

### 1 GHz CATV 18 dB PUSH-PULL AMPLIFIER

#### DESCRIPTION

The MC-7831-HA is a GaAs Multi-chip Module designed for use in input stages in CATV applications up to 1 GHz. This unit has low distortion, low noise figure and return loss across the entire frequency band. Reliability and performance uniformity are assured by our stringent quality and control procedures.

#### FEATURES

- Low distortion
- High linear gain  $G_L = 18.0 \text{ dB MIN. @ } f = 870 \text{ MHz}$
- Low return loss

#### ORDERING INFORMATION

| Part Number | Order Number  | Package                               | Supplying Form   |
|-------------|---------------|---------------------------------------|------------------|
| MC-7831-HA  | MC-7831-HA-AZ | 7-pin special with heatsink (Pb-Free) | 25 pcs MAX./Tray |

**Remark** To order evaluation samples, contact your nearby sales office.  
Part number for sample order: MC-7831-HA

#### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = +25°C, unless otherwise specified)

| Parameter                     | Symbol           | Ratings     | Unit |
|-------------------------------|------------------|-------------|------|
| Supply Voltage                | V <sub>DD</sub>  | 30          | V    |
| Input Voltage <sup>Note</sup> | V <sub>i</sub>   | 65.0        | dBmV |
| Operating Case Temperature    | T <sub>c</sub>   | -30 to +100 | °C   |
| Storage Temperature           | T <sub>stg</sub> | -40 to +100 | °C   |

**Note** In case of single tone

**Caution** Observe precautions when handling because these devices are sensitive to electrostatic discharge.

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**RECOMMENDED OPERATING CONDITIONS ( $Z_s = Z_L = 75 \Omega$ , unless otherwise specified)**

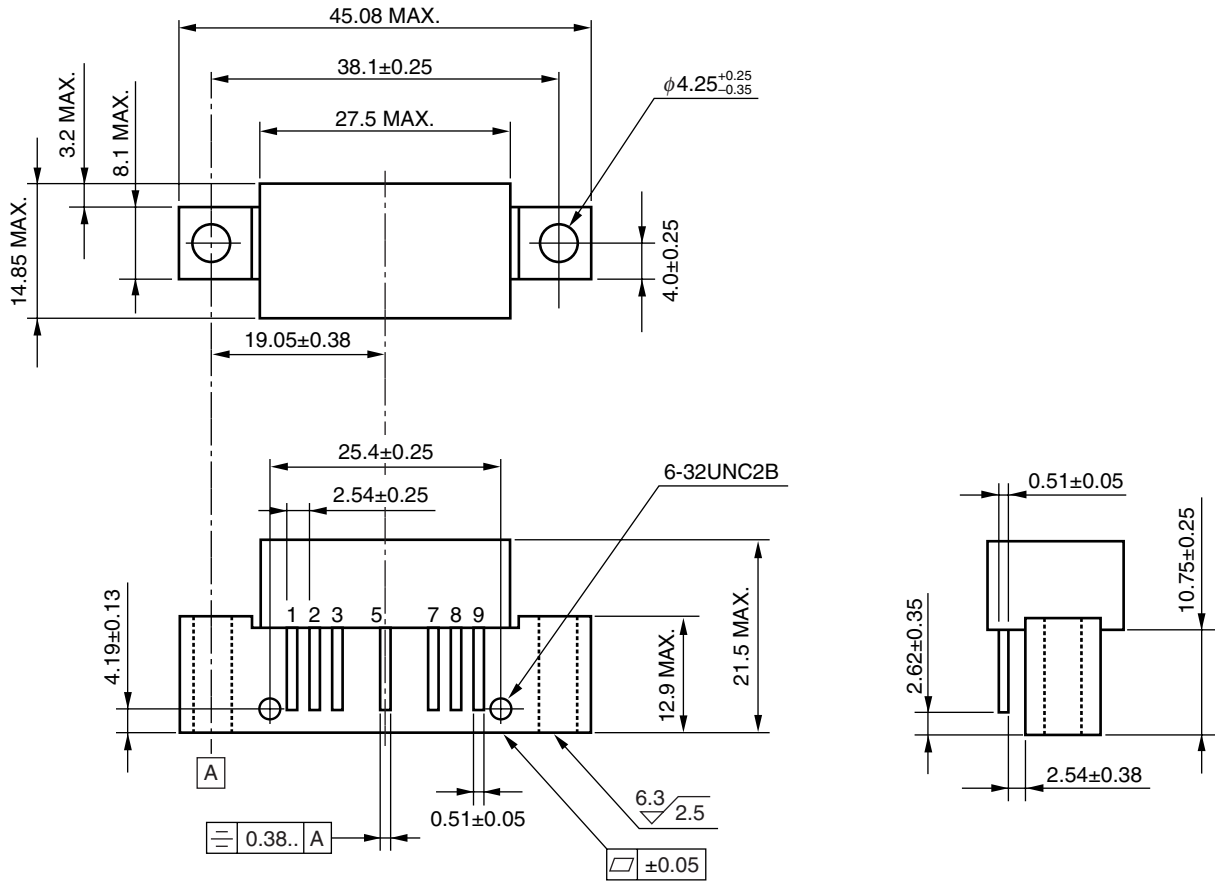
| Parameter                  | Symbol   | Test Conditions   | MIN. | TYP. | MAX. | Unit |
|----------------------------|----------|-------------------|------|------|------|------|
| Supply Voltage             | $V_{DD}$ |                   | 23.5 | 24.0 | 24.5 | V    |
| Input Voltage              | $V_i$    | 110 channel, Flat | –    | 21.0 | 27.5 | dBmV |
| Operating Case Temperature | $T_c$    |                   | –30  | +25  | +85  | °C   |

**ELECTRICAL CHARACTERISTICS ( $T_c = 30 \pm 5^\circ\text{C}$ ,  $V_{DD} = 24 \text{ V}$ ,  $Z_s = Z_L = 75 \Omega$ , unless otherwise specified)**

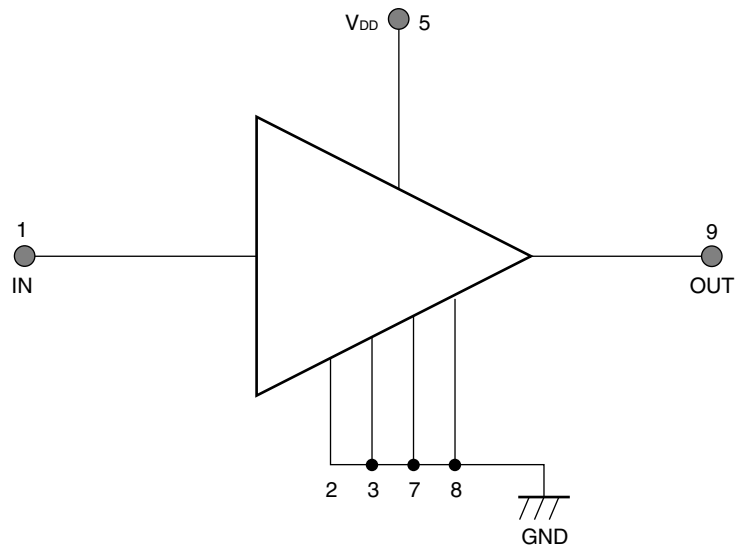
| Parameter                | Symbol                 | Test Conditions                          | MIN.  | TYP. | MAX.  | Unit |
|--------------------------|------------------------|--|-------|------|-------|------|
| Linear Gain              | $G_L$                  | $f = 870 \text{ MHz}$                    | 18.0  | –    | 21.0  | dB   |
| Gain Slope               | $G_{\text{slope}}$     | $f = 40 \text{ to } 870 \text{ MHz}$     | 0.2   | –    | 1.0   | dB   |
| Gain Flatness 1          | $G_{\text{Flatness1}}$ | $f = 40 \text{ to } 870 \text{ MHz}$     | –0.35 | –    | +0.35 | dB   |
| Gain Flatness 2          | $G_{\text{Flatness2}}$ | $f = 40 \text{ to } 1\,000 \text{ MHz}$  | –0.35 | –    | +0.85 | dB   |
| Noise Figure 1           | NF1                    | $f = 50 \text{ MHz}$                     | –     | –    | 6.5   | dB   |
| Noise Figure 2           | NF2                    | $f = 870 \text{ MHz}$                    | –     | –    | 7.0   | dB   |
| Operating Current        | $I_{DD}$               | RF OFF ( $P_{in} = \text{None}$ )        | 180   | –    | 240   | mA   |
| Composite Triple Beat    | CTB                    | 110 channel,                             | –     | –    | –57   | dBc  |
| Cross Modulation         | XM                     | $V_o = 44 \text{ dBmV}$ , Flat           | –     | –    | –50   | dBc  |
| Composite 2nd Order Beat | CSO                    |  | –     | –    | –57   | dBc  |
| Input Return Loss 1      | RLi1                   | $f = 40 \text{ to } 160 \text{ MHz}$     | 20.0  | –    | –     | dB   |
| Input Return Loss 2      | RLi2                   | $f = 160 \text{ to } 320 \text{ MHz}$    | 19.0  | –    | –     | dB   |
| Input Return Loss 3      | RLi3                   | $f = 320 \text{ to } 640 \text{ MHz}$    | 17.5  | –    | –     | dB   |
| Input Return Loss 4      | RLi4                   | $f = 640 \text{ to } 870 \text{ MHz}$    | 16.0  | –    | –     | dB   |
| Input Return Loss 5      | RLi5                   | $f = 870 \text{ to } 1\,000 \text{ MHz}$ | 10.0  | –    | –     | dB   |
| Output Return Loss 1     | RLo1                   | $f = 40 \text{ to } 160 \text{ MHz}$     | 20.0  | –    | –     | dB   |
| Output Return Loss 2     | RLo2                   | $f = 160 \text{ to } 320 \text{ MHz}$    | 19.0  | –    | –     | dB   |
| Output Return Loss 3     | RLo3                   | $f = 320 \text{ to } 640 \text{ MHz}$    | 17.5  | –    | –     | dB   |
| Output Return Loss 4     | RLo4                   | $f = 640 \text{ to } 870 \text{ MHz}$    | 16.0  | –    | –     | dB   |
| Output Return Loss 5     | RLo5                   | $f = 870 \text{ to } 1\,000 \text{ MHz}$ | 12.0  | –    | –     | dB   |

PACKAGE DIMENSIONS

7-PIN SPECIAL WITH HEATSINK (UNIT: mm)



PIN CONNECTION



**NOTES ON CORRECT USE**

- (1) The space between PC board and root of the lead should be kept more than 1 mm to prevent undesired stress to the lead and also should be kept less than 4 mm to prevent undesired parasitic inductance.  
Recommended that space is 2.0 to 3.0 mm typical.
- (2) Recommended torque strength of the screw is 59 to 78 Ncm.
- (3) Form the ground pattern as wide as possible to minimize ground impedance.  
(to prevent undesired oscillation)  
All the ground pins must be connected together with wide ground pattern to decrease impedance difference.

**RECOMMENDED SOLDERING CONDITIONS**

This product should be soldered and mounted under the following recommended conditions. For soldering methods and conditions other than those recommended below, contact your nearby sales office.

| Soldering Method | Soldering Conditions  | Recommended Condition Symbol |
|------------------|---|------------------------------|
| Pin Part Heating | Pin area temperature (pin temperature) : 350°C or below <sup>Note</sup><br>Soldering time (per pin of device) : 3 seconds or less | —                            |

**Note** The point of pin part heating must be kept more than 1.2 mm distance from the root of lead.

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| <p><b>Caution</b></p> | <p>GaAs Products</p> | <p>This product uses gallium arsenide (GaAs).<br/>GaAs vapor and powder are hazardous to human health if inhaled or ingested, so please observe the following points.</p> <ul style="list-style-type: none"> <li>• Follow related laws and ordinances when disposing of the product. If there are no applicable laws and/or ordinances, dispose of the product as recommended below.             <ol style="list-style-type: none"> <li>1. Commission a disposal company able to (with a license to) collect, transport and dispose of materials that contain arsenic and other such industrial waste materials.</li> <li>2. Exclude the product from general industrial waste and household garbage, and ensure that the product is controlled (as industrial waste subject to special control) up until final disposal.</li> </ol> </li> <li>• Do not burn, destroy, cut, crush, or chemically dissolve the product.</li> <li>• Do not lick the product or in any way allow it to enter the mouth.</li> </ul> |
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