

DESCRIPTION

2SC2538 is a silicon NPN epitaxial planar type transistor designed for RF amplifiers on VHF band mobile radio applications.

FEATURES

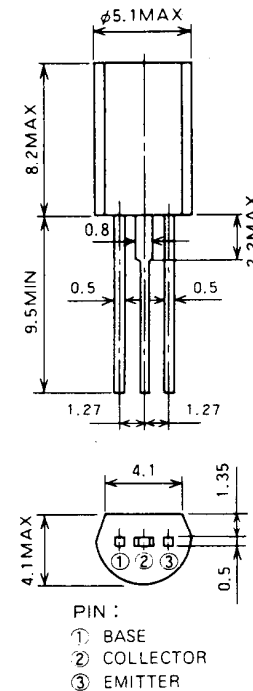
- High power gain: $G_{pe} \geq 10\text{dB}$
@ $V_{CC} = 13.5\text{V}$, $P_o = 0.5\text{W}$, $f = 175\text{MHz}$
- TO-92 similar package is convenient for mounting.
- Equivalent input/output series impedance:
 $Z_{in} = 5.3 - j2.9\Omega$ @ $V_{CC} = 13.5\text{V}$, $P_o = 500\text{mW}$, $f = 175\text{MHz}$
 $Z_{out} = 29 - j63.5\Omega$

APPLICATION

Driver amplifiers in general VHF band mobile radio applications.

OUTLINE DRAWING

Dimensions in mm



TO-92L

ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$ 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	$R_{BE} = \infty$	17	V
I_C	Collector current		0.4	A
P_C	Collector dissipation	$T_a = 25^\circ\text{C}$	0.7	W
		$T_C = 25^\circ\text{C}$	3	W
T_j	Junction temperature		135	$^\circ\text{C}$
T_{stg}	Storage temperature		-55 to 135	$^\circ\text{C}$
R_{th-a}	Thermal resistance	Junction to ambient	157	$^\circ\text{C/W}$
R_{th-c}		Junction to case	36.7	$^\circ\text{C/W}$

Note. Above parameters are guaranteed independently.

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

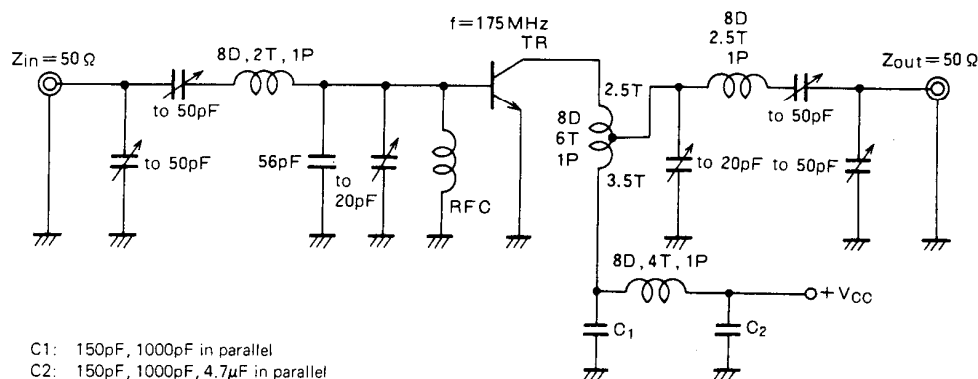
Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
$V_{(BR)EBO}$	Emitter to base breakdown voltage	$I_E = 1\text{mA}$, $I_C = 0$	4			V
$V_{(BR)CBO}$	Collector to base breakdown voltage	$I_C = 1\text{mA}$, $I_E = 0$	40			V
$V_{(BR)CEO}$	Collector to emitter breakdown voltage	$I_C = 10\text{mA}$, $R_{BE} = \infty$	17			V
I_{CBO}	Collector cutoff current	$V_{CB} = 15\text{V}$, $I_E = 0$			100	μA
I_{EBO}	Emitter cutoff current	$V_{EB} = 3\text{V}$, $I_C = 0$			200	μA
h_{FE}	DC forward current gain *	$V_{CE} = 10\text{V}$, $I_C = 0.1\text{A}$	10	80	300	—
P_O	Output power	$V_{CC} = 13.5\text{V}$, $P_{in} = 50\text{mW}$, $f = 175\text{MHz}$	500	600		mW
η_C	Collector efficiency		45	55		%

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

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

NPN EPITAXIAL PLANAR TYPE

TEST CIRCUIT



C1: 150pF, 1000pF in parallel

C2: 150pF, 1000pF, 4.7μF in parallel

NOTES: All coils are made from 1.5mmφ silver plated copper wire

Coil Dimensions in milli-meter

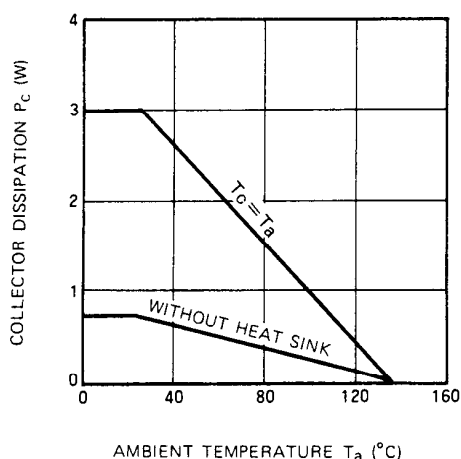
D: Inner diameter of coil

T: Turn number of coil

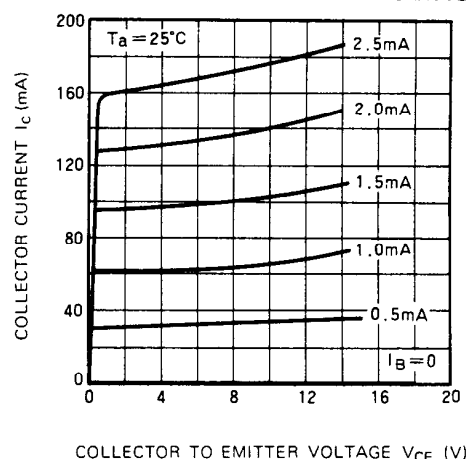
P: Pitch of coil

TYPICAL PERFORMANCE DATA

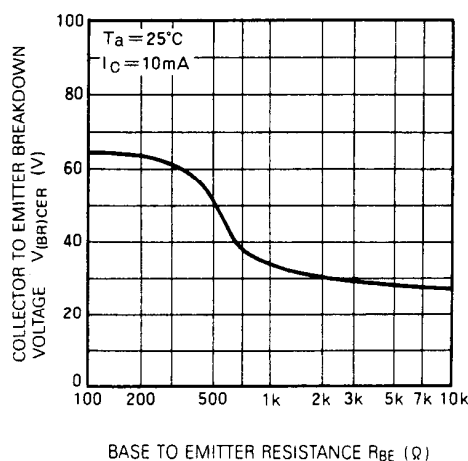
COLLECTOR DISSIPATION VS. AMBIENT TEMPERATURE



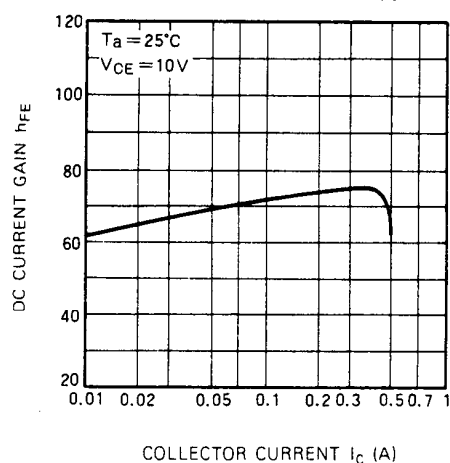
COLLECTOR CURRENT VS. COLLECTOR TO EMITTER VOLTAGE



COLLECTOR TO EMITTER BREAKDOWN VOLTAGE VS. BASE TO EMITTER RESISTANCE

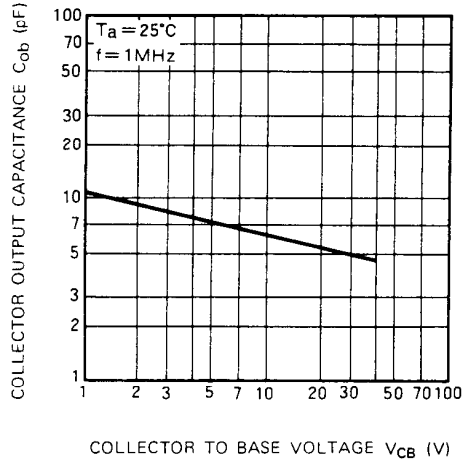


DC CURRENT GAIN VS. COLLECTOR CURRENT

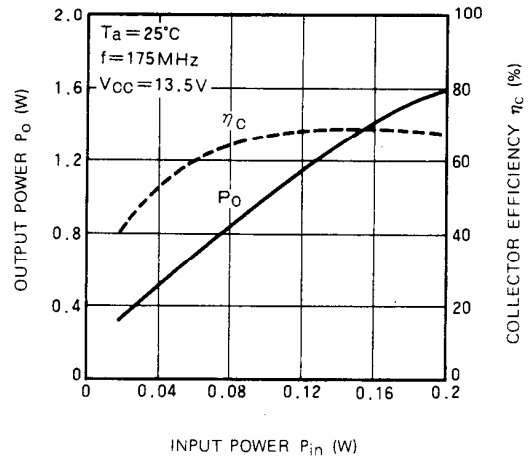


NPN EPITAXIAL PLANAR TYPE

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



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



**OUTPUT POWER VS. COLLECTOR
SUPPLY VOLTAGE**

