

**DESCRIPTION**

2SC1970 is a silicon NPN epitaxial planar type transistor designed for RF power amplifiers on VHF band mobile radio applications.

**FEATURES**

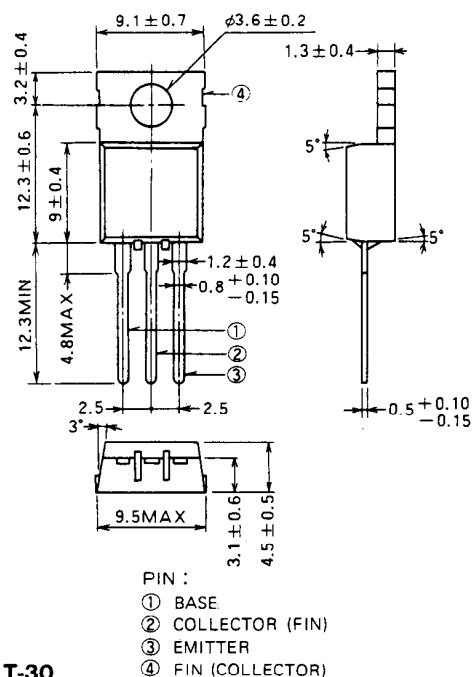
- High power gain:  $G_{pe} \geq 9.2\text{dB}$   
@  $V_{CC} = 13.5\text{V}$ ,  $P_O = 1\text{W}$ ,  $f = 175\text{MHz}$
- Emitter ballasted construction, gold metallization for high reliability and good performances.
- TO-220 package similarly is convenient for mounting.

**APPLICATION**

0.8 to 1 watts output power amplifiers and driver in VHF band mobile radio applications.

**OUTLINE DRAWING**

Dimensions in mm

**T-30****ABSOLUTE MAXIMUM RATINGS** ( $T_C = 25^\circ\text{C}$  unless otherwise specified)

| Symbol     | Parameter                    | Conditions               | Ratings    | Unit               |
|------------|------------------------------|--------------------------|------------|--------------------|
| $V_{CBO}$  | Collector to base voltage    |                          | 40         | V                  |
| $V_{EBO}$  | Emitter to base voltage      |                          | 4          | V                  |
| $V_{CEO}$  | Collector to emitter voltage | $R_{BE} = \infty$        | 17         | V                  |
| $I_C$      | Collector current            |                          | 0.6        | A                  |
| $P_C$      | Collector dissipation        | $T_a = 25^\circ\text{C}$ | 1          | W                  |
|            |                              | $T_C = 25^\circ\text{C}$ | 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      | 125        | $^\circ\text{C/W}$ |
| $R_{th-c}$ |                              | Junction to case         | 25         | $^\circ\text{C/W}$ |

Note. Above parameters are guaranteed independently.

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

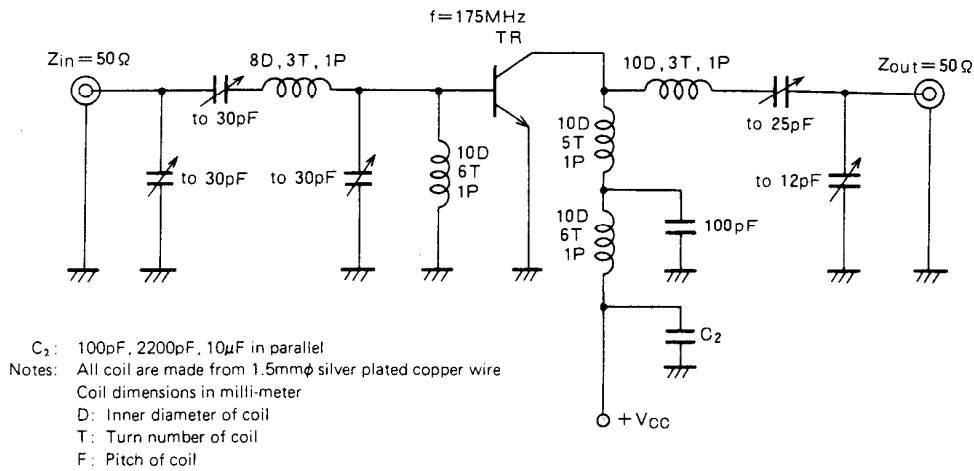
| Symbol        | Parameter                              | Test conditions                                                         | Limits |     |     | Unit          |
|---------------|----------------------------------------|-------------------------------------------------------------------------|--------|-----|-----|---------------|
|               |                                        |                                                                         | Min    | Typ | Max |               |
| $V_{(BR)EBO}$ | Emitter to base breakdown voltage      | $I_E = 1\text{mA}$ , $I_C = 0$                                          | 4      |     |     | V             |
| $V_{(BR)CBO}$ | Collector to base breakdown voltage    | $I_C = 5\text{mA}$ , $I_E = 0$                                          | 40     |     |     | V             |
| $V_{(BR)CEO}$ | Collector to emitter breakdown voltage | $I_C = 50\text{mA}$ , $R_{BE} = \infty$                                 | 17     |     |     | V             |
| $I_{CBO}$     | Collector cutoff current               | $V_{CB} = 25\text{V}$ , $I_E = 0$                                       |        |     | 100 | $\mu\text{A}$ |
| $I_{EBO}$     | Emitter cutoff current                 | $V_{EB} = 3\text{V}$ , $I_C = 0$                                        |        |     | 100 | $\mu\text{A}$ |
| $h_{FE}$      | DC forward current gain *              | $V_{CE} = 10\text{V}$ , $I_C = 0.1\text{A}$                             | 10     | 50  | 180 | —             |
| $P_O$         | Output power                           | $V_{CC} = 13.5\text{V}$ , $P_{in} = 0.12\text{W}$ , $f = 175\text{MHz}$ | 1      | 1.2 |     | W             |
| $\eta_C$      | Collector efficiency                   |                                                                         | 50     | 60  |     | %             |

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

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

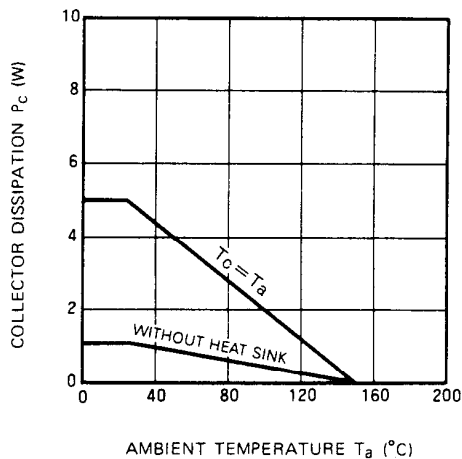
**NPN EPITAXIAL PLANAR TYPE**

**TEST CIRCUIT**

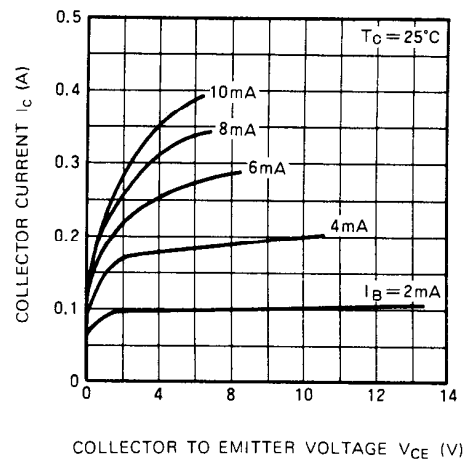


**TYPICAL PERFORMANCE DATA**

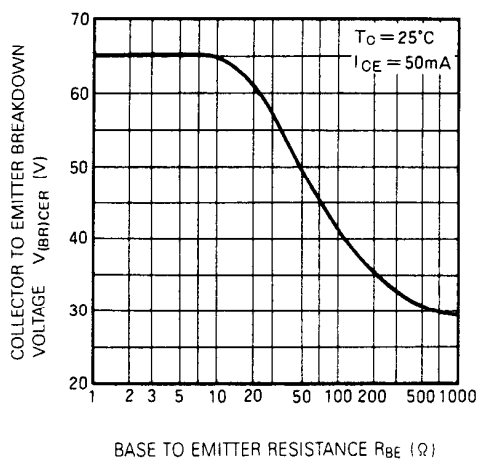
**COLLECTOR DISSIPATION VS. AMBIENT TEMPERATURE**



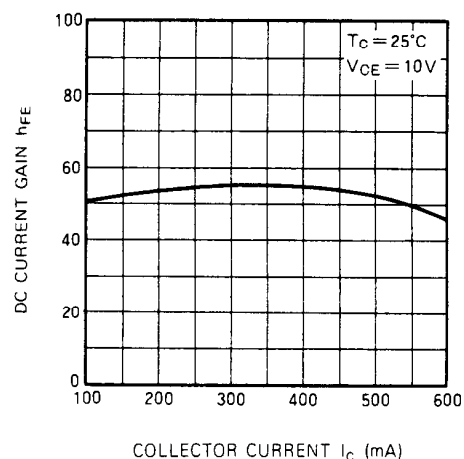
**COLLECTOR CURRENT VS. COLLECTOR TO EMITTER VOLTAGE**



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

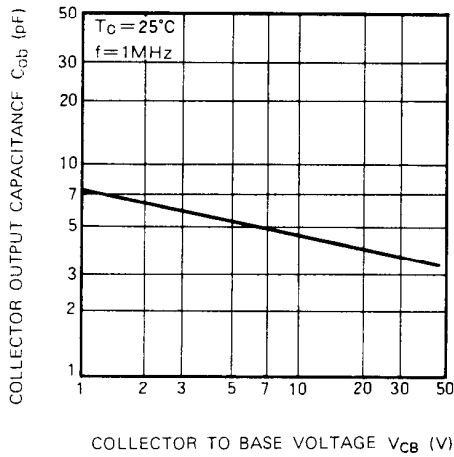


**DC CURRENT GAIN VS. COLLECTOR CURRENT**

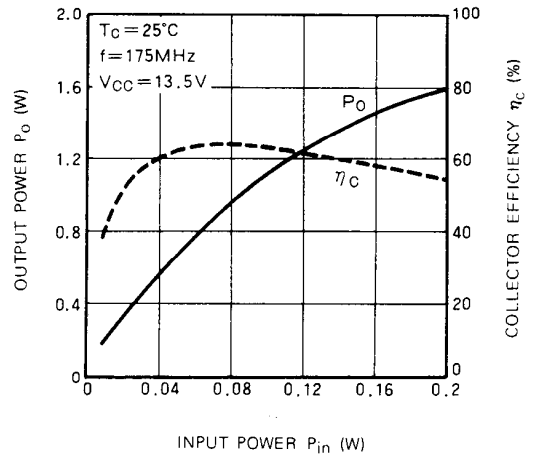


**NPN EPITAXIAL PLANAR TYPE**

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



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



**OUTPUT POWER VS. COLLECTOR  
SUPPLY VOLTAGE**

