

DATA SHEET



GaAs MULTI-CHIP MODULE MC-7847

870 MHz CATV 25 dB POWER DOUBLER AMPLIFIER

DESCRIPTION

The MC-7847 is a GaAs Multi-chip Module designed for use in CATV applications up to 870 MHz. 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 $G_L = 25.0 \text{ dB MIN. @ } f = 870 \text{ MHz}$
- Low return loss

<R> ORDERING INFORMATION

| Part Number | Order Number | Package | Supplying Form |
|-------------|--------------|---------------------------------------|------------------|
| MC-7847 | MC-7847-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-7847

ABSOLUTE MAXIMUM RATINGS ($T_A = +25^\circ\text{C}$)

| Parameter | Symbol | Ratings | Unit |
|-------------------------------|-----------|-------------|------------------|
| Supply Voltage | V_{DD} | 30 | V |
| Input Voltage ^{Note} | V_i | 65.0 | dBmV |
| Operating Case Temperature | T_c | -30 to +100 | $^\circ\text{C}$ |
| Storage Temperature | T_{stg} | -40 to +100 | $^\circ\text{C}$ |

Note In case of single tone

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

The information in this document is subject to change without notice. Before using this document, please confirm that this is the latest version.

RECOMMENDED OPERATING CONDITIONS ($Z_s = Z_L = 75 \Omega$)

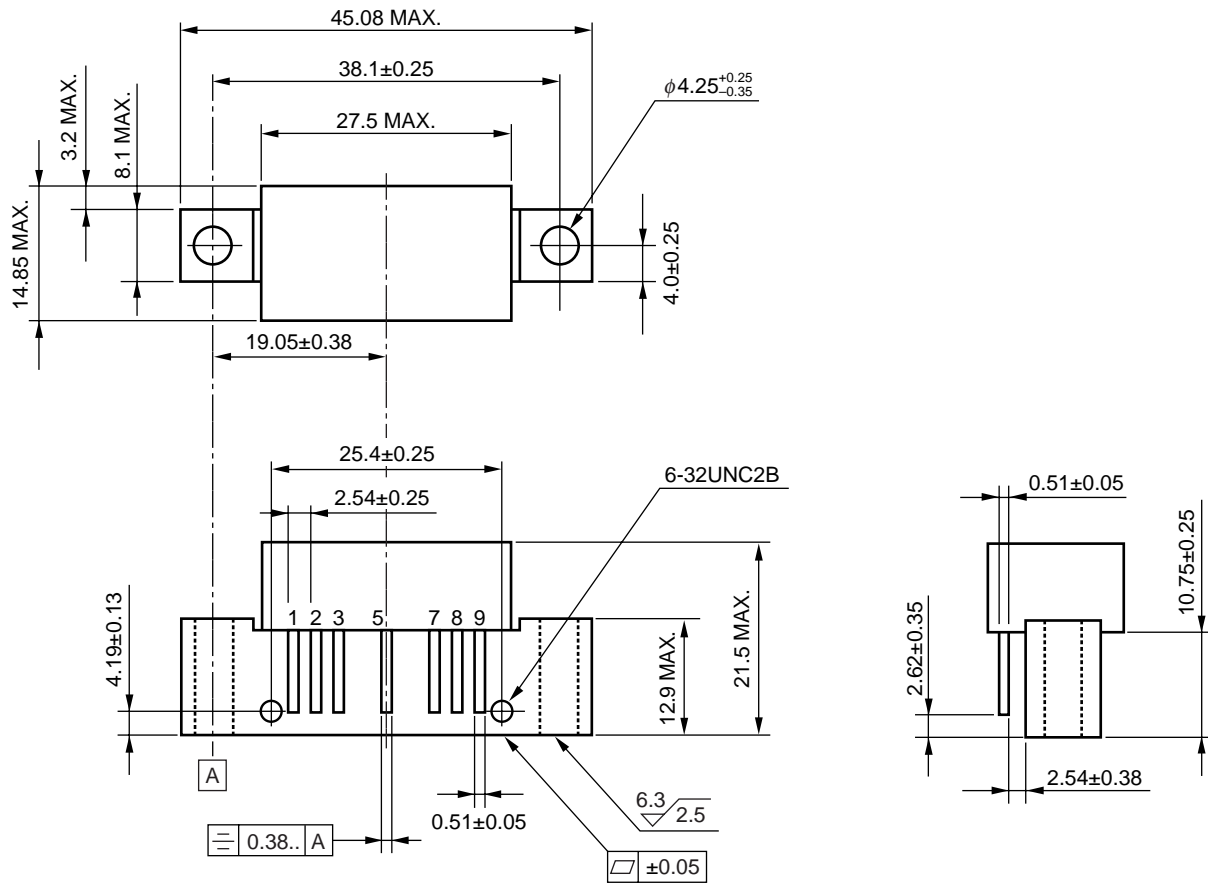
| Parameter | Symbol | Test Conditions | MIN. | TYP. | MAX. | Unit |
|----------------------------|----------|--|------|------|------|------|
| Supply Voltage | V_{DD} | | 23.5 | 24.0 | 24.5 | V |
| Input Voltage | V_i | 110 channel, 10 dB tilted across the band | – | 29.0 | 32.0 | dBmV |
| Operating Case Temperature | T_c | | –30 | +25 | +85 | °C |

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

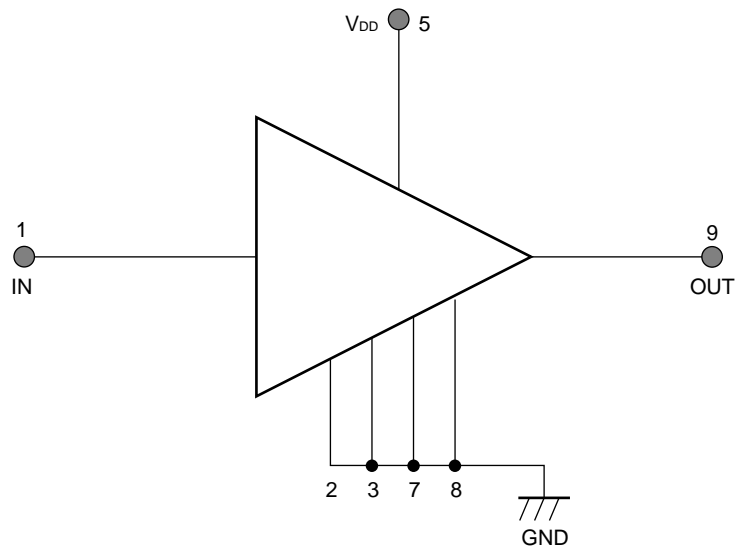
| Parameter | Symbol | Test Conditions | MIN. | TYP. | MAX. | Unit |
|--------------------------|-----------------------|---|------|------|------|------|
| Linear Gain | G_L | $f = 870\text{ MHz}$ | 25.0 | – | 26.0 | dB |
| Gain Slope | G_{Slope} | $f = 40\text{ to }870\text{ MHz}$ | 1.0 | 1.4 | 1.8 | dB |
| Gain Flatness | G_{Flatness} | $f = 40\text{ to }870\text{ MHz}$, Peak to valley | – | – | 0.6 | dB |
| Noise Figure 1 | NF1 | $f = 50\text{ MHz}$ | – | – | 5.5 | dB |
| Noise Figure 2 | NF2 | $f = 870\text{ MHz}$ | – | – | 6.0 | dB |
| Operating Current | I_{DD} | RF OFF | 275 | – | 375 | mA |
| Composite Triple Beat | CTB | 110 channel, $V_o = 50\text{ dBmV}$ at 745.25 MHz, 10 dB tilted across the band | – | – | –60 | dBc |
| Cross Modulation | XM | | – | – | –55 | dBc |
| Composite 2nd Order Beat | CSO | | – | – | –63 | dBc |
| Input Return Loss 1 | RLi1 | $f = 40\text{ to }160\text{ MHz}$ | 20 | – | – | dB |
| Input Return Loss 2 | RLi2 | $f = 160\text{ to }320\text{ MHz}$ | 20 | – | – | dB |
| Input Return Loss 3 | RLi3 | $f = 320\text{ to }640\text{ MHz}$ | 19 | – | – | dB |
| Input Return Loss 4 | RLi4 | $f = 640\text{ to }870\text{ MHz}$ | 17 | – | – | dB |
| Output Return Loss 1 | RLo1 | $f = 40\text{ to }160\text{ MHz}$ | 20 | – | – | dB |
| Output Return Loss 2 | RLo2 | $f = 160\text{ to }320\text{ MHz}$ | 20 | – | – | dB |
| Output Return Loss 3 | RLo3 | $f = 320\text{ to }640\text{ MHz}$ | 19 | – | – | dB |
| Output Return Loss 4 | RLo4 | $f = 640\text{ to }870\text{ MHz}$ | 18 | – | – | dB |

PACKAGE DIMENSIONS

7-PIN SPECIAL WITH HEATSINK (UNIT: mm)



PIN CONNECTION



NOTE 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 in the following recommended conditions. Other soldering methods and conditions than the recommended conditions are to be consulted with our sales representatives.

| Soldering Method | Soldering Conditions | Condition Symbol |
|------------------|--|------------------|
| Pin Part Heating | Pin area temperature : less than 350°C ^{Note} Hour : Within 3 sec./pin | — |

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

- **The information in this document is current as of December, 2006. The information is subject to change without notice. For actual design-in, refer to the latest publications of NEC Electronics data sheets or data books, etc., for the most up-to-date specifications of NEC Electronics products. Not all products and/or types are available in every country. Please check with an NEC Electronics sales representative for availability and additional information.**
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(Note)

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| | |
|-------------------------------------|---|
| <p>Caution GaAs Products</p> | <p>This product uses gallium arsenide (GaAs). 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"> • 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"> 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. 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. • Do not burn, destroy, cut, crush, or chemically dissolve the product. • Do not lick the product or in any way allow it to enter the mouth. |
|-------------------------------------|---|

Subject: Compliance with EU Directives

CEL certifies, to its knowledge, that semiconductor and laser products detailed below are compliant with the requirements of European Union (EU) Directive 2002/95/EC Restriction on Use of Hazardous Substances in electrical and electronic equipment (RoHS) and the requirements of EU Directive 2003/11/EC Restriction on Penta and Octa BDE.

CEL Pb-free products have the same base part number with a suffix added. The suffix –A indicates that the device is Pb-free. The –AZ suffix is used to designate devices containing Pb which are exempted from the requirement of RoHS directive (*). In all cases the devices have Pb-free terminals. All devices with these suffixes meet the requirements of the RoHS directive.

This status is based on CEL’s understanding of the EU Directives and knowledge of the materials that go into its products as of the date of disclosure of this information.

| Restricted Substance per RoHS | Concentration Limit per RoHS (values are not yet fixed) | Concentration contained in CEL devices | |
|-------------------------------|---|--|-----|
| | | -A | -AZ |
| Lead (Pb) | < 1000 PPM | Not Detected | (*) |
| Mercury | < 1000 PPM | Not Detected | |
| Cadmium | < 100 PPM | Not Detected | |
| Hexavalent Chromium | < 1000 PPM | Not Detected | |
| PBB | < 1000 PPM | Not Detected | |
| PBDE | < 1000 PPM | Not Detected | |

If you should have any additional questions regarding our devices and compliance to environmental standards, please do not hesitate to contact your local representative.

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