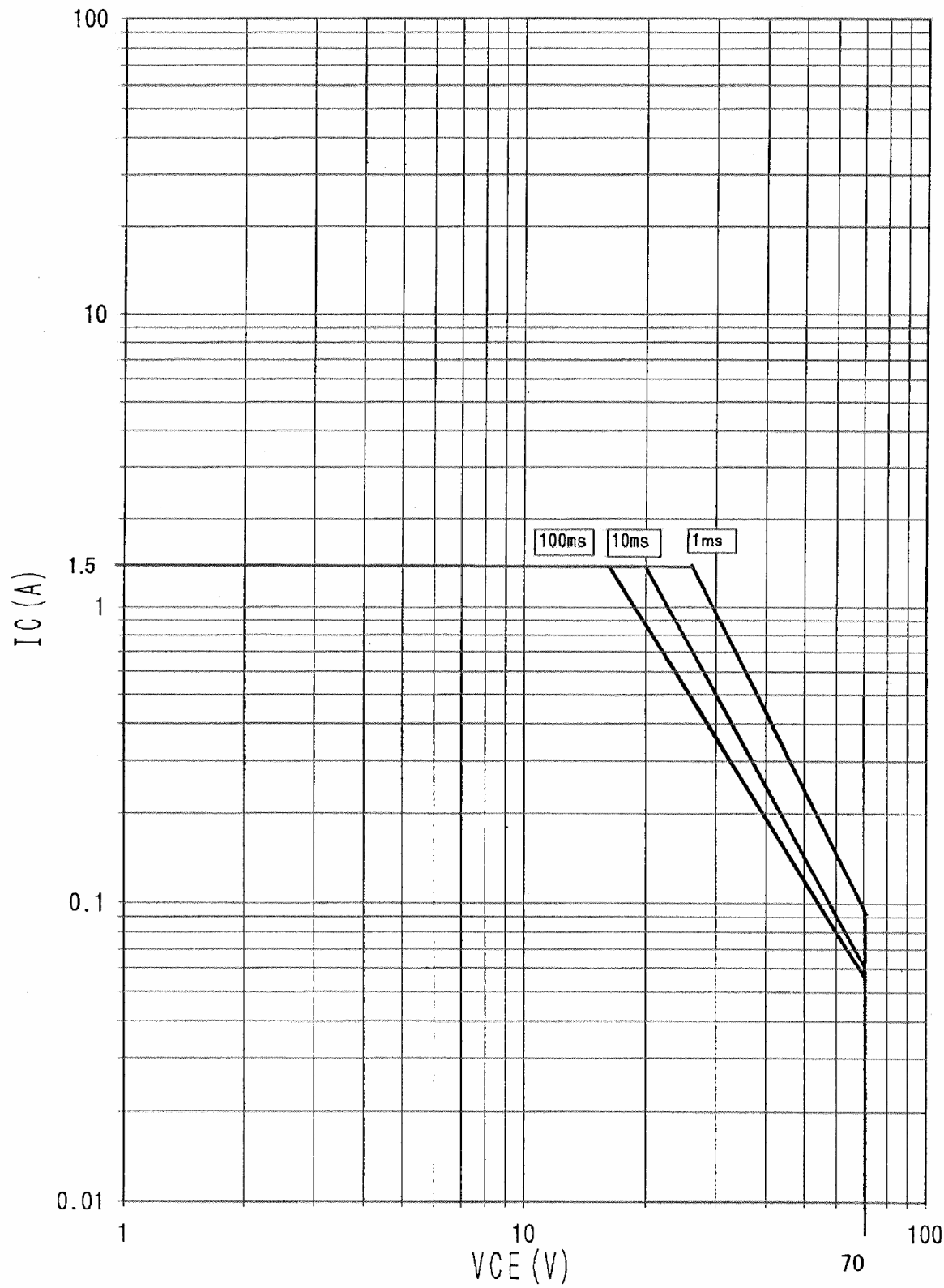
■ Technical Data (continued)  
● Package Power Dissipation

$P_D - T_a$   
 $R_{th(j-c)} = 5^{\circ}\text{C/W}$   
 $R_{th(j-a)} = 65^{\circ}\text{C/W}$



- Technical Data (continued)
- Safe Operation Area

ASO DATA



■ Precautions for Application

Test result of short between pins

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

1							
2	○						
3	○	○					
4	○	×	○				
5	○	○	○	×			
6	○	○	○	×	○		
7	○	○	○	○	○	○	
Pin No.	1	2	3	4	5	6	7
	INVERTING INPUT	V <sub>CC</sub>	PUMP UP OUT	GND	OUTPUT	OUTPUT V <sub>CC</sub>	NON INVERTING INPUT

- : No destruction of IC for pins short for 3secs.  
×: Destruction of IC for pins short for 1second.  
After destruction, continuous supply of  $V_{CC}$  may cause IC package to crack.  
To prevent this problem, insert resistance ( 2  $\Omega$  to 3  $\Omega$  ) for over current limited in  $V_{CC}$  line.

## ■ Precautions for Application (continued)

## Maximum Current at Pin 3

This is a regulation of output peak current during the flyback period.

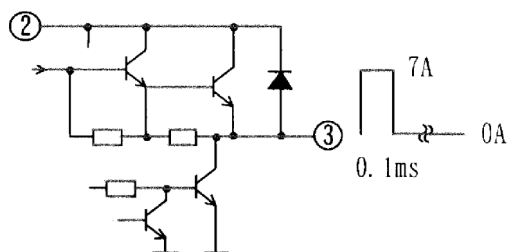
## Operating Conditions

$$V_{CC} = 30 \text{ V}$$

$$I_{sp-p} = 1.6 \text{ A[p-p]}$$

In case of using external component shown in application circuit ( page 4 ),

$I_3$  is tolerated up to 7 A (  $I_3 \leq 7 \text{ A}$  ) with 0.1 m sec single pulse on condition that  $V_{2-3}$  is less than 30 V (  $V_{2-3} \leq 30 \text{ V}$  ).





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