Device Data Book

CATV DISTRIBUTION AMPLIFIER MODULE DEVICE DATA

DL209/D
Rev. 0
10/2002

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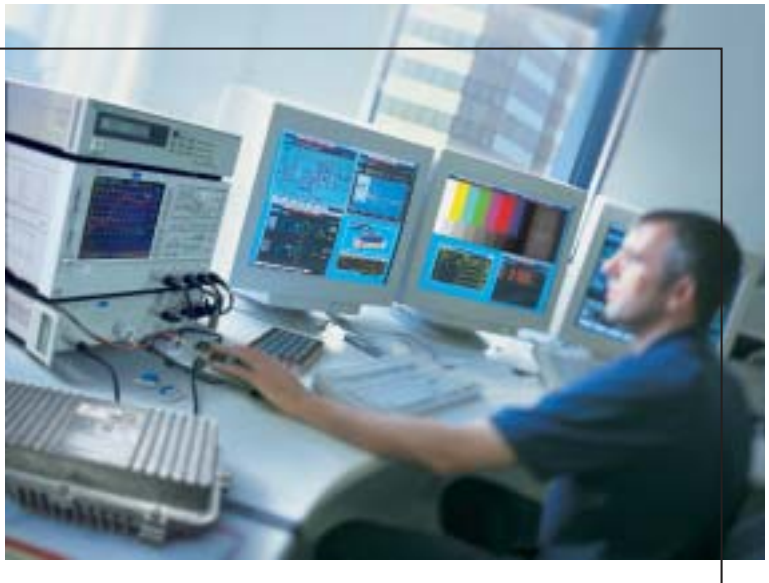

CATV

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CATV Distribution Amplifier Module Device Data

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RF CATV Distribution Amplifier Module Device Data

FOREWORD

This publication includes technical information and specifications for Motorola's broadband linear amplifier modules designed for general purpose and CATV distribution applications. The products use silicon bipolar or gallium arsenide device technologies as the foundation for building complete module solutions.

Selector Guides by product family are provided at the beginning of the book to enable quick comparisons of performance characteristics and to aid you in identifying devices that meet your functional performance requirements of frequency, gain, linearity and output capability.

All devices are in alphanumeric order in the *Data Sheet Device Index* of this book. Just turn to the appropriate page for technical details of the known device. Complete device specifications are provided in the form of *Data Sheets* which are categorized by product type into two chapters for easy reference.

Applications assistance is only a phone call away — call the nearest Motorola Semiconductor Sales office or 1-800-521-6274. Please refer to our section on *Access Data On–Line* so that you will always have easy access to the most current information available on Motorola's CATV Distribution Amplifier Module product portfolio.

DATA CLASSIFICATION

Advance Information

This heading on a data sheet indicates that the device is in sampling, pre–production, or first production stages. The disclaimer at the bottom of the first page reads: "This document contains information on a new product. Specifications and information herein are subject to change without notice."

Fully Released

A fully released data sheet contains neither a classification heading nor a disclaimer at the bottom of the first page. This document contains information on a product in full production. Guaranteed limits will not be changed without written notice to your local Motorola Semiconductor Sales Office.

The information in this book has been carefully checked and is believed to be accurate; however, no responsibility is assumed for inaccuracies.

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See the RF and IF Design Resource site at http://www.motorola.com/rf for specific CATV Distribution Amplifier Module product support information for:

- Data sheets
- Applications notes
- Selector guides
- Packaging information
- Press releases
- Events

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DATA SHEET DEVICE INDEX

Chapter One

CATV Distribution Amplifier Module and RF General Purpose Linear Amplifier Module Selector Guide

As a leading supplier of semiconductor products, Motorola has a broad RF portfolio of Class A, broadband linear amplifiers for general purpose and CATV distribution applications. Using silicon bipolar and gallium arsenide technologies, Motorola is committed to the development of new products and expansion of its product offerings to meet the ever–increasing global demands for higher performance and lower system costs.

How to Use This Selector Guide

Motorola's RF broadband linear products are divided into general purpose linear amplifier modules and CATV distribution amplifier modules. The CATV products are further segmented into forward and reverse path applications. Within the two CATV groups, the products are listed by frequency band and power dissipation and then by preamplifier and power doubler (post amplifier) applications.

Applications Assistance

Applications assistance is only a phone call away — call the nearest Semiconductor Sales office or 1-800-521-6274.

Access Data On–Line!

Use the Motorola Internet to access Motorola Semiconductor product data at http://www.motorola.com/semiconductors or http://www.motorola.com/rf. The Motorola Semiconductor Internet provides you with instant access to product summary pages, data sheets, selector guide information, application information, package outlines, on–line technical support and much more.

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UPDATED SEPTEMBER 2002

Motorola RF General Purpose Linear Amplifier Modules

Motorola general purpose linear amplifier modules are designed and specified for 50 ohm applications where linearity and dynamic range are essential.

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UPDATED SEPTEMBER 2002

Motorola RF General Purpose Linear Amplifier Modules

This device has been optimized for 50 ohm applications. It was designed for multi–purpose applications where linearity and dynamic range are of primary concern.

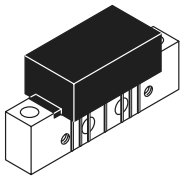
General Purpose Linear Amplifier Modules — Class A – Silicon Bipolar

Product	Frequency Band MHz	V_{CC} (Nom) Volts	I_{CC} (Nom) mA	Gain (Nom) @ 100 MHz dB	Gain Flatness (Typ) dB	P_{1dB} (Typ) @ 200 MHz dBm	3rd Order Intercept (Typ) dBm	NF (Typ) @ 200 MHz dB	Pkg/Style
MHW1345★	10–200	24	310	34.5	1.0	28	44	3.8	1302/1

Note: Possible replacement for CA2830C.

★New Product

RF General Purpose Linear Amplifier Module Package



CASE 1302
STYLE 1

SCALE 1:2

Motorola CATV Distribution Amplifier Modules

Motorola Hybrids are manufactured using the latest CATV generation technology which has set new standards for CATV system performance and reliability. These hybrids have been optimized to provide premium performance in all CATV systems up to 152 channels. Additions to our CATV product family include 40–870 MHz high output gallium arsenide (GaAs) power doublers as well as low distortion, low power consumption reverse amplifiers.

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UPDATED SEPTEMBER 2002

Motorola CATV Distribution Amplifier Modules

Motorola Hybrids are manufactured using the latest generation technology which has set new standards for CATV system performance and reliability. These hybrids have been optimized to provide premium performance in all CATV systems up to 152 channels.

Forward Amplifier Modules

40–1000 MHz Hybrids, V_{CC} = 24 Vdc, Class A — Silicon Bipolar

Product	Hybrid Gain (Nom) @ 50 MHz dB	Channel Loading Capacity	Maximum Distortion Specifications: Output Level dBmV/CH	2nd Order Test dBc	Composite Triple Beat dBc 152 CH	Cross Modulation dBc 152 CH	DC Current mA Typ	Noise Figure @ 1000 MHz dB MAX	Pkg/ Style
Preamplifiers									
MHW9182B	18.5	152	+38	–63[40]	–61	–61	210	7.5	714Y/1
MHW9242A	23.2	152	+38	–61[40]	–58	–59	318	8.0	1302/1

40–870 MHz High Output Hybrids, V_{CC} = 24 Vdc, Class A — GaAs

Product	Hybrid Gain (Nom) @ 870 MHz dB	Channel Loading Capacity	Maximum Distortion Specifications: Output Level dBmV/CH	2nd Order Test dBc	Composite Triple Beat dBc 132 CH	Cross Modulation dBc 132 CH	DC Current mA Typ	Noise Figure @ 870 MHz dB MAX	Pkg/ Style
Preamplifiers									
MHW9146[46a]	14.3	132	+44	–64[36]	–56	–55	245	5.0	1302/1
MHW9186★	18.5	128	+44	–60[36]	–58	–52	250	5.0	1302/1
MHW9206★	20.2	132	+44	–59[36]	–57	–51	245	4.5	1302/1
MHW9236[46a]	23	132	+44	–60[36]	–60	–60	245	5.5	1302/1
MHW9276[46a]	27.5	132	+44	–60[36]	–58	–53	250	6.0	1302/1
Power Doublers									
MHW9187★	20	132	+48	–62[34]	–56	–55	425	4.5	1302/1
MHW9188★	20.3	132	+48	–62[34]	–56	–55	425	4.5	1302/1
MHW9189[35]★	20.3	132	+48	–62[34]	–56	–55	425	4.5	1302/2
MHW9247★	24.9	132	+48	–62[34]	–56	–54	440	7.0	1302/1
MHW9267[46a]	27.3	132	+48	–60[34]	–56	–54	440	7.0	1302/1

[34]Composite 2nd Order; V_{out} = +48 dBmV/ch
[35]Mirror Image of MHW9188
[36]Composite 2nd order; V_{out} = +44 dBmV/ch
[40]Composite 2nd Order; V_{out} = +38 dBmV/ch
[46]To be introduced: a) 4Q02
★New Product

CATV Distribution: Forward Amplifier Modules (continued)

40–870 MHz Hybrids, V_{CC} = 24 Vdc, Class A — Silicon Bipolar

Product	Hybrid Gain (Nom) @ 870 MHz dB	Channel Loading Capacity	Maximum Distortion Specifications: Output Level dBmV/CH	2nd Order Test dBc	Composite Triple Beat dBc 128 CH	Cross Modulation dBc 128 CH	DC Current mA Typ	Noise Figure @ 870 MHz dB Max	Pkg/ Style
Preamplifiers									
MHW8202B★	20.9	128	+38	–66(40)	–63	–62	220	7.0	1302/1

40–860 MHz Hybrids, V_{CC} = 24 Vdc, Class A — Silicon Bipolar

Product	Hybrid Gain (Nom) @ 50 MHz dB	Channel Loading Capacity	Maximum Distortion Specifications: Output Level dBmV/CH	2nd Order Test dBc	Composite Triple Beat dBc 128 CH	Cross Modulation FM = 55 MHz dBc 128 CH	DC Current mA Typ	Noise Figure @ 860 MHz dB Max	Pkg/ Style
Preamplifiers									
MHW8182B	18.5	128	+38	–64(40)	–66	–65	220	7.5	714Y/1
MHW8222B	21.9	128	+38	–60(40)	–64	–63	220	7.0	1302/1
MHW8242A	24	128	+38	–62(40)	–64	–62	318	7.5	1302/1
MHW8272A	27.2	128	+38	–64(40)	–64	–62	310	7.0	1302/1
Power Doublers									
MHW8185L(21)	18.5	128	+40	–62(39)	–63	–64	365	8.5*	714Y/1
MHW8185	18.8	128	+40	–62(39)	–64	–64	400	8.0	714Y/1
MHW8205L(22)	19.5	128	+40	–60(39)	–63	–64	365	8.5*	714Y/1
MHW8205	19.8	128	+40	–60(39)	–63	–64	400	8.0	714Y/1

*@ 870 MHz

40–750 MHz Hybrids, V_{CC} = 24 Vdc, Class A — Silicon Bipolar

Product	Hybrid Gain (Nom) @ 50 MHz dB	Channel Loading Capacity	Maximum Distortion Specifications: Output Level dBmV/CH	2nd Order Test dBc	Composite Triple Beat dBc 110 CH	Cross Modulation FM = 55 MHz dBc 110 CH	DC Current mA Typ	Noise Figure @ 750 MHz dB Max	Pkg/ Style
Preamplifiers									
MHW7182B	18.5	110	+40	–63(39)	–66	–64	220	6.5	714Y/1
MHW7222B	21.9	110	+40	–60(39)	–61	–60	220	6.5	1302/1
MHW7242A	24	110	+40	–62(39)	–63	–61	318	7.0	1302/1
MHW7272A	27.2	110	+40	–64(39)	–64	–60	310	6.5	1302/1
MHW7292A★	29	110	+40	–60(39)	–60	–60	310	6.5*	1302/1

*@ 770 MHz

(21)Low DC Current Version of MHW8185; Typical I_{CC} @ Vdc = 24 V is 365 mA.

(22)Low DC Current Version of MHW8205; Typical I_{CC} @ Vdc = 24 V is 365 mA.

(39)Composite 2nd order; V_{out} = +40 dBmV/ch

(40)Composite 2nd Order; V_{out} = +38 dBmV/ch

★New Product

40–750 MHz Hybrids, V_{CC} = 24 Vdc, Class A — Silicon Bipolar (continued)

Product	Hybrid Gain (Nom) @ 50 MHz dB	Channel Loading Capacity	Maximum Distortion Specifications: Output Level dBmV/CH	2nd Order Test dBc	Composite Triple Beat dBc 110 CH	Cross Modulation FM = 55 MHz dBc 110 CH	DC Current mA Typ	Noise Figure @ 750 MHz dB Max	Pkg/ Style
Power Doublers									
MHW7185CL	18.5	110	+44	–64[36]	–61	–63	370	7.5	714Y/1
MHW7185C	18.8	110	+44	–64[36]	–62	–63	400	7.5	714Y/1
MHW7205CL	19.5	110	+44	–63[36]	–61	–62	365	7.5	714Y/1
MHW7205C	19.8	110	+44	–63[36]	–61	–62	400	7.5	714Y/1

40–550 MHz Hybrids, V_{CC} = 24 Vdc, Class A — Silicon Bipolar

Product	Hybrid Gain (Nom) @ 50 MHz dB	Channel Loading Capacity	Maximum Distortion Specifications: Output Level dBmV/CH	2nd Order Test dBc	Composite Triple Beat dBc 77 CH	Cross Modulation dBc 77 CH	DC Current mA Typ	Noise Figure @ 550 MHz dB Max	Pkg/ Style
Forward Amplifiers									
MHW6342T	34.5	77	+44	–57[36]	–57	–57	310	6.5	1302/1

Reverse Amplifier Modules

5–200 MHz Hybrids, V_{CC} = 24 Vdc, Class A — Silicon Bipolar

Product	Hybrid Gain (Nom) @ 10 MHz dB	Channel Loading Capacity	Maximum Distortion Specifications: Output Level dBmV/ CH	2nd Order Test[30] dBc	Composite Triple Beat dBc 22 CH	Composite Triple Beat dBc 26 CH	Cross Modulation dBc 22 CH	Cross Modulation dBc 26 CH	DC Current mA Typ	Noise Figure @ 175 MHz dB Max	Pkg/ Style
MHW1244	24	22, 26	+50	–72	–68	–67.5[19]	–61	–61[19]	210	5.0	1302/1

[19]Typical

[30]Channels 2 and A @ 7

[36]Composite 2nd order; V_{out} = +44 dBmV/ch

CATV Distribution: Reverse Amplifier Modules (continued)

Low Current Amplifiers — 5–200 MHz Hybrids, V_{CC} = 24 Vdc, Class A — Silicon Bipolar

Product	Hybrid Gain (Nom) @ 5 MHz dB	Channel Loading Capacity	Maximum Distortion Specifications: Output Level dBmV/CH	2nd Order Test dBc: 6 CH	2nd Order Test dBc: 10 CH	Composite Triple Beat dBc: 6 CH	Composite Triple Beat dBc: 10 CH	Cross Modulation dBc: 6 CH	Cross Modulation dBc: 10 CH	DC Current mA Typ	Noise Figure @ 200 MHz dB Max	Pkg/ Style
MHW1223LA	22.7	6,10	+50	–68	–65	–75	–66	–65	–60	95	7.0	1302/1
MHW1253LA	25.5	6,10	+50	–68	–66	–75	–66	–65	–61	95	6.5	1302/1
MHW1303LA	30.8	6,10	+50	–68	–65	–74	–64	–64	–58	95	5.7	1302/1

Low Current Amplifiers — 5–150 MHz Hybrids, V_{CC} = 24 Vdc, Class A — Silicon Bipolar

Product	Hybrid Gain (Nom) @ 5 MHz dB	Channel Loading Capacity	Maximum Distortion Specifications: Output Level dBmV/CH	2nd Order Test dBc: 6 CH	2nd Order Test dBc: 10 CH	Composite Triple Beat dBc: 6 CH	Composite Triple Beat dBc: 10 CH	Cross Modulation dBc: 6 CH	Cross Modulation dBc: 10 CH	DC Current mA Typ	Noise Figure @ 150 MHz dB Max	Pkg/ Style
MHW1353LA	35.2	6,10	+50	–68	–65	–73	–62	–63	–57	95	5.4	1302/1

Low Current Amplifiers — 5–65 MHz Hybrids, V_{CC} = 24 Vdc, Class A — Silicon Bipolar

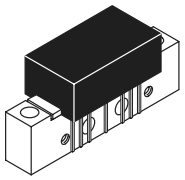
Product	Hybrid Gain (Nom) @ 5 MHz dB	Channel Loading Capacity	Maximum Distortion Specifications: Output Level dBmV/CH	2nd Order Test dBc: 6 CH	2nd Order Test dBc: 10 CH	Composite Triple Beat dBc: 6 CH	Composite Triple Beat dBc: 10 CH	Cross Modulation dBc: 6 CH	Cross Modulation dBc: 10 CH	DC Current mA Typ	Noise Figure @ 65 MHz dB Max	Pkg/ Style
MHW1224LA	22.7	6,10	+50	–68	–65	–75	–66	–65	–60	95	7.0	1302/1
MHW1254LA	25.5	6,10	+50	–68	–66	–75	–66	–65	–61	95	6.5	1302/1
MHW1304LA	30.8	6,10	+50	–68	–65	–74	–64	–64	–58	95	5.7	1302/1
MHW1354LA	35.2	6,10	+50	–68	–65	–73	–62	–63	–57	95	5.4	1302/1

Low Current Amplifiers — 5–50 MHz Hybrids, V_{CC} = 24 Vdc, Class A — Silicon Bipolar

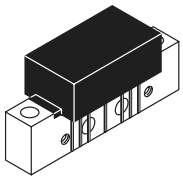
Product	Hybrid Gain (Nom) @ 5 MHz dB	Channel Loading Capacity	Maximum Distortion Specifications: Output Level dBmV/CH	2nd Order Test[30] dBc	Composite Triple Beat dBc: 3 CH	Cross Modulation dBc: 4 CH	DC Current mA Typ	Noise Figure @ 50 MHz dB Max	Pkg/ Style
MHW1254L	25	4	+50	–70	–70	–62	115	4.5	1302/1

[30]Channels 2 and A @ 7

CATV Distribution Amplifier Module Packages



CASE 714Y
STYLE 1



CASE 1302
STYLE 1, 2

SCALE 1:2

Chapter Two

Motorola RF General Purpose Linear Amplifier Module Data Sheets

The RF Line
General Purpose Linear Amplifier Module

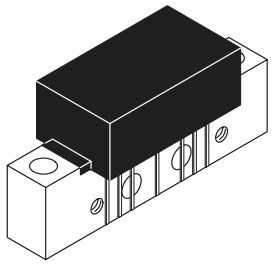
MHW1345

10–200 MHz
34.5 dB
800 mW
GENERAL PURPOSE
LINEAR AMPLIFIER MODULE

Features
- 34.5 dB Typical Gain @ 100 MHz
- Silicon Bipolar Technology
- Class A Operation
- Typical ITO = +44 dBm @ 200 MHz
- Unconditionally Stable Under All Load Conditions

Applications
- Driver Amplifier in 50 Ohm Systems Requiring High Linearity
- Instrumentation Amplifiers
- Return Path Amplifier on CATV Systems Operating in the 10 to 200 MHz Frequency Range
- Possible Replacement for CA2830C

Description
- 24 Vdc Supply, 10 to 200 MHz, General Purpose Linear Amplifier Module



CASE 1302–01, STYLE 1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
DC Supply Voltage	V_{CC}	28	Vdc
RF Power Input	P_{in}	+5	dBm
Operating Case Temperature Range	T_C	–20 to +100	°C
Storage Temperature Range	T_{stg}	–40 to +100	°C

ELECTRICAL CHARACTERISTICS (T_C = 25°C, V_{CC} = 24 V, 50 Ω system unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Frequency Range	BW	10	—	200	MHz
Gain Flatness (f = 10–200 MHz)	G_F	—	±0.5	±1	dB
Power Gain (f = 100 MHz)	G_p	33.5	34.5	35.5	dB
Noise Figure, Broadband (f = 200 MHz)	NF	—	3.8	4.5	dB
Power Output — 1 dB Compression (f = 10–200 MHz)	P_{1dB}	630	800	—	mW
Power Output — 1 dB Compression (f = 10–200 MHz, V_{CC} = 28 V)	P_{1dB}	1000	1260	—	mW
Third Order Intercept (See Figure 2, f_1 = 200 MHz)	ITO	43	44	—	dBm
Input/Output VSWR (f = 10–200 MHz)	VSWR	—	1.5:1	2:1	—
Second Harmonic Distortion (Tone at 100 mW, f_{2H} = 150 MHz)	d_{so}	—	–60	–50	dB
Peak Envelope Power (Two Tone Distortion Test — See Figure 2) (f = 10–200 MHz @ –32 dB IMD)	PEP	600	800	—	mW
Supply Current	I_{CC}	270	310	330	mA

Biased at 24 Volts $T = 25°C$ $Z_o = 50\Omega$

Frequency (MHz)	S11		S21		S12		S22	
	Mag	Ang	Mag	Ang	Mag	Ang	Mag	Ang
10	–19.3	45.5	34.6	–0.6	–47.0	2.3	–14.5	76.8
50	–15.6	35.0	34.2	–56.7	–47.5	–30.3	–12.6	45.0
100	–13.2	34.4	33.9	–114	–47.9	–62.9	–10.8	10.7
200	–11.1	30.1	33.5	134	–48.3	–128	–14.9	–42.6

Magnitude in dB, Phase Angle in degrees.

Table 1. S–Parameters

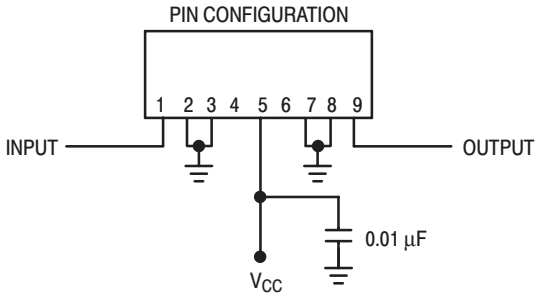
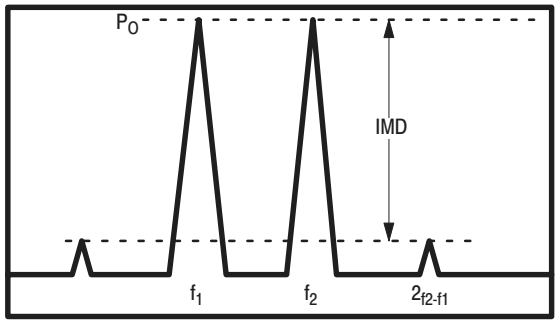


Figure 1. External Connections



$$ITO = P_O + \frac{IMD}{2} \text{ @ IMD} > 60dB$$

$PEP = 4X\ P_O$ @ IMD = –32dB

Figure 2. Intermodulation Test

Chapter Three

Motorola CATV Distribution Amplifier Module Data Sheets

Data Sheets (continued)

The RF Line
CATV Amplifier Module

MHW1223LA

5–200 MHz, 22.7 dB
10–CHANNEL
CATV LOW CURRENT AMPLIFIER

Features

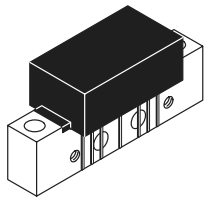
- Specified for 6– and 10–Channel Loading
- Excellent Distortion Performance
- Low Power Consumption
- Capable of Handling Multiple Channels in the Return Path with Good Distortion Performance
- Silicon Bipolar Transistor Technology
- Unconditionally Stable Under All Load Conditions

Applications

- CATV Systems Operating in the 5 to 200 MHz Frequency Range
- Specified for Use as a Return Path Amplifier for Low–, Mid– and High–Split 2–Way Cable TV Systems

Description

- 24 Vdc Supply, 5 to 200 MHz, CATV Reverse Amplifier



CASE 1302–01, STYLE 1

MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
DC Supply Voltage	V_{CC}	+28	Vdc
RF Input Voltage (Single Tone)	V_{in}	+60	dBmV
Operating Case Temperature Range	T_C	– 20 to +100	°C
Storage Temperature Range	T_{stg}	– 40 to +100	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = 30°C, 75 Ω system, unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Bandwidth	All	BW	5	—	200	MHz
Power Gain	(f = 5 MHz)	G_p	22.1	22.7	23.5	dB
Slope	(5–200 MHz)	S	– 0.2	—	0.7	dB
Gain Flatness (Peak To Valley)	(5–200 MHz)	G_F	—	—	0.4	dB
Return Loss — Input/Output		IRL/ORL				dB
	(@ f = 5–150 MHz)		20	—	—	
	(@ f = 150–200 MHz)		18	—	—	
Composite Second Order (V_{out} = +50 dBmV per Ch., Worst Case)						dBc
	6–Channel FLAT	CSO_6	—	– 73	– 68	
	10–Channel FLAT	CSO_{10}	—	– 72	– 65	

ELECTRICAL CHARACTERISTICS – continued (V_{CC} = 24 Vdc, T_C = 30°C, 75 Ω system, unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Cross Modulation Distortion (V_{out} = +50 dBmV per Ch., Worst Case)					dBc
6–Channel FLAT	XMD_6	—	–69	–65	
10–Channel FLAT	XMD_{10}	—	–63	–60	
Composite Triple Beat (V_{out} = +50 dBmV per Ch., Worst Case)					dBc
6–Channel FLAT	CTB_6	—	–78	–75	
10–Channel FLAT	CTB_{10}	—	–69	–66	
Noise Figure	NF				dB
(f = 5–200 MHz)		—	6.3	7	
DC Current	I_{DC}	85	95	110	mA

The RF Line
CATV Amplifier Module

MHW1224LA

5–65 MHz, 22.7 dB
10–CHANNEL
CATV LOW CURRENT AMPLIFIER

Features

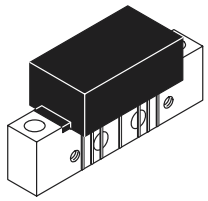
- Specified for 6– and 10–Channel Loading
- Excellent Distortion Performance
- Low Power Consumption
- Capable of Handling Multiple Channels in the Return Path with Good Distortion Performance
- Silicon Bipolar Transistor Technology
- Unconditionally Stable Under All Load Conditions

Applications

- CATV Systems Operating in the 5 to 65 MHz Frequency Range
- Specified for Use as a Return Path Amplifier for Low–Split 2–Way Cable TV Systems

Description

- 24 Vdc Supply, 5 to 65 MHz, CATV Reverse Amplifier



CASE 1302–01, STYLE 1

MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
DC Supply Voltage	V_{CC}	+28	Vdc
RF Input Voltage (Single Tone)	V_{in}	+60	dBmV
Operating Case Temperature Range	T_C	– 20 to +100	°C
Storage Temperature Range	T_{stg}	– 40 to +100	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = 30°C, 75 Ω system, unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Bandwidth	All	BW	5	—	65	MHz
Power Gain	(f = 5 MHz)	G_p	22.1	22.7	23.2	dB
Slope	(5–65 MHz)	S	– 0.2	—	0.5	dB
Gain Flatness (Peak To Valley)	(5–65 MHz)	G_F	—	—	0.4	dB
Return Loss — Input/Output	(@ f = 5–65 MHz)	IRL/ORL	20	—	—	dB
Composite Second Order (V_{out} = +50 dBmV per Ch., Worst Case)						dBc
	6–Channel FLAT	CSO_6	—	– 73	– 68	
	10–Channel FLAT	CSO_{10}	—	– 72	– 65	

ELECTRICAL CHARACTERISTICS – continued (V_{CC} = 24 Vdc, T_C = 30°C, 75 Ω system, unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Cross Modulation Distortion (V_{out} = +50 dBmV per Ch., Worst Case)					dBc
6–Channel FLAT	XMD_6	—	–69	–65	
10–Channel FLAT	XMD_{10}	—	–63	–60	
Composite Triple Beat (V_{out} = +50 dBmV per Ch., Worst Case)					dBc
6–Channel FLAT	CTB_6	—	–78	–75	
10–Channel FLAT	CTB_{10}	—	–69	–66	
Noise Figure	NF				dB
(f = 5–65 MHz)		—	6.3	7	
DC Current	I_{DC}	85	95	110	mA

The RF Line
CATV Amplifier Module

MHW1244

5–200 MHz, 24.0 dB
26–CHANNEL
CATV HIGH–SPLIT
REVERSE AMPLIFIER

Features

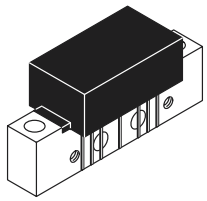
- Specified for 12–, 22– and 26–Channel Loading
- Excellent Distortion Performance
- Superior Gain, Return Loss and DC Current Stability over Temperature
- Capable of Handling Multiple Channels in the Return Path with Good Distortion Performance
- Silicon Bipolar Transistor Technology
- Unconditionally Stable Under All Load Conditions

Applications

- CATV Systems Operating in the 5 to 200 MHz Frequency Range
- Designed for Broadband Applications Requiring Low Distortion Characteristics
- Specified for Use as a Return Path Amplifier for Low–, Mid– and High–Split 2–Way Cable TV Systems

Description

- 24 Vdc Supply, 5 to 200 MHz, CATV Reverse Amplifier



CASE 1302–01, STYLE 1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
RF Voltage Input (Single Tone)	V_{in}	+65	dBmV
DC Supply Voltage	V_{CC}	+28	Vdc
Operating Case Temperature Range	T_C	–20 to +100	°C
Storage Temperature Range	T_{stg}	–40 to +100	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system)

Characteristic	Symbol	MHW1244	Units
Power Gain @ 10 MHz	G_p	24.0 ± 0.5	dB
Frequency Range (Response/Return Loss) (1)	BW	5.0–200	MHz
Cable Slope Equivalent (5.0–200 MHz)	S	–0.2 Min/+0.8 Max	dB
Gain Flatness (5.0–200 MHz)	G_F	±0.2 Max	dB
Input/Output Return Loss (5.0–200 MHz) (1)	IRL/ORL	18.0 Min	dB
Cross Modulation Distortion @ +50 dBmV per ch.			
12–Channel FLAT (5.0–120 MHz)	XMD_{12}	–66 Typ	dBc
22–Channel FLAT (5.0–175 MHz) (2) (3)	XMD_{22}	–61 Max	dBc
26–Channel FLAT (5.0–200 MHz)	XMD_{26}	–61 Typ	dBc

NOTES:
1. Response and return loss characteristics are tested and guaranteed for the full 5.0–200 MHz frequency range.
2. Motorola 100% distortion and noise figure testing is performed over the 5.0–175 MHz frequency range. Cross modulation and composite triple beat testing are with 22–channel loading; Video carriers used are:

T7–T13	7.0–43.0 MHz	7–Channels
2–6	55.25–83.25 MHz	5–Channels
A–7	121.25–175.25 MHz	10–Channels

3. Video carriers used for 12–Channel typical performances are T7–6; For 26–Channel typical performance, Channels 8, 9, 10 and 11 are added to the 22–Channel carriers listed above.

ELECTRICAL CHARACTERISTICS — continued (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system)

Characteristic	Symbol	MHW1244	Units
Composite Triple Beat Distortion @ +50 dBmV per ch. 22–Channel FLAT (5.0–175 MHz) (2) 26–Channel FLAT (5.0–200 MHz) (3)	 CTB_{22} CTB_{26}	 –68 Max –67.5 Typ	 dBc dBc
Individual Triple Beat Distortion @ +50 dBmV per ch. Mid–Split (5.0–120 MHz) T11, T12 and CH2 @ 123.25 MHz High–Split (5.0–175 MHz) T13, CH2 and CH5 @ 175.5 MHz	 TB_3 TB_3	 –87 Typ –84 Typ	 dBc dBc
Second Order Distortion @ +50 dBmV per ch. High–Split (5.0–175 MHz) CH2, CHA @ 176.5 MHz	IMD	–72 Max	dBc
Noise Figure High–Split (5.0–175 MHz) (2)	NF	5.0 Max	dB
DC Current	I_{DC}	210 Typ/240 Max	mAdc

NOTES:

1. Response and return loss characteristics are tested and guaranteed for the full 5.0–200 MHz frequency range.
2. Motorola 100% distortion and noise figure testing is performed over the 5.0–175 MHz frequency range. Cross modulation and composite triple beat testing are with 22–channel loading; Video carriers used are:

T7–T13	7.0–43.0 MHz	7–Channels
2–6	55.25–83.25 MHz	5–Channels
A–7	121.25–175.25 MHz	10–Channels

3. Video carriers used for 12–Channel typical performances are T7–6; For 26–Channel typical performance, Channels 8, 9, 10 and 11 are added to the 22–Channel carriers listed above.

The RF Line
CATV Amplifier Module

MHW1253LA

5–200 MHz, 25.5 dB
10–CHANNEL
CATV LOW CURRENT AMPLIFIER

Features

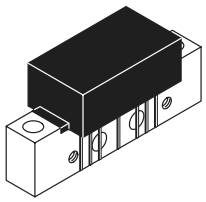
- Specified for 6– and 10–Channel Loading
- Excellent Distortion Performance
- Low Power Consumption
- Capable of Handling Multiple Channels in the Return Path with Good Distortion Performance
- Silicon Bipolar Transistor Technology
- Unconditionally Stable Under All Load Conditions

Applications

- CATV Systems Operating in the 5 to 200 MHz Frequency Range
- Specified for Use as a Return Path Amplifier for Low–, Mid– and High–Split 2–Way Cable TV Systems

Description

- 24 Vdc Supply, 5 to 200 MHz, CATV Reverse Amplifier



CASE 1302–01, STYLE 1

MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
DC Supply Voltage	V_{CC}	+28	Vdc
RF Input Voltage (Single Tone)	V_{in}	+60	dBmV
Operating Case Temperature Range	T_C	– 20 to +100	°C
Storage Temperature Range	T_{stg}	– 40 to +100	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = 30°C, 75 Ω system, unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Bandwidth	All	BW	5	—	200	MHz
Power Gain	(f = 5 MHz)	G_p	25	25.5	26	dB
Slope	(5–200 MHz)	S	– 0.2	—	0.7	dB
Gain Flatness (Peak To Valley)	(5–200 MHz)	G_F	—	—	0.4	dB
Return Loss — Input/Output		IRL/ORL				dB
	(@ f = 5–150 MHz)		20	—	—	
	(@ f = 150–200 MHz)		18	—	—	
Composite Second Order (V_{out} = +50 dBmV per Ch., Worst Case)						dBc
	6–Channel FLAT	CSO_6	—	– 73	– 68	
	10–Channel FLAT	CSO_{10}	—	– 71	– 66	

REV 2

ELECTRICAL CHARACTERISTICS – continued (V_{CC} = 24 Vdc, T_C = 30°C, 75 Ω system, unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Cross Modulation Distortion (V_{out} = +50 dBmV per Ch., Worst Case)					dBc
6–Channel FLAT	XMD_6	—	–69	–65	
10–Channel FLAT	XMD_{10}	—	–64	–61	
Composite Triple Beat (V_{out} = +50 dBmV per Ch., Worst Case)					dBc
6–Channel FLAT	CTB_6	—	–78	–75	
10–Channel FLAT	CTB_{10}	—	–69	–66	
Noise Figure	NF				dB
(f = 5–200 MHz)		—	5.8	6.5	
DC Current	I_{DC}	85	95	110	mA

The RF Line
CATV Amplifier Module

MHW1254L

50 MHz, 25 dB
4–CHANNEL
CATV LOW CURRENT AMPLIFIER

Features

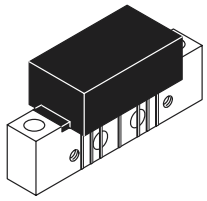
- Specified for 4–Channel Loading
- Superior Gain, Return Loss and DC Current Stability over Temperature
- Capable of Handling Multiple Channels in the Return Path with Good Distortion Performance
- Silicon Bipolar Transistor Technology
- Unconditionally Stable Under All Load Conditions

Applications

- CATV Systems Operating in the 5 to 50 MHz Frequency Range
- Specified for Use as a Return Path Amplifier for Low–Split 2–Way Cable TV Systems

Description

- 24 Vdc Supply, 5 to 50 MHz, CATV Reverse Amplifier



CASE 1302–01, STYLE 1

MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
DC Supply Voltage	V_{CC}	+28	Vdc
RF Input Voltage (Single Tone)	V_{IN}	+70	dBmV
Operating Case Temperature Range	T_C	– 20 to +100	°C
Storage Temperature Range	T_{stg}	– 40 to +100	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = 30°C, 75 ohm system, unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
Bandwidth		BW	5.0	50	MHz
Power Gain	(f = 5.0 MHz)	G_p	24.3	25.8	dB
Return Loss	(@ f = 5.0–50 MHz)	RL	20	—	dB
Second Order Distortion	(V_{out} = +50 dBmV/ch)	IMD	—	–70	dBc
Cross Modulation	(V_{out} = +50 dBmV/ch)	XMD_4	—	–62	dBc
Triple Beat Distortion	(V_{out} = +50 dBmV/ch)	TB_3	—	–70	dBc
Noise Figure	(f = 50 MHz)	NF	—	4.5	dB
DC Current		IDC	100	135	mA

The RF Line
CATV Amplifier Module

MHW1254LA

5–65 MHz, 25.5 dB
10–CHANNEL
CATV LOW CURRENT AMPLIFIER

Features

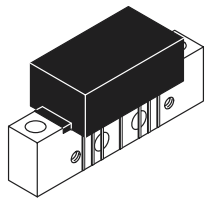
- Specified for 6– and 10–Channel Loading
- Excellent Distortion Performance
- Low Power Consumption
- Capable of Handling Multiple Channels in the Return Path with Good Distortion Performance
- Silicon Bipolar Transistor Technology
- Unconditionally Stable Under All Load Conditions

Applications

- CATV Systems Operating in the 5 to 65 MHz Frequency Range
- Specified for Use as a Return Path Amplifier for Low–Split 2–Way Cable TV Systems

Description

- 24 Vdc Supply, 5 to 65 MHz, CATV Reverse Amplifier



CASE 1302–01, STYLE 1

MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
DC Supply Voltage	V_{CC}	+28	Vdc
RF Input Voltage (Single Tone)	V_{in}	+60	dBmV
Operating Case Temperature Range	T_C	– 20 to +100	°C
Storage Temperature Range	T_{stg}	– 40 to +100	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = 30°C, 75 Ω system, unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Bandwidth	All	BW	5	—	65	MHz
Power Gain	(f = 5 MHz)	G_p	25	25.5	26	dB
Slope	(5–65 MHz)	S	– 0.2	—	0.5	dB
Gain Flatness (Peak To Valley)	(5–65 MHz)	G_F	—	—	0.4	dB
Return Loss — Input/Output	(@ f = 5–65 MHz)	IRL/ORL	20	—	—	dB
Composite Second Order (V_{out} = +50 dBmV per Ch., Worst Case)						dBc
	6–Channel FLAT	CSO_6	—	– 73	– 68	
	10–Channel FLAT	CSO_{10}	—	– 71	– 66	

ELECTRICAL CHARACTERISTICS – continued (V_{CC} = 24 Vdc, T_C = 30°C, 75 Ω system, unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Cross Modulation Distortion (V_{out} = +50 dBmV per Ch., Worst Case)					dBc
6–Channel FLAT	XMD_6	—	–69	–65	
10–Channel FLAT	XMD_{10}	—	–64	–61	
Composite Triple Beat (V_{out} = +50 dBmV per Ch., Worst Case)					dBc
6–Channel FLAT	CTB_6	—	–78	–75	
10–Channel FLAT	CTB_{10}	—	–69	–66	
Noise Figure	NF				dB
(f = 5–65 MHz)		—	5.8	6.5	
DC Current	I_{DC}	85	95	110	mA

The RF Line
CATV Amplifier Module

MHW1303LA

5–200 MHz, 30.8 dB
10–CHANNEL
CATV LOW CURRENT AMPLIFIER

Features

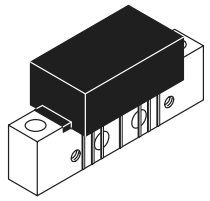
- Specified for 6– and 10–Channel Loading
- Excellent Distortion Performance
- Low Power Consumption
- Capable of Handling Multiple Channels in the Return Path with Good Distortion Performance
- Silicon Bipolar Transistor Technology
- Unconditionally Stable Under All Load Conditions

Applications

- CATV Systems Operating in the 5 to 200 MHz Frequency Range
- Specified for Use as a Return Path Amplifier for Low–, Mid– and High–Split 2–Way Cable TV Systems

Description

- 24 Vdc Supply, 5 to 200 MHz, CATV Reverse Amplifier



CASE 1302–01, STYLE 1

MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
DC Supply Voltage	V_{CC}	+28	Vdc
RF Input Voltage (Single Tone)	V_{in}	+60	dBmV
Operating Case Temperature Range	T_C	– 20 to +100	°C
Storage Temperature Range	T_{stg}	– 40 to +100	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = 30°C, 75 Ω system, unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Bandwidth	All	BW	5	—	200	MHz
Power Gain	(f = 5 MHz)	G_p	30	30.8	31.2	dB
Slope	(5–200 MHz)	S	0	—	1.0	dB
Gain Flatness (Peak To Valley)	(5–200 MHz)	G_F	—	—	0.7	dB
Return Loss — Input/Output		IRL/ORL				dB
	(@ f = 5–65 MHz)		20	—	—	
	(@ f = 65–200 MHz)		18	—	—	
Composite Second Order (V_{out} = +50 dBmV per Ch., Worst Case)						dBc
	6–Channel FLAT	CSO_6	—	– 73	– 68	
	10–Channel FLAT	CSO_{10}	—	– 70	– 65	

ELECTRICAL CHARACTERISTICS – continued (V_{CC} = 24 Vdc, T_C = 30°C, 75 Ω system, unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Cross Modulation Distortion (V_{out} = +50 dBmV per Ch., Worst Case)					dBc
6–Channel FLAT	XMD_6	—	–67	–64	
10–Channel FLAT	XMD_{10}	—	–61	–58	
Composite Triple Beat (V_{out} = +50 dBmV per Ch., Worst Case)					dBc
6–Channel FLAT	CTB_6	—	–76	–74	
10–Channel FLAT	CTB_{10}	—	–67	–64	
Noise Figure	NF				dB
(f = 5–200 MHz)		—	5	5.7	
DC Current	I_{DC}	85	95	110	mA

The RF Line
CATV Amplifier Module

MHW1304LA

5–65 MHz, 30.8 dB
10–CHANNEL
CATV LOW CURRENT AMPLIFIER

Features

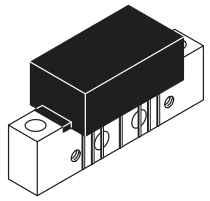
- Specified for 6– and 10–Channel Loading
- Excellent Distortion Performance
- Low Power Consumption
- Capable of Handling Multiple Channels in the Return Path with Good Distortion Performance
- Silicon Bipolar Transistor Technology
- Unconditionally Stable Under All Load Conditions

Applications

- CATV Systems Operating in the 5 to 65 MHz Frequency Range
- Specified for Use as a Return Path Amplifier for Low–Split 2–Way Cable TV Systems

Description

- 24 Vdc Supply, 5 to 65 MHz, CATV Reverse Amplifier



CASE 1302–01, STYLE 1

MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
DC Supply Voltage	V_{CC}	+28	Vdc
RF Input Voltage (Single Tone)	V_{in}	+60	dBmV
Operating Case Temperature Range	T_C	– 20 to +100	°C
Storage Temperature Range	T_{stg}	– 40 to +100	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = 30°C, 75 Ω system, unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Bandwidth	All	BW	5	—	65	MHz
Power Gain	(f = 5 MHz)	G_p	30	30.8	31.2	dB
Slope	(5–65 MHz)	S	– 0.2	—	0.5	dB
Gain Flatness (Peak To Valley)	(5–65 MHz)	G_F	—	—	0.5	dB
Return Loss — Input/Output	(@ f = 5–65 MHz)	IRL/ORL	20	—	—	dB
Composite Second Order (V_{out} = +50 dBmV per Ch., Worst Case)						dBc
	6–Channel FLAT	CSO_6	—	– 73	– 68	
	10–Channel FLAT	CSO_{10}	—	– 70	– 65	

ELECTRICAL CHARACTERISTICS – continued (V_{CC} = 24 Vdc, T_C = 30°C, 75 Ω system, unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Cross Modulation Distortion (V_{out} = +50 dBmV per Ch., Worst Case)					dBc
6–Channel FLAT	XMD_6	—	–67	–64	
10–Channel FLAT	XMD_{10}	—	–61	–58	
Composite Triple Beat (V_{out} = +50 dBmV per Ch., Worst Case)					dBc
6–Channel FLAT	CTB_6	—	–76	–74	
10–Channel FLAT	CTB_{10}	—	–67	–64	
Noise Figure	NF				dB
(f = 5–65 MHz)		—	5	5.7	
DC Current	I_{DC}	85	95	110	mA

The RF Line
CATV Amplifier Module

MHW1353LA

5–150 MHz, 35.2 dB
10–CHANNEL
CATV LOW CURRENT AMPLIFIER

Features

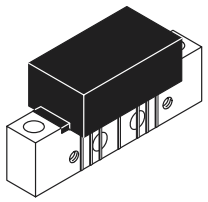
- Specified for 6– and 10–Channel Loading
- Excellent Distortion Performance
- Low Power Consumption
- Capable of Handling Multiple Channels in the Return Path with Good Distortion Performance
- Silicon Bipolar Transistor Technology
- Unconditionally Stable Under All Load Conditions

Applications

- CATV Systems Operating in the 5 to 150 MHz Frequency Range
- Specified for Use as a Return Path Amplifier for Low–, Mid– and High–Split 2–Way Cable TV Systems

Description

- 24 Vdc Supply, 5 to 150 MHz, CATV Reverse Amplifier



CASE 1302–01, STYLE 1

MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
DC Supply Voltage	V_{CC}	+28	Vdc
RF Input Voltage (Single Tone)	V_{in}	+60	dBmV
Operating Case Temperature Range	T_C	– 20 to +100	°C
Storage Temperature Range	T_{stg}	– 40 to +100	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = 30°C, 75 Ω system, unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Bandwidth	All	BW	5	—	150	MHz
Power Gain	(f = 5 MHz)	G_p	34.5	35.2	35.7	dB
Slope	(5–150 MHz)	S	0	—	1	dB
Gain Flatness (Peak To Valley)	(5–150 MHz)	G_F	—	—	0.7	dB
Return Loss — Input/Output		IRL/ORL				dB
	(@ f = 5–65 MHz)		20	—	—	
	(@ f = 65–150 MHz)		18	—	—	
Composite Second Order (V_{out} = +50 dBmV per Ch., Worst Case)						dBc
	6–Channel FLAT	CSO_6	—	– 73	– 68	
	10–Channel FLAT	CSO_{10}	—	– 69	– 65	

ELECTRICAL CHARACTERISTICS – continued (V_{CC} = 24 Vdc, T_C = 30°C, 75 Ω system, unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Cross Modulation Distortion (V_{out} = +50 dBmV per Ch., Worst Case)					dBc
6–Channel FLAT	XMD_6	—	–66	–63	
10–Channel FLAT	XMD_{10}	—	–60	–57	
Composite Triple Beat (V_{out} = +50 dBmV per Ch., Worst Case)					dBc
6–Channel FLAT	CTB_6	—	–75	–73	
10–Channel FLAT	CTB_{10}	—	–65	–62	
Noise Figure	NF				dB
(f = 5–150 MHz)		—	4.4	5.4	
DC Current	I_{DC}	85	95	110	mA

The RF Line
CATV Amplifier Module

MHW1354LA

5–65 MHz, 35.2 dB
10–CHANNEL
CATV LOW CURRENT AMPLIFIER

Features

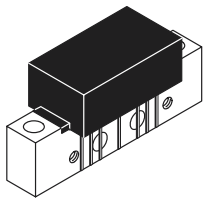
- Specified for 6– and 10–Channel Loading
- Excellent Distortion Performance
- Low Power Consumption
- Capable of Handling Multiple Channels in the Return Path with Good Distortion Performance
- Silicon Bipolar Transistor Technology
- Unconditionally Stable Under All Load Conditions

Applications

- CATV Systems Operating in the 5 to 65 MHz Frequency Range
- Specified for Use as a Return Path Amplifier for Low–Split 2–Way Cable TV Systems

Description

- 24 Vdc Supply, 5 to 65 MHz, CATV Reverse Amplifier



CASE 1302–01, STYLE 1

MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
DC Supply Voltage	V_{CC}	+28	Vdc
RF Input Voltage (Single Tone)	V_{in}	+60	dBmV
Operating Case Temperature Range	T_C	– 20 to +100	°C
Storage Temperature Range	T_{stg}	– 40 to +100	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = 30°C, 75 Ω system, unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Bandwidth	All	BW	5	—	65	MHz
Power Gain	(f = 5 MHz)	G_p	34.5	35.2	35.7	dB
Slope	(5–65 MHz)	S	– 0.2	—	0.5	dB
Gain Flatness (Peak To Valley)	(5–65 MHz)	G_F	—	—	0.5	dB
Return Loss — Input/Output	(@ f = 5–65 MHz)	IRL/ORL	20	—	—	dB
Composite Second Order (V_{out} = +50 dBmV per Ch., Worst Case)						dBc
	6–Channel FLAT	CSO_6	—	– 73	– 68	
	10–Channel FLAT	CSO_{10}	—	– 69	– 65	

ELECTRICAL CHARACTERISTICS – continued (V_{CC} = 24 Vdc, T_C = 30°C, 75 Ω system, unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Cross Modulation Distortion (V_{out} = +50 dBmV per Ch., Worst Case)					dBc
6–Channel FLAT	XMD_6	—	–66	–63	
10–Channel FLAT	XMD_{10}	—	–60	–57	
Composite Triple Beat (V_{out} = +50 dBmV per Ch., Worst Case)					dBc
6–Channel FLAT	CTB_6	—	–75	–73	
10–Channel FLAT	CTB_{10}	—	–65	–62	
Noise Figure	NF				dB
(f = 5–65 MHz)		—	4.4	5.4	
DC Current	I_{DC}	85	95	110	mA

The RF Line
CATV Amplifier Module

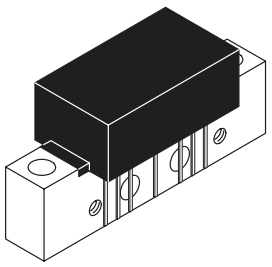
MHW6342T

550 MHz
35.2 dB GAIN
77–CHANNEL
CATV AMPLIFIER

Features
- Specified for 77–Channel Loading
- Excellent Distortion Performance
- Superior Gain, Return Loss and DC Current Stability over Temperature
- Silicon Bipolar Transistor Technology
- Unconditionally Stable Under All Load Conditions

Applications
- CATV Systems Operating in the 40 to 550 MHz Frequency Range
- Single Module High Gain Line Amplifier in Cable TV Distribution System

Description
- 24 Vdc Supply, 40 to 550 MHz, CATV Forward Amplifier



CASE 1302–01, STYLE 1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
RF Voltage Input (Single Tone)	V_{in}	+55	dBmV
DC Supply Voltage	V_{CC}	+28	Vdc
Operating Case Temperature Range	T_C	–20 to +100	°C
Storage Temperature Range	T_{stg}	–40 to +100	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Frequency Range		BW	40	—	550	MHz
Power Gain	50 MHz 550 MHz	G_p	33.5 34.5	34.5 35.2	35.5 —	dB
Slope		S	0	0.7	2	dB
Gain Flatness (Peak To Valley)		G_F	—	0.3	0.8	dB
Return Loss — Input/Output (Z_o = 75 Ohms)	40–550 MHz 450–550 MHz	IRL/ORL	18 16	— —	— —	dB
Second Order Intermodulation Distortion (V_{out} = +46 dBmV per ch., Ch 2, M13, M22) (V_{out} = +44 dBmV per ch., Ch 2, M30, M39)		IMD	 — —	 –80 –74	 — —	dBc
Cross Modulation Distortion (V_{out} = +46 dBmV per ch.) (V_{out} = +44 dBmV per ch.)	 60–Channel FLAT 77–Channel FLAT	 XMD_{60} XMD_{77}	 — —	 –62 –63	 — –57	dBc

ELECTRICAL CHARACTERISTICS — continued (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Composite Triple Beat						dBc
(V_{out} = +46 dBmV per ch.)	60–Channel FLAT	CTB_{60}	—	–64	—	
(V_{out} = +44 dBmV per ch.)	77–Channel FLAT	CTB_{77}	—	–63	–57	
Composite Second Order						dBc
(V_{out} = +46 dBmV/ch, 60–Channel FLAT)		CSO_{60}	—	–70	—	
(V_{out} = +44 dBmV/ch, 77–Channel FLAT)		CSO_{77}	—	–65	–57	
Noise Figure	550 MHz	NF	—	5.5	6.5	dB
DC Current		I_{DC}	—	310	340	mA

The RF Line
CATV Amplifier Module

MHW7182B

750 MHz
19 dB GAIN
110–CHANNEL
CATV AMPLIFIER

Features

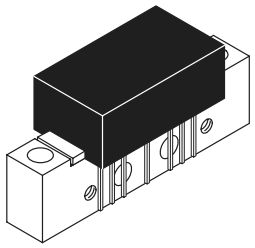
- Specified for 77– and 110–Channel Loading
- Excellent Distortion Performance
- Silicon Bipolar Transistor Technology
- Unconditionally Stable Under All Load Conditions

Applications

- CATV Systems Operating in the 40 to 750 MHz Frequency Range
- Input Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications
- Output Stage Amplifier on Applications Requiring Low Power Dissipation

Description

- 24 Vdc Supply, 40 to 750 MHz, CATV Forward Amplifier



CASE 714Y–03, STYLE 1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
RF Voltage Input (Single Tone)	V_{in}	+70	dBmV
DC Supply Voltage	V_{CC}	+28	Vdc
Operating Case Temperature Range	T_C	–20 to +100	°C
Storage Temperature Range	T_{stg}	–40 to +100	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Frequency Range		BW	40	—	750	MHz
Power Gain	50 MHz 750 MHz	G_p	18 18.2	18.5 19	19 20	dB
Slope	40–750 MHz	S	0	0.4	1	dB
Gain Flatness (40–750 MHz, Peak to Valley)		G_F	—	0.3	0.6	dB
Return Loss — Input/Output (Z_o = 75 Ohms) @ 40 MHz @ f > 40 MHz (Derate)		IRL/ORL	 20 —	 — —	 — 0.005	 dB dB/MHz
Composite Second Order (V_{out} = +40 dBmV/ch., Worst Case) (V_{out} = +44 dBmV/ch., Worst Case)	 110–Channel FLAT 77–Channel FLAT	 CSO_{110} CSO_{77}	 — —	 –70 –70	 –63 –64	dBc

ELECTRICAL CHARACTERISTICS — continued (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Cross Modulation Distortion @ Ch 2						dBc
(V_{out} = +40 dBmV/ch., FM = 55 MHz)	110–Channel FLAT	XMD_{110}	—	–66	–64	
(V_{out} = +44 dBmV/ch., FM = 55 MHz)	77–Channel FLAT	XMD_{77}	—	–61	–59	
Composite Triple Beat						dBc
(V_{out} = +40 dBmV/ch., Worst Case)	110–Channel FLAT	CTB_{110}	—	–68	–66	
(V_{out} = +44 dBmV/ch., Worst Case)	77–Channel FLAT	CTB_{77}	—	–66	–64	
Noise Figure	50 MHz	NF	—	4.0	5.0	dB
	550 MHz		—	4.5	—	
	750 MHz		—	5.0	6.5	
DC Current (V_{DC} = 24 V, T_C = 30°C)		I_{DC}	180	220	240	mA

The RF Line
CATV Amplifier Module

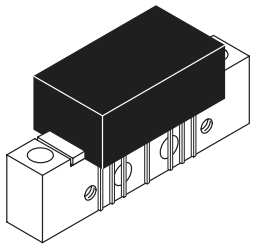
MHW7185C

750 MHz
19.4 dB GAIN
110–CHANNEL
CATV AMPLIFIER

Features
- Specified for 77– and 110–Channel Loading
- Excellent Distortion Performance
- Silicon Bipolar Transistor Technology
- Unconditionally Stable Under All Load Conditions

Applications
- CATV Systems Operating in the 40 to 750 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 750 MHz, CATV Forward Power Doubler Amplifier



CASE 714Y–03, STYLE 1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
RF Voltage Input (Single Tone)	V_{in}	+70	dBmV
DC Supply Voltage	V_{CC}	+28	Vdc
Operating Case Temperature Range	T_C	–20 to +100	°C
Storage Temperature Range	T_{stg}	–40 to +100	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Frequency Range		BW	40	—	750	MHz
Power Gain	50 MHz 750 MHz	G_p	18.3 19	18.8 19.4	19.3 20	dB
Slope	40–750 MHz	S	0	0.4	1.0	dB
Gain Flatness (40–750 MHz, Peak to Valley)		G_F	—	0.3	0.6	dB
Return Loss — Input/Output (Z_o = 75 Ohms) @ 40 MHz @ f > 40 MHz (Derate)		IRL/ORL	 19 —	 — —	 — 0.006	 dB dB/MHz
Composite Second Order (V_{out} = +44 dBmV/ch., Worst Case)	 110–Channel FLAT 77–Channel FLAT	 CSO_{110} CSO_{77}	 — —	 –72 –80	 –64 –68	dBc
Cross Modulation Distortion @ Ch 2 (V_{out} = +44 dBmV/ch., FM = 55 MHz)	 110–Channel FLAT 77–Channel FLAT	 XMD_{110} XMD_{77}	 — —	 –66 –70	 –63 –68	dBc

ELECTRICAL CHARACTERISTICS — continued (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Composite Triple Beat (V_{out} = +44 dBmV/ch., Worst Case)	110–Channel FLAT	CTB_{110}	—	–64	–62	dBc
	77–Channel FLAT	CTB_{77}	—	–71	–69	
Noise Figure	50 MHz	NF	—	5.0	6.0	dB
	550 MHz		—	5.8	—	
	750 MHz		—	6.2	7.5	
DC Current (V_{DC} = 24 V, T_C = 30°C)		I_{DC}	365	400	435	mA

The RF Line
CATV Amplifier Module

MHW7185CL

750 MHz
19.2 dB GAIN
110–CHANNEL
CATV AMPLIFIER

Features

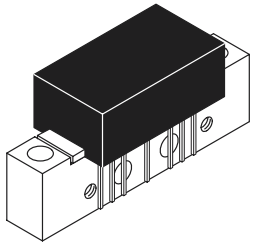
- Specified for 77– and 110–Channel Loading
- Lower DC Current Requirements
- Excellent Distortion Performance
- Excellent DC Current Stability over Temperature
- Silicon Bipolar Transistor Technology
- Unconditionally Stable Under All Load Conditions

Applications

- CATV Systems Operating in the 40 to 750 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
- Amplifier Requiring Lower Power Dissipation While Maintaining Excellent Output Performance

Description

- 24 Vdc Supply, 40 to 750 MHz, CATV Forward Power Doubler Amplifier



CASE 714Y–03, STYLE 1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
RF Voltage Input (Single Tone)	V_{in}	+70	dBmV
DC Supply Voltage	V_{CC}	+28	Vdc
Operating Case Temperature Range	T_C	–20 to +100	°C
Storage Temperature Range	T_{stg}	–40 to +100	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Frequency Range		BW	40	—	750	MHz
Power Gain	50 MHz 750 MHz	G_p	18 18.7	18.5 19.2	19 19.7	dB
Slope	40–750 MHz	S	0.3	0.6	1.3	dB
Gain Flatness (40–750 MHz, Peak to Valley)		G_F	—	0.3	0.6	dB
Return Loss — Input/Output (Z_o = 75 Ohms) @ 40 MHz @ f > 40 MHz (Derate)		IRL/ORL	 20 —	 — —	 — 0.007	 dB dB/MHz
Composite Second Order (V_{out} = +44 dBmV/ch., Worst Case)	110–Channel FLAT 77–Channel FLAT	 CSO_{110} CSO_{77}	 — —	 –70 –83	 –64 –68	dBc
Cross Modulation Distortion @ Ch 2 (V_{out} = +44 dBmV/ch., FM = 55 MHz)	110–Channel FLAT 77–Channel FLAT	 XMD_{110} XMD_{77}	 — —	 –66 –69	 –63 –67	dBc

ELECTRICAL CHARACTERISTICS — continued (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Composite Triple Beat (V_{out} = +44 dBmV/ch., Worst Case)	110–Channel FLAT 77–Channel FLAT	 CTB_{110} CTB_{77}	 — —	 –63.5 –70	 –61 –68	dBc
Noise Figure	50 MHz 550 MHz 750 MHz	NF	— — —	5.3 5.8 6.5	6.2 — 7.5	dB
DC Current (V_{DC} = 24 V, T_C = –20 to +100°C)		I_{DC}	345	370	385	mA

The RF Line
CATV Amplifier Module

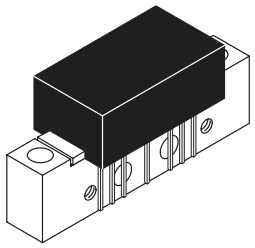
MHW7205C

750 MHz
20.2 dB GAIN
110–CHANNEL
CATV AMPLIFIER

Features
- Specified for 77– and 110–Channel Loading
- Excellent Distortion Performance
- Silicon Bipolar Transistor Technology
- Unconditionally Stable Under All Load Conditions

Applications
- CATV Systems Operating in the 40 to 750 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 750 MHz, CATV Forward Power Doubler Amplifier



CASE 714Y–03, STYLE 1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
RF Voltage Input (Single Tone)	V_{in}	+70	dBmV
DC Supply Voltage	V_{CC}	+28	Vdc
Operating Case Temperature Range	T_C	–20 to +100	°C
Storage Temperature Range	T_{stg}	–40 to +100	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Frequency Range		BW	40	—	750	MHz
Power Gain	50 MHz 750 MHz	G_p	19.3 20	19.8 20.2	20.3 21	dB
Slope	40–750 MHz	S	0	0.4	1.0	dB
Gain Flatness (40–750 MHz, Peak to Valley)		G_F	—	0.3	0.6	dB
Return Loss — Input/Output (Z_o = 75 Ohms) @ 40 MHz @ f > 40 MHz (Derate)		IRL/ORL	 19 —	 — —	 — 0.006	 dB dB/MHz
Composite Second Order (V_{out} = +44 dBmV/ch., Worst Case)	 110–Channel FLAT 77–Channel FLAT	 CSO_{110} CSO_{77}	 — —	 –70 –80	 –63 –68	dBc
Cross Modulation Distortion @ Ch 2 (V_{out} = +44 dBmV/ch., FM = 55 MHz)	 110–Channel FLAT 77–Channel FLAT	 XMD_{110} XMD_{77}	 — —	 –67 –70	 –62 –68	dBc

ELECTRICAL CHARACTERISTICS — continued (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Composite Triple Beat (V_{out} = +44 dBmV/ch., Worst Case)	110–Channel FLAT 77–Channel FLAT	CTB_{110} CTB_{77}	— —	–63 –71	–61 –69	dBc
Noise Figure	50 MHz 550 MHz 750 MHz	NF	— — —	5.0 5.8 6.2	6.0 — 7.5	dB
DC Current (V_{DC} = 24 V, T_C = 30°C)		I_{DC}	365	400	435	mA

The RF Line
CATV Amplifier Module

MHW7205CL

750 MHz
20 dB GAIN
110–CHANNEL
CATV AMPLIFIER

Features

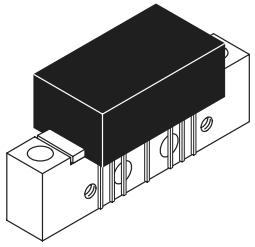
- Specified for 77– and 110–Channel Loading
- Lower DC Current Requirements
- Excellent Distortion Performance
- Excellent DC Current Stability over Temperature
- Silicon Bipolar Transistor Technology
- Unconditionally Stable Under All Load Conditions

Applications

- CATV Systems Operating in the 40 to 750 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
- Amplifier Requiring Lower Power Dissipation While Maintaining Excellent Output Performance

Description

- 24 Vdc Supply, 40 to 750 MHz, CATV Forward Power Doubler Amplifier



CASE 714Y–03, STYLE 1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
RF Voltage Input (Single Tone)	V_{in}	+70	dBmV
DC Supply Voltage	V_{CC}	+28	Vdc
Operating Case Temperature Range	T_C	–20 to +100	°C
Storage Temperature Range	T_{stg}	–40 to +100	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Frequency Range		BW	40	—	750	MHz
Power Gain	50 MHz 750 MHz	G_p	19 19.7	19.5 20	20 21.2	dB
Slope	40–750 MHz	S	0.2	0.5	1.7	dB
Gain Flatness (40–750 MHz, Peak to Valley)		G_F	—	0.3	0.8	dB
Return Loss — Input/Output (Z_o = 75 Ohms) @ 40 MHz @ f > 40 MHz (Derate)		IRL/ORL	 20 —	 — —	 — 0.007	 dB dB/MHz
Composite Second Order (V_{out} = +44 dBmV/ch., Worst Case)	 110–Channel FLAT 77–Channel FLAT	 CSO_{110} CSO_{77}	 — —	 –69 –80	 –63 –67	dBc
Cross Modulation Distortion @ Ch 2 (V_{out} = +44 dBmV/ch., FM = 55 MHz)	 110–Channel FLAT 77–Channel FLAT	 XMD_{110} XMD_{77}	 — —	 –65 –69	 –62 –66	dBc

ELECTRICAL CHARACTERISTICS — continued (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Composite Triple Beat (V_{out} = +44 dBmV/ch., Worst Case)	110–Channel FLAT 77–Channel FLAT	CTB_{110} CTB_{77}	— —	–63 –70	–61 –68	dBc
Noise Figure	50 MHz 550 MHz 750 MHz	NF	— — —	5.0 5.8 6.2	6.2 — 7.5	dB
DC Current (V_{DC} = 24 V, T_C = –20 to +100°C)		I_{DC}	345	365	385	mA

The RF Line
CATV Amplifier Module

MHW7222B

750 MHz
22.7 dB GAIN
110–CHANNEL
CATV AMPLIFIER

Features

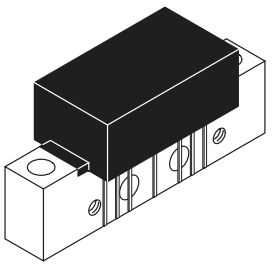
- Specified for 77– and 110–Channel Loading
- Excellent Distortion Performance
- Silicon Bipolar Transistor Technology
- Unconditionally Stable Under All Load Conditions

Applications

- CATV Systems Operating in the 40 to 750 MHz Frequency Range
- Input Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications
- Output Stage Amplifier on Applications Requiring Low Power Dissipation

Description

- 24 Vdc Supply, 40 to 750 MHz, CATV Forward Amplifier



CASE 1302–01, STYLE 1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
DC Supply Voltage	V_{CC}	+28	Vdc
RF Input Voltage (Single Tone)	V_{in}	+70	dBmV
Operating Case Temperature Range	T_C	–20 to +100	°C
Storage Temperature Range	T_{stg}	–40 to +100	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Frequency Range		BW	40	—	750	MHz
Power Gain	f = 50 MHz f = 750 MHz	G_p	21.4 22.2	21.9 22.7	22.4 23.2	dB
Slope (f = 40–750 MHz)		S	0.2	0.7	1.2	—
Gain Flatness (Peak To Valley)	(f = 40–750 MHz)	G_F	—	0.4	0.6	—
Input/Output Return Loss @ f = 40 MHz		IRL/ORL	20	25	—	dB
Derate Return Loss @ f > 40 MHz		RLD	—	—	0.006	dB/MHz
Composite Second Order (V_{out} = +40 dBmV/ch; 110 Channels) (V_{out} = +44 dBmV/ch; 77 Channels)		 CSO_{110} CSO_{77}	 — —	 –67 –67	 –60 –60	dBc

ELECTRICAL CHARACTERISTICS — continued (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Cross Modulation Distortion						dBc
(V_{out} = +40 dBmV/ch, 110–Channel @ Fm = 55.25 MHz)		XMD_{110}	—	–63	–60	
(V_{out} = +44 dBmV/ch, 77–Channel @ Fm = 55.25 MHz)		XMD_{77}	—	–59	–56	
Composite Triple Beat						dBc
(V_{out} = +40 dBmV/ch, 110–Channels, Worst Case)		CTB_{110}	—	–64	–61	
(V_{out} = +44 dBmV/ch, 77–Channels, Worst Case)		CTB_{77}	—	–65	–62	
Noise Figure	f = 50 MHz	NF	—	3.7	4.5	dB
	f = 750 MHz		—	5	6.5	
DC Current		I_{DC}	180	220	240	mA

The RF Line
CATV Amplifier Module

MHW7242A

750 MHz
24.7 dB GAIN
110–CHANNEL
CATV AMPLIFIER

Features

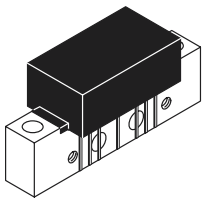
- Specified for 77– and 110–Channel Loading
- Excellent Distortion Performance
- Silicon Bipolar Transistor Technology
- Unconditionally Stable Under All Load Conditions

Applications

- CATV Systems Operating in the 40 to 750 MHz Frequency Range
- Input Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications
- Output Stage Amplifier on Applications Requiring Low Power Dissipation

Description

- 24 Vdc Supply, 40 to 750 MHz, CATV Forward Amplifier



CASE 1302–01, STYLE 1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
RF Voltage Input (Single Tone)	V_{in}	+55	dBmV
DC Supply Voltage	V_{CC}	+28	Vdc
Operating Case Temperature Range	T_C	–20 to +100	°C
Storage Temperature Range	T_{stg}	–40 to +100	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Frequency Range		BW	40	—	750	MHz
Power Gain	50 MHz 750 MHz	G_p	23.2 24	24 24.7	24.8 26	dB
Slope	40–750 MHz	S	0	0.6	1.5	dB
Gain Flatness (40–750 MHz, Peak To Valley)		G_F	—	0.4	0.6	dB
Return Loss — Input/Output (Z_o = 75 Ohms)	@ 40 MHz @ f > 40 MHz (Derate)	IRL/ORL	20 —	— —	— 0.007	dB dB/MHz
Composite Second Order (V_{out} = +40 dBmV/ch., Worst Case) (V_{out} = +44 dBmV/ch., Worst Case)	 110–Channel FLAT 77–Channel FLAT	 CSO_{110} CSO_{77}	 — —	 –69 –78	 –62 —	dBc

ELECTRICAL CHARACTERISTICS — continued (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Cross Modulation Distortion @ Ch 2						dBc
(V_{out} = +40 dBmV/ch., FM = 55 MHz)	110–Channel FLAT	XMD_{110}	—	–63	–61	
(V_{out} = +44 dBmV/ch., FM = 55 MHz)	77–Channel FLAT	XMD_{77}	—	–58	—	
Composite Triple Beat						dBc
(V_{out} = +40 dBmV/ch., Worst Case)	110–Channel FLAT	CTB_{110}	—	–67	–63	
(V_{out} = +44 dBmV/ch., Worst Case)	77–Channel FLAT	CTB_{77}	—	–64	—	
Noise Figure	50 MHz	NF	—	4.8	5.5	dB
	750 MHz		—	5.5	7	
DC Current		I_{DC}	280	318	350	mA

The RF Line
CATV Amplifier Module

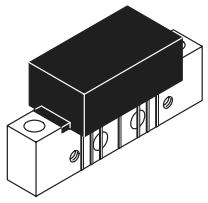
MHW7272A

750 MHz
27.7 dB GAIN
110–CHANNEL
CATV AMPLIFIER

Features
- Specified for 110–Channel Loading
- Excellent Distortion Performance
- Silicon Bipolar Transistor Technology
- Unconditionally Stable Under All Load Conditions

Applications
- CATV Systems Operating in the 40 to 750 MHz Frequency Range
- Input Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications
- Output Stage Amplifier on Applications Requiring Low Power Dissipation

Description
- 24 Vdc Supply, 40 to 750 MHz, CATV Forward Amplifier



CASE 1302–01, STYLE 1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
RF Voltage Input (Single Tone)	V_{in}	+55	dBmV
DC Supply Voltage	V_{CC}	+28	Vdc
Operating Case Temperature Range	T_C	–20 to +100	°C
Storage Temperature Range	T_{stg}	–40 to +100	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Frequency Range		BW	40	—	750	MHz
Power Gain	50 MHz 750 MHz	G_p	26.2 27	27.2 27.7	27.8 29	dB
Slope	40–750 MHz	S	0	0.7	1.5	dB
Gain Flatness (40–750 MHz, Peak to Valley)		G_F	—	0.4	0.8	dB
Return Loss — Input/Output (Z_o = 75 Ohms)	@ 40 MHz @ f > 40 MHz (Derate)	IRL/ORL	20 —	— —	— 0.007	dB dB/MHz
Composite Second Order (V_{out} = +40 dBmV/ch., Worst Case)	110–Channel FLAT	CSO_{110}	—	–70	–64	dBc
Cross Modulation Distortion @ Ch 2 (V_{out} = +40 dBmV/ch., FM = 55 MHz)	110–Channel FLAT	XMD_{110}	—	–63	–60	dBc
Composite Triple Beat (V_{out} = +40 dBmV/ch., Worst Case)	110–Channel FLAT	CTB_{110}	—	–68	–64	dBc
Noise Figure	50 MHz 750 MHz	NF	— —	— 5.5	5.5 6.5	dB
DC Current (V_{DC} = 24 V, T_C = 30°C)		I_{DC}	280	310	350	mA

The RF Line
CATV Amplifier Module

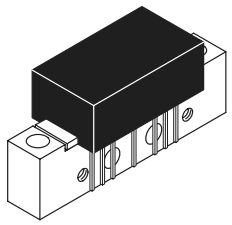
MHW7292A

770 MHz, 29.8 dB GAIN
110–CHANNEL
CATV AMPLIFIER

Features
- Specified for 110–Channel Loading
- Excellent Distortion Performance
- Silicon Bipolar Transistor Technology
- Unconditionally Stable Under All Load Conditions

Applications
- CATV Systems Operating in the 40 to 770 MHz Frequency Range
- Input Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications
- Output Stage Amplifier on Applications Requiring Low Power Dissipation

Description
- 24 Vdc Supply, 40 to 770 MHz, CATV Forward Amplifier



CASE 1302–01, STYLE 1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
RF Voltage Input (Single Tone)	V_{in}	+55	dBmV
DC Supply Voltage	V_{CC}	+28	Vdc
Operating Case Temperature Range	T_C	–20 to +100	°C
Storage Temperature Range	T_{stg}	–40 to +100	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Frequency Range		BW	40	—	770	MHz
Power Gain	50 MHz 770 MHz	G_p	28.2 29	29 29.8	29.8 31	dB
Slope	40–770 MHz	S	0	0.7	2	dB
Gain Flatness (40–750 MHz, Peak to Valley)		G_F	—	0.4	0.8	dB
Return Loss — Input/Output (Z_o = 75 Ohms)	@ 40 MHz @ f > 40 MHz (Derate)	IRL/ORL	20 —	— —	— 0.007	dB dB/MHz
Composite Second Order (V_{out} = +40 dBmV/ch., Worst Case)	110–Channel FLAT	CSO_{110}	—	–70	–60	dBc
Cross Modulation Distortion @ Ch 2 (V_{out} = +40 dBmV/ch., FM = 55 MHz)	110–Channel FLAT	XMD_{110}	—	–62	–60	dBc
Composite Triple Beat (V_{out} = +40 dBmV/ch., Worst Case)	110–Channel FLAT	CTB_{110}	—	–62	–60	dBc
Noise Figure	50 MHz 770 MHz	NF	— —	— 5.5	5.5 6.5	dB
DC Current (V_{DC} = 24 V, T_C = 30°C)		I_{DC}	280	310	350	mA

REV 1

The RF Line
CATV Amplifier Module

MHW8182B

860 MHz
19.1 dB GAIN
128–CHANNEL
CATV AMPLIFIER

Features

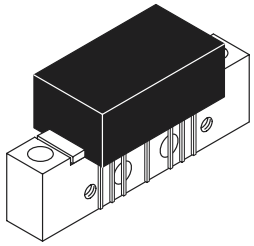
- Specified for 77–, 110– and 128–Channel Loading
- Excellent Distortion Performance
- Superior Gain, Return Loss and DC Current Stability over Temperature
- Silicon Bipolar Transistor Technology
- Unconditionally Stable Under All Load Conditions

Applications

- CATV Systems Operating in the 40 to 860 MHz Frequency Range
- Input Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications
- Output Stage Amplifier on Applications Requiring Low Power Dissipation

Description

- 24 Vdc Supply, 40 to 860 MHz, CATV Forward Amplifier



CASE 714Y–03, STYLE 1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
RF Voltage Input (Single Tone)	V_{in}	+70	dBmV
DC Supply Voltage	V_{CC}	+28	Vdc
Operating Case Temperature Range	T_C	–20 to +100	°C
Storage Temperature Range	T_{stg}	–40 to +100	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Frequency Range		BW	40	—	860	MHz
Power Gain	50 MHz 860 MHz	G_p	18 18.2	18.5 19.1	19 20.5	dB
Slope	40–860 MHz	S	0	0.7	2.5	dB
Gain Flatness (40–860 MHz, Peak to Valley)		G_F	—	0.3	0.6	dB
Return Loss — Input/Output (Z_o = 75 Ohms) @ 40 MHz @ f > 40 MHz (Derate)		IRL/ORL	 20 —	 — —	 — 0.005	 dB dB/MHz
Composite Second Order (V_{out} = +38 dBmV/ch., Worst Case) (V_{out} = +40 dBmV/ch., Worst Case) (V_{out} = +44 dBmV/ch., Worst Case)	 128–Channel FLAT 110–Channel FLAT 77–Channel FLAT	 CSO_{128} CSO_{110} CSO_{77}	 — — —	 –71 –70 –70	 –64 –63 –64	dBc

ELECTRICAL CHARACTERISTICS – continued (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Cross Modulation Distortion @ Ch 2						dBc
(V_{out} = +38 dBmV/ch., FM = 55 MHz)	128–Channel FLAT	XMD_{128}	—	–68	–65	
(V_{out} = +40 dBmV/ch., FM = 55 MHz)	110–Channel FLAT	XMD_{110}	—	–66	–64	
(V_{out} = +44 dBmV/ch., FM = 55 MHz)	77–Channel FLAT	XMD_{77}	—	–61	–59	
Composite Triple Beat						dBc
(V_{out} = +38 dBmV/ch., Worst Case)	128–Channel FLAT	CTB_{128}	—	–69	–66	
(V_{out} = +40 dBmV/ch., Worst Case)	110–Channel FLAT	CTB_{110}	—	–68	–66	
(V_{out} = +44 dBmV/ch., Worst Case)	77–Channel FLAT	CTB_{77}	—	–66	–64	
Noise Figure	50 MHz	NF	—	4.0	5.0	dB
	550 MHz		—	4.5	—	
	750 MHz		—	5.0	6.5	
	860 MHz		—	5.5	7.5	
DC Current (V_{DC} = 24 V, T_C = 30°C)		I_{DC}	180	220	240	mA

The RF Line
CATV Amplifier Module

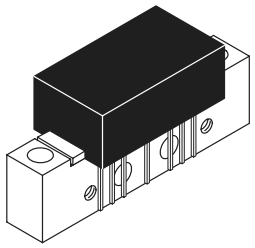
MHW8185

860 MHz
19.4 dB GAIN
128–CHANNEL
CATV AMPLIFIER

Features
- Specified for 77–, 110– and 128–Channel Loading
- Excellent Distortion Performance
- Silicon Bipolar Transistor Technology
- Unconditionally Stable Under All Load Conditions

Applications
- CATV Systems Operating in the 40 to 860 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 860 MHz, CATV Forward Power Doubler Amplifier



CASE 714Y–03, STYLE 1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
RF Voltage Input (Single Tone)	V_{in}	+70	dBmV
DC Supply Voltage	V_{CC}	+28	Vdc
Operating Case Temperature Range	T_C	–20 to +100	°C
Storage Temperature Range	T_{stg}	–40 to +100	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Frequency Range		BW	40	—	860	MHz
Power Gain	50 MHz 860 MHz	G_p	18.3 19	18.8 19.4	19.3 20.5	dB
Slope	40–860 MHz	S	0	.5	1.5	dB
Gain Flatness (40–860 MHz, Peak to Valley)		G_F	—	0.3	1.0	dB
Return Loss — Input/Output (Z_o = 75 Ohms) @ 40 MHz @ f > 40 MHz (Derate)		IRL/ORL	 19 —	 — —	 — 0.006	 dB dB/MHz
Composite Second Order (V_{out} = +40 dBmV/ch., Worst Case) (V_{out} = +44 dBmV/ch., Worst Case)	 128–Channel FLAT 110–Channel FLAT 77–Channel FLAT	 CSO_{128} CSO_{110} CSO_{77}	 — — —	 –70 –72 –80	 –62 –64 –68	dBc
Cross Modulation Distortion @ Ch 2 (V_{out} = +40 dBmV/ch., FM = 55 MHz) (V_{out} = +44 dBmV/ch., FM = 55 MHz)	 128–Channel FLAT 110–Channel FLAT 77–Channel FLAT	 XMD_{128} XMD_{110} XMD_{77}	 — — —	 –72 –67 –70	 –64 –63 –68	dBc

ELECTRICAL CHARACTERISTICS – continued (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Composite Triple Beat						dBc
(V_{out} = +40 dBmV/ch., Worst Case)	128–Channel FLAT	CTB_{128}	—	–67	–64	
(V_{out} = +44 dBmV/ch., Worst Case)	110–Channel FLAT	CTB_{110}	—	–64	–62	
	77–Channel FLAT	CTB_{77}	—	–71	–69	
Noise Figure	50 MHz	NF	—	5.0	6.0	dB
	550 MHz		—	5.8	—	
	750 MHz		—	6.2	—	
	860 MHz		—	7.0	8.0	
DC Current (V_{DC} = 24 V, T_C = 30°C)		I_{DC}	365	400	435	mA

The RF Line
CATV Amplifier Module

MHW8185L

870 MHz
19.4 dB GAIN
128–CHANNEL
CATV AMPLIFIER

Features

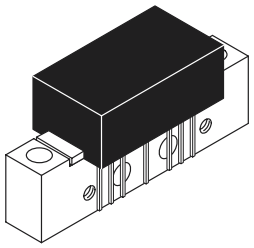
- Specified for 77–, 110– and 128–Channel Loading
- Lower DC Current Requirements
- Excellent Distortion Performance
- Excellent DC Current Stability over Temperature
- Silicon Bipolar Transistor Technology
- Unconditionally Stable Under All Load Conditions

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
- Amplifiers Requiring Lower Power Dissipation While Maintaining Excellent Output Performance

Description

- 24 Vdc Supply, 40 to 870 MHz, CATV Forward Power Doubler Amplifier



CASE 714Y–03, STYLE 1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
RF Voltage Input (Single Tone)	V_{in}	+70	dBmV
DC Supply Voltage	V_{CC}	+28	Vdc
Operating Case Temperature Range	T_C	–20 to +100	°C
Storage Temperature Range	T_{stg}	–40 to +100	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Frequency Range		BW	40	—	870	MHz
Power Gain	50 MHz 870 MHz	G_p	18 19	18.5 19.4	19 20.5	dB
Slope	40–870 MHz	S	0.4	0.9	1.4	dB
Gain Flatness (40–870 MHz, Peak–to–Valley)		G_F	—	0.3	0.8	dB
Return Loss — Input/Output (Z_o = 75 Ohms) @ 40 MHz @ f > 40 MHz (Derate)		IRL/ORL	 20 —	 — —	 — 0.007	 dB dB/MHz
Composite Second Order (V_{out} = +40 dBmV/ch., Worst Case) (V_{out} = +44 dBmV/ch., Worst Case) (V_{out} = +44 dBmV/ch., Worst Case)	 128–Channel FLAT 110–Channel FLAT 77–Channel FLAT	 CSO_{128} CSO_{110} CSO_{77}	 — — —	 –69 –70 –85	 –62 –64 –68	dBc

ELECTRICAL CHARACTERISTICS — continued (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Cross Modulation Distortion @ Ch 2						dBc
(V_{out} = +40 dBmV/ch., FM = 55 MHz)	128–Channel FLAT	XMD_{128}	—	–72	–64	
(V_{out} = +44 dBmV/ch., FM = 55 MHz)	110–Channel FLAT	XMD_{110}	—	–66	–63	
(V_{out} = +44 dBmV/ch., FM = 55 MHz)	77–Channel FLAT	XMD_{77}	—	–69	–67	
Composite Triple Beat						dBc
(V_{out} = +40 dBmV/ch., Worst Case)	128–Channel FLAT	CTB_{128}	—	–66	–63	
(V_{out} = +44 dBmV/ch., Worst Case)	110–Channel FLAT	CTB_{110}	—	–63	–61	
(V_{out} = +44 dBmV/ch., Worst Case)	77–Channel FLAT	CTB_{77}	—	–70	–68	
Noise Figure	50 MHz	NF	—	5.3	6.2	dB
	550 MHz		—	5.8	—	
	750 MHz		—	6.6	—	
	870 MHz		—	7.8	8.5	
DC Current (V_{DC} = 24 V, T_C = –20 to +100°C)		I_{DC}	345	365	385	mA

The RF Line
CATV Amplifier Module

MHW8202B

870 MHz
20.9 dB GAIN
128–CHANNEL
CATV AMPLIFIER

Features

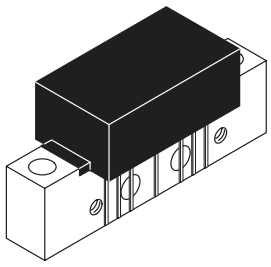
- Specified for 77–, 110– and 128–Channel Loading
- Excellent Distortion Performance
- Silicon Bipolar Transistor Technology
- Unconditionally Stable Under All Load Conditions

Applications

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

Description

- 24 Vdc Supply, 40 to 870 MHz, CATV Forward Amplifier



CASE 1302–01, STYLE 1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
DC Supply Voltage	V_{CC}	+28	Vdc
RF Input Voltage (Single Tone)	V_{in}	+70	dBmV
Operating Case Temperature Range	T_C	–20 to +100	°C
Storage Temperature Range	T_{stg}	–40 to +100	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Frequency Range		BW	40	—	870	MHz
Power Gain	f = 50 MHz f = 870 MHz	G_p	19.8 20.3	20.4 20.9	20.8 21.8	dB
Slope (f = 40–870 MHz)		S	—	0.5	1.2	dB
Gain Flatness (Peak To Valley)	(f = 40–870 MHz)	G_F	—	0.4	0.6	dB
Input/Output Return Loss @ f = 40 MHz		IRL/ORL	20	21	—	dB
Derate Return Loss @ f > 40 MHz		RLD	—	—	0.005	dB/MHz
Composite Second Order (V_{out} = +38 dBmV/ch; 128–Channels, Worst Case) (V_{out} = +40 dBmV/ch; 110–Channels, Worst Case) (V_{out} = +44 dBmV/ch; 77–Channels, Worst Case)		 CSO_{128} CSO_{110} CSO_{77}	 — — —	 –71 –70 –75	 –66 –65 –70	dBc

ELECTRICAL CHARACTERISTICS — continued (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Cross Modulation Distortion						dBc
(V_{out} = +38 dBmV/ch, 128–Channels, Worst Case)		XMD_{128}	—	–67	–62	
(V_{out} = +40 dBmV/ch, 110–Channels, Worst Case)		XMD_{110}	—	–65	–61	
(V_{out} = +44 dBmV/ch, 77–Channels, Worst Case)		XMD_{77}	—	–58	–57	
Composite Triple Beat						dBc
(V_{out} = +38 dBmV/ch, 128–Channels, Worst Case)		CTB_{128}	—	–67	–63	
(V_{out} = +40 dBmV/ch, 110–Channels, Worst Case)		CTB_{110}	—	–66	–63	
(V_{out} = +44 dBmV/ch, 77–Channels, Worst Case)		CTB_{77}	—	–65	–63	
Noise Figure	f = 50 MHz	NF	—	3.8	5.0	dB
	f = 750 MHz		—	5.0	6.5	
	f = 870 MHz		—	5.6	7.0	
DC Current		I_{DC}	180	220	240	mA

The RF Line
CATV Amplifier Module

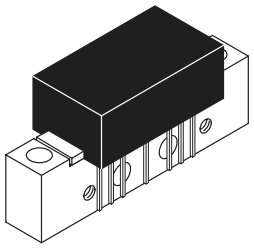
MHW8205

860 MHz
20.2 dB GAIN
128–CHANNEL
CATV AMPLIFIER

Features
- Specified for 77–, 110– and 128–Channel Loading
- Excellent Distortion Performance
- Silicon Bipolar Transistor Technology
- Unconditionally Stable Under All Load Conditions

Applications
- CATV Systems Operating in the 40 to 860 MHz Frequency Range
- Output Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems

Description
- 24 Vdc Supply, 40 to 860 MHz, CATV Forward Power Doubler Amplifier



CASE 714Y–03, STYLE 1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
RF Voltage Input (Single Tone)	V_{in}	+70	dBmV
DC Supply Voltage	V_{CC}	+28	Vdc
Operating Case Temperature Range	T_C	–20 to +100	°C
Storage Temperature Range	T_{stg}	–40 to +100	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Frequency Range		BW	40	—	860	MHz
Power Gain	50 MHz 860 MHz	G_p	19.3 20	19.8 20.2	20.3 21.5	dB
Slope	40–860 MHz	S	0	.4	1.5	dB
Gain Flatness (40–860 MHz, Peak to Valley)		G_F	—	0.3	1.0	dB
Return Loss — Input/Output (Z_o = 75 Ohms) @ 40 MHz @ f > 40 MHz (Derate)		IRL/ORL	 19 —	 — —	 — 0.006	 dB dB/MHz
Composite Second Order (V_{out} = +40 dBmV/ch., Worst Case) (V_{out} = +44 dBmV/ch., Worst Case)	 128–Channel FLAT 110–Channel FLAT 77–Channel FLAT	 CSO_{128} CSO_{110} CSO_{77}	 — — —	 –69 –70 –80	 –60 –63 –68	dBc

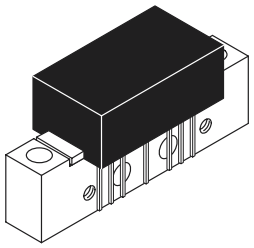
ELECTRICAL CHARACTERISTICS — continued (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Cross Modulation Distortion @ Ch 2						dBc
(V_{out} = +40 dBmV/ch., FM = 55 MHz)	128–Channel FLAT	XMD_{128}	—	–72	–64	
(V_{out} = +44 dBmV/ch., FM = 55 MHz)	110–Channel FLAT	XMD_{110}	—	–67	–62	
	77–Channel FLAT	XMD_{77}	—	–71	–68	
Composite Triple Beat						dBc
(V_{out} = +40 dBmV/ch., Worst Case)	128–Channel FLAT	CTB_{128}	—	–66	–63	
(V_{out} = +44 dBmV/ch., Worst Case)	110–Channel FLAT	CTB_{110}	—	–63	–61	
	77–Channel FLAT	CTB_{77}	—	–71	–69	
Noise Figure	50 MHz	NF	—	5.0	6.0	dB
	550 MHz		—	5.8	—	
	750 MHz		—	6.2	—	
	860 MHz		—	7.0	8.0	
DC Current (V_{DC} = 24 V, T_C = 30°C)		I_{DC}	365	400	435	mA

The RF Line
CATV Amplifier Module

MHW8205L

870 MHz
20.4 dB GAIN
128–CHANNEL
CATV AMPLIFIER



CASE 714Y–03, STYLE 1

Features
- Specified for 77–, 110– and 128–Channel Loading
- Lower DC Current Requirements
- Excellent Distortion Performance
- Excellent DC Current Stability over Temperature
- Silicon Bipolar 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
- Amplifiers Requiring Lower Power Dissipation While Maintaining Excellent Output Performance

Description
- 24 Vdc Supply, 40 to 870 MHz, CATV Forward Power Doubler Amplifier

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
RF Voltage Input (Single Tone)	V_{in}	+70	dBmV
DC Supply Voltage	V_{CC}	+28	Vdc
Operating Case Temperature Range	T_C	–20 to +100	°C
Storage Temperature Range	T_{stg}	–40 to +100	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Frequency Range		BW	40	—	870	MHz
Power Gain	50 MHz 870 MHz	G_p	19 19.8	19.5 20.4	20 21.3	dB
Slope	40–870 MHz	S	0.2	0.8	1.7	dB
Gain Flatness (40–870 MHz, Peak to Valley)		G_F	—	0.5	1.0	dB
Return Loss — Input/Output (Z_o = 75 Ohms) @ 40 MHz @ f > 40 MHz (Derate)		IRL/ORL	 20 —	 — —	 — 0.007	 dB dB/MHz
Composite Second Order (V_{out} = +40 dBmV/ch., Worst Case) (V_{out} = +44 dBmV/ch., Worst Case)	 128–Channel FLAT 110–Channel FLAT 77–Channel FLAT	 CSO_{128} CSO_{110} CSO_{77}	 — — —	 –69 –70 –80	 –60 –63 –67	dBc

REV 1

ELECTRICAL CHARACTERISTICS — continued (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Cross Modulation Distortion @ Ch 2						dBc
(V_{out} = +40 dBmV/ch., FM = 55 MHz)	128–Channel FLAT	XMD_{128}	—	–72	–64	
(V_{out} = +44 dBmV/ch., FM = 55 MHz)	110–Channel FLAT	XMD_{110}	—	–65	–62	
	77–Channel FLAT	XMD_{77}	—	–69	–66	
Composite Triple Beat						dBc
(V_{out} = +40 dBmV/ch., Worst Case)	128–Channel FLAT	CTB_{128}	—	–66	–63	
(V_{out} = +44 dBmV/ch., Worst Case)	110–Channel FLAT	CTB_{110}	—	–63	–61	
	77–Channel FLAT	CTB_{77}	—	–70	–68	
Noise Figure	50 MHz	NF	—	5.0	6.2	dB
	550 MHz		—	5.8	—	
	750 MHz		—	6.2	—	
	870 MHz		—	7.7	8.5	
DC Current (V_{DC} = 24 V, T_C = –20°C to +100°C)		I_{DC}	345	365	385	mA

The RF Line
CATV Amplifier Module

MHW8222B

860 MHz
22.7 dB GAIN
128–CHANNEL
CATV AMPLIFIER

Features

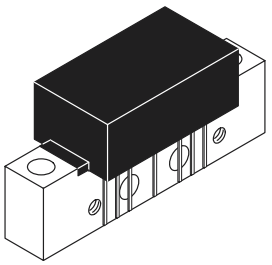
- Specified for 77–, 110– and 128–Channel Loading
- Excellent Distortion Performance
- Silicon Bipolar Transistor Technology
- Unconditionally Stable Under All Load Conditions

Applications

- CATV Systems Operating in the 40 to 860 MHz Frequency Range
- Input Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications
- Output Stage Amplifier on Applications Requiring Low Power Dissipation

Description

- 24 Vdc Supply, 40 to 860 MHz, CATV Forward Amplifier



CASE 1302–01, STYLE 1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
DC Supply Voltage	V_{CC}	+28	Vdc
RF Input Voltage (Single Tone)	V_{in}	+70	dBmV
Operating Case Temperature Range	T_C	–20 to +100	°C
Storage Temperature Range	T_{stg}	–40 to +100	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Frequency Range		BW	40	—	860	MHz
Power Gain	f = 50 MHz f = 860 MHz	G_p	21.4 21.8	21.9 22.7	22.4 24	dB
Slope (f = 40–860 MHz)		S	0.1	0.8	1.5	—
Gain Flatness (Peak To Valley)	(f = 40–860 MHz)	G_F	—	0.4	0.6	—
Input/Output Return Loss @ f = 40 MHz		IRL/ORL	20	24	—	dB
Derate Return Loss @ f > 40 MHz		RLD	—	—	0.009	dB/MHz
Composite Second Order (V_{out} = +38 dBmV/ch; 128 Channels) (V_{out} = +40 dBmV/ch; 110 Channels) (V_{out} = +44 dBmV/ch; 77 Channels)		 CSO_{128} CSO_{110} CSO_{77}	 — — —	 –68 –64 –65	 –60 –61 –62	dBc

REV 3

ELECTRICAL CHARACTERISTICS — continued (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Cross Modulation Distortion						dBc
(V_{out} = +38 dBmV/ch, 128–Channel @ Fm = 55.25 MHz)		XMD_{128}	—	–65	–63	
(V_{out} = +40 dBmV/ch, 110–Channel @ Fm = 55.25 MHz)		XMD_{110}	—	–63	–60	
(V_{out} = +44 dBmV/ch, 77–Channel @ Fm = 55.25 MHz)		XMD_{77}	—	–59	–56	
Composite Triple Beat						dBc
(V_{out} = +38 dBmV/ch, 128–Channels, Worst Case)		CTB_{128}	—	–66	–64	
(V_{out} = +40 dBmV/ch, 110–Channels, Worst Case)		CTB_{110}	—	–64	–61	
(V_{out} = +44 dBmV/ch, 77–Channels, Worst Case)		CTB_{77}	—	–65	–62	
Noise Figure	f = 50 MHz	NF	—	3.7	4.5	dB
	f = 750 MHz		—	5	6.5	
	f = 860 MHz		—	5.6	7	
DC Current		I_{DC}	180	220	240	mA

The RF Line
CATV Amplifier Module

MHW8242A

860 MHz
25 dB GAIN
128–CHANNEL
CATV AMPLIFIER

Features

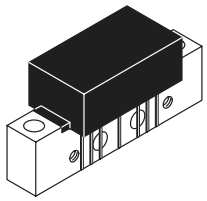
- Specified for 77– and 128–Channel Loading
- Excellent Distortion Performance
- Silicon Bipolar Transistor Technology
- Unconditionally Stable Under All Load Conditions

Applications

- CATV Systems Operating in the 40 to 860 MHz Frequency Range
- Input Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications
- Output Stage Amplifier on Applications Requiring Low Power Dissipation

Description

- 24 Vdc Supply, 40 to 860 MHz, CATV Forward Amplifier



CASE 1302–01, STYLE 1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
RF Voltage Input (Single Tone)	V_{in}	+55	dBmV
DC Supply Voltage	V_{CC}	+28	Vdc
Operating Case Temperature Range	T_C	–20 to +100	°C
Storage Temperature Range	T_{stg}	–40 to +100	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Frequency Range		BW	40	—	860	MHz
Power Gain	50 MHz 860 MHz	G_p	23.2 24	24 25	24.8 26	dB
Slope	40–860 MHz	S	0	0.8	1.8	dB
Gain Flatness (40–860 MHz, Peak To Valley)		G_F	—	0.4	0.8	dB
Return Loss — Input/Output (Z_o = 75 Ohms)	@ 40 MHz @ f > 40 MHz (Derate)	IRL/ORL	20 —	— —	— 0.007	dB dB/MHz
Composite Second Order (V_{out} = +38 dBmV/ch., Worst Case) (V_{out} = +44 dBmV/ch., Worst Case)	 128–Channel FLAT 77–Channel FLAT	 CSO_{128} CSO_{77}	 — —	 –69 –78	 –62 —	dBc
Cross Modulation Distortion @ Ch 2 (V_{out} = +38 dBmV/ch., FM = 55 MHz) (V_{out} = +44 dBmV/ch., FM = 55 MHz)	 128–Channel FLAT 77–Channel FLAT	 XMD_{128} XMD_{77}	 — —	 –65 –58	 –62 —	dBc
Composite Triple Beat (V_{out} = +38 dBmV/ch., Worst Case) (V_{out} = +44 dBmV/ch., Worst Case)	 128–Channel FLAT 77–Channel FLAT	 CTB_{128} CTB_{77}	 — —	 –68 –64	 –64 —	dBc
Noise Figure	50 MHz 860 MHz	NF	— —	4.8 5.8	5.5 7.5	dB
DC Current		I_{DC}	280	318	350	mA

The RF Line
CATV Amplifier Module

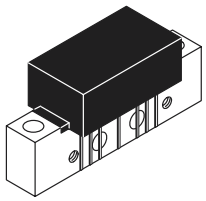
MHW8272A

860 MHz
27.7 dB GAIN
128–CHANNEL
CATV AMPLIFIER

Features
- Specified for 128–Channel Loading
- Excellent Distortion Performance
- Silicon Bipolar Transistor Technology
- Unconditionally Stable Under All Load Conditions

Applications
- CATV Systems Operating in the 40 to 860 MHz Frequency Range
- Input Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications
- Output Stage Amplifier on Applications Requiring Low Power Dissipation

Description
- 24 Vdc Supply, 40 to 860 MHz, CATV Forward Amplifier



CASE 1302–01, STYLE 1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
RF Voltage Input (Single Tone)	V_{in}	+55	dBmV
DC Supply Voltage	V_{CC}	+28	Vdc
Operating Case Temperature Range	T_C	–20 to +100	°C
Storage Temperature Range	T_{stg}	–40 to +100	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Frequency Range		BW	40	—	860	MHz
Power Gain	50 MHz 860 MHz	G_p	26.2 27	27.2 27.7	27.8 29.5	dB
Slope	40–860 MHz	S	0	0.6	2	dB
Gain Flatness (40–860 MHz, Peak to Valley)		G_F	—	0.4	0.8	dB
Return Loss — Input/Output (Z_o = 75 Ohms) @ 40 MHz @ f > 40 MHz (Derate)		IRL/ORL	 20 —	 — —	 — 0.007	 dB dB/MHz
Composite Second Order (V_{out} = +38 dBmV/ch., Worst Case)	128–Channel FLAT	CSO_{128}	—	–69	–64	dBc
Cross Modulation Distortion @ Ch 2 (V_{out} = +38 dBmV/ch., FM = 55 MHz)	128–Channel FLAT	XMD_{128}	—	–65	–62	dBc
Composite Triple Beat (V_{out} = +38 dBmV/ch., Worst Case)	128–Channel FLAT	CTB_{128}	—	–69	–64	dBc
Noise Figure	50 MHz 860 MHz	NF	— —	— 6.0	5.5 7.0	dB
DC Current (V_{DC} = 24 V, T_C = 30°C)		I_{DC}	280	310	350	mA

This document contains information on a new product. Specifications and information herein are subject to change without notice.

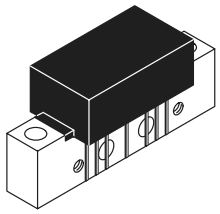
Advance Information

The RF Line

Gallium Arsenide CATV Amplifier Module

MHW9146

870 MHz
14.3 dB GAIN
132–CHANNEL
GaAs CATV AMPLIFIER



CASE 1302–01, STYLE 1

Features

- Specified for 79–, 112– and 132–Channel Loading
- Excellent Distortion Performance
- 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
- Input Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Output Stage Amplifier on Applications Requiring Low Power Dissipation and High Output Performance
- Driver Amplifier in Linear General Purpose Applications

Description

- 24 Vdc Supply, 40 to 870 MHz, CATV GaAs Forward Amplifier

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
RF Voltage Input (Single Tone)	V_{in}	+65	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

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

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = +45°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Frequency Range		BW	40	—	870	MHz
Power Gain	870 MHz	G_p	14.0	14.3	15	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)	40–500 MHz f > 501 MHz	IRL	 20 18	 — —	 — —	dB
Return Loss — Output (Z_o = 75 Ohms)	40–160 MHz f > 160 MHz	ORL	 20 18	 — —	 — —	dB

ELECTRICAL CHARACTERISTICS – continued (V_{CC} = 24 Vdc, T_C = +45°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Composite Second Order						dBc
(V_{out} = +44 dBmV/ch., Worst Case)	79–Channel FLAT	CSO_{79}	—	—	—	
	112–Channel FLAT	CSO_{112}	—	—	—	
	132–Channel FLAT	CSO_{132}	—	–66	–64	
Cross Modulation Distortion @ Ch 2						dBc
(V_{out} = +44 dBmV/ch., FM = 55.25 MHz)	79–Channel FLAT	XMD_{79}	—	—	—	
	112–Channel FLAT	XMD_{112}	—	—	—	
	132–Channel FLAT	XMD_{132}	—	–57	–55	
Composite Triple Beat						dBc
(V_{out} = +44 dBmV/ch., Worst Case)	79–Channel FLAT	CTB_{79}	—	—	—	
	112–Channel FLAT	CTB_{112}	—	—	—	
	132–Channel FLAT	CTB_{132}	—	–58	–56	
Noise Figure	50 MHz	NF	—	4.1	5.0	dB
	550 MHz		—	3.8	—	
	750 MHz		—	4.0	—	
	870 MHz		—	4.3	5.0	
DC Current (V_{DC} = 24 V, T_C = 45°C)		I_{DC}	230	245	260	mA

The RF Line
CATV Amplifier Module

MHW9182B

1000 MHz
19.4 dB GAIN
152–CHANNEL
CATV AMPLIFIER

Features

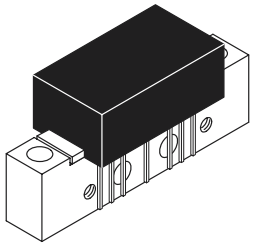
- Specified for 110– and 152–Channel Loading
- Excellent Distortion Performance
- Superior Gain, Return Loss and DC Current Stability over Temperature
- Silicon Bipolar Transistor Technology
- Unconditionally Stable Under All Load Conditions

Applications

- CATV Systems Operating in the 40 to 1000 MHz Frequency Range
- Input Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications
- Output Stage Amplifier on Applications Requiring Low Power Dissipation

Description

- 24 Vdc Supply, 40 to 1000 MHz, CATV Forward Amplifier



CASE 714Y–03, STYLE 1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
RF Voltage Input (Single Tone)	V_{in}	+70	dBmV
DC Supply Voltage	V_{CC}	+28	Vdc
Operating Case Temperature Range	T_C	–20 to +100	°C
Storage Temperature Range	T_{stg}	–40 to +100	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

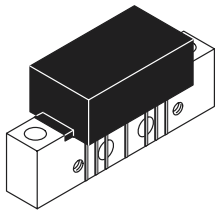
Characteristic		Symbol	Min	Typ	Max	Unit
Frequency Range		BW	40	—	1000	MHz
Power Gain	50 MHz 1000 MHz	G_p	18 18.7	18.5 19.4	19 20.7	dB
Slope	40–1000 MHz	S	0.4	0.9	1.4	dB
Gain Flatness (40–1000 MHz, Peak to Valley)		G_F	—	0.4	0.8	dB
Return Loss — Input/Output (Z_o = 75 Ohms) @ 40 MHz @ f > 40 MHz (Derate)		IRL/ORL	 20 —	 — —	 — 0.006	 dB dB/MHz
Composite Second Order (V_{out} = +40 dBmV/ch., Worst Case) (V_{out} = +38 dBmV/ch., Worst Case)	 110–Channel FLAT 152–Channel FLAT	 CSO_{110} CSO_{152}	 — —	 70 –69	 –63 –63	dBc
Cross Modulation Distortion @ Ch 2 (V_{out} = +40 dBmV/ch., FM = 55 MHz) (V_{out} = +38 dBmV/ch., FM = 55 MHz)	 110–Channel FLAT 152–Channel FLAT	 XMD_{110} XMD_{152}	 — —	 –66 –65	 –64 –61	dBc
Composite Triple Beat (V_{out} = +40 dBmV/ch., Worst Case) (V_{out} = +38 dBmV/ch., Worst Case)	 110–Channel FLAT 152–Channel FLAT	 CTB_{110} CTB_{152}	 — —	 –68 –64	 –66 –61	dBc
Noise Figure	50 MHz 550 MHz 860 MHz 1000 MHz	NF	— — — —	4.0 4.5 5.5 6.0	5.0 — — 7.5	dB
DC Current (V_{DC} = 24 V, T_C = 30°C)		I_{DC}	180	210	240	mA

REV 1

The RF Line
Gallium Arsenide CATV Amplifier Module

MHW9186

870 MHz
18.5 dB GAIN
132–CHANNEL
GaAs CATV AMPLIFIER



CASE 1302–01, STYLE 1

Features
- Specified for 79–, 112– and 132–Channel Loading
- Excellent Distortion Performance
- 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
- Input Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Output Stage Amplifier on Applications Requiring Low Power Dissipation and High Output Performance
- Driver Amplifier in Linear General Purpose Applications

Description
- 24 Vdc Supply, 40 to 870 MHz, CATV GaAs Forward Amplifier

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
RF Voltage Input (Single Tone)	V_{in}	+65	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

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

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Frequency Range		BW	40	—	870	MHz
Power Gain	50 MHz 870 MHz	G_p	17.5 18	18 18.5	18.5 19.5	dB
Slope	40–870 MHz	S	0.2	0.6	1.2	dB
Gain Flatness (40–870 MHz, Peak–to–Valley)		G_F	—	0.3	0.8	dB
Return Loss — Input (Z_o = 75 Ohms)	 40–200 MHz 200–600 MHz 600–870 MHz	IRL	 20 19 18	 — — —	 — — —	dB
Return Loss — Output (Z_o = 75 Ohms)	 40–200 MHz 200–600 MHz 600–870 MHz	ORL	 20 19 18	 — — —	 — — —	dB

REV 1

ELECTRICAL CHARACTERISTICS – continued (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Composite Second Order						dBc
(V_{out} = +44 dBmV/ch., Worst Case)	132–Channel FLAT	CSO_{132}	—	–67	–60	
(V_{out} = +46 dBmV/ch., Worst Case)	112–Channel FLAT	CSO_{112}	—	–65	–61	
(V_{out} = +48 dBmV/ch., Worst Case)	79–Channel FLAT	CSO_{79}	—	–72	–64	
Cross Modulation Distortion @ Ch 2						dBc
(V_{out} = +44 dBmV/ch., FM = 55 MHz)	132–Channel FLAT	XMD_{132}	—	–58	–52	
(V_{out} = +46 dBmV/ch., FM = 55 MHz)	112–Channel FLAT	XMD_{112}	—	–58	–52	
(V_{out} = +48 dBmV/ch., FM = 55 MHz)	79–Channel FLAT	XMD_{79}	—	–58	–52	
Composite Triple Beat						dBc
(V_{out} = +44 dBmV/ch., Worst Case)	132–Channel FLAT	CTB_{132}	—	–62	–58	
(V_{out} = +46 dBmV/ch., Worst Case)	112–Channel FLAT	CTB_{112}	—	–61	–58	
(V_{out} = +48 dBmV/ch., Worst Case)	79–Channel FLAT	CTB_{79}	—	–64	–60	
Noise Figure	50 MHz	NF	—	4	5.0	dB
	870 MHz		—	3.7	5.0	
DC Current (V_{DC} = 24 V, T_C = –20° to +100°C)		I_{DC}	230	250	265	mA

The RF Line
Gallium Arsenide CATV Amplifier Module

MHW9187

870 MHz
20 dB GAIN
132–CHANNEL
GaAs CATV AMPLIFIER

Features

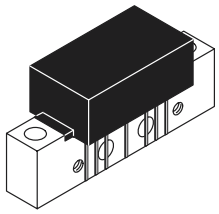
- Specified for 79–, 112– and 132–Channel Loading
- Excellent Distortion Performance
- Higher Output Capability
- GaAs FET Transistor Technology
- Unconditionally Stable Under All Load Conditions

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



CASE 1302–01, STYLE 1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
RF Voltage Input (Single Tone)	V_{in}	+70	dBmV
DC Supply Voltage	V_{CC}	+28	Vdc
Operating Case Temperature Range	T_C	–20 to +100	°C
Storage Temperature Range	T_{stg}	–40 to +100	°C

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	0.7	2	kV

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = +45°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Frequency Range		BW	40	—	870	MHz
Power Gain	870 MHz	G_p	19.4	20	20.6	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		IRL				dB
(Z_o = 75 Ohms)	40–500 Mhz		20	—	—	
	501–750 Mhz		18	—	—	
	751–870 Mhz		16	—	—	
Return Loss — Output		ORL				dB
(Z_o = 75 Ohms)	40–160 Mhz		20	—	—	
	f > 160 Mhz		18	—	—	

REV 2

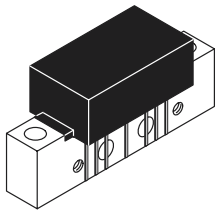
ELECTRICAL CHARACTERISTICS – continued (V_{CC} = 24 Vdc, T_C = +45°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Composite Second Order						dBc
(V_{out} = +48 dBmV/ch., Worst Case)	132–Channel FLAT	CSO_{132}	—	–64	–62	
(V_{out} = +48 dBmV/ch., Worst Case)	112–Channel FLAT	CSO_{112}	—	–66	–64	
(V_{out} = +48 dBmV/ch., Worst Case)	79–Channel FLAT	CSO_{79}	—	–70	–68	
(V_{out} = +56 dBmV @ 870 Mhz Equiv)	112–Channel, 12db Tilt	CSO_{112}	—	–65	–63	
(V_{out} = +56 dBmV @ 870 Mhz Equiv)	112–Channel, 13.5db Tilt	CSO_{112}	—	–64	–62	
(V_{out} = +56 dBmV @ 870 Mhz Equiv)	112–Channel, 17db Tilt	CSO_{112}	—	–63	–61	
(V_{out} = +58 dBmV @ 870 Mhz Equiv)	79–Channel, 12db Tilt	CSO_{79}	—	–69	–67	
(V_{out} = +58 dBmV @ 870 Mhz Equiv)	79–Channel, 13.5db Tilt	CSO_{79}	—	–74	–72	
(V_{out} = +58 dBmV @ 870 Mhz Equiv)	79–Channel, 17db Tilt	CSO_{79}	—	–73	–71	
Cross Modulation Distortion @ Ch 2						dBc
(V_{out} = +48 dBmV/ch., FM = 55 MHz)	132–Channel FLAT	XMD_{132}	—	–57	–55	
(V_{out} = +48 dBmV/ch., FM = 55 MHz)	112–Channel FLAT	XMD_{112}	—	–59	–57	
(V_{out} = +48 dBmV/ch., FM = 55 MHz)	79–Channel FLAT	XMD_{79}	—	–62	–60	
(V_{out} = +56 dBmV @ 870 Mhz Equiv)	112–Channel, 12db Tilt	XMD_{112}	—	–53	–51	
(V_{out} = +56 dBmV @ 870 Mhz Equiv)	112–Channel, 13.5db Tilt	XMD_{112}	—	–55	–53	
(V_{out} = +56 dBmV @ 870 Mhz Equiv)	112–Channel, 17db Tilt	XMD_{112}	—	–58	–56	
(V_{out} = +58 dBmV @ 870 Mhz Equiv)	79–Channel, 12db Tilt	XMD_{79}	—	–60	–47	
(V_{out} = +58 dBmV @ 870 Mhz Equiv)	79–Channel, 13.5db Tilt	XMD_{79}	—	–62	–60	
(V_{out} = +58 dBmV @ 870 Mhz Equiv)	79–Channel, 17db Tilt	XMD_{79}	—	–67	–65	
Composite Triple Beat						dBc
(V_{out} = +48 dBmV/ch., Worst Case)	132–Channel FLAT	CTB_{132}	—	–60	–56	
(V_{out} = +48 dBmV/ch., Worst Case)	112–Channel FLAT	CTB_{112}	—	–64	–60	
(V_{out} = +48 dBmV/ch., Worst Case)	79–Channel FLAT	CTB_{79}	—	–68	–66	
(V_{out} = +56 dBmV @ 870 Mhz Equiv)	112–Channel, 12db Tilt	CTB_{112}	—	–60	–58	
(V_{out} = +56 dBmV @ 870 Mhz Equiv)	112–Channel, 13.5db Tilt	CTB_{112}	—	–61	–59	
(V_{out} = +56 dBmV @ 870 Mhz Equiv)	112–Channel, 17db Tilt	CTB_{112}	—	–64	–62	
(V_{out} = +58 dBmV @ 870 Mhz Equiv)	79–Channel, 12db Tilt	CTB_{79}	—	–66	–64	
(V_{out} = +58 dBmV @ 870 Mhz Equiv)	79–Channel, 13.5db Tilt	CTB_{79}	—	–71	–69	
(V_{out} = +58 dBmV @ 870 Mhz Equiv)	79–Channel, 17db Tilt	CTB_{79}	—	–74	–72	
Noise Figure	50 MHz	NF	—	4.0	4.5	dB
	550 MHz		—	3.5	4.5	
	750 MHz		—	3.5	4.5	
	870 MHz		—	4.0	4.5	
DC Current (V_{DC} = 24 V, T_C = 45°C)		I_{DC}	410	425	440	mA

The RF Line
Gallium Arsenide CATV Amplifier Module

MHW9188

870 MHz
20.3 dB GAIN
132–CHANNEL
GaAs CATV AMPLIFIER



CASE 1302–01, STYLE 1

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

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

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

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = +45°C, 75 Ω 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		IRL				dB
(Z_o = 75 Ohms)	40–500 MHz		20	—	—	
	501–750 MHz		18	—	—	
	751–870 MHz		16	—	—	
Return Loss — Output		ORL				dB
(Z_o = 75 Ohms)	40–160 MHz		20	—	—	
	f > 160 MHz		18	—	—	

REV 1

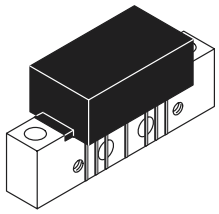
ELECTRICAL CHARACTERISTICS – continued (V_{CC} = 24 Vdc, T_C = +45°C, 75 Ω system unless otherwise noted)

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

The RF Line
Gallium Arsenide CATV Amplifier Module

MHW9189

870 MHz
20.3 dB GAIN
132–CHANNEL
GaAs CATV AMPLIFIER



CASE 1302–01, STYLE 2

Features

- Specified for 79–, 112– and 132–Channel Loading
- Mirror Image of MHW9188
- 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 Mirror Power Doubler Amplifier

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

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

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = +45°C, 75 Ω 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		IRL				dB
(Z_o = 75 Ohms)	40–500 MHz		20	—	—	
	501–750 MHz		18	—	—	
	751–870 MHz		16	—	—	
Return Loss — Output		ORL				dB
(Z_o = 75 Ohms)	40–160 MHz		20	—	—	
	f > 160 MHz		18	—	—	

REV 1

ELECTRICAL CHARACTERISTICS – continued (V_{CC} = 24 Vdc, T_C = +45°C, 75 Ω system unless otherwise noted)

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

The RF Line
Gallium Arsenide CATV Amplifier Module

MHW9206

870 MHz
20.2 dB GAIN
132–CHANNEL
GaAs CATV AMPLIFIER

Features

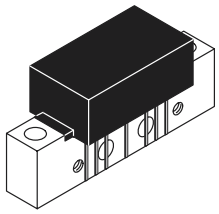
- Specified for 79–, 112– and 132–Channel Loading
- Excellent Distortion Performance
- Built–in Input Diode Protection
- GaAs FET Transistor Technology
- Unconditionally Stable Under All Load Conditions

Applications

- CATV Systems Operating in the 47 to 870 MHz Frequency Range
- Input Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Output Stage Amplifier on Applications Requiring Low Power Dissipation and High Output Performance
- Driver Amplifier in Linear General Purpose Applications

Description

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



CASE 1302–01, STYLE 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

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

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = +45°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Frequency Range		BW	47	—	870	MHz
Power Gain	870 MHz	G_p	19.6	20.2	20.8	dB
Slope	47–870 MHz	S	0.4	0.8	1.4	dB
Gain Flatness (47–870 MHz, Peak–to–Valley)		G_F	—	—	0.5	dB
Return Loss — Input/Output		IRL/ORL				dB
(Z_o = 75 Ohms)	47–500 MHz		20	—	—	
	501–750 MHz		19	—	—	
	751–870 MHz		18	—	—	
Composite Second Order						dBc
(V_{out} = +48 dBmV/ch., Worst Case)	79–Channel FLAT	CSO_{79}	—	–66	–63	
(V_{out} = +46 dBmV/ch., Worst Case)	112–Channel FLAT	CSO_{112}	—	–62	–59	
(V_{out} = +44 dBmV/ch., Worst Case)	132–Channel FLAT	CSO_{132}	—	–63	–59	

ELECTRICAL CHARACTERISTICS – continued (V_{CC} = 24 Vdc, T_C = +45°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Cross Modulation Distortion @ Ch 2						dBc
(V_{out} = +48 dBmV/ch., FM = 55.25 MHz)	79–Channel FLAT	XMD_{79}	—	–55	–51	
(V_{out} = +46 dBmV/ch., FM = 55.25 MHz)	112–Channel FLAT	XMD_{112}	—	–55	–51	
(V_{out} = +44 dBmV/ch., FM = 55.25 MHz)	132–Channel FLAT	XMD_{132}	—	–57	–51	
Composite Triple Beat						dBc
(V_{out} = +48 dBmV/ch., Worst Case)	79–Channel FLAT	CTB_{79}	—	–62	–60	
(V_{out} = +46 dBmV/ch., Worst Case)	112–Channel FLAT	CTB_{112}	—	–60	–57	
(V_{out} = +44 dBmV/ch., Worst Case)	132–Channel FLAT	CTB_{132}	—	–60	–57	
Noise Figure	50 MHz	NF	—	3.8	4.5	dB
	870 MHz		—	4	4.5	
DC Current (V_{DC} = 24 V, T_C = 45°C)		I_{DC}	230	245	260	mA

This document contains information on a new product. Specifications and information herein are subject to change without notice.

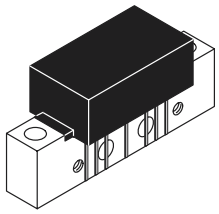
Advance Information

The RF Line

Gallium Arsenide CATV Amplifier Module

MHW9236

870 MHz
23 dB GAIN
132–CHANNEL
GaAs CATV AMPLIFIER



CASE 1302–01, STYLE 1

Features

- Specified for 79–, 112– and 132–Channel Loading
- Excellent Distortion Performance
- 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
- Input Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Output Stage Amplifier on Applications Requiring Low Power Dissipation and High Output Performance
- Driver Amplifier in Linear General Purpose Applications

Description

- 24 Vdc Supply, 40 to 870 MHz, CATV GaAs Forward Amplifier

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

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

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = +45°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Frequency Range		BW	40	—	870	MHz
Power Gain	870 MHz	G_p	22.5	23	23.5	dB
Slope	40–870 MHz	S	0	0.5	1.0	dB
Gain Flatness (40–870 MHz, Peak–to–Valley)		G_F	—	—	0.8	dB
Return Loss — Input (Z_o = 75 Ohms)	40–500 MHz f > 501 MHz	IRL	20 18	— —	— —	dB

ELECTRICAL CHARACTERISTICS – continued (V_{CC} = 24 Vdc, T_C = +45°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Return Loss — Output		ORL				dB
(Z_o = 75 Ohms)	40–160 MHz		20	—	—	
	f > 160 MHz		18	—	—	
Composite Second Order						dBc
(V_{out} = +48 dBmV/ch., Worst Case)	79–Channel FLAT	CSO_{79}	—	—	—	
(V_{out} = +46 dBmV/ch., Worst Case)	112–Channel FLAT	CSO_{112}	—	—	—	
(V_{out} = +44 dBmV/ch., Worst Case)	132–Channel FLAT	CSO_{132}	—	–64	–60	
Cross Modulation Distortion @ Ch 2						dBc
(V_{out} = +48 dBmV/ch., FM = 55.25 MHz)	79–Channel FLAT	XMD_{79}	—	—	—	
(V_{out} = +46 dBmV/ch., FM = 55.25 MHz)	112–Channel FLAT	XMD_{112}	—	—	—	
(V_{out} = +44 dBmV/ch., FM = 55.25 MHz)	132–Channel FLAT	XMD_{132}	—	–57	–55	
Composite Triple Beat						dBc
(V_{out} = +48 dBmV/ch., Worst Case)	79–Channel FLAT	CTB_{79}	—	—	—	
(V_{out} = +46 dBmV/ch., Worst Case)	112–Channel FLAT	CTB_{112}	—	—	—	
(V_{out} = +44 dBmV/ch., Worst Case)	132–Channel FLAT	CTB_{132}	—	–64	–60	
Noise Figure	50 MHz	NF	—	5.0	5.5	dB
	550 MHz		—	5.0	5.5	
	750 MHz		—	5.0	5.5	
	870 MHz		—	5.0	5.5	
DC Current (V_{DC} = 24 V, T_C = 45°C)		I_{DC}	230	245	260	mA

The RF Line
CATV Amplifier Module

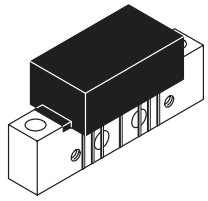
MHW9242A

1000 MHz
24 dB GAIN
152–CHANNEL
CATV AMPLIFIER

Features
- Specified for 77–, 110–, 128– and 152–Channel Loading
- Excellent Distortion Performance
- Superior Gain, Return Loss and DC Current Stability over Temperature
- Silicon Bipolar Transistor Technology
- Unconditionally Stable Under All Load Conditions

Applications
- CATV Systems Operating in the 40 to 1000 MHz Frequency Range
- Input Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications
- Output Stage Amplifier on Applications Requiring Low Power Dissipation

Description
- 24 Vdc Supply, 40 to 1000 MHz, CATV Forward Amplifier



CASE 1302–01, STYLE 1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
RF Voltage Input (Single Tone)	V_{in}	+55	dBmV
DC Supply Voltage	V_{CC}	+28	Vdc
Operating Case Temperature Range	T_C	–20 to +100	°C
Storage Temperature Range	T_{stg}	–40 to +100	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Frequency Range		BW	40	—	1000	MHz
Power Gain	50 MHz 1000 MHz	G_p	23.2 24	— —	24.8 26	dB
Slope	40–1000 MHz	S	0	—	2.5	dB
Gain Flatness (40–1000 MHz, Peak–to–Valley)		G_F	—	—	1.0	dB
Return Loss — Input/Output (Z_o = 75 Ohms)	@ 40 MHz @ f > 40 MHz (Derate)	IRL/ORL	20 —	— —	— 0.01	dB dB/MHz
Composite Second Order						dBc
(V_{out} = +38 dBmV/ch; Worst Case)	152–Channel FLAT	CSO_{152}	—	–66	–61	
(V_{out} = +38 dBmV/ch; Worst Case)	128–Channel FLAT	CSO_{128}	—	–69	—	
(V_{out} = +40 dBmV/ch;Worst Case)	110–Channel FLAT	CSO_{110}	—	–69	—	
(V_{out} = +44 dBmV/ch; Worst Case)	77–Channel FLAT	CSO_{77}	—	–78	—	
Cross Modulation Distortion @ Ch 2						dBc
(V_{out} = +38 dBmV/ch., FM= 55 MHz)	152–Channel FLAT	XMD_{152}	—	–62	–59	
(V_{out} = +38 dBmV/ch, FM = 55.25 MHz)	128–Channel FLAT	XMD_{128}	—	–65	—	
(V_{out} = +40 dBmV/ch, FM = 55.25 MHz)	110–Channel FLAT	XMD_{110}	—	–63	—	
(V_{out} = +44 dBmV/ch, FM = 55.25 MHz)	77–Channel FLAT	XMD_{77}	—	–58	—	

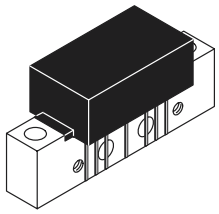
ELECTRICAL CHARACTERISTICS – continued (V_{CC} = 24 Vdc, T_C = +30°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Composite Triple Beat						dBc
(V_{out} = +38 dBmV/ch., Worst Case)	152–Channel FLAT	CTB_{152}	—	–64	–58	
(V_{out} = +38 dBmV/ch, Worst Case)	128–Channel FLAT	CTB_{128}	—	–68	—	
(V_{out} = +40 dBmV/ch, Worst Case)	110–Channel FLAT	CTB_{110}	—	–67	—	
(V_{out} = +44 dBmV/ch, Worst Case)	77–Channel FLAT	CTB_{77}	—	–64	—	
Noise Figure	f = 50 MHz	NF	—	4.8	5.5	dB
	f = 750 MHz		—	5.5	7.0	
	f = 860 MHz		—	5.8	7.5	
	f = 1000 MHz		—	—	8.0	
DC Current		I_{DC}	280	318	350	mA

The RF Line
Gallium Arsenide CATV Amplifier Module

MHW9247

870 MHz
24.9 dB GAIN
132–CHANNEL
GaAs CATV AMPLIFIER



CASE 1302–01, STYLE 1

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

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
RF Voltage Input (Single Tone)	V_{in}	+70	dBmV
DC Supply Voltage	V_{CC}	+28	Vdc
Operating Case Temperature Range	T_C	–20 to +100	°C
Storage Temperature Range	T_{stg}	–40 to +100	°C

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

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = +45°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Frequency Range		BW	40	—	870	MHz
Power Gain	870 MHz	G_p	24.4	24.9	25.4	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		IRL				dB
(Z_o = 75 Ohms)	40–500 MHz		20	—	—	
	501–750 MHz		18	—	—	
	751–870 MHz		16	—	—	
Return Loss — Output		ORL				dB
(Z_o = 75 Ohms)	40–160 MHz		20	—	—	
	f > 160 MHz		18	—	—	

REV 1

ELECTRICAL CHARACTERISTICS – continued (V_{CC} = 24 Vdc, T_C = +45°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Composite Second Order						dBc
(V_{out} = +48 dBmV/ch., Worst Case)	132–Channel FLAT	CSO_{132}	—	–64	–62	
(V_{out} = +48 dBmV/ch., Worst Case)	112–Channel FLAT	CSO_{112}	—	–66	–64	
(V_{out} = +48 dBmV/ch., Worst Case)	79–Channel FLAT	CSO_{79}	—	–70	–68	
(V_{out} = +56 dBmV @ 870 Mhz Equiv)	112–Channel, 12db Tilt	CSO_{112}	—	–66	–64	
(V_{out} = +56 dBmV @ 870 Mhz Equiv)	112–Channel, 13.5db Tilt	CSO_{112}	—	–67	–65	
(V_{out} = +56 dBmV @ 870 Mhz Equiv)	112–Channel, 17db Tilt	CSO_{112}	—	–68	–66	
(V_{out} = +58 dBmV @ 870 Mhz Equiv)	79–Channel, 12db Tilt	CSO_{79}	—	–71	–69	
(V_{out} = +58 dBmV @ 870 Mhz Equiv)	79–Channel, 13.5db Tilt	CSO_{79}	—	–74	–72	
(V_{out} = +58 dBmV @ 870 Mhz Equiv)	79–Channel, 17db Tilt	CSO_{79}	—	–74	–72	
Cross Modulation Distortion @ Ch 2						dBc
(V_{out} = +48 dBmV/ch., FM = 55 MHz)	132–Channel FLAT	XMD_{132}	—	–56	–54	
(V_{out} = +48 dBmV/ch., FM = 55 MHz)	112–Channel FLAT	XMD_{112}	—	–58	–56	
(V_{out} = +48 dBmV/ch., FM = 55 MHz)	79–Channel FLAT	XMD_{79}	—	–60	–58	
(V_{out} = +56 dBmV @ 870 Mhz Equiv)	112–Channel, 12db Tilt	XMD_{112}	—	–53	–51	
(V_{out} = +56 dBmV @ 870 Mhz Equiv)	112–Channel, 13.5db Tilt	XMD_{112}	—	–54	–52	
(V_{out} = +56 dBmV @ 870 Mhz Equiv)	112–Channel, 17db Tilt	XMD_{112}	—	–55	–53	
(V_{out} = +58 dBmV @ 870 Mhz Equiv)	79–Channel, 12db Tilt	XMD_{79}	—	–55	–53	
(V_{out} = +58 dBmV @ 870 Mhz Equiv)	79–Channel, 13.5db Tilt	XMD_{79}	—	–58	–56	
(V_{out} = +58 dBmV @ 870 Mhz Equiv)	79–Channel, 17db Tilt	XMD_{79}	—	–61	–59	
Composite Triple Beat						dBc
(V_{out} = +48 dBmV/ch., Worst Case)	132–Channel FLAT	CTB_{132}	—	–58	–56	
(V_{out} = +48 dBmV/ch., Worst Case)	112–Channel FLAT	CTB_{112}	—	–61	–59	
(V_{out} = +48 dBmV/ch., Worst Case)	79–Channel FLAT	CTB_{79}	—	–68	–66	
(V_{out} = +56 dBmV @ 870 Mhz Equiv)	112–Channel, 12db Tilt	CTB_{112}	—	–58	–56	
(V_{out} = +56 dBmV @ 870 Mhz Equiv)	112–Channel, 13.5db Tilt	CTB_{112}	—	–59	–57	
(V_{out} = +56 dBmV @ 870 Mhz Equiv)	112–Channel, 17db Tilt	CTB_{112}	—	–61	–59	
(V_{out} = +58 dBmV @ 870 Mhz Equiv)	79–Channel, 12db Tilt	CTB_{79}	—	–64	–62	
(V_{out} = +58 dBmV @ 870 Mhz Equiv)	79–Channel, 13.5db Tilt	CTB_{79}	—	–67	–65	
(V_{out} = +58 dBmV @ 870 Mhz Equiv)	79–Channel, 17db Tilt	CTB_{79}	—	–69	–67	
Noise Figure	50 MHz	NF	—	5.5	7.0	dB
	550 MHz		—	5.5	7.0	
	750 MHz		—	5.8	7.0	
	870 MHz		—	6.0	7.0	
DC Current (V_{DC} = 24 V, T_C = 45°C)		I_{DC}	420	440	460	mA

This document contains information on a new product. Specifications and information herein are subject to change without notice.

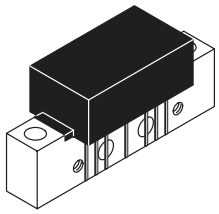
Advance Information

The RF Line

Gallium Arsenide CATV Amplifier Module

MHW9267

870 MHz
27.3 dB GAIN
132–CHANNEL
GaAs CATV AMPLIFIER



CASE 1302–01, STYLE 1

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

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

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

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = +45°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Frequency Range		BW	40	—	870	MHz
Power Gain	870 MHz	G_p	26.8	27.3	27.8	dB
Slope	40–870 MHz	S	0	0.7	1.4	dB
Gain Flatness (40–870 MHz, Peak–to–Valley)		G_F	—	—	0.5	dB
Return Loss — Input		IRL				dB
(Z_o = 75 Ohms)	40–500 MHz		20	—	—	
	501–750 MHz		18	—	—	
	751–870 MHz		16	—	—	

ELECTRICAL CHARACTERISTICS – continued (V_{CC} = 24 Vdc, T_C = +45°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Return Loss — Output		ORL				dB
(Z_o = 75 Ohms)	40–160 MHz		20	—	—	
	f > 160 MHz		18	—	—	
Composite Second Order						dBc
(V_{out} = +48 dBmV/ch., Worst Case)	132–Channel FLAT	CSO_{132}	—	–62	–60	
(V_{out} = +48 dBmV/ch., Worst Case)	112–Channel FLAT	CSO_{112}	—	–66	–64	
(V_{out} = +48 dBmV/ch., Worst Case)	79–Channel FLAT	CSO_{79}	—	–70	–68	
(V_{out} = +56 dBmV @ 870 MHz Equiv)	112–Channel, 12db Tilt	CSO_{112}	—	–66	–64	
(V_{out} = +56 dBmV @ 870 MHz Equiv)	112–Channel, 13.5db Tilt	CSO_{112}	—	–67	–65	
(V_{out} = +56 dBmV @ 870 MHz Equiv)	112–Channel, 17db Tilt	CSO_{112}	—	–68	–66	
(V_{out} = +58 dBmV @ 870 MHz Equiv)	79–Channel, 12db Tilt	CSO_{79}	—	–71	–69	
(V_{out} = +58 dBmV @ 870 MHz Equiv)	79–Channel, 13.5db Tilt	CSO_{79}	—	–74	–72	
(V_{out} = +58 dBmV @ 870 MHz Equiv)	79–Channel, 17db Tilt	CSO_{79}	—	–74	–72	
Cross Modulation Distortion @ Ch 2						dBc
(V_{out} = +48 dBmV/ch., FM = 55 MHz)	132–Channel FLAT	XMD_{132}	—	–56	–54	
(V_{out} = +48 dBmV/ch., FM = 55 MHz)	112–Channel FLAT	XMD_{112}	—	–58	–56	
(V_{out} = +48 dBmV/ch., FM = 55 MHz)	79–Channel FLAT	XMD_{79}	—	–60	–58	
(V_{out} = +56 dBmV @ 870 MHz Equiv)	112–Channel, 12db Tilt	XMD_{112}	—	–53	–51	
(V_{out} = +56 dBmV @ 870 MHz Equiv)	112–Channel, 13.5db Tilt	XMD_{112}	—	–54	–52	
(V_{out} = +56 dBmV @ 870 MHz Equiv)	112–Channel, 17db Tilt	XMD_{112}	—	–55	–53	
(V_{out} = +58 dBmV @ 870 MHz Equiv)	79–Channel, 12db Tilt	XMD_{79}	—	–55	–53	
(V_{out} = +58 dBmV @ 870 MHz Equiv)	79–Channel, 13.5db Tilt	XMD_{79}	—	–58	–56	
(V_{out} = +58 dBmV @ 870 MHz Equiv)	79–Channel, 17db Tilt	XMD_{79}	—	–61	–59	
Composite Triple Beat						dBc
(V_{out} = +48 dBmV/ch., Worst Case)	132–Channel FLAT	CTB_{132}	—	–58	–56	
(V_{out} = +48 dBmV/ch., Worst Case)	112–Channel FLAT	CTB_{112}	—	–61	–59	
(V_{out} = +48 dBmV/ch., Worst Case)	79–Channel FLAT	CTB_{79}	—	–68	–66	
(V_{out} = +56 dBmV @ 870 MHz Equiv)	112–Channel, 12db Tilt	CTB_{112}	—	–58	–56	
(V_{out} = +56 dBmV @ 870 MHz Equiv)	112–Channel, 13.5db Tilt	CTB_{112}	—	–59	–57	
(V_{out} = +56 dBmV @ 870 MHz Equiv)	112–Channel, 17db Tilt	CTB_{112}	—	–61	–59	
(V_{out} = +58 dBmV @ 870 MHz Equiv)	79–Channel, 12db Tilt	CTB_{79}	—	–64	–62	
(V_{out} = +58 dBmV @ 870 MHz Equiv)	79–Channel, 13.5db Tilt	CTB_{79}	—	–67	–65	
(V_{out} = +58 dBmV @ 870 MHz Equiv)	79–Channel, 17db Tilt	CTB_{79}	—	–69	–67	
Noise Figure	50 MHz	NF	—	5.5	7.0	dB
	550 MHz		—	5.5	7.0	
	750 MHz		—	5.8	7.0	
	870 MHz		—	6.0	7.0	
DC Current (V_{DC} = 24 V, T_C = 45°C)		I_{DC}	420	440	460	mA

This document contains information on a new product. Specifications and information herein are subject to change without notice.

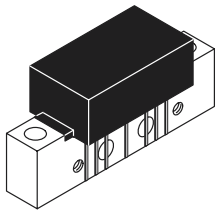
Advance Information

The RF Line

Gallium Arsenide CATV Amplifier Module

MHW9276

870 MHz
27.5 dB GAIN
132–CHANNEL
GaAs CATV AMPLIFIER



CASE 1302–01, STYLE 1

Features

- 79–, 112– and 132–Channel Loading
- Excellent Distortion Performance
- 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
- Input Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Output Stage Amplifier on Applications Requiring Low Power Dissipation and High Output Performance
- Driver Amplifier in Linear General Purpose Applications

Description

- 24 Vdc Supply, 40 to 870 MHz, CATV GaAs Forward Amplifier

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
RF Voltage Input (Single Tone)	V_{in}	+65	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

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

ELECTRICAL CHARACTERISTICS (V_{CC} = 24 Vdc, T_C = +45°C, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Frequency Range		BW	40	—	870	MHz
Power Gain	870 MHz	G_p	26.8	27.5	28	dB
Slope	40–870 MHz	S	0.4	0.95	1.4	dB
Gain Flatness (40–870 MHz, Peak–to–Valley)		G_F	—	—	0.8	dB
Return Loss — Input/Output (Z_o = 75 Ohms)		IRL/ORL				dB
	40–200 MHz		20	—	—	
	201–600 MHz		19	—	—	
	601–870 MHz		18			

ELECTRICAL CHARACTERISTICS – continued (V_{CC} = 24 Vdc, T_C = +45°C, 75 Ω system unless otherwise noted)

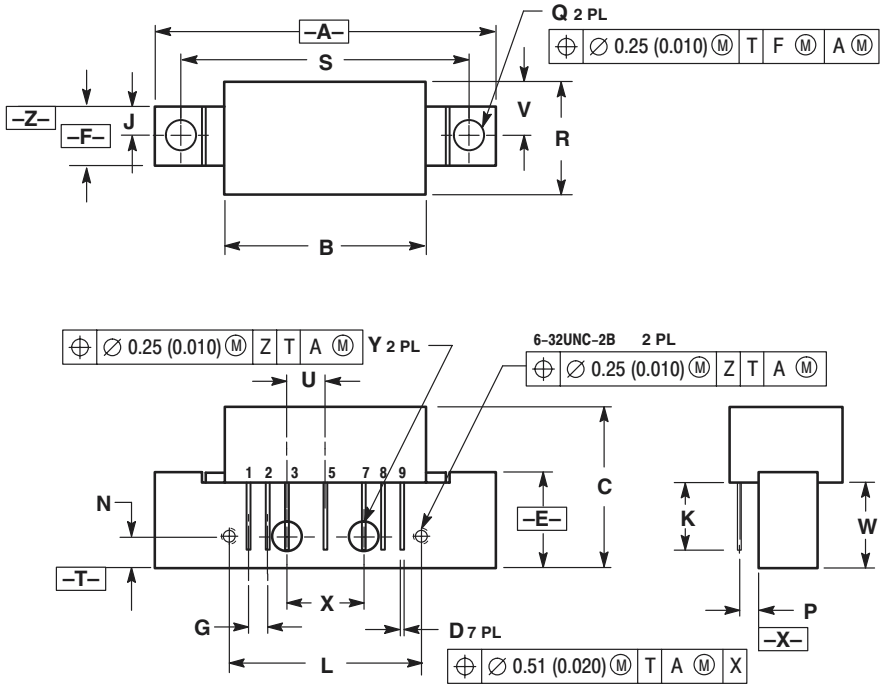
Characteristic		Symbol	Min	Typ	Max	Unit
Composite Second Order						dBc
(V_{out} = +48 dBmV/ch., Worst Case)	79–Channel FLAT	CSO_{79}	—	—	—	
(V_{out} = +46 dBmV/ch., Worst Case)	112–Channel FLAT	CSO_{112}	—	—	—	
(V_{out} = +44 dBmV/ch., Worst Case)	132–Channel FLAT	CSO_{132}	—	–62	–60	
Cross Modulation Distortion @ Ch 2						dBc
(V_{out} = +48 dBmV/ch., FM = 55.25 MHz)	79–Channel FLAT	XMD_{79}	—	—	—	
(V_{out} = +46 dBmV/ch., FM = 55.25 MHz)	112–Channel FLAT	XMD_{112}	—	—	—	
(V_{out} = +44 dBmV/ch., FM = 55.25 MHz)	132–Channel FLAT	XMD_{132}	—	–58	–53	
Composite Triple Beat						dBc
(V_{out} = +48 dBmV/ch., Worst Case)	79–Channel FLAT	CTB_{79}	—	—	—	
(V_{out} = +46 dBmV/ch., Worst Case)	112–Channel FLAT	CTB_{112}	—	—	—	
(V_{out} = +44 dBmV/ch., Worst Case)	132–Channel FLAT	CTB_{132}	—	–60	–58	
Noise Figure	50 MHz	NF	—	5.0	5.5	dB
	550 MHz		—	5.0	—	
	750 MHz		—	5.0	—	
	870 MHz		—	5.0	6.0	
DC Current (V_{DC} = 24 V, T_C = 45°C)		I_{DC}	235	250	265	mA

Chapter Four
Packaging Information

The packaging availability for each device type is indicated on the individual data sheets and in the Selector Guide. All of the outline dimensions for the packages are given in this section.

Table of Contents

Case Dimensions

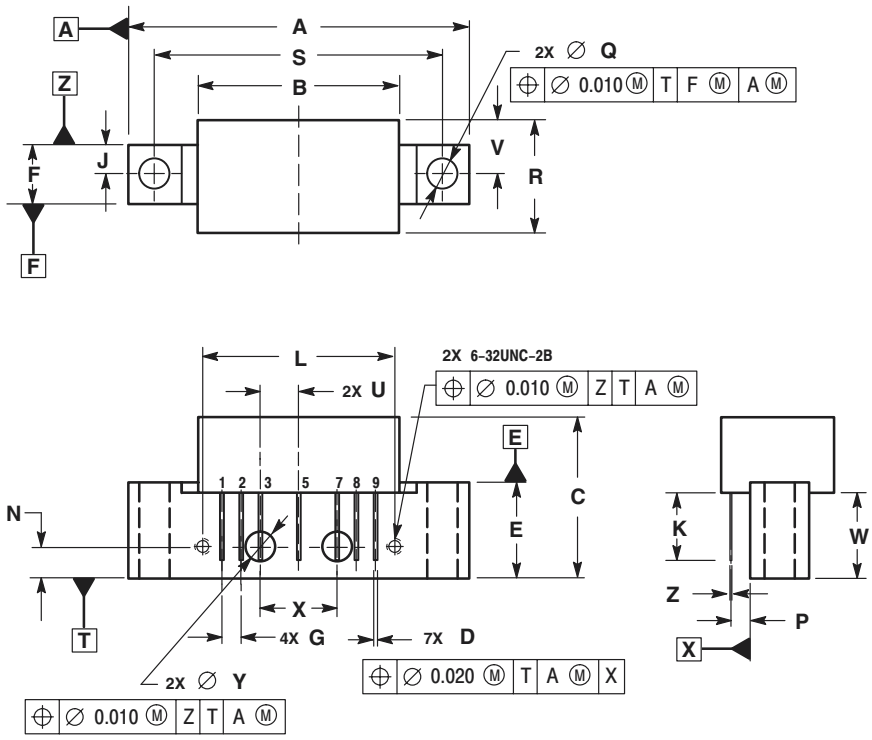


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	-----	1.775	-----	45.08
B	-----	1.085	-----	27.56
C	-----	0.840	-----	21.34
D	0.018	0.022	0.46	0.56
E	0.465	0.510	11.81	12.95
F	0.300	0.325	7.62	8.25
G	0.100 BSC		2.54 BSC	
J	0.156 BSC		3.96 BSC	
K	0.315	0.355	8.00	8.50
L	1.00 BSC		25.40 BSC	
N	0.165 BSC		4.19 BSC	
P	0.100 BSC		2.54 BSC	
Q	0.148	0.168	3.76	4.27
R	-----	0.600	-----	15.24
S	1.500 BSC		38.10 BSC	
U	0.200 BSC		5.08 BSC	
V	---	0.250	---	6.35
W	0.435	0.450	11.05	11.43
X	0.400 BSC		10.16 BSC	
Y	0.152	0.163	3.85	4.15

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

CASE 714Y–03
ISSUE D



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

	INCHES		MILLIMETERS	
DIM	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

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

Chapter Five

Motorola Distributor & Worldwide Sales Offices

MOTOROLA AUTHORIZED DISTRIBUTORS AND WORLDWIDE SALES OFFICES

AUTHORIZED DISTRIBUTORS – UNITED STATES OF AMERICA

ALABAMA
Huntsville
Arrow Electronics 1–800–777–2776
FAI ..... (256) 971–1324
Future Electronics ..... (256) 971–2010
Avnet Electronics ..... (258) 830–8700

ARIZONA
Phoenix
FAI ..... (602) 629–3000
Future Electronics ..... (602) 629–3013
Avnet Electronics ..... (480) 736–7000
Tempe
Arrow Electronics 1–800–777–2776
Newark ..... (602) 966–6340
Tucson
Avnet Electronics ..... (520) 742–0515

CALIFORNIA
Agoura Hills
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