

# 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

### ■ Features

- Vertical Deflection Output Circuit

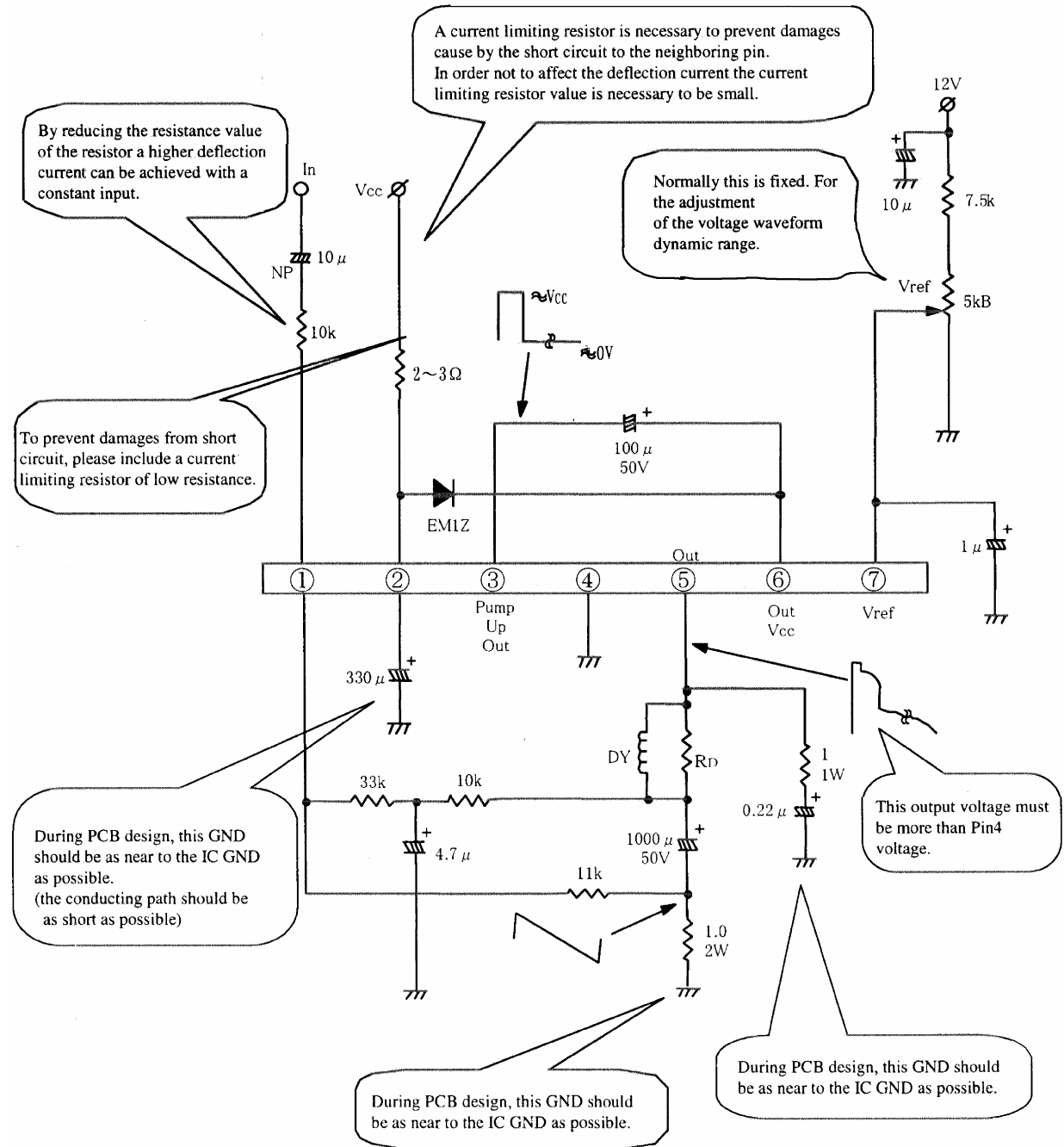
### ■ Applications

- IC for Color TV

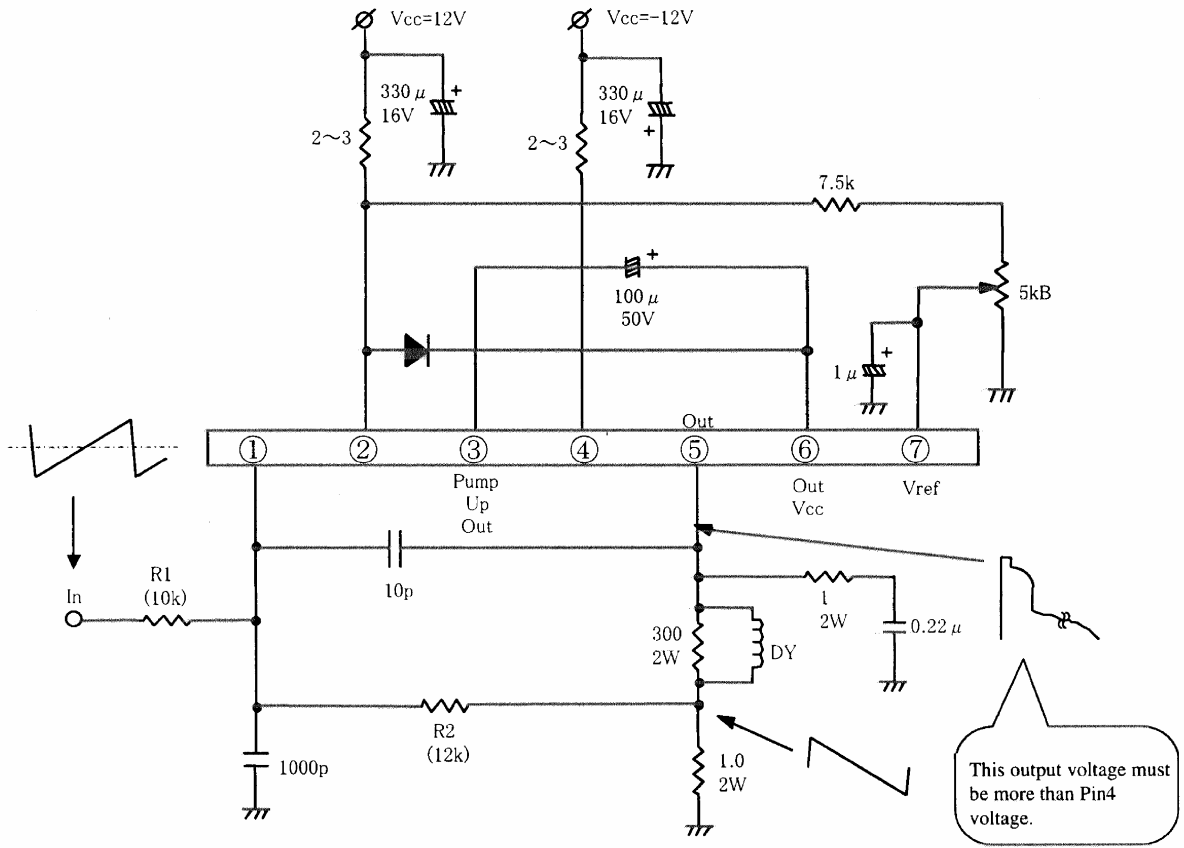
### ■ Package

- T0220-7pin Plastic Package with Fin

■ Application Circuit  
 •AC Coupling

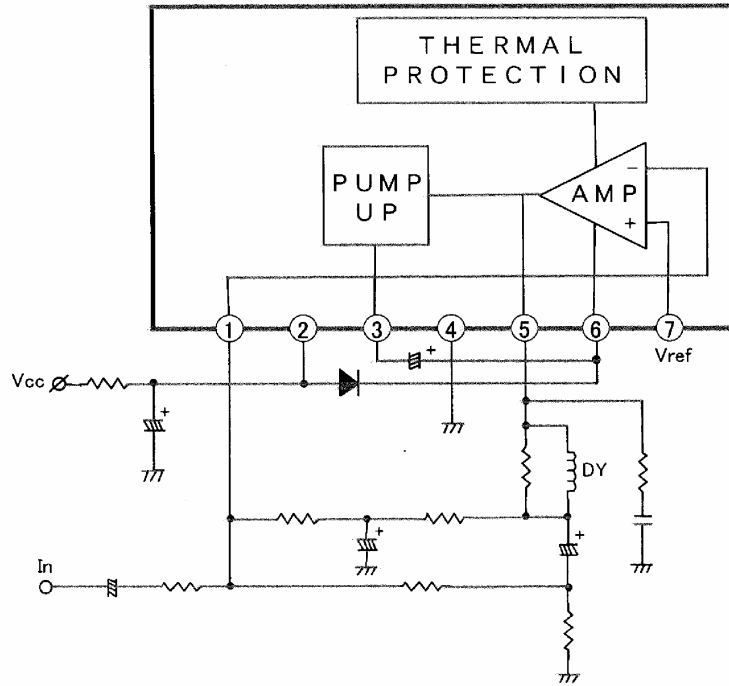


■ Application Circuit Example  
 •DC Coupling



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

Absolute Maximum Ratings						
No.	Parameter	Symbol	Rating		Unit	Note
1	Storage temperature	$T_{stg}$	- 55 to +150		°C	* 1
2	Operating ambient temperature	$T_{opr}$	- 20 to +70		°C	* 1
3	Operating ambient atmospheric pressure	$P_{opr}$	$1.013 \times 10^5 \pm 0.61 \times 10^5$		Pa	
4	Operating constant gravity	$G_{opr}$	9 810		m/S <sup>2</sup>	
5	Operating shock	$S_{opr}$	4 900		m/S <sup>2</sup>	
6	Supply voltage	$V_{CC2}$	35		V	
7	Supply current	$I_{CC2}$	360		mA	
8	Power dissipation	$P_D$	1.5		W	* 2
9	Circuit voltage	$V_{5-4}, V_{6-4}$	0	70	V	
10	Circuit voltage	$V_{7-4}, V_{1-4}$	0	$V_{2-4}$	V	
11	Circuit current	$I_5, I_3$	- 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	$V_{CC2}$	12 to 30	V	
Deflection output current	$I_{5p-p}$	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

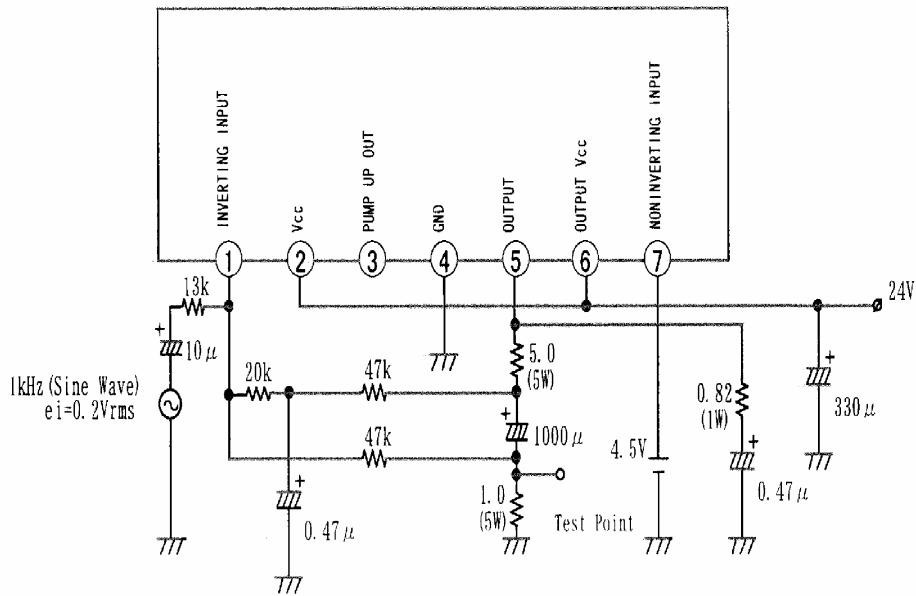
b No.	Parameter	Symbol	Test circuits	Conditions	Reference			Unit	Note
					Min	Typ	Max		
1	Idling current	$I_6$	2	$V_{CC} = 24\text{ V}$	5	—	50	mA	
2	Thermal protection operating temperature	$T_t$	1	$V_{CC} = 24\text{ V}$ Temperature at output shutdown	150	—	—	°C	

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

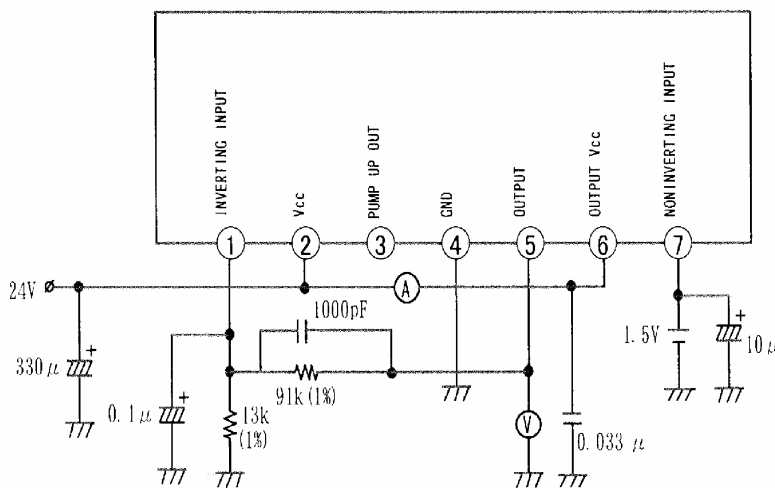


■ Description of Test Circuits Test Methods

Test Circuit – 1 (Thermal Production Operating Temperature)



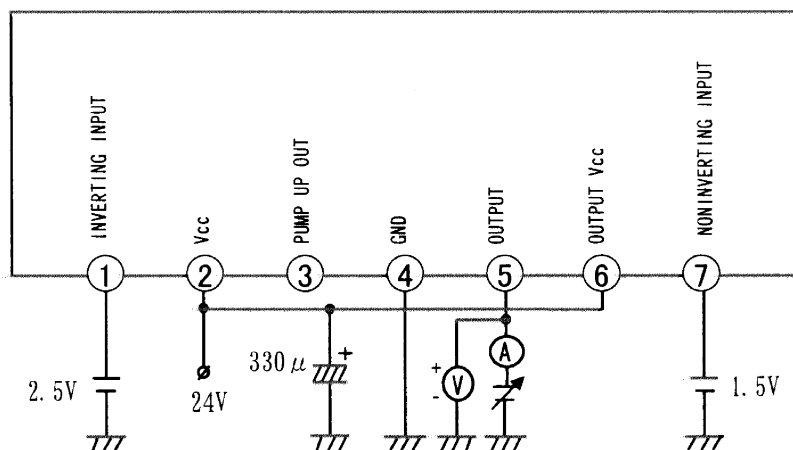
Test Circuit – 2 (Mid-point Voltage, Idling Current)



■ Description of Test Circuits Test Methods (continued)

Test Circuit – 3

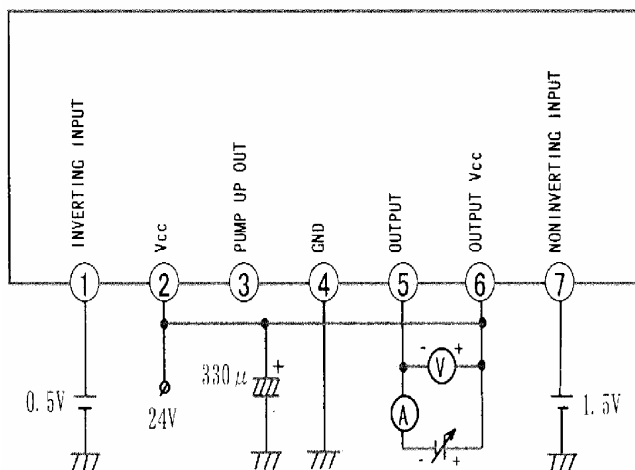
(Output Saturation Voltage (Lower) )



Monitor the voltage when the current is 0.8 A.

Test Circuit – 4

(Output Saturation Voltage (Upper) )



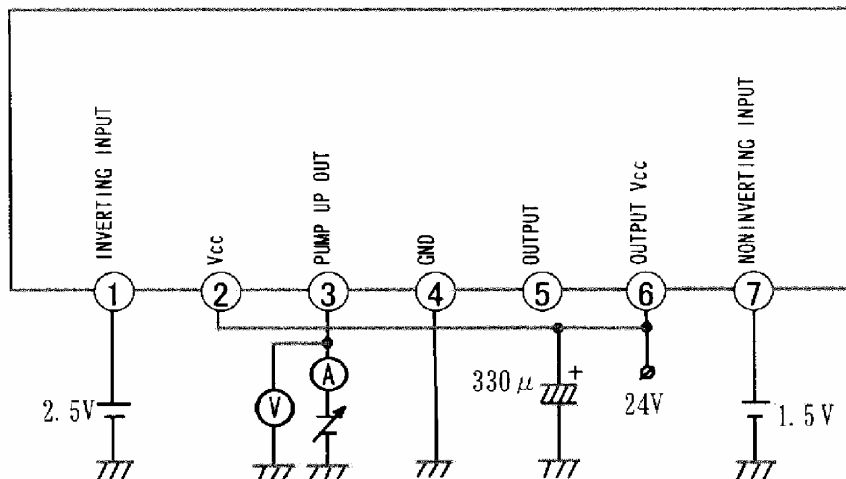
Monitor the voltage when the current is 0.8 A.

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

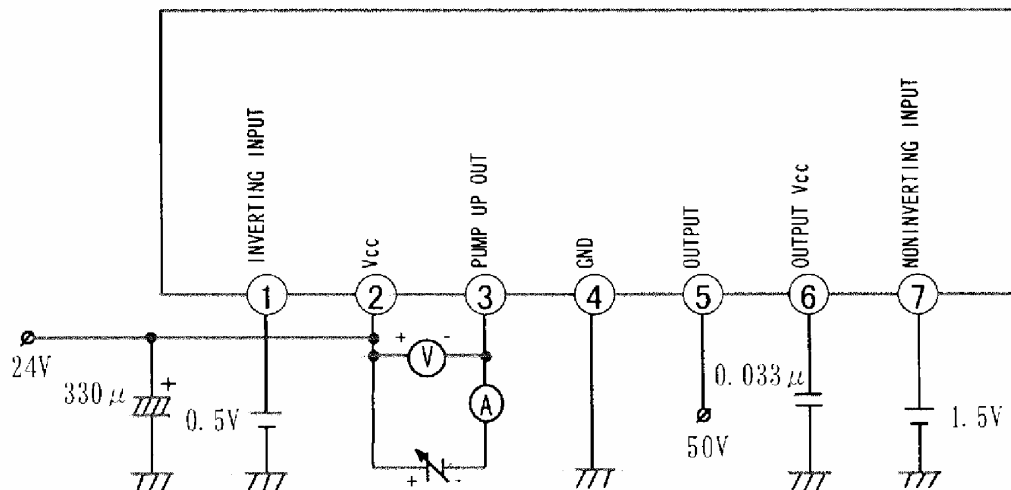
( Pump-up Charge Saturation Voltage )



Monitor the voltage when the current is 20 mA.

Test Circuit – 6

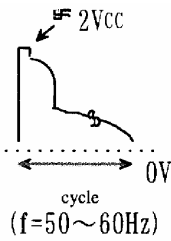
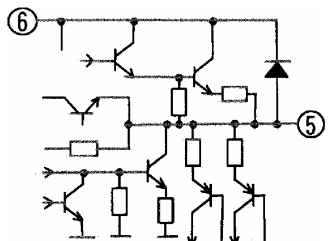
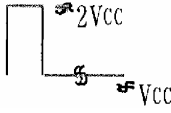
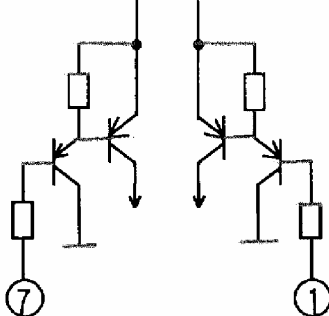
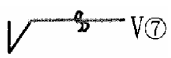
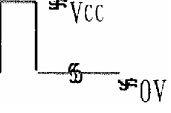
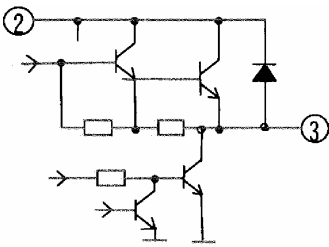
( Pump-up Discharge Saturation Voltage )



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

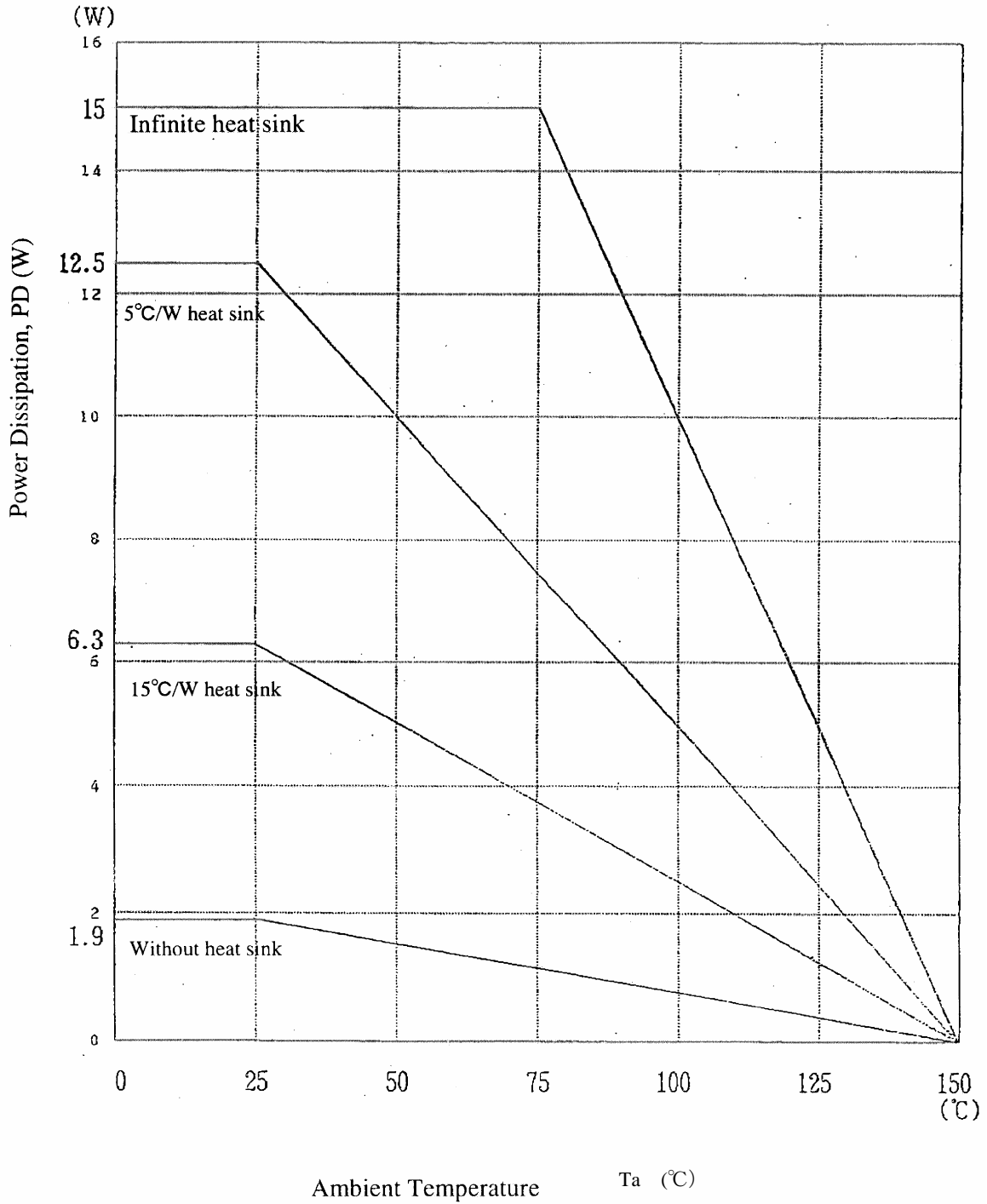
Pin No.	Pin name	Pin voltage (V)	Function	Equivalent circuit
4	GND	DC	—	—
5	Vertical output		A vertical deflection coil is connected and 1 A to 2 A of deflection current is provided through the pin. At this time, output voltage must be more than Pin 4 voltage.	
6	Vertical output power supply		About $V_{CC} \times 2$ 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 fryback pulse in order to supply about $V_{CC} \times 2$ to pin 6.	

■ Technical Data (continued)  
 • Package Power Dissipation

$$P_D - T_a$$

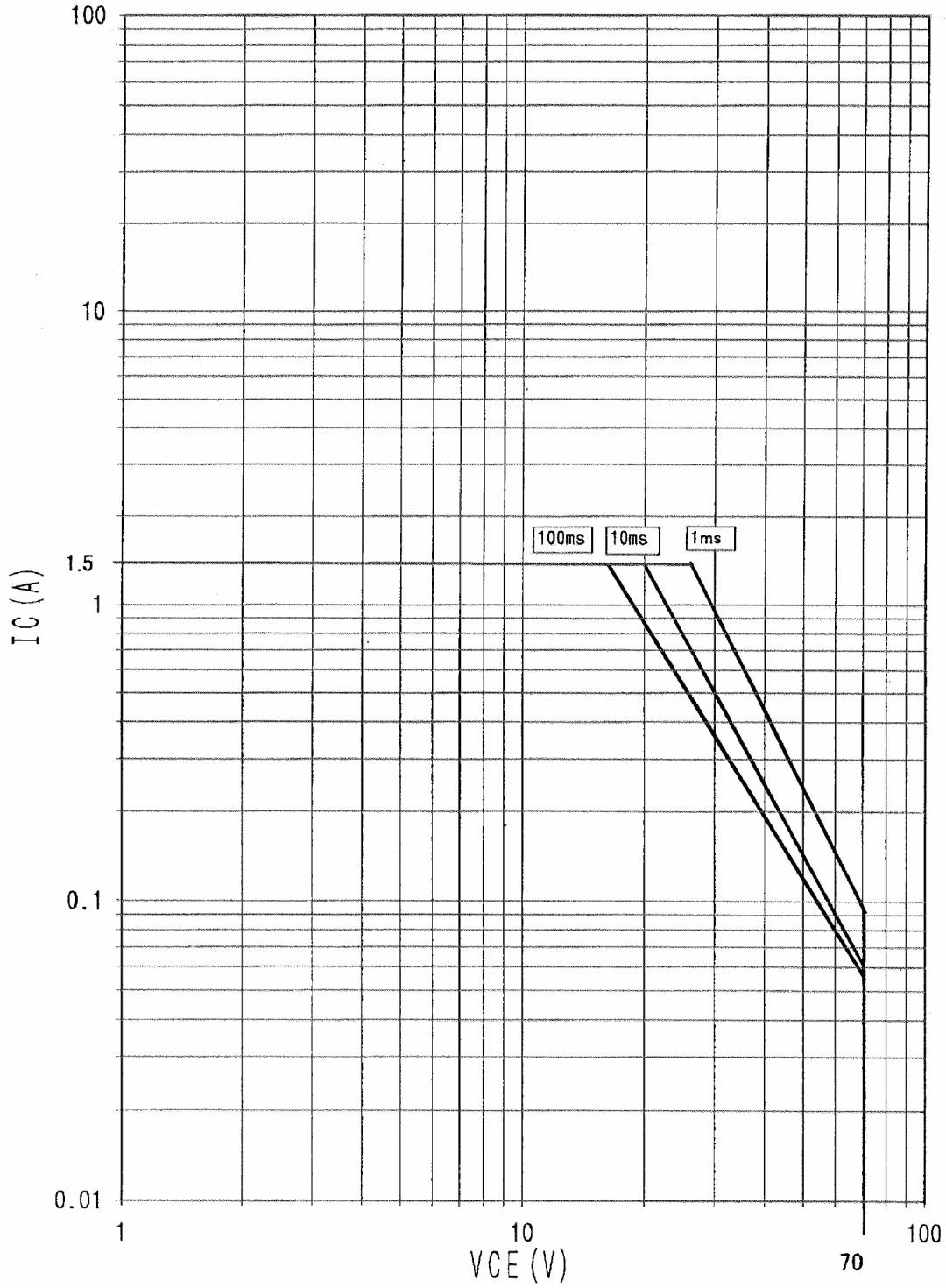
$$R_{th(j-c)} = 5^\circ\text{C/W}$$

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



- 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	$V_{CC}$	PUMP UP OUT	GND	OUTPUT	OUTPUT $V_{CC}$	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.

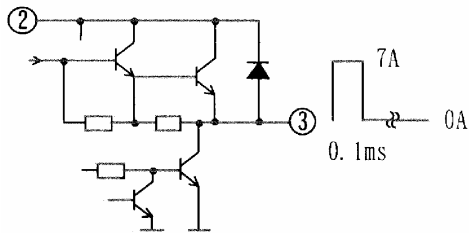
## Operating Conditions

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

$$I_{5p-p} = 1.6 \text{ A [p-p]}$$

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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