



THE DATASHEET OF BH7649KS2



High-performance Video Signal Switchers

Video · Audio Signal Switchers for Car Navigation Car DVD Player


BH7649KS2

No.11066EAT05

●Description

BH7649KS2 is built-in video switch, audio switch and isolation amplifier in a single chip.

●Features

- 1) Video inputs selector: 7-inputs composite, Video outputs: 2-outputs 75Ω video driver, 2-outputs AMP
- 2) Built in Video gain switch (-6dB / -3dB / 0dB / 3dB)
- 3) Built in Video LPF switch (6.75MHz / Through)
- 4) Built in sag compensation circuit
- 5) Enables two load drivers
- 6) Video driver: Able to be used without load
- 7) Video driver : Able to be used without output coupling capacitor(one load)
- 8) Audio inputs selector: 5-inputs(Lch, Rch), Audio outputs : 2-outputs(Lch, Rch)
- 9) Built in Audio gain switch (0dB / -6dB)
- 10) Built in Audio LPF switch (24kHz / Through)
- 11) Built in MUTE function
- 12) Audio/Video all inputs: Built in isolator function
- 13) Selectable isolator function for different Audio/Video input channels
- 14) Serial control with I²C-BUS (I²C-BUS is compatible with fast mode of Version2.0)
- 15) Optional Slave address modifications (90H / 92H)

●Applications

Car navigation, Car DVD

●Absolute maximum ratings (Ta=+25°C)

| Parameter | Symbol | Ratings | Unit |
|--|--------------------|-----------------|------|
| Supply voltage VVcc | VVccmax | 10 | V |
| Supply voltage AVcc | AVccmax | 10 | V |
| Power dissipation | Pd | 1900 *1 | mW |
| Input voltage range I ² C-BUS input (SCL, SDA) | V _{I2CIN} | -0.2 ~ 7.0 | V |
| Input voltage range Video selector, LOGIC (VIN1, VRET1, VIN2, VRET2, VIN3, VRET3, VIN4, VRET4, VIN5, VRET5, VIN6, VRET6, VIN7, VRET7, ADR) | V _{IN1} | -0.2 ~ 5.1 | V |
| Input voltage range Video driver (VDIN1, VDIN2) | V _{DIN1} | -0.2 ~ VVcc+0.2 | V |
| Input voltage range Audio selector (LIN1, ARET1, RIN1, LIN2, ARET2, RIN2, LIN3, ARET3, RIN3, LIN4, ARET4, RIN4, LIN5, ARET5, RIN5) | V _{AIN1} | -0.2 ~ AVcc+0.2 | V |
| Storage temperature range | Tstg | -55~+125 | °C |

*1 When mounting on a 70mm × 70mm × 1.6mm 4-layer glass epoxy board
Reduced by 19mW/°C at Ta = +25°C or higher

●Operating conditions

| Parameter | Symbol | Ratings | Unit |
|-----------------------------|--------|-------------|------|
| Supply voltage VVcc | VVcc | +7.5 ~ +9.5 | V |
| Supply voltage AVcc | AVcc | +7.5 ~ +9.5 | V |
| Operating temperature range | Topr | -40 ~ +85 | °C |

* This product is not designed for protection against radioactive rays.

● Electric characteristic (Unless otherwise specified, Ta=+25°C, VVcc=8.5V, AVcc=8.5V)

| Parameter | Symbol | Limits | | | Unit | Conditions | | |
|-----------------------------|--|-------------------|-------------------|-------|------|-----------------------|---|----------------------|
| | | Min. | Typ. | Max. | | | | |
| CHIP | Circuit current1 | ICC1 | - | 34 | 48 | mA | No signal(VIDEO) | |
| | Circuit current2 | ICC2 | - | 23 | 32 | mA | No signal(AUDIO) | |
| VIDEO | Voltage gain | -6dB | GVM6 _V | -6.4 | -6.0 | -5.6 | dB | Vin=1.0Vpp, f=100kHz |
| | | -3dB | GVM3 _V | -3.4 | -3.0 | -2.6 | dB | Vin=1.0Vpp, f=100kHz |
| | | 0dB | GV0 _V | -0.4 | 0.0 | 0.4 | dB | Vin=1.0Vpp, f=100kHz |
| | | 3dB | GV3 _V | 2.6 | 3.0 | 3.4 | dB | Vin=1.0Vpp, f=100kHz |
| | | 6dB | GV6 _V | 5.6 | 6.0 | 6.4 | dB | Vin=1.0Vpp, f=100kHz |
| | Frequency characteristics1 [f=6.75MHz LPF MODE] | GF11 _V | -1.5 | 0.0 | 1.0 | dB | Vin=1.0Vpp, f=6.75MHz/100kHz | |
| | | GF12 _V | - | -30 | -20 | dB | Vin=1.0Vpp, f=27MHz/100kHz | |
| | Frequency characteristics 2_1 [THROUGH MODE_-6dB] | GF2 _V | -0.6 | 0.9 | 1.9 | dB | Vin=1.0Vpp, f=10MHz/100kHz Gain=-6dB | |
| | Frequency characteristics 2_2 [THROUGH MODE_-3dB] | GF2 _V | -0.7 | 0.8 | 1.8 | dB | Vin=1.0Vpp, f=10MHz/100kHz Gain=-3dB | |
| | Frequency characteristics 2_3 [THROUGH MODE_0dB] | GF2 _V | -0.7 | 0.8 | 1.8 | dB | Vin=1.0Vpp, f=10MHz/100kHz Gain=0dB | |
| | Frequency characteristics 2_4 [THROUGH MODE_3dB] | GF2 _V | -1.0 | 0.5 | 1.5 | dB | Vin=1.0Vpp, f=10MHz/100kHz Gain=3dB | |
| | Frequency characteristics 3 [VDOUT1, VDOUT2] | GF3 _V | -3.0 | -0.5 | 1.0 | dB | Vin=1.0Vpp, f=15MHz | |
| | Maximum output level | VOM _V | 2.6 | - | - | Vp-p | f=10kHz, THD=1.0% | |
| | Cross talk | CT _V | - | -60 | -50 | dB | Vin=1.0Vpp, f=4.43MHz | |
| MUTE attenuation | MT _V | - | -60 | -50 | dB | Vin=1.0Vpp, f=4.43MHz | | |
| Common mode rejection ratio | CMRR | - | -60 | -40 | dB | Vin=1Vpp, f=20kHz | | |
| AUDIO | Voltage gain | 0dB | GV0 _A | -0.4 | 0.0 | 0.4 | dB | Vin=1Vrms, f=1kHz |
| | | -6dB | GV6 _A | -6.4 | -6.0 | -5.6 | dB | Vin=1Vrms, f=1kHz |
| | Frequency characteristics 1 [f=24kHz LPF MODE] | GF11 _A | -2.0 | -0.5 | 1.0 | dB | Vin=1Vrms, f=24kHz/1kHz | |
| | | GF12 _A | - | -26 | -15 | dB | Vin=1Vrms, f=96kHz/1kHz | |
| | Frequency characteristics 2 [THROUGH MODE] | GF2 _A | -1.0 | 0.0 | 1.0 | dB | Vin=1Vrms, f=50kHz/1kHz | |
| | Total harmonic distortion | THD+N | - | 0.002 | 0.1 | % | Vin=1Vrms, f=1kHz ※1 | |
| | Maximum output level | VOM _A | 2.0 | 2.4 | - | Vrms | f=1kHz, THD<0.3% ※1 | |
| | Cross talk | CT _A | - | -100 | -85 | dB | Vin=2Vrms, f=1kHz ※1 | |
| | MUTE attenuation | MT _A | - | -100 | -85 | dB | Vin=2Vrms, f=1kHz ※1 | |
| | Residual noise1 [THROUGH MODE] | NA | - | 10 | - | uVrms | (THROUGH MODE select) ※2 | |
| | Residual noise2 [f=24kHz LPF MODE] | NA_LPF | - | 20 | - | uVrms | LOUT1, ROUT1(LPF select) ※2 | |
| Common mode rejection ratio | CMRR | - | -70 | -40 | dB | Vin=1Vrms, f=1kHz | | |
| PSRR | PSRR _A | - | -50 | - | dB | ※3 | | |
| I ² C | [SCL,SDA] | | | | | | | |
| | VIL ※4 | Vin1L | 0 | - | 1.0 | V | Low Level input voltage | |
| | VIH ※4 | Vin1H | 2.0 | - | 5.5 | V | High Level input voltage | |
| | Input bias current | IINI2C | -10 | 0 | 10 | uA | | |
| | SDA output voltage | VoL | 0 | - | 0.4 | V | at 3.0mA sink current | |
| | [ADR] | | | | | | | |
| | VIL | Vin2L | 0 | - | 1.0 | V | Low Level input voltage | |
| | VIH | Vin2H | 2.0 | - | 5.1 | V | High Level input voltage ※5 | |
| Input impedance | ZIN _{ADR} | 70 | 100 | 130 | kΩ | Pull-Down Resistor | | |

※1 400HzHPF + 30kHzLPF ON

※2 IHF-A Filter ON

※3 Vin=0.3Vpp, f=100Hz at VCC, 30kHzLPF ON

※4 <I²C-BUS(SCL,SDA) SPEC> VIL:-0.5[V]~0.3V_{DD}[V], VIH:0.7V_{DD}[V]~V_{DD}+0.5 or 5.5[V] (V_{DD}:I2C-BUS Supply voltage)
<BH7649KS2> Be sure to use as VIL:0.0[V]~1.0[V], VIH:2.0[V]~5.5[V]

※5 We recommend that it is connect ADR Pin to 38Pin(VREG Pin) when ADR Pin is used as "H".

●Block Diagram (Audio block)

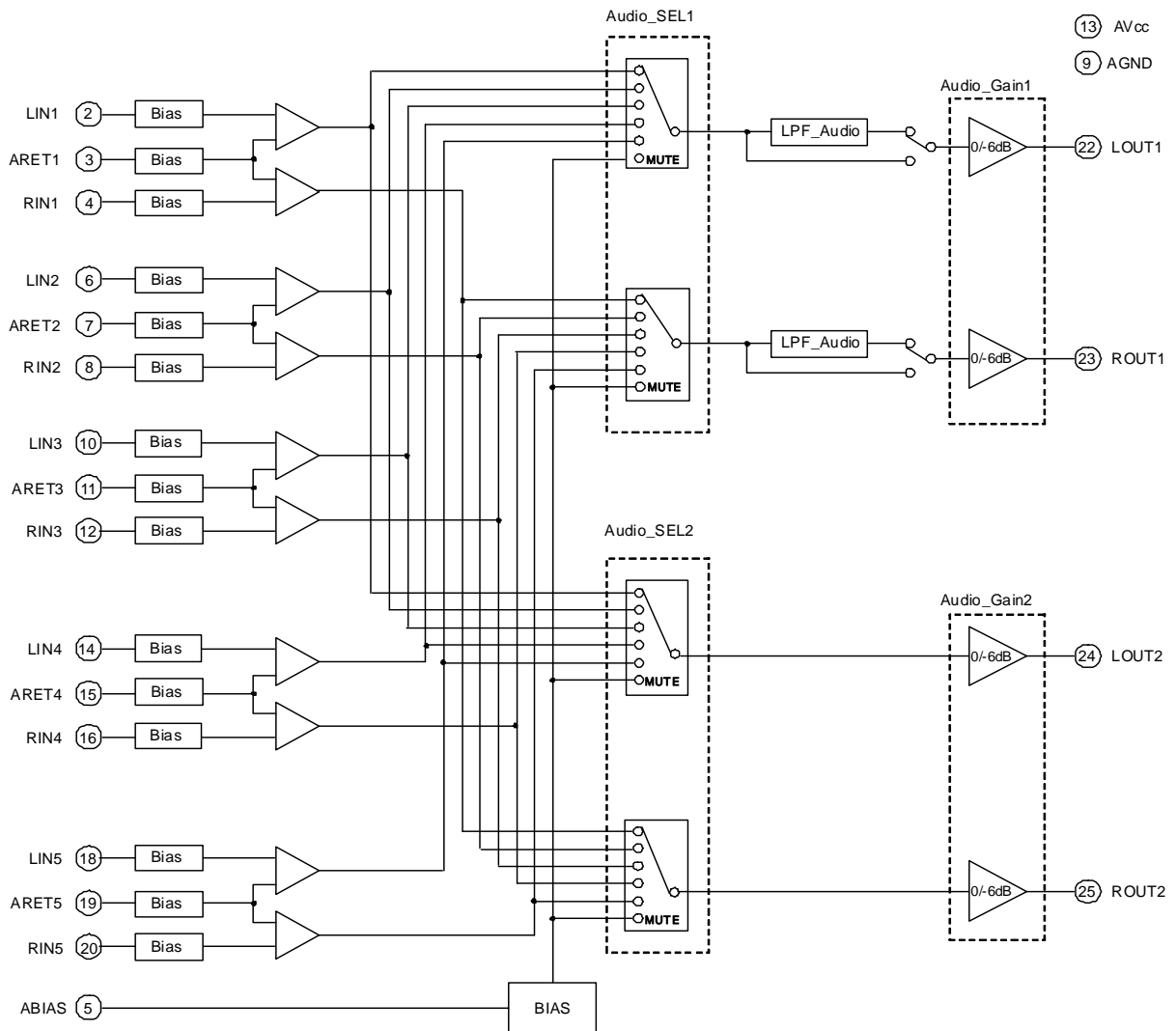


Fig.1 Block Diagram

●Block Diagram (Video block)

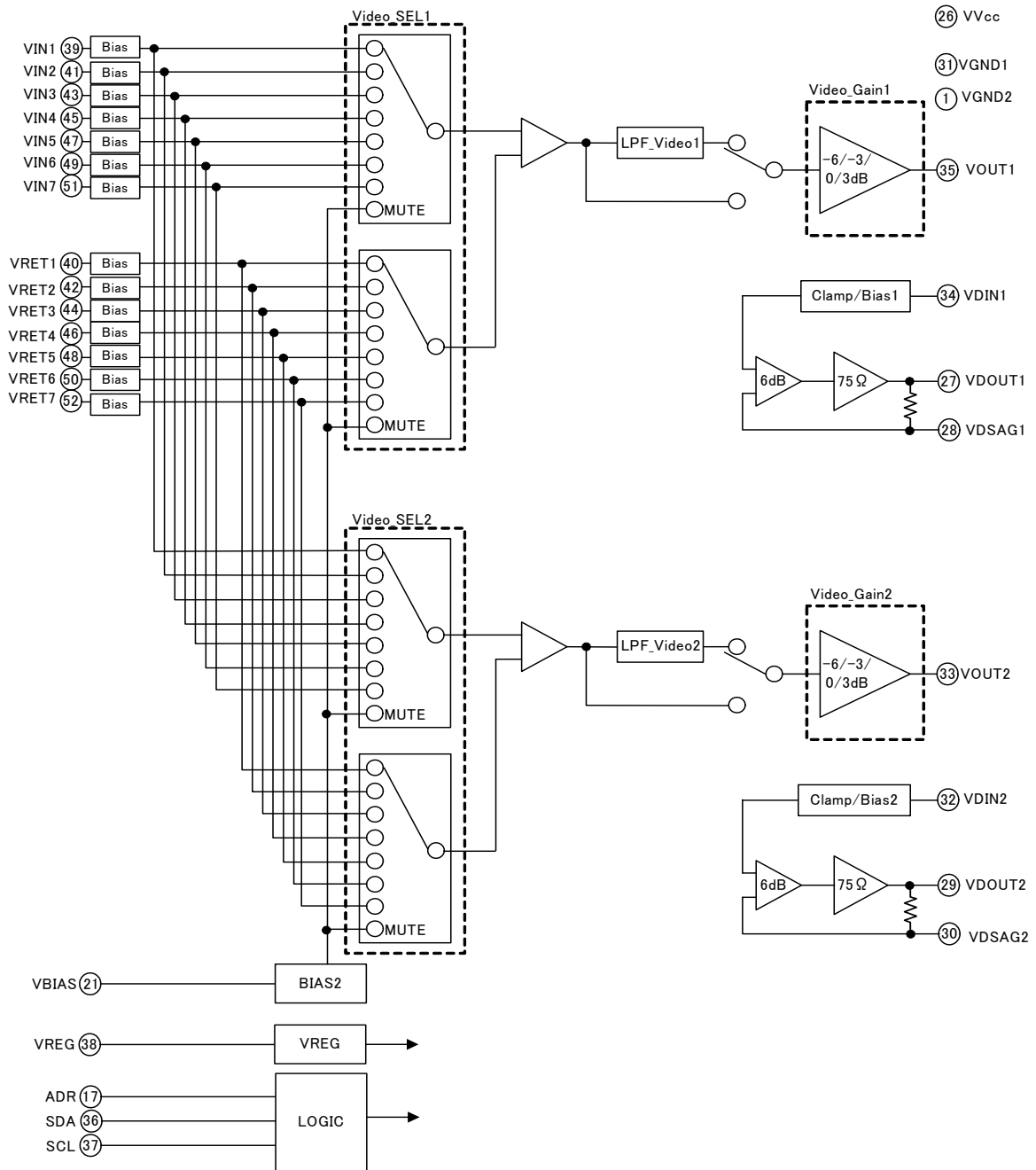


Fig.2 Block Diagram

●Package outlines

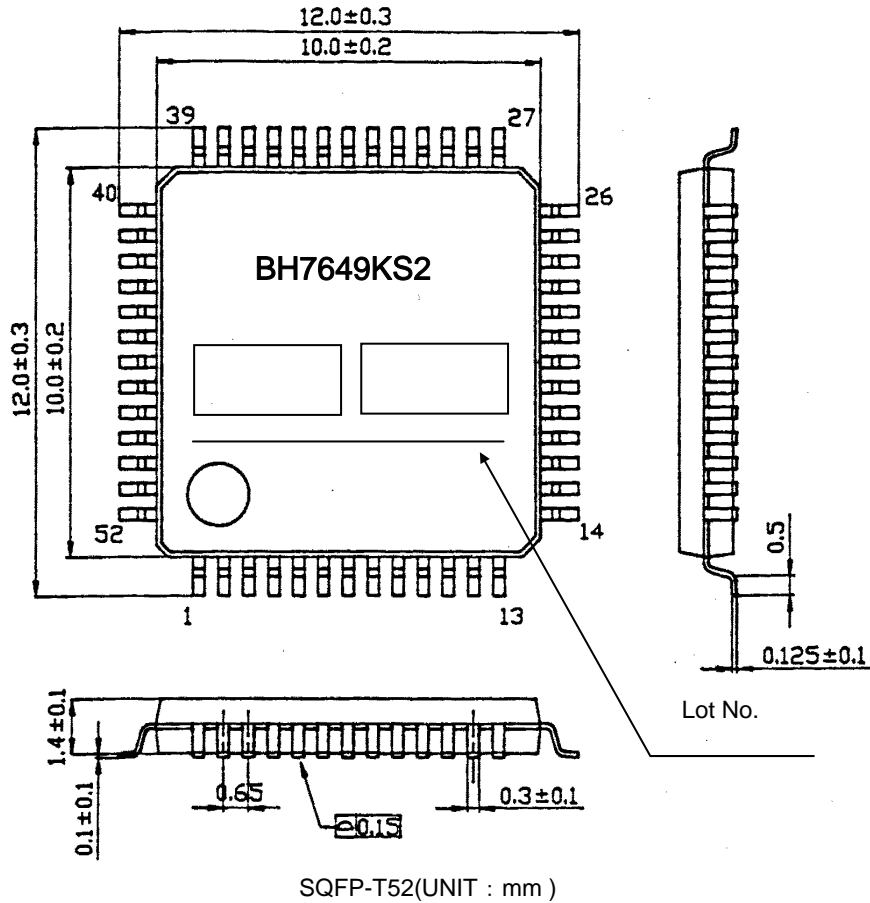


Fig.3 Package outlines

●Pin assignment table

| No. | I/O | Pin Name | No. | I/O | Pin Name | No. | I/O | Pin Name | No. | I/O | Pin Name |
|-----|-----|----------|-----|-----|----------|-----|-----|----------|-----|-----|----------|
| 1 | - | VGND2 | 14 | I | LIN4 | 27 | O | VDOUT1 | 40 | I | VRET1 |
| 2 | I | LIN1 | 15 | I | ARET4 | 28 | O | VDSAG1 | 41 | I | VIN2 |
| 3 | I | ARET1 | 16 | I | RIN4 | 29 | O | VDOUT2 | 42 | I | VRET2 |
| 4 | I | RIN1 | 17 | I | ADR | 30 | O | VDSAG2 | 43 | I | VIN3 |
| 5 | - | ABIAS | 18 | I | LIN5 | 31 | - | VGND1 | 44 | I | VRET3 |
| 6 | I | LIN2 | 19 | I | ARET5 | 32 | I | VDIN2 | 45 | I | VIN4 |
| 7 | I | ARET2 | 20 | I | RIN5 | 33 | O | VOUT2 | 46 | I | VRET4 |
| 8 | I | RIN2 | 21 | - | VBIAS | 34 | I | VDIN1 | 47 | I | VIN5 |
| 9 | - | AGND | 22 | O | LOUT1 | 35 | O | VOUT1 | 48 | I | VRET5 |
| 10 | I | LIN3 | 23 | O | ROUT1 | 36 | I/O | SDA | 49 | I | VIN6 |
| 11 | I | ARET3 | 24 | O | LOUT2 | 37 | I | SCL | 50 | I | VRET6 |
| 12 | I | RIN3 | 25 | O | ROUT2 | 38 | O | VREG | 51 | I | VIN7 |
| 13 | - | AVcc | 26 | - | VVcc | 39 | I | VIN1 | 52 | I | VRET7 |

● I²C—BUS Control specification I²C-BUS Format (WRITE MODE)

| | | | | | | | | | | | | | | | |
|---|---------------|---|-------|---|-------|---|-------|---|-------|---|-------|---|-------|---|---|
| S | SLAVE ADDRESS | A | DATA1 | A | DATA2 | A | DATA3 | A | DATA4 | A | DATA5 | A | DATA6 | A | P |
|---|---------------|---|-------|---|-------|---|-------|---|-------|---|-------|---|-------|---|---|

S : Start Condition

A : Acknowledge

P : Stop Condition

| | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---------------|--------------|--------------|--------------|--------------|--------------|--------------|------------------|------------------|
| SLAVE ADDRESS | 1 | 0 | 0 | 1 | 0 | 0 | ADR | 0 |
| DATA1 | Video_SEL1 | | | Video_SEL2 | | | LPF_Video1 | LPF_Video2 |
| DATA2 | Video_Gain1 | | Video_Gain2 | | Clamp/Bias1 | Clamp/Bias2 | Video_power-off1 | Video_power-off2 |
| DATA3 | Audio_SEL1 | | | Audio_SEL2 | | | 0 | LPF_Audio |
| DATA4 | 0 | 0 | Audio_Gain1 | Audio_Gain2 | 0 | 0 | 0 | 0 |
| DATA5 | Isolation_V1 | Isolation_V2 | Isolation_V3 | Isolation_V4 | Isolation_V5 | Isolation_V6 | Isolation_V7 | 0 |
| DATA6 | Isolation_A1 | Isolation_A2 | Isolation_A3 | Isolation_A4 | Isolation_A5 | 0 | 0 | 0 |

When power is turned on, all parts start from LOW condition.

[Prohibited matter] The terminal inputs of ADR do not change from start to stop condition. Operation error might happen.

●Selecting input switch / Setting mode

| Data name | Status | Data name | Status | Data name | Status |
|-------------|-------------------------------------|------------------|--|--------------|--|
| ADR | Sets the slave address by ADR pin | Clamp/Bias1 | Input mode selectors (Clamp/Bias1 : VDIN1) | Isolation_V1 | Isolator function selectors (VIN1) |
| | 0 : 90H ADR pin = " L " | | 0 : Clamp input mode (VDOUT1:direct drive) | | 0 : On |
| Video_SEL1 | Signal input selectors (Video_SEL1) | Clamp/Bias2 | 1 : Bias input mode (VDOUT1:output coupling "C") | Isolation_V2 | 1 : Off |
| | | | 000 : VIN1 | | Input mode selectors (Clamp/Bias2 : VDIN2) |
| | 001 : VIN2 | | 0 : Clamp input mode (VDOUT2 direct drive) | | 0 : On |
| | 010 : VIN3 | Video_power-off1 | 1 : Bias input mode (VDOUT2:output coupling "C") | Isolation_V3 | 1 : Off |
| | 011 : VIN4 | | Power-off function selectors (VDIN1 - VDOUT1) | | Isolator function selectors (VIN3) |
| | 100 : VIN5 | | 0 : On | | 0 : On |
| | 101 : VIN6 | Video_power-off2 | 1 : Off | Isolation_V4 | 1 : Off |
| | 110 : VIN7 | | Power-off function selectors (VDIN2 - VDOUT2) | | Isolator function selectors (VIN4) |
| | 111 : MUTE | | 0 : On | | 0 : On |
| Video_SEL2 | Signal input selectors (Video_SEL2) | Audio_SEL1 | 1 : Off | Isolation_V5 | 1 : Off |
| | | | 000 : VIN1 | | Signal input selectors (Audio_SEL1) |
| | 001 : VIN2 | | 000 : LIN1, RIN1 | | 0 : On |
| | 010 : VIN3 | | 001 : LIN2, RIN2 | Isolation_V6 | 1 : Off |
| | 011 : VIN4 | | 010 : LIN3, RIN3 | | Isolator function selectors (VIN6) |
| | 100 : VIN5 | | 011 : LIN4, RIN4 | | 0 : On |
| | 101 : VIN6 | | 100 : LIN5, RIN5 | Isolation_V7 | 1 : Off |
| | 110 : VIN7 | | 101 : MUTE | | Isolator function selectors (VIN7) |
| | 111 : MUTE | | 110 : MUTE | | 0 : On |
| LPF_Video1 | LPF function selectors of VOUT1 | Audio_SEL2 | 111 : MUTE | Isolation_A1 | 1 : Off |
| | | | 000 : LIN1, RIN1 | | Signal input selectors (Audio_SEL2) |
| | 0 : 6.75MHz | | 000 : LIN1, RIN1 | | 0 : On |
| | 1 : Through | | 001 : LIN2, RIN2 | Isolation_A2 | 1 : Off |
| LPF_Video2 | LPF function selectors of VOUT2 | | 010 : LIN3, RIN3 | | Isolator function selectors (LIN2, RIN2) |
| | | | 011 : LIN4, RIN4 | | 0 : On |
| | 0 : 6.75MHz | | 100 : LIN5, RIN5 | | 1 : Off |
| | 1 : Through | | 101 : MUTE | Isolation_A3 | Isolator function selectors (LIN3, RIN3) |
| Video_Gain1 | Output gain selectors (Video_Gain1) | | 110 : MUTE | | |
| | | 00 : -6dB | | 111 : MUTE | |
| | 01 : -3dB | LPF_Audio | LPF function selectors of LOUT1 and ROUT1 | Isolation_A4 | Isolator function selectors (LIN4, RIN4) |
| | 10 : 0dB | | 0 : Through | | |
| | 11 : 3dB | | 1 : 24kHz | | 1 : Off |
| Video_Gain2 | Output gain selectors (Video_Gain2) | Audio_Gain1 | Output gain selectors (Audio_Gain1) | Isolation_A5 | Isolator function selectors (LIN5, RIN5) |
| | | | 00 : -6dB | | 0 : 0dB |
| | 01 : -3dB | | 1 : -6dB | | 1 : Off |
| | 10 : 0dB | Audio_Gain2 | Output gain selectors (Audio_Gain2) | | |
| | 11 : 3dB | | 0 : 0dB | | |
| | | | 1 : -6dB | | |

● Evaluation board circuit diagram

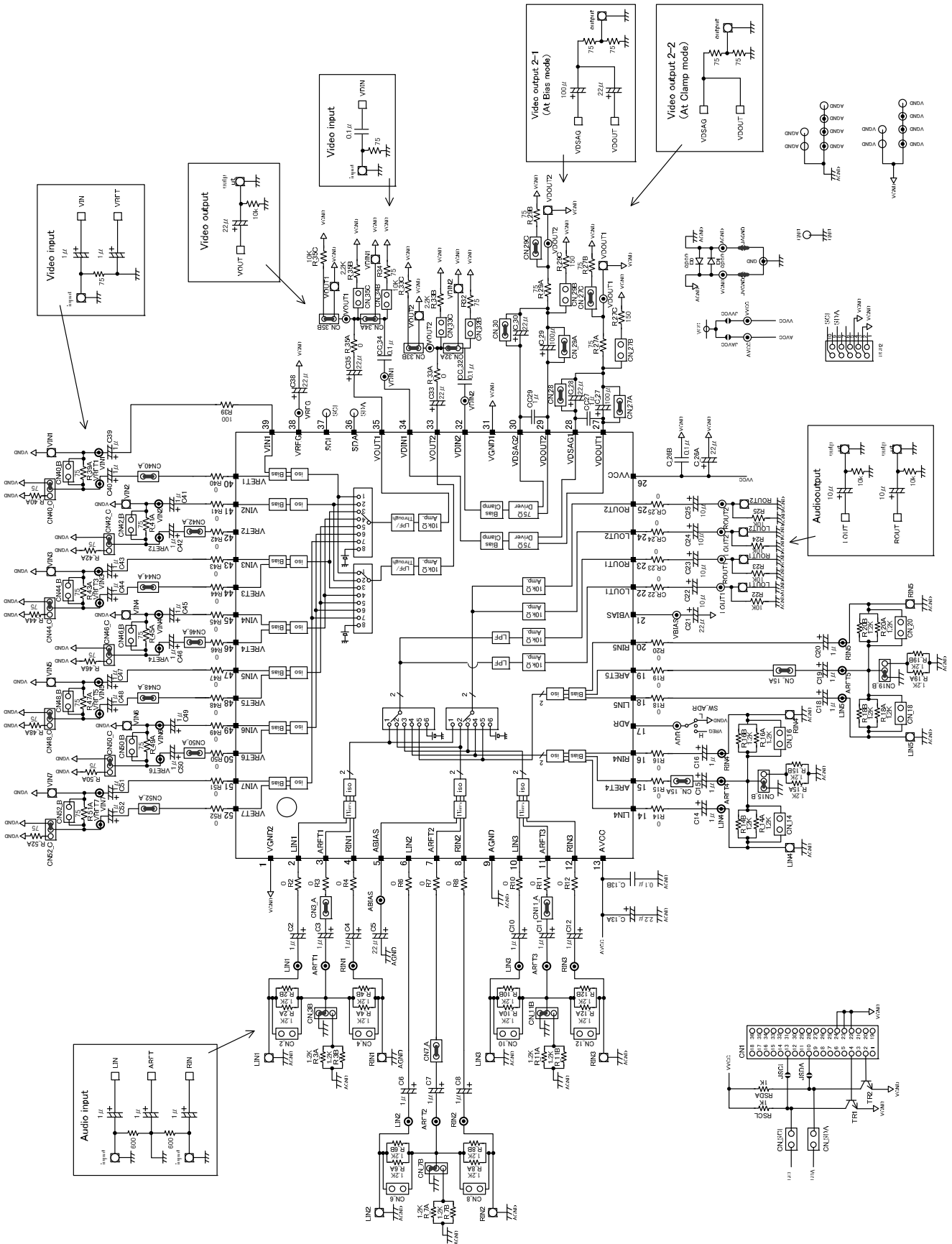


Fig.5

●Evaluation board PCB layer

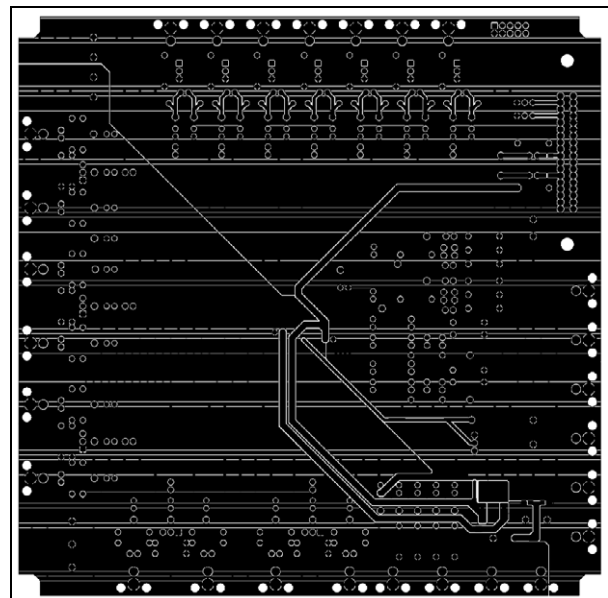
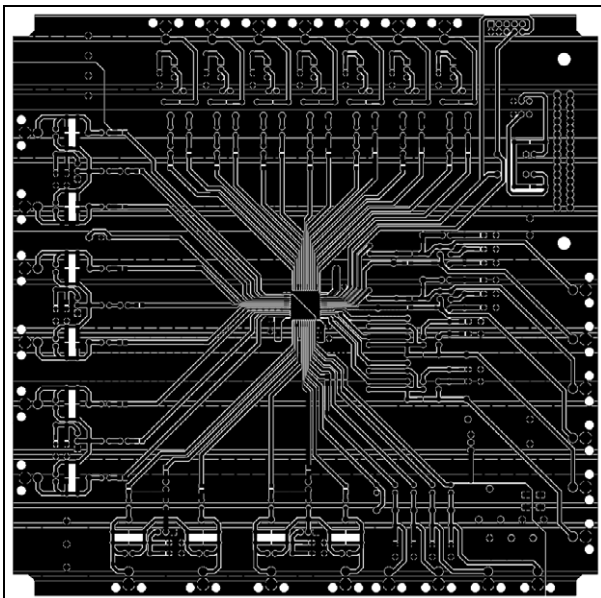
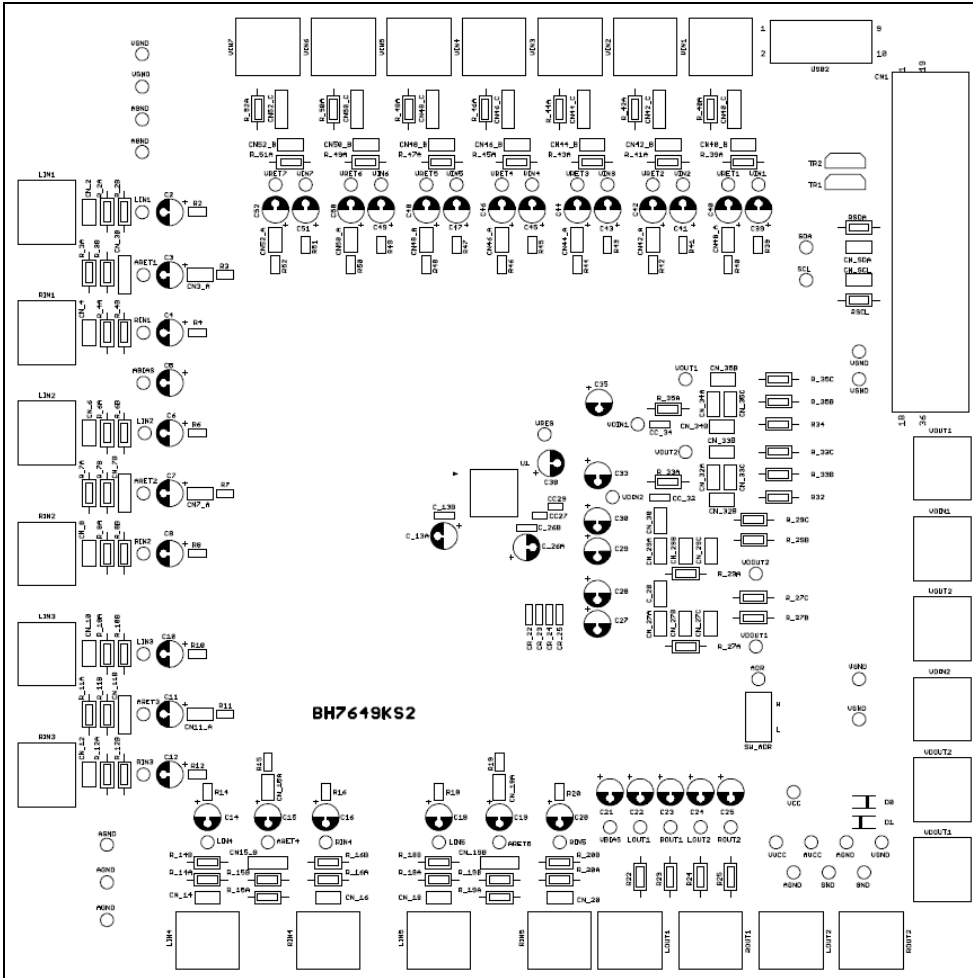
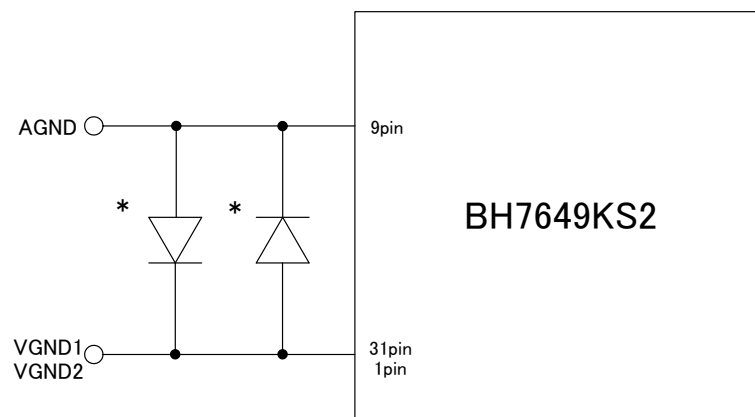


Fig.6

●Notes for use

- (1) Absolute maximum ratings
If the absolute maximum ratings for applied voltage and/or operation temperature are exceeded, LSI damage may result. Therefore, do not apply voltage or use in a temperature that exceeds these absolute maximum ratings. If it is possible that absolute maximum ratings will be exceeded, use a physical safety device such as a fuse and make sure that no conditions that might exceed the absolute maximum ratings will be applied to the LSI IC.
- (2) GND potential
Regardless of the operation mode, the voltage of the GND pin should be at least the minimum voltage. Actually check whether or not the voltage at each pin, including transient phenomena, is less than the GND pin voltage.
- (3) Thermal design
The thermal design should be done using an ample margin that takes into consideration the allowable dissipation under actual use conditions. Perform thermal design in which there are adequate margins by taking into account the allowable power dissipation in actual states of use.
- (4) Shorts between pins and mounting errors
When mounting LSI ICs onto the circuit board, make sure each LSI's orientation and position is correct. The ICs may become damaged if they are not mounted correctly when the power is turned on. Similarly, damage may also result if a short occurs, such as when a foreign object is positioned between pins in an IC, or between a pin and power supply or GND connection.
- (5) Operation in strong electromagnetic field
When used within a strong electromagnetic field, evaluate carefully to avoid the risk of operation faults.
- (6) When not using a sag compensation circuit
Connect the sag compensation pin and output pin as closely as possible. There is a danger of high frequency oscillation. Also make the distance from the output pin (OUT pin, SAG pin) to the 75Ω resistance as short as possible.
- (7) When using a sag compensation circuit
Make the length of the output pin (OUT pin, SAG pin) and capacitor as short as possible. There is a danger of high frequency oscillation. Also make the distance from the output pin (OUT pin, SAG pin) to the 75Ω resistance as short as possible. If these cautions is not observed in board layout, connect a capacitor ($0.01\mu\text{F}\sim 0.1\mu\text{F}$) as short as possible
- (8) VGND1(31pin), VGND2(1pin) and AGND(9pin) connection
When to float any one of GND pins(VGND1, VGND2 and AGND) during operation, the internal ESD protection diode Between VGND1, VGND2 and AGND may be damaged by large current surge. If the abnormal design like floating any one of GND pins is required, it is advisable to connect external diodes between GND pins. The connection detail of external diodes is illustrated in Fig.7.



* :1SR154-400(ROHM) etc.

Fig.7 External diodes

●Ordering part number

| | |
|---|---|
| B | D |
|---|---|

Part No.

| | | | |
|---|---|---|---|
| 7 | 6 | 4 | 9 |
|---|---|---|---|

Part No.

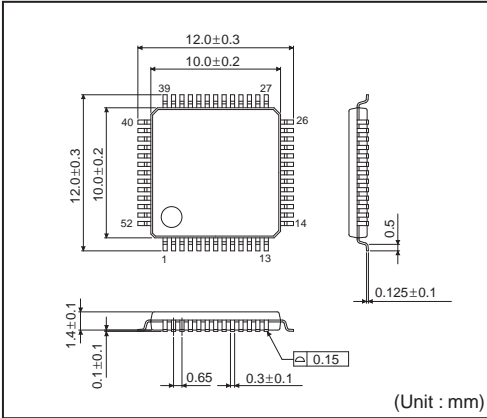
| | | |
|---|---|---|
| K | S | 2 |
|---|---|---|

Package
KS2 : SQFP-T52

| | |
|--|--|
| | |
|--|--|

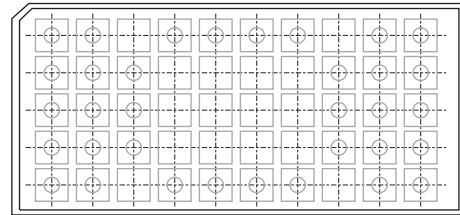
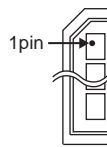
Packaging and forming specification
None: Tray

SQFP-T52



<Tape and Reel information>

| | |
|-------------------|---|
| Container | Tray (with dry pack) |
| Quantity | 1000pcs |
| Direction of feed | Direction of product is fixed in a tray |



*Order quantity needs to be multiple of the minimum quantity.

Notice

Precaution on using ROHM Products

- Our Products are designed and manufactured for application in ordinary electronic equipments (such as AV equipment, OA equipment, telecommunication equipment, home electronic appliances, amusement equipment, etc.). If you intend to use our Products in devices requiring extremely high reliability (such as medical equipment ^(Note 1), transport equipment, traffic equipment, aircraft/spacecraft, nuclear power controllers, fuel controllers, car equipment including car accessories, safety devices, etc.) and whose malfunction or failure may cause loss of human life, bodily injury or serious damage to property ("Specific Applications"), please consult with the ROHM sales representative in advance. Unless otherwise agreed in writing by ROHM in advance, ROHM shall not be in any way responsible or liable for any damages, expenses or losses incurred by you or third parties arising from the use of any ROHM's Products for Specific Applications.

(Note1) Medical Equipment Classification of the Specific Applications

| JAPAN | USA | EU | CHINA |
|-----------|-----------|------------|-----------|
| CLASS III | CLASS III | CLASS II b | CLASS III |
| CLASS IV | | CLASS III | |

- ROHM designs and manufactures its Products subject to strict quality control system. However, semiconductor products can fail or malfunction at a certain rate. Please be sure to implement, at your own responsibilities, adequate safety measures including but not limited to fail-safe design against the physical injury, damage to any property, which a failure or malfunction of our Products may cause. The following are examples of safety measures:
 - Installation of protection circuits or other protective devices to improve system safety
 - Installation of redundant circuits to reduce the impact of single or multiple circuit failure
- Our Products are designed and manufactured for use under standard conditions and not under any special or extraordinary environments or conditions, as exemplified below. Accordingly, ROHM shall not be in any way responsible or liable for any damages, expenses or losses arising from the use of any ROHM's Products under any special or extraordinary environments or conditions. If you intend to use our Products under any special or extraordinary environments or conditions (as exemplified below), your independent verification and confirmation of product performance, reliability, etc. prior to use, must be necessary:
 - Use of our Products in any types of liquid, including water, oils, chemicals, and organic solvents
 - Use of our Products outdoors or in places where the Products are exposed to direct sunlight or dust
 - Use of our Products in places where the Products are exposed to sea wind or corrosive gases, including Cl₂, H₂S, NH₃, SO₂, and NO₂
 - Use of our Products in places where the Products are exposed to static electricity or electromagnetic waves
 - Use of our Products in proximity to heat-producing components, plastic cords, or other flammable items
 - Sealing or coating our Products with resin or other coating materials
 - Use of our Products without cleaning residue of flux (even if you use no-clean type fluxes, cleaning residue of flux is recommended); or Washing our Products by using water or water-soluble cleaning agents for cleaning residue after soldering
 - Use of the Products in places subject to dew condensation
- The Products are not subject to radiation-proof design.
- Please verify and confirm characteristics of the final or mounted products in using the Products.
- In particular, if a transient load (a large amount of load applied in a short period of time, such as pulse. is applied, confirmation of performance characteristics after on-board mounting is strongly recommended. Avoid applying power exceeding normal rated power; exceeding the power rating under steady-state loading condition may negatively affect product performance and reliability.
- De-rate Power Dissipation (Pd) depending on Ambient temperature (Ta). When used in sealed area, confirm the actual ambient temperature.
- Confirm that operation temperature is within the specified range described in the product specification.
- ROHM shall not be in any way responsible or liable for failure induced under deviant condition from what is defined in this document.

Precaution for Mounting / Circuit board design

- When a highly active halogenous (chlorine, bromine, etc.) flux is used, the residue of flux may negatively affect product performance and reliability.
- In principle, the reflow soldering method must be used; if flow soldering method is preferred, please consult with the ROHM representative in advance.

For details, please refer to ROHM Mounting specification

Precautions Regarding Application Examples and External Circuits

1. If change is made to the constant of an external circuit, please allow a sufficient margin considering variations of the characteristics of the Products and external components, including transient characteristics, as well as static characteristics.
2. You agree that application notes, reference designs, and associated data and information contained in this document are presented only as guidance for Products use. Therefore, in case you use such information, you are solely responsible for it and you must exercise your own independent verification and judgment in the use of such information contained in this document. ROHM shall not be in any way responsible or liable for any damages, expenses or losses incurred by you or third parties arising from the use of such information.

Precaution for Electrostatic

This Product is electrostatic sensitive product, which may be damaged due to electrostatic discharge. Please take proper caution in your manufacturing process and storage so that voltage exceeding the Products maximum rating will not be applied to Products. Please take special care under dry condition (e.g. Grounding of human body / equipment / solder iron, isolation from charged objects, setting of Ionizer, friction prevention and temperature / humidity control).

Precaution for Storage / Transportation

1. Product performance and soldered connections may deteriorate if the Products are stored in the places where:
 - [a] the Products are exposed to sea winds or corrosive gases, including Cl₂, H₂S, NH₃, SO₂, and NO₂
 - [b] the temperature or humidity exceeds those recommended by ROHM
 - [c] the Products are exposed to direct sunshine or condensation
 - [d] the Products are exposed to high Electrostatic
2. Even under ROHM recommended storage condition, solderability of products out of recommended storage time period may be degraded. It is strongly recommended to confirm solderability before using Products of which storage time is exceeding the recommended storage time period.
3. Store / transport cartons in the correct direction, which is indicated on a carton with a symbol. Otherwise bent leads may occur due to excessive stress applied when dropping of a carton.
4. Use Products within the specified time after opening a humidity barrier bag. Baking is required before using Products of which storage time is exceeding the recommended storage time period.

Precaution for Product Label

QR code printed on ROHM Products label is for ROHM's internal use only.

Precaution for Disposition

When disposing Products please dispose them properly using an authorized industry waste company.

Precaution for Foreign Exchange and Foreign Trade act

Since our Products might fall under controlled goods prescribed by the applicable foreign exchange and foreign trade act, please consult with ROHM representative in case of export.

Precaution Regarding Intellectual Property Rights

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Other Precaution



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General Precaution

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