

MITSUBISHI RF POWER TRANSISTOR  
**2SC2905**

**NPN EPITAXIAL PLANAR TYPE**

**DESCRIPTION**

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

**FEATURES**

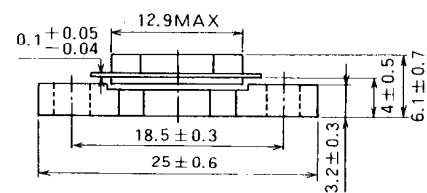
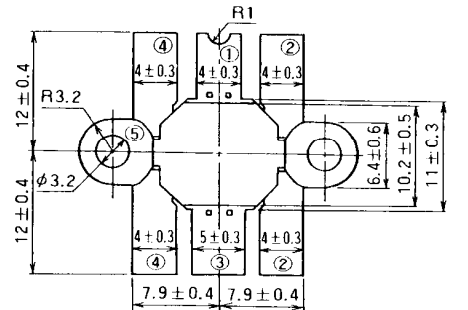
- High power output, high gain:  
 $P_O \geq 45W, G_{pe} \geq 4.8dB$  @  $V_{CC} = 12.5V, f = 520MHz,$   
 $P_{in} = 15W.$
- Emitter ballasted construction.
- High ruggedness: Ability to withstand more than 20:1 load VSWR when operated at  $V_{CC} = 15.2V, P_O = 45W,$   
 $f = 520MHz.$
- High reliability 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



PIN :

- ① COLLECTOR
- ② EMITTER (FLANGE)
- ③ BASE
- ④ EMITTER (FLANGE)
- ⑤ FIN (EMITTER)

**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		%

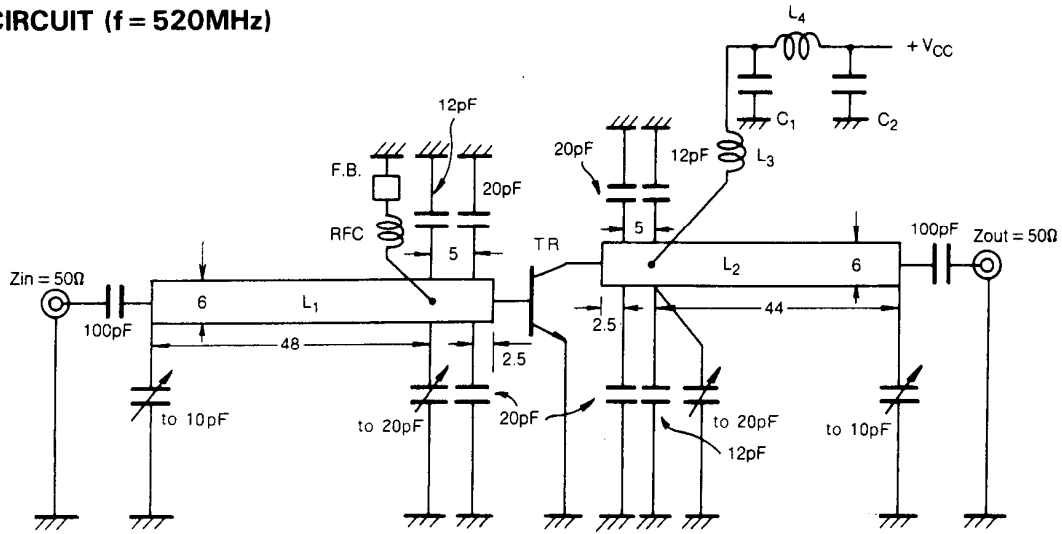
Note. \* Pulse test,  $P_W = 150\mu s, duty = 5\%.$

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

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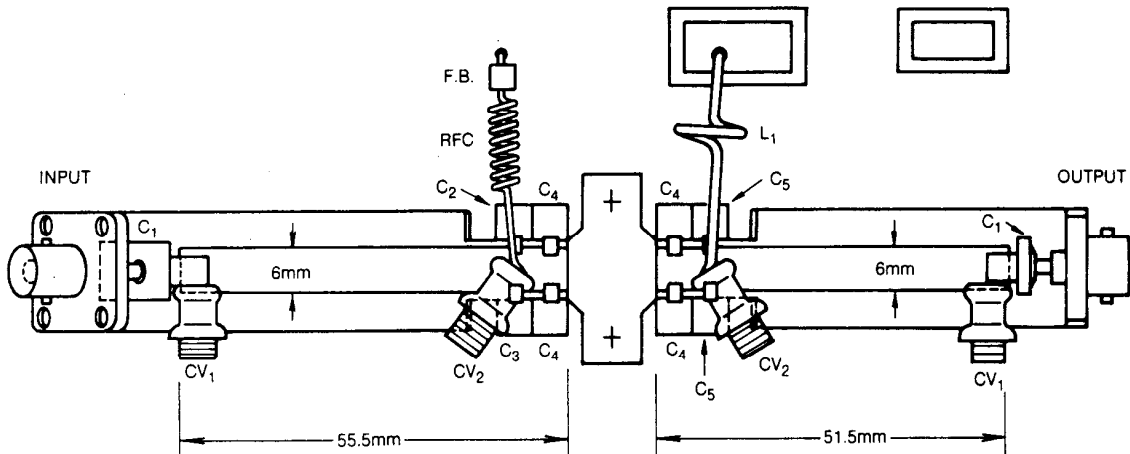
**NPN EPITAXIAL PLANAR TYPE**

**TEST CIRCUIT (f = 520MHz)**



- Dimensions: mm
- L<sub>1</sub>, L<sub>2</sub>: Microstrip: Board Material 1.6mm Thick, glass-terfon  $\epsilon_r = 2.7$
  - L<sub>3</sub>: 1 Turn, AWG #13, 8mm I.D.
  - L<sub>4</sub>: 5 Turns, AWG #13, 8mm I.D.
  - RFC: 9 Turns, AWG #20, 4mm I.D.
  - F.B.: Ferrite Bead
  - C<sub>1</sub>: 82pF, 220pF, 2200pF, 4700pF, 33 $\mu$ F in Parallel
  - C<sub>2</sub>: 82pF, 220pF, 2200pF, 4700pF, 22 $\mu$ F in Parallel

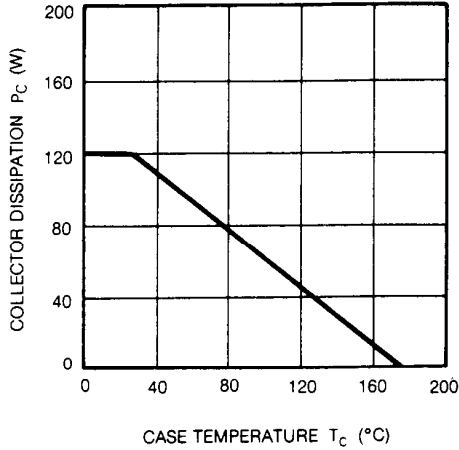
**TEST CIRCUIT BOARD LAYOUT (f = 520MHz)**



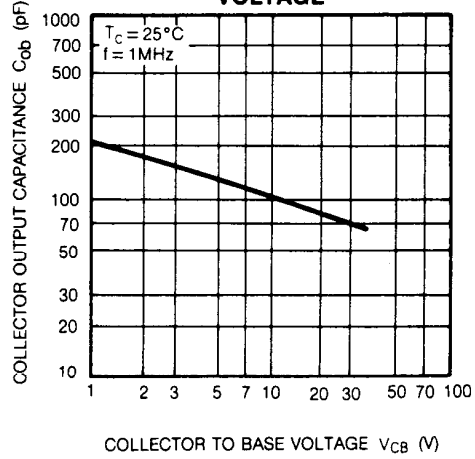
- C<sub>1</sub>: 100pF(Ribbon Lead Mica)
- C<sub>2</sub>: 12pF(Ribbon Lead Mica)
- C<sub>3</sub>: 0
- C<sub>4</sub>: 20pF(Ribbon Lead Mica)
- C<sub>5</sub>: 12pF(Ribbon Lead Mica)
- CV<sub>1</sub>: -10pF(Air Variable Capacitor) muRata TTA 43 A 100A
- CV<sub>2</sub>: -20pF(Air Variable Capacitor) muRata TTA 45 A 200A
- F.B.: Ferrite Bead
- RFC: 9 Turns, AWG #20, 4mm I.D.
- L<sub>1</sub>: 1 Turns, AWG #13, 8mm I.D.
- Microstrip: Board Material 1.6mm Thick, glass-terfon  $\epsilon_r = 2.7$

**TYPICAL PERFORMANCE DATA**

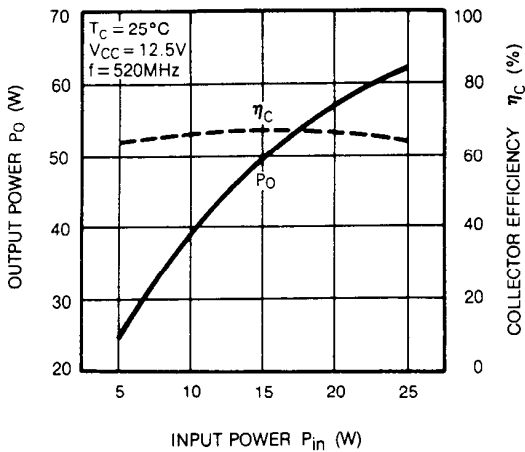
**COLLECTOR DISSIPATION VS. CASE TEMPERATURE**



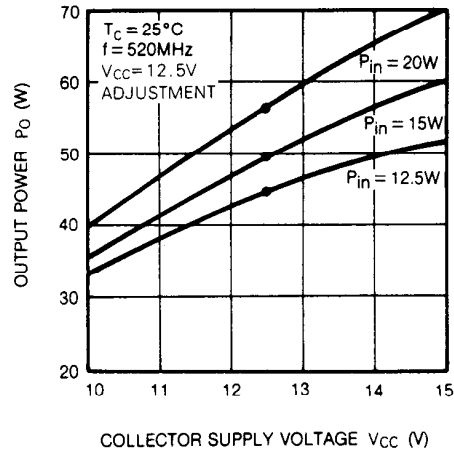
**COLLECTOR OUTPUT CAPACITANCE VS. COLLECTOR TO BASE VOLTAGE**



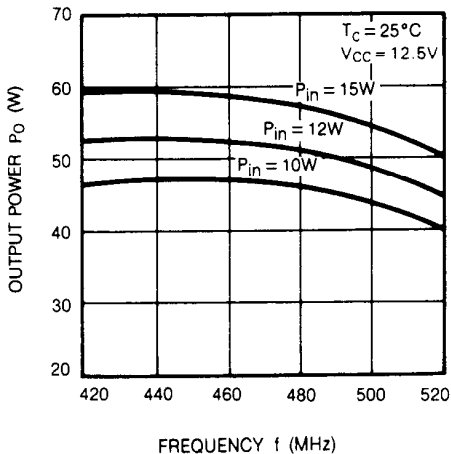
**OUTPUT POWER, COLLECTOR EFFICIENCY VS. INPUT POWER**



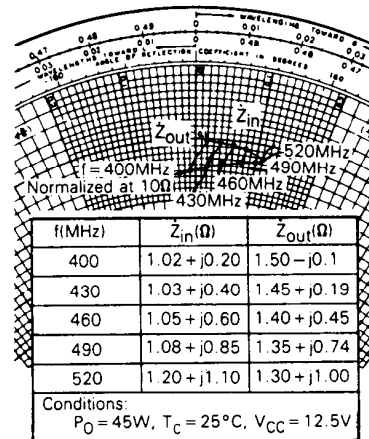
**OUTPUT POWER VS. COLLECTOR SUPPLY VOLTAGE**



**OUTPUT POWER VS. FREQUENCY**



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





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