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NEC

VHF~UHF BROAD-BAND AMPLIFIER

# THICK FILM HYBRID INTEGRATED CIRCUIT

# MC-5156

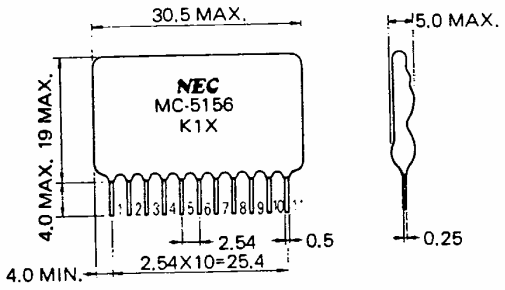
## DESCRIPTION AND APPLICATIONS

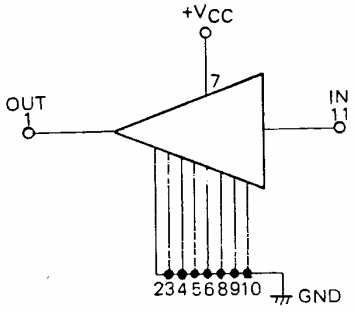
The MC-5156 is a thick film hybrid integrated circuit designed for broad-band general purpose amplifier applications in the 30 to 890 MHz band. The device is a "post amplifier" which features low noise, flat gain with a typical output of 100 to 110 dBμV/75 Ω. Since the MC-5156 is designed to serve as a VHF-UHF TV booster amplifier, the device is matched to 75 Ω. The MC-5156 offers solutions to many amplifier problems where battery operation and bandwidth is required. Reliability and performance uniformity are assured by gold metallized transistors and NEC's stringent quality-control procedures. The MC-5156 is a complete circuit which requires no additional adjustments or components. Its use offers reductions in the number of manufacturing operations, assembly time, parts control, maintenance and design complexity.

## FEATURES

- Operates as a flat amplifier from 30 to 890 MHz without adjustments or external components.
- Large intersept point (+28.7 dBm TYP.)
- Input and output matching to 75 Ω.
- Low noise figure (6 dB TYP.)
- Low intermodulation distortion ($IM_2$=−55 dB, $IM_3$=−65 dB TYP.)

**PACKAGE DIMENSIONS**
**in millimeters**




## ABSOLUTE MAXIMUM RATINGS (Ta=25 °C)

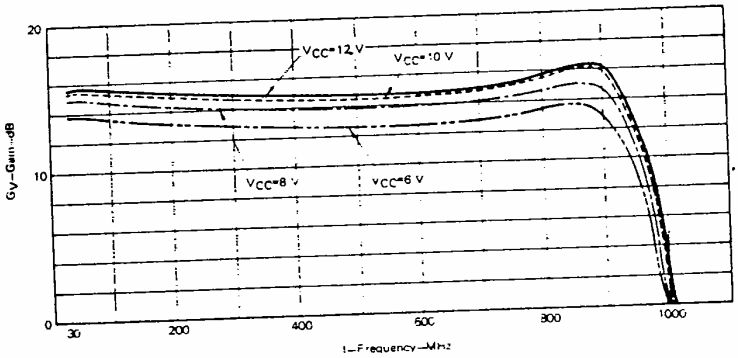
| | | | |
|---|---|---|---|
| Supply Voltage | $V_{CC}$ | 15 | V |
| Operating Current | $I_{CC}$ | 90 | mA |
| Input Voltage | $V_I$ | 0.5 | V |
| Total Dissipation | $P_T$ | 1.3 | W |
| Operating Temperature | $T_{opt}$ | −30 to +65 | °C |
| Storage Temperature | $T_{stg}$ | −30 to +85 | °C |

## ELECTRICAL CHARACTERISTICS ($T_a$=25 °C, $V_{CC}$=12 V, $Z_S$=$Z_L$=75 Ω *)

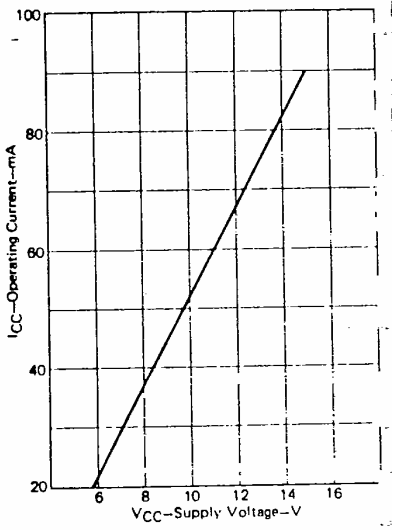
| CHARACTERISTIC | SYMBOL | MIN. | TYP. | MAX. | UNIT | TEST CONDITIONS |
|---|---|---|---|---|---|---|
| Operating Current | $I_{CC}$ | 55 | 61 | 67 | mA | |
| Average Gain | $G_{V(av)}$ | 15 | | 16 | dB | f=30~890 MHz |
| Gain Flatness | $\pm\Delta G_{V(av)}$ | | ±0.8 | ±1.2 | dB | f=30~890 MHz |
| Input Output VSWR | $VSWR_{I,O}$ | | | 2.5 | | f=30~890 MHz |
| Isolation | $I_{SO}$ | 25 | | | dB | f=30~890 MHz |
| Noise Figure | NF | | 5.5 | 7.5 | dB | f=30~300 MHz |
| | | | 6 | 8 | dB | f=300~890 MHz |
| 2nd Order Intermodulation Distortion | $IM_2$ | | −55 | | dB | $f_1$=90 MHz, $f_2$=100 MHz, $f_1+f_2$, $V_O$= 105 dBμV/75 Ω |
| 3rd Order Intermodulation Distortion | $IM_3$ | | −65 | | dB | $f_1$=200 MHz, $f_2$=210 MHz, f=$2f_2-f_1$, $V_O$=105 dBμV/75 Ω |
| | | | −50 | | dB | $f_1$=700 MHz, $f_2$=750 MHz, f=$2f_2-f_1$, $V_O$=105 dBμV/75 Ω |
| Output Power | $P_O$ | | 13 | | dBm | f=500 MHz (1 dB Gain Compression) |

* This device can be used in $Z_O$=50 Ω with some VSWR.

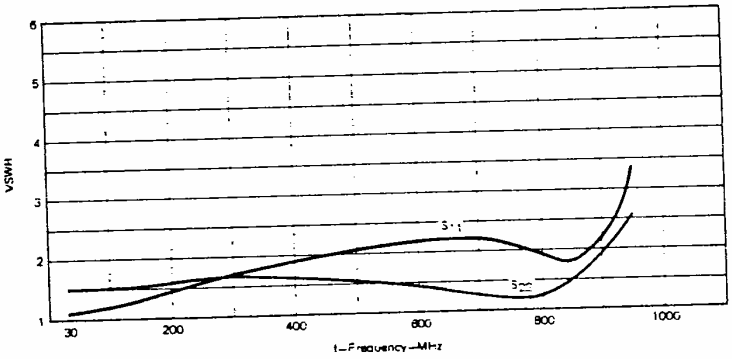
GAIN vs. FREQUENCY



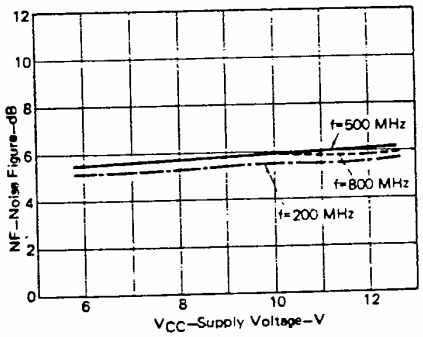

OPERATING CURRENT vs. SUPPLY VOLTAGE




VSWR vs. FREQUENCY




NOISE FIGURE vs. FREQUENCY




INTERMODULATION DISTORTION vs. SUPPLY VOLTAGE