

2SC1946A

NPN EPITAXIAL PLANAR TYPE

DESCRIPTION

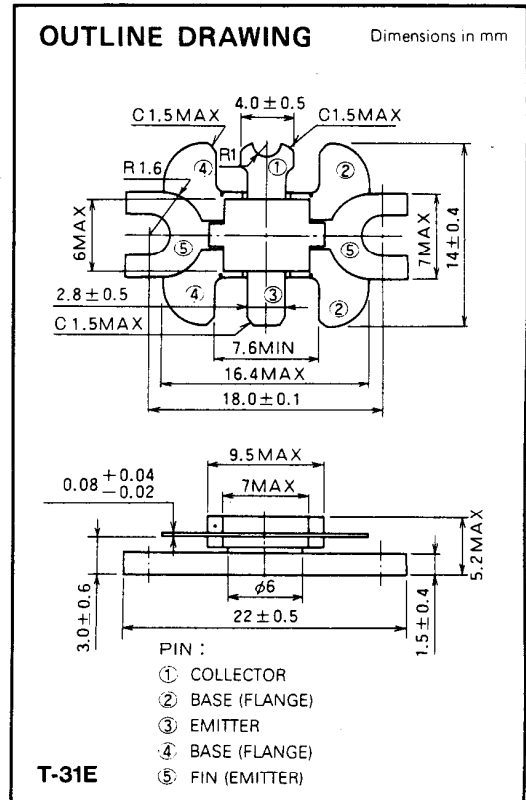
2SC1946A is a silicon NPN epitaxial planar type transistor designed for RF power amplifiers on VHF band mobile radio applications.

FEATURES

- High power gain: $G_{pe} \geq 10\text{dB}$
@ $V_{CC} = 13.5\text{V}$, $P_O = 30\text{W}$, $f = 175\text{MHz}$
- Emitter ballasted construction and gold metallization for high reliability and good performances.
- Low thermal resistance ceramic package with flange.
- Ability of withstanding more than 20:1 load VSWR when operated at $V_{CC} = 15.2\text{V}$, $P_O = 30\text{W}$, $f = 175\text{MHz}$.
- Equivalent input/output impedance at rated operating conditions: $Z_{in} = 0.65 + j1.4\Omega$
 $Z_{out} = 1.9 + j0.75\Omega$

APPLICATION

25 watts output power amplifiers in VHF 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 | | 35 | V |
| V_{EBO} | Emitter to base voltage | | 4 | V |
| V_{CEO} | Collector to emitter voltage | $R_{BE} = \infty$ | 17 | V |
| I_C | Collector current | | 7 | A |
| P_C | Collector dissipation | $T_a = 25^\circ\text{C}$ | 3 | W |
| | | $T_C = 25^\circ\text{C}$ | 50 | W |
| T_j | Junction temperature | | 175 | $^\circ\text{C}$ |
| T_{stg} | Storage temperature | | -55 to 175 | $^\circ\text{C}$ |
| R_{th-a} | Thermal resistance | Junction to ambient | 50 | $^\circ\text{C}/\text{W}$ |
| R_{th-c} | | Junction to case | 3 | $^\circ\text{C}/\text{W}$ |

Note. Above parameters are guaranteed independently.

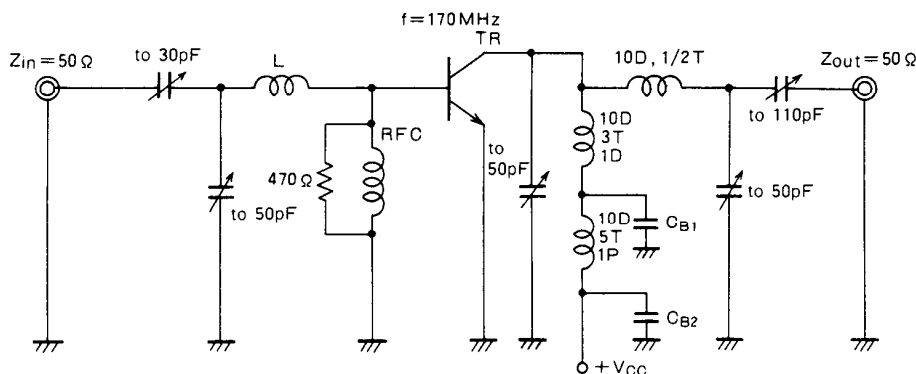
ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise specified)

| Symbol | Parameter | Test conditions | Limits | | | Unit |
|---------------|--|--|--------|-----|-----|------|
| | | | Min | Typ | Max | |
| $V_{(BR)EBO}$ | Emitter to base breakdown voltage | $I_E = 10\text{mA}$, $I_C = 0$ | 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 | $I_C = 0.1\text{A}$, $R_{BE} = \infty$ | 17 | | | V |
| I_{CBO} | Collector cutoff current | $V_{CB} = 25\text{V}$, $I_E = 0$ | | | 2 | mA |
| I_{EBO} | Emitter cutoff current | $V_{EB} = 3\text{V}$, $I_C = 0$ | | | 1 | mA |
| h_{FE} | DC forward current gain * | $V_{CE} = 10\text{V}$, $I_C = 0.2\text{A}$ | 10 | 50 | 180 | — |
| P_O | Output power | $V_{CC} = 13.5\text{V}$, $P_{in} = 3\text{W}$, $f = 175\text{MHz}$ | 30 | 35 | | W |
| η_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

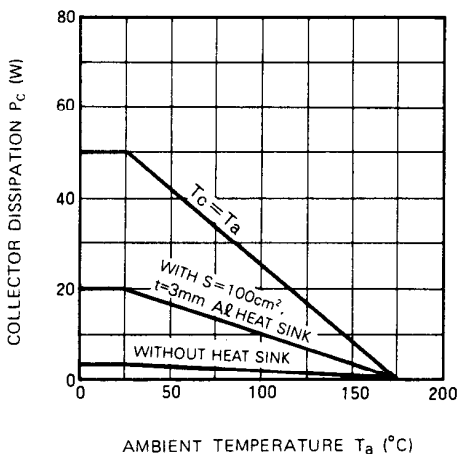


L: Length 10mm
 RFC: 0.4mm enameled wire 12T with Ferrite Bead
 CB1: 220pF, 2200pF in parallel
 CB2: 220pF, 2200pF, 10μF in parallel

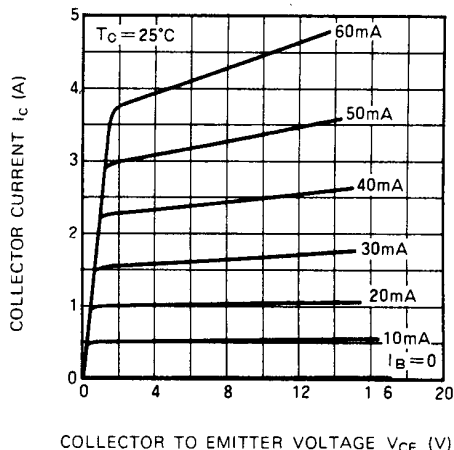
Notes: All coils are made from 1.5mmφ silver plated copper wire
 Coil dimensions in milli-meter
 D: Inner diameter of coil
 T: Turn number of coil
 P: Pitch of coil

TYPICAL PERFORMANCE DATA

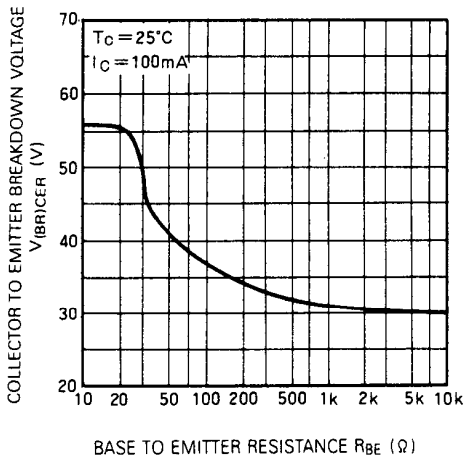
COLLECTOR DISSIPATION VS. AMBIENT TEMPERATURE



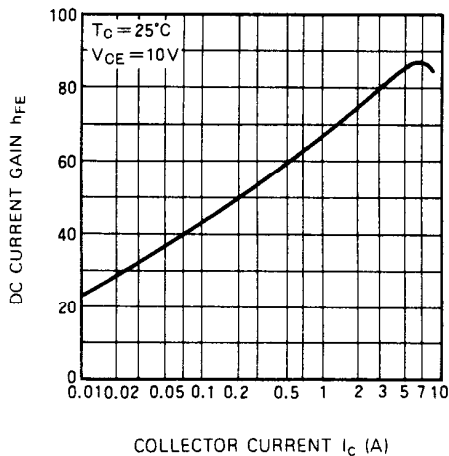
COLLECTOR CURRENT VS. COLLECTOR TO EMITTER VOLTAGE

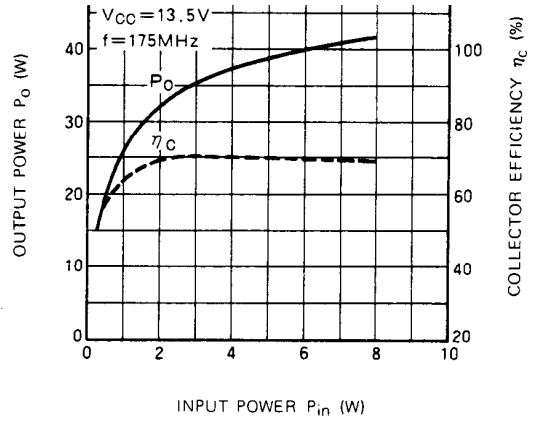
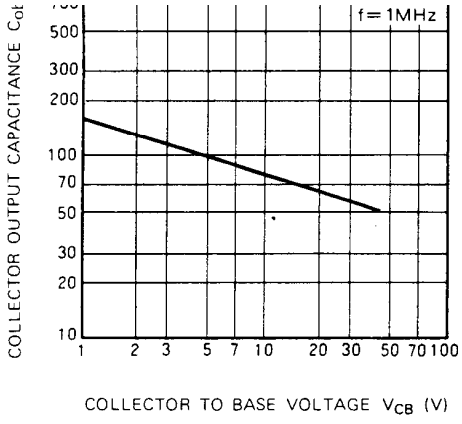


COLLECTOR TO EMITTER BREAKDOWN VOLTAGE VS. BASE TO EMITTER RESISTANCE



DC CURRENT GAIN VS. COLLECTOR CURRENT





OUTPUT POWER VS. COLLECTOR SUPPLY VOLTAGE

