



# INTEGRATED CIRCUIT

## TECHNICAL DATA

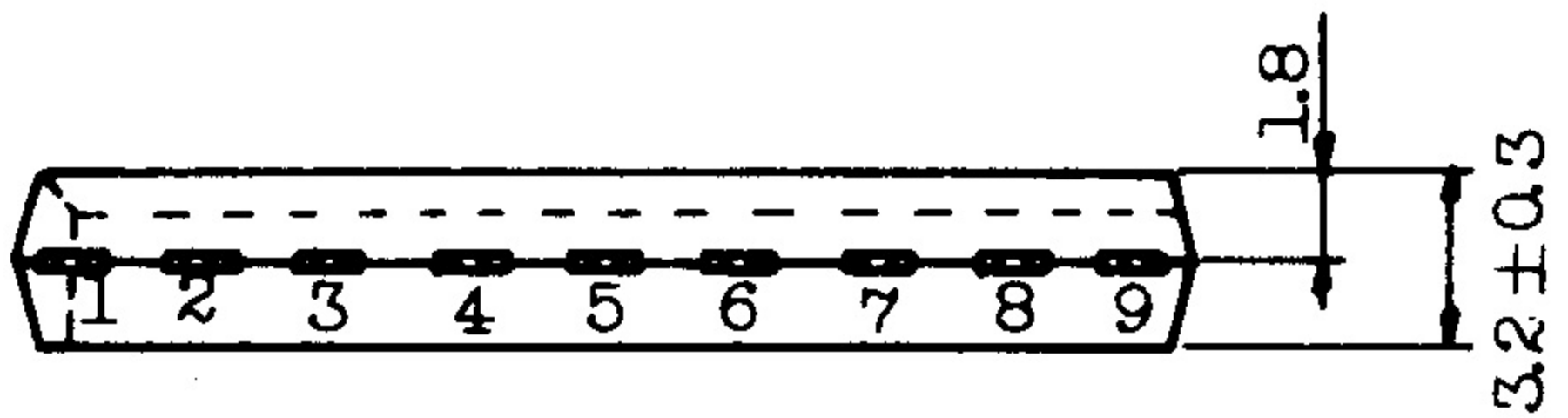
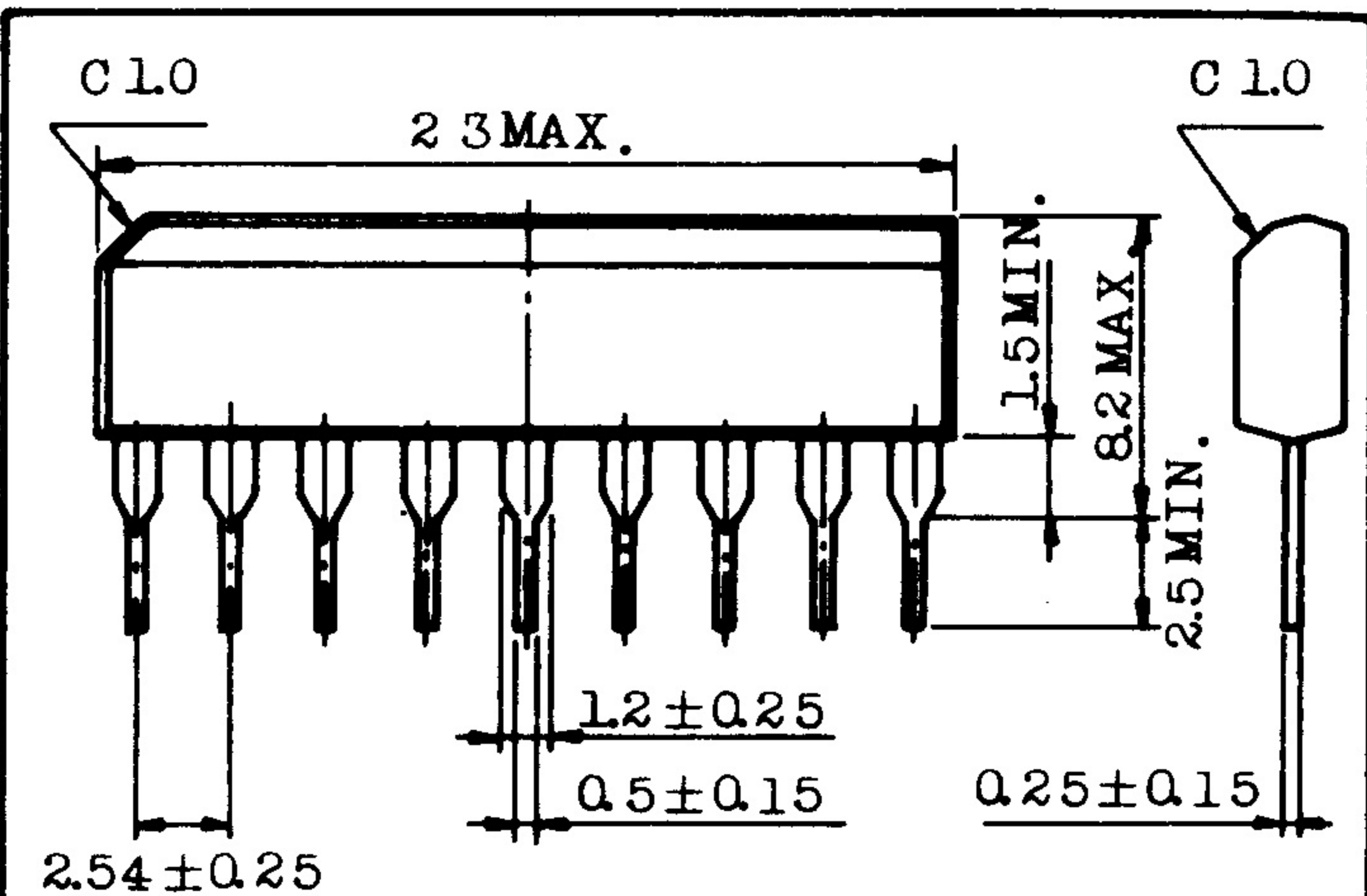
# TA7310P

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT  
SILICON MONOLITHIC

FOR PHASE LOCKED LOOP FREQUENCY  
SYNTHESIZER.

- . Doubly Balanced Mixer
- . Emitter Follower Circuit
- . Differential Amplifier
- . Wide Operating Supply Voltage Range :  $V_{CC}=6 \sim 10V$

Unit in mm



Lead pitch is 2.54 and tolerance is  $\pm 0.25$  against theoretical center of each lead that is obtained on the basis of No.1 lead.

JEDEC

TOSHIBA

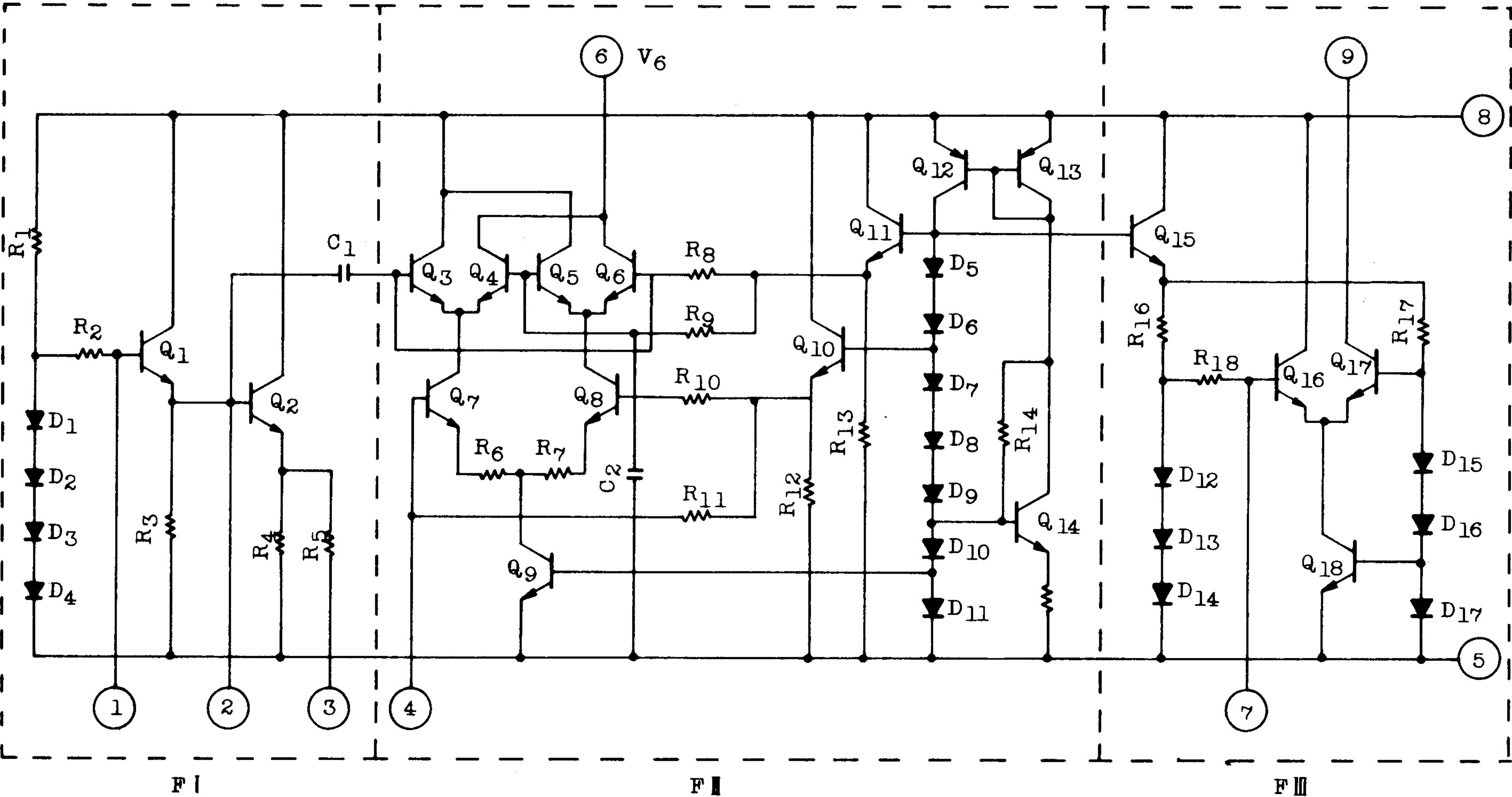
5-23B

### MAXIMUM RATINGS ( $T_a=25^{\circ}C$ )

| CHARACTERISTIC           | SYMBOL    | RATING         | UNIT        |
|--------------------------|-----------|----------------|-------------|
| Supply Voltage           | $V_{CC}$  | 10             | V           |
| 6 Pin Supply Voltage     | $V_6$     | 14             | V           |
| 1 Pin Supply Voltage     | $V_9$     | 20             | V           |
| Power Dissipation (Note) | $P_D$     | 600            | mW          |
| Operating Temperature    | $T_{opr}$ | $-30 \sim 75$  | $^{\circ}C$ |
| Storage Temperature      | $T_{stg}$ | $-55 \sim 150$ | $^{\circ}C$ |

Note : Derated above  $T_a=25^{\circ}C$  in the proportion of  $4.8mW/^{\circ}C$ .

### EQUIVALENT CIRCUIT

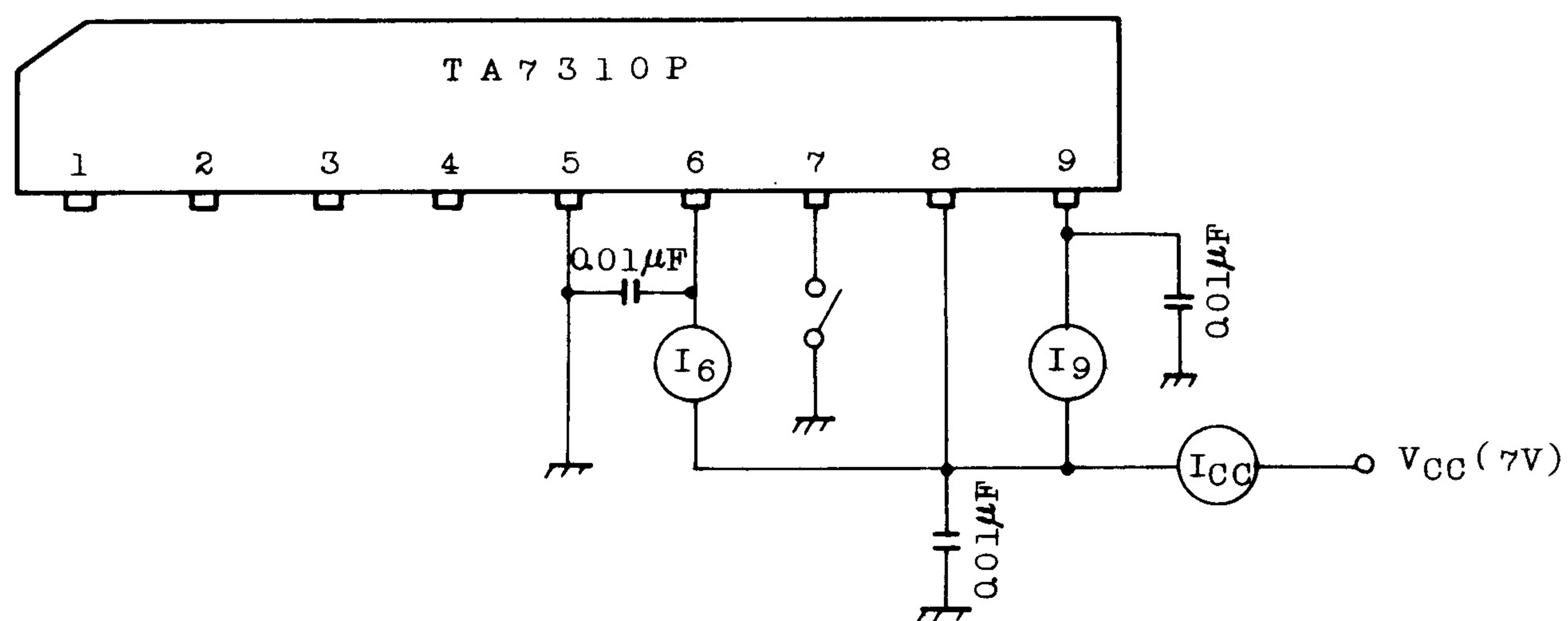


ELECTRICAL CHARACTERISTICS ( $T_a=25^{\circ}$ )

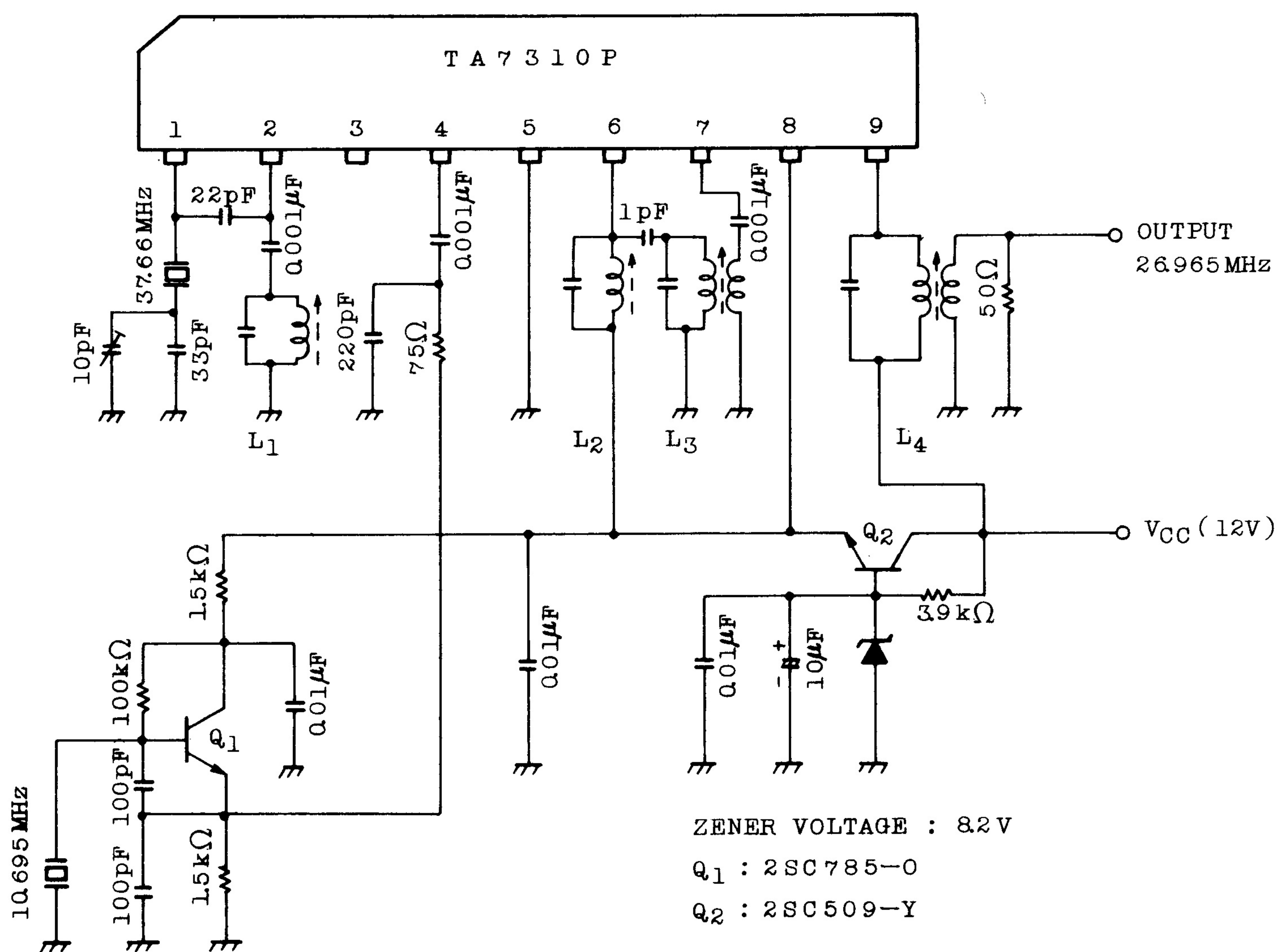
| CHARACTERISTIC                          |                                   | SYMBOL            | TEST CIR-CUIT | TEST CONDITION                                  | MIN. | TYP. | MAX. | UNIT      |
|-----------------------------------------|-----------------------------------|-------------------|---------------|-------------------------------------------------|------|------|------|-----------|
| Supply Current                          |                                   | $I_{CC}$          | 1             | $V_{CC}=7V$                                     | 21.5 | —    | 38.0 | mA        |
| 6 Pin Supply Current                    |                                   | $I_6$             | 1             | $V_{CC}=7V$                                     | 3.0  | —    | 5.5  | mA        |
| 9 Pin Maximum Supply Current            |                                   | $I_9(\text{Max})$ | 1             | $V_{CC}=7V$ , 7pin GND                          | 6.0  | —    | 12.0 | mA        |
| Output Power                            |                                   | $P_o$             | 2             | $V_{CC}=7V$ , $V_9=12V$<br>$f=26.965\text{MHz}$ | 6.0  | 10   | —    | mW        |
| Differential Amplifier Input Impedance  | 7 Pin Parallel Input Resistance   | $R_{ip7}$         | 10            | $V_{CC}=7V$ , $f=27\text{MHz}$                  | —    | 1.0  | —    | $k\Omega$ |
|                                         | 7 Pin Parallel Input Capacitance  | $C_{ip7}$         |               |                                                 | —    | 6.5  | —    | pF        |
| Differential Amplifier Output Impedance | 9 Pin Parallel Output Resistance  | $R_{op9}$         | 11            | $V_{CC}=7V$ , $V_9=12V$ ,<br>$f=27\text{MHz}$   | —    | 4.0  | —    | $k\Omega$ |
|                                         | 9 Pin Parallel Output Capacitance | $C_{op9}$         |               |                                                 | —    | 4.0  | —    | pF        |
| Doubly Balanced Mixer Input Impedance   | 4 Pin Parallel Input Resistance   | $R_{ip4}$         | 12            | $V_{CC}=7V$ , $f=10\text{MHz}$                  | —    | 1.5  | —    | $k\Omega$ |
|                                         | 4 Pin Parallel Input Capacitance  | $C_{ip4}$         |               |                                                 | —    | 4.3  | —    | pF        |
| Doubly Balanced Mixer Output Impedance  | 6 Pin Parallel Output Resistance  | $R_{op6}$         | 13            | $V_{CC}=7V$ , $f=27\text{MHz}$                  | —    | 3.5  | —    | $k\Omega$ |
|                                         | 6 Pin Parallel Output Capacitance | $C_{op6}$         |               |                                                 | —    | 6.0  | —    | pF        |

## TEST CIRCUIT

1. ICC, I6, I9(Max.)



2. P<sub>O</sub>



COIL DATA (10mm □) TABLE 1

|           |       | L1          | L2          | L3          | L4          |
|-----------|-------|-------------|-------------|-------------|-------------|
| Primary   | Turns | 3T          | 6T          | 6T          | 12T         |
|           | L     | 0.6 $\mu$ H | 0.3 $\mu$ H | 0.3 $\mu$ H | 1.2 $\mu$ H |
|           | C     | 56pF        | 100pF       | 100pF       | 30pF        |
| Secondary | Turns | —           | —           | 2T          | 2T          |

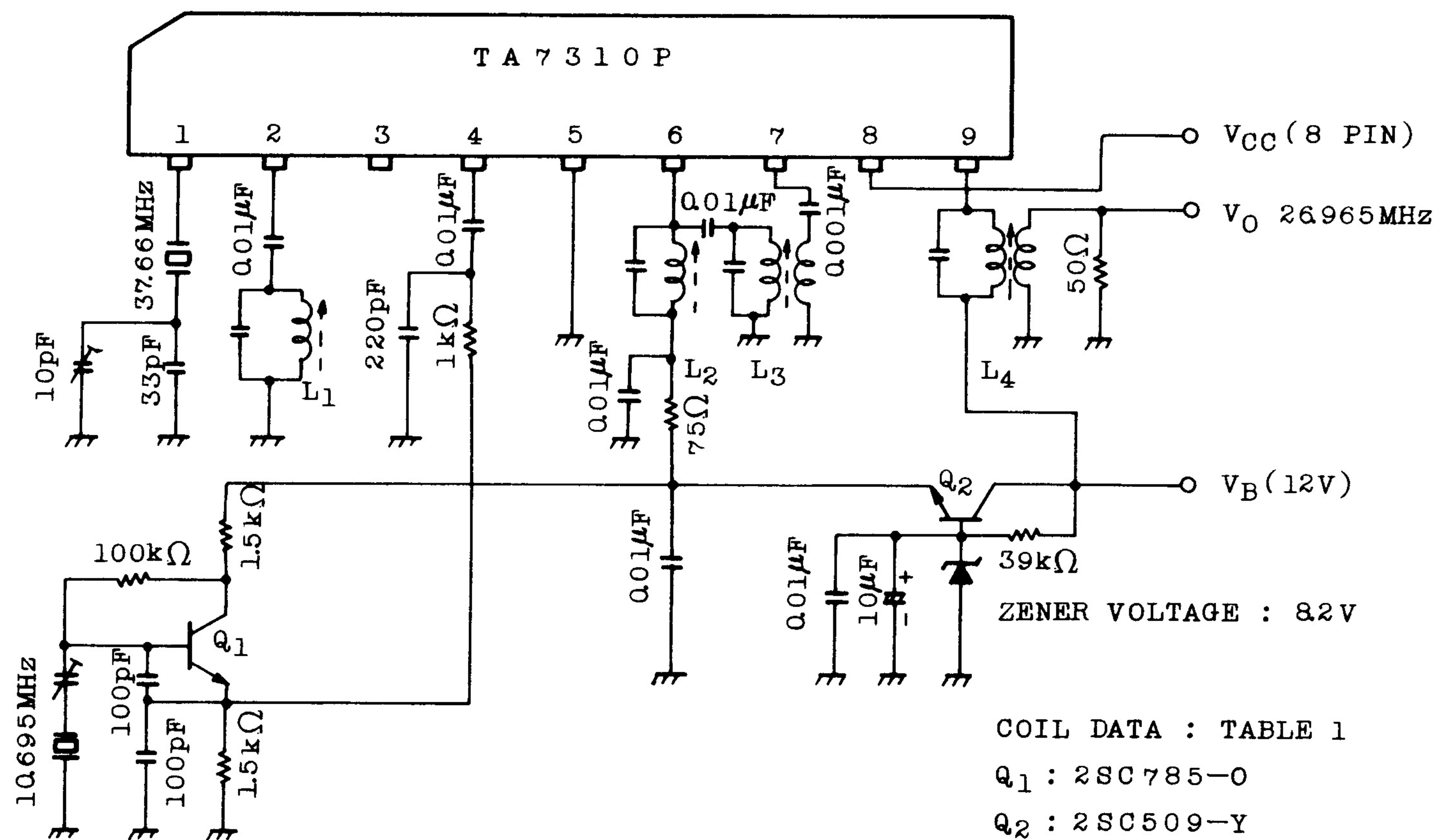


# INTEGRATED CIRCUIT

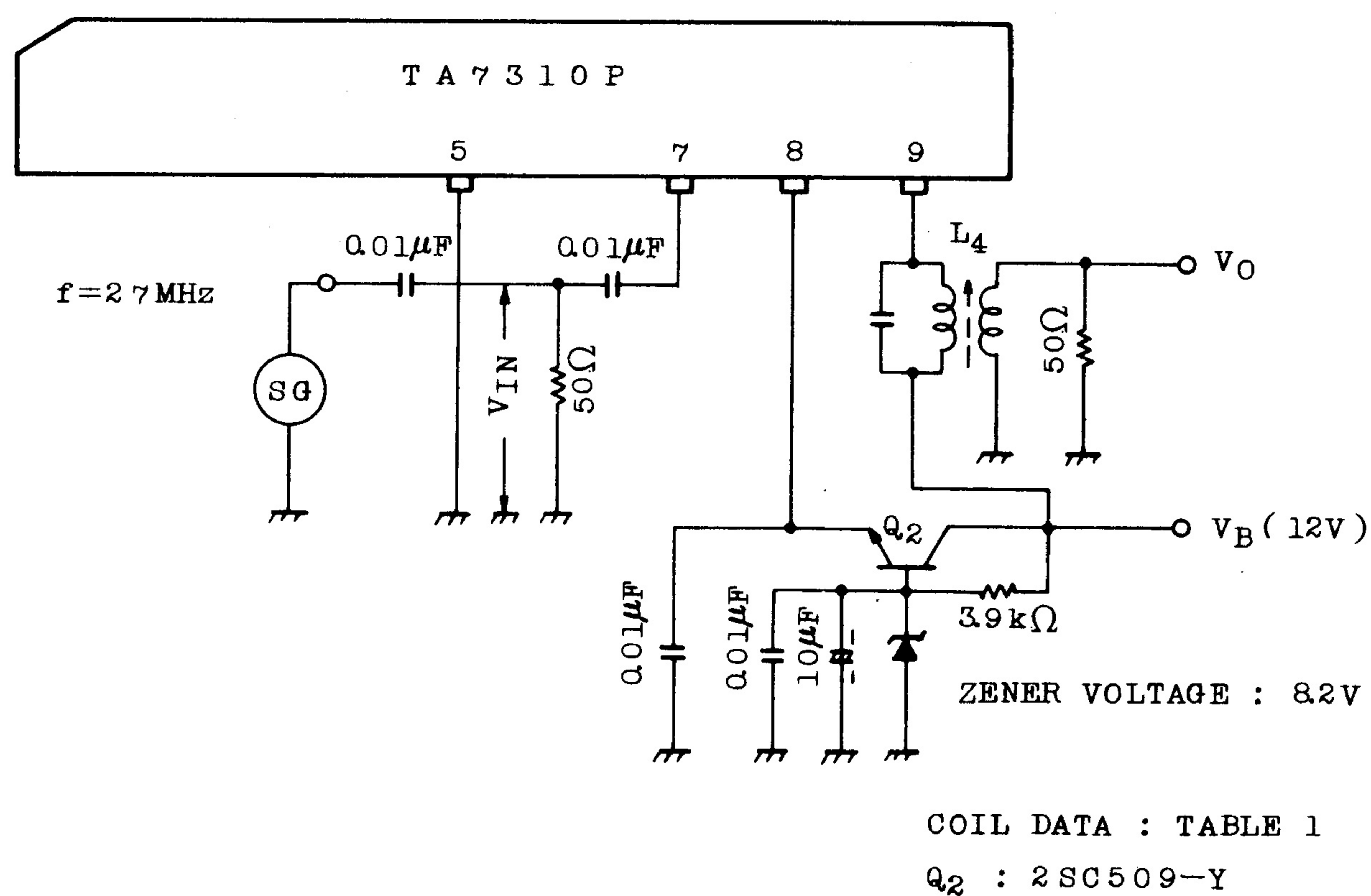
## TECHNICAL DATA

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### 3. $V_O - V_{CC}(8 \text{ PIN})$



### 4. $V_O - V_{IN}$



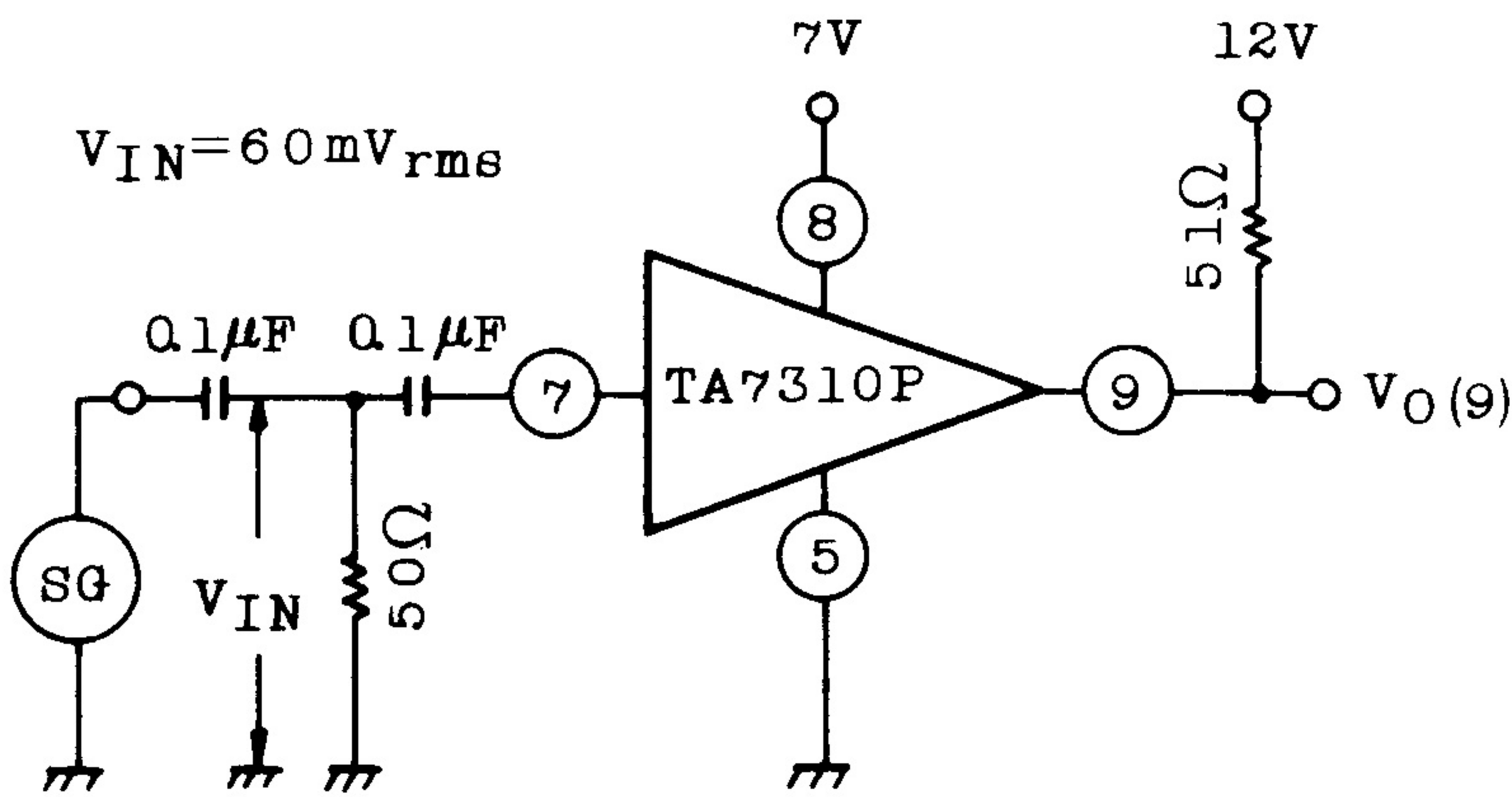


# INTEGRATED CIRCUIT

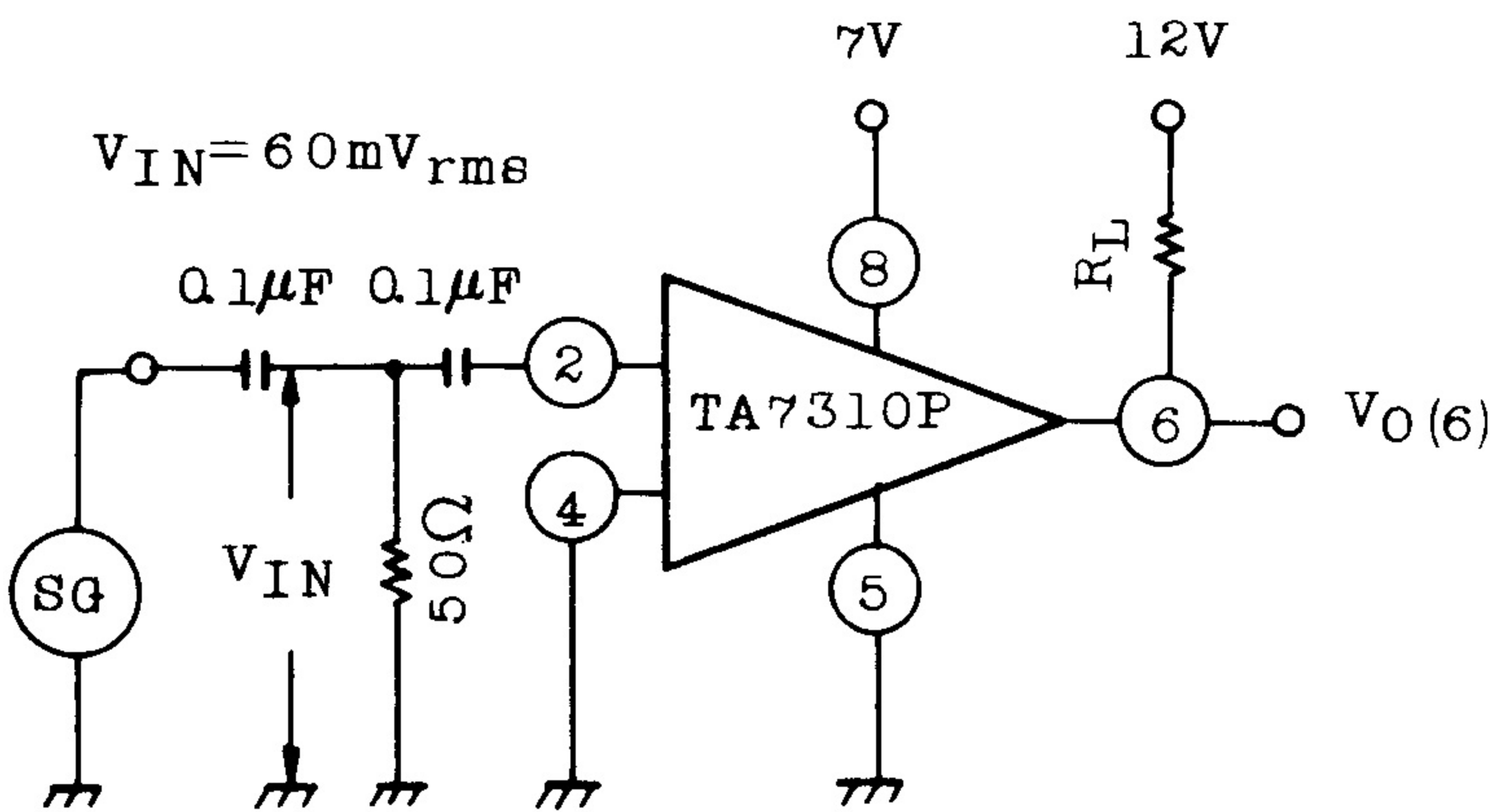
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## TECHNICAL DATA

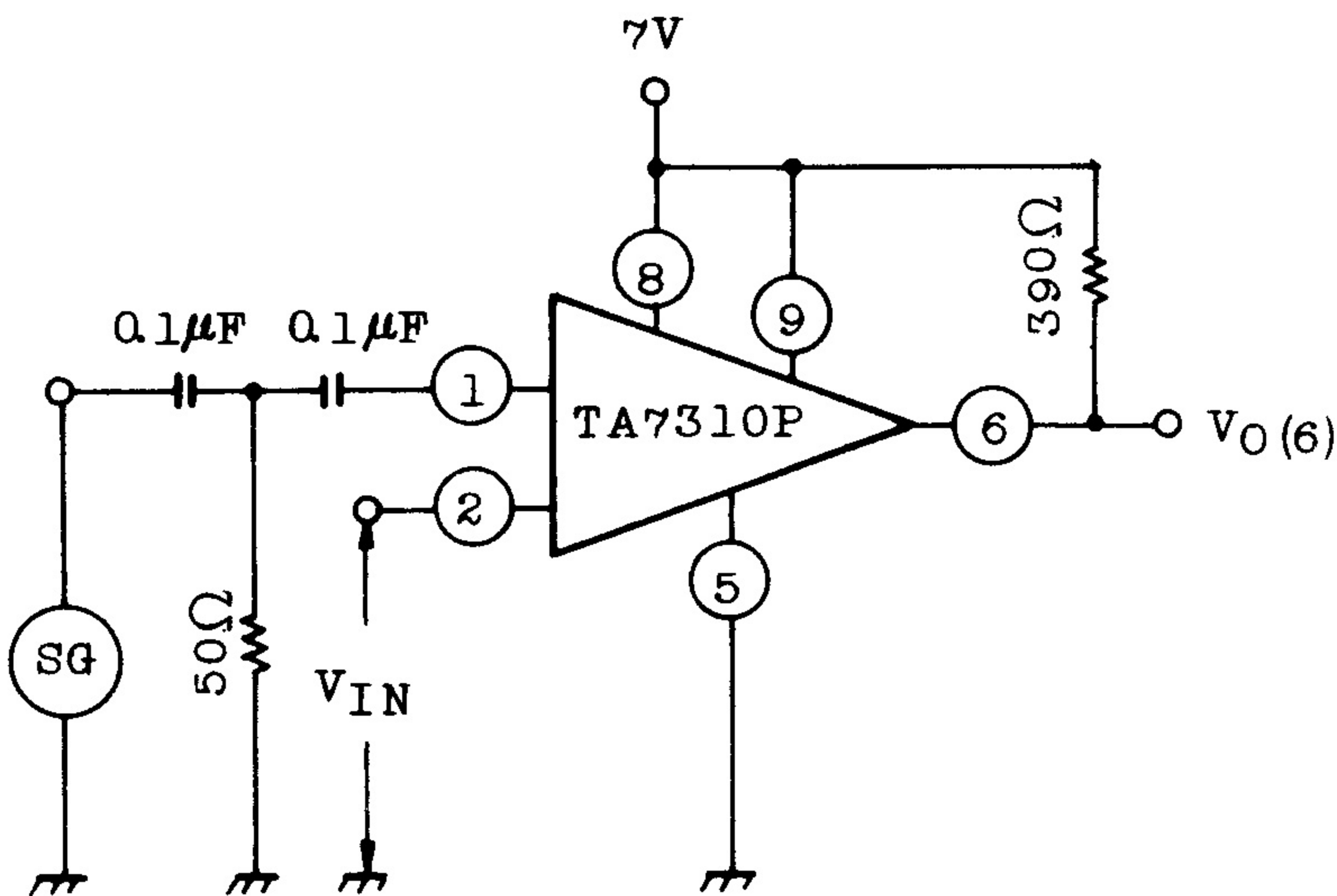
5.  $V_O(9) - f$



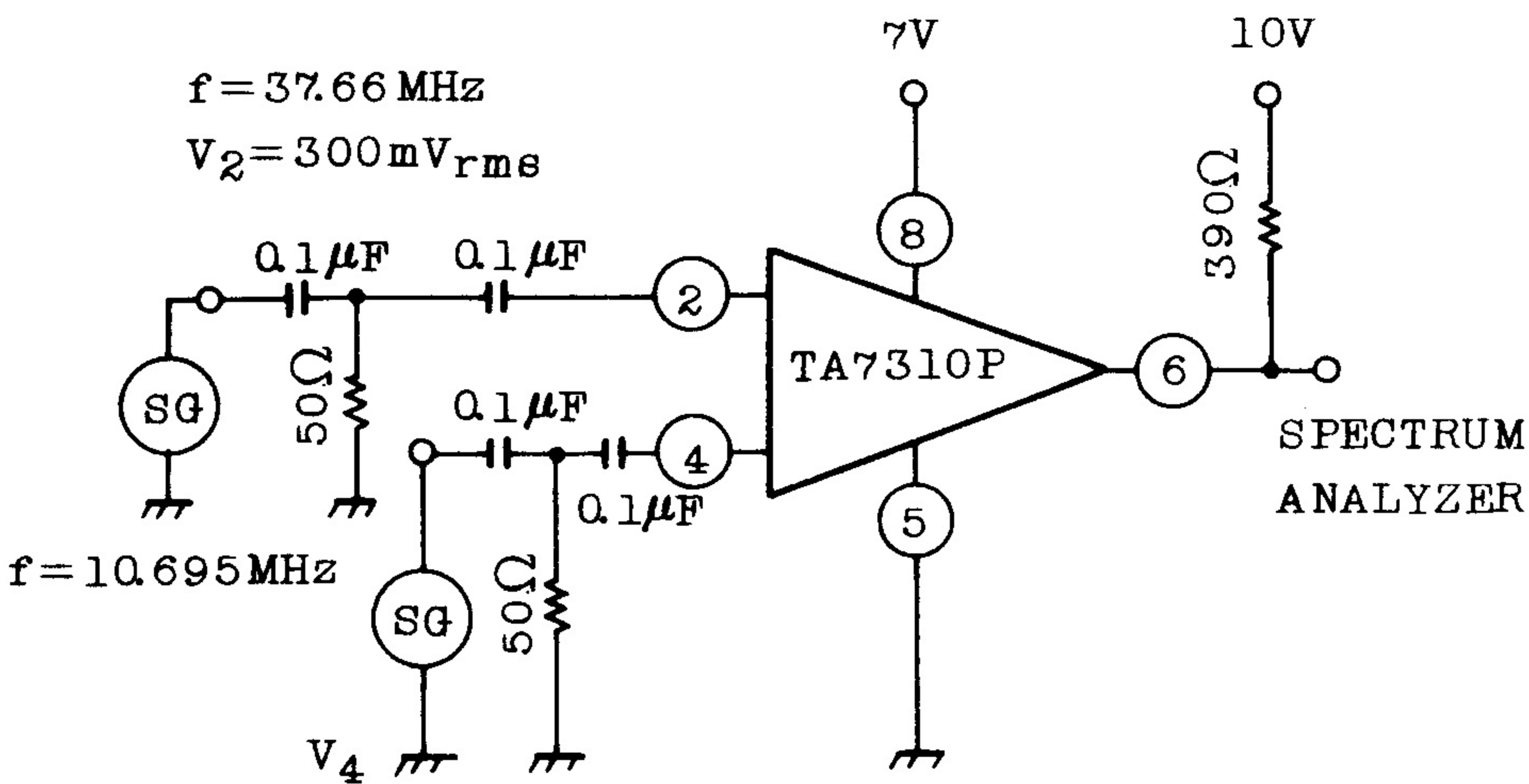
6.  $V_O(6) - f$



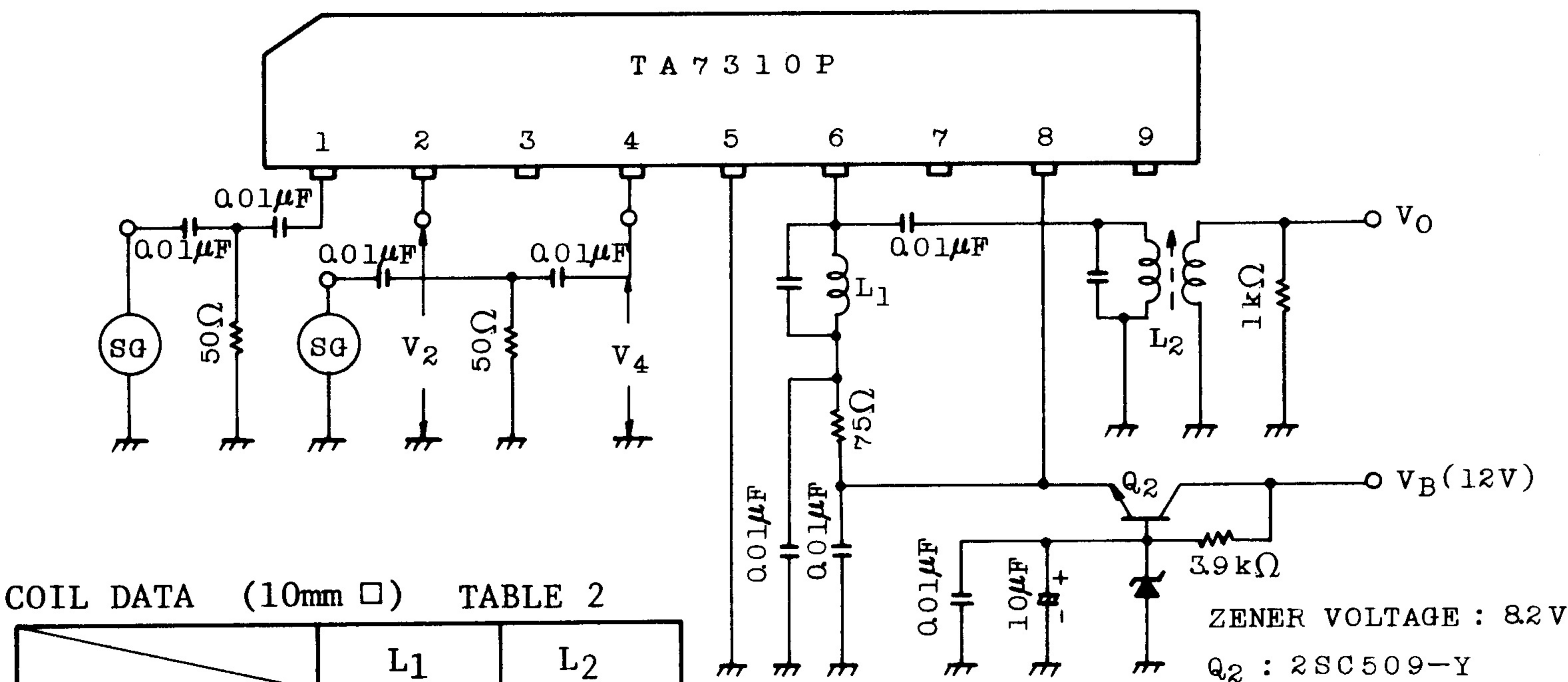
7. CARRIER FEED THROUGH ( $V_O(6) - f$ )



8. SIDE BAND HARMONIC SUPPRESSION - LOCAL OSC. LEVEL



9.  $V_O - V_4$

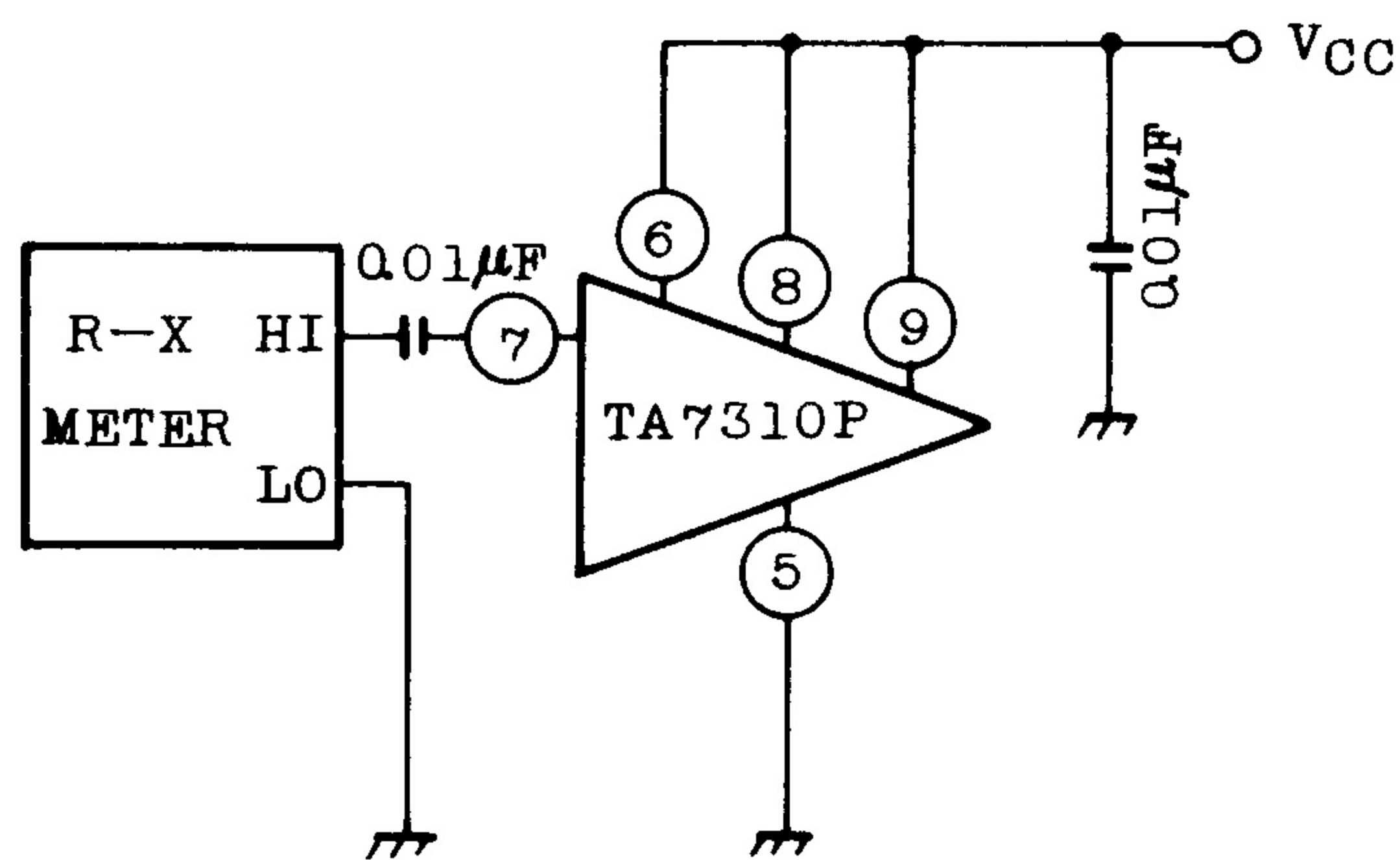


COIL DATA (10mm □) TABLE 2

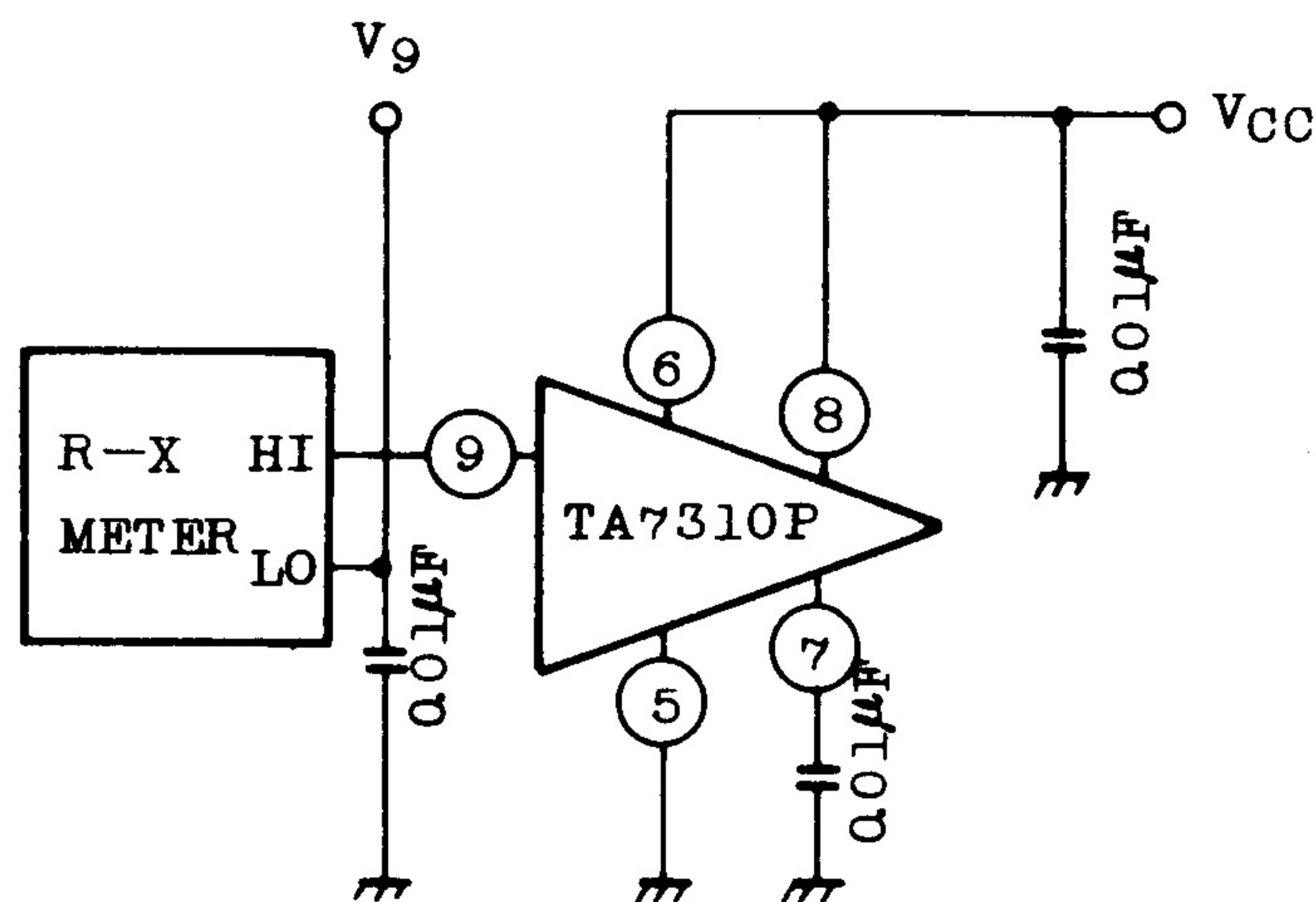
|         |       | L1    | L2    |
|---------|-------|-------|-------|
|         | Turns | 6T    | 6T    |
|         | L     | 0.3μH | 0.3μH |
| Primary | C     | 100pF | 100pF |
|         | Turns | -     | 2T    |



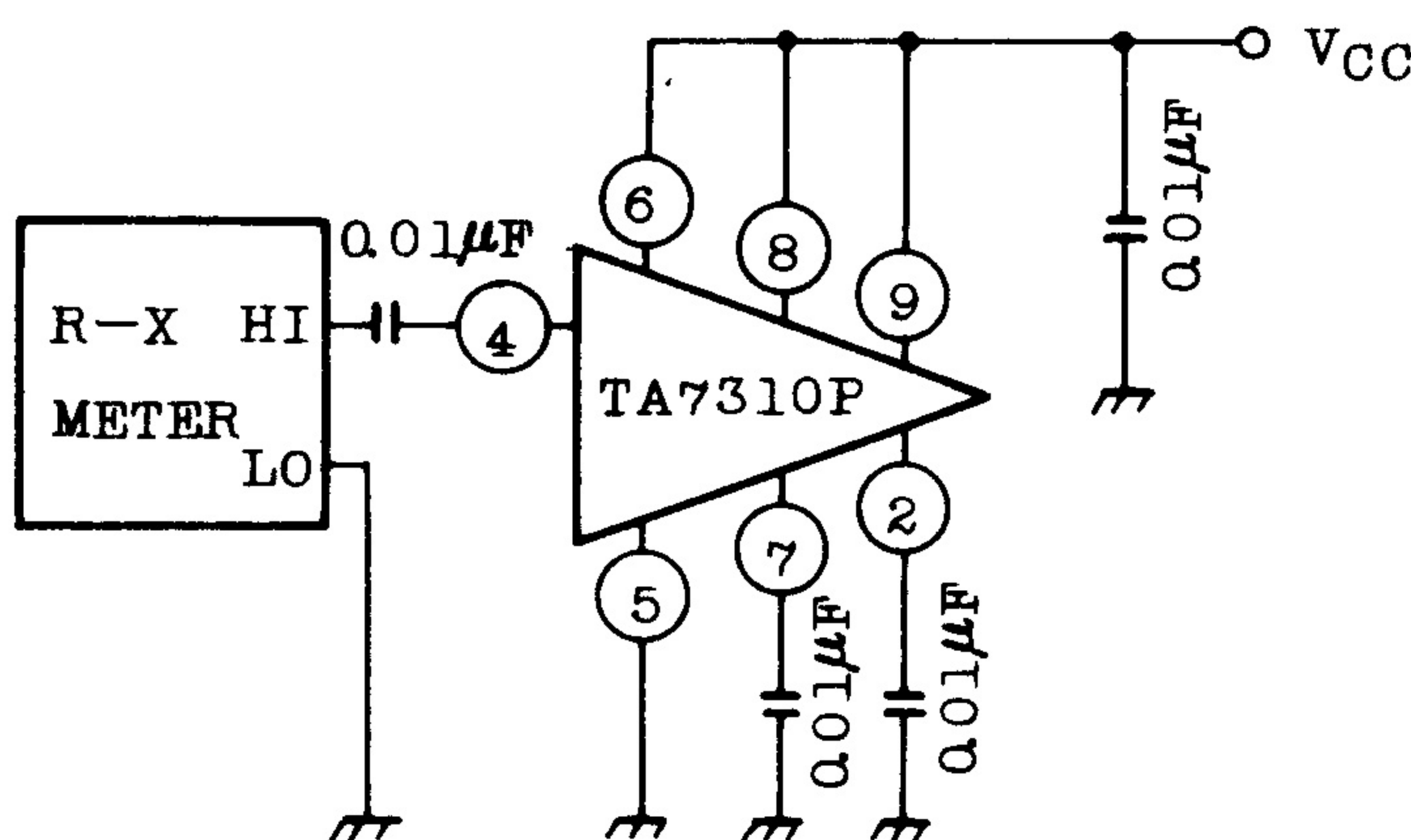
10.  $R_{ip7}$ ,  $C_{ip7}$



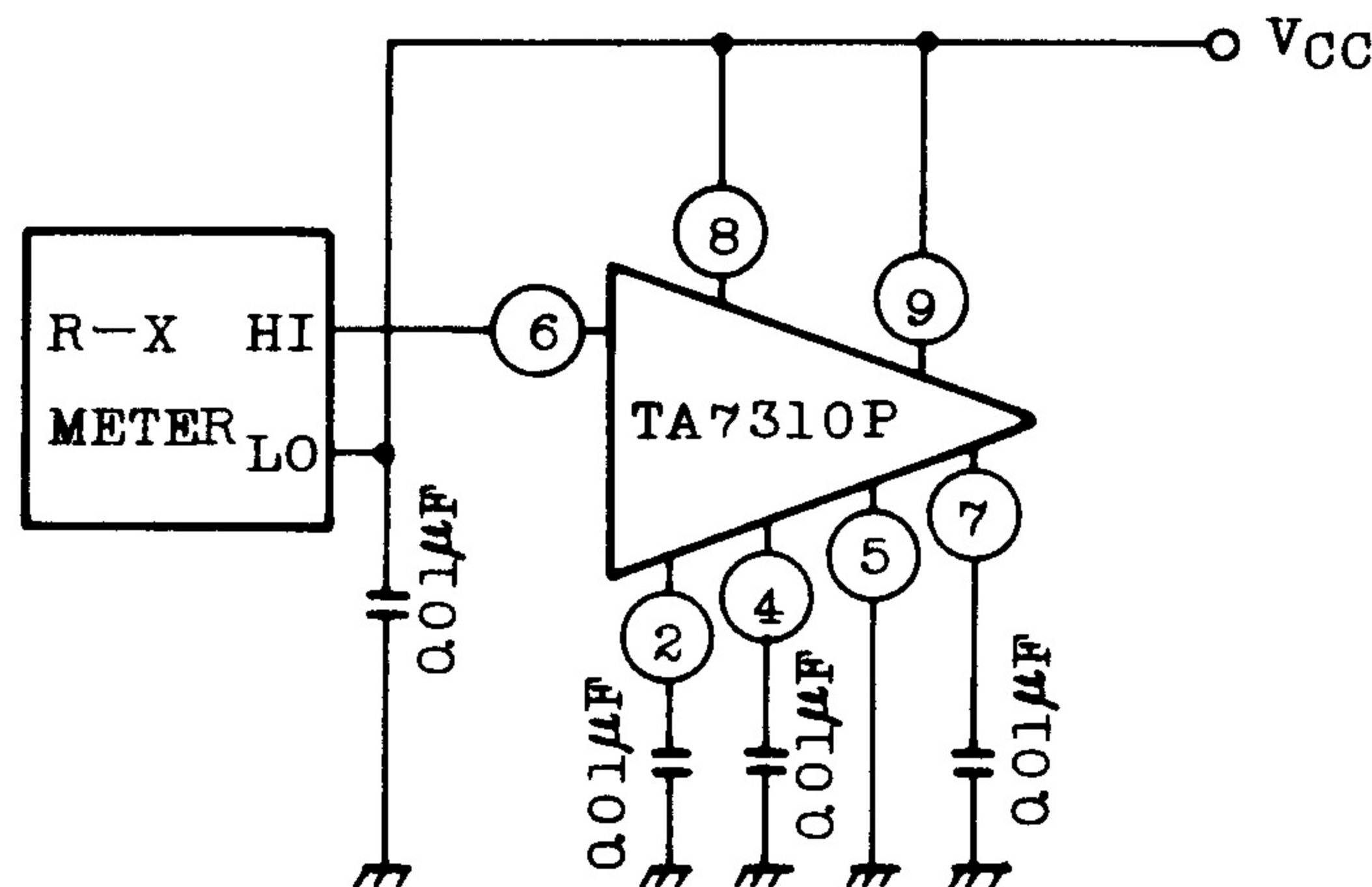
11.  $R_{op9}$ ,  $C_{op9}$



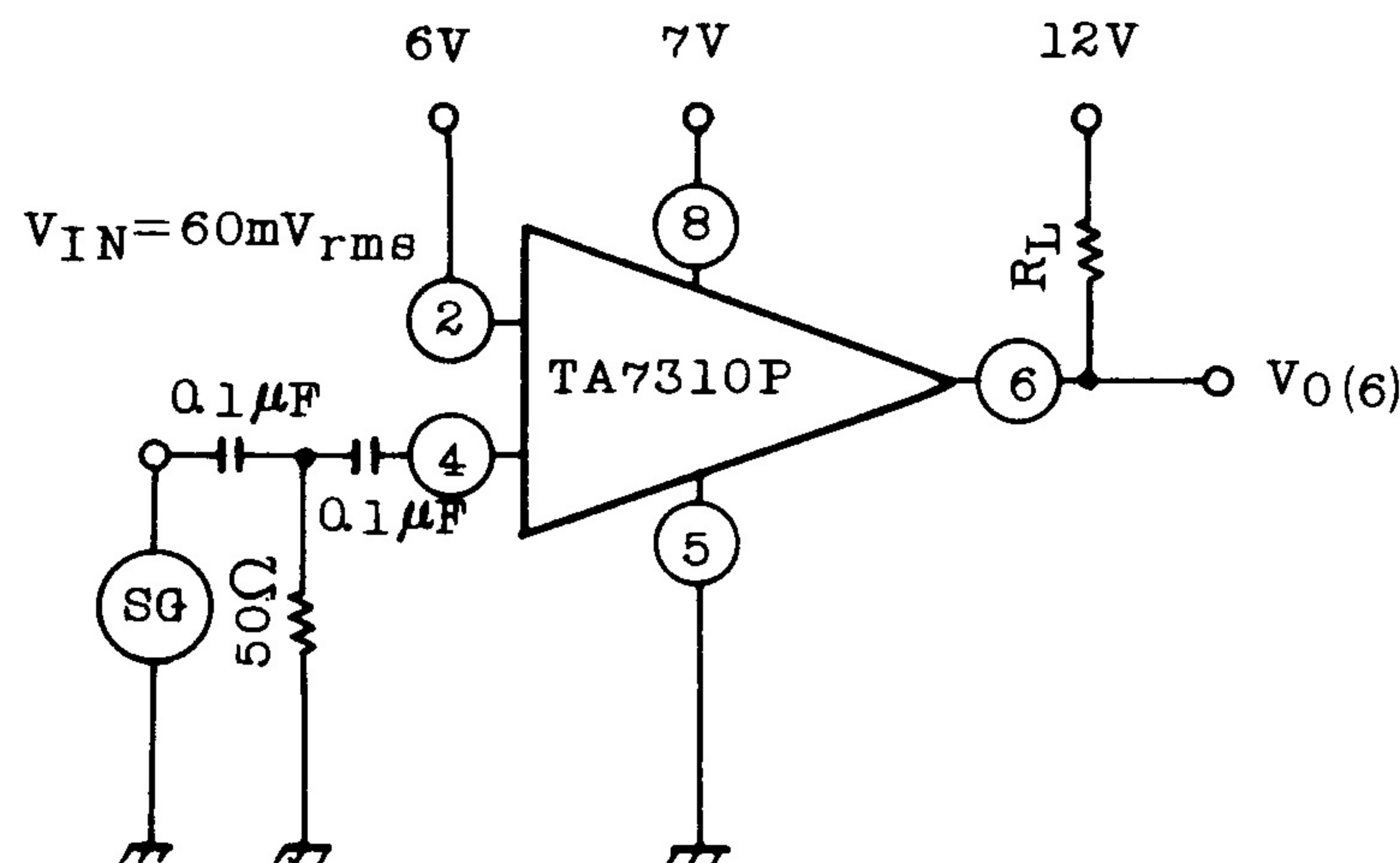
12.  $R_{ip4}$ ,  $C_{ip4}$



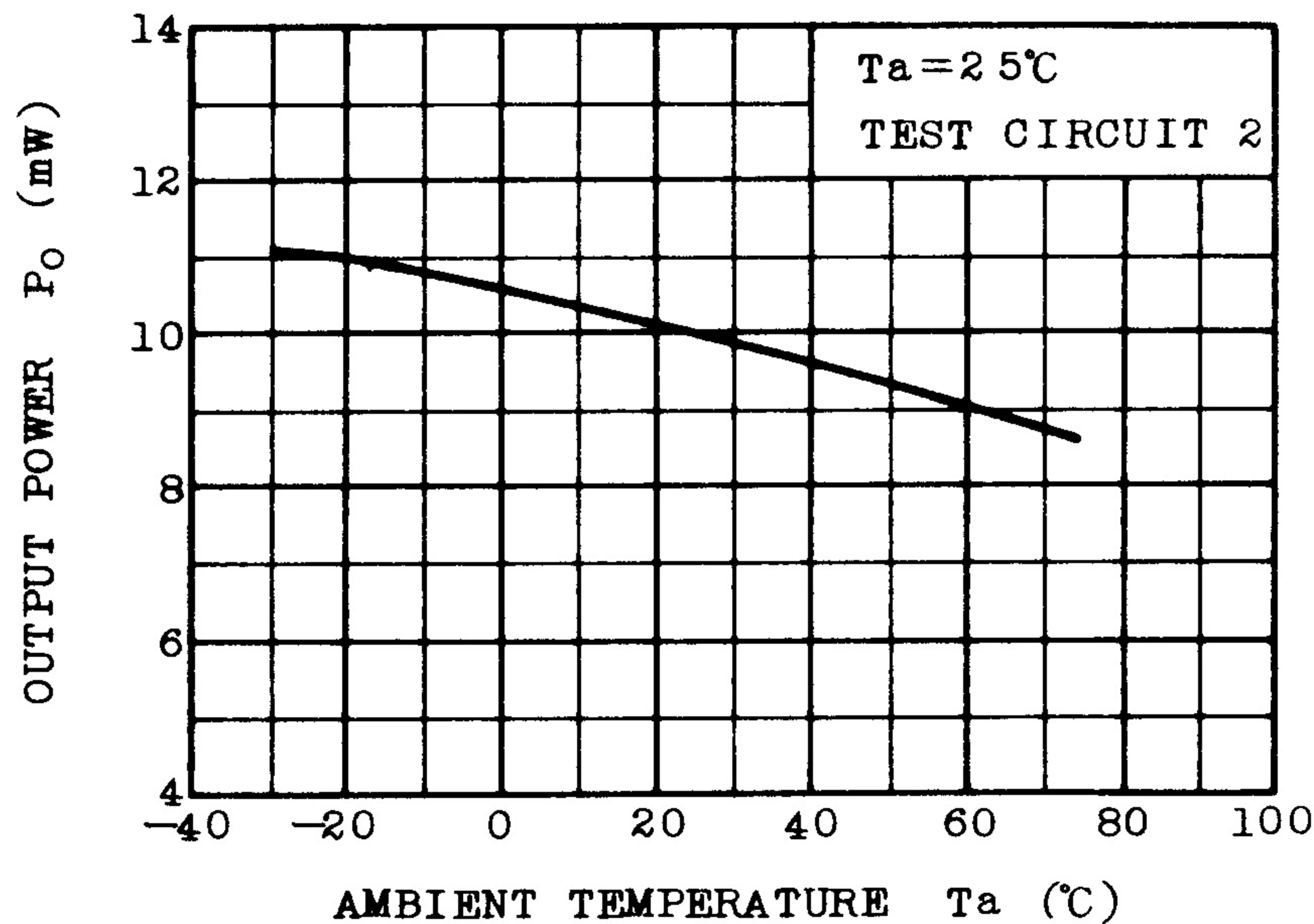
13.  $R_{op6}$ ,  $C_{op6}$



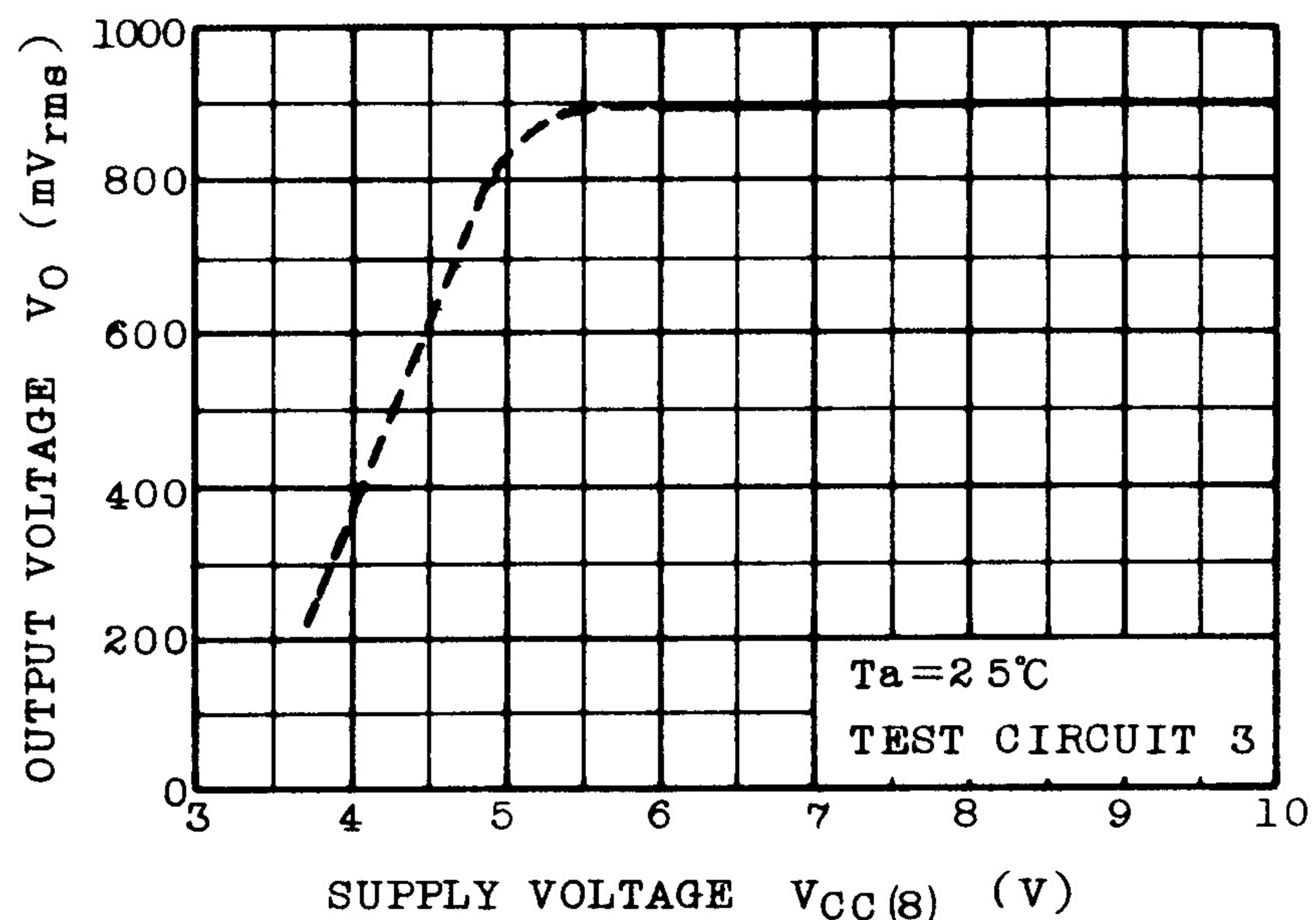
14.  $V_{O(6)} - f$



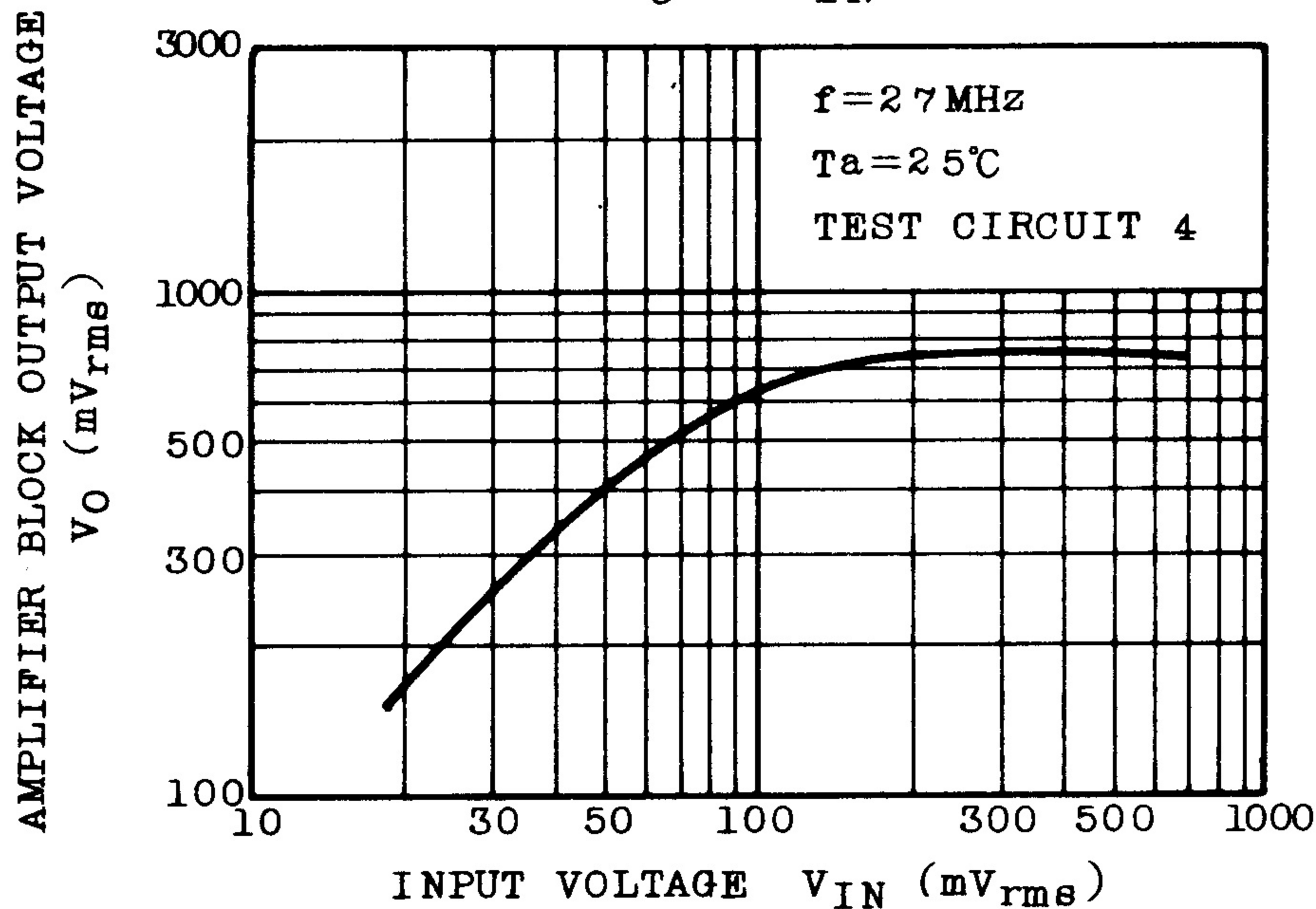
$P_O - T_a$



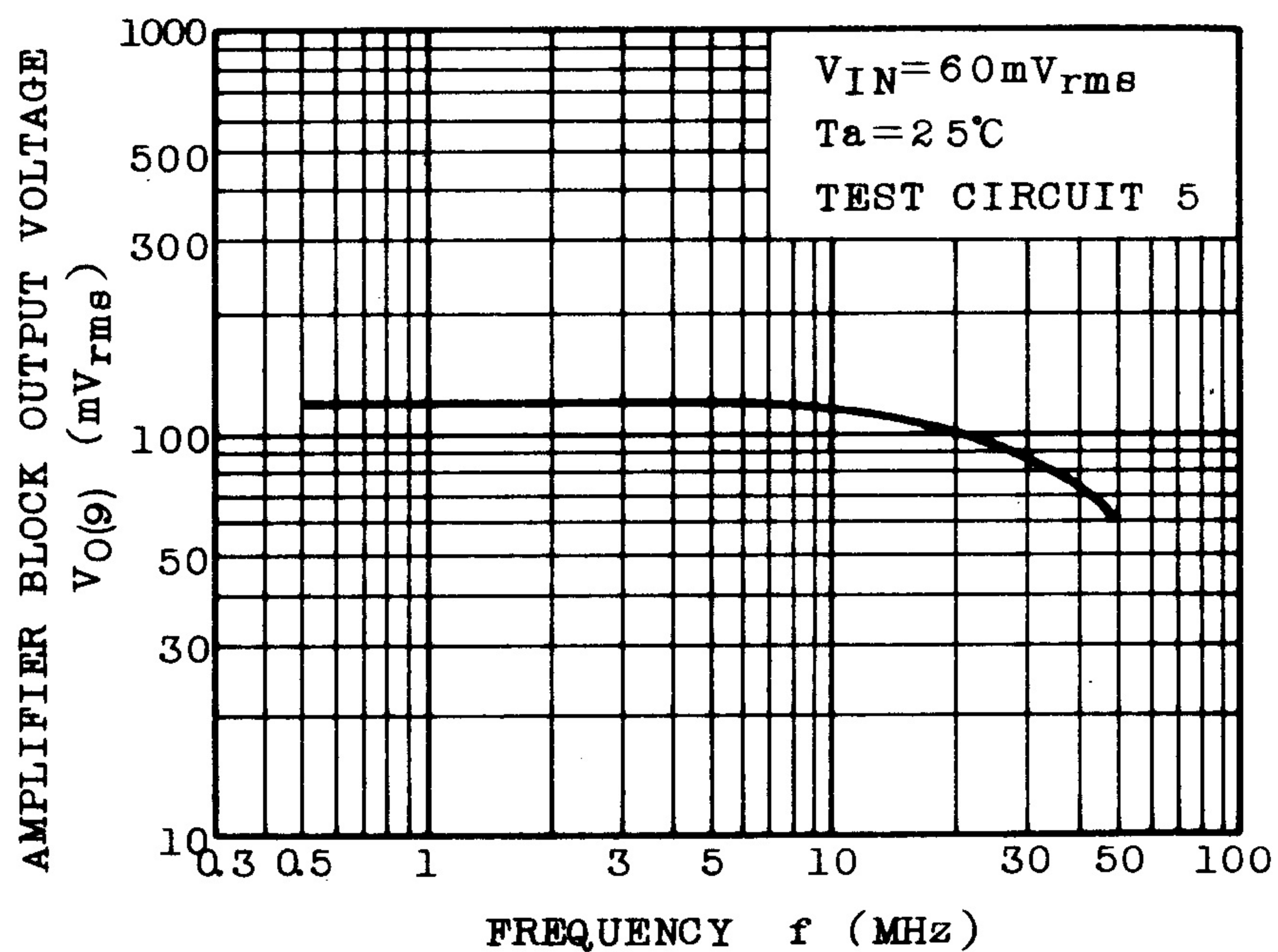
$V_O - V_{CC}$



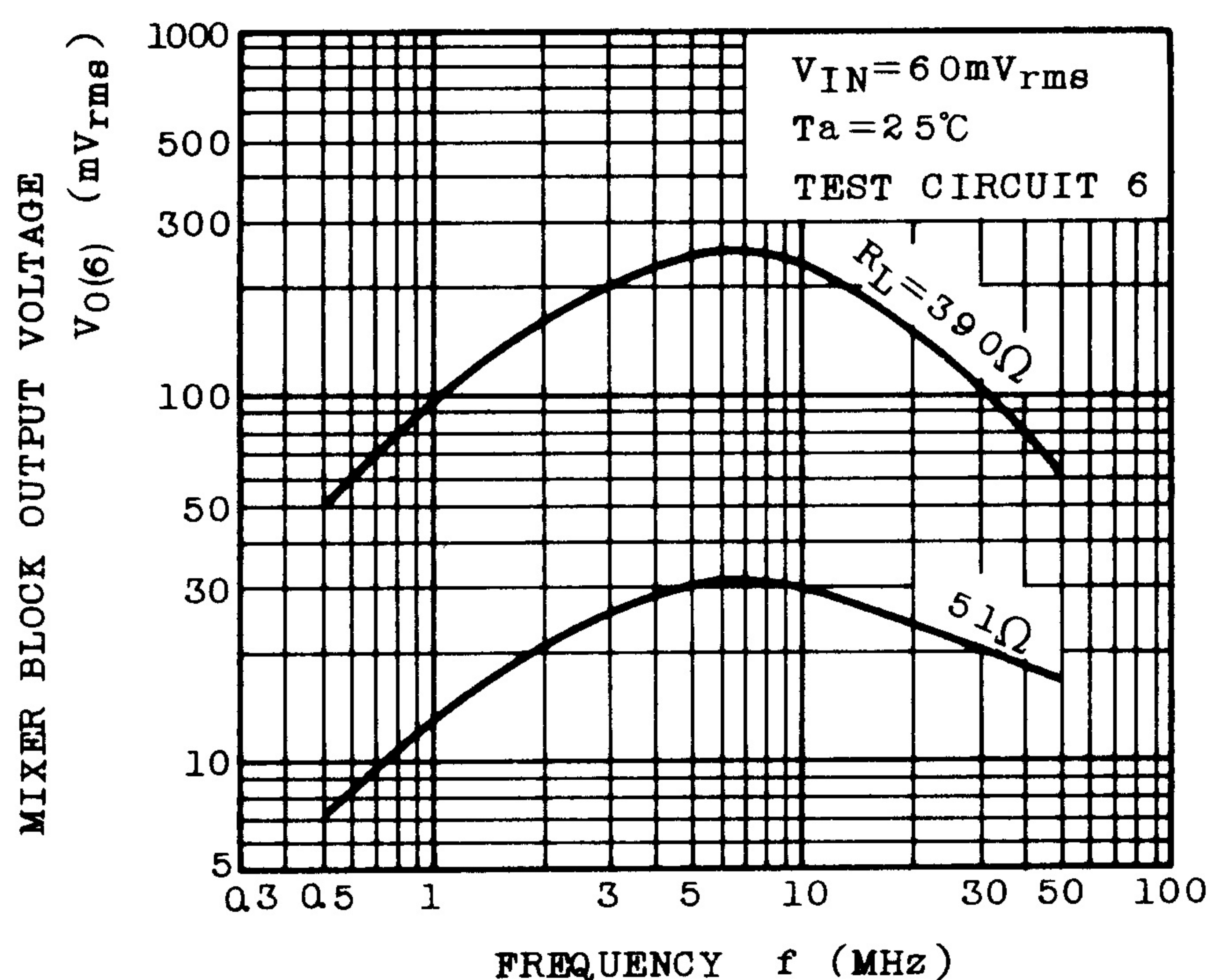
$V_O - V_{IN}$



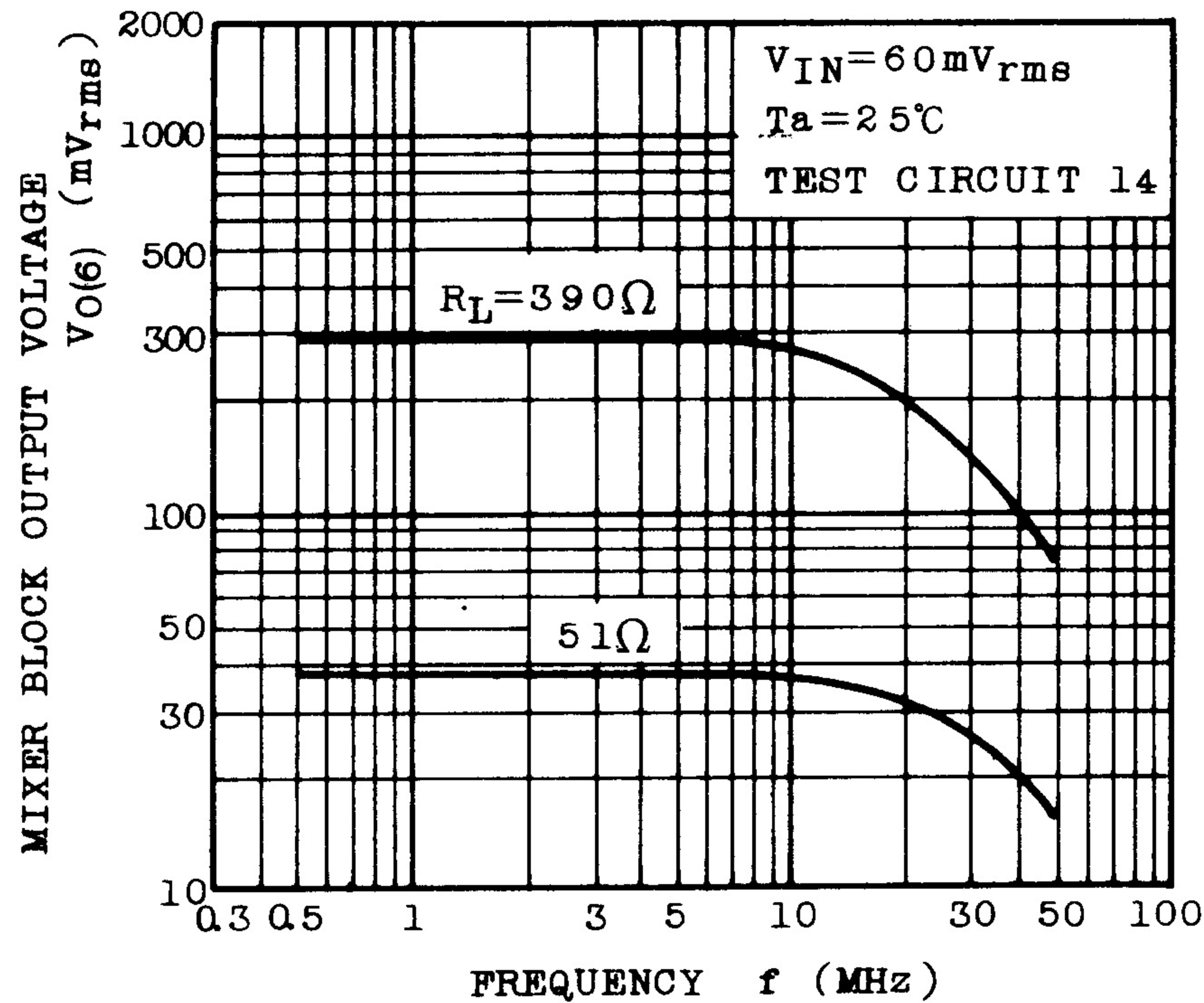
$V_O(9) - f$

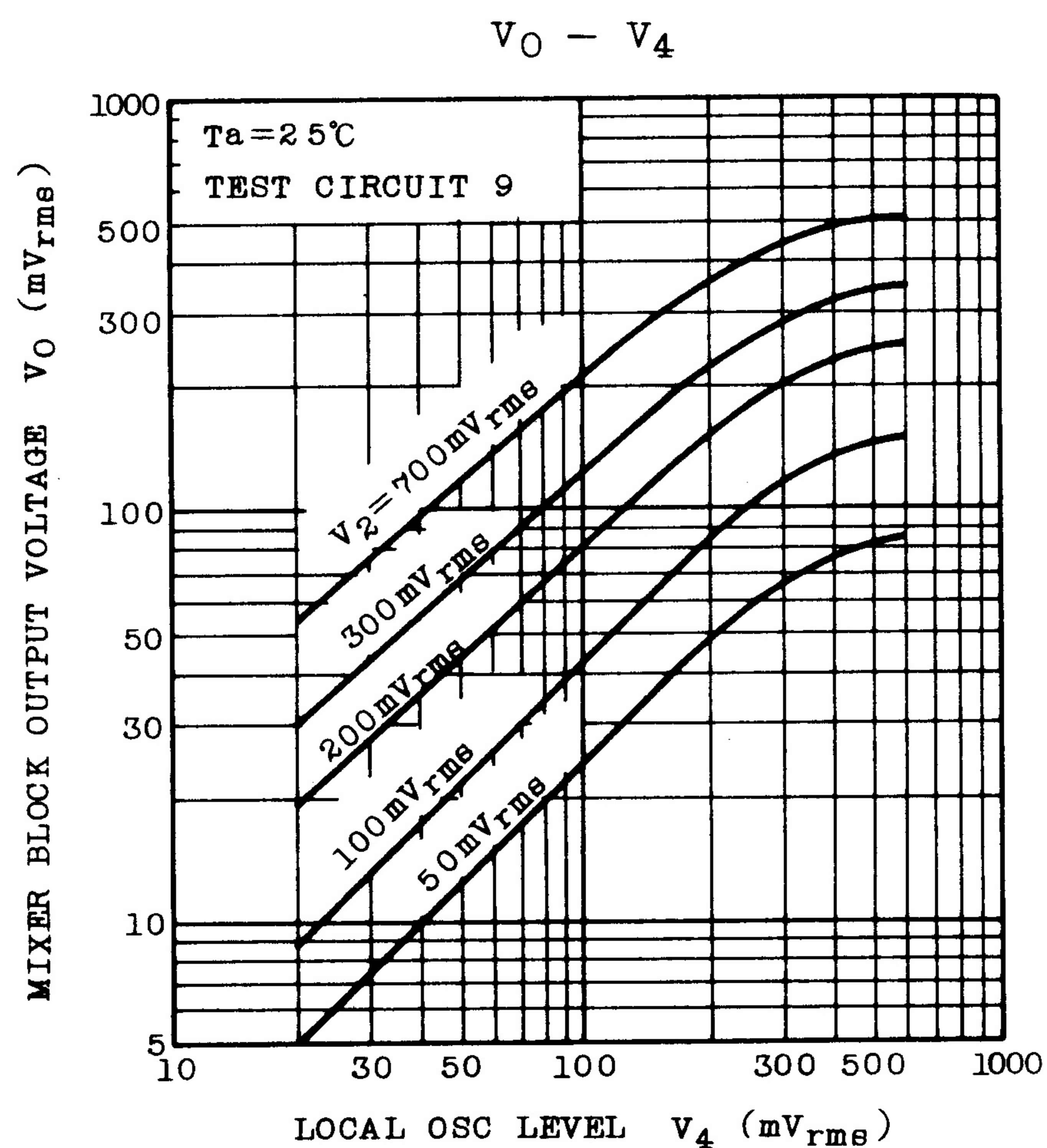
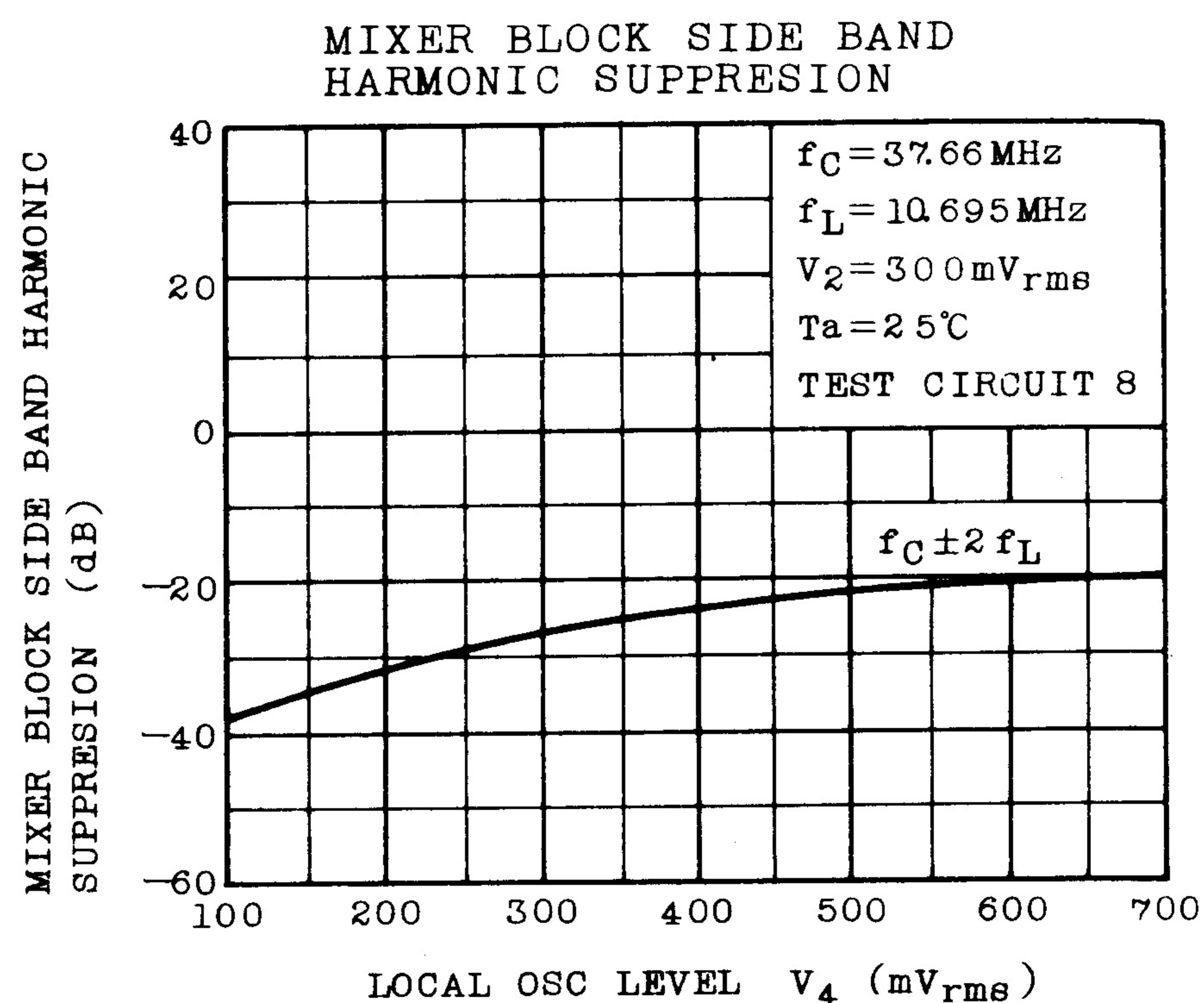
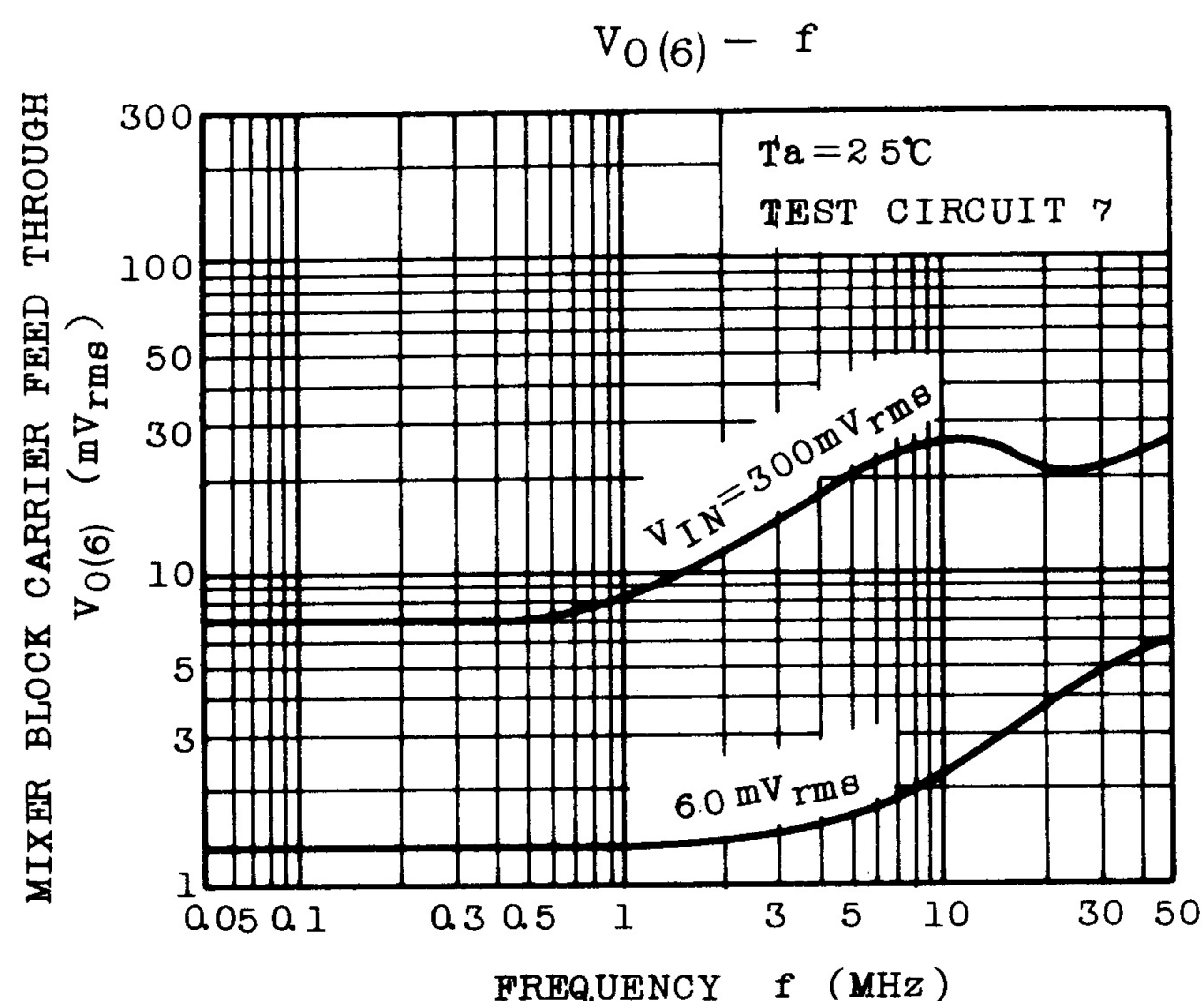


$V_O(6) - f$



$V_O(6) - f$





## APPLICATION BLOCK DIAGRAM

TA7310P is designed especially for use in CB transceiver in conjunction with TA9106BP frequency synthesizer.

The functions incorporated are emitter follower circuit (F I), doubly balanced mixer (F II) and differential amplifier (F III).

Emitter follower circuit may be used as reference oscillator or VCO.

Differential amplifier may be used wide band RF amplifier.

