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Freescale Semiconductor  
 Technical Data

Document Number: MHW9188N  
 Rev. 4, 4/2006



# 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

## Applications

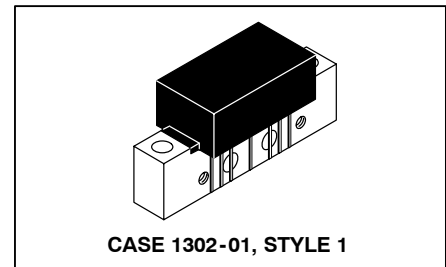
- CATV Systems Operating in the 40 to 870 MHz Frequency Range
- Output Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications

## Description

- 24 Vdc Supply, 40 to 870 MHz, CATV GaAs Forward Power Doubler Amplifier Module
- Replaced MHW9188. There are no form, fit or function changes with this part replacement.
- RoHS Compliant

**MHW9188N**

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



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**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	40	—	870	MHz
Power Gain 870 MHz	$G_p$	19.7	20.3	20.9	dB
Slope 40-870 MHz	S	0	0.5	1.0	dB
Gain Flatness (40-870 MHz, Peak-to-Valley)	$G_F$	—	—	0.5	dB
Return Loss — Input ( $Z_o = 75$ Ohms)	IRL	20 18 16	— — —	— — —	dB
Return Loss — Output ( $Z_o = 75$ Ohms)	ORL	20 18	— —	— —	dB

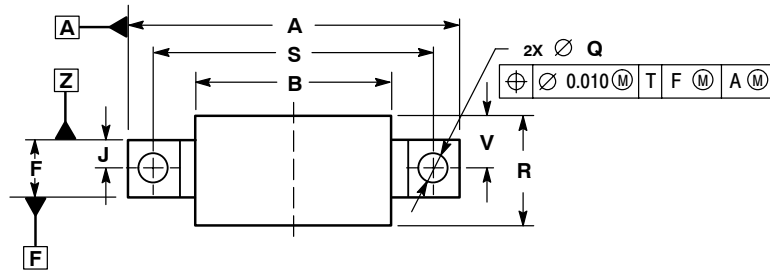
**Table 3. Electrical Characteristics** ( $V_{CC} = 24$  Vdc,  $T_C = +45^\circ\text{C}$ , 75  $\Omega$  system unless otherwise noted) (continued)

Characteristic	Symbol	Min	Typ	Max	Unit
<b>Composite Second Order</b>					dBc
( $V_{out} = +48$ dBmV/ch., Worst Case) 132-Channel FLAT	CSO <sub>132</sub>	—	-64	-62	
( $V_{out} = +48$ dBmV/ch., Worst Case) 112-Channel FLAT	CSO <sub>112</sub>	—	-66	-64	
( $V_{out} = +48$ dBmV/ch., Worst Case) 79-Channel FLAT	CSO <sub>79</sub>	—	-70	-68	
( $V_{out} = +56$ dBmV @ 870 MHz Equiv) 112-Channel, 12 dB Tilt	CSO <sub>112</sub>	—	-65	-63	
( $V_{out} = +56$ dBmV @ 870 MHz Equiv) 112-Channel, 13.5 dB Tilt	CSO <sub>112</sub>	—	-64	-62	
( $V_{out} = +56$ dBmV @ 870 MHz Equiv) 112-Channel, 17 dB Tilt	CSO <sub>112</sub>	—	-63	-61	
( $V_{out} = +58$ dBmV @ 870 MHz Equiv) 79-Channel, 12 dB Tilt	CSO <sub>79</sub>	—	-69	-67	
( $V_{out} = +58$ dBmV @ 870 MHz Equiv) 79-Channel, 13.5 dB Tilt	CSO <sub>79</sub>	—	-74	-72	
( $V_{out} = +58$ dBmV @ 870 MHz Equiv) 79-Channel, 17 dB Tilt	CSO <sub>79</sub>	—	-73	-71	
<b>Cross Modulation Distortion @ Ch 2</b>					dBc
( $V_{out} = +48$ dBmV/ch., FM = 55 MHz) 132-Channel FLAT	XMD <sub>132</sub>	—	-57	-55	
( $V_{out} = +48$ dBmV/ch., FM = 55 MHz) 112-Channel FLAT	XMD <sub>112</sub>	—	-59	-57	
( $V_{out} = +48$ dBmV/ch., FM = 55 MHz) 79-Channel FLAT	XMD <sub>79</sub>	—	-62	-60	
( $V_{out} = +56$ dBmV @ 870 MHz Equiv) 112-Channel, 12 dB Tilt	XMD <sub>112</sub>	—	-53	-51	
( $V_{out} = +56$ dBmV @ 870 MHz Equiv) 112-Channel, 13.5 dB Tilt	XMD <sub>112</sub>	—	-55	-53	
( $V_{out} = +56$ dBmV @ 870 MHz Equiv) 112-Channel, 17 dB Tilt	XMD <sub>112</sub>	—	-58	-56	
( $V_{out} = +58$ dBmV @ 870 MHz Equiv) 79-Channel, 12 dB Tilt	XMD <sub>79</sub>	—	-60	-47	
( $V_{out} = +58$ dBmV @ 870 MHz Equiv) 79-Channel, 13.5 dB Tilt	XMD <sub>79</sub>	—	-62	-60	
( $V_{out} = +58$ dBmV @ 870 MHz Equiv) 79-Channel, 17 dB Tilt	XMD <sub>79</sub>	—	-67	-65	
<b>Composite Triple Beat</b>					dBc
( $V_{out} = +48$ dBmV/ch., Worst Case) 132-Channel FLAT	CTB <sub>132</sub>	—	-58	-56	
( $V_{out} = +48$ dBmV/ch., Worst Case) 112-Channel FLAT	CTB <sub>112</sub>	—	-62	-60	
( $V_{out} = +48$ dBmV/ch., Worst Case) 79-Channel FLAT	CTB <sub>79</sub>	—	-68	-66	
( $V_{out} = +56$ dBmV @ 870 MHz Equiv) 112-Channel, 12 dB Tilt	CTB <sub>112</sub>	—	-60	-58	
( $V_{out} = +56$ dBmV @ 870 MHz Equiv) 112-Channel, 13.5 dB Tilt	CTB <sub>112</sub>	—	-61	-59	
( $V_{out} = +56$ dBmV @ 870 MHz Equiv) 112-Channel, 17 dB Tilt	CTB <sub>112</sub>	—	-64	-62	
( $V_{out} = +58$ dBmV @ 870 MHz Equiv) 79-Channel, 12 dB Tilt	CTB <sub>79</sub>	—	-66	-64	
( $V_{out} = +58$ dBmV @ 870 MHz Equiv) 79-Channel, 13.5 dB Tilt	CTB <sub>79</sub>	—	-71	-69	
( $V_{out} = +58$ dBmV @ 870 MHz Equiv) 79-Channel, 17 dB Tilt	CTB <sub>79</sub>	—	-74	-72	
<b>Noise Figure</b>					dB
50 MHz	NF	—	4.0	4.5	
550 MHz		—	4.0	4.5	
750 MHz		—	4.0	4.5	
870 MHz		—	4.0	4.5	
<b>DC Current</b> ( $V_{DC} = 24$ V, $T_C = 45^\circ\text{C}$ )	$I_{DC}$	410	425	440	mA

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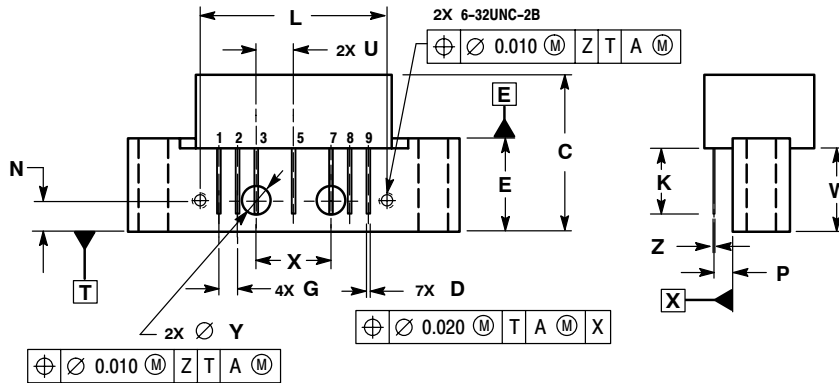
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PACKAGE DIMENSIONS



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

CASE 1302-01  
 ISSUE E

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