

MITSUBISHI RF POWER TRANSISTOR

# 2SC2166

NPN EPITAXIAL PLANAR TYPE

## DESCRIPTION

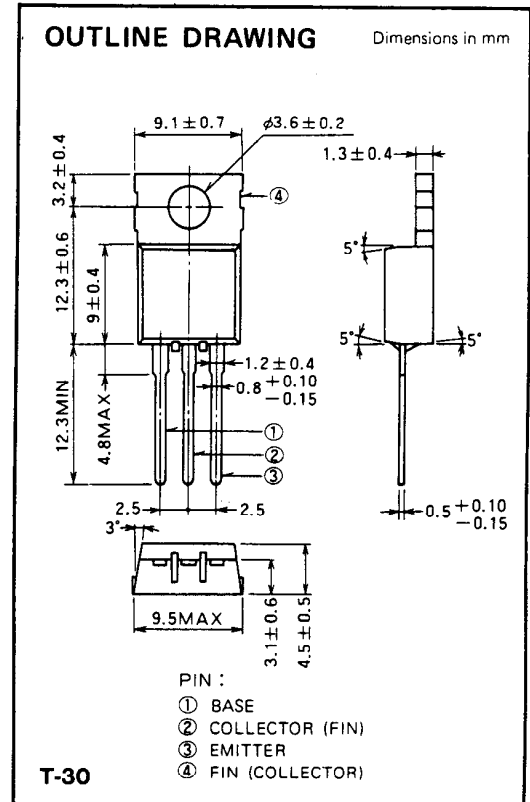
2SC2166 is a silicon NPN epitaxial planar type transistor designed for RF power amplifiers in HF band mobile radio applications.

## FEATURES

- High power gain:  $G_{pe} \geq 13.8\text{dB}$   
@  $V_{CC} = 12\text{V}$ ,  $P_O = 6\text{W}$ ,  $f = 27\text{MHz}$
- Emitter ballasted construction for high reliability and good performances.
- TO-220 similar package is combinient for mounting.

## APPLICATION

3 to 4 watts output power amplifiers in HF band mobile radio applications.



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

| Symbol     | Parameter                    | Conditions               | Ratings    | Unit               |
|------------|------------------------------|--------------------------|------------|--------------------|
| $V_{CBO}$  | Collector to base voltage    |                          | 75         | V                  |
| $V_{EBO}$  | Emitter to base voltage      |                          | 5          | V                  |
| $V_{CER}$  | Collector to emitter voltage | $R_{BE} = 10\ \Omega$    | 75         | V                  |
| $I_C$      | Collector current            |                          | 4          | 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      | $I_E = 1\text{mA}$ , $I_C = 0$                                       | 5      |     |     | V             |
| $V_{(BR)CBO}$ | Collector to base breakdown voltage    | $I_C = 1\text{mA}$ , $I_E = 0$                                       | 75     |     |     | V             |
| $V_{(BR)CER}$ | Collector to emitter breakdown voltage | $I_C = 10\text{mA}$ , $R_{BE} = 10\ \Omega$                          | 75     |     |     | V             |
| $I_{CBO}$     | Collector cutoff current               | $V_{CB} = 30\text{V}$ , $I_E = 0$                                    |        |     | 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 *              | $V_{CE} = 10\text{V}$ , $I_C = 0.1\text{A}$                          | 35     | 70  | 180 | —             |
| $P_O$         | Output power                           | $V_{CC} = 12\text{V}$ , $P_{in} = 0.25\text{W}$ , $f = 27\text{MHz}$ | 6      | 7.5 |     | W             |
| $\eta_C$      | Collector efficiency                   |                                                                      | 55     | 60  |     | %             |

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

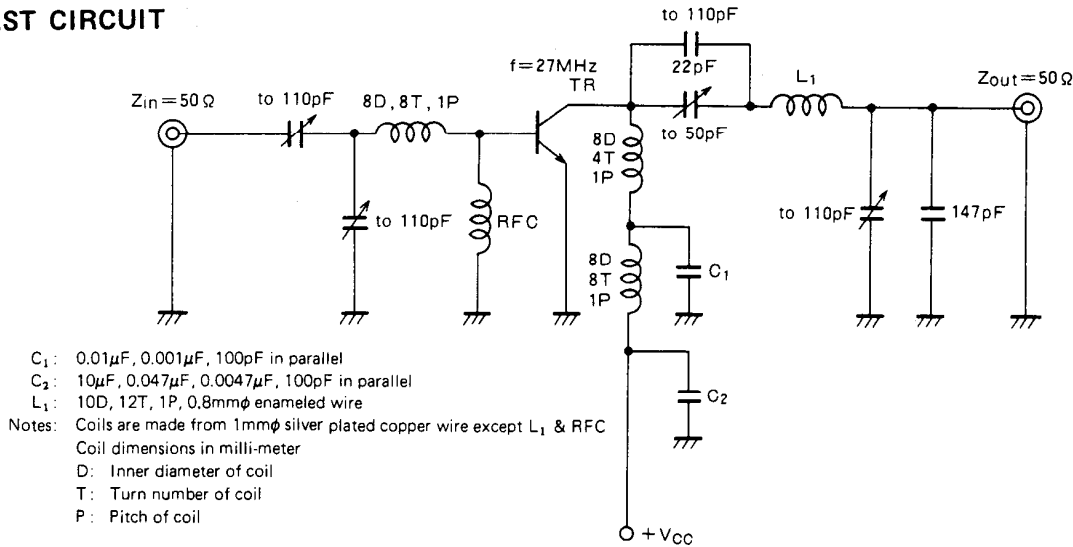
Above parameters, ratings, limits and conditions are subject to change.

NOV. '97



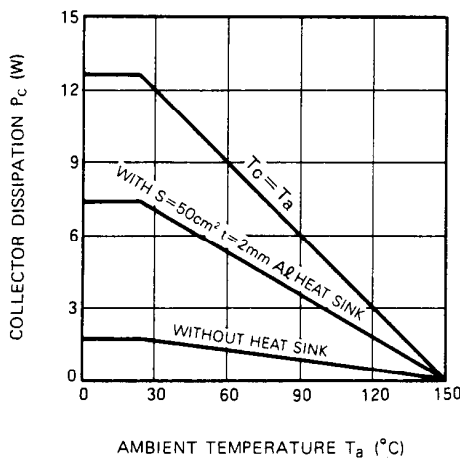
**NPN EPITAXIAL PLANAR TYPE**

**TEST CIRCUIT**

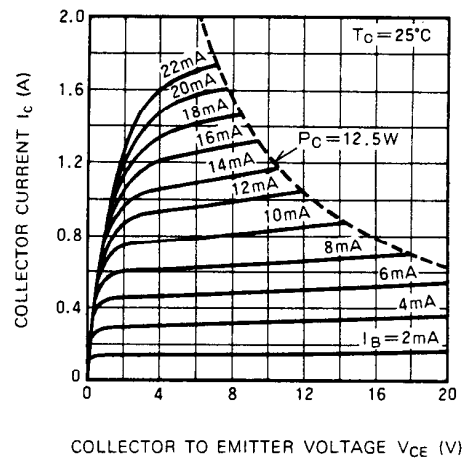


**TYPICAL PERFORMANCE DATA**

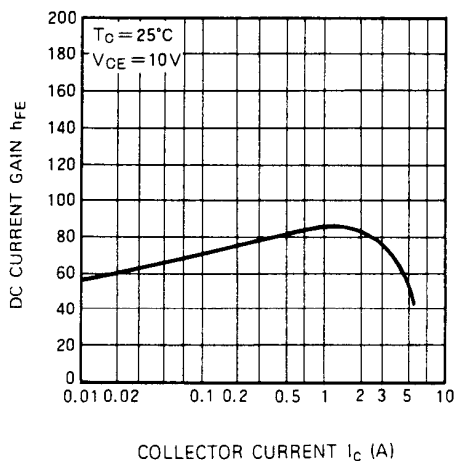
**COLLECTOR DISSIPATION VS. AMBIENT TEMPERATURE**



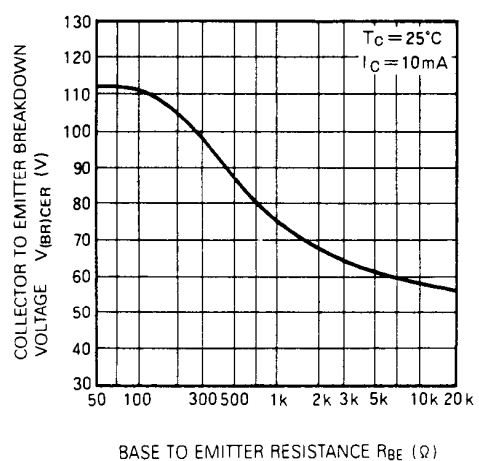
**COLLECTOR CURRENT VS. COLLECTOR TO EMITTER VOLTAGE**



**DC CURRENT GAIN VS. COLLECTOR CURRENT**

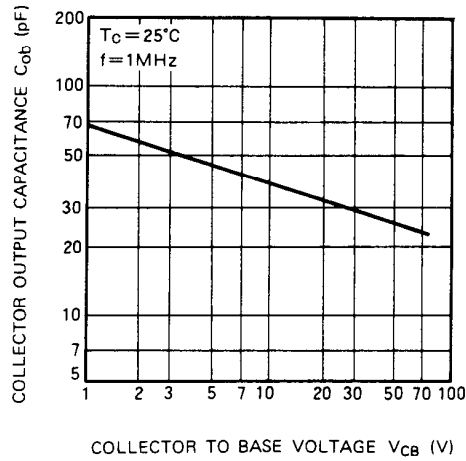


**COLLECTOR TO EMITTER BREAKDOWN VOLTAGE VS. BASE TO EMITTER RESISTANCE**

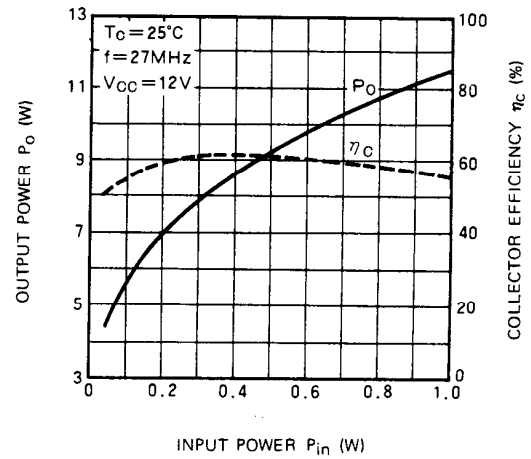


**NPN EPITAXIAL PLANAR TYPE**

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



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



**OUTPUT POWER VS. COLLECTOR SUPPLY VOLTAGE**

