

# NEC's 870 MHz GaAs CATV POWER DOUBLER AMPLIFIER

#### FEATURES

- GaAs ACTIVE DEVICES
- LOW DISTORTION
- HIGH LINEAR GAIN: MC-7845 - GL = 18 dB MIN at f = 870 MHz MC-7846 - GL = 22 dB MIN at f = 870 MHz MC-7847 - GL = 25 dB MIN at f = 870 MHz
- LOW RETURN LOSS
- LOW GAIN CHANGE OVER TEMPERATURE
- SPECIFIED FOR 79, 110, and 132 CHANNELS PERFORMANCE
- HIGH RELIABILITY AND RUGGEDNESS: Withstands environmental extremes as well as Silicon devices (Surge, ESD, Etc.)

#### DESCRIPTION

NEC's MC-7845, MC-7846, and MC-7847 are GaAs Multi-Chip Modules designed for use as output stages in CATV applications up to 870 MHz. The only difference between these devices is gain, which is 18 dB, 22 dB, and 25 dB respectively. Because these units are GaAs devices they have low distortion, low noise figure, and low return loss across the entire frequency band.

Like the previous generation of products, these devices survive such hazards as surge and ESD as well as their silicon competitors, but deliver superior performance with low DC current required. All devices are assembled and tested using fully automated equipment to maximize consistency in part to part performance, and reliability is assured by NEC's stringent quality and process control procedures. These parts come in industry compatible hybrid packages.

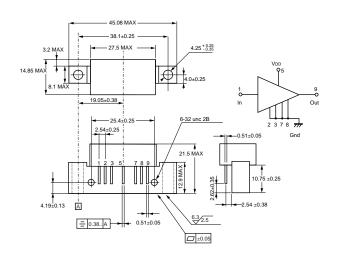
#### OUTLINE DIMENSIONS (Units in mm)

#### PACKAGE OUTLINE H02

MC-7845

**MC-7846** 

**MC-7847** 



#### APPLICATIONS

- CATV HEADEND SYSTEMS
- CATV OPTICAL NODES
- CATV DISTRIBUTION AMPS

| PART NUMBER |                    | MC-7845 |      | MC-7846 |      | MC-7847 |     | 7    |      |     |      |                                  |
|-------------|--------------------|---------|------|---------|------|---------|-----|------|------|-----|------|----------------------------------|
| SYMBOLS     | CHARACTERISTICS    | UNITS   | MIN  | TYP     | MAX  | MIN     | TYP | MAX  | MIN  | TYP | MAX  | TEST CONDITIONS                  |
| BW          | Frequency Range    | MHz     | 50   | -       | 870  | 50      | _   | 870  | 50   | _   | 870  |                                  |
| GL          | Linear Gain        | dB      | 18.0 | -       | 19.0 | 22.0    | -   | 23.0 | 25.0 | -   | 26.0 | f = 870 MHz                      |
| S           | Gain Slope         | dB      | 0.2  | 0.6     | 1.0  | 0.6     | 1.0 | 1.4  | 1.0  | 1.4 | 1.8  | f = 40 to 870 MHz                |
| Gf          | Gain Flatness      | dB      | -    | -       | 0.6  | -       | -   | 0.6  | -    | -   | 0.6  | 40 to 870 MHz;<br>Peak to Valley |
| NF          | Noise Figure 1     | dB      | -    | -       | 6.5  | -       | -   | 6.0  | -    | -   | 5.5  | f = 50 MHz                       |
|             | Noise Figure 2     |         | -    | -       | 7.0  | -       | -   | 6.5  | -    | -   | 6.0  | f = 870 MHz                      |
| RLi         | Input Return Loss  | dB      | 20.0 | -       | -    | 20.0    | -   | -    | 20.0 | -   | -    | 40 to 160MHz                     |
|             |                    |         | 19.0 | -       | -    | 20.0    | -   | -    | 20.0 | -   | -    | 160 to 320 MHz                   |
|             |                    |         | 17.5 | -       | -    | 19.0    | -   | -    | 19.0 | -   | -    | 320 to 640 MHz                   |
|             |                    |         | 16.0 | -       | -    | 17.0    | -   | -    | 17.0 | -   | -    | 640 to 870 MHz                   |
| RLo         | Output Return Loss | dB      | 20.0 | -       | -    | 20.0    | -   | -    | 20.0 | -   | -    | 40 to 160MHz                     |
|             |                    |         | 19.0 | -       | -    | 20.0    | -   | -    | 20.0 | -   | -    | 160 to 320 MHz                   |
|             |                    |         | 17.5 | -       | -    | 19.0    | -   | -    | 19.0 | -   | -    | 320 to 640 MHz                   |
|             |                    |         | 16.0 | -       | -    | 18.0    | -   | -    | 18.0 | -   | -    | 640 to 870 MHz                   |

**ELECTRICAL CHARACTERISTICS** (TA =  $30\pm5$  °C, VDD = 24 V, Zs = ZL =  $75 \Omega$ )

continued on next page

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#### ELECTRICAL CHARACTERISTICS, cont. (TA = 30±5 °C, VDD = 24 V, ZS = ZL = 75 Ω)

| PART NUMBER |                               |       | MC-7845 |     | MC-7846 |     | MC-7847 |     | 7   |     |     |  |
|-------------|-------------------------------|-------|---------|-----|---------|-----|---------|-----|-----|-----|-----|--|
| SYMBOLS     | CHARACTERISTICS               | UNITS | MIN     | TYP | MAX     | MIN | TYP     | MAX | MIN | TYP | MAX | TEST CONDITIONS                          |
| IDD         | Operating Current             | mA    | 275     | -   | 375     | 275 | -       | 375 | 275 | _   | 375 | RF OFF                                   |
| СТВ         | Composite Triple Beat         | dBc   | -       | -63 | -60     | -   | -63     | -60 | -   | -65 | -60 | 110 Channels,                            |
| XMod        | Cross Modulation <sup>1</sup> | dBc   | -       | -59 | -55     | _   | -60     | -55 | _   | -62 | -55 | Vout = 50 dBmV at                        |
| CSO         | Composite Second Order        | dBc   | -       | -68 | -63     | -   | -67     | -63 | -   | -67 | -63 | 745.25 MHz, 10 dB tilted across the band |

1. Measured per US standard methods and procedures (using selective level meter).

#### ABSOLUTE MAXIMUM RATINGS<sup>1</sup> (TCASE= 30 °C)

| SYMBOLS | PARAMETERS                               | UNITS | RATINGS     |
|---------|--|-------|-------------|
| Vdd     | Supply Voltage                           | V     | 30          |
| Vi      | Input Voltage (Single Tone) <sup>2</sup> | dBmV  | 65          |
| Тс      | Operating Case Temperature               | °C    | -30 to +100 |
| Tstg    | Storage Temperature                      | °C    | -40 to +100 |

Note:

1. Operation in excess of any one of these parameters may result in permanent damage.

2. Maximum single channel power applied to the input for 1 minute with no measurable degradation in performance.

### **RECOMMENDED OPERATING CONDITIONS** (Zs = ZL = 75Ω)

| SYMBOLS | PARAMETERS   | UNITS | MIN  | TYP                  | MAX                  |
|---------|--|-------|------|----------------------|----------------------|
| Vdd     | Supply VoltageV  | 23.5  | 24.0 | 24.5                 |                      |
| Vi      | Input Voltage <sup>1</sup> , MC-7845<br>MC-7846<br>MC-7847 | dBmV  |      | 36.0<br>32.0<br>29.0 | 39.0<br>35.0<br>32.0 |
| Тс      | Operating Case<br>Temperature                              | °C    | -30  | +25                  | +85                  |

Note:

1. Test Conditions: 110 Channels, 10 dB tilted across the band.

#### **ORDERING INFORMATION**

| PART NUMBER | PACKAGE                     | QUANTITY        |
|-------------|-----------------------------|-----------------|
| MC-7845     | 7-pin special with heatsink | 50pcs max/ Tray |
| MC-7846     | 7-pin special with heatsink | 50pcs max/ Tray |
| MC-7847     | 7-pin special with heatsink | 50pcs max/ Tray |

## 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 on the lead and also should be kept less than 4 mm to prevent undesired parasitic inductance.

Recommended 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        | Soldering  | Condition |  |  |
|------------------|--|-----------|--|--|
| Method           | Conditions   | Symbol    |  |  |
| Pin Part Heating | Pin area temperature: less<br>than 260°C1<br>Hour: Within 2 sec./pin | _         |  |  |

Note.

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

Life Support Applications

These NEC products are not intended for use in life support devices, appliances, or systems where the malfunction of these products can reasonably be expected to result in personal injury. The customers of CEL using or selling these products for use in such applications do so at their own risk and agree to fully indemnify CEL for all damages resulting from such improper use or sale.

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07/08/2003