MITSUBISHI RF POWER TRANSISTOR

# 2SC2097

## NPN EPITAXIAL PLANAR TYPE

## DESCRIPTION

2SC2097 is a silicon NPN epitaxial planar type transistor designed for RF power amplifiers in HF band mobile radio applications.

## FEATURES

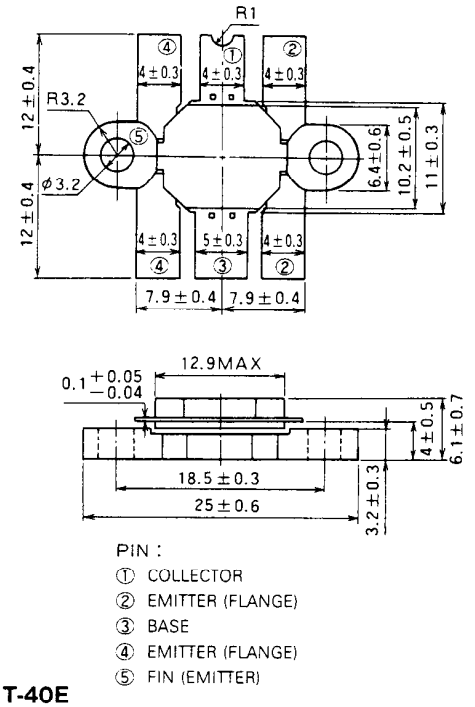
- High power gain: $G_{pe} \geqq 12.3$dB
  @$V_{CC}$ = 13.5V, $P_O$ = 75W, f = 30MHz
- Emitter ballasted construction for good performances.
- Low thermal resistance ceramic package with flange.
- Ability of withstanding infinite load VSWR when operated at $V_{CC}$ = 15.2V, $P_O$ = 70W, f = 30MHz, $T_C$ = 25°C.

## APPLICATION

HF band linear power amplifiers in push-pull class AB operation.

## 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°C unless otherwise specified)

| Symbol | Parameter | Conditions | Ratings | Unit |
|---|---|---|---|---|
| $V_{CBO}$ | Collector to base voltage | | 50 | V |
| $V_{EBO}$ | Emitter to base voltage | | 5 | V |
| $V_{CEO}$ | Collector to emitter voltage | $R_{BE} = \infty$ | 20 | V |
| $I_C$ | Collector current | | 15 | A |
| $P_C$ | Collector dissipation | $T_a$ = 25°C | 7.5 | W |
| | | $T_C$ = 25°C | 150 | W |
| $T_j$ | Junction temperature | | 175 | °C |
| Tstg | Storage temperature | | −55 to 175 | °C |
| Rth-a | Thermal resistance | Junction to ambient | 20 | °C/W |
| Rth-c | | Junction to case | 1.2 | °C/W |

Note. Above parameters are guaranteed independently.

## ELECTRICAL CHARACTERISTICS ($T_C$ = 25°C unless otherwise specified)

| Symbol | Parameter | Test conditions | Limits | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | |
| $V_{(BR)EBO}$ | Emitter to base breakdown voltage | $I_E$ = 10mA, $I_C$ = 0 | 5 | | | V |
| $V_{(BR)CBO}$ | Collector to base breakdown voltage | $I_C$ = 20mA, $I_E$ = 0 | 50 | | | V |
| $V_{(BR)CEO}$ | Collector to emitter breakdown voltage | $I_C$ = 0.1A, $R_{BE} = \infty$ | 20 | | | V |
| $I_{CBO}$ | Collector cutoff current | $V_{CB}$ = 25V, $I_E$ = 0 | | | 5 | mA |
| $I_{EBO}$ | Emitter cutoff current | $V_{EB}$ = 2V, $I_C$ = 0 | | | 4 | mA |
| $h_{FE}$ | DC forward current gain * | $V_{CE}$ = 10V, $I_C$ = 0.1A | 10 | 50 | 180 | — |
| $P_O$ | Output power | $V_{CC}$ = 13.5V, $P_{in}$ = 4W, f = 30MHz | 75 | 85 | | W |
| $\eta_C$ | Collector efficiency | | 55 | 65 | | % |

Note. * Pulse test, $P_W$ = 150μs, duty = 5%.
Above parameters, ratings, limits and conditions are subject to change.



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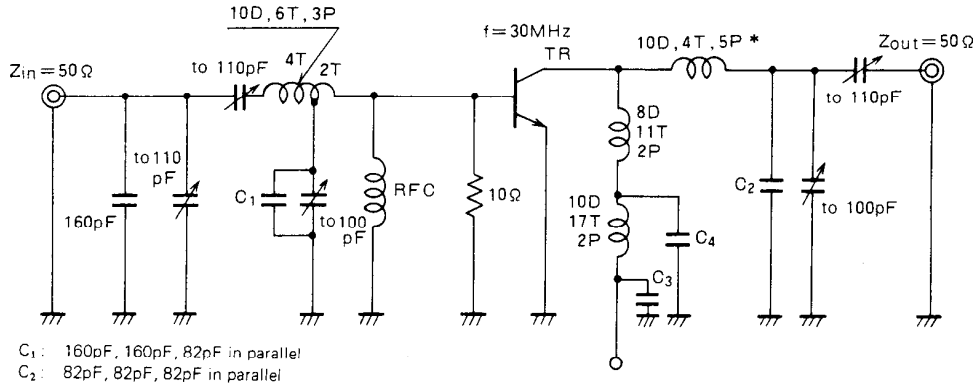
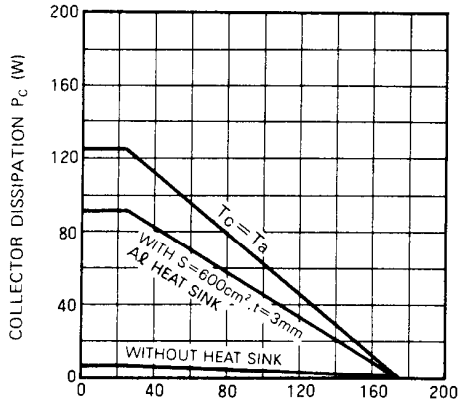
## TEST CIRCUIT



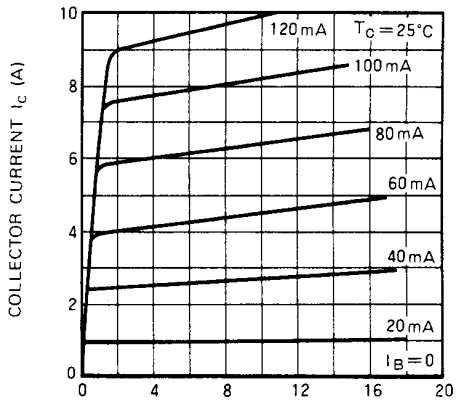

$C_1$: 160pF, 160pF, 82pF in parallel
$C_2$: 82pF, 82pF, 82pF in parallel
$C_3$: 100pF, 4700pF, 4700pF, 0.22μF, 0.22μF, 33μF, 330μF in parallel
$C_4$: 100pF, 220pF, 4700pF, 0.1μF, 330μF in parallel
RFC: 1mmφ enameled wire 27T.
Notes: All coils are made from 1.5mmφ silver plated copper wire but coil (sign *) is made from 2.3mmφ
D: Inner diameter of coil P: Pitch of coil
T: Turn number of coil Dimension in milli-meter

## TYPICAL PERFORMANCE DATA

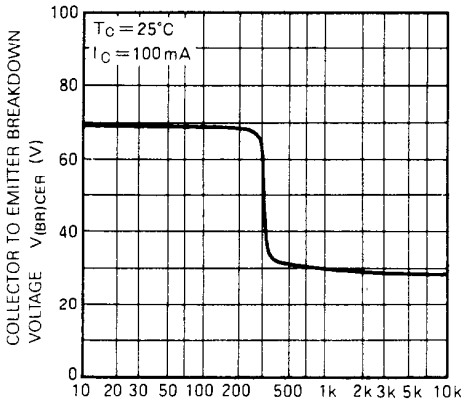
### COLLECTOR DISSIPATION VS. AMBIENT TEMPERATURE



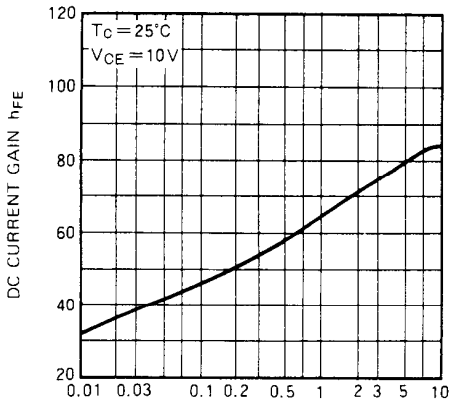

### COLLECTOR CURRENT VS. COLLECTOR TO EMITTER VOLTAGE




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




### DC CURRENT GAIN VS. COLLECTOR CURRENT



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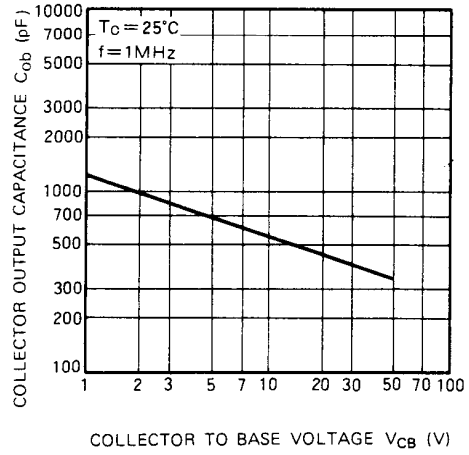
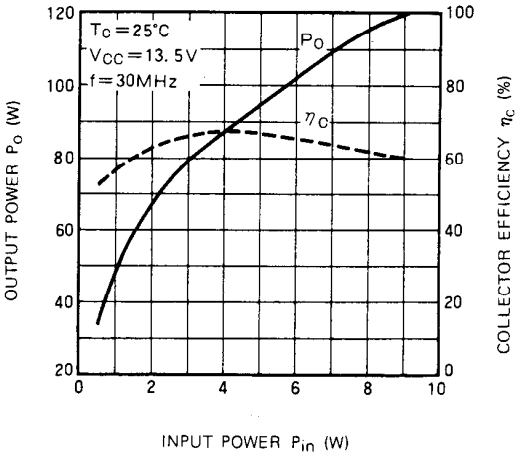
### COLLECTOR OUTPUT CAPACITANCE VS. COLLECTOR TO BASE VOLTAGE




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




### OUTPUT POWER VS. COLLECTOR SUPPLY VOLTAGE