

**DESCRIPTION**

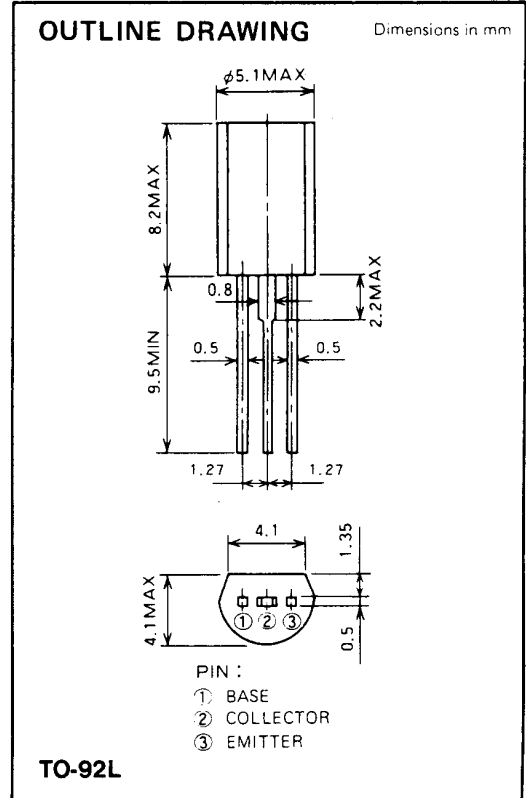
2SC2538 is a silicon NPN epitaxial planar type transistor designed for RF amplifiers on VHF band mobile radio applications.

**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.



**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.

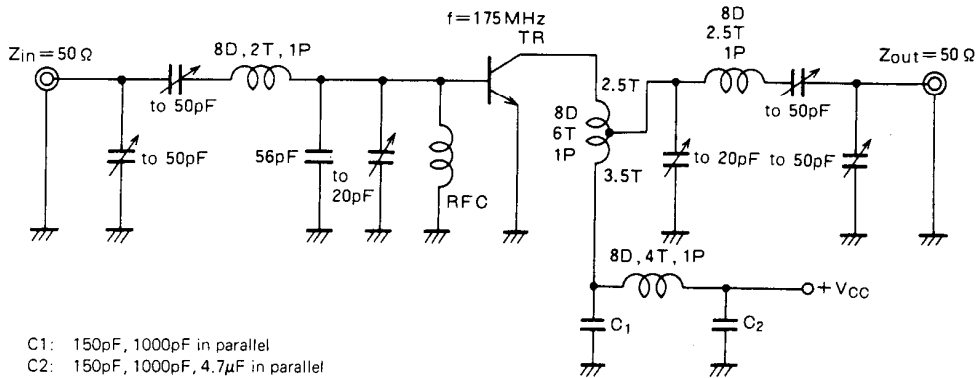
**ELECTRICAL CHARACTERISTICS** ( $T_C = 25^\circ\text{C}$  unless otherwise specified)

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	$I_C = 10\text{mA}$ , $R_{RE} = \infty$	17			V
$I_{CBO}$	Collector cutoff current	$V_{CB} = 15\text{V}$ , $I_E = 0$			100	$\mu\text{A}$
$I_{EBO}$	Emitter cutoff current	$V_{EB} = 3\text{V}$ , $I_C = 0$			200	$\mu\text{A}$
$h_{FE}$	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
$\eta_C$	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.

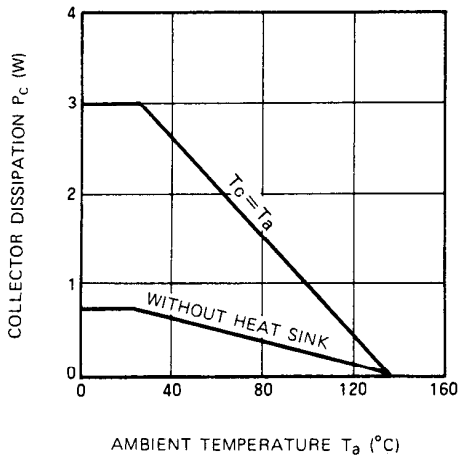
**TEST CIRCUIT**



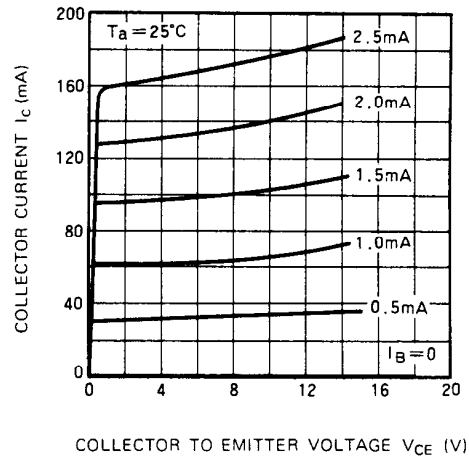
C1: 150pF, 1000pF in parallel  
 C2: 150pF, 1000pF, 4.7μF in parallel  
 NOTES: All coils are made from 1.5mmφ silver plated copper wire  
 Coil Dimensions in milli-meter  
 D: Inner diameter of coil  
 T: Turn number of coil  
 P: Pitch of coil

**TYPICAL PERFORMANCE DATA**

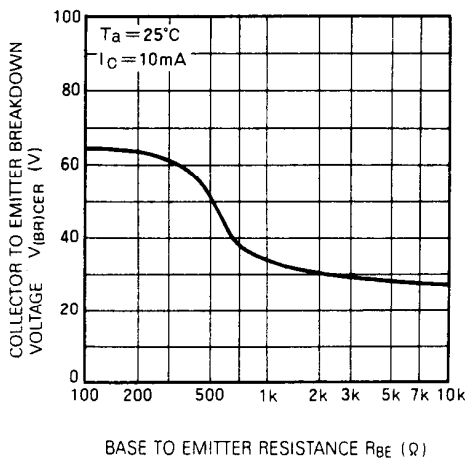
**COLLECTOR DISSIPATION VS. AMBIENT TEMPERATURE**



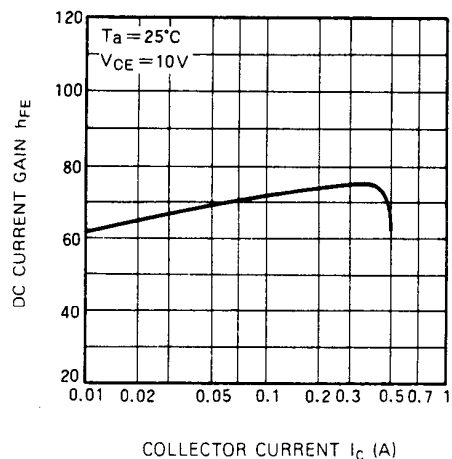
**COLLECTOR CURRENT VS. COLLECTOR TO EMITTER VOLTAGE**



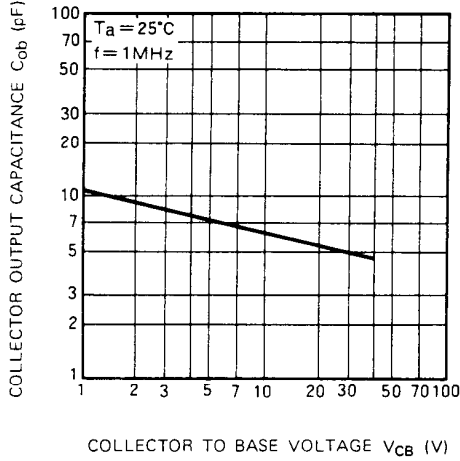
**COLLECTOR TO EMITTER BREAKDOWN VOLTAGE VS. BASE TO EMITTER RESISTANCE**



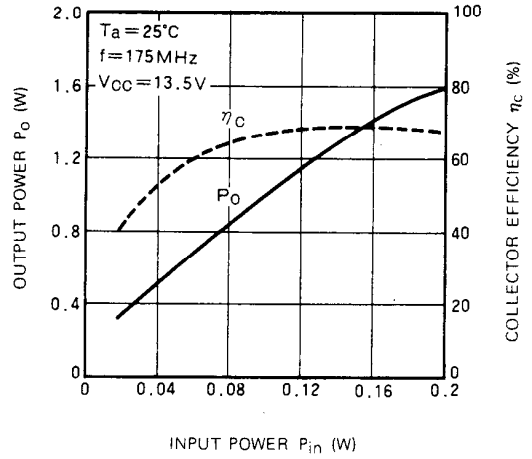
**DC CURRENT GAIN VS. COLLECTOR CURRENT**



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



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



**OUTPUT POWER VS. COLLECTOR SUPPLY VOLTAGE**

