

# TA1249F

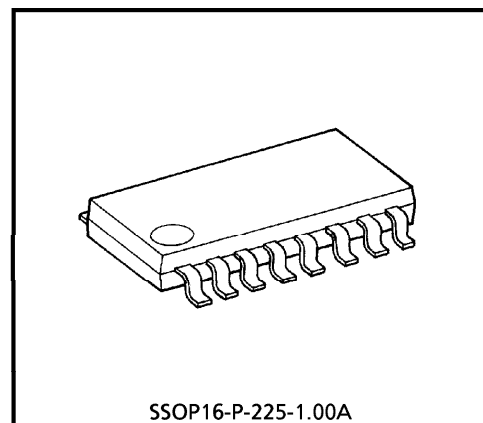
## 2-CHANNEL RECORDING AMPLIFIER & PRE-AMPLIFIER FOR VCR

The TA1249F is a 2-channel recording amplifier and pre-amplifier for use in VCR. Since the recording amplifier uses a differential mechanism, it is particularly effective in reducing high-frequency even-ordered distortion.

The pre-amplifier also has a differential mechanism and thus also reduces noise.

### FEATURES

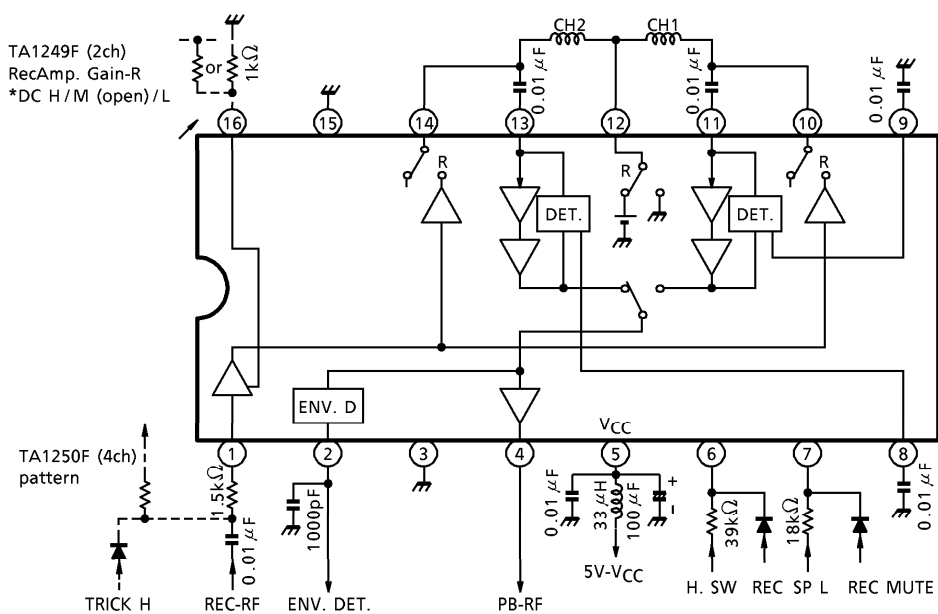
- Differential drive type recording amplifier
- Differential input type pre-amplifier
- Built-in envelope detector for auto-tracking
- Built-in recording mute circuit
- Board patterns can easily be shared, due to the high pin compatibility with the TA1250F 4-channel recording amplifier and pre-amplifier, and the TA1273F 6-channel recording amplifier and pre-amplifier.



SSOP16-P-225-1.00A

Weight : 0.14g (Typ.)

### BLOCK DIAGRAM



PIN DESCRIPTIONS ( $V_{CC} = 5.0V$ ,  $T_a = 25^\circ C$ )

| PIN No. | FUNCTION                     | TYPICAL DC VOLTAGE | INTERFACE CIRCUIT | NOTES                                                                                                                                                |
|---------|------------------------------|--------------------|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1       | Rec RF IN                    | 0.9V               |                   | Current input type                                                                                                                                   |
| 2       | ENV DET OUT                  | —                  |                   | Pull-up used in Hi-Fi mode<br>(Over 4.9V : Hi-Fi mode)                                                                                               |
| 3       | GND                          | (0V)               | —                 | —                                                                                                                                                    |
| 4       | PB RF OUT                    | 2V                 |                   | Video : 0.3mV <sub>p-p</sub> input<br>↓ 60dB<br>300mV <sub>p-p</sub> output<br>Hi-Fi : 0.15mV <sub>p-p</sub> input<br>↓ 67dB<br>336mV <sub>p-p</sub> |
| 5       | V <sub>CC</sub>              | (5V)               | —                 | —                                                                                                                                                    |
| 6       | H.SW / Rec H switching       | 2.5V               |                   | REC mode when TP6 is greater than 4.1V<br>H.SW is current input type                                                                                 |
| 7       | SP / EP / Rec Mute switching | 1.7V               |                   | V <sub>7</sub> voltage<br>L : SP<br>H : EP<br>TP7 voltage<br>H : Red Mute                                                                            |
| 8       | Filter 2                     | 1.8V               |                   | DC return filter                                                                                                                                     |
| 9       | Filter 1                     |                    |                   |                                                                                                                                                      |
| 10      | Rec OUT1                     | Open collector     |                   | —                                                                                                                                                    |
| 14      | Rec OUT2                     |                    |                   |                                                                                                                                                      |

| PIN No. | FUNCTION                   | TYPICAL DC VOLTAGE      | INTERFACE CIRCUIT | NOTES                                                                   |
|---------|----------------------------|-------------------------|-------------------|-------------------------------------------------------------------------|
| 11      | PB IN1                     | PB : 0.9V               |                   | —                                                                       |
| 13      | PB IN2                     |                         |                   |                                                                         |
| 12      | Head COMMON                | Rec : 4.3V<br>PB : 0.1V |                   | —                                                                       |
| 15      | Head GND                   | (0V)                    | —                 | —                                                                       |
| 16      | Rec current gain switching | 2.5V                    |                   | Open : 2.5V<br>Gain switching :<br>H / M / V →<br>5V / 2.5V (OPEN) / 0V |

CONTROL TABLES

HEAD switching

| During PB | V <sub>6</sub> voltage | SP mode | EP mode | Hi-Fi mode |
|-----------|------------------------|---------|---------|------------|
|           | H                      | 2ch     | 2ch     | 2ch        |
|           | L                      | 1ch     | 1ch     | 1ch        |

(Note) The above settings are controlled by the input and output currents.  
Pin 6 (TP6) has function of Rec H too.

MODE switching

| V <sub>7</sub> voltage | Mode |
|------------------------|------|
| L                      | SP   |
| H (OPEN)               | EP   |

(Note) Pin 7 has function of Rec Mute too. When pin 7 (TP7) is raised to H (V<sub>CC</sub>), then Rec Mute mode is set.

Switching of Rec current gain is performed at pin 16.

| Pin 16 voltage | Gain  |
|----------------|-------|
| H              | 3.5dB |
| M (OPEN)       | 0dB   |
| L              | − 6dB |

(Note) Uses M-level voltage at pin 16 as reference.

## EXAMPLES OF REC CURRENT SETTING

- When used in video mode  
Input : 500mV<sub>p-p</sub>, 4MHz

| PIN 1 INPUT RESISTANCE | REC CURRENT GAIN | REC CURRENT (SINGLE-CHANNEL OUTPUT) |
|------------------------|------------------|-------------------------------------|
| 1k $\Omega$            | M                | 17.7mA                              |
|                        | L                | 8.89mA                              |
| 1.5k $\Omega$          | H                | 17.8mA                              |
|                        | M                | 11.8mA                              |
|                        | L                | 5.93mA                              |

- When used in Hi-Fi mode  
Input : 700mV<sub>p-p</sub>, 2MHz

| PIN 1 INPUT RESISTANCE | REC CURRENT GAIN | REC CURRENT (SINGLE-CHANNEL OUTPUT) |
|------------------------|------------------|-------------------------------------|
| 2k $\Omega$            | H                | 24.8mA                              |
|                        | M                | 16.6mA                              |
|                        | L                | 8.3mA                               |
| 3k $\Omega$            | H                | 16.5mA                              |
|                        | M                | 11.0mA                              |

## MAXIMUM RATINGS (Ta = 25°C)

| CHARACTERISTIC        | SYMBOL                   | RATING                          | UNIT |
|-----------------------|--------------------------|---------------------------------|------|
| Power Supply Voltage  | V <sub>CC</sub>          | 7                               | V    |
| Power Dissipation 1   | P <sub>D1</sub> (Note 1) | 378                             | mW   |
| Power Dissipation 2   | P <sub>D2</sub> (Note 2) | 780                             | mW   |
| Input Voltage         | V <sub>IN</sub>          | GND – 0.3~V <sub>CC</sub> + 0.3 | V    |
| Operating Temperature | T <sub>opr</sub>         | – 20~75                         | °C   |
| Storage Temperature   | T <sub>stg</sub>         | – 55~150                        | °C   |

(Note 1) Derated linearly above Ta = 25°C in the proportion of 3mW/°C.

(Note 2) On the board mounting (Glass epoxy 50×50×1.6mm, Area of copper : 40%)  
Derated linearly above Ta = 25°C in the proportion of 6.3mW/°C.

## RECOMMENDED POWER SUPPLY VOLTAGE RANGE

Power supply voltage : 4.5~5.5V, 5V (typical)

ELECTRICAL CHARACTERISTICS ( $V_{CC} = 5V$ ,  $T_a = 25^\circ C$ )VIDEO SYSTEM  
PB mode

| CHARACTERISTIC                | SYMBOL           | TEST CIR-CUIT | TEST CONDITION                                                                                                   | MIN.  | TYP. | MAX. | UNIT          |
|-------------------------------|------------------|---------------|------------------------------------------------------------------------------------------------------------------|-------|------|------|---------------|
| Power Supply Current          | Iccp             | —             | —                                                                                                                | 21    | 27   | 33   | mA            |
| Voltage Gain                  | G1               | —             | Input (V11, V13) : $f = 1\text{MHz}$ ,<br>$0.3\text{mV}_{p-p}$                                                   | 57    | 60   | 63   | dB            |
|                               | G2               |               |                                                                                                                  |       |      |      |               |
| Voltage Gain Difference       | $\Delta G$       | —             | G1 – G2                                                                                                          | – 0.5 | 0    | 0.5  | dB            |
| frequency Characteristic      | GF1              | —             | Input (V11, V13) : $0.3\text{mV}_{p-p}$<br>Output ratio 8M / 1M                                                  | – 1.5 | 0.5  | 2.5  | dB            |
|                               | GF2              |               |                                                                                                                  |       |      |      |               |
| secondary Harmonic Distortion | HD1              | —             | Input (V11, V13) : $0.3\text{mV}_{p-p}$<br>Power ratio 8M / 4M                                                   | —     | – 50 | – 45 | dB            |
|                               | HD2              |               |                                                                                                                  |       |      |      |               |
| Maximum Output Voltage        | Vom1             | —             | Input (V11, V13) : $f = 1\text{MHz}$ ;<br>level when<br>thirdly harmonic distortion of<br>output reaches – 30dB. | 2.0   | 2.2  | —    | $V_{p-p}$     |
|                               | Vom2             |               |                                                                                                                  |       |      |      |               |
| Crosstalk                     | CR1              | —             | Input (V11, V13) : $f = 4\text{MHz}$ ,<br>$0.3\text{mV}_{p-p}$<br>Level difference between<br>channels           | —     | – 38 | – 35 | dB            |
|                               | CR2              |               |                                                                                                                  |       |      |      |               |
| Output DC Offset              | $\Delta V_{ODC}$ | —             | CH1 – CH2                                                                                                        | – 15  | 0    | 15   | mV            |
| Eguated Input Noise           | N1               | —             | Measurement point 4MHz<br>RBW : 10kHz                                                                            | —     | 0.1  | —    | $\mu V_{rms}$ |
|                               | N2               |               |                                                                                                                  |       |      |      |               |
| ENV-Det (SP Mode)             | VENVS1           | —             | Input (V11, V13) : $f = 4\text{MHz}$ ,<br>$50\mu V_{p-p}$                                                        | 0.4   | 0.7  | 1.0  | V             |
|                               | VENVS2           | —             | Input (V11, V13) : $f = 4\text{MHz}$ ,<br>$1\text{mV}_{p-p}$                                                     | 2.95  | 3.35 | 3.75 |               |
| ENV-Det (EP Mode)             | VENVE1           | —             | Input (V11, V13) : $f = 4\text{MHz}$ ,<br>$50\mu V_{p-p}$                                                        | 0.8   | 1.1  | 1.4  | V             |
|                               | VENVE2           | —             | Input (V11, V13) : $f = 4\text{MHz}$ ,<br>$1\text{mV}_{p-p}$                                                     | 3.4   | 3.8  | 4.2  |               |

Rec mode (Input resistance :  $1.5\text{k}\Omega$ )

| CHARACTERISTIC                | SYMBOL           | TEST CIR-<br>CUIT | TEST CONDITION                                                              | MIN.  | TYP. | MAX. | UNIT |
|-------------------------------|------------------|-------------------|-----------------------------------------------------------------------------|-------|------|------|------|
| Power Supply Current          | I <sub>ccr</sub> | —                 | —                                                                           | 52    | 63   | 79   | mA   |
| Current Gain                  | GrH1             | —                 | Input : f = 1MHz, 500mV <sub>p-p</sub><br>Pin 16 pull-up (Rec Gain : High)  | 33.8  | 34.3 | 34.8 | dB   |
|                               | GrH2             |                   |                                                                             |       |      |      |      |
|                               | GrM1             | —                 | Input : f = 1MHz, 500mV <sub>p-p</sub><br>Pin 16 open (Rec Gain : Middle)   | 30.3  | 30.8 | 31.3 |      |
|                               | GrM2             |                   |                                                                             |       |      |      |      |
|                               | GrL1             | —                 | Input : f = 1MHz, 500mV <sub>p-p</sub><br>Pin 16 pull-down (Rec Gain : Low) | 24.4  | 24.9 | 25.4 |      |
|                               | GrL2             |                   |                                                                             |       |      |      |      |
| Frequency Characteristic      | Grf1             | —                 | Input : 500mV <sub>p-p</sub> , pin 16 open<br>Output ratio 8M / 1M          | − 1.5 | 0    | 1.5  | dB   |
|                               | Grf2             |                   |                                                                             |       |      |      |      |
| Secondary Harmonic Distortion | HDR1             | —                 | f = 4MHz, 500mV <sub>p-p</sub> ,<br>Output ratio 8M / 4M                    | —     | − 50 | − 45 | dB   |
|                               | HDR2             |                   |                                                                             |       |      |      |      |

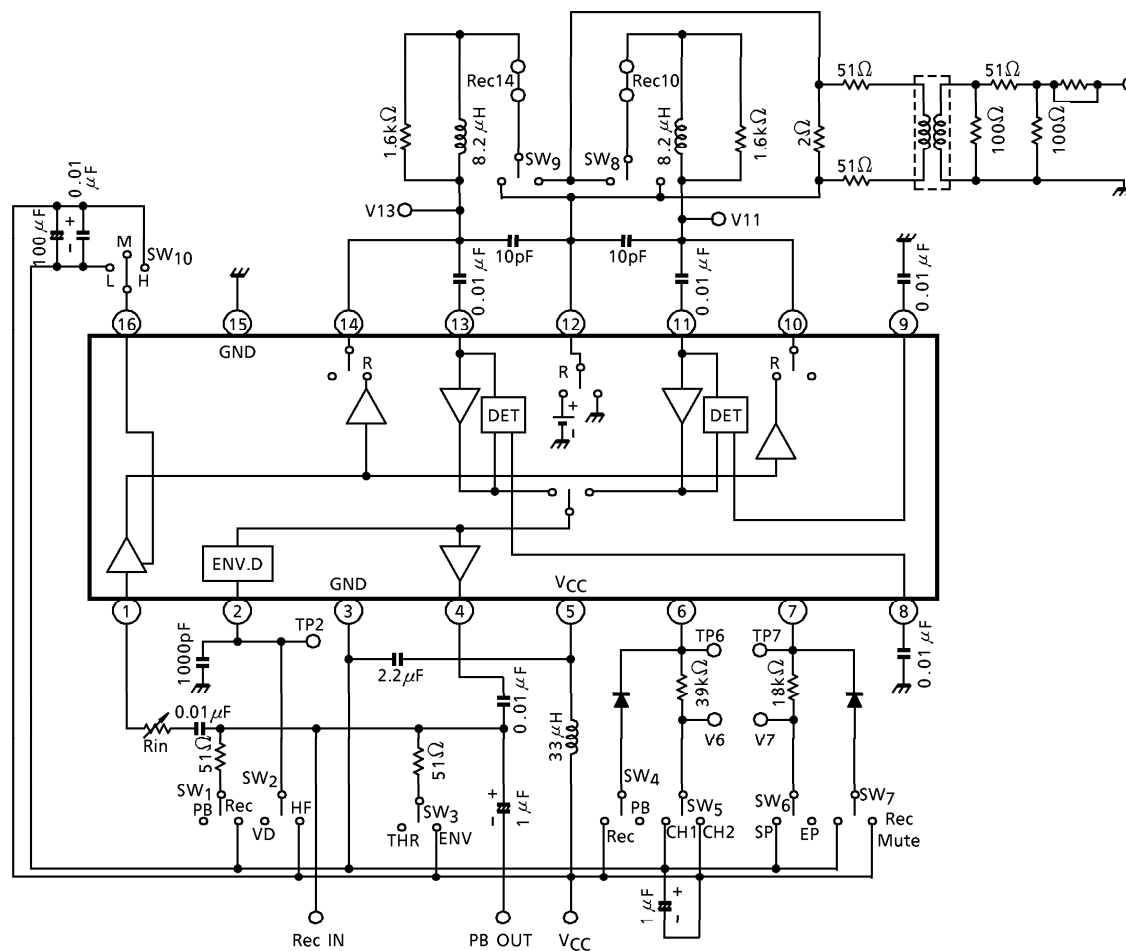
## CONTROL SYSTEM

| CHARACTERISTIC     | SYMBOL | TEST CIRCUIT | TEST CONDITION   | MIN. | TYP. | MAX. | UNIT |
|--------------------|--------|--------------|------------------|------|------|------|------|
| Rec Mute           | Mute1  | —            | Mute ON (TP7)    | 4.2  |      | 5.0  | V    |
|                    | Mute2  | —            | Mute OFF (TP7)   | 0.0  |      | 3.4  |      |
| Rec / PB           | R / P1 | —            | Rec mode (TP6)   | 4.0  |      | 5.0  | V    |
|                    | R / P2 | —            | PB mode (TP6)    | 0.0  |      | 2.8  |      |
| SP / EP            | EPS1   | —            | SP mode (V7)     | 0.0  |      | 0.6  | V    |
|                    | EPS2   | —            | EP mode (V7)     | 1.5  |      | 5.0  |      |
| 1CH / 2CH          | SWP1   | —            | 1CH (V6)         | 0.0  |      | 1.5  | V    |
|                    | SWP2   | —            | 2CH (V6)         | 3.5  |      | 5.0  |      |
| Pin 16 Gain Change | GH     | —            | High             | 4.0  |      | 5.0  | V    |
|                    | GL     | —            | Low              | 0.0  |      | 1.0  |      |
| Video / Hi-Fi      | VH1    | —            | Video mode (TP2) | 0.0  |      | 4.3  | V    |
|                    | VH2    | —            | Hi-Fi mode (TP2) | 4.9  |      | 5.0  |      |

Hi-Fi SYSTEM (Input resistance : 2K $\Omega$ )

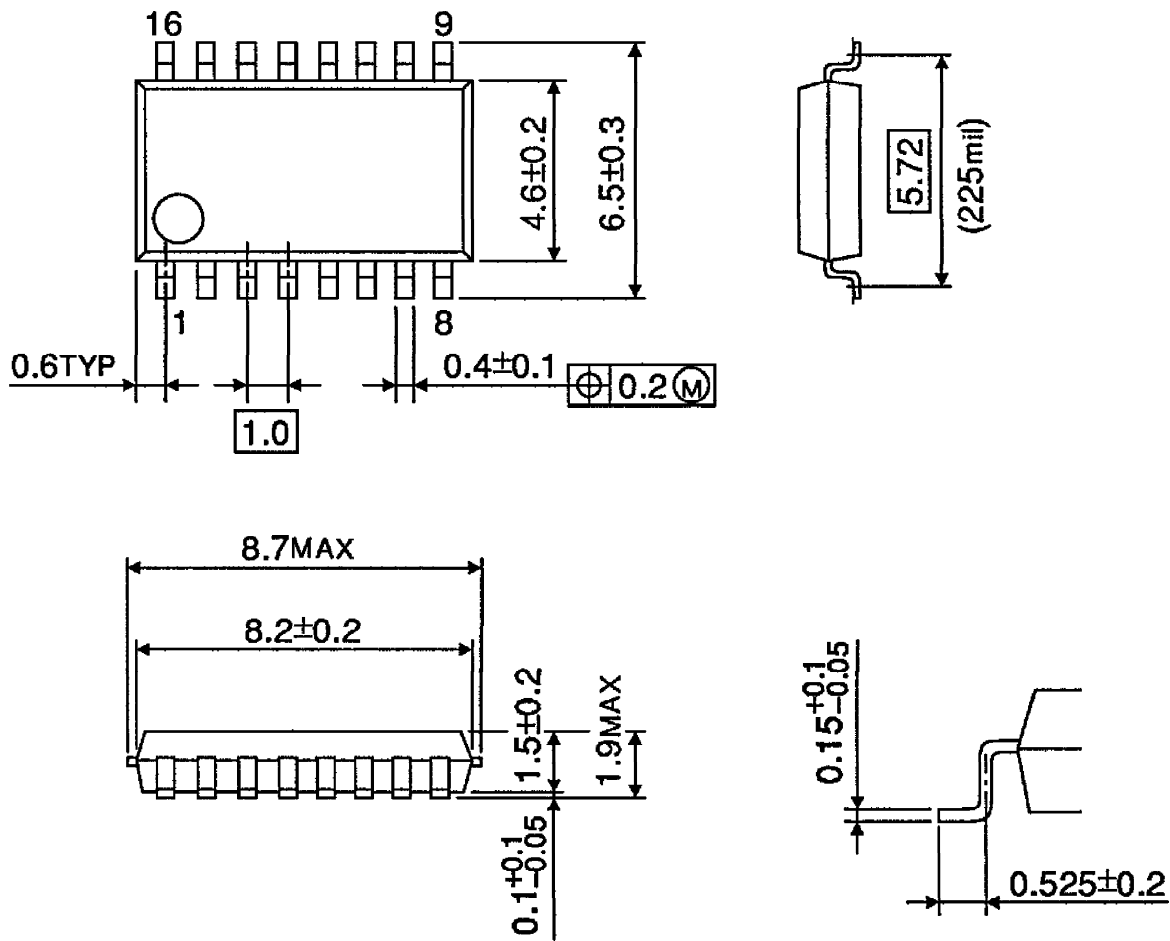
| CHARACTERISTIC                      | SYMBOL | TEST CIR-<br>CUIT | TEST CONDITION                                                                                                           | MIN.  | TYP. | MAX. | UNIT |
|-------------------------------------|--------|-------------------|--------------------------------------------------------------------------------------------------------------------------|-------|------|------|------|
| Power Supply Current (PB)           | Icchp  | —                 | —                                                                                                                        | 22    | 28   | 36   | mA   |
| Power Supply Current (Rec)          | Icchr  | —                 | —                                                                                                                        | 63    | 77   | 96   | mA   |
| Voltage Gain (PB)                   | GHP1   | —                 | Input (V11, V13) : 1MHz,<br>0.15mV <sub>p-p</sub>                                                                        | 64    | 67   | 70   | dB   |
|                                     | GHP2   |                   |                                                                                                                          |       |      |      |      |
| Current Gain (Rec)                  | GHRH1  | —                 | Input : f = 1.5MHz, 700mV <sub>p-p</sub><br>Rec Gain : High                                                              | 36.8  | 37.3 | 37.8 | dB   |
|                                     | GHRH2  |                   |                                                                                                                          |       |      |      |      |
|                                     | GHRM1  | —                 | Input : f = 1.5MHz, 700mV <sub>p-p</sub><br>Rec Gain : Middle                                                            | 33.3  | 33.8 | 34.3 |      |
|                                     | GHRM2  |                   |                                                                                                                          |       |      |      |      |
|                                     | GHRL1  | —                 | Input : f = 1.5MHz, 700mV <sub>p-p</sub><br>Rec Gain : Low                                                               | 27.4  | 27.9 | 28.4 |      |
|                                     | GHRL2  |                   |                                                                                                                          |       |      |      |      |
| Frequency Characteristic (PB)       | GHf1   | —                 | Input (V11, V13) : 0.15mV <sub>p-p</sub><br>Output ratio 3M / 1M                                                         | − 0.3 | 0.2  | 0.7  | dB   |
|                                     | GHf2   |                   |                                                                                                                          |       |      |      |      |
| Frequency Characteristic (Rec)      | GHrf1  | —                 | Input : 700mV <sub>p-p</sub><br>Output ratio 3M / 1M                                                                     | − 0.6 | 0    | 0.4  | dB   |
|                                     | GHrf2  |                   |                                                                                                                          |       |      |      |      |
| Secondary Harmonic Distortion (PB)  | HDrf1  | —                 | Input (V11, V13) : 2MHz,<br>0.15mV <sub>p-p</sub><br>Ratio 4M / 2M                                                       | —     | − 60 | − 45 | dB   |
|                                     | HDrf2  |                   |                                                                                                                          |       |      |      |      |
| Secondary Harmonic Distortion (Rec) | HDRf1  | —                 | Input : 2MHz, 700mV <sub>p-p</sub><br>Ratio 4M / 2M                                                                      | —     | − 50 | − 45 | dB   |
|                                     | HDRf2  |                   |                                                                                                                          |       |      |      |      |
| Intermodulation Distortion          | CMD1   | —                 | Input : 700mV <sub>p-p</sub> (R) + 221<br>mV <sub>p-p</sub> (L)<br>L : f = 1.3MHz, R : f = 1.7MHz,<br>L/R ratio : − 10dB | —     | − 45 | − 40 | dB   |
|                                     | CMD2   |                   |                                                                                                                          |       |      |      |      |
| Crosstalk                           | CRH1   | —                 | Input (V11, V13) : f = 2MHz,<br>0.15mV <sub>p-p</sub><br>Level difference between<br>channels                            | —     | − 38 | − 36 | dB   |
|                                     | CRH2   |                   |                                                                                                                          |       |      |      |      |

## TEST CIRCUIT



PACKAGE DIMENSIONS  
SSOP16-P-225-1.00A

Unit : mm



Weight : 0.14g (Typ.)

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000707EBA

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