

AN5452

IC for landing correction

■ Overview

The AN5452 is an IC to drive a landing correction coil of CRT monitor. The circuit is suitable for low power consumption design.

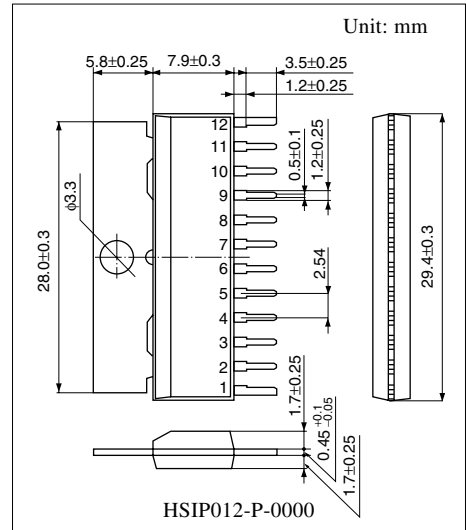
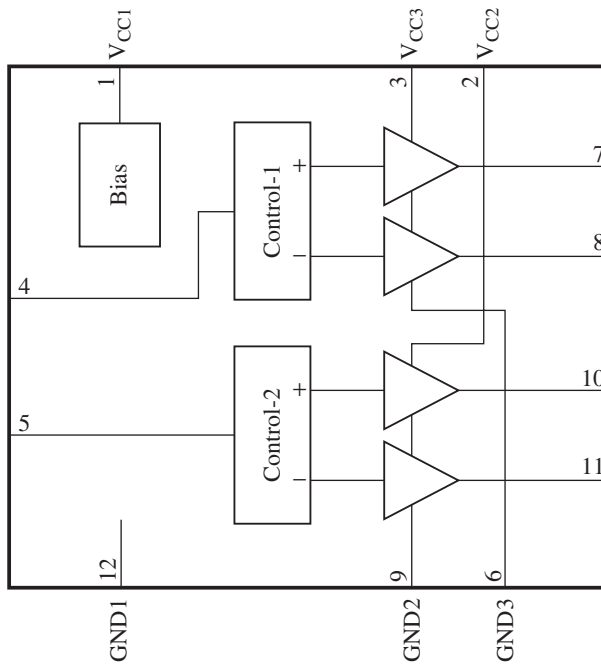
■ Features

- Built-in power amplifier (± 200 mA)
- Low standby current (typ.: 2 mA)
- Incorporating 2 circuits

■ Applications

- CRT monitors

■ Block Diagram



Note) The package of this product will be changed to lead-free type (HSIP012-P-0000D). See the new package dimensions section later of this datasheet.

■ Pin Descriptions

Pin No.	Description	Pin No.	Description
1	Control block power supply 12 V (V_{CC1})	7	Landing1 positive output
2	Output block power supply 12 V (V_{CC2})	8	Landing2 negative output
3	Output block power supply 12 V (V_{CC3})	9	Output block GND (GND2)
4	Landing1 control input	10	Landing2 positive output
5	Landing2 control input	11	Landing2 negative output
6	Output block GND (GND3)	12	Control block GND (GND1)

■ Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Supply voltage	V_{CC1}	13.5	V
	V_{CC2}	13.5	
	V_{CC3}	13.5	
Supply current	I_{CC1}	35	mA
	I_{CC2}	200	
	I_{CC3}	200	
Power dissipation *2	P_D	1 171	mW
Operating ambient temperature *1	T_{opr}	-20 to +75	°C
Storage temperature *1	T_{stg}	-55 to +150	°C

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

*2: The power dissipation for the independent package (without a heat sink) at $T_a = 75^\circ\text{C}$. Refer to "■ Technical Information" for details.

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

4. Refer to "■ Usage Notes" in case of using the IC at $V_{CC2}, V_{CC3} \leq 8\text{ V}$

■ Recommended Operating Range

Parameter	Symbol	Range	Unit
Supply voltage	V_{CC1}	10.8 to 13.2	V
	V_{CC2}	7.0 to 13.2	
	V_{CC3}	7.0 to 13.2	
Landing1 control input	V_{4-12}	0 to 6	V
Landing2 control input	V_{5-12}	0 to 6	V
Landing1 positive output	I_7	-200 to +200	mA
Landing1 negative output	I_8	-200 to +200	mA
Landing2 positive output	I_{10}	-200 to +200	mA
Landing2 negative output	I_{11}	-200 to +200	mA

■ Recommended Operating Range (continued)

Parameter	Symbol	Range	Unit
Peak current	$I_{7(P)}$	-0.7 to +0.7	A
	$I_{8(P)}$	-0.7 to +0.7	
	$I_{10(P)}$	-0.7 to +0.7	
	$I_{11(P)}$	-0.7 to +0.7	

Note) The peak current characteristic is the reference value for design. The shipping inspection of it is not performed.

For the evaluating conditions, refer to "■ Electrical Characteristics • Explanations of testing method".

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Circuit current 1	I_{CC1}	$V_{CC1} = 12\text{ V}, V_{CC2} = V_{CC3} = 12\text{ V}$	1.5	3.0	4.5	mA
Circuit current 2	I_{CC2}	$V_{CC1} = 12\text{ V}, V_{CC2} = V_{CC3} = 12\text{ V}$	—	0	1	mA
Circuit current 3	I_{CC3}	$V_{CC1} = 12\text{ V}, V_{CC2} = V_{CC3} = 12\text{ V}$	—	0	1	mA
Circuit voltage 7	V_{7-6}	$V_{CC1} = 12\text{ V}, V_{CC2} = V_{CC3} = 12\text{ V}$	4.1	4.5	4.9	V
Circuit voltage 8	V_{8-6}	$V_{CC1} = 12\text{ V}, V_{CC2} = V_{CC3} = 12\text{ V}$	4.1	4.5	4.9	V
Circuit voltage 10	V_{10-9}	$V_{CC1} = 12\text{ V}, V_{CC2} = V_{CC3} = 12\text{ V}$	4.1	4.5	4.9	V
Circuit voltage 11	V_{11-9}	$V_{CC1} = 12\text{ V}, V_{CC2} = V_{CC3} = 12\text{ V}$	4.1	4.5	4.9	V
Landing1 output voltage 1	$E_{1(1)}$	V_7-V_8 at $V_4 = 2.5\text{ V}$	-0.3	0.0	+0.3	V
Landing1 output voltage 2	$E_{1(2)}$	V_7-V_8 at $V_4 = 5\text{ V}$	+5.1	+5.5	+5.9	V
Landing1 output voltage 3	$E_{1(3)}$	V_7-V_8 at $V_4 = 0\text{ V}$	-5.9	-5.5	-5.1	V
Landing2 output voltage 1	$E_{2(1)}$	$V_{10}-V_{11}$ at $V_5 = 2.5\text{ V}$	-0.3	0.0	+0.3	V
Landing2 output voltage 2	$E_{2(2)}$	$V_{10}-V_{11}$ at $V_5 = 5\text{ V}$	+5.1	+5.5	+5.9	V
Landing2 output voltage 3	$E_{2(3)}$	$V_{10}-V_{11}$ at $V_5 = 0\text{ V}$	-5.9	-5.5	-5.1	V

• Design reference data

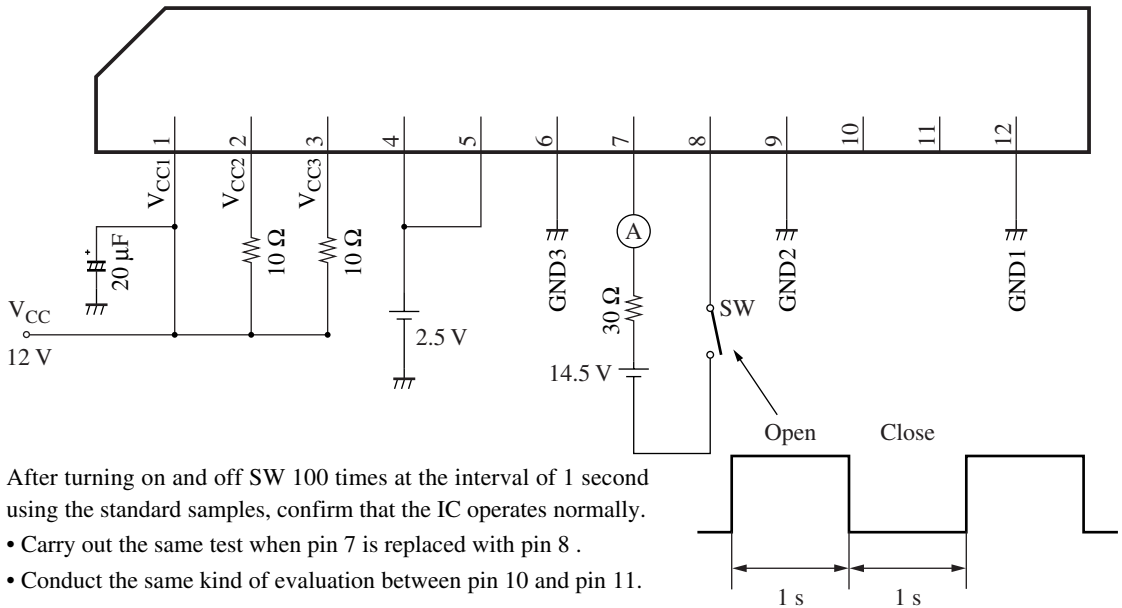
Note) The characteristics listed below are theoretical values based on the IC design and are not guaranteed.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Landing1 output fluctuation with high-level supply voltage	$\Delta E_1 / V_{CCH}$	$V_{CC1} = 12\text{ V} \rightarrow 13.2\text{ V}$, ΔE at $V_{CC2,3} = 12\text{ V} \rightarrow 13.2\text{ V}$	-0.2	—	+0.2	V
Landing1 output fluctuation with low-level supply voltage	$\Delta E_1 / V_{CCI}$	$V_{CC1} = 12\text{ V} \rightarrow 10.8\text{ V}$, ΔE at $V_{CC2,3} = 12\text{ V} \rightarrow 10\text{ V}$	-0.2	—	+0.2	V
Landing2 output fluctuation with high-level supply voltage	$\Delta E_2 / V_{CCH}$	$V_{CC1} = 12\text{ V} \rightarrow 13.2\text{ V}$, ΔE at $V_{CC2,3} = 12\text{ V} \rightarrow 13.2\text{ V}$	-0.2	—	+0.2	V
Landing2 output fluctuation with low-level supply voltage	$\Delta E_2 / V_{CCI}$	$V_{CC1} = 12\text{ V} \rightarrow 10.8\text{ V}$, ΔE at $V_{CC2,3} = 12\text{ V} \rightarrow 10\text{ V}$	-0.2	—	+0.2	V
Landing1 output fluctuation with temperature	$\Delta E_1 / T_a$	ΔE at $T_a = +25^\circ\text{C} \rightarrow -25^\circ\text{C}$ and $T_a = +25^\circ\text{C} \rightarrow +70^\circ\text{C}$	-0.2	—	+0.2	V
Landing2 output fluctuation with temperature	$\Delta E_2 / T_a$	ΔE at $T_a = +25^\circ\text{C} \rightarrow -25^\circ\text{C}$ and $T_a = +25^\circ\text{C} \rightarrow +70^\circ\text{C}$	-0.2	—	+0.2	V

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

• Explanations of testing method

Conditions at evaluating a peak current



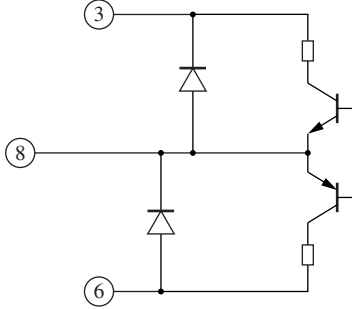
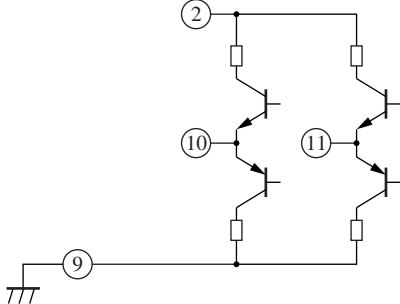
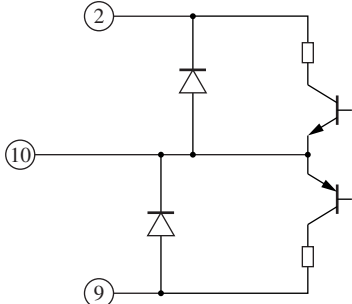
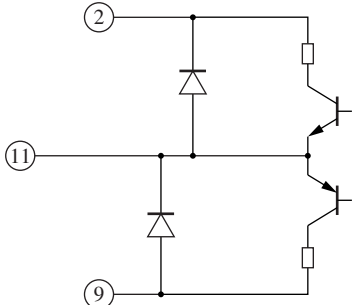

■ Terminal Equivalent Circuits

Pin No.	Equivalent circuit	Description	Pin voltage DC (V)
1		Control block voltage 12 V (V_{CC1}): Power supply pin for control block Apply DC 12 V.	12
2		Output block power supply 12 V (V_{CC2}): Power supply pin for landing2 output. Apply DC 12 V via protection resistor.	12
3		Output block power supply 12 V (V_{CC3}): Power supply pin for landing1 output Apply DC 12 V via protection resistor.	12

■ Terminal Equivalent Circuits (continued)

Pin No.	Equivalent circuit	Description	Pin voltage DC (V)
4		<p>Landing1 control input: Control input for landing1 Apply DC 0 V to 5 V (typ. = 2.5 V)</p>	—
5		<p>Landing2 control input: Control input for landing2 Apply DC 0 V to 5 V (typ. = 2.5 V)</p>	—
6		<p>GND3: Grounding pin for landing1 output</p>	0
7		<p>Landing1 positive output: Pin for landing1 positive output. Output is given as the same polarity as pin 4</p>	1.7 to 7.4

■ Terminal Equivalent Circuits (continued)

Pin No.	Equivalent circuit	Description	Pin voltage DC (V)
8		<p>Landing1 negative output: Pin for landing1 negative output. Output is given as the reverse polarity of pin 4</p>	1.7 to 7.4
9		<p>GND2: The grounding pin for the landing2 output</p>	0
10		<p>Landing2 positive output: Pin for landing2 positive output. Output is given as the same polarity as pin 5.</p>	1.7 to 7.4
11		<p>Landing2 negative output: Pin for landing2 negative output. Output is given as the reverse polarity of pin 5.</p>	1.7 to 7.4
12		<p>GND1: Grounding pin for control block.</p>	0

■ Usage Notes

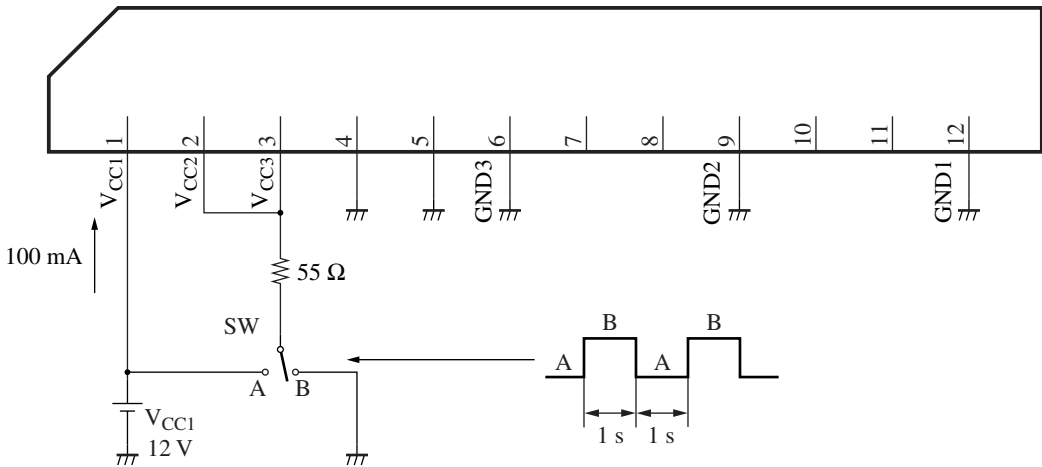
1. The order of power supply turning on and off

- 1) Turning on sequence
 - 1st time pin 2, pin 3 (12 V power supply)
 - 2nd time pin 1 (12 V power supply)
- 2) Turning off sequence
 - 1st time pin 1 (12 V power supply)
 - 2nd time pin 2, pin 3 (12 V power supply)

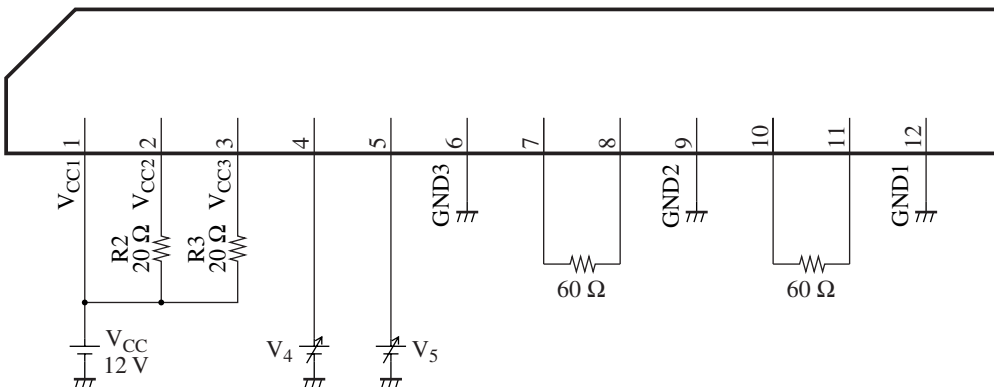
In the state that the pin 1 has been established, if pin 2 or pin 3 is decreased to under 5 V, an abnormal current of 50 mA to 300 mA flows to pin 1, so that there is a possibility of breakdown of the IC. The above setting sequence should be observed.

It is confirmed that the IC operates normally after turning on and off SW 100 times at the interval of 1 second using the following circuit. Therefore, there will be no problem even if a current of 100 mA or less is allowed to flow to pin 1 for only about 50 ms at turning on and turning off the set power supply. However, we do not give guarantee by shipping test.

2. Circuit for checking abnormal current



3. The change in output voltage by the VCC2 and VCC3 voltage change



If pin 3 (VCC3) becomes a voltage of 8 V or less by making resistance value of R3 larger, the upper limit of output voltage for pin 7 and pin 8 is restricted and then the output becomes as shown in figure 1.

Similarly, if pin 2 (VCC2) voltage becomes 8 V or less by making resistance value R2 larger, the output voltage of pin 10 and pin 11 becomes as shown in figure 2.

A care must be taken in case of using VCC2 and VCC3 at a voltage of 8 V or less.

■ Usage Notes (continued)

3. The change in output voltage by the V_{CC2} and V_{CC3} voltage change (continued)

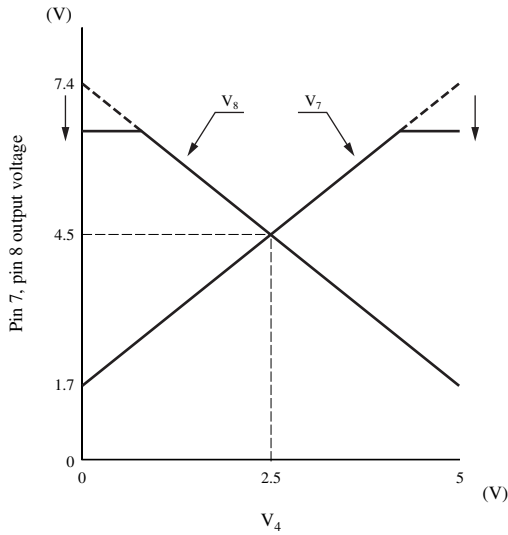


Figure 1

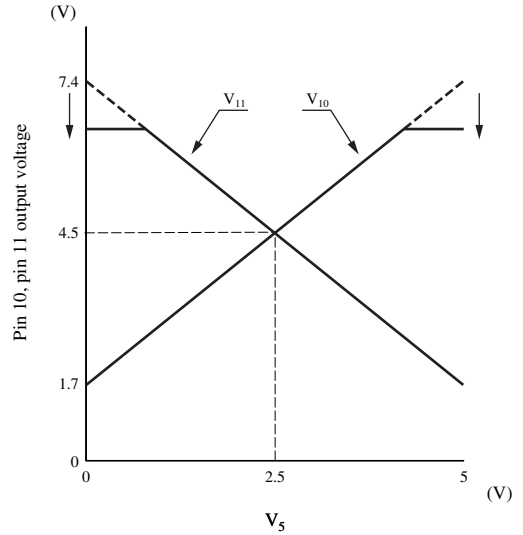
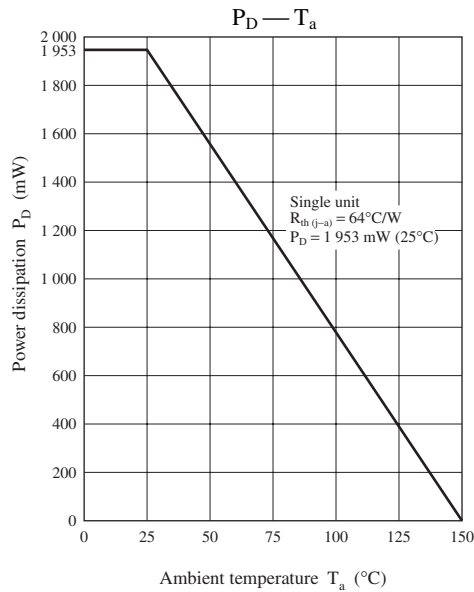


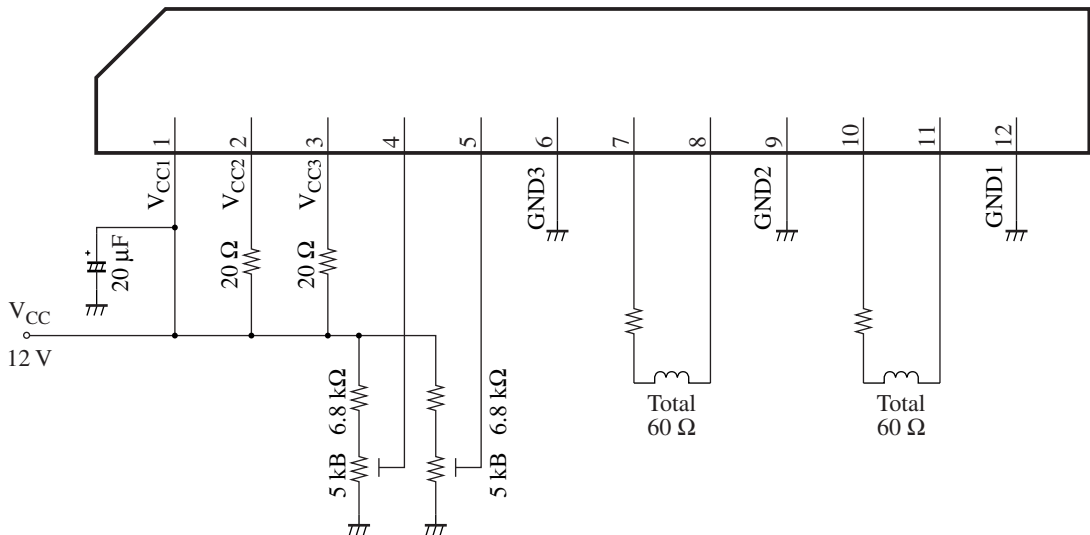
Figure 2

■ Technical Information

- $P_D - T_a$ curve of HSIP012-P-0000

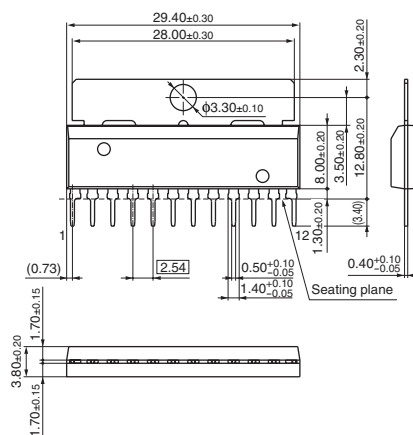


■ Application Circuit Example



■ New Package Dimensions (Unit: mm)

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



Request for your special attention and precautions in using the technical information and semiconductors described in this material

- (1) An export permit needs to be obtained from the competent authorities of the Japanese Government if any of the products or technologies described in this material and controlled under the "Foreign Exchange and Foreign Trade Law" is to be exported or taken out of Japan.
- (2) The technical information described in this material is limited to showing representative characteristics and applied circuit examples of the products. It does not constitute the warranting of industrial property, the granting of relative rights, or the granting of any license.
- (3) The products described in this material are intended to be used for standard applications or general electronic equipment (such as office equipment, communications equipment, measuring instruments and household appliances).
Consult our sales staff in advance for information on the following applications:
 - Special applications (such as for airplanes, aerospace, automobiles, traffic control equipment, combustion equipment, life support systems and safety devices) in which exceptional quality and reliability are required, or if the failure or malfunction of the products may directly jeopardize life or harm the human body.
 - Any applications other than the standard applications intended.
- (4) The products and product specifications described in this material are subject to change without notice for reasons of modification and/or improvement. At the final stage of your design, purchasing, or use of the products, therefore, ask for the most up-to-date Product Standards in advance to make sure that the latest specifications satisfy your requirements.
- (5) When designing your equipment, comply with the guaranteed values, in particular those of maximum rating, the range of operating power supply voltage and heat radiation characteristics. Otherwise, we will not be liable for any defect which may arise later in your equipment.
Even when the products are used within the guaranteed values, redundant design is recommended, so that such equipment may not violate relevant laws or regulations because of the function of our products.
- (6) When using products for which dry packing is required, observe the conditions (including shelf life and after-unpacking standby time) agreed upon when specification sheets are individually exchanged.
- (7) No part of this material may be reprinted or reproduced by any means without written permission from our company.

Please read the following notes before using the datasheets

- A. These materials are intended as a reference to assist customers with the selection of Panasonic semiconductor products best suited to their applications.
Due to modification or other reasons, any information contained in this material, such as available product types, technical data, and so on, is subject to change without notice.
Customers are advised to contact our semiconductor sales office and obtain the latest information before starting precise technical research and/or purchasing activities.
- B. Panasonic is endeavoring to continually improve the quality and reliability of these materials but there is always the possibility that further rectifications will be required in the future. Therefore, Panasonic will not assume any liability for any damages arising from any errors etc. that may appear in this material.
- C. These materials are solely intended for a customer's individual use.
Therefore, without the prior written approval of Panasonic, any other use such as reproducing, selling, or distributing this material to a third party, via the Internet or in any other way, is prohibited.