

DESCRIPTION

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

FEATURES

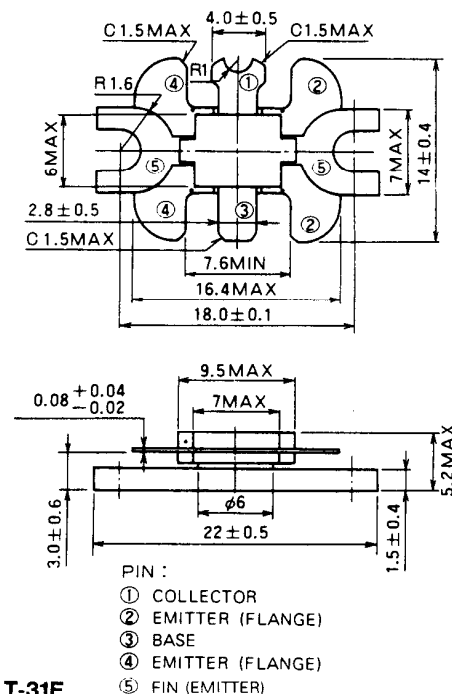
- High power gain: $G_{pe} \geq 14.5\text{dB}$
@ $V_{CC} = 13.5\text{V}$, $P_O = 14\text{W}$, $f = 175\text{MHz}$
- Emitter ballasted construction and gold metallization for high reliability and good performances.
- Low thermal resistance ceramic package with flange.
- Ability of withstanding more than 20:1 load VSWR when operated at $V_{CC} = 15.2\text{V}$, $P_O = 18\text{W}$, $f = 175\text{MHz}$, $T_C = 25^\circ\text{C}$.

APPLICATION

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

OUTLINE DRAWING

Dimensions in mm



ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$ 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		3.5	A
P_C	Collector dissipation	$T_a = 25^\circ\text{C}$	2.5	W
		$T_C = 25^\circ\text{C}$	35	W
T_j	Junction temperature		175	$^\circ\text{C}$
T_{stg}	Storage temperature		-55 to 175	$^\circ\text{C}$
R_{th-a}	Thermal resistance	Junction to ambient	60	$^\circ\text{C/W}$
R_{th-c}		Junction to case	4.3	$^\circ\text{C/W}$

Note. Above parameters are guaranteed independently.

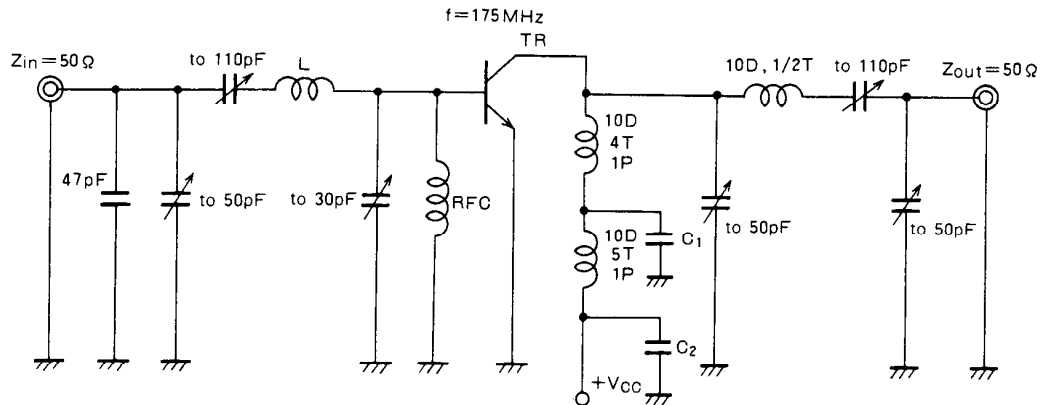
ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
$V_{(BR)EBO}$	Emitter to base breakdown voltage	$I_E = 10\text{mA}$, $I_C = 0$	4			V
$V_{(BR)CBO}$	Collector to base breakdown voltage	$I_C = 10\text{mA}$, $I_E = 0$	35			V
$V_{(BR)CEO}$	Collector to emitter breakdown voltage	$I_C = 50\text{mA}$, $R_{BE} = \infty$	17			V
I_{CBO}	Collector cutoff current	$V_{CB} = 25\text{V}$, $I_E = 0$			1000	μA
I_{EBO}	Emitter cutoff current	$V_{EB} = 3\text{V}$, $I_C = 0$			1000	μA
h_{FE}	DC forward current gain *	$V_{CE} = 10\text{V}$, $I_C = 0.1\text{A}$	10	50	180	—
P_O	Output power	$V_{CC} = 13.5\text{V}$, $P_{in} = 0.5\text{W}$, $f = 175\text{MHz}$	14	17		W
η_C	Collector efficiency		60	65		%

Note. * Pulse test, $P_W = 150\mu\text{s}$, duty = 5%.

Above parameters, ratings, limits and conditions are subject to change.

TEST CIRCUIT

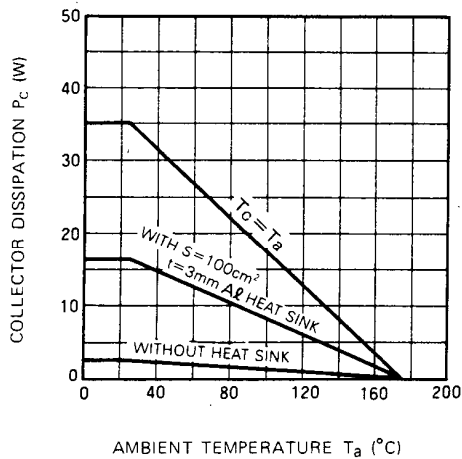


L: Length 10mm
 RFC: 0.4mm ϕ enameled wire 12T with Ferrite Bead
 C1: 220pF, 2200pF in parallel
 C2: 220pF, 2200pF, 10 μ F in parallel

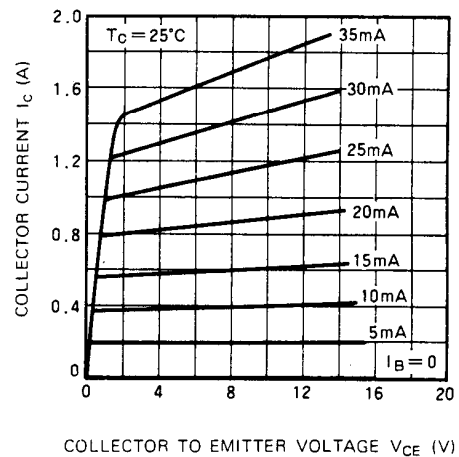
NOTES: All coils are made from 1.5mm ϕ silver plated copper wire
 D: Inner diameter of coil
 T: Turn number of coil
 P: Pitch of coil
 Dimension in milli-meter

TYPICAL PERFORMANCE DATA

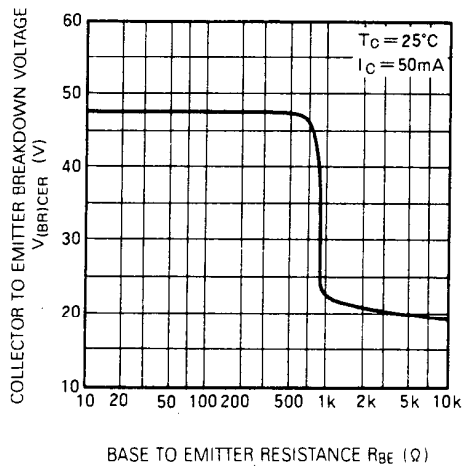
COLLECTOR DISSIPATION VS. AMBIENT TEMPERATURE



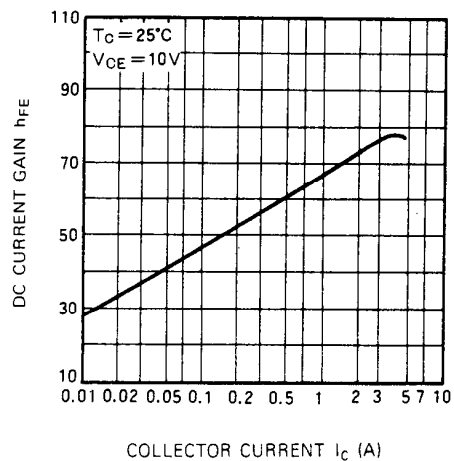
COLLECTOR CURRENT VS. COLLECTOR TO EMITTER VOLTAGE



COLLECTOR TO EMITTER BREAKDOWN VOLTAGE VS. BASE TO EMITTER RESISTANCE

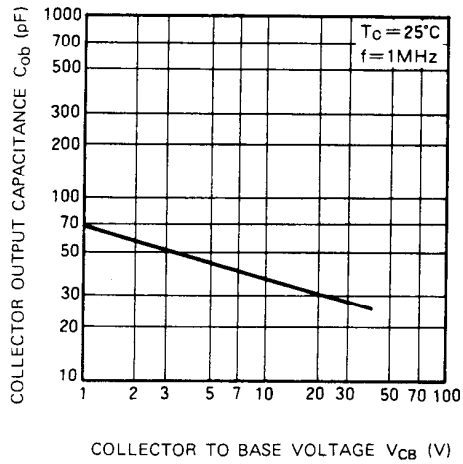


DC CURRENT GAIN VS. COLLECTOR CURRENT

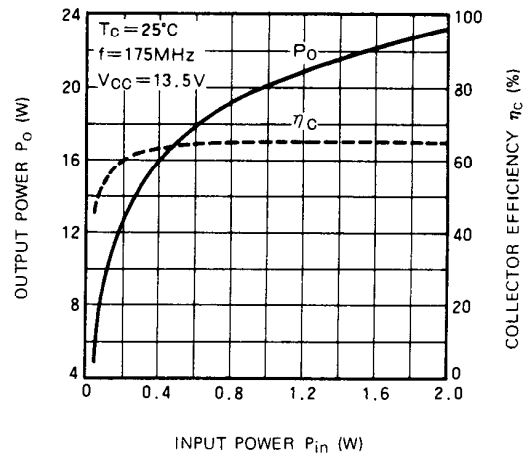


NPN EPITAXIAL PLANAR TYPE

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



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



**OUTPUT POWER VS. COLLECTOR
 SUPPLY VOLTAGE**

