

# CATV 22 dB POWER DOUBLER AMPLIFIER

# MC-7866G

## FEATURES

- **GALLIUM ARSENIDE ACTIVE DEVICES**
- **LOW DISTORTION**
- **LOW NOISE FIGURE**  
(5.6 dB TYP at 860 MHz)
- **LOW DC CURRENT DRAW**  
(355 mA TYP at 24 V)
- **HIGH RELIABILITY**  
(FIT = 125 at heat sink temperature of 100°C,  
Report available)
- **INDUSTRY COMPATIBLE PACKAGE**

## DESCRIPTION

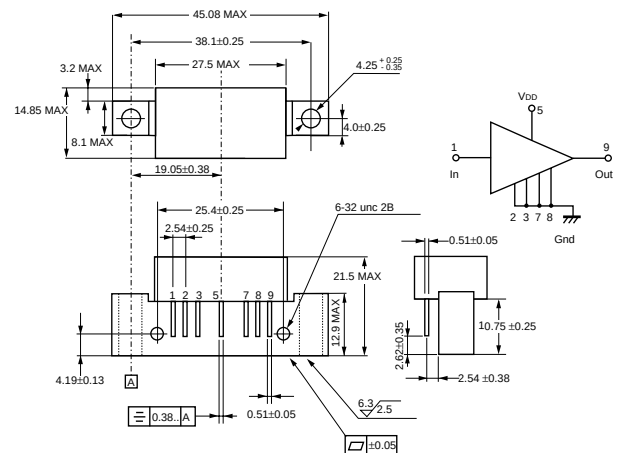
The MC-7866G is a GaAs hybrid integrated circuit designed to be used as the output device in CATV applications up to 860 MHz. This unit has a minimum gain of 21.5 dB at 860 MHz, and because it is a GaAs device, it has lower distortion and lower noise figure. These Power Doublers deliver these performance advantages with 10 to 20% less DC input power. Reliability is assured by NEC's stringent quality and process control procedures. Devices are assembled and tested using fully automated equipment to maximize the consistency in part to part performance. The MC-7866G features round connection pins and slightly different body dimensions for customers desiring these packaging dimensions.

## ELECTRICAL CHARACTERISTICS (T<sub>CASE</sub> = 30 °C, V<sub>DD</sub> = 24 V, Z<sub>S</sub> = Z<sub>I</sub> = 75 Ω)

| PART NUMBER |                                      |       | MC-7866G |            |      |                                                            |
|-------------|--------------------------------------|-------|----------|------------|------|------------------------------------------------------------|
| SYMBOLS     | PARAMETERS                           | UNITS | MIN      | TYP        | MAX  | CONDITIONS                                                 |
| BW          | Frequency Range                      | MHz   | 50       |            | 860  |                                                            |
| GA          | Gain                                 | dB    | 21.5     |            | 23.0 | f = 860 MHz                                                |
| S           | Gain Slope                           | dB    | 0        |            | 2.0  | 50 to 860 MHz                                              |
| Gf          | Gain Flatness                        | dB    |          |            | 1.0  | 50 to 860 MHz; Peak to Valley                              |
| S11         | Input Return Loss                    | dB    | 18.0     |            |      | 50 to 160 MHz                                              |
|             |                                      | dB    | 17.0     |            |      | 160 to 320 MHz                                             |
|             |                                      | dB    | 16.0     |            |      | 320 to 640 MHz                                             |
|             |                                      | dB    | 14.5     |            |      | 640 to 860 MHz                                             |
| S22         | Output Return Loss                   | dB    | 18.0     |            |      | 50 to 160 MHz                                              |
|             |                                      | dB    | 17.0     |            |      | 160 to 320 MHz                                             |
|             |                                      | dB    | 16.0     |            |      | 320 to 640 MHz                                             |
|             |                                      | dB    | 14.5     |            |      | 640 to 860 MHz                                             |
| S12         | Reverse Isolation                    | dB    | 30       |            |      | 50 to 860 MHz                                              |
| CTB         | Composite Triple Beat, 110 Channels  | dB    |          | -61<br>-66 | -54  | VOUT = 50 dBmV at 750 MHz, 10 dB Tilt<br>VOUT = 44 dBmV/ch |
| CSO         | Composite Second Order, 110 Channels | dB    |          | -66<br>-68 | -59  | VOUT = 50 dBmV at 750 MHz, 10 dB Tilt<br>VOUT = 44 dBmV/ch |
| XMod        | Cross Modulation, 110 Channels       | dB    |          | -63<br>-67 | -56  | VOUT = 50 dBmV at 750 MHz, 10 dB Tilt<br>VOUT = 44 dBmV/ch |
| IDD         | DC Current                           | mA    |          | 355        | 380  |                                                            |
| NF          | Noise Figure                         | dB    |          | 5.2        | 6.0  | 50 MHz                                                     |
|             |                                      | dB    |          | 5.6        | 6.5  | 860 MHz                                                    |

## OUTLINE DIMENSIONS (Units in mm)

## PACKAGE OUTLINE



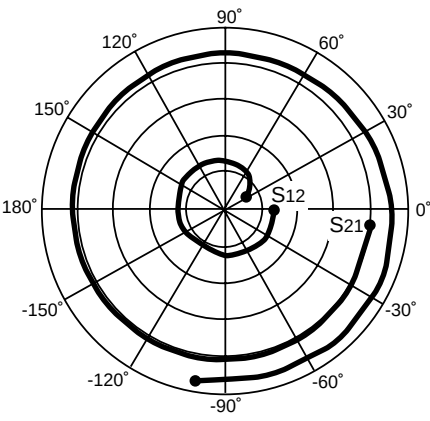
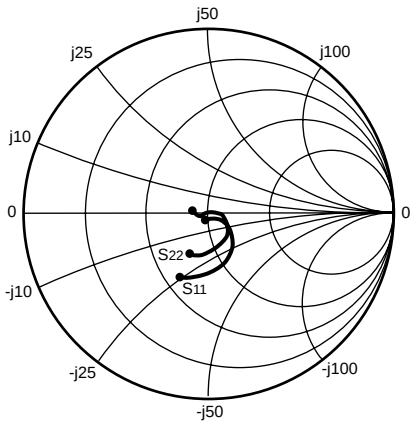
ABSOLUTE MAXIMUM RATINGS<sup>1</sup> (T<sub>CASE</sub>= 30 °C)

| SYMBOL           | PARAMETERS                  | UNITS | RATINGS     |
|------------------|-----------------------------|-------|-------------|
| V <sub>DD</sub>  | Supply Voltage              | V     | 30          |
| V <sub>I</sub>   | Input Voltage (Single Tone) | dBmV  | 65          |
| T <sub>OP</sub>  | Operating Temperature       | °C    | -30 to +100 |
| T <sub>STG</sub> | Storage Temperature         | °C    | -40 to +100 |

Note:

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

TYPICAL SCATTERING PARAMETERS



S<sub>21</sub> MAG:  
3.0/DIV., 15.00 FS  
S<sub>12</sub> MAG:  
0.01/DIV., 0.05 FS

V<sub>DD</sub> = 24 V

| FREQUENCY<br>(MHz) | S <sub>11</sub> |         | S <sub>21</sub> |          | S <sub>12</sub> |          | S <sub>22</sub> |          |
|--------------------|-----------------|---------|-----------------|----------|-----------------|----------|-----------------|----------|
|                    | MAG             | ANG     | MAG             | ANG      | MAG             | ANG      | MAG             | ANG      |
| 50                 | 0.048           | -127.70 | 12.02           | -5.330   | 0.014           | -0.943   | 0.095           | 170.300  |
| 100                | 0.052           | -122.50 | 12.19           | -32.490  | 0.014           | -23.440  | 0.076           | 175.100  |
| 150                | 0.063           | -117.20 | 12.27           | -55.310  | 0.014           | -42.330  | 0.060           | -172.300 |
| 200                | 0.071           | -115.70 | 12.35           | -77.010  | 0.013           | -60.560  | 0.051           | -157.600 |
| 250                | 0.079           | -113.80 | 12.46           | -98.320  | 0.013           | -78.790  | 0.052           | -136.500 |
| 300                | 0.084           | -108.60 | 12.50           | -119.600 | 0.013           | -97.170  | 0.061           | -118.300 |
| 350                | 0.086           | -109.30 | 12.51           | -141.200 | 0.012           | -116.000 | 0.072           | -118.000 |
| 400                | 0.092           | -108.00 | 12.53           | -162.000 | 0.012           | -134.800 | 0.084           | -116.900 |
| 450                | 0.083           | -112.20 | 12.58           | 176.600  | 0.013           | -154.200 | 0.078           | -125.900 |
| 500                | 0.071           | -114.60 | 12.63           | 155.500  | 0.013           | -172.900 | 0.067           | -136.200 |
| 550                | 0.050           | -107.50 | 12.71           | 134.000  | 0.013           | 168.800  | 0.043           | -148.200 |
| 600                | 0.028           | -62.65  | 12.81           | 112.200  | 0.014           | 151.600  | 0.010           | 155.400  |
| 650                | 0.058           | -27.59  | 12.89           | 90.480   | 0.014           | 135.500  | 0.031           | 8.324    |
| 700                | 0.106           | -23.72  | 12.94           | 68.600   | 0.014           | 119.900  | 0.079           | -3.264   |
| 750                | 0.159           | -35.72  | 13.07           | 46.710   | 0.014           | 104.900  | 0.120           | -25.050  |
| 800                | 0.215           | -47.67  | 13.37           | 24.370   | 0.014           | 91.370   | 0.160           | -42.110  |
| 850                | 0.268           | -61.11  | 13.77           | 1.207    | 0.013           | 77.800   | 0.187           | -61.310  |
| 900                | 0.318           | -79.62  | 14.16           | -23.740  | 0.013           | 61.730   | 0.201           | -78.800  |
| 950                | 0.329           | -92.75  | 14.19           | -49.130  | 0.011           | 45.780   | 0.220           | -88.640  |
| 1000               | 0.369           | -104.20 | 14.08           | -74.330  | 0.009           | 35.730   | 0.246           | -104.000 |
| 1050               | 0.392           | -115.00 | 14.30           | -100.300 | 0.007           | 23.440   | 0.246           | -114.800 |