Panasonic

AN5448

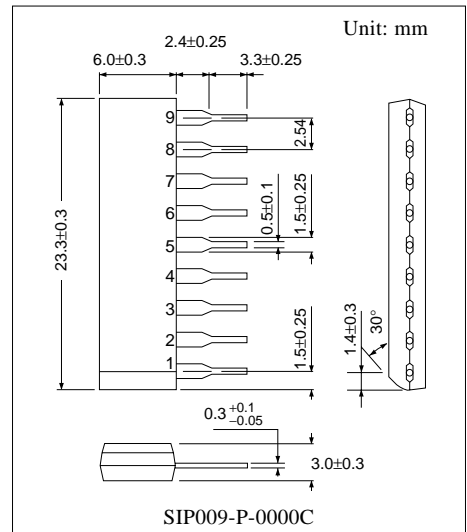## TILT correction IC

■ Overview

The AN5448 is a rotation (TILT) correction IC in which the control circuit and the drive circuit are integrated on a single chip.
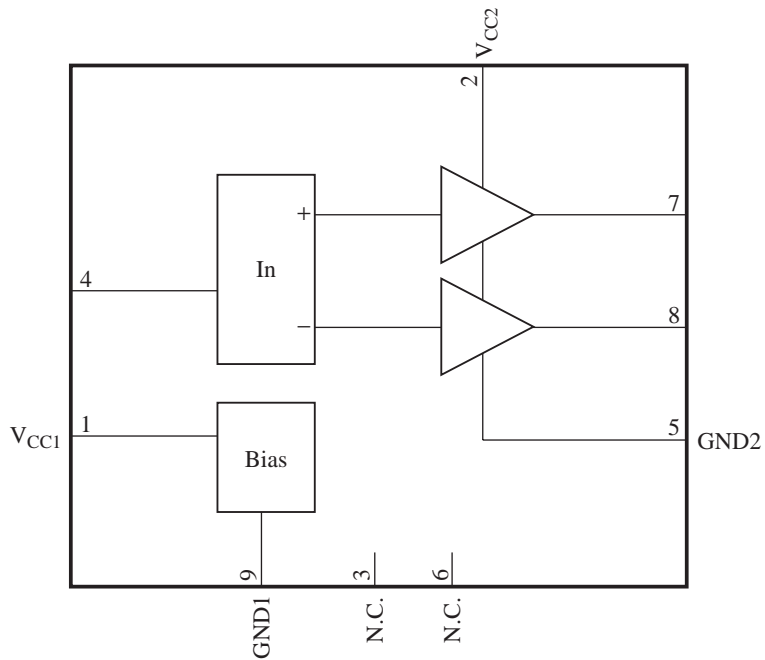
■ Features

- TILT output range: 1.7 V to 7.4 V
- Maximum output current: 200 mA
- Frequency characteristics: 200 kHz

■ Applications

- CRT monitor

Unit: mm

SIP009-P-0000C

■ Block Diagram

■ Pin Descriptions

Pin No.	Description
1	Supply voltage 12 V (V_{CC1})
2	Output block supply voltage 12 V (V_{CC2})
3	N.C.
4	TILT control input
5	Output block GND (GND2)
6	N.C.
7	TILT positive output
8	TILT negative output
9	GND (GND1)

■ Absolute Maximum Ratings

Parameter	Symbol		Rating	Unit
Supply voltage	V_{CC}	V_{CC1}	13.5	V
		V_{CC2}	13.5	
Supply current	I_{CC}	I_{CC1}	30	mA
		I_{CC2}	200	
Power dissipation [*2]		P_D	524	mW
Operating ambient temperature [*1]		T_{opr}	−20 to +75	°C
Storage temperature [*1]		T_{stg}	−55 to +150	°C

Note) Be sure to comply with "■ Usage Notes" for the sequence of turning on power supply.

　　*1: Except for the power dissipation, operating ambient temperature and storage temperature, all ratings are for $T_a = 25°C$.

　　*2: The power dissipation shown is for the IC package at $T_a = 75°C$. Refer to "■ Technical Information" for details.

■ Recommended Operating Range

Parameter	Symbol	Range	Unit
Supply voltage	V_{CC1}	10.8 to 13.2	V
	V_{CC2}	7.4 to 13.2	
TILT control input	V_{4-9}	0 to 6	V
TILT positive output	I_7	−200 to +200	mA
TILT negative output	I_8	−200 to +200	mA
Peak current	I_7	− 0.3 to +0.3	A
	I_8	− 0.3 to +0.3	

Note) For the conditions in evaluating the peak current, refer to "■ Electrical Characteristics ● Explanations of testing method".

■ Electrical Characteristics at $T_a = 25°C$

| Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Circuit current (pin 1)	I_{CC1}	$V_{CC1} = 12$ V, $V_{CC2} = 12$ V	0.6	1.8	4.0	mA
Circuit current (pin 2)	I_{CC2}	$V_{CC1} = 12$ V, $V_{CC2} = 12$ V	—	0	1	mA
Circuit voltage (pin 7)	V_{7-5}	$V_{CC1} = 12$ V, $V_{CC2} = 12$ V	4.1	4.5	4.9	V
Circuit voltage (pin 8)	V_{8-5}	$V_{CC1} = 12$ V, $V_{CC2} = 12$ V	4.1	4.5	4.9	V
Output voltage difference (1)	$V_{7-8\ (1)}$	$V_7 - V_8$ at $V_4 = 2.5$ V	− 0.45	0	+0.45	V
Output voltage difference (2)	$V_{7-8\ (2)}$	$V_7 - V_8$ at $V_4 = 5$ V	5.3	5.7	6.1	V
Output voltage difference (3)	$V_{7-8\ (3)}$	$V_7 - V_8$ at $V_4 = 0$ V	−6.1	−5.7	−5.3	V

• Design reference data

Note) The characteristics listed below are theoretical values based on the IC design and are not guaranteed.

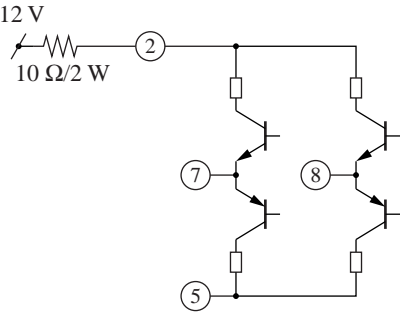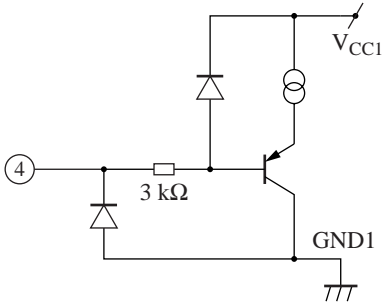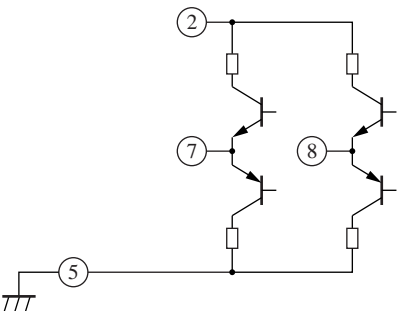| Parameter	Symbol	Conditions	Min	Typ	Max	Unit
TILT output fluctuation with supply voltage (high)	$\dfrac{\Delta V_{7-8}}{V_{CCH}}$	$V_{CC1} = 12$ V $\rightarrow$ 13.2 V, ΔV_{7-8} at $V_{CC2} = 12$ V $\rightarrow$ 13.2 V	—	±0.2	—	V
TILT output fluctuation with supply voltage (low)	$\dfrac{\Delta V_{7-8}}{V_{CC1}}$	$V_{CC1} = 12$ V $\rightarrow$ 10.8 V, ΔV_{7-8} at $V_{CC2} = 12$ V $\rightarrow$ 10.8 V	—	±0.2	—	V
TILT output fluctuation with temperature	$\Delta V_{7-8}/T_a$	$V_{IN} = 2.5$ V, ΔV_{7-8} at $T_a = +25°C \rightarrow +75°C$ and $T_a = +25°C \rightarrow -20°C$	—	±0.2	—	V

• Explanations of testing method

Conditions on evaluation of the peak current
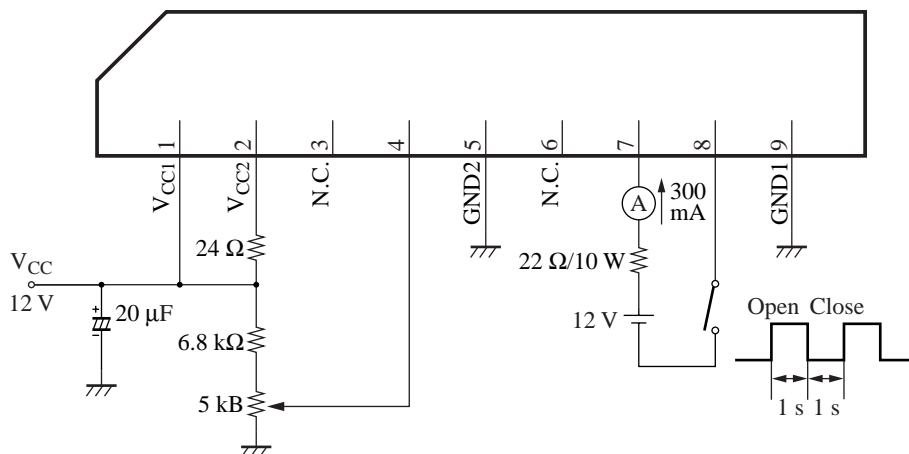
Confirm that the IC operates normally after turning on and off SW 100 times at the interval of one second. Carry out the above test when pin 7 is replaced with pin 8.

■ Terminal Equivalent Circuits

Pin No.	Equivalent circuit	Description	DC voltage (V)
1		Supply voltage 12 V (V_{CC1}): Supply voltage pin. Apply DC 12 V.	12
2		Output-block power supply 12 V (V_{CC2}): Supply voltage pin for TILT output Apply DC 12 V via a protection resistor.	12
3	—	N.C.	—
4		TILT control input: Control input for TILT Apply DC 0 V to 5 V. (typ. = 2.5 V)	—
5		GND2: The grounding pin for TILT output block.	0

■ Terminal Equivalent Circuits (continued)

Pin No.	Equivalent circuit	Description	DC voltage (V)
6	—	N.C.	—
7		TILT positive output: The positive output pin for TILT It outputs the same polarity as pin 4.	1.7 to 7.4
8		TILT negative output: The negative output pin for TILT It outputs the reverse polarity of pin 4.	1.7 to 7.4
9		GND1: The grounding pin for 12 V system.	0

■ Usage Notes

1. The sequence of power supply turning on and off

  1) Turning on sequence: First time: Pin 2 (12 V power supply)

                               Second time: Pin 1 (12 V power supply)

  2) Turning off sequence: First time: Pin 1 (12 V power supply)

                               Second time: Pin 2 (12 V power supply)

     If pin 2 voltage is decreased to 4.5 V or less under the established state of pin 1, an abnormal current of 20 mA to 50 mA flows to pin 1, so that there is a possibility of breakdown of the IC. The above setting sequence should be observed.

     The normal operation of the IC has been confirmed after tuning on and off SW 100 times at the interval of 1 second with the following testing circuit. Therefore, there will be no problem even if a current under 50 mA is allowed to flow to pin 1 for only about 1 second at turning on and turning off the set power supply. However, we do not give you guarantee by our shipping test.

■ Usage Notes (continued)

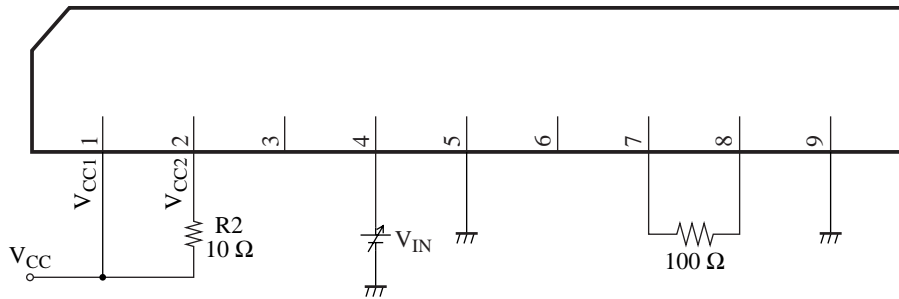2. Testing circuit for checking abnormal current
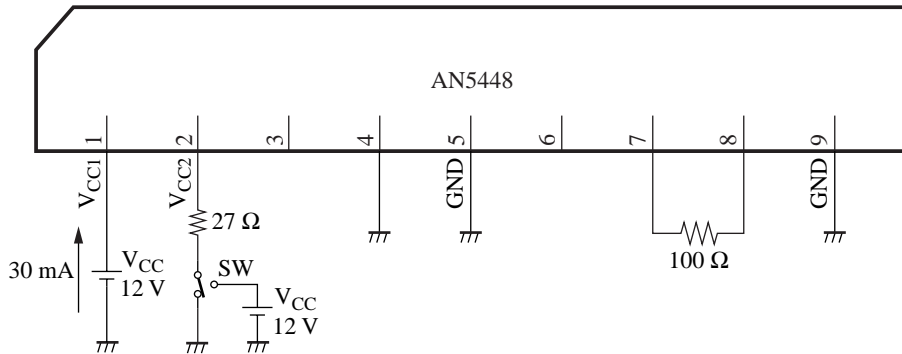
3. Principle of abnormal current generation
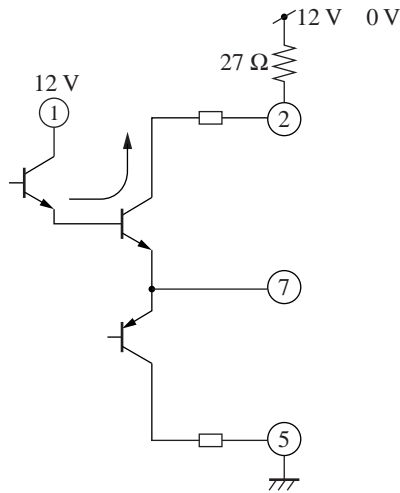
Note) The same also applies to pin 8

■ Usage Notes (continued)

4. The change in the output voltage by V_{CC2} voltage change.

  If pin 2 voltage becomes a voltage of 8.3 V or less by making R2 value larger, the upper limit of TILT output voltage is restricted and becomes as shown in figure 1.

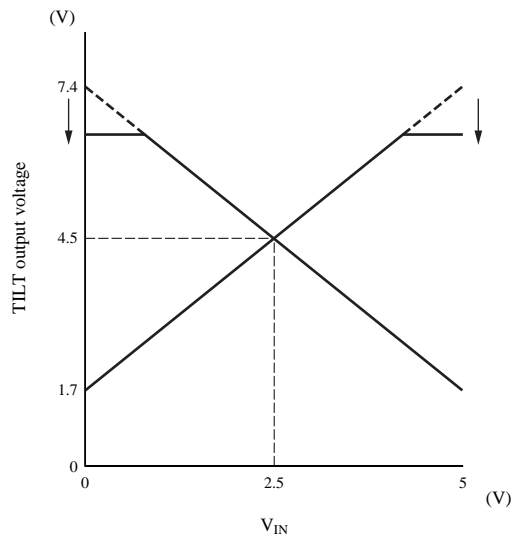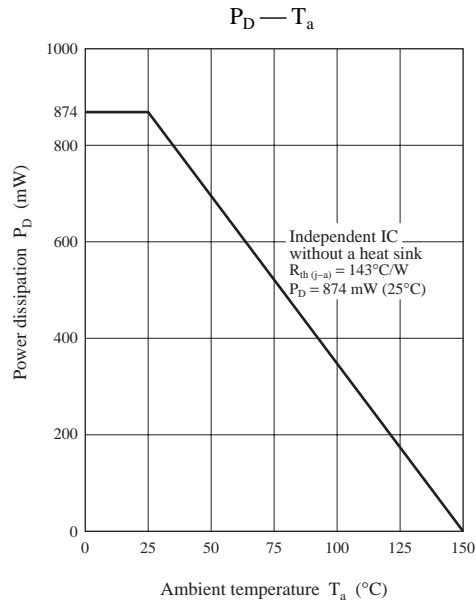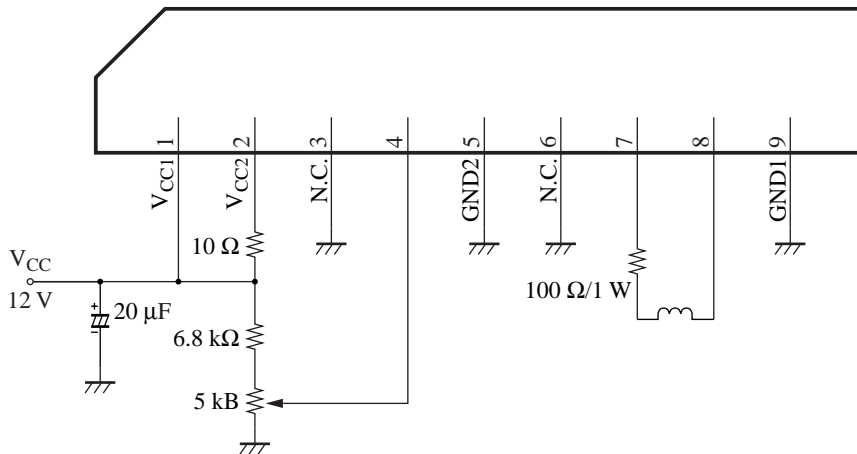 Care must be taken at using V_{CC2} at a voltage of 8.3 V or less.

Figure 1

■ Technical Information

• P_D — T_a curve of SIP009-P-0000C

$$P_D — T_a$$

Independent IC
without a heat sink
$R_{th (j–a)} = 143°C/W$
$P_D = 874$ mW (25°C)

Power dissipation P_D (mW)

Ambient temperature T_a (°C)

■ Application Circuit Example

V_{CC1} 1 V_{CC2} 2 N.C. 3 4 GND2 5 N.C. 6 7 8 GND1 9

V_{CC}
12 V
20 μF
10 Ω
6.8 kΩ
5 kB
100 Ω/1 W

∗ The above characteristics are reference values based on design and not guaranteed values.