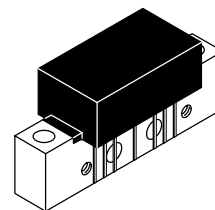


Replaced by MHW9189AN. There are no form, fit or function changes with this part replacement. N suffix indicates RoHS compliant part.

# MHW9189A

**870 MHz**  
**20.3 dB GAIN**  
**132-CHANNEL**  
**GaAs CATV AMPLIFIER MODULE**



CASE 1302-01, STYLE 2

## Gallium Arsenide CATV Amplifier Module

### Features

- Specified for 79-, 112- and 132-Channel Loading
- Excellent Distortion Performance
- Higher Output Capability
- Built-in Input Diode Protection
- GaAs FET Transistor Technology
- Unconditionally Stable Under All Load Conditions
- Output Port Ring Wave Protection

### Applications

- CATV Systems Operating in the 47 to 870 MHz Frequency Range
- Output Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications

### Description

- 24 Vdc Supply, 47 to 870 MHz, CATV GaAs Forward Power Doubler Amplifier Module

**Table 1. Maximum Ratings**

| Rating                           | Symbol    | Value       | Unit |
|----------------------------------|-----------|-------------|------|
| RF Voltage Input (Single Tone)   | $V_{in}$  | +75         | dBmV |
| DC Supply Voltage                | $V_{CC}$  | +26         | Vdc  |
| Operating Case Temperature Range | $T_C$     | -20 to +100 | °C   |
| Storage Temperature Range        | $T_{stg}$ | -40 to +100 | °C   |

**Table 2. ESD Maximum Ratings**

| Rating                              | Input Value | Output Value | Unit |
|-------------------------------------|-------------|--------------|------|
| Surge Voltage per IEC 1000-4-5      | 300         | 300          | V    |
| Human Body Model per Mil. Std. 1686 | 2           | 2            | kV   |

**Table 3. Electrical Characteristics** ( $V_{CC} = 24$  Vdc,  $T_C = +45^\circ\text{C}$ , 75  $\Omega$  system unless otherwise noted)

| Characteristic                             | Symbol | Min            | Typ         | Max         | Unit |
|--|--------|----------------|-------------|-------------|------|
| Frequency Range                            | BW     | 47             | —           | 870         | MHz  |
| Power Gain 870 MHz                         | $G_p$  | 19.7           | 20.3        | 20.9        | dB   |
| Slope 47-870 MHz                           | S      | 0              | 0.5         | 1.0         | dB   |
| Gain Flatness (47-870 MHz, Peak-to-Valley) | $G_F$  | —              | —           | 0.5         | dB   |
| Return Loss — Input<br>( $Z_o = 75$ Ohms)  | IRL    | 20<br>18<br>16 | —<br>—<br>— | —<br>—<br>— | dB   |
| Return Loss — Output<br>( $Z_o = 75$ Ohms) | ORL    | 20<br>18       | —<br>—      | —<br>—      | dB   |
|  |        | 47-160 MHz     |             |             |      |
|  |        | $f > 160$ MHz  |             |             |      |

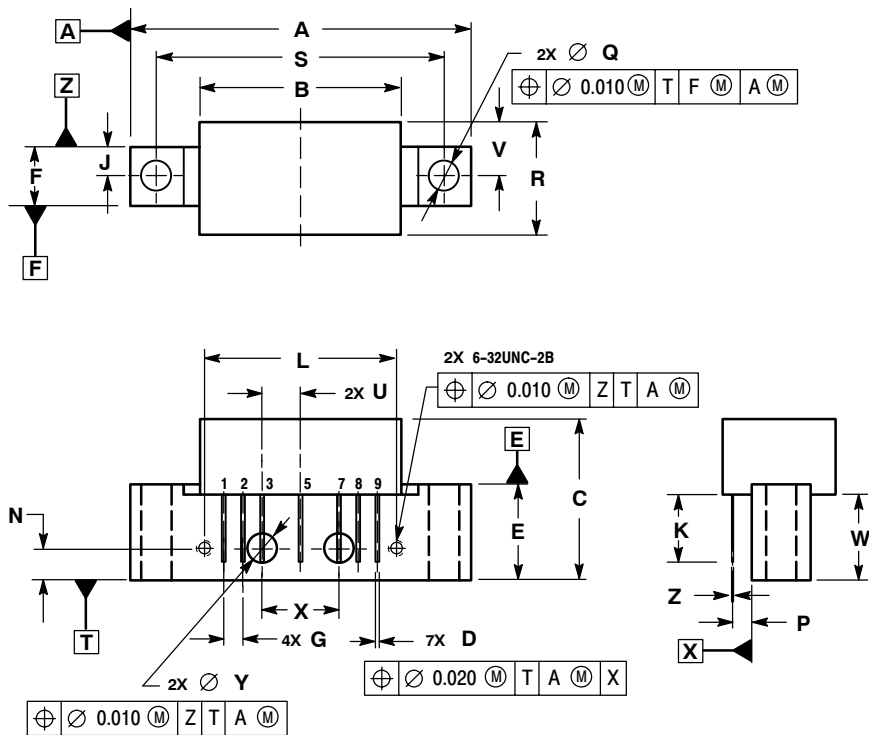
**Table 3. Electrical Characteristics** ( $V_{CC} = 24 \text{ Vdc}$ ,  $T_C = +45^\circ\text{C}$ ,  $75 \Omega$  system unless otherwise noted) (continued)

| Characteristic  | Symbol      | Min | Typ | Max | Unit |
|---|-------------|-----|-----|-----|------|
| <b>Composite Second Order</b>   |             |     |     |     |      |
| ( $V_{out} = +48 \text{ dBmV/ch.}$ , Worst Case) 132-Channel FLAT                           | $CSO_{132}$ | —   | -64 | -62 | dBc  |
| ( $V_{out} = +48 \text{ dBmV/ch.}$ , Worst Case) 112-Channel FLAT                           | $CSO_{112}$ | —   | -66 | -64 |      |
| ( $V_{out} = +48 \text{ dBmV/ch.}$ , Worst Case) 79-Channel FLAT                            | $CSO_{79}$  | —   | -70 | -68 |      |
| ( $V_{out} = +56 \text{ dBmV @ 870 MHz Equiv}$ ) 112-Channel, 12 dB Tilt                    | $CSO_{112}$ | —   | -65 | -63 |      |
| ( $V_{out} = +56 \text{ dBmV @ 870 MHz Equiv}$ ) 112-Channel, 13.5 dB Tilt                  | $CSO_{112}$ | —   | -64 | -62 |      |
| ( $V_{out} = +56 \text{ dBmV @ 870 MHz Equiv}$ ) 112-Channel, 17 dB Tilt                    | $CSO_{112}$ | —   | -63 | -61 |      |
| ( $V_{out} = +58 \text{ dBmV @ 870 MHz Equiv}$ ) 79-Channel, 12 dB Tilt                     | $CSO_{79}$  | —   | -69 | -67 |      |
| ( $V_{out} = +58 \text{ dBmV @ 870 MHz Equiv}$ ) 79-Channel, 13.5 dB Tilt                   | $CSO_{79}$  | —   | -74 | -72 |      |
| ( $V_{out} = +58 \text{ dBmV @ 870 MHz Equiv}$ ) 79-Channel, 17 dB Tilt                     | $CSO_{79}$  | —   | -73 | -71 |      |
| <b>Cross Modulation Distortion @ Ch 2</b>   |             |     |     |     |      |
| ( $V_{out} = +48 \text{ dBmV/ch.}$ , FM = 55 MHz) 132-Channel FLAT                          | $XMD_{132}$ | —   | -57 | -55 | dBc  |
| ( $V_{out} = +48 \text{ dBmV/ch.}$ , FM = 55 MHz) 112-Channel FLAT                          | $XMD_{112}$ | —   | -59 | -57 |      |
| ( $V_{out} = +48 \text{ dBmV/ch.}$ , FM = 55 MHz) 79-Channel FLAT                           | $XMD_{79}$  | —   | -62 | -60 |      |
| ( $V_{out} = +56 \text{ dBmV @ 870 MHz Equiv}$ ) 112-Channel, 12 dB Tilt                    | $XMD_{112}$ | —   | -53 | -51 |      |
| ( $V_{out} = +56 \text{ dBmV @ 870 MHz Equiv}$ ) 112-Channel, 13.5 dB Tilt                  | $XMD_{112}$ | —   | -55 | -53 |      |
| ( $V_{out} = +56 \text{ dBmV @ 870 MHz Equiv}$ ) 112-Channel, 17 dB Tilt                    | $XMD_{112}$ | —   | -58 | -56 |      |
| ( $V_{out} = +58 \text{ dBmV @ 870 MHz Equiv}$ ) 79-Channel, 12 dB Tilt                     | $XMD_{79}$  | —   | -60 | -47 |      |
| ( $V_{out} = +58 \text{ dBmV @ 870 MHz Equiv}$ ) 79-Channel, 13.5 dB Tilt                   | $XMD_{79}$  | —   | -62 | -60 |      |
| ( $V_{out} = +58 \text{ dBmV @ 870 MHz Equiv}$ ) 79-Channel, 17 dB Tilt                     | $XMD_{79}$  | —   | -67 | -65 |      |
| <b>Composite Triple Beat</b>  |             |     |     |     |      |
| ( $V_{out} = +48 \text{ dBmV/ch.}$ , Worst Case) 132-Channel FLAT                           | $CTB_{132}$ | —   | -58 | -56 | dBc  |
| ( $V_{out} = +48 \text{ dBmV/ch.}$ , Worst Case) 112-Channel FLAT                           | $CTB_{112}$ | —   | -62 | -60 |      |
| ( $V_{out} = +48 \text{ dBmV/ch.}$ , Worst Case) 79-Channel FLAT                            | $CTB_{79}$  | —   | -68 | -66 |      |
| ( $V_{out} = +56 \text{ dBmV @ 870 MHz Equiv}$ ) 112-Channel, 12 dB Tilt                    | $CTB_{112}$ | —   | -60 | -58 |      |
| ( $V_{out} = +56 \text{ dBmV @ 870 MHz Equiv}$ ) 112-Channel, 13.5 dB Tilt                  | $CTB_{112}$ | —   | -61 | -59 |      |
| ( $V_{out} = +56 \text{ dBmV @ 870 MHz Equiv}$ ) 112-Channel, 17 dB Tilt                    | $CTB_{112}$ | —   | -64 | -62 |      |
| ( $V_{out} = +58 \text{ dBmV @ 870 MHz Equiv}$ ) 79-Channel, 12 dB Tilt                     | $CTB_{79}$  | —   | -66 | -64 |      |
| ( $V_{out} = +58 \text{ dBmV @ 870 MHz Equiv}$ ) 79-Channel, 13.5 dB Tilt                   | $CTB_{79}$  | —   | -71 | -69 |      |
| ( $V_{out} = +58 \text{ dBmV @ 870 MHz Equiv}$ ) 79-Channel, 17 dB Tilt                     | $CTB_{79}$  | —   | -74 | -72 |      |
| <b>Noise Figure</b>   |             |     |     |     |      |
| 50 MHz  | NF          | —   | 4.0 | 5.0 | dB   |
| 550 MHz   |             | —   | 4.0 | 5.0 |      |
| 750 MHz   |             | —   | 4.0 | 5.0 |      |
| 870 MHz   |             | —   | 4.0 | 5.0 |      |
| <b>DC Current (<math>V_{DC} = 24 \text{ V}</math>, <math>T_C = 45^\circ\text{C}</math>)</b> |             |     |     |     |      |
|   | $I_{DC}$    | 410 | 425 | 440 | mA   |

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### PACKAGE DIMENSIONS



NOTES:  
 1. DIMENSIONS ARE IN INCHES.  
 2. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994.

| DIM | INCHES    |       | MILLIMETERS |        |
|-----|-----------|-------|-------------|--------|
|     | MIN       | MAX   | MIN         | MAX    |
| A   | ---       | 1.775 | ---         | 45.085 |
| B   | ---       | 1.085 | ---         | 27.559 |
| C   | ---       | 0.840 | ---         | 21.336 |
| D   | 0.015     | 0.021 | 0.381       | 0.533  |
| E   | 0.465     | 0.510 | 11.811      | 12.954 |
| F   | 0.300     | 0.325 | 7.62        | 8.255  |
| G   | 0.100 BSC |       | 2.540 BSC   |        |
| J   | 0.156 BSC |       | 3.962 BSC   |        |
| K   | 0.315     | 0.355 | 8.001       | 9.017  |
| L   | 1.000 BSC |       | 25.400 BSC  |        |
| N   | 0.165 BSC |       | 4.191 BSC   |        |
| P   | 0.100 BSC |       | 2.540 BSC   |        |
| Q   | 0.148     | 0.168 | 3.759       | 4.267  |
| R   | ---       | 0.600 | ---         | 15.24  |
| S   | 1.500 BSC |       | 38.100 BSC  |        |
| U   | 0.200 BSC |       | 5.080 BSC   |        |
| V   | ---       | 0.250 | ---         | 6.350  |
| W   | 0.435     | ---   | 11.049      | ---    |
| X   | 0.400 BSC |       | 10.160 BSC  |        |
| Y   | 0.152     | 0.163 | 3.861       | 4.140  |
| Z   | 0.009     | 0.011 | 0.229       | 0.279  |

STYLE 2:  
 PIN 1. RF OUTPUT  
 2. GROUND  
 3. GROUND  
 4. DELETED  
 5. VDC  
 6. DELETED  
 7. GROUND  
 8. GROUND  
 9. RF INPUT

CASE 1302-01  
 ISSUE B

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