MITSUBISHI RF POWER TRANSISTOR

2SC1946A

NPN EPITAXIAL PLANAR TYPE

DESCRIPTION

2SC1946A is a silicon NPN epitaxial planar type transistor designed for RF power amplifiers on VHF band mobile radio applications.

FEATURES

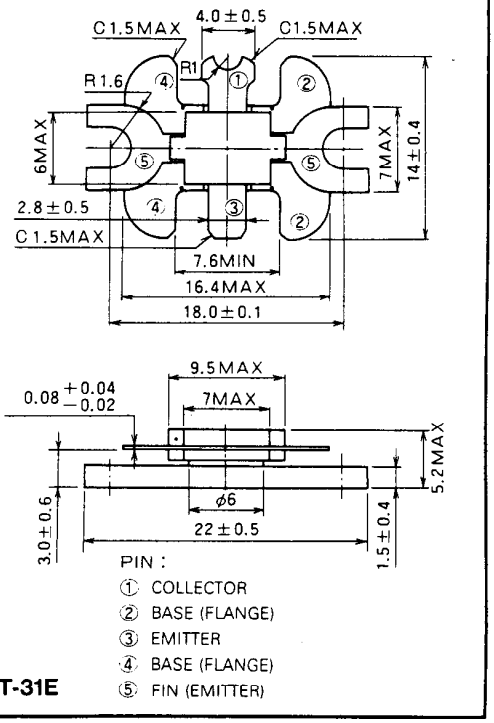
- High power gain: $G_{pe} \geqq 10$dB
  @V_{CC} = 13.5V, P_O = 30W, f = 175MHz
- Emitter ballasted construction and gold metallization for high reliability and good performances.
- Low thermal resistance ceramic package with flange.
- Ability of withstanding more than 20:1 load VSWR when operated at V_{CC} = 15.2V, P_O = 30W, f = 175MHz.
- Equivalent input/output impedance at rated operating conditions: Z_{in} = 0.65 + j1.4Ω
  Z_{out} = 1.9 + j0.75Ω

APPLICATION

25 watts output power amplifiers in VHF band mobile radio applications.

OUTLINE DRAWING

Dimensions in mm



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

T-31E

ABSOLUTE MAXIMUM RATINGS (T_C=25°C unless otherwise specified)

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		7	A
P_C	Collector dissipation	T_a=25°C	3	W
		T_C=25°C	50	W
T_j	Junction temperature		175	°C
T_{stg}	Storage temperature		−55 to 175	°C
R_{th-a}	Thermal resistance	Junction to ambient	50	°C/W
R_{th-c}		Junction to case	3	°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	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 cutoff current	V_{CB}=25V, I_E=0			2	mA
I_{EBO}	Emitter cutoff current	V_{EB}=3V, I_C=0			1	mA
h_{FE}	DC forward current gain *	V_{CE}=10V, I_C=0.2A	10	50	180	—
P_O	Output power	V_{CC}=13.5V, P_{in}=3W, f=175MHz	30	35		W
η_C	Collector efficiency		60	70		%

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

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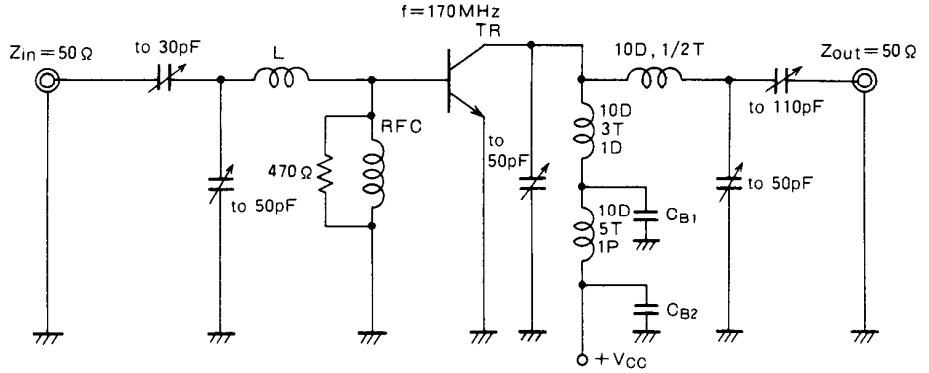
TEST CIRCUIT

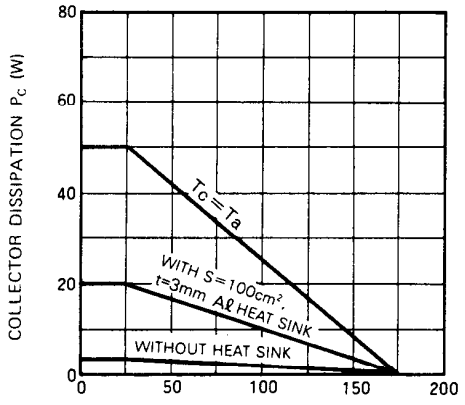


L: Length 10mm
RFC: 0.4mm enameled wire 12T with Ferrite Bead
C_{B1}: 220pF, 2200pF in parallel
C_{B2}: 220pF, 2200pF, 10μF in parallel

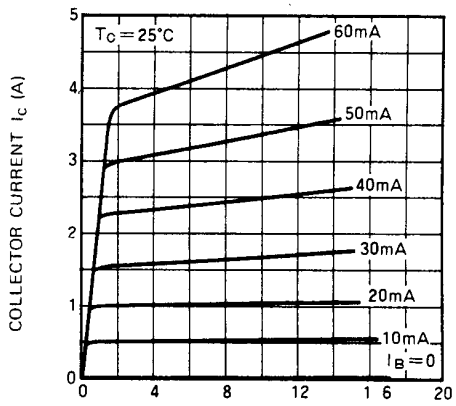
Notes: All coils are made from 1.5mmϕ silver plated copper wire
Coil dimensions in milli-meter
D: Inner diameter of coil
T: Turn number of coil
P: Pitch of coil

TYPICAL PERFORMANCE DATA

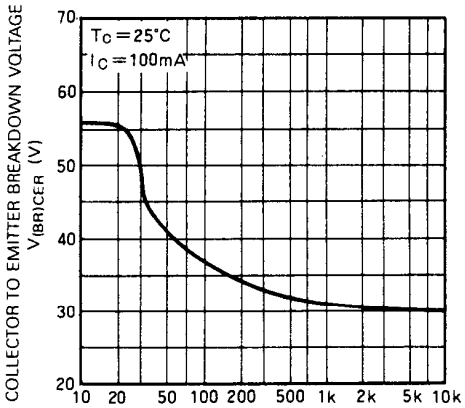
COLLECTOR DISSIPATION VS. AMBIENT TEMPERATURE



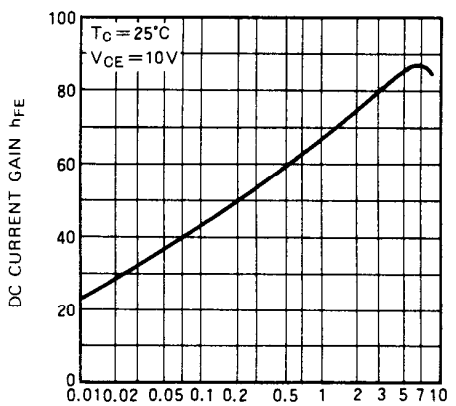
COLLECTOR CURRENT VS. COLLECTOR TO EMITTER VOLTAGE



COLLECTOR TO EMITTER BREAKDOWN VOLTAGE VS. BASE TO EMITTER RESISTANCE



DC CURRENT GAIN VS. COLLECTOR CURRENT



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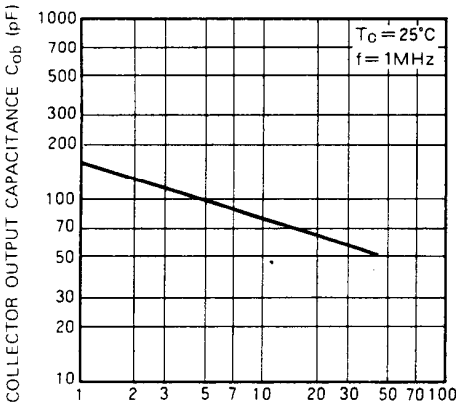
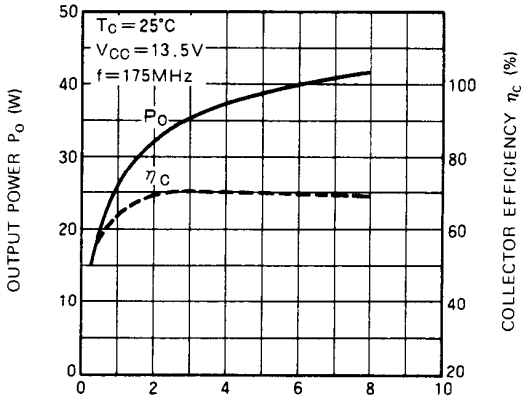
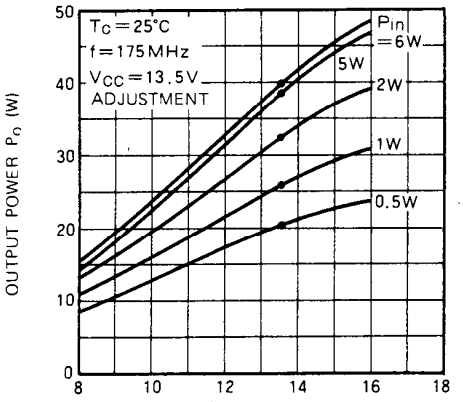
COLLECTOR OUTPUT CAPACITANCE VS. COLLECTOR TO BASE VOLTAGE



OUTPUT POWER, COLLECTOR EFFICIENCY VS. INPUT POWER



OUTPUT POWER VS. COLLECTOR SUPPLY VOLTAGE



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