MITSUBISHI RF POWER TRANSISTOR

2SC2131

NPN EPITAXIAL PLANAR TYPE

DESCRIPTION

2SC2131 is a silicon NPN epitaxial planar type transistor designed for RF power amplifiers in UHF band mobile radio applications.

FEATURES

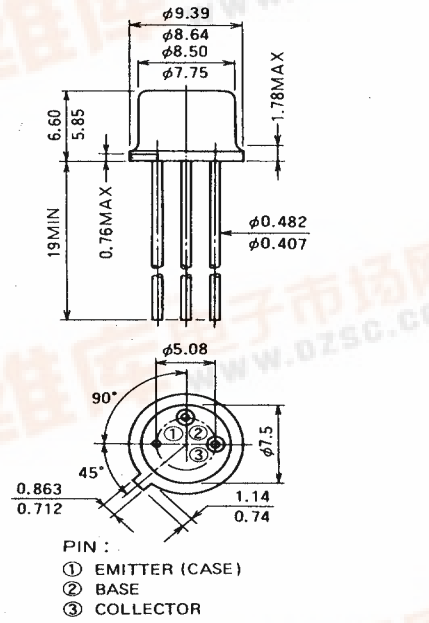
- High power gain: $G_{pe} \geqq 6.7$dB
  @V_{CC} = 13.5V, P_O = 1.4W, f = 500MHz
- TO-39 metal seeled package for high reliability.
- Emitter ballasted construction, gold metallization for good performances.
- Emitter electrode is connected electrically to the case.

APPLICATION

1 watt power amplifiers in UHF band mobile radio applications and driver amplifiers in general.

OUTLINE DRAWING

Dimensions in mm



T-8E

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

Symbol	Parameter	Conditions	Ratings	Unit
V_{CBO}	Collector to base voltage		40	V
V_{EBO}	Emitter to base voltage		4	V
V_{CEO}	Collector to emitter voltage	R_{BE} = ∞	18	V
I_C	Collector current		0.6	A
P_C	Collector dissipation	T_a = 25°C	0.8	W
		T_C = 25°C	4	W
T_j	Junction temperature		175	°C
T_{stg}	Storage temperature		−55 to 175	°C
R_{th-a}	Thermal resistance	Junction to ambient	187.5	°C/W
R_{th-c}		Junction to case	37.5	°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 = 1mA, I_C = 0	4			V
$V_{(BR)CBO}$	Collector to base breakdown voltage	I_C = 5mA, I_E = 0	40			V
$V_{(BR)CEO}$	Collector to emitter breakdown voltage	I_C = 50mA, R_{BE} = ∞	18			V
I_{CBO}	Collector cutoff current	V_{CB} = 25V, I_E = 0			100	μA
I_{EBO}	Emitter cutoff current	V_{EB} = 3V, I_C = 0			100	μA
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} = 0.3W, f = 500MHz	1.4	1.6		W
η_C	Collector efficiency		50	60		%

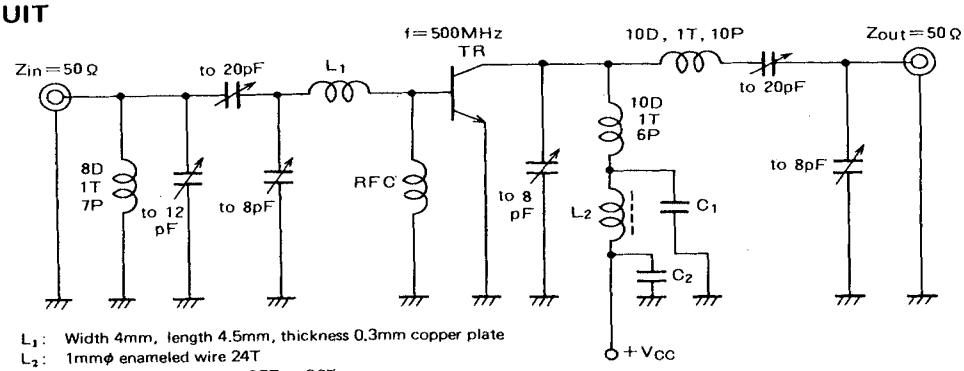
Note. *Pulse test, P_W = 150μs, duty = 5%.
Above parameters, ratings, limits and conditions are subject to change.

MITSUBISHI RF POWER TRANSISTOR

2SC2131

NPN EPITAXIAL PLANAR TYPE

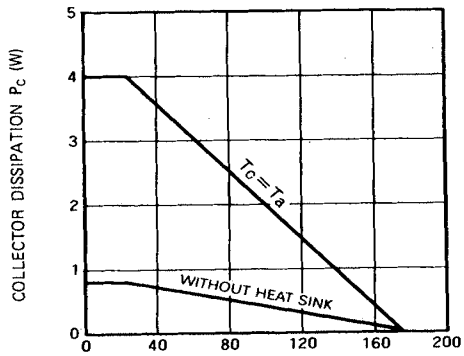
TEST CIRCUIT



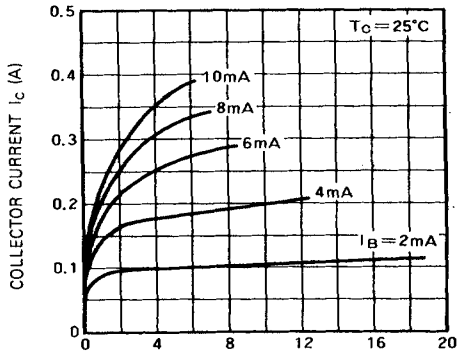
L_1: Width 4mm, length 4.5mm, thickness 0.3mm copper plate
L_2: 1mmφ enameled wire 24T
RFC: 0.3mmφ enameled wire 25T to 30T
C_1: 50pF, 100pF, 2200pF, 0.005μF, 0.0022μF in parallel
C_2: 0.02μF, 0.047μF, 0.47μF in parallel
Notes: Coils are made from 1.5mmφ silver plated copper wire except L_1, L_2 & RFC
D: Inner diameter of coil
T: Turn number of coil
P: Pitch of coil
Coil dimensions in milli-meter

TYPICAL PERFORMANCE DATA

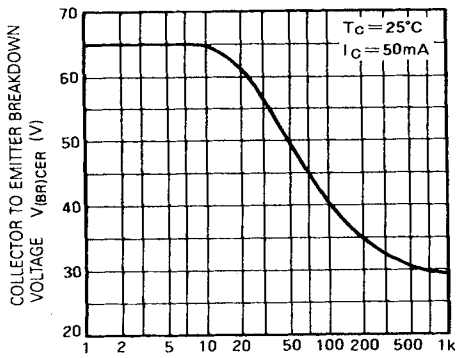
COLLECTOR DISSIPATION VS. AMBIENT TEMPERATURE



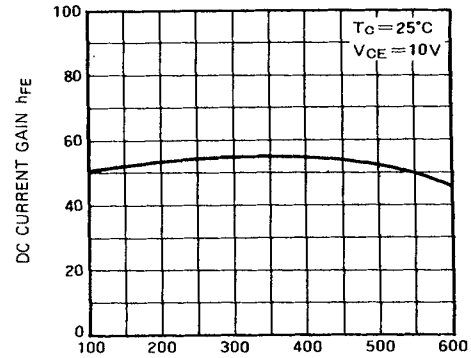
COLLECTOR CURRENT VS. COLLECTOR TO EMITTER VOLTAGE



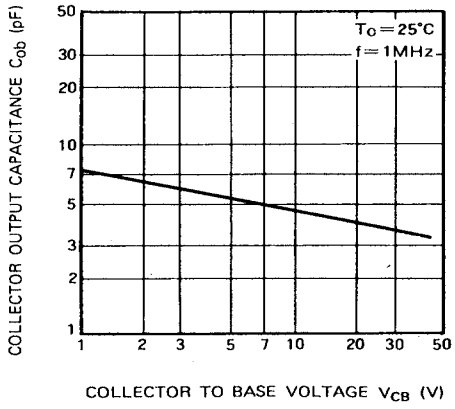
COLLECTOR TO EMITTER BREAKDOWN VOLTAGE VS. BASE TO EMITTER RESISTANCE



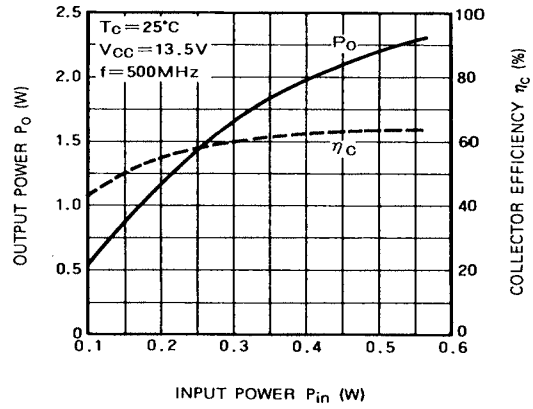
DC CURRENT GAIN VS. COLLECTOR CURRENT



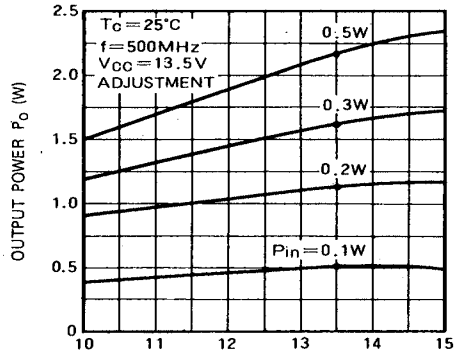
COLLECTOR OUTPUT CAPACITANCE VS. COLLECTOR TO BASE VOLTAGE



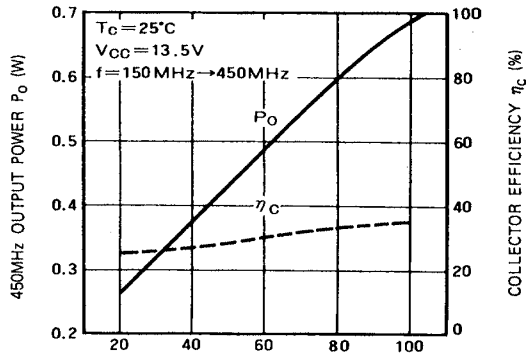
OUTPUT POWER, COLLECTOR EFFICIENCY VS. INPUT POWER



OUTPUT POWER VS. COLLECTOR SUPPLY VOLTAGE

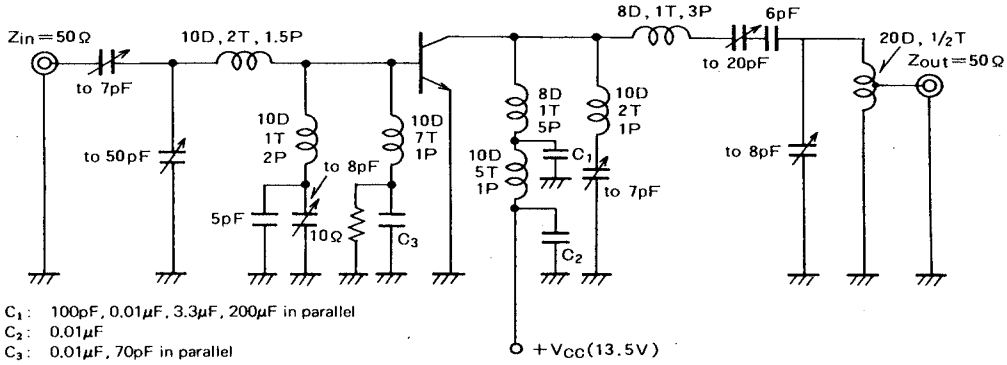


TRIPLER OUTPUT POWER, COLLECTOR EFFICIENCY VS. INPUT POWER



APPLICATION CIRCUIT

TRIPLER CIRCUIT DIAGRAM (150MHz → 450MHz)



C_1: 100pF, 0.01μF, 3.3μF, 200μF in parallel
C_2: 0.01μF
C_3: 0.01μF, 70pF in parallel
Notes: All coils are made from 1.5mmφ silver plated copper wire
D: Inner diameter of coil
T: Turn number of coil
P: Pitch of coil
Dimension in milli-meter