NEC

HIGH GAIN CATV POWER DOUBLER AMPLIFIER

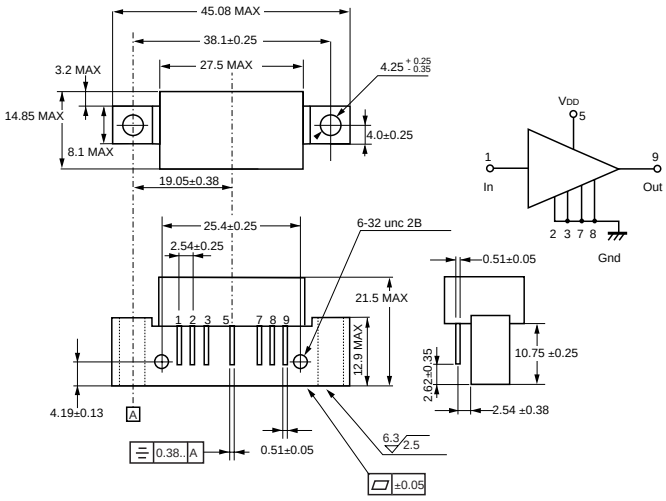
MC-7842 MC-7843

FEATURES

- **GALLIUM ARSENIDE ACTIVE DEVICES**
- **HIGH GAIN/LOW DISTORTION**
  MC-7842: 22 dB Linear Gain
  MC-7843: 24 dB Linear Gain
- **LOW DC CURRENT DRAW**
  375 mA MAX DC Current (360 TYP)
- **LOW GAIN CHANGE OVER TEMP**
  0.5 dB TYP change from -30 to +100°C
- **HIGH RELIABILITY/RUGGEDNESS**
  Withstands environmental extremes as well as Silicon devices (surge, ESD, etc.)
- **INDUSTRY COMPATIBLE PACKAGE**

OUTLINE DIMENSIONS (Units in mm)

PACKAGE OUTLINE H02



DESCRIPTION

The MC-7842 and MC-7843 are GaAs hybrid integrated circuits designed to be used as the output stage in CATV cable distribution amplifier applications up to 870 MHz. The only difference between the MC-7842 and the MC-7843 is gain of about 22 dB and 24 dB respectively. With this product, NEC has made significant advancements to their initial power doubler product offering, including lower distortion, higher crash point, less variation in gain over temperature, a reduction in out of band gain at the high end, and improved ability to survive an overdrive. Like the previous 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. Both parts come in industry compatible hybrid packages.

ELECTRICAL CHARACTERISTICS (T_{CASE} = 30°C, V_{DD} = 24 V, Z_S = Z_L = 75 Ω)

PART NUMBER			MC-7842			MC-7843			
SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX	MIN	TYP	MAX	CONDITIONS
BW	Frequency Range	MHz	50	–	870	50	–	870	
G_L	Linear Gain	dB	22.0	–	23.5	24.0	–	25.5	f = 870 MHz
S	Gain Slope	dB	0.3	0.9	1.5	0.3	0.9	1.5	50 to 870 MHz
G_f	Gain Flatness	dB	–	–	1.0	–	–	1.0	50 to 870 MHz; Peak to Valley
NF	Noise Figure	dB dB	– –	– –	6.3 6.8	– –	– –	6.0 6.5	50 MHz 870 MHz
I_{DD}	Operating Current, P_{IN} = none	dB	275		375	275		375	
CTB	Composite Triple Beat Distortion	dBc	–	-64	-60	–	-64	-60	110 channels, Vout = +50dBmV, at 745.25 MHz, 10dB tilted across the band.
X-Mod	Cross Modulation[1]	dBc	–	-60	-55	–	-60	-55	
CSO	Composite Second Order Distortion	dBc	–	-66	-63	–	-66	-63	
R_L in/out	Input/Output Return Loss	dB	20.0	–	–	20.0	–	–	40 to 160 MHz
		dB	19.0	–	–	19.0	–	–	160 to 320 MHz
		dB	17.5	–	–	17.5	–	–	320 to 640 MHz
		dB	16.0	–	–	16.0	–	–	640 to 870 MHz

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

ABSOLUTE MAXIMUM RATINGS[1] (T_{CASE}= 30 °C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
V_{DD}	Supply Voltage	V	30
V_i	Input Voltage[2]	dBmV	65
T_C	Operating Case Temperature	°C	-30 to +100
T_{STG}	Storage Temperature	°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= 75Ω)

SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX
V_{DD}	Supply Voltage	V	23.5	24.0	24.5
V_i	Input Voltage[1]				
	MC-7842	dBmV	–	27.0	31.5
	MC-7843	dBmV	–	25.0	29.5
T_C	Operating Case Temperature	°C	-30	+25	+85

Note:
1. Test Condition: 110 channels, 10 dB tilted across the band.

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.

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.