MITSUBISHI RF POWER TRANSISTOR

2SC2539

NPN EPITAXIAL PLANAR TYPE

DESCRIPTION

2SC2539 is a silicon NPN epitaxial planar type transistor designed for RF power amplifiers in VHF band mobile radio applications.

FEATURES

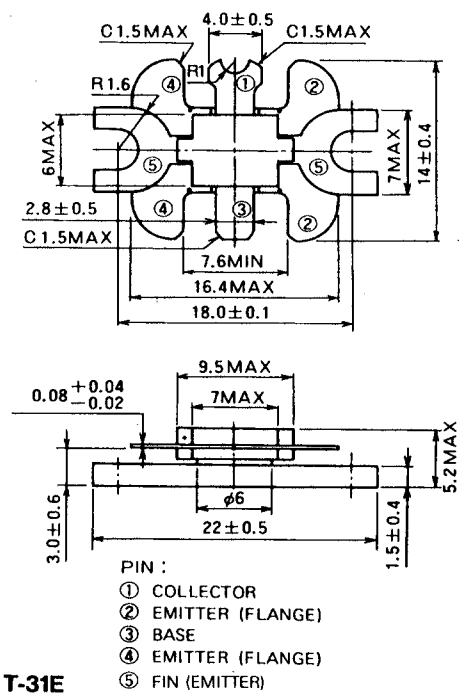
- High power gain: $G_{pe} \geqq 14.5$dB
  @V_{CC} = 13.5V, P_O = 14W, f = 175MHz
- Emitter ballasted construction and gold metallization for high reliability and good performances.
- Low thermal resistance ceramic package with flange.
- Ability of withstanding more than 20:1 load VSWR when operated at V_{CC} = 15.2V, P_O = 18W, f = 175MHz, T_C = 25°C.
- Equivalent input/output series impedance:
  Zin=1.7−j4.4Ω @Po=14W, Vcc=13.5V, f=175MHz
  Zout=6−j7.4Ω

APPLICATION

10 to 14 watts output power amplifiers in VHF band mobile radio applications.

OUTLINE DRAWING

Dimensions in mm



PIN :
① COLLECTOR
② EMITTER (FLANGE)
③ BASE
④ EMITTER (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_{CER}	Collector to emitter voltage	$R_{BE}=\infty$	17	V
I_C	Collector current		3.5	A
P_C	Collector dissipation	T_a=25°C	2.5	W
		T_C=25°C	35	W
T_j	Junction temperature		175	°C
Tstg	Storage temperature		−55 to 175	°C
Rth-a	Thermal resistance	Junction to ambient	60	°C/W
Rth-c		Junction to case	4.3	°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=50mA, $R_{BE}=\infty$	17			V
I_{CBO}	Collector cutoff current	V_{CB}=25V, I_E=0			1000	μA
I_{EBO}	Emitter cutoff current	V_{EB}=3V, I_C=0			1000	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}=0.5W, f=175MHz	14	17		W
η_C	Collector efficiency		60	65		%

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

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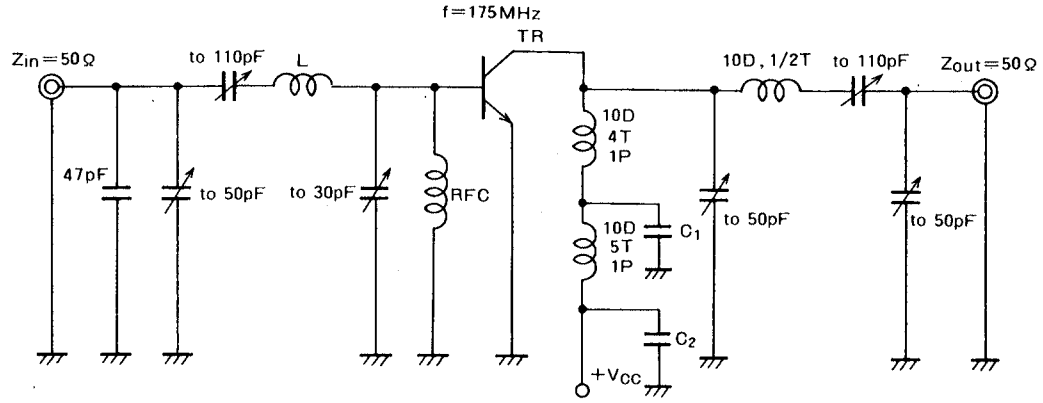
TEST CIRCUIT

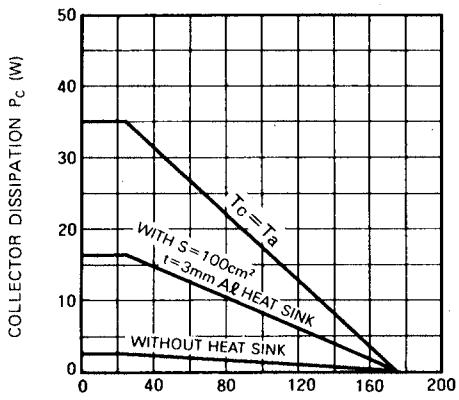


L: Length 10mm
RFC: 0.4mmφ enameled wire 12T with Ferrite Bead
C1: 220pF, 2200pF in parallel
C2: 220pF, 2200pF, 10μF in parallel

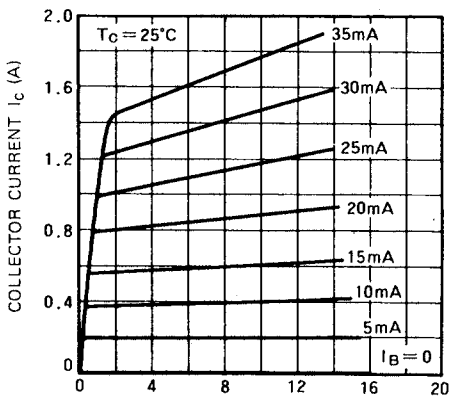
NOTES: All coils are made from 1.5mmφ silver plated copper wire
D: Inner diameter of coil
T: Turn number of coil
P: Pitch of coil
Dimension in milli-meter

TYPICAL PERFORMANCE DATA

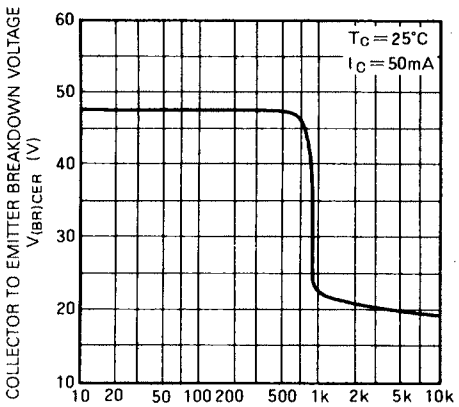
COLLECTOR DISSIPATION VS. AMBIENT TEMPERATURE



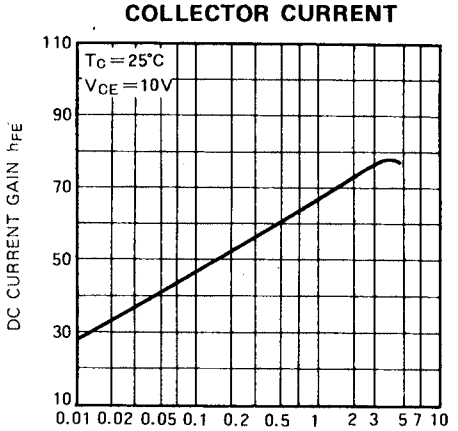
COLLECTOR CURRENT VS. COLLECTOR TO EMITTER VOLTAGE



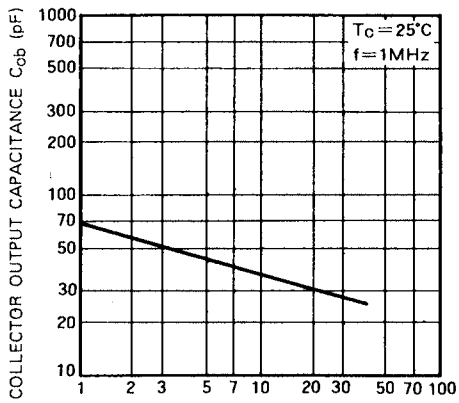
COLLECTOR TO EMITTER BREAKDOWN VOLTAGE VS. BASE TO EMITTER RESISTANCE



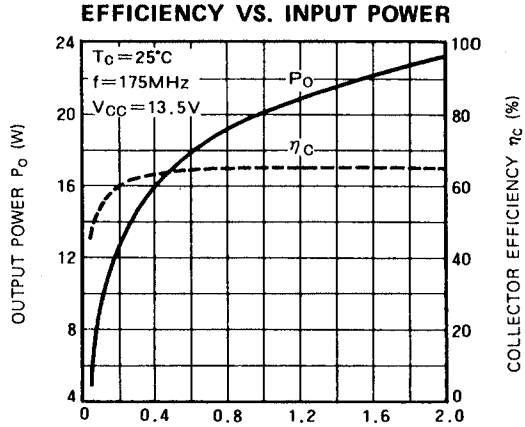
DC CURRENT GAIN VS. COLLECTOR CURRENT



COLLECTOR OUTPUT CAPACITANCE VS. COLLECTOR TO BASE VOLTAGE



OUTPUT POWER, COLLECTOR EFFICIENCY VS. INPUT POWER



OUTPUT POWER VS. COLLECTOR SUPPLY VOLTAGE