CEL

NEC's 870 MHz GaAs CATV 25 dB POWER DOUBLER AMPLIFIER

MC-7847-KC

FEATURES

- **GaAs ACTIVE DEVICES**
- **LOW DISTORTION**
- **HIGH LINEAR GAIN:**
  MC-7847-KC - 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

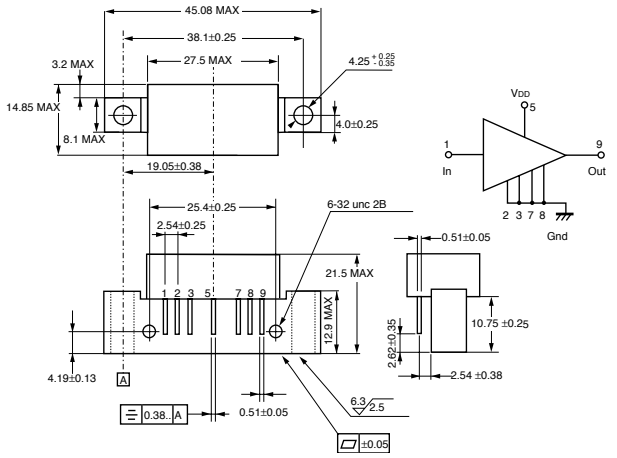
NEC's MC-7847-KC is a GaAs Multi-Chip Modules designed for use as output stages in CATV applications up to 870 MHz. This is a high gain device offering 25 dB minimum gain at 870 MHz. Because this unit is a GaAs device it has low distortion, low noise figure, and low return loss across the entire frequency band.

The MC-7847-KC is similar to NEC's standard push-pull devices, but the higher current allows for better distortion performance, especially X-mod.

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 (T_A = 30±5 °C, V_{DD} = 24 V, Z_S = Z_L = 75 Ω)

PART NUMBER			MC-7847-KC			TEST CONDITIONS
SYMBOLS	CHARACTERISTICS	UNITS	MIN	TYP	MAX	
BW	Frequency Range	MHz	50	–	870	
G_L	Linear Gain	dB	25.0	–	26.0	f = 870 MHz
S	Gain Slope	dB	1.0	1.4	1.8	f = 40 to 870 MHz
Gf	Gain Flatness	dB	–	–	0.6	40 to 870 MHz; Peak to Valley
NF	Noise Figure 1	dB	–	–	5.5	f = 50 MHz
	Noise Figure 2		–	–	6.0	f = 870 MHz
RLi	Input Return Loss	dB	20.0	–	–	40 to 160MHz
			20.0	–	–	160 to 320 MHz
			19.5	–	–	320 to 640 MHz
			17.0	–	–	640 to 870 MHz
RL_O	Output Return Loss	mA	20.0	–	–	40 to 160MHz
I_{DD}	Operating Current	mA	350	–	420	RF OFF
CTB	Composite Triple Beat	dBc	–	–	-60	110 Channels
XMod	Cross Modulation[1]	dBc	–	–	-55	V_{OUT} = 50 dBmV at 745.25 MHz, 10 dB tilted across the band
CSO	Composite Second Order	dBc	–	–	-63	

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 (Single Tone)[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 ($Z_S = Z_L = 75\Omega$)

SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX
V_{DD}	Supply Voltage V	23.5	24.0	24.5	
V_i	Input Voltage[1], MC-7847-KC	dBmV	–	32.0	35.0
T_C	Operating Case Temperature	°C	-30	+25	+85

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

ORDERING INFORMATION

PART NUMBER	PACKAGE	QUANTITY
MC-7847-KC-AZ	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.

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.

CEL California Eastern Laboratories, Your source for NEC RF, Microwave, Optoelectronic, and Fiber Optic Semiconductor Devices.
4590 Patrick Henry Drive • Santa Clara, CA 95054-1817 • (408) 988-3500 • FAX (408) 988-0279 • **www.cel.com**

CEL California Eastern Laboratories

4590 Patrick Henry Drive
Santa Clara, CA 95054-1817
Telephone: (408) 919-2500
Facsimile: (408) 988-0279

Subject: Compliance with EU Directives

CEL certifies, to its knowledge, that semiconductor and laser products detailed below are compliant with the requirements of European Union (EU) Directive 2002/95/EC Restriction on Use of Hazardous Substances in electrical and electronic equipment (RoHS) and the requirements of EU Directive 2003/11/EC Restriction on Penta and Octa BDE.

CEL Pb-free products have the same base part number with a suffix added. The suffix –A indicates that the device is Pb-free. The –AZ suffix is used to designate devices containing Pb which are exempted from the requirement of RoHS directive (*). In all cases the devices have Pb-free terminals. All devices with these suffixes meet the requirements of the RoHS directive.

This status is based on CEL's understanding of the EU Directives and knowledge of the materials that go into its products as of the date of disclosure of this information.

Restricted Substance per RoHS	Concentration Limit per RoHS (values are not yet fixed)	Concentration contained in CEL devices	
Lead (Pb)	< 1000 PPM	-A	-AZ
		Not Detected	(*)
Mercury	< 1000 PPM	Not Detected	
Cadmium	< 100 PPM	Not Detected	
Hexavalent Chromium	< 1000 PPM	Not Detected	
PBB	< 1000 PPM	Not Detected	
PBDE	< 1000 PPM	Not Detected	

If you should have any additional questions regarding our devices and compliance to environmental standards, please do not hesitate to contact your local representative.