

**DESCRIPTION**

2SC2905 is a silicon NPN epitaxial planar type transistor specifically designed for high power amplifiers applications in UHF band.

**FEATURES**

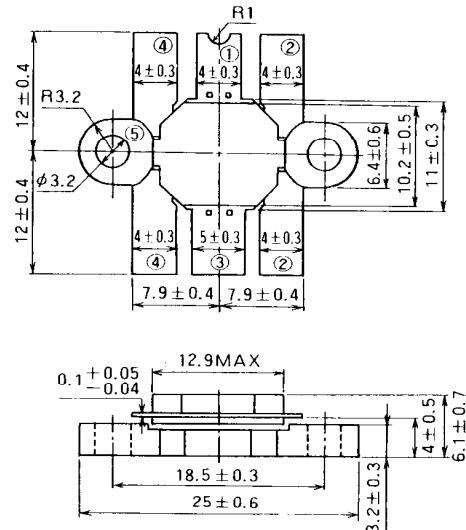
- High power output, high gain:  
 $P_O \geq 45W$ ,  $G_{pe} \geq 4.8dB$  @  $V_{CC} = 12.5V$ ,  $f = 520MHz$ ,  
 $P_{in} = 15W$ .
- Emitter ballasted construction.
- High ruggedness: Ability to withstand more than 20:1 load VSWR when operated at  $V_{CC} = 15.2V$ ,  $P_O = 45W$ ,  $f = 520MHz$ .
- High reliability due to gold metalization die.
- Flange type ceramic package.
- $Z_{in} = 1.2 + j1.1\Omega$ ,  $Z_{out} = 1.3 + j1.0\Omega$   
@  $V_{CC} = 12.5V$ ,  $f = 520MHz$ ,  $P_O = 45W$ .

**APPLICATION**

For output stage of 35—40W power amplifiers in UHF band.

**OUTLINE DRAWING**

Dimensions in mm

**T-40E****ABSOLUTE MAXIMUM RATINGS** ( $T_C = 25^\circ C$ )

| 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            |                    | 15         | A          |
| $P_C$     | Collector dissipation        | $T_C = 25^\circ C$ | 120        | W          |
| $T_J$     | Junction temperature         |                    | 175        | $^\circ C$ |
| $T_{stg}$ | Storage temperature          |                    | -55 to 175 | $^\circ C$ |

Note. Above parameters are guaranteed independently.

**ELECTRICAL CHARACTERISTICS** ( $T_C = 25^\circ C$ )

| Symbol        | Parameter                              | Test conditions                                  | Limits |     |     | Unit |
|---------------|----------------------------------------|--------------------------------------------------|--------|-----|-----|------|
|               |                                        |                                                  | Min    | Typ | Max |      |
| $V_{(BR)EBO}$ | Emitter to base breakdown voltage      | $I_E = 10mA$ , $I_C = 0$                         | 4      |     |     | V    |
| $V_{(BR)CBO}$ | Collector to base breakdown voltage    | $I_C = 10mA$ , $I_E = 0$                         | 35     |     |     | V    |
| $V_{(BR)CEO}$ | Collector to emitter breakdown voltage | $I_C = 0.1A$ , $R_{BE} = \infty$                 | 17     |     |     | V    |
| $I_{CBO}$     | Collector cut off current              | $V_{CB} = 15V$ , $I_E = 0$                       |        |     | 2   | mA   |
| $I_{EBO}$     | Emitter cut off current                | $V_{EB} = 3V$ , $I_C = 0$                        |        |     | 3   | mA   |
| $h_{FE}$      | DC forward current gain *              | $V_{CE} = 10V$ , $I_C = 1A$                      | 10     | 50  | 180 | —    |
| $P_O$         | Power Output                           | $V_{CC} = 12.5V$ , $P_{in} = 15W$ , $f = 520MHz$ | 45     | 50  |     | W    |
| $\eta_C$      | Collector efficiency                   |                                                  | 60     | 65  |     | %    |

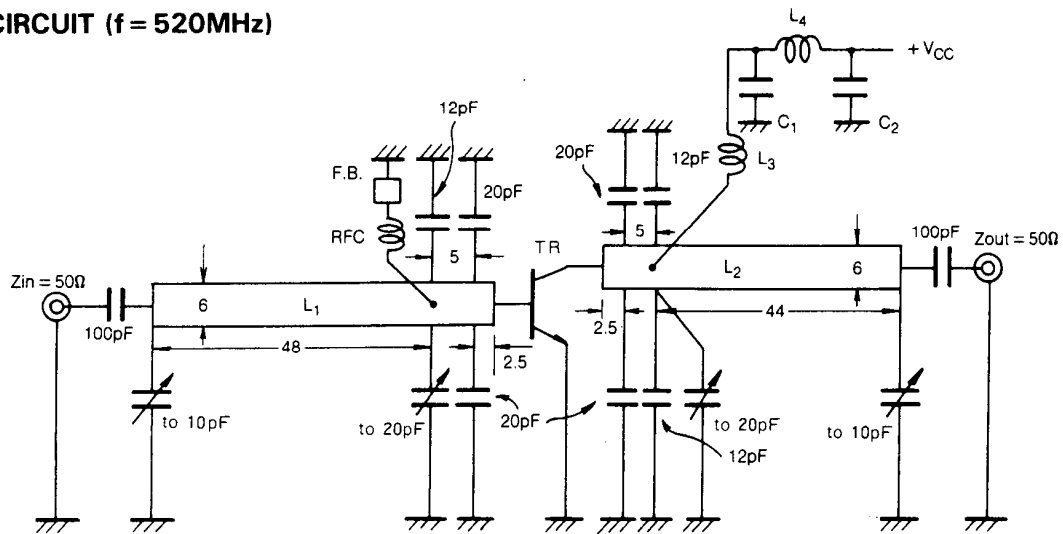
Note. \* Pulse test,  $P_W = 150\mu s$ , duty=5%.

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

**MITSUBISHI RF POWER TRANSISTOR**  
**2SC2905**

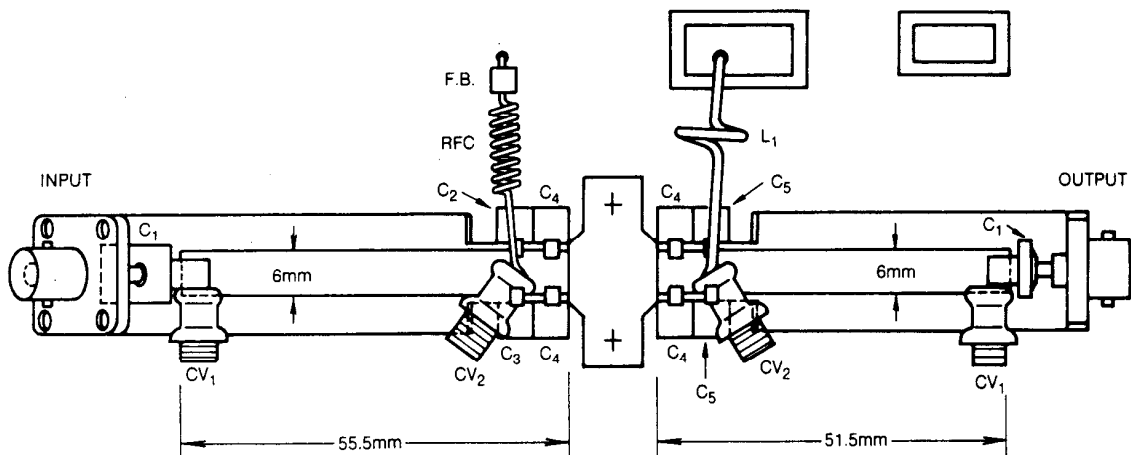
**NPN EPITAXIAL PLANAR TYPE**

**TEST CIRCUIT ( $f = 520\text{MHz}$ )**



- Dimensions: mm
- $L_1, L_2$ : Microstrip: Board Material 1.6mm Thick, glass-epoxy  $\epsilon_r = 2.7$
  - $L_3$ : 1 Turn, AWG #13, 8mm I.D.
  - $L_4$ : 5 Turns, AWG #13, 8mm I.D.
  - RFC: 9 Turns, AWG #20, 4mm I.D.
  - F.B.: Ferrite Bead
  - $C_1$ : 82pF, 220pF, 2200pF, 4700pF, 33 $\mu$ F in Parallel
  - $C_2$ : 82pF, 220pF, 2200pF, 4700pF, 22 $\mu$ F in Parallel

**TEST CIRCUIT BOARD LAYOUT ( $f = 520\text{MHz}$ )**

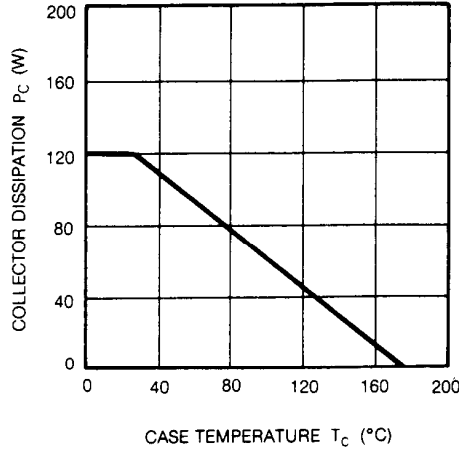


- $C_1$ : 100pF(Ribbon Lead Mica)
- $C_2$ : 12pF(Ribbon Lead Mica)
- $C_3$ : 0
- $C_4$ : 20pF(Ribbon Lead Mica)
- $C_5$ : 12pF(Ribbon Lead Mica)
- $CV_1$ : -10pF(Air Variable Capacitor) muRata TTA 43 A 100A
- $CV_2$ : -20pF(Air Variable Capacitor) muRata TTA 45 A 200A
- F.B.: Ferrite Bead
- RFC: 9 Turns, AWG #20, 4mm I.D.
- $L_1$ : 1 Turns, AWG #13, 8mm I.D.
- Microstrip: Board Material 1.6mm Thick, glass-epoxy  $\epsilon_r = 2.7$

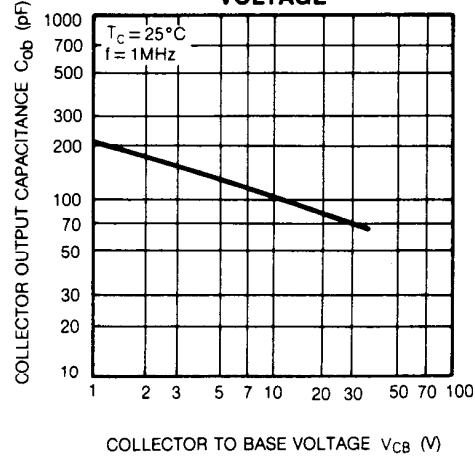
**NPN EPITAXIAL PLANAR TYPE**

**TYPICAL PERFORMANCE DATA**

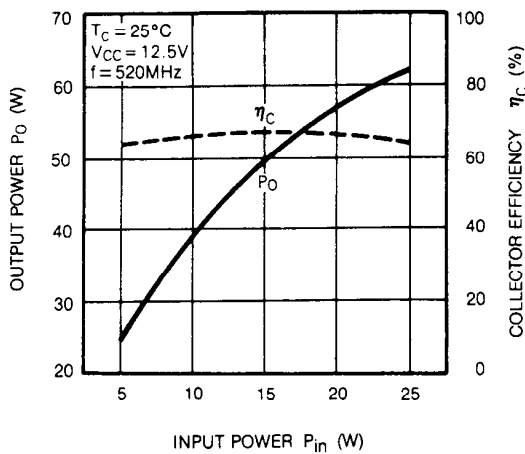
**COLLECTOR DISSIPATION VS. CASE TEMPERATURE**



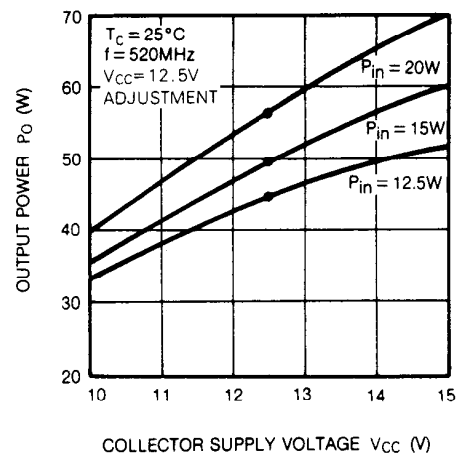
**COLLECTOR OUTPUT CAPACITANCE VS. COLLECTOR TO BASE VOLTAGE**



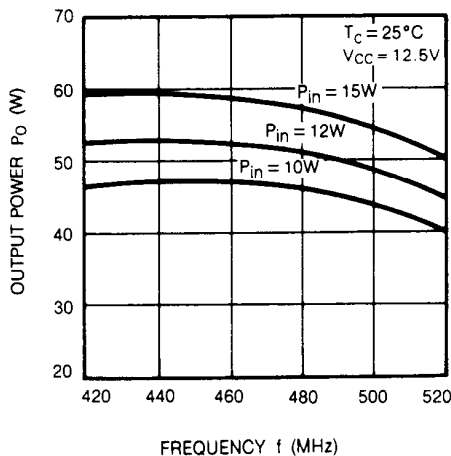
**OUTPUT POWER, COLLECTOR EFFICIENCY VS. INPUT POWER**



**OUTPUT POWER VS. COLLECTOR SUPPLY VOLTAGE**



**OUTPUT POWER VS. FREQUENCY**



**SERIES INPUT AND OUTPUT IMPEDANCE VS. FREQUENCY CHARACTERISTICS**

