

Device Data Book

CATV DISTRIBUTION AMPLIFIER MODULE DEVICE DATA

DL209/D
Rev. 1
10/2003



digital dna™



CATV



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

Product Preview

This heading on a data sheet indicates that the device is in the formative stages or in design (under development). The disclaimer at the bottom of the first page reads: "This document contains information on a product under development. Motorola reserves the right to change or discontinue this product without notice."

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Freescale Semiconductor, Inc.

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<http://www.motorola.com/semiconductors>.

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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Phone: 852-26668334

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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 part number search, parametric search, product summary pages, data sheets, selector guide information, application information, package outlines, on-line technical support and much more.

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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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Freescale Semiconductor, Inc.

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.

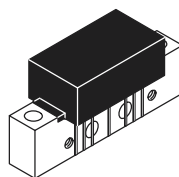
General Purpose Linear Amplifier Modules — Class A — Silicon Bipolar

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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Freescale Semiconductor, Inc.

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				DC Current mA Typ	Noise Figure @ 1000 MHz dB Max	Pkg/Style
			Output Level dBmV/CH	2nd Order Test dBc	Composite Triple Beat	Cross Modulation			
					dBc 152 CH	dBc 152 CH			

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				DC Current mA Typ	Noise Figure @ 870 MHz dB Max	Pkg/Style
			Output Level dBmV/CH	2nd Order Test dBc	Composite Triple Beat	Cross Modulation			
					dBc 132 CH	dBc 132 CH			

Preamplifiers

MHW9146★	14.3	132	+44	-60 ⁽³⁶⁾	-60	-55	245	5.5	1302/1
MHW9186	18.5	132	+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★	23.8	132	+44	-60 ⁽³⁶⁾	-60	-50	255	6.5	1302/1
MHW9276★	27.9	132	+44	-60 ⁽³⁶⁾	-60	-53	250	6.5	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
MHW9227★	22.1	132	+48	-62 ⁽³⁴⁾	-56	-55	425	4.5	1302/1
MHW9247	24.9	132	+48	-62 ⁽³⁴⁾	-56	-54	440	7.0	1302/1
MHW9267★	27.6	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

★New Product

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CATV Distribution: Forward Amplifier Modules (continued)

40-870 MHz High Output MMIC, $V_{CC} = 24$ Vdc, Class A — GaAs

Product	Hybrid Gain (Nom) @ 870 MHz dB	Channel Loading Capacity	Maximum Distortion Specifications				DC Current mA Typ	Noise Figure @ 870 MHz dB Max	Pkg/Style
			Output Level dBmV/CH	2nd Order Test dBc	Composite Triple Beat dBc	Cross Modulation dBc			
					132 CH	132 CH			

Preamplifiers

MMG1001R2 ^(18e) ★	18.5	132	+44	-58	-56	-52	250	5.0	978/—
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Power Doublers

MMG2001R2 ^(18e) ★	19.5	132	+48	-60	-54	-53	425	4.5	978/—
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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				DC Current mA Typ	Noise Figure @ 870 MHz dB Max	Pkg/Style
			Output Level dBmV/CH	2nd Order Test dBc	Composite Triple Beat dBc	Cross Modulation dBc			
					128 CH	128 CH			

Preamplifiers

MHW8202B	20.9	128	+38	-66 ⁽⁴⁰⁾	-63	-62	220	7.0	1302/1
MHW8272A	27.2	128	+38	-64 ⁽⁴⁰⁾	-64	-62	310	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				DC Current mA Typ	Noise Figure @ 860 MHz dB Max	Pkg/Style
			Output Level dBmV/CH	2nd Order Test dBc	Composite Triple Beat dBc	Cross Modulation FM = 55 MHz dBc			
					128 CH	128 CH			

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

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

⁽¹⁸⁾Tape and Reel Packaging Option Available by adding suffix: a) R1 = 500 units; b) R2 = 2,500 units; c) T1 = 3,000 units; d) T3 = 10,000 units; e) R2 = 1,500 units;

f) T1 = 1,000 units; g) R2 = 4,000 units; h) R1 = 1,000 units; i) R3 = 250 units; j) T1 = 500 units; k) R2 = 450 units; l) T1 = 5,000 units; m) R2 = 2,000 units;

n) R4 = 100 units.

⁽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

Freescale Semiconductor, Inc.

CATV Distribution: Forward Amplifier Modules (continued)

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				DC Current mA Typ	Noise Figure @ 750 MHz dB Max	Pkg/ Style
			Output Level dBmV/CH	2nd Order Test dBc	Composite Triple Beat	Cross Modulation FM = 55 MHz			
					dBc	dBc			
					110 CH	110 CH			

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

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

High Gain Forward Amplifiers, $V_{CC} = 24$ Vdc, Class A — Silicon Bipolar

Product	Hybrid Gain (Nom)	Frequency Band	Channel Loading Capacity	Maximum Distortion Specifications				DC Current	Noise Figure @ High Freq.	Pkg/Style
	@ 50 MHz			Output Level	2nd Order Test	Composite Triple Beat	Cross Modulation			
	dB			dBmV/CH	dBc	dBc	dBc			

Forward Amplifiers

MHW6342T	34.5	40-550	77	+44	-57 ⁽³⁶⁾	-57	-57	310	6.5	1302/1
MHW7342 ^(46b)	34	40-750	112	+44	-50 ⁽³⁶⁾	-52	-53	325	6.0	1302/1
MHW8342 ^(46b)	34	40-870	132	+44	-42 ⁽³⁶⁾	-46	-52	325	6.5	1302/1

⁽³⁶⁾Composite 2nd Order; $V_{out} = +44$ dBmV/ch

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

⁽⁴⁶⁾To be introduced: a) 3Q03; b) 4Q03; c) 1Q04

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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						DC Current mA Typ	Noise Figure @ 175 MHz dB Max	Pkg/ Style
			Output Level dBmV/ CH	2nd Order Test dBc	Composite Triple Beat dBc		Cross Modulation dBc				
					22 CH	26 CH	22 CH	26 CH			
MHW1244	24	22, 26	+50	-72 ⁽³⁰⁾	-68	-67.5 ⁽¹⁹⁾	-61	-61 ⁽¹⁹⁾	210	5.0	1302/1
MHW1346 ^(46b)	35	22, 26	+50	-72 ⁽³¹⁾	-68	-70 ⁽¹⁹⁾	-60	-63 ⁽¹⁹⁾	325	5.0*	1302/1

*@ 200 MHz

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							DC Current mA Typ	Noise Figure @ 200 MHz dB Max	Pkg/Style
			Output Level dBmV/CH	2nd Order Test		Composite Triple Beat		Cross Modulation				
				dBc		dBc		dBc				
				6 CH	10 CH	6 CH	10 CH	6 CH	10 CH			
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							DC Current mA Typ	Noise Figure @ 150 MHz dB Max	Pkg/ Style
			Output Level dBmV/ CH	2nd Order Test dBc		Composite Triple Beat dBc		Cross Modulation dBc				
				6 CH	10 CH	6 CH	10 CH	6 CH	10 CH			
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							DC Current mA Typ	Noise Figure @ 65 MHz dB Max	Pkg/ Style
			Output Level dBmV/ CH	2nd Order Test		Composite Triple Beat		Cross Modulation				
				dBc		dBc		dBc				
				6 CH	10 CH	6 CH	10 CH	6 CH	10 CH			
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

⁽¹⁹⁾Typical⁽³⁰⁾Channels 2 and A @ 7⁽³¹⁾26 Ch. Composite Second Order Test⁽⁴⁶⁾To be introduced: a) 3Q03; b) 4Q03; c) 1Q04

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CATV Distribution: Reverse Amplifier Modules (continued)

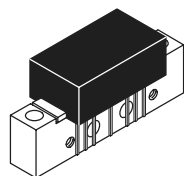
Low Current Amplifiers — 5-50 MHz Hybrids, $V_{CC} = 24$ Vdc, Class A — Silicon Bipolar

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

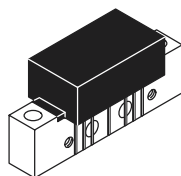
⁽³⁰⁾Channels 2 and A @ 7

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CATV Distribution Amplifier Module Packages

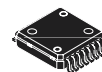


CASE 714Y
STYLE 1



CASE 1302
STYLE 1, 2

SCALE 1:2



CASE 978
PFP-16

SCALE 1:1

Chapter Two

Motorola RF General Purpose Linear Amplifier Module Data Sheets

Freescale Semiconductor, Inc.

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The RF Line

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

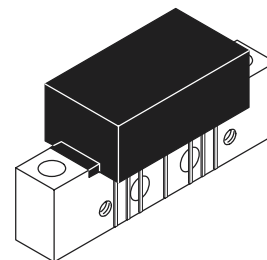
- Driver Amplifier in 50 Ohm Systems Requiring High Linearity
- Instrumentation Amplifiers
- Return Path Amplifier on CATV Systems Operating in the 10 to 200 MHz Frequency Range
- Possible Replacement for CA2830C

Description

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

MHW1345

**10-200 MHz
34.5 dB
800 mW
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 ($T_C = 25^\circ\text{C}$, $V_{CC} = 24\text{ V}$, 50 Ω system unless otherwise noted)

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

REV 0

MOTOROLA CATV DISTRIBUTION
AMPLIFIER MODULE DEVICE DATA

**For More Information On This Product,
Go to: www.freescale.com**

**MHW1345
2.1- 3**

Freescale Semiconductor, Inc.

Biased at 24 Volts

T = 25°C Z_o = 50Ω

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

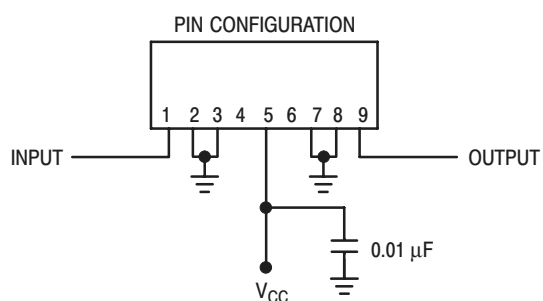
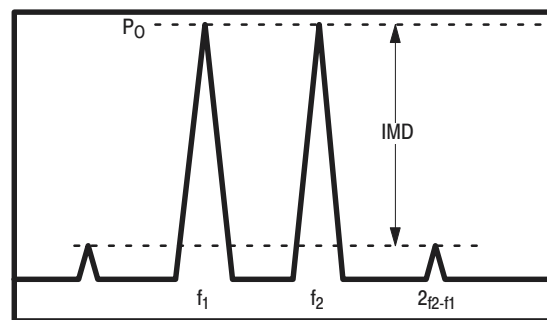


Figure 1. External Connections



$$ITO = P_0 + \frac{IMD}{2} @ IMD > 60dB$$

$$PEP = 4X P_0 @ IMD = -32dB$$

Figure 2. Intermodulation Test

Chapter Three

Motorola CATV Distribution Amplifier Module Data Sheets

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Data Sheets (continued)

Device Number	Page Number
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The RF Line CATV Amplifier Module

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

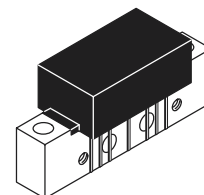
- CATV Systems Operating in the 5 to 200 MHz Frequency Range
- Specified for Use as a Return Path Amplifier for Low-, Mid- and High-Split 2-Way Cable TV Systems

Description

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

MHW1223LA

**5-200 MHz, 22.7 dB
10-CHANNEL
CATV LOW CURRENT 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, $T_C = 30^\circ\text{C}$, 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 (@ $f = 5$ -150 MHz) (@ $f = 150$ -200 MHz)	IRL/ORL	20 18	— —	— —	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	

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ELECTRICAL CHARACTERISTICS - continued ($V_{CC} = 24$ Vdc, $T_C = 30^\circ\text{C}$, 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 ($f = 5$ -200 MHz)	NF	—	6.3	7	dB
DC Current	I_{DC}	85	95	110	mA

The RF Line CATV Amplifier Module

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

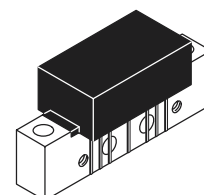
- CATV Systems Operating in the 5 to 65 MHz Frequency Range
- Specified for Use as a Return Path Amplifier for Low-Split 2-Way Cable TV Systems

Description

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

MHW1224LA

**5-65 MHz, 22.7 dB
10-CHANNEL
CATV LOW CURRENT 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, $T_C = 30^\circ\text{C}$, 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	

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ELECTRICAL CHARACTERISTICS - continued ($V_{CC} = 24 \text{ Vdc}$, $T_C = 30^\circ\text{C}$, 75Ω system, unless otherwise noted)

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

The RF Line CATV Amplifier Module

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

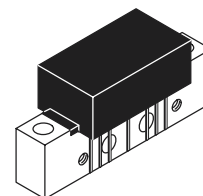
- CATV Systems Operating in the 5 to 200 MHz Frequency Range
- Designed for Broadband Applications Requiring Low Distortion Characteristics
- Specified for Use as a Return Path Amplifier for Low-, Mid- and High-Split 2-Way Cable TV Systems

Description

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

MHW1244

**5-200 MHz, 24.0 dB
26-CHANNEL
CATV HIGH-SPLIT
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, $T_C = +30^\circ\text{C}$, 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) 22-Channel FLAT (5.0-175 MHz) (2) (3) 26-Channel FLAT (5.0-200 MHz)	XMD_{12} XMD_{22} XMD_{26}	-66 Typ -61 Max -61 Typ	dBc dBc dBc

NOTES:

- Response and return loss characteristics are tested and guaranteed for the full 5.0-200 MHz frequency range.
- 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
- 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.

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ELECTRICAL CHARACTERISTICS — continued ($V_{CC} = 24$ Vdc, $T_C = +30^{\circ}\text{C}$, 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:

- Response and return loss characteristics are tested and guaranteed for the full 5.0-200 MHz frequency range.
- 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
- 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

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

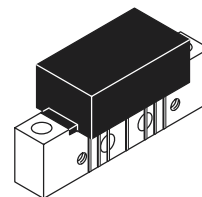
- CATV Systems Operating in the 5 to 200 MHz Frequency Range
- Specified for Use as a Return Path Amplifier for Low-, Mid- and High-Split 2-Way Cable TV Systems

Description

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

MHW1253LA

**5-200 MHz, 25.5 dB
10-CHANNEL
CATV LOW CURRENT 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, $T_C = 30^\circ\text{C}$, 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 (@ $f = 5$ -150 MHz) (@ $f = 150$ -200 MHz)	IRL/ORL	20 18	— —	— —	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	

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ELECTRICAL CHARACTERISTICS - continued ($V_{CC} = 24$ Vdc, $T_C = 30^\circ\text{C}$, 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 ($f = 5$ -200 MHz)	NF	—	5.8	6.5	dB
DC Current	I_{DC}	85	95	110	mA

The RF Line CATV Amplifier Module

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

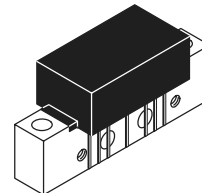
- CATV Systems Operating in the 5 to 50 MHz Frequency Range
- Specified for Use as a Return Path Amplifier for Low-Split 2-Way Cable TV Systems

Description

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

MHW1254L

**50 MHz, 25 dB
4-CHANNEL
CATV LOW CURRENT 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, $T_C = 30^\circ\text{C}$, 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

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

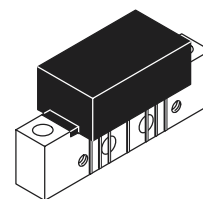
- CATV Systems Operating in the 5 to 65 MHz Frequency Range
- Specified for Use as a Return Path Amplifier for Low-Split 2-Way Cable TV Systems

Description

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

MHW1254LA

5-65 MHz, 25.5 dB
10-CHANNEL
CATV LOW CURRENT 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, $T_C = 30^\circ\text{C}$, 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	

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MHW1254LA
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For More Information On This Product
Go to: www.freescale.com

MOTOROLA CATV DISTRIBUTION
 AMPLIFIER MODULE DEVICE DATA

Freescale Semiconductor, Inc.

ELECTRICAL CHARACTERISTICS - continued ($V_{CC} = 24$ Vdc, $T_C = 30^\circ\text{C}$, 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 ($f = 5$ -65 MHz)	NF	—	5.8	6.5	dB
DC Current	I_{DC}	85	95	110	mA

The RF Line

CATV Amplifier Module

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

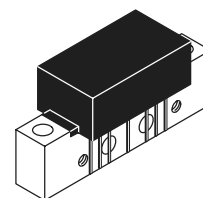
- CATV Systems Operating in the 5 to 200 MHz Frequency Range
- Specified for Use as a Return Path Amplifier for Low-, Mid- and High-Split 2-Way Cable TV Systems

Description

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

MHW1303LA

5-200 MHz, 30.8 dB
10-CHANNEL
CATV LOW CURRENT 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, $T_C = 30^\circ\text{C}$, 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 (@ f = 5-65 MHz) (@ f = 65-200 MHz)	IRL/ORL	20 18	— —	— —	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	

REV 1

MHW1303LA
3.1- 14

For More Information On This Product
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 AMPLIFIER MODULE DEVICE DATA

Freescale Semiconductor, Inc.

ELECTRICAL CHARACTERISTICS - continued ($V_{CC} = 24$ Vdc, $T_C = 30^\circ\text{C}$, 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 ($f = 5$ -200 MHz)	NF	—	5	5.7	dB
DC Current	I_{DC}	85	95	110	mA

The RF Line

CATV Amplifier Module

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

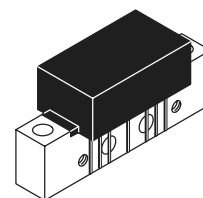
- CATV Systems Operating in the 5 to 65 MHz Frequency Range
- Specified for Use as a Return Path Amplifier for Low-Split 2-Way Cable TV Systems

Description

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

MHW1304LA

5-65 MHz, 30.8 dB
10-CHANNEL
CATV LOW CURRENT 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, $T_C = 30^\circ\text{C}$, 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	

Freescale Semiconductor, Inc.

ELECTRICAL CHARACTERISTICS - continued ($V_{CC} = 24$ Vdc, $T_C = 30^\circ\text{C}$, 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 ($f = 5$ -65 MHz)	NF	—	5	5.7	dB
DC Current	I_{DC}	85	95	110	mA

This document contains information on a product under development. Motorola reserves the right to change or discontinue this product without notice.

Product Preview

The RF Line

CATV Amplifier Module

Features

- Specified for 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

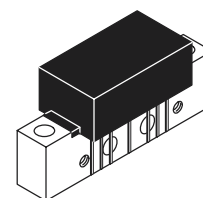
- CATV Systems Operating in the 5 to 200 MHz Frequency Range
- Designed for Broadband Applications Requiring Low Distortion Characteristics
- Specified for Use as a Return Path Amplifier for Low-, Mid- and High-Split 2-Way Cable TV Systems

Description

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

MHW1346

5-200 MHz, 35 dB
26-CHANNEL
CATV HIGH-SPLIT
REVERSE AMPLIFIER
MODULE



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, $T_C = +30^\circ\text{C}$, 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	34.5	35	35.8	dB
Slope (5-200 MHz)	S	0	—	1.0	dB
Gain Flatness (Peak To Valley) (5-200 MHz)	G_F	—	0.6	1	dB
Return Loss — Input/Output (@ $f = 5$ -65 MHz) (@ $f = 65$ -200 MHz)	IRL/ORL	20 16	24 20	— —	dB
Composite Second Order ($V_{out} = +50$ dBmV per Ch., Worst Case)					dBc
5-175 MHz 22-Channel FLAT	CSO_{22}	—	-76	-72	
5-200 MHz 26-Channel FLAT	CSO_{26}	—	-75	—	

REV 0

MHW1346
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For More Information On This Product
Go to: www.freescale.com

MOTOROLA CATV DISTRIBUTION
AMPLIFIER MODULE DEVICE DATA

Freescale Semiconductor, Inc.

ELECTRICAL CHARACTERISTICS - continued ($V_{CC} = 24$ Vdc, $T_C = 30^\circ\text{C}$, 75 Ω system, unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Cross Modulation Distortion ($V_{out} = +50$ dBmV per Ch., Worst Case)					dBc
22-Channel FLAT	XMD_{22}	—	-64	-60	
26-Channel FLAT	XMD_{26}	—	-63	—	
Composite Triple Beat ($V_{out} = +50$ dBmV per Ch., Worst Case)					dBc
5-175 MHz 22-Channel FLAT	CTB_{22}	—	-72	-68	
5-200 MHz 26-Channel FLAT	CTB_{26}	—	-70	—	
Noise Figure ($f = 200$ MHz)	NF	—	3.5	5	dB
DC Current	I_{DC}	310	325	350	mA

The RF Line

CATV Amplifier Module

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

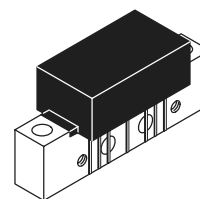
- CATV Systems Operating in the 5 to 150 MHz Frequency Range
- Specified for Use as a Return Path Amplifier for Low-, Mid- and High-Split 2-Way Cable TV Systems

Description

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

MHW1353LA

5-150 MHz, 35.2 dB
10-CHANNEL
CATV LOW CURRENT 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, $T_C = 30^\circ\text{C}$, 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 (@ f = 5-65 MHz) (@ f = 65-150 MHz)	IRL/ORL	20 18	— —	— —	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	

REV 1

MHW1353LA
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For More Information On This Product
Go to: www.freescale.com

MOTOROLA CATV DISTRIBUTION
 AMPLIFIER MODULE DEVICE DATA

Freescale Semiconductor, Inc.

ELECTRICAL CHARACTERISTICS - continued ($V_{CC} = 24$ Vdc, $T_C = 30^\circ\text{C}$, 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 ($f = 5$ -150 MHz)	NF	—	4.4	5.4	dB
DC Current	I_{DC}	85	95	110	mA

The RF Line

CATV Amplifier Module

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

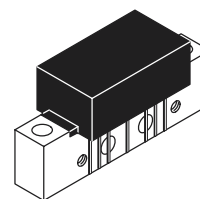
- CATV Systems Operating in the 5 to 65 MHz Frequency Range
- Specified for Use as a Return Path Amplifier for Low-Split 2-Way Cable TV Systems

Description

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

MHW1354LA

5-65 MHz, 35.2 dB
10-CHANNEL
CATV LOW CURRENT 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, $T_C = 30^\circ\text{C}$, 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	

Freescale Semiconductor, Inc.

ELECTRICAL CHARACTERISTICS - continued ($V_{CC} = 24$ Vdc, $T_C = 30^\circ\text{C}$, 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 ($f = 5$ -65 MHz)	NF	—	4.4	5.4	dB
DC Current	I_{DC}	85	95	110	mA

The RF Line

CATV Amplifier Module

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

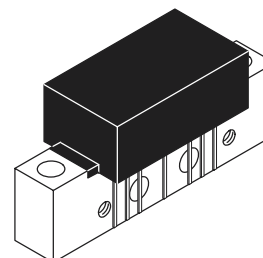
- CATV Systems Operating in the 40 to 550 MHz Frequency Range
- Single Module High Gain Line Amplifier in Cable TV Distribution System

Description

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

MHW6342T

550 MHz
35.2 dB GAIN
77-CHANNEL
CATV 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, $T_C = +30^{\circ}\text{C}$, 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

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MHW6342T
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For More Information On This Product
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MOTOROLA CATV DISTRIBUTION
 AMPLIFIER MODULE DEVICE DATA

Freescale Semiconductor, Inc.

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

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

The RF Line

CATV Amplifier Module

Features

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

Applications

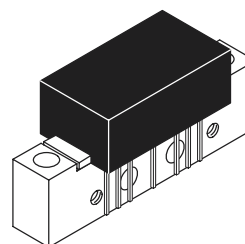
- CATV Systems Operating in the 40 to 750 MHz Frequency Range
- Input Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications
- Output Stage Amplifier on Applications Requiring Low Power Dissipation

Description

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

MHW7182B

750 MHz
19 dB GAIN
110-CHANNEL
CATV AMPLIFIER



CASE 714Y-04, 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, $T_C = +30^\circ\text{C}$, 75 Ω system unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Frequency Range	BW	40	—	750	MHz
Power Gain	G_p	18	18.5	19	dB
		18.2	19	20	
Slope	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)	IRL/ORL	20	—	—	dB
@ 40 MHz		—	—	0.005	dB/MHz
@ $f > 40$ MHz (Derate)		—	—	—	
Composite Second Order		—	—	—	dBc
($V_{out} = +40$ dBmV/ch., Worst Case)	CSO_{110}	—	-70	-63	
($V_{out} = +44$ dBmV/ch., Worst Case)	CSO_{77}	—	-70	-64	

REV 2

MHW7182B
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For More Information On This Product
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MOTOROLA CATV DISTRIBUTION
 AMPLIFIER MODULE DEVICE DATA

Freescale Semiconductor, Inc.

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

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

The RF Line

CATV Amplifier Module

Features

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

Applications

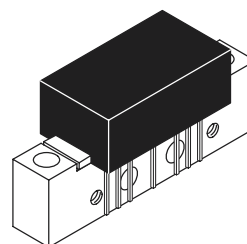
- CATV Systems Operating in the 40 to 750 MHz Frequency Range
- Output Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications

Description

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

MHW7185C

750 MHz
19.4 dB GAIN
110-CHANNEL
CATV AMPLIFIER



CASE 714Y-04, 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, $T_C = +30^\circ\text{C}$, 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

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MHW7185C
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For More Information On This Product
Go to: www.freescale.com

MOTOROLA CATV DISTRIBUTION
 AMPLIFIER MODULE DEVICE DATA

Freescale Semiconductor, Inc.

ELECTRICAL CHARACTERISTICS — continued ($V_{CC} = 24$ Vdc, $T_C = +30^\circ\text{C}$, 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, $T_C = 30^\circ\text{C}$)		I_{DC}	365	400	435	mA

The RF Line

CATV Amplifier Module

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

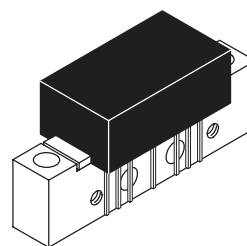
- CATV Systems Operating in the 40 to 750 MHz Frequency Range
- Output Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications
- Amplifier Requiring Lower Power Dissipation While Maintaining Excellent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

Description

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

MHW7185CL

750 MHz
19.2 dB GAIN
110-CHANNEL
CATV AMPLIFIER



CASE 714Y-04, 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, $T_C = +30^{\circ}\text{C}$, 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 ($Z_0 = 75$ 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

REV 2

MHW7185CL
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For More Information On This Product
Go to: www.freescale.com

MOTOROLA CATV DISTRIBUTION
 AMPLIFIER MODULE DEVICE DATA

Freescale Semiconductor, Inc.

ELECTRICAL CHARACTERISTICS — continued ($V_{CC} = 24$ Vdc, $T_C = +30^\circ\text{C}$, 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}	—	-63.5	-61	dBc
	77-Channel FLAT	CTB_{77}	—	-70	-68	
Noise Figure	50 MHz	NF	—	5.3	6.2	dB
	550 MHz		—	5.8	—	
	750 MHz		—	6.5	7.5	
DC Current ($V_{DC} = 24$ V, $T_C = -20$ to $+100^\circ\text{C}$)		I_{DC}	345	370	385	mA

The RF Line

CATV Amplifier Module

Features

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

Applications

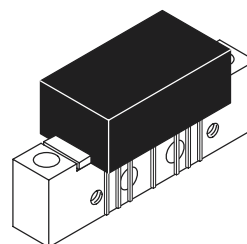
- CATV Systems Operating in the 40 to 750 MHz Frequency Range
- Output Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications

Description

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

MHW7205C

750 MHz
20.2 dB GAIN
110-CHANNEL
CATV AMPLIFIER



CASE 714Y-04, 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, $T_C = +30^\circ\text{C}$, 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

REV 7

MHW7205C
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For More Information On This Product
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MOTOROLA CATV DISTRIBUTION
 AMPLIFIER MODULE DEVICE DATA

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ELECTRICAL CHARACTERISTICS — continued ($V_{CC} = 24$ Vdc, $T_C = +30^\circ\text{C}$, 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}	—	-63	-61	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, $T_C = 30^\circ\text{C}$)		I_{DC}	365	400	435	mA

The RF Line

CATV Amplifier Module

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

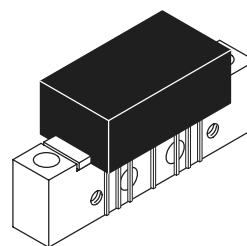
- CATV Systems Operating in the 40 to 750 MHz Frequency Range
- Output Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications
- Amplifier Requiring Lower Power Dissipation While Maintaining Excellent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

Description

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

MHW7205CL

750 MHz
20 dB GAIN
110-CHANNEL
CATV AMPLIFIER



CASE 714Y-04, 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, $T_C = +30^{\circ}\text{C}$, 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

REV 2

MHW7205CL
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Go to: www.freescale.com

MOTOROLA CATV DISTRIBUTION
 AMPLIFIER MODULE DEVICE DATA

Freescale Semiconductor, Inc.

ELECTRICAL CHARACTERISTICS — continued ($V_{CC} = 24$ Vdc, $T_C = +30^\circ\text{C}$, 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}	—	-63	-61	dBc
	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	7.5	
DC Current ($V_{DC} = 24$ V, $T_C = -20$ to $+100^\circ\text{C}$)		I_{DC}	345	365	385	mA

The RF Line

CATV Amplifier Module

Features

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

Applications

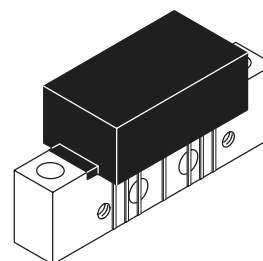
- CATV Systems Operating in the 40 to 750 MHz Frequency Range
- Input Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications
- Output Stage Amplifier on Applications Requiring Low Power Dissipation

Description

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

MHW7222B

750 MHz
22.7 dB GAIN
110-CHANNEL
CATV 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, $T_C = +30^\circ\text{C}$, 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

REV 3

MHW7222B
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Go to: www.freescale.com

MOTOROLA CATV DISTRIBUTION
 AMPLIFIER MODULE DEVICE DATA

Freescale Semiconductor, Inc.

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

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

The RF Line

CATV Amplifier Module

Features

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

Applications

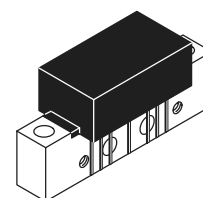
- CATV Systems Operating in the 40 to 750 MHz Frequency Range
- Input Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications
- Output Stage Amplifier on Applications Requiring Low Power Dissipation

Description

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

MHW7242A

750 MHz
24.7 dB GAIN
110-CHANNEL
CATV 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, $T_C = +30^\circ\text{C}$, 75 Ω system unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Frequency Range	BW	40	—	750	MHz
Power Gain	G_p	23.2	24	24.8	dB
		24	24.7	26	
Slope	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 ($Z_0 = 75$ Ohms)	IRL/ORL	20	—	—	dB
		—	—	0.007	dB/MHz
Composite Second Order					dBc
($V_{out} = +40$ dBmV/ch., Worst Case)	CSO_{110}	—	-69	-62	
($V_{out} = +44$ dBmV/ch., Worst Case)	CSO_{77}	—	-78	—	

REV 3

MHW7242A
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For More Information On This Product
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MOTOROLA CATV DISTRIBUTION
 AMPLIFIER MODULE DEVICE DATA

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

Characteristic		Symbol	Min	Typ	Max	Unit
Cross Modulation Distortion @ Ch 2 ($V_{out} = +40$ dBmV/ch., FM = 55 MHz) ($V_{out} = +44$ dBmV/ch., FM = 55 MHz)	110-Channel FLAT	XMD_{110}	—	-63	-61	dBc
	77-Channel FLAT	XMD_{77}	—	-58	—	
Composite Triple Beat ($V_{out} = +40$ dBmV/ch., Worst Case) ($V_{out} = +44$ dBmV/ch., Worst Case)	110-Channel FLAT	CTB_{110}	—	-67	-63	dBc
	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

Features

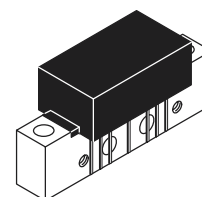
- Specified for 110-Channel Loading
- Excellent Distortion Performance
- Silicon Bipolar Transistor Technology
- Unconditionally Stable Under All Load Conditions

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

**750 MHz
27.7 dB GAIN
110-CHANNEL
CATV 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, $T_C = +30^\circ\text{C}$, 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, $T_C = 30^\circ\text{C}$)	I_{DC}	280	310	350	mA

REV 1

MHW7272A
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For More Information On This Product
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MOTOROLA CATV DISTRIBUTION
 AMPLIFIER MODULE DEVICE DATA

The RF Line CATV Amplifier Module

Features

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

Applications

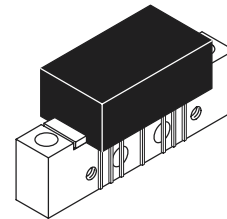
- CATV Systems Operating in the 40 to 770 MHz Frequency Range
- Input Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications
- Output Stage Amplifier on Applications Requiring Low Power Dissipation

Description

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

MHW7292A

**770 MHz, 29.8 dB GAIN
110-CHANNEL
CATV 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, $T_C = +30^\circ\text{C}$, 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, $T_C = 30^\circ\text{C}$)	I_{DC}	280	310	350	mA

REV 1

MOTOROLA CATV DISTRIBUTION
AMPLIFIER MODULE DEVICE DATA

**For More Information On This Product,
Go to: www.freescale.com**

**MHW7292A
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This document contains information on a product under development. Motorola reserves the right to change or discontinue this product without notice.

Product Preview

The RF Line

CATV Amplifier Module

Features

- Specified for up to 112-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

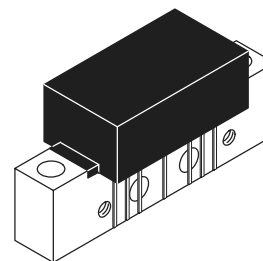
- CATV Systems Operating in the 40 to 750 MHz Frequency Range
- Single Module High Gain Line Amplifier in Cable TV Distribution System

Description

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

MHW7342

750 MHz
34 dB GAIN
112-CHANNEL
CATV AMPLIFIER MODULE



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, $T_C = +30^\circ\text{C}$, 75 Ω system unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Frequency Range	BW	40	—	750	MHz
Power Gain	G_p	33.2	34	34.8	dB
		34	35.2	36	
Slope	S	0.5	1.2	2.25	dB
Gain Flatness (Peak To Valley)	G_F	—	0.3	0.8	dB
Return Loss — Input ($Z_o = 75$ Ohms)	IRL	22	28	—	dB
		18	25	—	
		16	22	—	
		14	19	—	
Return Loss — Output ($Z_o = 75$ Ohms)	ORL	22	28	—	dB
		19	25	—	
		17	22	—	
		15	22	—	

REV 0

MHW7342
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For More Information On This Product
Go to: www.freescale.com

MOTOROLA CATV DISTRIBUTION
AMPLIFIER MODULE DEVICE DATA

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

Characteristic		Symbol	Min	Typ	Max	Unit
Composite Second Order ($V_{out} = +44 \text{ dBmV/ch.}$, Worst Case)	79-Channel FLAT	CSO_{79}	—	-65	-60	dBc
	112-Channel FLAT	CSO_{112}	—	-55	-50	
Cross Modulation Distortion ($V_{out} = +44 \text{ dBmV}$, FM = 55.25 MHz)	79-Channel FLAT	XMD_{79}	—	-63	-60	dBc
	112-Channel FLAT	XMD_{112}	—	-56	-53	
Composite Triple Beat ($V_{out} = +44 \text{ dBmV/ch.}$, Worst Case)	79-Channel FLAT	CTB_{79}	—	-64	-62	dBc
	112-Channel FLAT	CTB_{112}	—	-54	-52	
Noise Figure	50 MHz	NF	—	3.5	4.5	dB
	550 MHz		—	4.5	—	
	750 MHz		—	5	6	
DC Current		I_{DC}	310	325	350	mA

The RF Line

CATV Amplifier Module

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

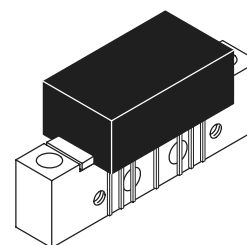
- CATV Systems Operating in the 40 to 860 MHz Frequency Range
- Input Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications
- Output Stage Amplifier on Applications Requiring Low Power Dissipation

Description

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

MHW8182B

860 MHz
19.1 dB GAIN
128-CHANNEL
CATV AMPLIFIER



CASE 714Y-04, 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, $T_C = +30^{\circ}\text{C}$, 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) 128-Channel FLAT ($V_{out} = +40$ dBmV/ch., Worst Case) 110-Channel FLAT ($V_{out} = +44$ dBmV/ch., Worst Case) 77-Channel FLAT	CSO_{128} CSO_{110} CSO_{77}	— — —	-71 -70 -70	-64 -63 -64	dBc

REV 2

MHW8182B
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For More Information On This Product
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MOTOROLA CATV DISTRIBUTION
 AMPLIFIER MODULE DEVICE DATA

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ELECTRICAL CHARACTERISTICS - continued ($V_{CC} = 24$ Vdc, $T_C = +30^\circ\text{C}$, 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, $T_C = 30^\circ\text{C}$)		I_{DC}	180	220	240	mA

The RF Line

CATV Amplifier Module

Features

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

Applications

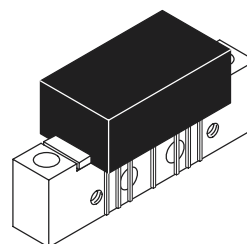
- CATV Systems Operating in the 40 to 860 MHz Frequency Range
- Output Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications

Description

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

MHW8185

860 MHz
19.4 dB GAIN
128-CHANNEL
CATV AMPLIFIER



CASE 714Y-04, 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, $T_C = +30^\circ\text{C}$, 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

REV 6

MHW8185
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For More Information On This Product
Go to: www.freescale.com

MOTOROLA CATV DISTRIBUTION
 AMPLIFIER MODULE DEVICE DATA

Freescale Semiconductor, Inc.

ELECTRICAL CHARACTERISTICS - continued ($V_{CC} = 24 \text{ Vdc}$, $T_C = +30^\circ\text{C}$, 75Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Composite Triple Beat ($V_{out} = +40 \text{ dBmV/ch.}$, Worst Case) ($V_{out} = +44 \text{ dBmV/ch.}$, Worst Case)	128-Channel FLAT	CTB_{128}	—	-67	-64	dBc
	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 ($V_{DC} = 24 \text{ V}$, $T_C = 30^\circ\text{C}$)		I_{DC}	365	400	435	mA

The RF Line

CATV Amplifier Module

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

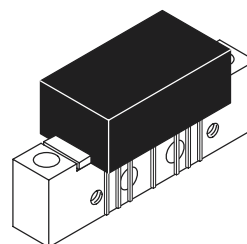
- CATV Systems Operating in the 40 to 870 MHz Frequency Range
- Output Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications
- Amplifiers Requiring Lower Power Dissipation While Maintaining Excellent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

Description

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

MHW8185L

870 MHz
19.4 dB GAIN
128-CHANNEL
CATV AMPLIFIER



CASE 714Y-04, 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, $T_C = +30^\circ\text{C}$, 75 Ω system unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Frequency Range	BW	40	—	870	MHz
Power Gain	G_p	18	18.5	19	dB
		19	19.4	20.5	
Slope	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)	IRL/ORL				
@ 40 MHz		20	—	—	dB
@ $f > 40$ MHz (Derate)		—	—	0.007	dB/MHz
Composite Second Order					dBc
($V_{out} = +40$ dBmV/ch., Worst Case) 128-Channel FLAT	CSO_{128}	—	-69	-62	
($V_{out} = +44$ dBmV/ch., Worst Case) 110-Channel FLAT	CSO_{110}	—	-70	-64	
($V_{out} = +44$ dBmV/ch., Worst Case) 77-Channel FLAT	CSO_{77}	—	-85	-68	

REV 2

MHW8185L
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For More Information On This Product
Go to: www.freescale.com

MOTOROLA CATV DISTRIBUTION
 AMPLIFIER MODULE DEVICE DATA

Freescale Semiconductor, Inc.

ELECTRICAL CHARACTERISTICS — continued ($V_{CC} = 24$ Vdc, $T_C = +30^\circ\text{C}$, 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 $+100^\circ\text{C}$)		I_{DC}	345	365	385	mA

The RF Line

CATV Amplifier Module

MHW8202B

Features

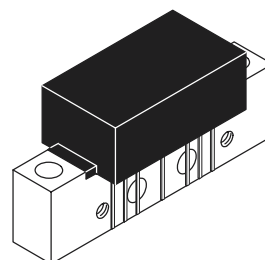
- Specified for 77-, 110- and 128-Channel Loading
- Excellent Distortion Performance
- Silicon Bipolar Transistor Technology
- Unconditionally Stable Under All Load Conditions

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

870 MHz
20.9 dB GAIN
128-CHANNEL
CATV 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, $T_C = +30^{\circ}\text{C}$, 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

REV 1

MHW8202B
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For More Information On This Product
Go to: www.freescale.com
MOTOROLA CATV DISTRIBUTION
AMPLIFIER MODULE DEVICE DATA

Freescale Semiconductor, Inc.

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

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

The RF Line

CATV Amplifier Module

Features

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

Applications

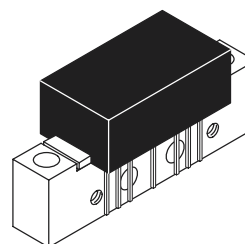
- CATV Systems Operating in the 40 to 860 MHz Frequency Range
- Output Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems

Description

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

MHW8205

860 MHz
20.2 dB GAIN
128-CHANNEL
CATV AMPLIFIER



CASE 714Y-04, 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, $T_C = +30^\circ\text{C}$, 75 Ω system unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Frequency Range	BW	40	—	860	MHz
Power Gain	G_p	19.3	19.8	20.3	dB
50 MHz		20	20.2	21.5	
860 MHz					
Slope	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)	IRL/ORL				
@ 40 MHz		19	—	—	dB
@ $f > 40$ MHz (Derate)		—	—	0.006	dB/MHz
Composite Second Order					dBc
($V_{out} = +40$ dBmV/ch., Worst Case)	128-Channel FLAT	CSO ₁₂₈	—	-69	-60
($V_{out} = +44$ dBmV/ch., Worst Case)	110-Channel FLAT	CSO ₁₁₀	—	-70	-63
	77-Channel FLAT	CSO ₇₇	—	-80	-68

Freescale Semiconductor, Inc.

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

Characteristic		Symbol	Min	Typ	Max	Unit
Cross Modulation Distortion @ Ch 2 ($V_{out} = +40$ dBmV/ch., FM = 55 MHz) ($V_{out} = +44$ dBmV/ch., FM = 55 MHz)	128-Channel FLAT	XMD_{128}	—	-72	-64	dBc
	110-Channel FLAT	XMD_{110}	—	-67	-62	
	77-Channel FLAT	XMD_{77}	—	-71	-68	
Composite Triple Beat ($V_{out} = +40$ dBmV/ch., Worst Case) ($V_{out} = +44$ dBmV/ch., Worst Case)	128-Channel FLAT	CTB_{128}	—	-66	-63	dBc
	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, $T_C = 30^\circ\text{C}$)		I_{DC}	365	400	435	mA

The RF Line

CATV Amplifier Module

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

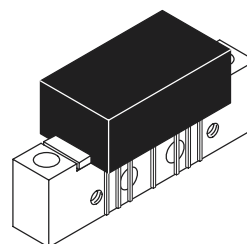
- CATV Systems Operating in the 40 to 870 MHz Frequency Range
- Output Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications
- Amplifiers Requiring Lower Power Dissipation While Maintaining Excellent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

Description

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

MHW8205L

870 MHz
20.4 dB GAIN
128-CHANNEL
CATV AMPLIFIER



CASE 714Y-04, 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, $T_C = +30^\circ\text{C}$, 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 2

MHW8205L
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For More Information On This Product
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MOTOROLA CATV DISTRIBUTION
 AMPLIFIER MODULE DEVICE DATA

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

Characteristic		Symbol	Min	Typ	Max	Unit
Cross Modulation Distortion @ Ch 2 ($V_{out} = +40$ dBmV/ch., FM = 55 MHz) ($V_{out} = +44$ dBmV/ch., FM = 55 MHz)	128-Channel FLAT	XMD_{128}	—	-72	-64	dBc
	110-Channel FLAT	XMD_{110}	—	-65	-62	
	77-Channel FLAT	XMD_{77}	—	-69	-66	
Composite Triple Beat ($V_{out} = +40$ dBmV/ch., Worst Case) ($V_{out} = +44$ dBmV/ch., Worst Case)	128-Channel FLAT	CTB_{128}	—	-66	-63	dBc
	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, $T_C = -20^\circ\text{C}$ to $+100^\circ\text{C}$)		I_{DC}	345	365	385	mA

The RF Line

CATV Amplifier Module

Features

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

Applications

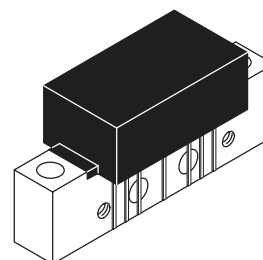
- CATV Systems Operating in the 40 to 860 MHz Frequency Range
- Input Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications
- Output Stage Amplifier on Applications Requiring Low Power Dissipation

Description

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

MHW8222B

860 MHz
22.7 dB GAIN
128-CHANNEL
CATV 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, $T_C = +30^\circ\text{C}$, 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

MHW8222B
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For More Information On This Product
Go to: www.freescale.com

MOTOROLA CATV DISTRIBUTION
 AMPLIFIER MODULE DEVICE DATA

Freescale Semiconductor, Inc.

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

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

The RF Line

CATV Amplifier Module

MHW8242A

Features

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

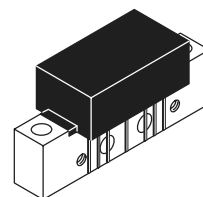
Applications

- 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

860 MHz
25 dB GAIN
128-CHANNEL
CATV 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, $T_C = +30^\circ\text{C}$, 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 ($Z_0 = 75$ 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)	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)	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)	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

REV 4

MHW8242A
3.1- 58

For More Information On This Product
Go to: www.freescale.com

MOTOROLA CATV DISTRIBUTION
 AMPLIFIER MODULE DEVICE DATA

The RF Line CATV Amplifier Module

Features

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

Applications

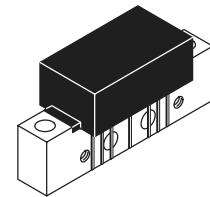
- CATV Systems Operating in the 40 to 870 MHz Frequency Range
- Input Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications
- Output Stage Amplifier on Applications Requiring Low Power Dissipation

Description

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

MHW8272A

**870 MHz
27.7 dB GAIN
128-CHANNEL
CATV AMPLIFIER MODULE**



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, $T_C = +30^\circ\text{C}$, 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	26.2 27	27.2 27.7	27.8 29.5	dB
Slope 40-870 MHz	S	0	0.6	2	dB
Gain Flatness (40-870 MHz, Peak to Valley)	G_F	—	0.4	0.8	dB
Return Loss — Input/Output ($Z_0 = 75$ 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 870 MHz	NF	— —	— 6.0	5.5 7.0	dB
DC Current ($V_{DC} = 24$ V, $T_C = 30^\circ\text{C}$)	I_{DC}	280	310	350	mA

REV 2

MOTOROLA CATV DISTRIBUTION
AMPLIFIER MODULE DEVICE DATA

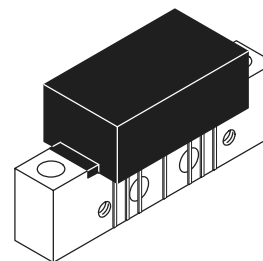
**For More Information On This Product,
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MHW8272A
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This document contains information on a product under development. Motorola reserves the right to change or discontinue this product without notice.

MHW8342

870 MHz
34 dB GAIN
132-CHANNEL
CATV AMPLIFIER MODULE



CASE 1302-01, STYLE 1

Product Preview

The RF Line

CATV Amplifier Module

Features

- Specified for up to 132-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 870 MHz Frequency Range
- Single Module High Gain Line Amplifier in Cable TV Distribution System

Description

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

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, $T_C = +30^\circ\text{C}$, 75 Ω system unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Frequency Range	BW	40	—	870	MHz
Power Gain	G_p	33.2	34	34.8	dB
		34	35.5	36	
Slope	S	0.5	1.25	2.5	dB
Gain Flatness (Peak To Valley)	G_F	—	0.3	0.8	dB
Return Loss — Input ($Z_o = 75$ Ohms)	IRL	22	28	—	dB
		18	25	—	
		16	22	—	
		14	19	—	
Return Loss — Output ($Z_o = 75$ Ohms)	ORL	22	28	—	dB
		19	25	—	
		17	22	—	
		15	22	—	

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MOTOROLA CATV DISTRIBUTION
AMPLIFIER MODULE DEVICE DATA

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ELECTRICAL CHARACTERISTICS — continued ($V_{CC} = 24$ Vdc, $T_C = +30^\circ\text{C}$, 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}	—	-65	-60	
($V_{out} = +44$ dBmV/ch., Worst Case)	112-Channel FLAT	CSO_{112}	—	-55	-50	
($V_{out} = +44$ dBmV/ch., Worst Case)	132-Channel FLAT	CSO_{132}	—	-48	-42	
Cross Modulation Distortion						dBc
($V_{out} = +44$ dBmV, FM = 55.25 MHz)	79-Channel FLAT	XMD_{79}	—	-63	-60	
($V_{out} = +44$ dBmV, FM = 55.25 MHz)	112-Channel FLAT	XMD_{112}	—	-56	-53	
($V_{out} = +44$ dBmV, FM = 55.25 MHz)	132-Channel FLAT	XMD_{132}	—	-56	-52	
Composite Triple Beat						dBc
($V_{out} = +44$ dBmV/ch., Worst Case)	79-Channel FLAT	CTB_{79}	—	-64	-62	
($V_{out} = +44$ dBmV/ch., Worst Case)	112-Channel FLAT	CTB_{112}	—	-54	-52	
($V_{out} = +44$ dBmV/ch., Worst Case)	132-Channel FLAT	CTB_{132}	—	-50	-46	
Noise Figure	50 MHz	NF	—	3.5	4.5	dB
	550 MHz		—	4.5	—	
	870 MHz		—	5.5	6.5	
DC Current		I_{DC}	310	325	350	mA

The RF Line

Gallium Arsenide

CATV Amplifier Module

MHW9146

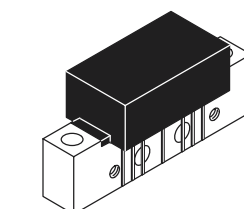
Features

- 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

870 MHz
14.3 dB GAIN
132-CHANNEL
GaAs CATV AMPLIFIER MODULE

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


CASE 1302-01, STYLE 1

Description

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

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, $T_C = +45^\circ\text{C}$, 75 Ω system unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Frequency Range	BW	40	—	870	MHz
Power Gain 870 MHz	G_p	13.8	14.3	14.8	dB
Slope 40-870 MHz	S	0	0.4	1.0	dB
Gain Flatness (40-870 MHz, Peak-to-Valley)	G_F	—	—	0.5	dB
Return Loss — Input ($Z_o = 75$ Ohms)	IRL	20 18	— —	— —	dB
Return Loss — Output ($Z_o = 75$ Ohms)	ORL	20 18	— —	— —	dB

REV 1

 MHW9146
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For More Information On This Product
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 MOTOROLA CATV DISTRIBUTION
 AMPLIFIER MODULE DEVICE DATA

Freescale Semiconductor, Inc.

ELECTRICAL CHARACTERISTICS - continued ($V_{CC} = 24$ Vdc, $T_C = +45^\circ\text{C}$, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Composite Second Order ($V_{out} = +48$ dBmV/ch., Worst Case)	79-Channel FLAT	CSO_{79}	—	-68	-64	dBc
($V_{out} = +46$ dBmV/ch., Worst Case)	112-Channel FLAT	CSO_{112}	—	-63	-60	
($V_{out} = +44$ dBmV/ch., Worst Case)	132-Channel FLAT	CSO_{132}	—	-63	-60	
Cross Modulation Distortion @ Ch 2 ($V_{out} = +48$ dBmV/ch., FM = 55.25 MHz)	79-Channel FLAT	XMD_{79}	—	-60	-55	dBc
($V_{out} = +46$ dBmV/ch., FM = 55.25 MHz)	112-Channel FLAT	XMD_{112}	—	-60	-55	
($V_{out} = +44$ dBmV/ch., FM = 55.25 MHz)	132-Channel FLAT	XMD_{132}	—	-60	-55	
Composite Triple Beat ($V_{out} = +48$ dBmV/ch., Worst Case)	79-Channel FLAT	CTB_{79}	—	-64	-60	dBc
($V_{out} = +46$ dBmV/ch., Worst Case)	112-Channel FLAT	CTB_{112}	—	-64	-60	
($V_{out} = +44$ dBmV/ch., Worst Case)	132-Channel FLAT	CTB_{132}	—	-64	-60	
Noise Figure	50 MHz	NF	—	4.4	5.5	dB
	550 MHz		—	3.8	—	
	750 MHz		—	4.0	—	
	870 MHz		—	4.3	5.5	
DC Current ($V_{DC} = 24$ V, $T_C = 45^\circ\text{C}$)		I_{DC}	230	245	260	mA

NOTE: This device requires an external 0.01 μF DC blocking capacitor connected to the output pin (Pin 9) as indicated in Figure 1.

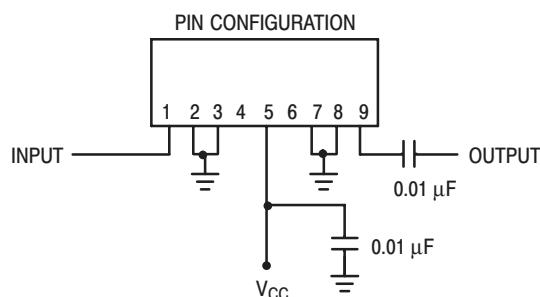


Figure 3. External Connections

The RF Line

CATV Amplifier Module

MHW9182B

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

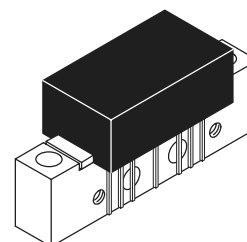
Applications

- 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

1000 MHz
19.4 dB GAIN
152-CHANNEL
CATV AMPLIFIER



CASE 714Y-04, 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, $T_C = +30^\circ\text{C}$, 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)	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)	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)	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, $T_C = 30^\circ\text{C}$)	I_{DC}	180	210	240	mA

REV 2

MHW9182B
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For More Information On This Product
Go to: www.freescale.com

MOTOROLA CATV DISTRIBUTION
 AMPLIFIER MODULE DEVICE DATA

The RF Line Gallium Arsenide CATV Amplifier Module

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

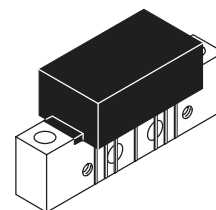
- CATV Systems Operating in the 40 to 870 MHz Frequency Range
- Input Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Output Stage Amplifier on Applications Requiring Low Power Dissipation and High Output Performance
- Driver Amplifier in Linear General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

Description

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

MHW9186

**870 MHz
18.5 dB GAIN
132-CHANNEL
GaAs CATV 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}	+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, $T_C = +30^\circ\text{C}$, 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

MOTOROLA CATV DISTRIBUTION
AMPLIFIER MODULE DEVICE DATA

**For More Information On This Product,
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**MHW9186
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Freescale Semiconductor, Inc.

ELECTRICAL CHARACTERISTICS - continued ($V_{CC} = 24$ Vdc, $T_C = +30^\circ\text{C}$, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Composite Second Order ($V_{out} = +44$ dBmV/ch., Worst Case)	132-Channel FLAT	CSO_{132}	—	-67	-60	dBc
($V_{out} = +46$ 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 ($V_{out} = +44$ dBmV/ch., FM = 55 MHz)	132-Channel FLAT	XMD_{132}	—	-58	-52	dBc
($V_{out} = +46$ 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 ($V_{out} = +44$ dBmV/ch., Worst Case)	132-Channel FLAT	CTB_{132}	—	-62	-58	dBc
($V_{out} = +46$ 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, $T_C = -20^\circ$ to $+100^\circ\text{C}$)		I_{DC}	230	250	265	mA

The RF Line Gallium Arsenide CATV Amplifier Module

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

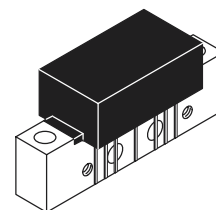
- CATV Systems Operating in the 40 to 870 MHz Frequency Range
- Output Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications

Description

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

MHW9187

**870 MHz
20 dB GAIN
132-CHANNEL
GaAs CATV 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, $T_C = +45^\circ\text{C}$, 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 ($Z_o = 75$ Ohms)	IRL	20 18 16	— — —	— — —	dB
Return Loss — Output ($Z_o = 75$ Ohms)	ORL	20 18	— —	— —	dB

REV 2

MOTOROLA CATV DISTRIBUTION
AMPLIFIER MODULE DEVICE DATA

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**MHW9187
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ELECTRICAL CHARACTERISTICS - continued ($V_{CC} = 24$ Vdc, $T_C = +45^\circ\text{C}$, 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						dB
	50 MHz	NF	—	4.0	4.5	
	550 MHz		—	3.5	4.5	
	750 MHz		—	3.5	4.5	
	870 MHz		—	4.0	4.5	
DC Current ($V_{DC} = 24$ V, $T_C = 45^\circ\text{C}$)		I_{DC}	410	425	440	mA

The RF Line Gallium Arsenide CATV Amplifier Module

Features

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

Applications

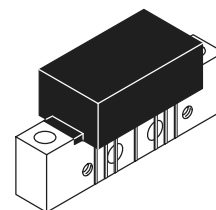
- CATV Systems Operating in the 40 to 870 MHz Frequency Range
- Output Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications

Description

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

MHW9188

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



CASE 1302-01, STYLE 1

MAXIMUM RATINGS

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

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, $T_C = +45^\circ\text{C}$, 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 ($Z_o = 75$ Ohms)	IRL	20 18 16	— — —	— — —	dB
Return Loss — Output ($Z_o = 75$ Ohms)	ORL	20 18	— —	— —	dB

REV 1

MOTOROLA CATV DISTRIBUTION
AMPLIFIER MODULE DEVICE DATA

**For More Information On This Product,
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MHW9188
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ELECTRICAL CHARACTERISTICS - continued ($V_{CC} = 24$ Vdc, $T_C = +45^\circ\text{C}$, 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					dB
50 MHz	NF	—	4.0	4.5	
550 MHz		—	4.0	4.5	
750 MHz		—	4.0	4.5	
870 MHz		—	4.0	4.5	
DC Current ($V_{DC} = 24$ V, $T_C = 45^\circ\text{C}$)	I_{DC}	410	425	440	mA

The RF Line

Gallium Arsenide

CATV Amplifier Module

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

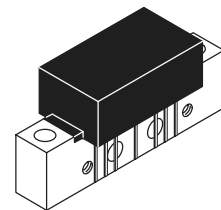
- CATV Systems Operating in the 40 to 870 MHz Frequency Range
- Output Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications

Description

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

MHW9189

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



CASE 1302-01, STYLE 2

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, $T_C = +45^\circ\text{C}$, 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 ($Z_o = 75$ Ohms)	IRL	20 18 16	— — —	— — —	dB
Return Loss — Output ($Z_o = 75$ Ohms)	ORL	20 18	— —	— —	dB

REV 1

MOTOROLA CATV DISTRIBUTION
AMPLIFIER MODULE DEVICE DATA

**For More Information On This Product,
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Freescale Semiconductor, Inc.

ELECTRICAL CHARACTERISTICS - continued ($V_{CC} = 24$ Vdc, $T_C = +45^\circ\text{C}$, 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, $T_C = 45^\circ\text{C}$)		I_{DC}	410	425	440	mA

The RF Line

Gallium Arsenide

CATV Amplifier Module

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

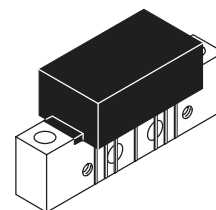
- CATV Systems Operating in the 47 to 870 MHz Frequency Range
- Input Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Output Stage Amplifier on Applications Requiring Low Power Dissipation and High Output Performance
- Driver Amplifier in Linear General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

Description

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

MHW9206

**870 MHz
20.2 dB GAIN
132-CHANNEL
GaAs CATV 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, $T_C = +45^\circ\text{C}$, 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 ($Z_o = 75$ Ohms)	IRL/ORL	20 19 18	— — —	— — —	dB
Composite Second Order ($V_{out} = +48$ dBmV/ch., Worst Case)	CSO_{79}	—	-66	-63	dBc
($V_{out} = +46$ dBmV/ch., Worst Case)	CSO_{112}	—	-62	-59	
($V_{out} = +44$ dBmV/ch., Worst Case)	CSO_{132}	—	-63	-59	

REV 1

MOTOROLA CATV DISTRIBUTION
AMPLIFIER MODULE DEVICE DATA

**For More Information On This Product,
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MHW9206
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Freescale Semiconductor, Inc.

ELECTRICAL CHARACTERISTICS - continued ($V_{CC} = 24 \text{ Vdc}$, $T_C = +45^\circ\text{C}$, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Cross Modulation Distortion @ Ch 2						dBc
($V_{out} = +48 \text{ dBmV/ch.}$, FM = 55.25 MHz)	79-Channel FLAT	XMD_{79}	—	-55	-51	
($V_{out} = +46 \text{ dBmV/ch.}$, FM = 55.25 MHz)	112-Channel FLAT	XMD_{112}	—	-55	-51	
($V_{out} = +44 \text{ dBmV/ch.}$, FM = 55.25 MHz)	132-Channel FLAT	XMD_{132}	—	-57	-51	
Composite Triple Beat						dBc
($V_{out} = +48 \text{ dBmV/ch.}$, Worst Case)	79-Channel FLAT	CTB_{79}	—	-62	-60	
($V_{out} = +46 \text{ dBmV/ch.}$, Worst Case)	112-Channel FLAT	CTB_{112}	—	-60	-57	
($V_{out} = +44 \text{ dBmV/ch.}$, 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 ($V_{DC} = 24 \text{ V}$, $T_C = 45^\circ\text{C}$)		I_{DC}	230	245	260	mA

The RF Line

Gallium Arsenide

CATV Amplifier Module

Features

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

Applications

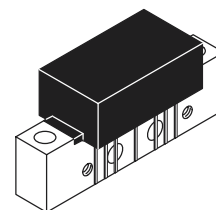
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- Output Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications

Description

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

MHW9227

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



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	200	200	V
Human Body Model per Mil. Std. 1686	2	2	kV

ELECTRICAL CHARACTERISTICS ($V_{CC} = 24$ Vdc, $T_C = +45^\circ\text{C}$, 75 Ω system unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Frequency Range	BW	47	—	870	MHz
Power Gain 870 MHz	G_p	21.5	22.1	22.7	dB
Slope 47-870 MHz	S	0	0.5	1.0	dB
Gain Flatness (40-870 MHz, Peak-to-Valley)	—	—	—	0.7	dB
Return Loss — Input/Output ($Z_o = 75$ Ohms)	IRL	20 18 16	— — —	— — —	dB
		47-500 MHz			
		501-750 MHz			
		751-870 MHz			

Freescale Semiconductor, Inc.

ELECTRICAL CHARACTERISTICS - continued ($V_{CC} = 24$ Vdc, $T_C = +45^\circ\text{C}$, 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	
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($V_{out} = +58$ 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}	—	-66	-64	
($V_{out} = +56$ dBmV @ 870 MHz Equiv) 112-Channel, 12 dB Tilt	CTB_{112}	—	-57	-55	
($V_{out} = +56$ dBmV @ 870 MHz Equiv) 112-Channel, 13.5 dB Tilt	CTB_{112}	—	-58	-56	
($V_{out} = +56$ dBmV @ 870 MHz Equiv) 112-Channel, 17 dB Tilt	CTB_{112}	—	-60	-58	
($V_{out} = +58$ dBmV @ 870 MHz Equiv) 79-Channel, 12 dB Tilt	CTB_{79}	—	-63	-61	
($V_{out} = +58$ dBmV @ 870 MHz Equiv) 79-Channel, 13.5 dB Tilt	CTB_{79}	—	-65	-63	
($V_{out} = +58$ dBmV @ 870 MHz Equiv) 79-Channel, 17 dB Tilt	CTB_{79}	—	-69	-67	
Noise Figure					dB
50 MHz	NF	—	4.0	4.5	
550 MHz		—	4.0	4.5	
750 MHz		—	4.0	4.5	
870 MHz		—	4.0	4.5	
DC Current ($V_{DC} = 24$ V, $T_C = 45^\circ\text{C}$)	I_{DC}	410	425	440	mA

The RF Line

Gallium Arsenide

CATV Amplifier Module

Features

- Specified for 79-, 112- and 132-Channel Loading
- Excellent Distortion Performance
- Integrated ESD Protection Diodes
- GaAs FET Transistor Technology
- Unconditionally Stable Under All Load Conditions

Applications

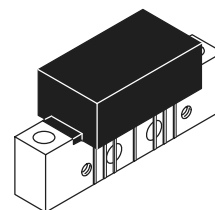
- CATV Systems Operating in the 40 to 870 MHz Frequency Range
- Input Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications

Description

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

MHW9236

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



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}	+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, $T_C = +30^\circ\text{C}$, 75 Ω system unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Frequency Range	BW	40	—	870	MHz
Power Gain 870 MHz	G_p	23	23.8	24.3	dB
Slope 40-870 MHz	S	0	0.55	1.2	dB
Gain Flatness (40-870 MHz, Peak-to-Valley)	G_F	—	—	0.8	dB
Return Loss — Input ($Z_o = 75$ Ohms)	IRL	20 18	— —	— —	dB
		40-500 MHz $f > 500$ MHz			

REV 3

MOTOROLA CATV DISTRIBUTION
AMPLIFIER MODULE DEVICE DATA

**For More Information On This Product,
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MHW9236
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Freescale Semiconductor, Inc.

ELECTRICAL CHARACTERISTICS - continued ($V_{CC} = 24$ Vdc, $T_C = +30^\circ\text{C}$, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Return Loss — Output ($Z_0 = 75$ Ohms)	40-300 MHz 301-750 MHz $f > 750$ MHz	ORL	20 19 16	— — —	— — —	dB
Composite Second Order ($V_{out} = +48$ dBmV/ch., Worst Case) ($V_{out} = +46$ dBmV/ch., Worst Case) ($V_{out} = +44$ dBmV/ch., Worst Case)	79-Channel FLAT 112-Channel FLAT 132-Channel FLAT	CSO_{79} CSO_{112} CSO_{132}	— — —	-66 -64 -64	-63 -60 -60	dBc
Cross Modulation Distortion @ Ch 2 ($V_{out} = +48$ dBmV/ch., FM = 55.25 MHz) ($V_{out} = +46$ dBmV/ch., FM = 55.25 MHz) ($V_{out} = +44$ dBmV/ch., FM = 55.25 MHz)	79-Channel FLAT 112-Channel FLAT 132-Channel FLAT	XMD_{79} XMD_{112} XMD_{132}	— — —	-57 -57 -57	-50 -50 -50	dBc
Composite Triple Beat ($V_{out} = +48$ dBmV/ch., Worst Case) ($V_{out} = +46$ dBmV/ch., Worst Case) ($V_{out} = +44$ dBmV/ch., Worst Case)	79-Channel FLAT 112-Channel FLAT 132-Channel FLAT	CTB_{79} CTB_{112} CTB_{132}	— — —	-66 -66 -68	-60 -60 -60	dBc
Noise Figure	50 MHz 550 MHz 750 MHz 870 MHz	NF	— — — —	5.0 5.0 5.0 5.3	6.0 — — 6.5	dB
DC Current ($V_{DC} = 24$ V, $T_C = 45^\circ\text{C}$)		I_{DC}	240	255	270	mA

The RF Line CATV Amplifier Module

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

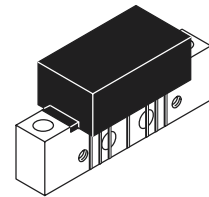
- CATV Systems Operating in the 40 to 1000 MHz Frequency Range
- Input Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications
- Output Stage Amplifier on Applications Requiring Low Power Dissipation

Description

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

MHW9242A

**1000 MHz
24 dB GAIN
152-CHANNEL
CATV 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, $T_C = +30^\circ\text{C}$, 75 Ω system unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Frequency Range	BW	40	—	1000	MHz
Power Gain	G_p	23.2	—	24.8	dB
		24	—	26	
Slope	S	0	—	2.5	dB
Gain Flatness (40-1000 MHz, Peak-to-Valley)	G_F	—	—	1.0	dB
Return Loss — Input/Output ($Z_0 = 75$ Ohms)	IRL/ORL	20	—	—	dB
	@ 40 MHz	—	—	0.01	dB/MHz
	@ $f > 40$ MHz (Derate)	—	—	—	
Composite Second Order					dBc
($V_{out} = +38$ dBmV/ch; Worst Case)	CSO ₁₅₂	—	-66	-61	
($V_{out} = +38$ dBmV/ch; Worst Case)	CSO ₁₂₈	—	-69	—	
($V_{out} = +40$ dBmV/ch; Worst Case)	CSO ₁₁₀	—	-69	—	
($V_{out} = +44$ dBmV/ch; Worst Case)	CSO ₇₇	—	-78	—	
Cross Modulation Distortion @ Ch 2					dBc
($V_{out} = +38$ dBmV/ch, FM = 55 MHz)	XMD ₁₅₂	—	-62	-59	
($V_{out} = +38$ dBmV/ch, FM = 55.25 MHz)	XMD ₁₂₈	—	-65	—	
($V_{out} = +40$ dBmV/ch, FM = 55.25 MHz)	XMD ₁₁₀	—	-63	—	
($V_{out} = +44$ dBmV/ch, FM = 55.25 MHz)	XMD ₇₇	—	-58	—	

REV 2

MOTOROLA CATV DISTRIBUTION
AMPLIFIER MODULE DEVICE DATA

**For More Information On This Product,
Go to: www.freescale.com**

MHW9242A

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Freescale Semiconductor, Inc.

ELECTRICAL CHARACTERISTICS - continued ($V_{CC} = 24 \text{ Vdc}$, $T_C = +30^\circ\text{C}$, 75Ω system unless otherwise noted)

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

The RF Line Gallium Arsenide CATV Amplifier Module

Features

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

Applications

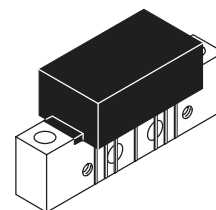
- CATV Systems Operating in the 40 to 870 MHz Frequency Range
- Output Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications

Description

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

MHW9247

**870 MHz
24.9 dB GAIN
132-CHANNEL
GaAs CATV 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	300	300	V
Human Body Model per Mil. Std. 1686	2	2	kV

ELECTRICAL CHARACTERISTICS ($V_{CC} = 24$ Vdc, $T_C = +45^\circ\text{C}$, 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 ($Z_o = 75$ Ohms)	IRL	20 18 16	— — —	— — —	dB
Return Loss — Output ($Z_o = 75$ Ohms)	ORL	20 18	— —	— —	dB

REV 1

MOTOROLA CATV DISTRIBUTION
AMPLIFIER MODULE DEVICE DATA

**For More Information On This Product,
Go to: www.freescale.com**

**MHW9247
3.1- 81**

Freescale Semiconductor, Inc.

ELECTRICAL CHARACTERISTICS - continued ($V_{CC} = 24$ Vdc, $T_C = +45^\circ\text{C}$, 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		NF				dB
	50 MHz		—	5.5	7.0	
	550 MHz		—	5.5	7.0	
	750 MHz		—	5.8	7.0	
	870 MHz		—	6.0	7.0	
DC Current ($V_{DC} = 24$ V, $T_C = 45^\circ\text{C}$)		I_{DC}	420	440	460	mA

The RF Line Gallium Arsenide CATV Amplifier Module

Features

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

Applications

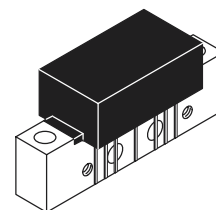
- CATV Systems Operating in the 47 to 870 MHz Frequency Range
- Output Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications

Description

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

MHW9267

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



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	200	200	V
Human Body Model per Mil. Std. 1686	2	2	kV

ELECTRICAL CHARACTERISTICS ($V_{CC} = 24$ Vdc, $T_C = +45^\circ\text{C}$, 75 Ω system unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Frequency Range	BW	40	—	870	MHz
Power Gain 870 MHz	G_p	27	27.6	28.2	dB
Slope 47-870 MHz	S	0	0.7	1.4	dB
Gain Flatness (40-870 MHz, Peak-to-Valley)	G_F	—	—	0.5	dB
Return Loss — Input ($Z_o = 75$ Ohms)	IRL	20 18 16	— — —	— — —	dB
		47-500 MHz 501-750 MHz 751-870 MHz			

Freescale Semiconductor, Inc.

ELECTRICAL CHARACTERISTICS - continued ($V_{CC} = 24$ Vdc, $T_C = +45^\circ\text{C}$, 75 Ω system unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Return Loss — Output ($Z_0 = 75$ Ohms)	47-160 MHz	ORL	20	—	—	dB
	$f > 160$ 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}	—	-64	-62	
($V_{out} = +48$ dBmV/ch., Worst Case)	79-Channel FLAT	CSO_{79}	—	-68	-66	
($V_{out} = +56$ dBmV @ 870 MHz Equiv)	112-Channel, 12db Tilt	CSO_{112}	—	-64	-62	
($V_{out} = +56$ dBmV @ 870 MHz Equiv)	112-Channel, 13.5db Tilt	CSO_{112}	—	-65	-63	
($V_{out} = +56$ dBmV @ 870 MHz Equiv)	112-Channel, 17db Tilt	CSO_{112}	—	-66	-64	
($V_{out} = +58$ 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}	—	-71	-69	
($V_{out} = +58$ dBmV @ 870 MHz Equiv)	79-Channel, 17db Tilt	CSO_{79}	—	-72	-70	
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}	—	-52	-50	
($V_{out} = +56$ dBmV @ 870 MHz Equiv)	112-Channel, 13.5db Tilt	XMD_{112}	—	-53	-51	
($V_{out} = +56$ 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	-52	
($V_{out} = +58$ 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}	—	-66	-64	
($V_{out} = +56$ 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}	—	-62	-60	
($V_{out} = +58$ dBmV @ 870 MHz Equiv)	79-Channel, 13.5db Tilt	CTB_{79}	—	-64	-62	
($V_{out} = +58$ dBmV @ 870 MHz Equiv)	79-Channel, 17db Tilt	CTB_{79}	—	-67	-65	
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, $T_C = 45^\circ\text{C}$)		I_{DC}	410	440	460	mA

The RF Line Gallium Arsenide CATV Amplifier Module

Features

- 79-, 112- and 132-Channel Loading
- Excellent Distortion Performance
- Integrated ESD Protection Diodes
- GaAs FET Transistor Technology
- Unconditionally Stable Under All Load Conditions

Applications

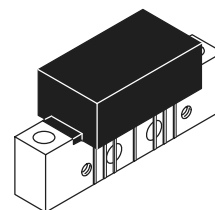
- CATV Systems Operating in the 40 to 870 MHz Frequency Range
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- Driver Amplifier in Linear General Purpose Applications

Description

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

MHW9276

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



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}	+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, $T_C = +30^\circ\text{C}$, 75 Ω system unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Frequency Range	BW	40	—	870	MHz
Power Gain 870 MHz	G_p	27	27.9	28.5	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

Freescale Semiconductor, Inc.

ELECTRICAL CHARACTERISTICS - continued ($V_{CC} = 24$ Vdc, $T_C = +30^\circ\text{C}$, 75 Ω system unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Input Return Loss ($Z_o = 75$ Ohms) 40-200 MHz 201-600 MHz 601-870 MHz	IRL	20 19 18	— — —	— — —	dB
Output Return Loss ($Z_o = 75$ Ohms) 40-200 MHz 201-600 MHz 601-870 MHz	ORL	20 18 18	— — —	— — —	dB
Composite Second Order ($V_{out} = +44$ dBmV/ch., Worst Case) 79-Channel FLAT ($V_{out} = +44$ dBmV/ch., Worst Case) 112-Channel FLAT ($V_{out} = +44$ dBmV/ch., Worst Case) 132-Channel FLAT	CSO ₇₉ CSO ₁₁₂ CSO ₁₃₂	— — —	-70 -66 -66	-64 -62 -60	dBc
Cross Modulation Distortion @ Ch 2 ($V_{out} = +44$ dBmV/ch., FM = 55.25 MHz) 79-Channel FLAT ($V_{out} = +44$ dBmV/ch., FM = 55.25 MHz) 112-Channel FLAT ($V_{out} = +44$ dBmV/ch., FM = 55.25 MHz) 132-Channel FLAT	XMD ₇₉ XMD ₁₁₂ XMD ₁₃₂	— — —	-60 -60 -60	-53 -53 -53	dBc
Composite Triple Beat ($V_{out} = +44$ dBmV/ch., Worst Case) 79-Channel FLAT ($V_{out} = +44$ dBmV/ch., Worst Case) 112-Channel FLAT ($V_{out} = +44$ dBmV/ch., Worst Case) 132-Channel FLAT	CTB ₇₉ CTB ₁₁₂ CTB ₁₃₂	— — —	-71 -68 -66	-65 -61 -60	dBc
Noise Figure 50 MHz 550 MHz 750 MHz 870 MHz	NF	— — — —	5.0 5.0 5.0 5.0	5.5 — — 6.5	dB
DC Current ($V_{DC} = 24$ V, $T_C = 45^\circ\text{C}$)	I_{DC}	235	250	265	mA

The RF Line

Gallium Arsenide

CATV Integrated Amplifier Module

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
- In Tape and Reel. R2 Suffix = 1,500 Units per 16 mm, 13 inch Reel.

Applications

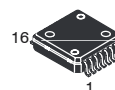
- CATV Systems Operating in the 40 to 870 MHz Frequency Range
- Input Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Output Stage Amplifier on Applications Requiring Low Power Dissipation and High Output Performance
- Driver Amplifier in Linear General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

Description

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

MMG1001R2

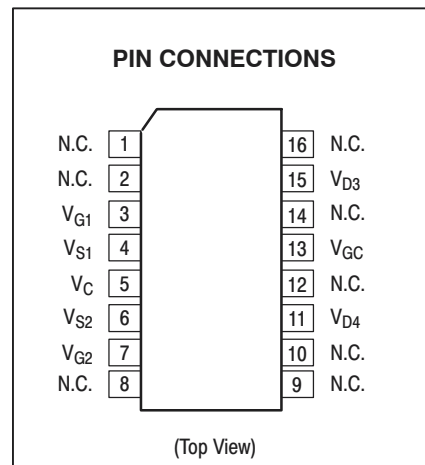
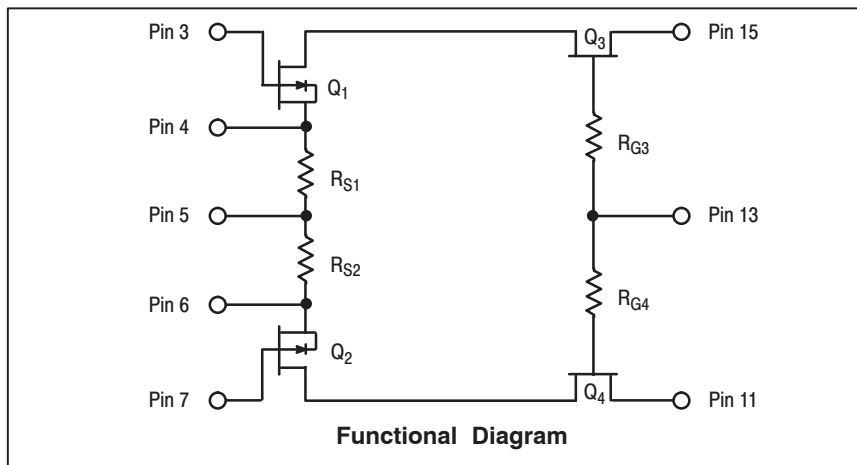
**870 MHz
18.5 dB GAIN
132-CHANNEL
CATV INTEGRATED AMPLIFIER
MODULE**



**CASE 978-03
PFP-16**

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



NOTE: MMG1001R2 Moisture Sensitivity Level (MSL) = 3.

ESD PROTECTION CHARACTERISTICS

Test Conditions	Class
Human Body Model	1 (minimum)
Machine Model	M1 (minimum)
Charge Device Model	C5 (minimum)

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	6.6	°C/W

ELECTRICAL CHARACTERISTICS ($V_{CC} = 24$ Vdc, $T_C = +30^\circ\text{C}$, 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	— —	dB
Slope 40-870 MHz	S	—	0.6	—	dB
Gain Flatness (40-870 MHz, Peak to Valley)	G_F	—	0.5	—	dB
Input Return Loss ($Z_o = 75$ Ohms) f = 40-160 MHz f = 161-450 MHz f = 451-870 MHz	IRL	— — —	21 19 22	— — —	dB
Output Return Loss ($Z_o = 75$ Ohms) f = 40-400 MHz f = 401-870 MHz	ORL	— —	22 17	— —	dB
Composite Second Order ($V_{out} = +44$ dBmV/ch., Worst Case) 132-Channel FLAT ($V_{out} = +46$ dBmV/ch., Worst Case) 112-Channel FLAT ($V_{out} = +48$ dBmV/ch., Worst Case) 79-Channel FLAT	CSO_{132} CSO_{112} CSO_{79}	— — —	-65 -65 -71	-58 -59 -62	dBc
Cross Modulation Distortion @ Ch 2 ($V_{out} = +44$ dBmV/ch., FM = 55 MHz) 132-Channel FLAT ($V_{out} = +46$ dBmV/ch., FM = 55 MHz) 112-Channel FLAT ($V_{out} = +48$ dBmV/ch., FM = 55 MHz) 79-Channel FLAT	XMD_{132} XMD_{112} XMD_{79}	— — —	-64 -63 -62	-52 -52 -52	dBc
Composite Triple Beat ($V_{out} = +44$ dBmV/ch., Worst Case) 132-Channel FLAT ($V_{out} = +46$ dBmV/ch., Worst Case) 112-Channel FLAT ($V_{out} = +48$ dBmV/ch., Worst Case) 79-Channel FLAT	CTB_{132} CTB_{112} CTB_{79}	— — —	-63 -64 -65	-56 -56 -58	dBc
Noise Figure 50 MHz 870 MHz	NF	— —	4 4	5.0 5.0	dB
DC Current ($V_{DC} = 24$ V, $T_C = -20^\circ$ to $+100^\circ\text{C}$)	I_{DC}	230	250	265	mA

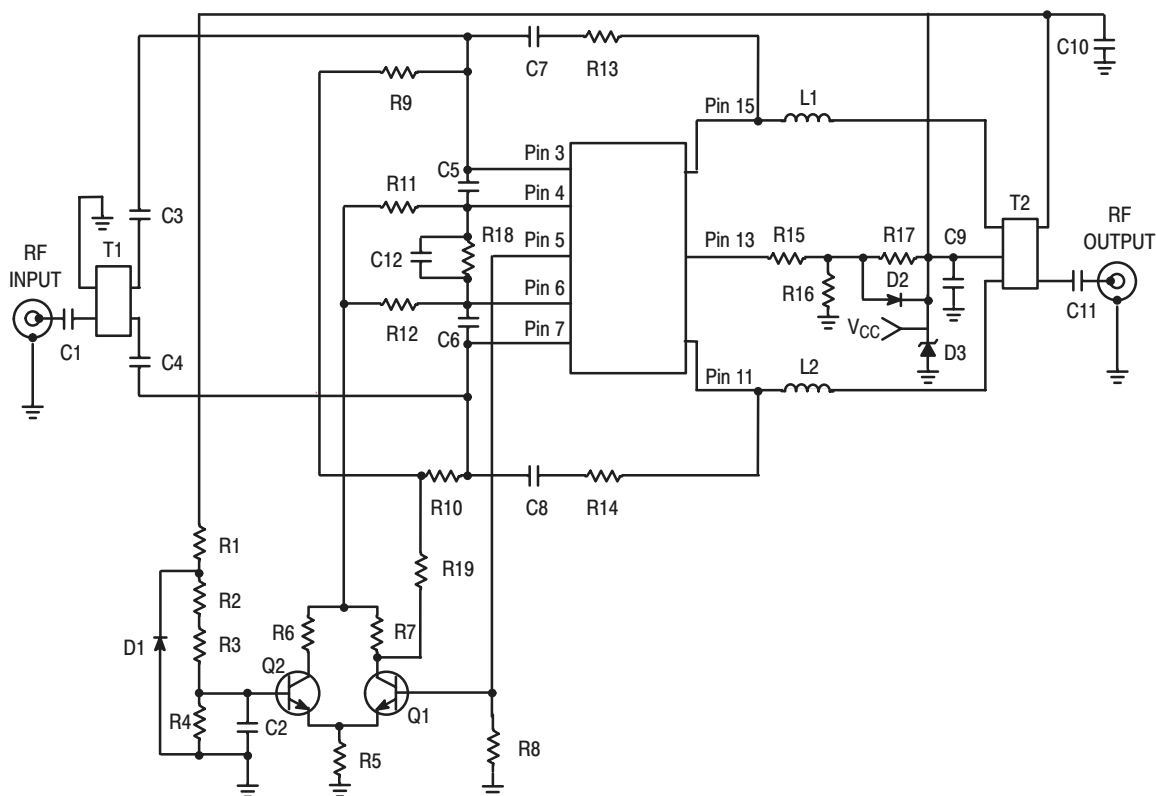


Figure 1. MMG1001R2 50-870 MHz Test Circuit Schematic

Table 1. MMG1001R2 50-870 MHz Test Circuit Component Designations and Values

Designation	Description
C1, C7, C8, C11	220 pF Chip Capacitors (0603)
C2, C3, C4, C9, C10	0.01 μ F Chip Capacitors (0603)
C5, C6	1.8 pF Chip Capacitors (0603)
C12	5.6 pF Chip Capacitor (0603)
D1	5.1 V Zener Diode, On/MM3Z5V1T1
D2	27 V Zener Diode, On/MM3Z27VT1
D3	Transient Voltage Suppressor, On/1.5k27A/1.5SMC27AT3
L1, L2	22 nH Chip Inductors (0603)
Q1, Q2	Dual Transistors Package, On/MBT3904DW1T1
R1	2.2 k Ω , 1/4 W Chip Resistor (1206)
R2	560 Ω Chip Resistor (0603)
R3	82 Ω Chip Resistor (0603)
R4, R5	820 Ω Chip Resistors (0603)
R6	120 Ω Chip Resistor (0603)
R7	1.5 k Ω Chip Resistor (0603)
R8	12 Ω , 1 W Chip Resistor (2512)
R9, R10, R15	470 Ω Chip Resistors (0603)
R11, R12	18 Ω Chip Resistors (0603)
R13, R14	910 Ω Chip Resistors (0603)
R16	2 k Ω Chip Resistor (0603)
R17	6.2 k Ω Chip Resistor (0603)
R18	15 Ω Chip Resistor (0603)
R19	0 Ω Chip Resistor (0603)
T1	Input Transformer, Mot/77PC016E068
T2	Output Transformer, Mot/77PC016E061
PCB	FR4, 62 mil, $\epsilon_r = 4.81$

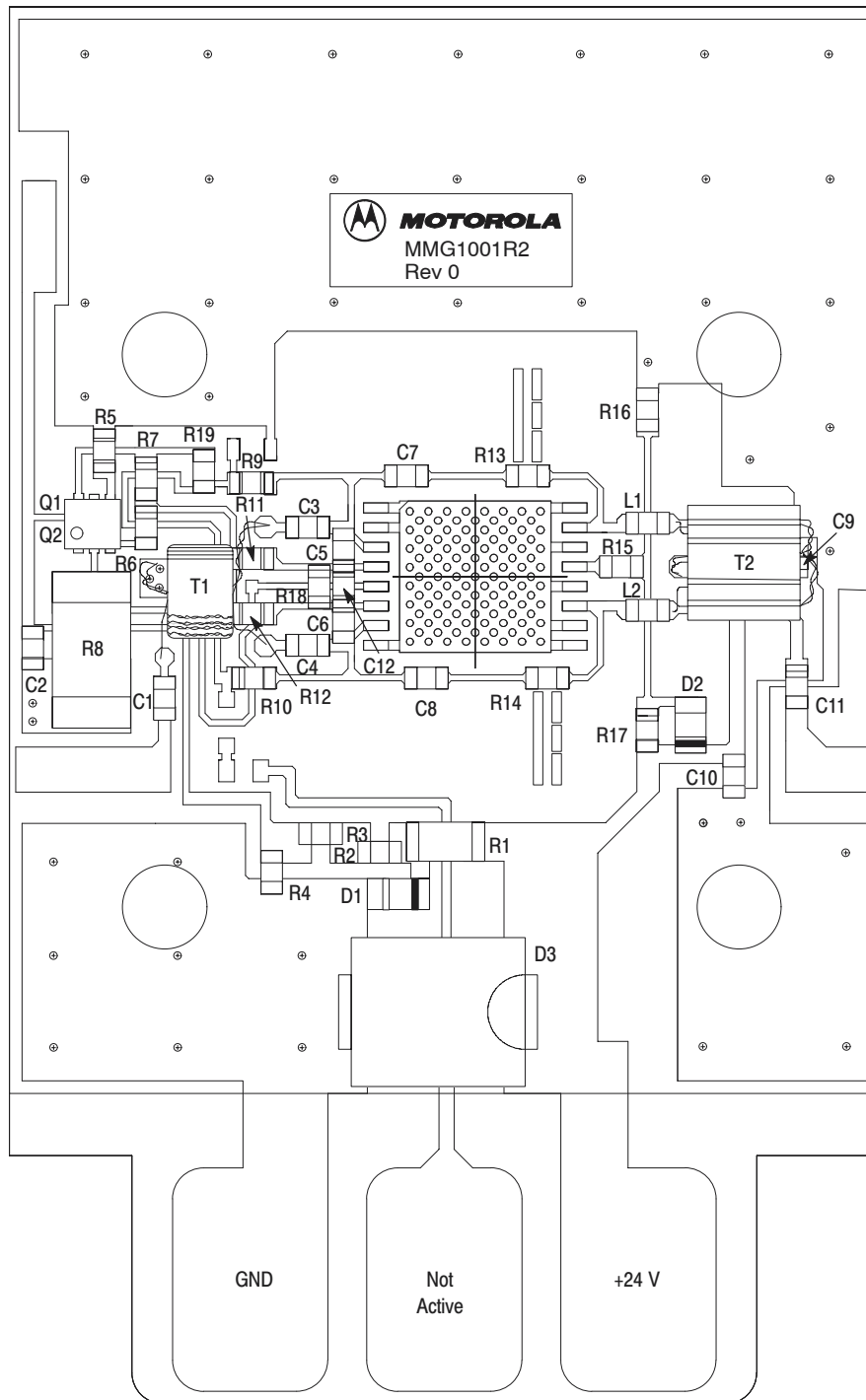


Figure 2. MMG1001R2 50-870 MHz Test Circuit Component Layout

Freescale Semiconductor, Inc.

TYPICAL CHARACTERISTICS

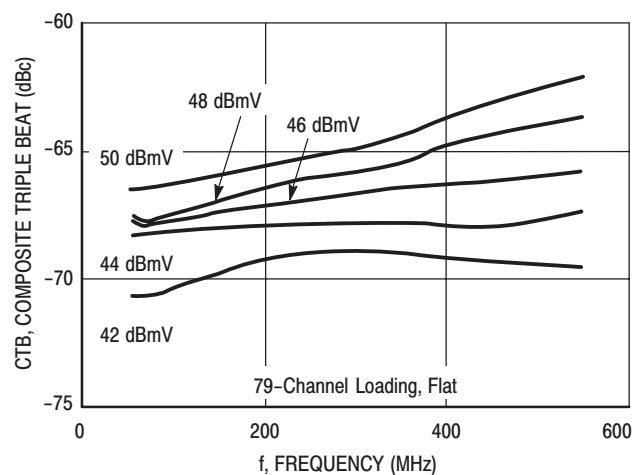


Figure 3. Composite Triple Beat versus Frequency

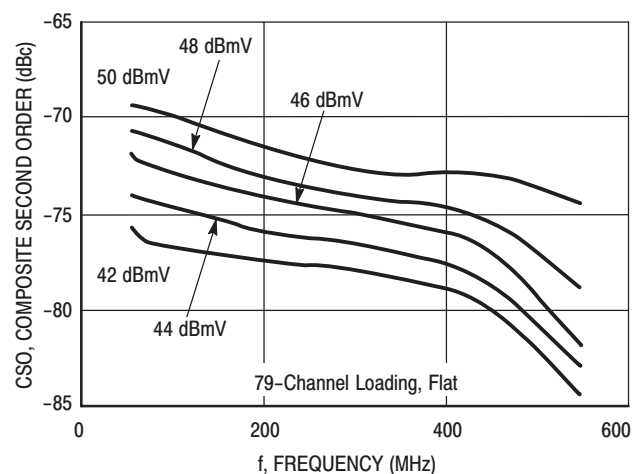


Figure 4. Composite Second Order versus Frequency

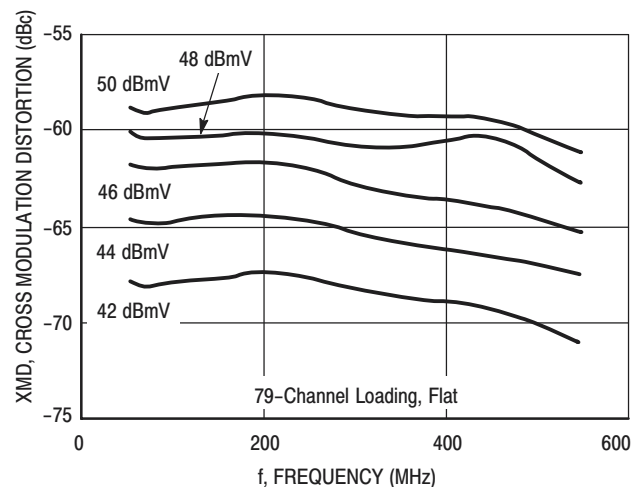


Figure 5. Cross Modulation Distortion versus Frequency

The RF Line

Gallium Arsenide

CATV Integrated Amplifier Module

Features

- Specified for 79-, 112- and 132-Channel Loading
- Excellent Distortion Performance
- Higher Output Capability
- Built-in Input Diode Protection
- GaAs FET Transistor Technology
- Unconditionally Stable Under All Load Conditions
- In Tape and Reel. R2 Suffix = 1,500 Units per 16 mm, 13 inch Reel.

Applications

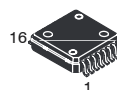
- CATV Systems Operating in the 40 to 870 MHz Frequency Range
- Output Stage Amplifier in Optical Nodes, Line Extenders and Trunk Distribution Amplifiers for CATV Systems
- Driver Amplifier in Linear General Purpose Applications

Description

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

MMG2001R2

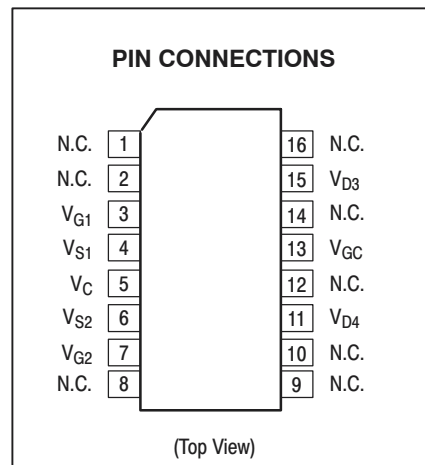
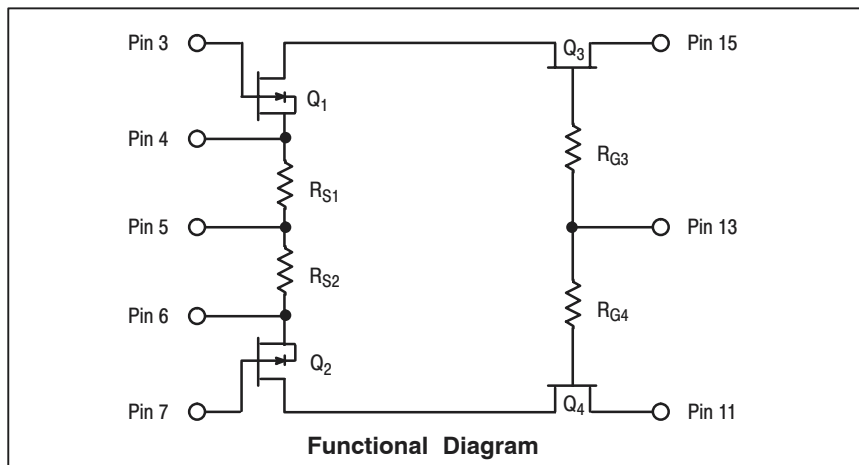
870 MHz
19.5 dB GAIN
132-CHANNEL
CATV INTEGRATED AMPLIFIER
MODULE



CASE 978-03
PFP-16

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



NOTE: MMG2001R2 Moisture Sensitivity Level (MSL) = 3.

ESD PROTECTION CHARACTERISTICS

Test Conditions	Class
Human Body Model	1 (minimum)
Machine Model	M1 (minimum)
Charge Device Model	C5 (minimum)

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	4.7	°C/W

ELECTRICAL CHARACTERISTICS ($V_{CC} = 24$ Vdc, $T_C = +45^\circ\text{C}$, 75 Ω system unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Frequency Range	BW	40	—	870	MHz
Power Gain	G_p	—	19	—	dB
40 MHz		—	21	—	
870 MHz		—	—	—	
Slope	S	—	0.8	—	dB
Gain Flatness (40-870 MHz, Peak to Valley)	G_F	—	0.5	—	dB
Input Return Loss ($Z_0 = 75$ Ohms)	IRL	—	21	—	dB
f = 40-160 MHz		—	19	—	
f = 161-450 MHz		—	22	—	
f = 451-870 MHz		—	—	—	
Output Return Loss ($Z_0 = 75$ Ohms)	ORL	—	22	—	dB
f = 40-400 MHz		—	17	—	
f = 401-870 MHz		—	—	—	
Composite Second Order					dBc
($V_{out} = +48$ dBmV/ch., Worst Case) 132-Channel FLAT	CSO_{132}	—	-68	-60	
($V_{out} = +48$ dBmV/ch., Worst Case) 112-Channel FLAT	CSO_{112}	—	-70	-62	
($V_{out} = +48$ dBmV/ch., Worst Case) 79-Channel FLAT	CSO_{79}	—	-74	-66	
($V_{out} = +56$ dBmV @ 870 MHz Equiv) 112-Channel, 12 dB Tilt	CSO_{112}	—	-63	—	
($V_{out} = +56$ dBmV @ 870 MHz Equiv) 112-Channel, 13.5 dB Tilt	CSO_{112}	—	-62	—	
($V_{out} = +56$ dBmV @ 870 MHz Equiv) 112-Channel, 17 dB Tilt	CSO_{112}	—	-61	—	
($V_{out} = +58$ dBmV @ 870 MHz Equiv) 79-Channel, 12 dB Tilt	CSO_{79}	—	-67	—	
($V_{out} = +58$ dBmV @ 870 MHz Equiv) 79-Channel, 13.5 dB Tilt	CSO_{79}	—	-72	—	
($V_{out} = +58$ dBmV @ 870 MHz Equiv) 79-Channel, 17 dB Tilt	CSO_{79}	—	-71	—	
Cross Modulation Distortion @ Ch 2					dBc
($V_{out} = +48$ dBmV/ch., FM = 55 MHz) 132-Channel FLAT	XMD_{132}	—	-55	-53	
($V_{out} = +48$ dBmV/ch., FM = 55 MHz) 112-Channel FLAT	XMD_{112}	—	-57	-55	
($V_{out} = +48$ dBmV/ch., FM = 55 MHz) 79-Channel FLAT	XMD_{79}	—	-60	-58	
($V_{out} = +56$ dBmV @ 870 MHz Equiv) 112-Channel, 12 dB Tilt	XMD_{112}	—	-51	—	
($V_{out} = +56$ dBmV @ 870 MHz Equiv) 112-Channel, 13.5 dB Tilt	XMD_{112}	—	-53	—	
($V_{out} = +56$ dBmV @ 870 MHz Equiv) 112-Channel, 17 dB Tilt	XMD_{112}	—	-56	—	
($V_{out} = +58$ dBmV @ 870 MHz Equiv) 79-Channel, 12 dB Tilt	XMD_{79}	—	-58	—	
($V_{out} = +58$ dBmV @ 870 MHz Equiv) 79-Channel, 13.5 dB Tilt	XMD_{79}	—	-60	—	
($V_{out} = +58$ dBmV @ 870 MHz Equiv) 79-Channel, 17 dB Tilt	XMD_{79}	—	-65	—	
Composite Triple Beat					dBc
($V_{out} = +48$ dBmV/ch., Worst Case) 132-Channel FLAT	CTB_{132}	—	-56	-54	
($V_{out} = +48$ dBmV/ch., Worst Case) 112-Channel FLAT	CTB_{112}	—	-60	-58	
($V_{out} = +48$ dBmV/ch., Worst Case) 79-Channel FLAT	CTB_{79}	—	-66	-64	
($V_{out} = +56$ dBmV @ 870 MHz Equiv) 112-Channel, 12 dB Tilt	CTB_{112}	—	-58	—	
($V_{out} = +56$ dBmV @ 870 MHz Equiv) 112-Channel, 13.5 dB Tilt	CTB_{112}	—	-59	—	
($V_{out} = +56$ dBmV @ 870 MHz Equiv) 112-Channel, 17 dB Tilt	CTB_{112}	—	-62	—	
($V_{out} = +58$ dBmV @ 870 MHz Equiv) 79-Channel, 12 dB Tilt	CTB_{79}	—	-64	—	
($V_{out} = +58$ dBmV @ 870 MHz Equiv) 79-Channel, 13.5 dB Tilt	CTB_{79}	—	-69	—	
($V_{out} = +58$ dBmV @ 870 MHz Equiv) 79-Channel, 17 dB Tilt	CTB_{79}	—	-72	—	
Noise Figure	NF	—	4.0	4.5	dB
50 MHz		—	4.0	4.5	
550 MHz		—	4.0	4.5	
750 MHz		—	4.0	4.5	
870 MHz		—	4.0	4.5	
DC Current ($V_{DC} = 24$ V, $T_C = 45^\circ\text{C}$)	I_{DC}	410	425	440	mA

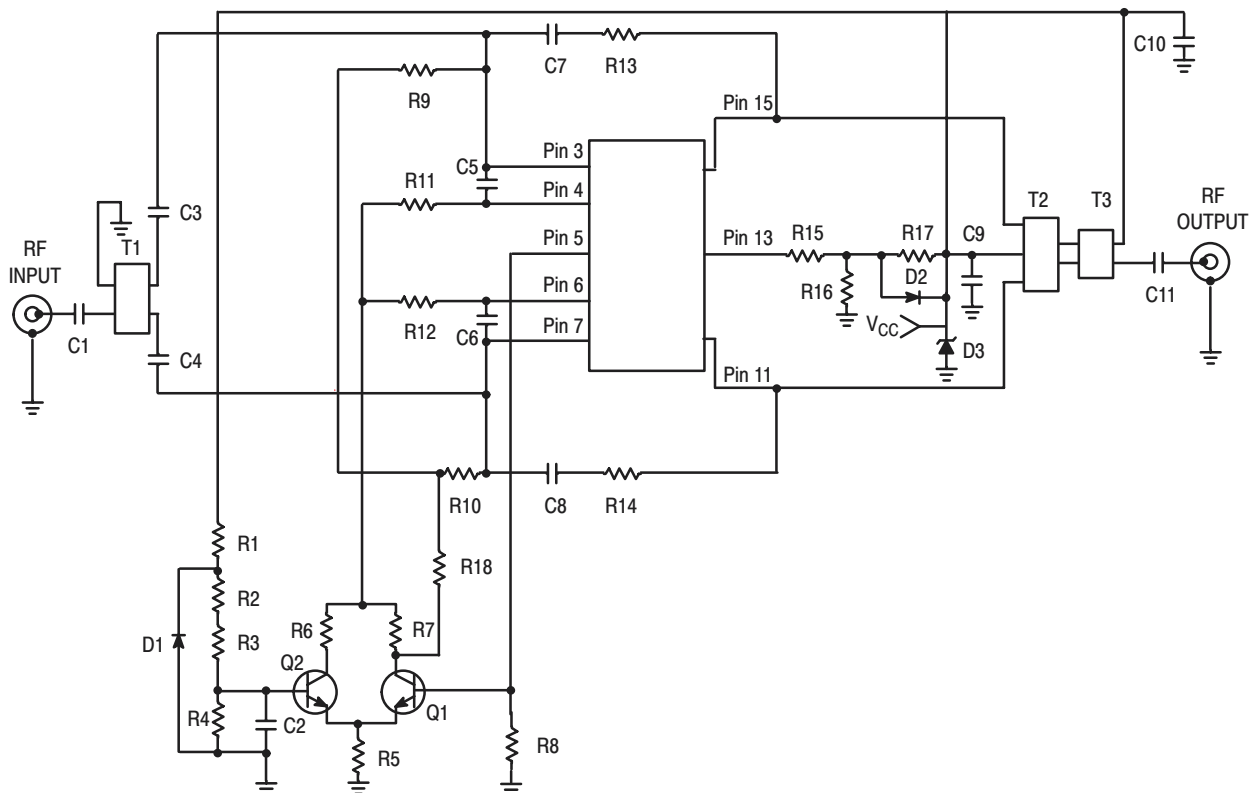


Figure 1. MMG2001R2 50-870 MHz Test Circuit Schematic

Table 1. MMG2001R2 50-870 MHz Test Circuit Component Designations and Values

Designation	Description
C1, C7, C8, C11	220 pF Chip Capacitors (0603)
C2, C3, C4, C9, C10	0.01 μ F Chip Capacitors (0603)
C5, C6	1.8 pF Chip Capacitors (0603)
D1	5.1 V Zener Diode, On/MM3Z5V1T1
D2	27 V Zener Diode, On/MM3Z27VT1
D3	Transient Voltage Suppressor, On/1.5k27A/1.5SMC27AT3
Q1, Q2	Dual Transistors Package, On/MBT3904DW1T1
R1	2.2 k Ω , 1/4 W Chip Resistor (1206)
R2	680 Ω Chip Resistor (0603)
R3	180 Ω Chip Resistor (0603)
R4	1600 Ω Chip Resistor (0603)
R5	820 Ω Chip Resistor (0603)
R6	120 Ω Chip Resistor (0603)
R7	1.5 k Ω Chip Resistor (0603)
R8	8 Ω , 1 W Chip Resistor (2512)
R9, R10, R15	470 Ω Chip Resistors (0603)
R11, R12	18 Ω Chip Resistors (0603)
R13, R14	680 Ω Chip Resistors (0603)
R16	2.4 k Ω Chip Resistor (0603)
R17	6.2 k Ω Chip Resistor (0603)
R18	0 Ω Chip Resistor (0603)
T1	Input Transformer, Mot/77PC016E080
T2	Output Transformer, Mot/77PC016E071
T3	Output Transformer, Mot/77PC016E072
PCB	FR4, 62 mil, $\epsilon_r = 4.81$

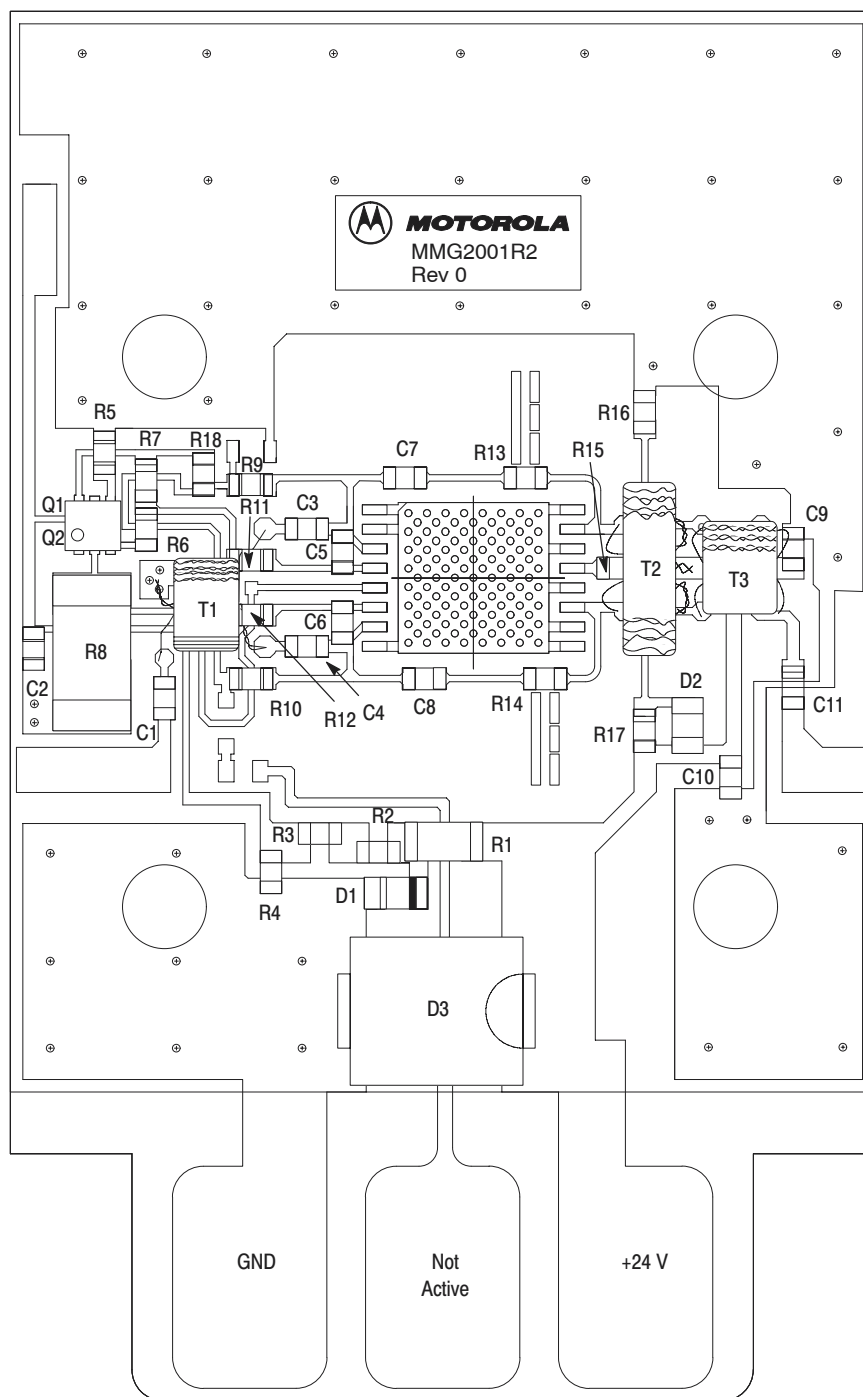


Figure 2. MMG2001R2 50-870 MHz Test Circuit Component Layout

Freescale Semiconductor, Inc.

TYPICAL CHARACTERISTICS

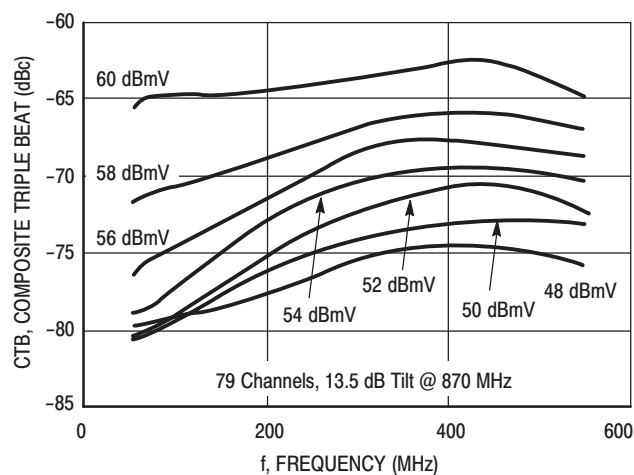


Figure 3. Composite Triple Beat versus Frequency

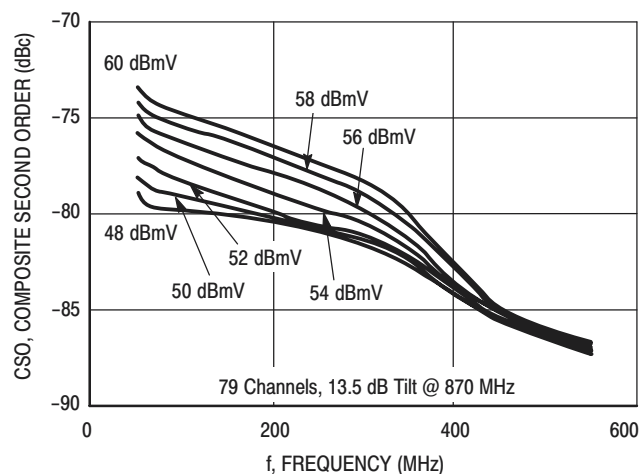


Figure 4. Composite Second Order versus Frequency

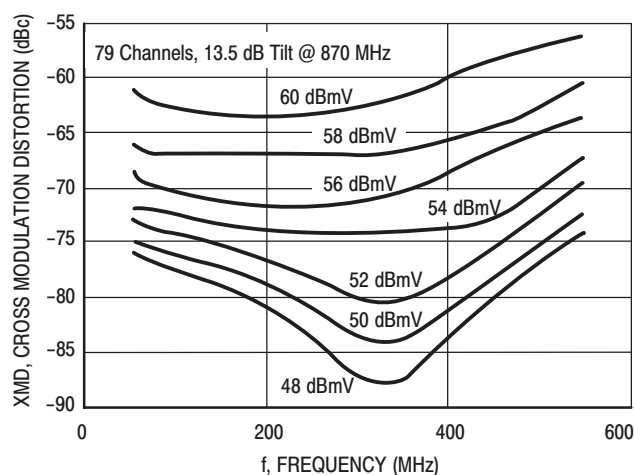


Figure 5. Cross Modulation Distortion versus Frequency

Chapter Four

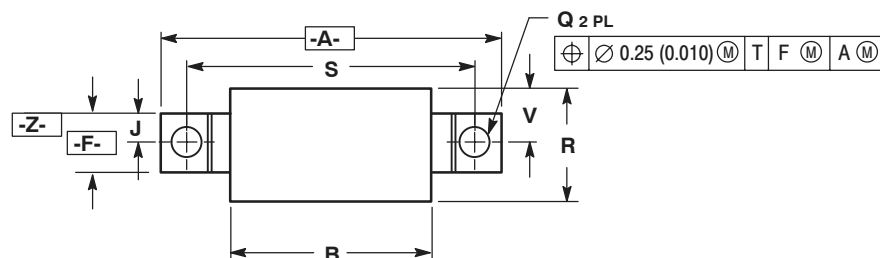
Packaging Information

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

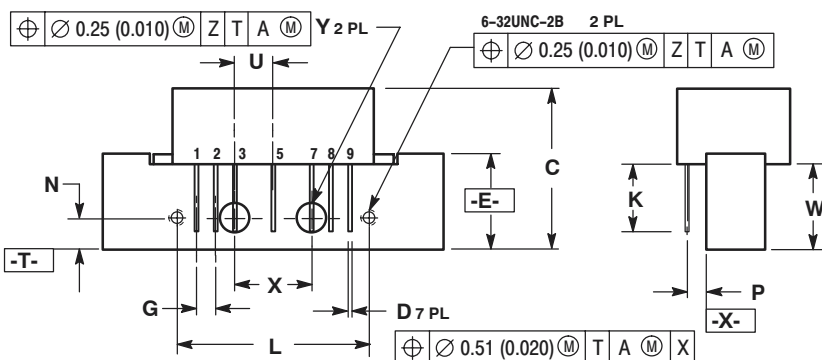
	Page
Case Dimensions	4.1-2

Case Dimensions



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

DIM	INCHES		MILLIMETERS	
	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

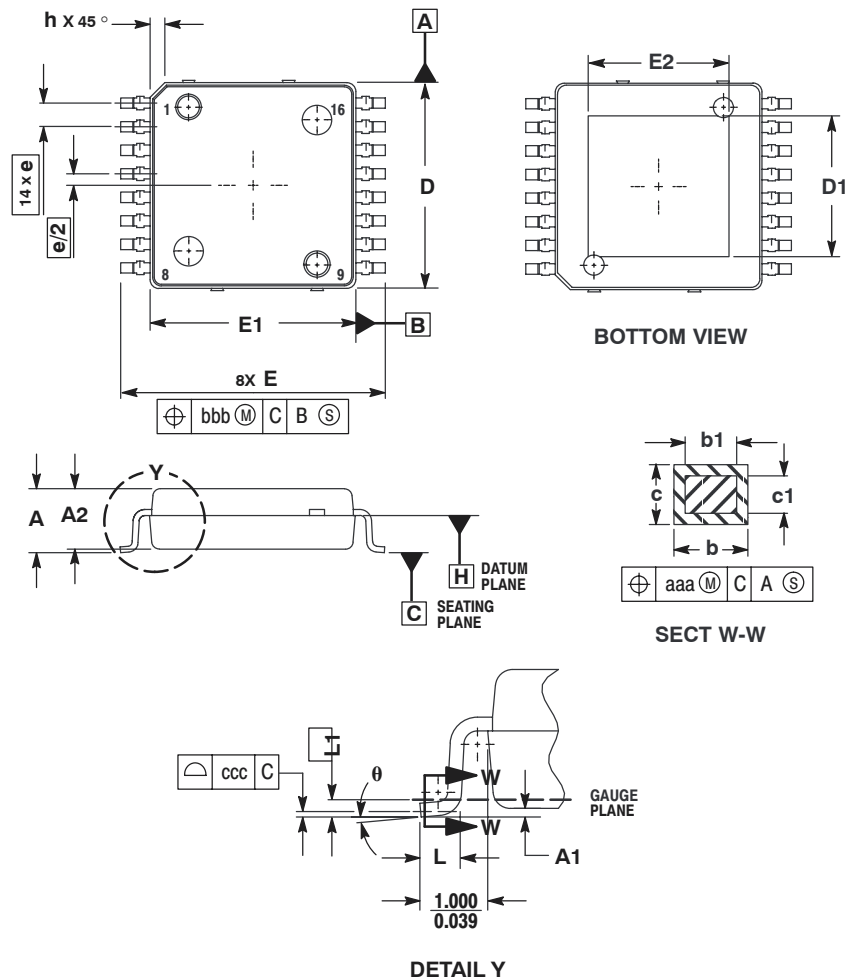


- STYLE 1:
 PIN 1: RF INPUT
 2: GROUND
 3: GROUND
 4: DELETED
 5: VDC
 6: DELETED
 7: GROUND
 8: GROUND
 9: RF OUTPUT

**CASE 714Y-03
 ISSUE D**

Freescale Semiconductor, Inc.

CASE DIMENSIONS (continued)



NOTES:

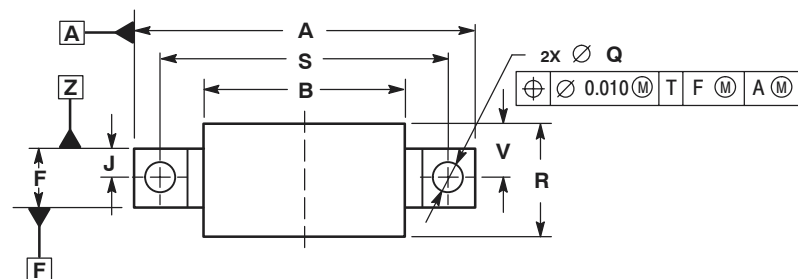
1. CONTROLLING DIMENSION: MILLIMETER.
2. DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994.
3. DATUM PLANE -H- IS LOCATED AT BOTTOM OF LEAD AND IS COINCIDENT WITH THE LEAD WHERE THE LEAD EXITS THE PLASTIC BODY AT THE BOTTOM OF THE PARTING LINE.
4. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD PROTRUSION. ALLOWABLE PROTRUSION IS 0.250 PER SIDE. DIMENSIONS D AND E1 DO INCLUDE MOLD MISMATCH AND ARE DETERMINED AT DATUM PLANE -H-.
5. DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION IS 0.127 TOTAL IN EXCESS OF THE b DIMENSION AT MAXIMUM MATERIAL CONDITION.
6. DATUMS -A- AND -B- TO BE DETERMINED AT DATUM PLANE -H-.

DIM	MILLIMETERS	
	MIN	MAX
A	2.000	2.300
A1	0.025	0.100
A2	1.950	2.100
D	6.950	7.100
D1	4.372	5.180
E	8.850	9.150
E1	6.950	7.100
E2	4.372	5.180
L	0.466	0.720
L1	0.250 BSC	
b	0.300	0.432
b1	0.300	0.375
c	0.180	0.279
c1	0.180	0.230
e	0.800 BSC	
h	---	0.600
θ	0°	7°
aaa	0.200	
bbb	0.200	
ccc	0.100	

CASE 978-03
ISSUE B
PFP-16
PLASTIC

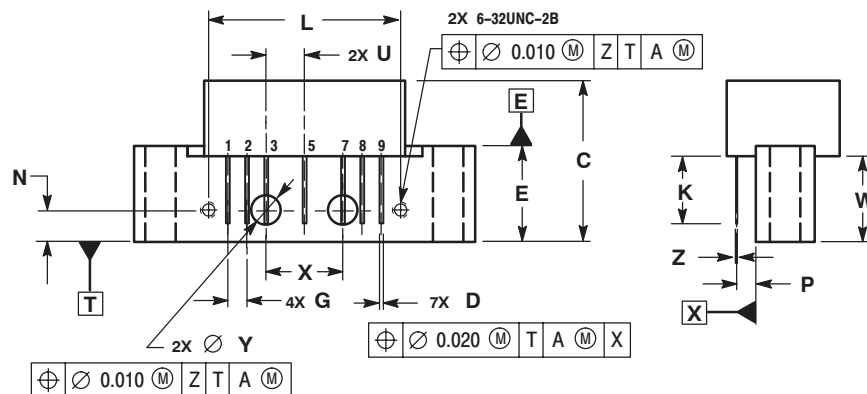
Freescale Semiconductor, Inc.

CASE DIMENSIONS (continued)



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

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



CASE 1302-01
ISSUE B

- 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

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Motorola Semiconductors H.K. Ltd.
Silicon Harbour Centre, 2 Dai King Street
Tai Po Industrial Estate, Tai Po, N.T. Hong Kong
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DL209/D
Rev. 1
10/2003