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

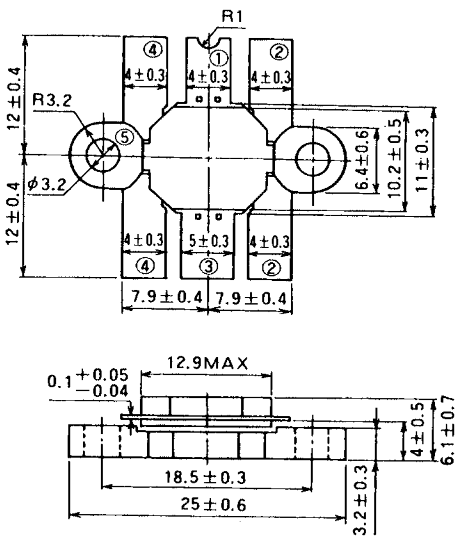
- High power gain: $G_{pe} \geq 12.3dB$ @V_{CC} = 13.5V, P_O = 75W, f = 30MHz
- Emitter ballasted construction for good performances.
- Low thermal resistance ceramic package with flange.
- Ability of withstanding infinite load VSWR when operated at V_{CC} = 15.2V, P_O = 70W, f = 30MHz, T_C = 25°C.
- Equivalent input/output series impedance:
  Zin=0.5−j1.0Ω @Po=75W, Vcc=13.5V, f=30MHz
  Zout=1.15−j1.4Ω

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	Ta=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
η_C	Collector efficiency		55	65		%

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

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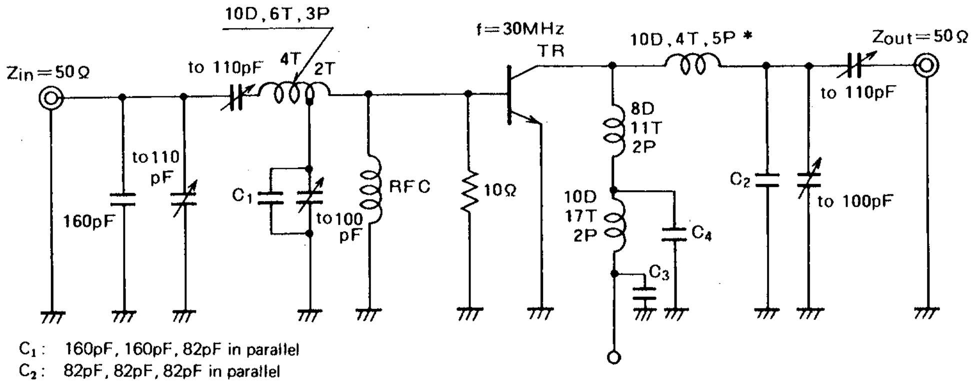
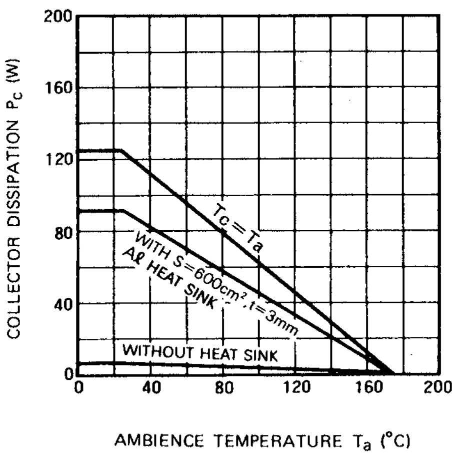
TEST CIRCUIT



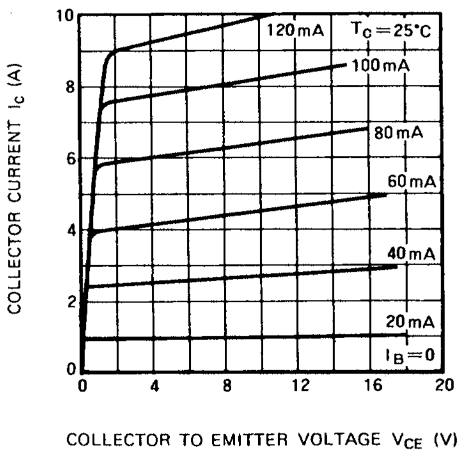
C1: 160pF, 160pF, 82pF in parallel
C2: 82pF, 82pF, 82pF in parallel
C3: 100pF, 4700pF, 4700pF, 0.22μF, 0.22μF, 33μF, 330μF in parallel
C4: 100pF, 220pF, 4700pF, 0.1μF, 330μF in parallel
RFC: 1mmϕ enameled wire 27T.
Notes: All coils are made from 1.5mmϕ silver plated copper wire but coil (sign *) is made from 2.3mmϕ
D: Inner diameter of coil   P: Pitch of coil
T: Turn number of coil   Dimension in milli-meter

TYPICAL PERFORMANCE DATA

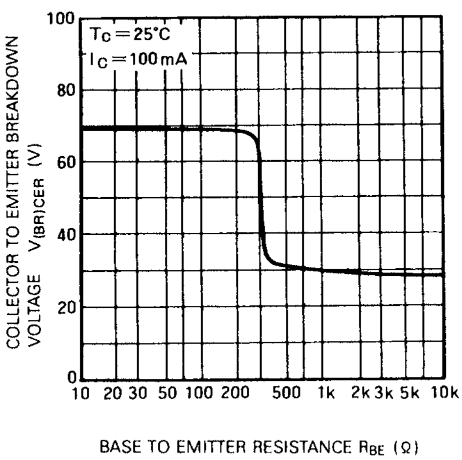
COLLECTOR DISSIPATION VS. AMBIENT TEMPERATURE



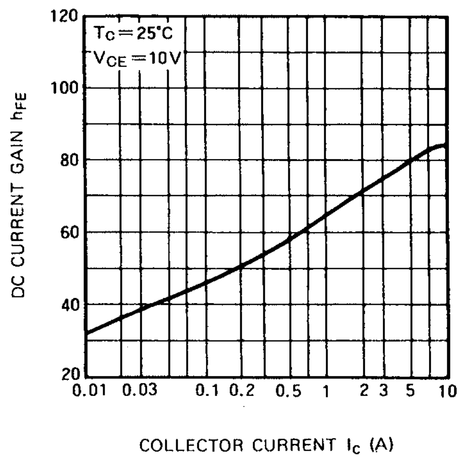
COLLECTOR CURRENT VS. COLLECTOR TO EMITTER VOLTAGE



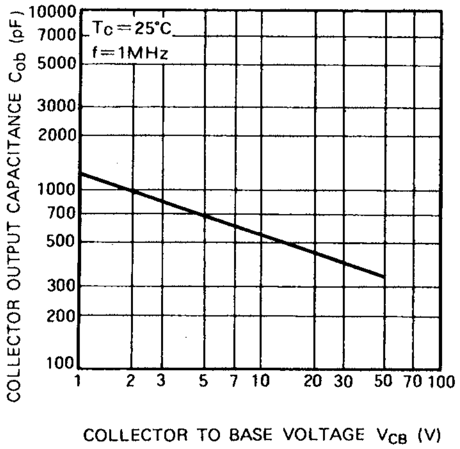
COLLECTOR TO EMITTER BREAKDOWN VOLTAGE VS. BASE TO EMITTER RESISTANCE



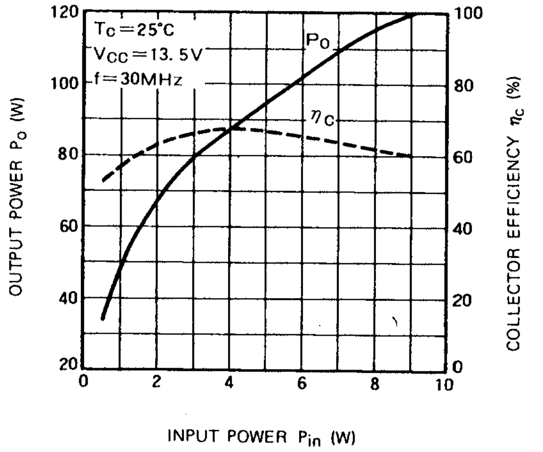
DC CURRENT GAIN VS. COLLECTOR CURRENT



COLLECTOR OUTPUT CAPACITANCE VS. COLLECTOR TO BASE VOLTAGE



OUTPUT POWER, COLLECTOR EFFICIENCY VS. INPUT POWER



OUTPUT POWER VS. COLLECTOR SUPPLY VOLTAGE