MITSUBISHI RF POWER TRANSISTOR

# 2SC4624

NPN EPITAXIAL PLANAR TYPE

## DESCRIPTION

2SC4624 is a silicon NPN epitaxial planar type transistor specifically designed for RF power amplifiers in 800-900 MHz band range.

## FEATURES

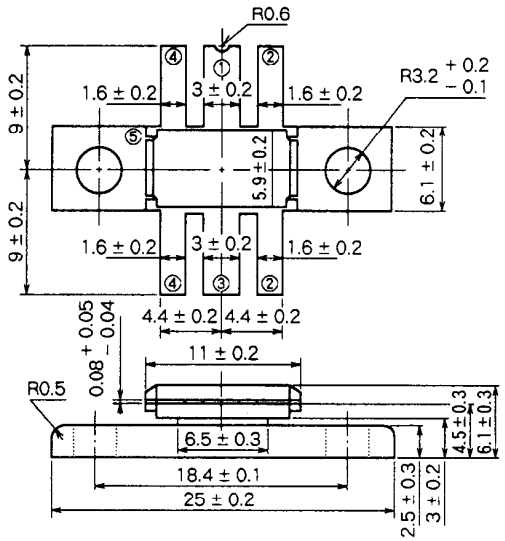
- High power gain : $G_{pe} \geqq 4.7$dB, $P_O \geqq 45$W @ $V_{CC}$ = 12.5V, f = 900MHz, $P_{in}$ = 15W
- Emitter ballasted construction.
- High ruggedness : Ability to withstand 20 : 1 load VSWR when operated at $V_{CC}$ = 15.2V, $P_O$ = 45W, f = 900MHz.
- High reliability due to gold metalization die.
- Flange type ceramic package.
- Common emitter configuraion.

## APPLICATIONS

RF power amplifiers in 800-900MHz band range, especially suitable for radio applications.

## OUTLINE DRAWING

Dimension in mm




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

T-44E

## ABSOLUTE MAXIMUM RATINGS ($T_C$ = 25℃ unless otherwise noted)

| Symbol | Parameter | Conditions | Ratings | Unit |
|---|---|---|---|---|
| $V_{CBO}$ | Collector-base voltage | | 35 | V |
| $V_{EBO}$ | Emitter-base voltage | | 2.5 | V |
| $V_{CES}$ | Collector-emitter voltage | $R_{BE}$ = ∞ | 16 | V |
| $I_C$ | Collector current | | 15 | A |
| $P_C$ | Collector dissipation | $T_C$ = 25℃ | 110 | W |
| $T_j$ | Junction temperature | | 175 | ℃ |
| $T_{stg}$ | Storage temperature range | | − 55 to 175 | ℃ |
| $R_{th\text{-}c}$ | Thermal resistance | Junction to case | 1.36 | W/℃ |

Note. Above parameters are guaranteed independently.

## ELECTRICAL CHARACTERISTICS ($T_C$ = 25℃ unless otherwise noted)

| Symbol | Parameter | Test conditions | Limits | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | |
| $V_{(BR)EBO}$ | Emitter-base breakdown voltage | $I_E$ = 10mA, $I_C$ = 0 | 2.5 | | | V |
| $V_{(BR)CBO}$ | Collector-base breakdown voltage | $I_C$ = 10mA, $I_E$ = 0 | 35 | | | V |
| $V_{(BR)CEO}$ | Collector-emitter breakdown voltage | $I_C$ = 100mA, $R_{BE}$ = ∞ | 16 | | | V |
| $I_{CBO}$ | Collector cutoff current | $V_{CB}$ = 15V, $I_E$ = 0 | | | 5000 | μA |
| $I_{EBO}$ | Emitter cutoff current | $V_{EB}$ = 2V, $I_C$ = 0 | | | 5000 | μA |
| $h_{FE}$ | DC forward current gain * | $V_{CE}$ = 10V, $I_C$ = 1A | 10 | 50 | 180 | − |
| $P_O$ | Output power | $V_{CC}$=12.5V, $P_{in}$=15W, f = 900MHz | 45 | 50 | | W |
| $\eta_C$ | Collector efficiency | | 45 | 50 | | % |

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



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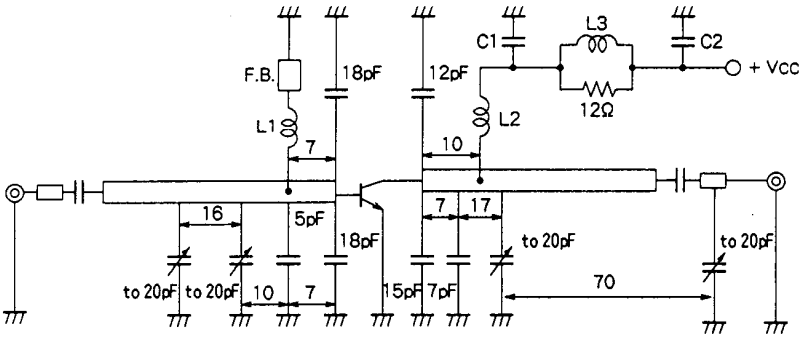
### TEST CIRCUIT



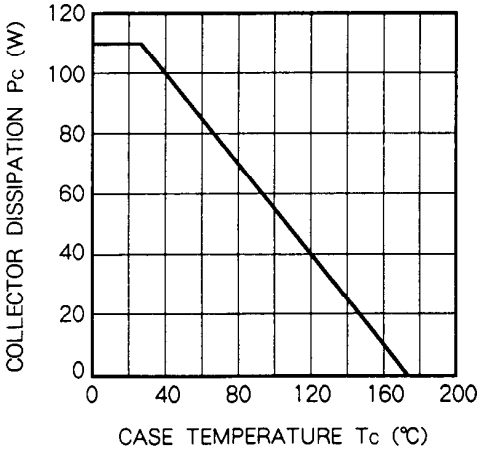

Z1, Z2, Z3, Z4 : Microboard material 1.6mm thick glass-teflon $\varepsilon r = 2.6$ 50Ω – line
C1 : 100pF, 100pF, 1000pF, 22000pF in parallel
C2 : 1000pF, 22000pF, 100μF in parallel

L1 : 2Turn, AWG # 13, 9.5mm I.D
L2 : 1Turn, AWG # 13, 9.5mm I.D
L3 : 6Turn, AWG # 20, 5mm I.D

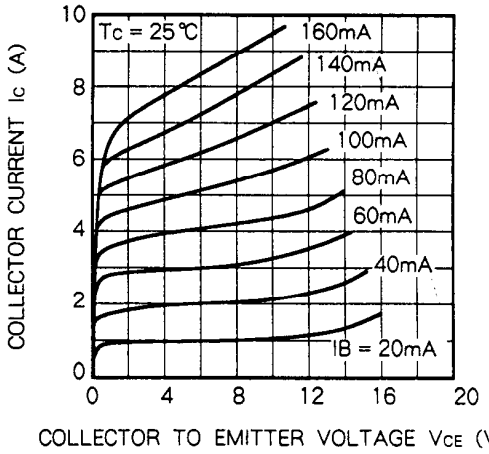
F.B : Ferrite Bead

### TYPICAL PERFORMANCE DATA

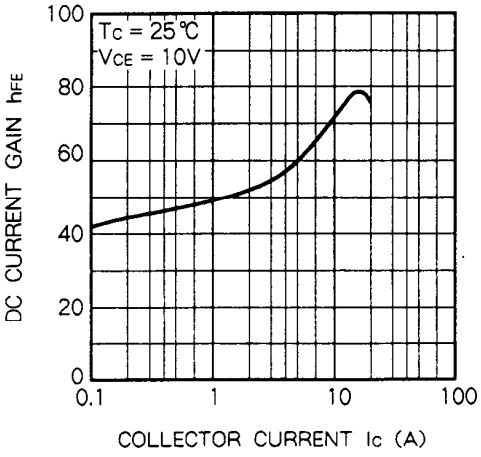
**COLLECTOR DISSIPATION VS. CASE TEMPERATURE CHARACTERISTICS**



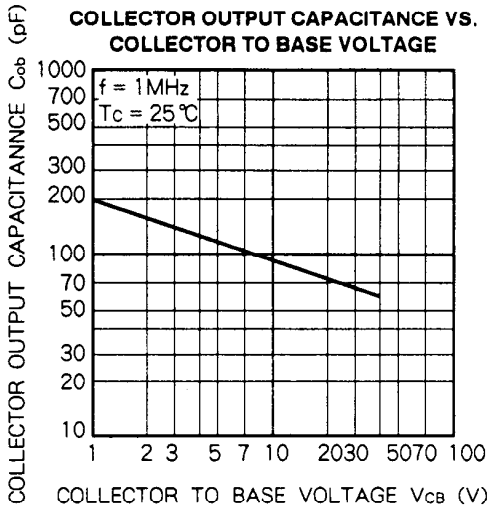

**COLLECTOR CURRENT VS. COLLECTOR TO EMITTER VOLTAGE**




**DC CURRENT GAIN VS. COLLECTOR CURRENT**




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



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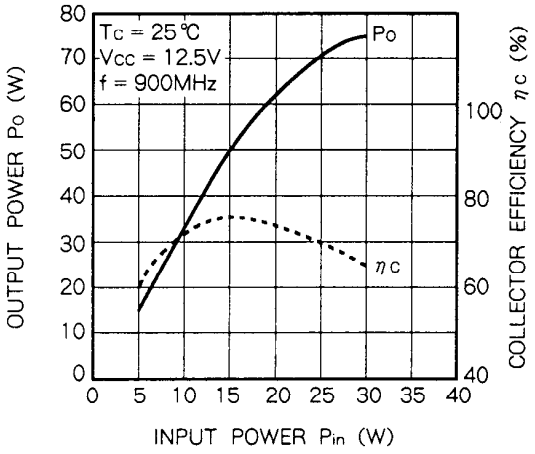
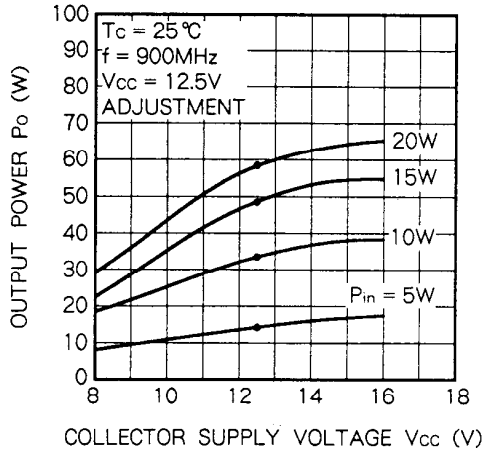
**OUTPUT POWER, COLLECTOR EFFICIENCY VS. INPUT POWER**

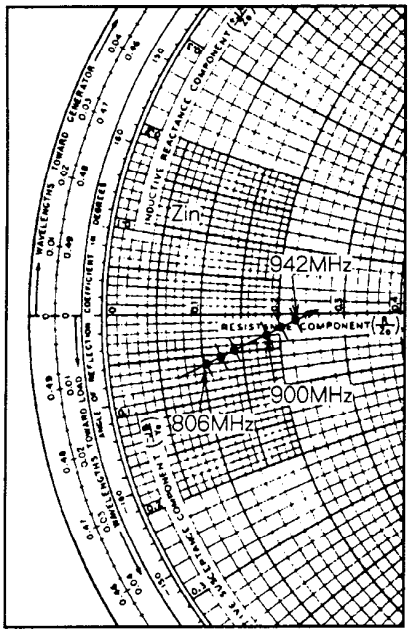


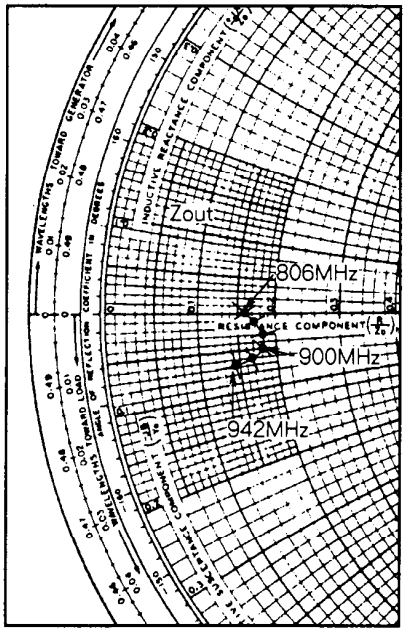

**OUTPUT POWER VS. COLLECTOR SUPPLY VOLTAGE**




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

Zo = 10 Ω




| f (GHz) | Zin (Ω) | Zout (Ω) |
|---|---|---|
| 806 | 1.05 – j0.60 | 1.63 – j0.00 |
| 840 | 1.20 – j0.55 | 1.72 – j0.01 |
| 870 | 1.40 – j0.50 | 1.90 – j0.30 |
| 900 | 1.80 – j0.30 | 1.85 – j0.45 |
| 920 | 2.00 – j0.20 | 1.70 – j0.58 |
| 942 | 2.20 – j0.15 | 1.50 – j0.62 |
| CONDITIONS : Vcc = 12.5V, Po = 45W | | |