

## DESCRIPTION

2SC1971 is a silicon NPN epitaxial planar type transistor designed for RF power amplifiers on VHF band mobile radio applications.

## FEATURES

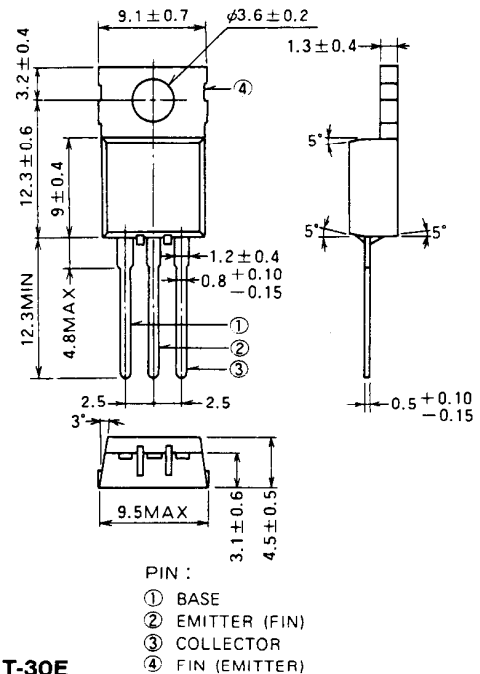
- High power gain:  $G_{pe} \geq 10\text{dB}$   
@  $V_{CC} = 13.5\text{V}$ ,  $P_O = 6\text{W}$ ,  $f = 175\text{MHz}$
- Emitter ballasted construction, gold metallization for high reliability and good performances.
- TO-220 package similar is convenient for mounting.
- Ability of withstanding more than 20:1 load VSWR when operated at  $V_{CC} = 15.2\text{V}$ ,  $P_O = 6\text{W}$ ,  $f = 175\text{MHz}$ .

## APPLICATION

4 to 5 watts output power amplifiers in VHF band applications.

## OUTLINE DRAWING

Dimensions in mm



## ABSOLUTE MAXIMUM RATINGS ( $T_C = 25^\circ\text{C}$ unless otherwise specified)

| Symbol     | Parameter                    | Conditions               | Ratings    | Unit               |
|------------|------------------------------|--------------------------|------------|--------------------|
| $V_{CB0}$  | Collector to base voltage    |                          | 35         | V                  |
| $V_{EB0}$  | Emitter to base voltage      |                          | 4          | V                  |
| $V_{CE0}$  | Collector to emitter voltage | $R_{BE} = \infty$        | 17         | V                  |
| $I_C$      | Collector current            |                          | 2          | A                  |
| $P_C$      | Collector dissipation        | $T_a = 25^\circ\text{C}$ | 1.5        | W                  |
|            |                              | $T_C = 25^\circ\text{C}$ | 12.5       | W                  |
| $T_j$      | Junction temperature         |                          | 150        | $^\circ\text{C}$   |
| $T_{stg}$  | Storage temperature          |                          | -55 to 150 | $^\circ\text{C}$   |
| $R_{th-a}$ | Thermal resistance           | Junction to ambient      | 83         | $^\circ\text{C/W}$ |
| $R_{th-c}$ |                              | Junction to case         | 10         | $^\circ\text{C/W}$ |

Note. Above parameters are guaranteed independently.

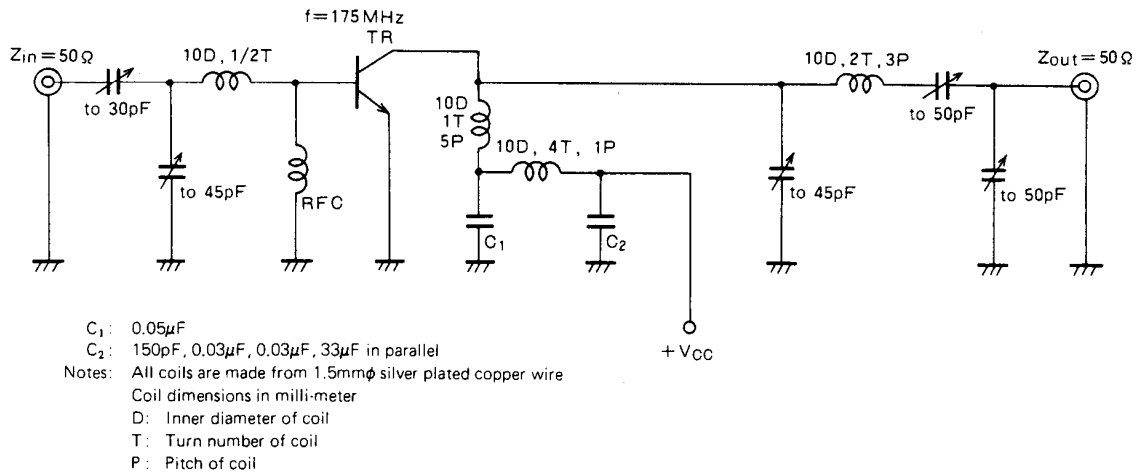
## ELECTRICAL CHARACTERISTICS ( $T_C = 25^\circ\text{C}$ unless otherwise specified)

| Symbol        | Parameter                              | Test conditions                                                        | Limits |     |     | Unit          |
|---------------|----------------------------------------|------------------------------------------------------------------------|--------|-----|-----|---------------|
|               |                                        |                                                                        | Min    | Typ | Max |               |
| $V_{(BR)EBO}$ | Emitter to base breakdown voltage      | $I_F = 5\text{mA}$ , $I_C = 0$                                         | 4      |     |     | V             |
| $V_{(BR)CBO}$ | Collector to base breakdown voltage    | $I_C = 10\text{mA}$ , $I_E = 0$                                        | 35     |     |     | V             |
| $V_{(BR)CEO}$ | Collector to emitter breakdown voltage | $I_C = 50\text{mA}$ , $R_{BE} = \infty$                                | 17     |     |     | V             |
| $I_{CBO}$     | Collector cutoff current               | $V_{CB} = 25\text{V}$ , $I_E = 0$                                      |        |     | 500 | $\mu\text{A}$ |
| $I_{EBO}$     | Emitter cutoff current                 | $V_{EB} = 3\text{V}$ , $I_C = 0$                                       |        |     | 500 | $\mu\text{A}$ |
| $h_{FE}$      | DC forward current gain *              | $V_{CE} = 10\text{V}$ , $I_C = 0.1\text{A}$                            | 10     | 50  | 180 | —             |
| * $P_O$       | Output power                           | $V_{CC} = 13.5\text{V}$ , $P_{in} = 0.6\text{W}$ , $f = 175\text{MHz}$ | 6      | 7   |     | W             |
| $\eta_C$      | Collector efficiency                   |                                                                        | 60     | 70  |     | %             |

Note. \* Pulse test,  $P_W = 150\mu\text{s}$ , duty = 5%.

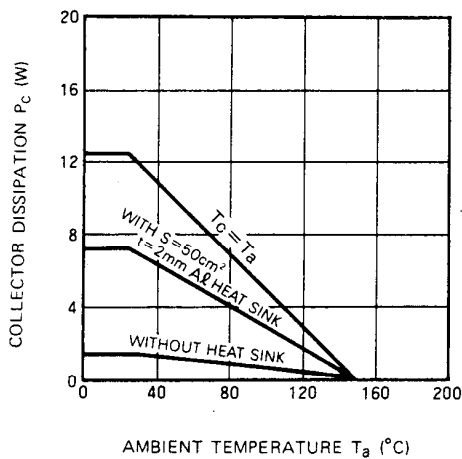
Above parameters, ratings, limits and conditions are subject to change.

**TEST CIRCUIT**

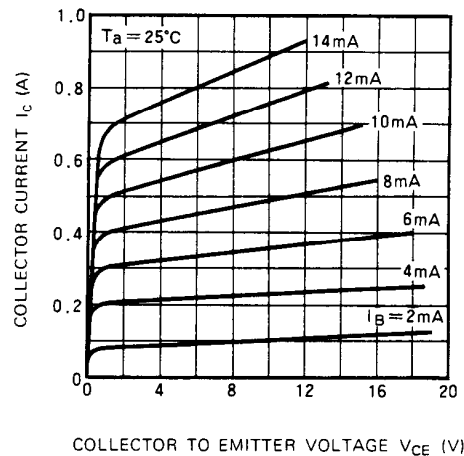


**TYPICAL PERFORMANCE DATA**

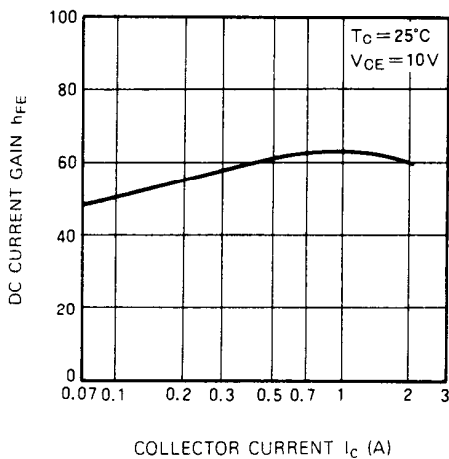
**COLLECTOR DISSIPATION VS. AMBIENT TEMPERATURE**



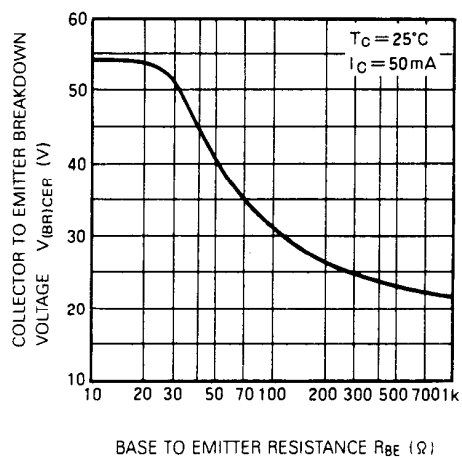
**COLLECTOR CURRENT VS. COLLECTOR TO EMITTER VOLTAGE**



**DC CURRENT GAIN VS. COLLECTOR CURRENT**

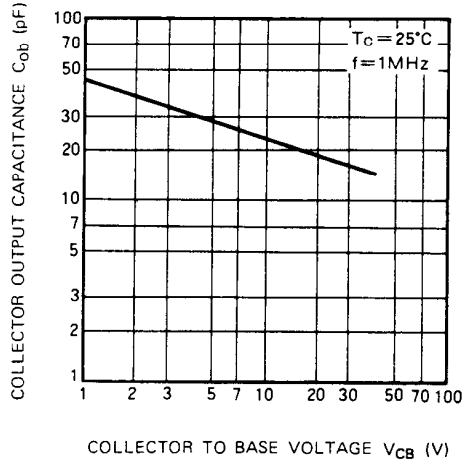


**COLLECTOR TO EMITTER BREAKDOWN VOLTAGE VS. BASE TO EMITTER RESISTANCE**

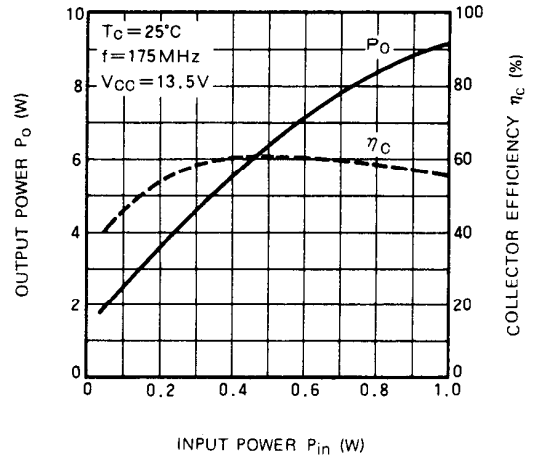


**NPN EPITAXIAL PLANAR TYPE**

**COLLECTOR OUTPUT CAPACITANCE VS.  
COLLECTOR TO BASE VOLTAGE**



**OUTPUT POWER,  
COLLECTOR EFFICIENCY  
VS. INPUT POWER**



**OUTPUT POWER VS. COLLECTOR  
SUPPLY VOLTAGE**

