



NEC's 870 MHz GaAs CATV POWER DOUBLER AMPLIFIER

MC-7845
MC-7846
MC-7847

FEATURES

- **GaAs ACTIVE DEVICES**
- **LOW DISTORTION**
- **HIGH LINEAR GAIN:**
MC-7845 - GL = 18 dB MIN at f = 870 MHz
MC-7846 - GL = 22 dB MIN at f = 870 MHz
MC-7847 - GL = 25 dB MIN at f = 870 MHz
- **LOW RETURN LOSS**
- **LOW GAIN CHANGE OVER TEMPERATURE**
- **SPECIFIED FOR 79, 110, and 132 CHANNELS PERFORMANCE**
- **HIGH RELIABILITY AND RUGGEDNESS:**
Withstands environmental extremes as well as Silicon devices (Surge, ESD, Etc.)

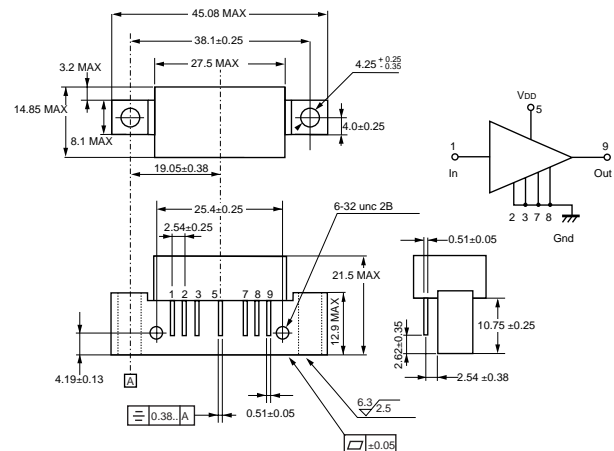
DESCRIPTION

NEC's MC-7845, MC-7846, and MC-7847 are GaAs Multi-Chip Modules designed for use as output stages in CATV applications up to 870 MHz. The only difference between these devices is gain, which is 18 dB, 22 dB, and 25 dB respectively. Because these units are GaAs devices they have low distortion, low noise figure, and low return loss across the entire frequency band.

Like the previous generation of products, these devices survive such hazards as surge and ESD as well as their silicon competitors, but deliver superior performance with low DC current required. All devices are assembled and tested using fully automated equipment to maximize consistency in part to part performance, and reliability is assured by NEC's stringent quality and process control procedures. These parts come in industry compatible hybrid packages.

OUTLINE DIMENSIONS (Units in mm)

PACKAGE OUTLINE H02



APPLICATIONS

- **CATV HEADEND SYSTEMS**
- **CATV OPTICAL NODES**
- **CATV DISTRIBUTION AMPS**

ELECTRICAL CHARACTERISTICS (TA = 30±5 °C, VDD = 24 V, ZS = ZL = 75 Ω)

PART NUMBER			MC-7845			MC-7846			MC-7847			TEST CONDITIONS
SYMBOLS	CHARACTERISTICS	UNITS	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
BW	Frequency Range	MHz	50	—	870	50	—	870	50	—	870	
GL	Linear Gain	dB	18.0	—	19.0	22.0	—	23.0	25.0	—	26.0	f = 870 MHz
S	Gain Slope	dB	0.2	0.6	1.0	0.6	1.0	1.4	1.0	1.4	1.8	f = 40 to 870 MHz
Gf	Gain Flatness	dB	—	—	0.6	—	—	0.6	—	—	0.6	40 to 870 MHz; Peak to Valley
NF	Noise Figure 1	dB	—	—	6.5	—	—	6.0	—	—	5.5	f = 50 MHz
	Noise Figure 2		—	—	7.0	—	—	6.5	—	—	6.0	f = 870 MHz
RLi	Input Return Loss	dB	20.0	—	—	20.0	—	—	20.0	—	—	40 to 160MHz
			19.0	—	—	20.0	—	—	20.0	—	—	160 to 320 MHz
			17.5	—	—	19.0	—	—	19.0	—	—	320 to 640 MHz
			16.0	—	—	17.0	—	—	17.0	—	—	640 to 870 MHz
RLo	Output Return Loss	dB	20.0	—	—	20.0	—	—	20.0	—	—	40 to 160MHz
			19.0	—	—	20.0	—	—	20.0	—	—	160 to 320 MHz
			17.5	—	—	19.0	—	—	19.0	—	—	320 to 640 MHz
			16.0	—	—	18.0	—	—	18.0	—	—	640 to 870 MHz

continued on next page

ELECTRICAL CHARACTERISTICS, cont. ($T_A = 30 \pm 5^\circ\text{C}$, $V_{DD} = 24\text{ V}$, $Z_S = Z_L = 75\ \Omega$)

PART NUMBER			MC-7845			MC-7846			MC-7847			TEST CONDITIONS
SYMBOLS	CHARACTERISTICS	UNITS	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
IDD	Operating Current	mA	275	–	375	275	–	375	275	–	375	RF OFF
CTB	Composite Triple Beat	dBc	–	-63	-60	–	-63	-60	–	-65	-60	110 Channels,
XMod	Cross Modulation ¹	dBc	–	-59	-55	–	-60	-55	–	-62	-55	$V_{OUT} = 50\text{ dBmV}$ at
CSO	Composite Second Order	dBc	–	-68	-63	–	-67	-63	–	-67	-63	745.25 MHz, 10 dB tilted across the band

1. Measured per US standard methods and procedures (using selective level meter).

**ABSOLUTE
MAXIMUM RATINGS¹** ($T_{CASE} = 30^\circ\text{C}$)

SYMBOLS	PARAMETERS	UNITS	RATINGS
V_{DD}	Supply Voltage	V	30
V_i	Input Voltage (Single Tone) ²	dBmV	65
T_c	Operating Case Temperature	$^\circ\text{C}$	-30 to +100
T_{STG}	Storage Temperature	$^\circ\text{C}$	-40 to +100

Note:

1. Operation in excess of any one of these parameters may result in permanent damage.
2. Maximum single channel power applied to the input for 1 minute with no measurable degradation in performance.

**RECOMMENDED
OPERATING CONDITIONS** ($Z_S = Z_L = 75\ \Omega$)

SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX
V_{DD}	Supply Voltage	V	23.5	24.0	24.5
V_i	Input Voltage ¹ , MC-7845 MC-7846 MC-7847	dBmV	–	36.0 32.0 29.0	39.0 35.0 32.0
T_c	Operating Case Temperature	$^\circ\text{C}$	-30	+25	+85

Note:

1. Test Conditions: 110 Channels, 10 dB tilted across the band.

ORDERING INFORMATION

PART NUMBER	PACKAGE	QUANTITY
MC-7845	7-pin special with heatsink	50pcs max/ Tray
MC-7846	7-pin special with heatsink	50pcs max/ Tray
MC-7847	7-pin special with heatsink	50pcs max/ Tray

NOTES ON CORRECT USE

1. The space between PC board and root of the lead should be kept more than 1 mm to prevent undesired stress on the lead and also should be kept less than 4 mm to prevent undesired parasitic inductance.

Recommended space is 2.0 to 3.0 mm typical.

2. Recommended torque strength of the screw is 59 to 78 Ncm.
3. Form the ground pattern as wide as possible to minimize ground impedance. (to prevent undesired oscillation)

All the ground pins must be connected together with wide ground pattern to decrease impedance difference.

Life Support Applications

These NEC products are not intended for use in life support devices, appliances, or systems where the malfunction of these products can reasonably be expected to result in personal injury. The customers of CEL using or selling these products for use in such applications do so at their own risk and agree to fully indemnify CEL for all damages resulting from such improper use or sale.

CEL California Eastern Laboratories, Your source for NEC RF, Microwave, Optoelectronic, and Fiber Optic Semiconductor Devices.

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RECOMMENDED SOLDERING CONDITIONS

This product should be soldered in the following recommended conditions. Other soldering methods and conditions than the recommended conditions are to be consulted with our sales representatives.

Soldering Method	Soldering Conditions	Condition Symbol
Pin Part Heating	Pin area temperature: less than 260°C ¹ Hour: Within 2 sec./pin	–

Note:

1. The point of pin part heating must be kept at a distance of more than 1.2 mm from the root of lead.

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