

# 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

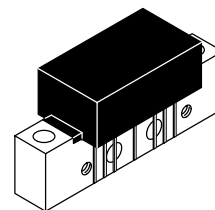
- CATV Systems Operating in the 47 to 870 MHz Frequency Range
- Output Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications

## Description

- 24 Vdc Supply, 47 to 870 MHz, CATV GaAs Forward Power Doubler Amplifier Module
- Replaced MHW9227A. There are no form, fit or function changes with this part replacement.
- RoHS Compliant

**MHW9227AN**

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



**CASE 1302-01, STYLE 1**

ARCHIVE INFORMATION

ARCHIVE INFORMATION

**Table 1. Maximum Ratings**

Rating	Symbol	Value	Unit
RF Voltage Input (Single Tone)	$V_{in}$	+70	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	200	200	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	$G_p$	21.5	22.1	22.7	dB
Slope 47-870 MHz	S	0	0.5	1.0	dB
Gain Flatness (40-870 MHz, Peak-to-Valley)	—	—	—	0.7	dB
Return Loss — Input/Output ( $Z_o = 75$ Ohms)	IRL				dB
		20	—	—	
		18	—	—	
		16	—	—	

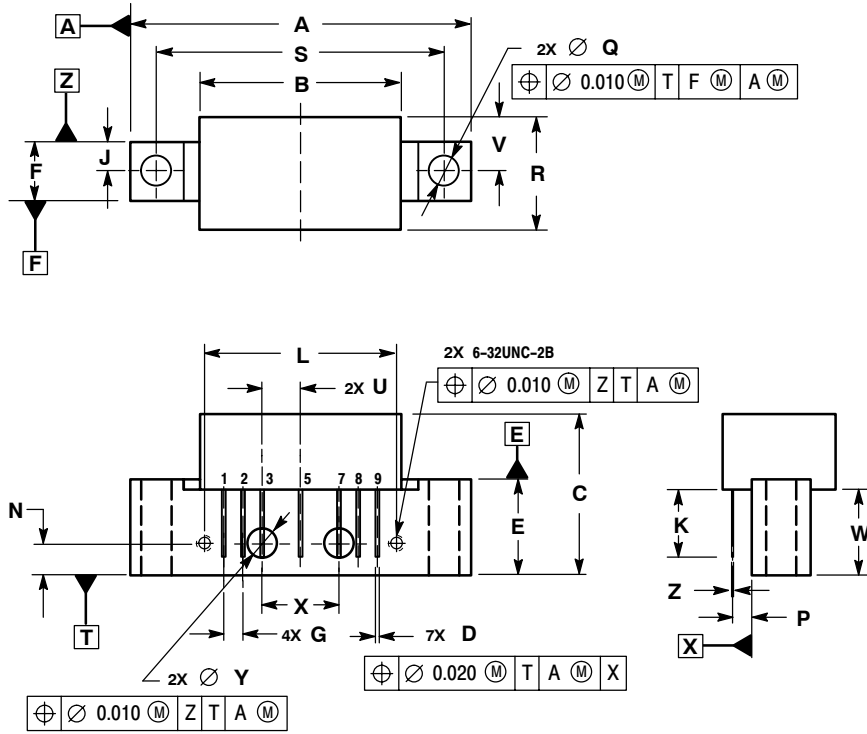
**Table 3. Electrical Characteristics** ( $V_{CC} = 24 \text{ Vdc}$ ,  $T_C = +45^\circ\text{C}$ ,  $75 \Omega$  system unless otherwise noted) (continued)

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	$CTB_{79}$	—	-66	-64	
( $V_{out} = +56 \text{ dBmV @ 870 MHz Equiv}$ ) 112-Channel, 12 dB Tilt	$CTB_{112}$	—	-57	-55	
( $V_{out} = +56 \text{ dBmV @ 870 MHz Equiv}$ ) 112-Channel, 13.5 dB Tilt	$CTB_{112}$	—	-58	-56	
( $V_{out} = +56 \text{ dBmV @ 870 MHz Equiv}$ ) 112-Channel, 17 dB Tilt	$CTB_{112}$	—	-60	-58	
( $V_{out} = +58 \text{ dBmV @ 870 MHz Equiv}$ ) 79-Channel, 12 dB Tilt	$CTB_{79}$	—	-63	-61	
( $V_{out} = +58 \text{ dBmV @ 870 MHz Equiv}$ ) 79-Channel, 13.5 dB Tilt	$CTB_{79}$	—	-65	-63	
( $V_{out} = +58 \text{ dBmV @ 870 MHz Equiv}$ ) 79-Channel, 17 dB Tilt	$CTB_{79}$	—	-69	-67	
<b>Noise Figure</b>					
50 MHz	NF	—	4.0	4.5	dB
550 MHz		—	4.0	4.5	
750 MHz		—	4.0	4.5	
870 MHz		—	4.0	4.5	
<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

ARCHIVE INFORMATION

ARCHIVE INFORMATION

### 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

**How to Reach Us:**

**Home Page:**  
www.freescale.com

**E-mail:**  
support@freescale.com

**USA/Europe or Locations Not Listed:**  
Freescale Semiconductor  
Technical Information Center, CH370  
1300 N. Alma School Road  
Chandler, Arizona 85224  
+1-800-521-6274 or +1-480-768-2130  
support@freescale.com

**Europe, Middle East, and Africa:**  
Freescale Halbleiter Deutschland GmbH  
Technical Information Center  
Schatzbogen 7  
81829 Muenchen, Germany  
+44 1296 380 456 (English)  
+46 8 52200080 (English)  
+49 89 92103 559 (German)  
+33 1 69 35 48 48 (French)  
support@freescale.com

**Japan:**  
Freescale Semiconductor Japan Ltd.  
Headquarters  
ARCO Tower 15F  
1-8-1, Shimo-Meguro, Meguro-ku,  
Tokyo 153-0064  
Japan  
0120 191014 or +81 3 5437 9125  
support.japan@freescale.com

**Asia/Pacific:**  
Freescale Semiconductor Hong Kong Ltd.  
Technical Information Center  
2 Dai King Street  
Tai Po Industrial Estate  
Tai Po, N.T., Hong Kong  
+800 2666 8080  
support.asia@freescale.com

**For Literature Requests Only:**

Freescale Semiconductor Literature Distribution Center  
P.O. Box 5405  
Denver, Colorado 80217  
1-800-441-2447 or 303-675-2140  
Fax: 303-675-2150  
LDCForFreescaleSemiconductor@hibbertgroup.com

Information in this document is provided solely to enable system and software implementers to use Freescale Semiconductor products. There are no express or implied copyright licenses granted hereunder to design or fabricate any integrated circuits or integrated circuits based on the information in this document.

Freescale Semiconductor reserves the right to make changes without further notice to any products herein. Freescale Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Freescale Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters that may be provided in Freescale Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals", must be validated for each customer application by customer's technical experts. Freescale Semiconductor does not convey any license under its patent rights nor the rights of others. Freescale Semiconductor products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Freescale Semiconductor product could create a situation where personal injury or death may occur. Should Buyer purchase or use Freescale Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold Freescale Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Freescale Semiconductor was negligent regarding the design or manufacture of the part.

Freescale™ and the Freescale logo are trademarks of Freescale Semiconductor, Inc. All other product or service names are the property of their respective owners.  
© Freescale Semiconductor, Inc. 2006, 2008. All rights reserved.

RoHS-compliant and/or Pb-free versions of Freescale products have the functionality and electrical characteristics of their non-RoHS-compliant and/or non-Pb-free counterparts. For further information, see <http://www.freescale.com> or contact your Freescale sales representative.

For information on Freescale's Environmental Products program, go to <http://www.freescale.com/epp>.

