

MITSUBISHI RF POWER TRANSISTOR

2SC1947

NPN EPITAXIAL PLANAR TYPE

DESCRIPTION

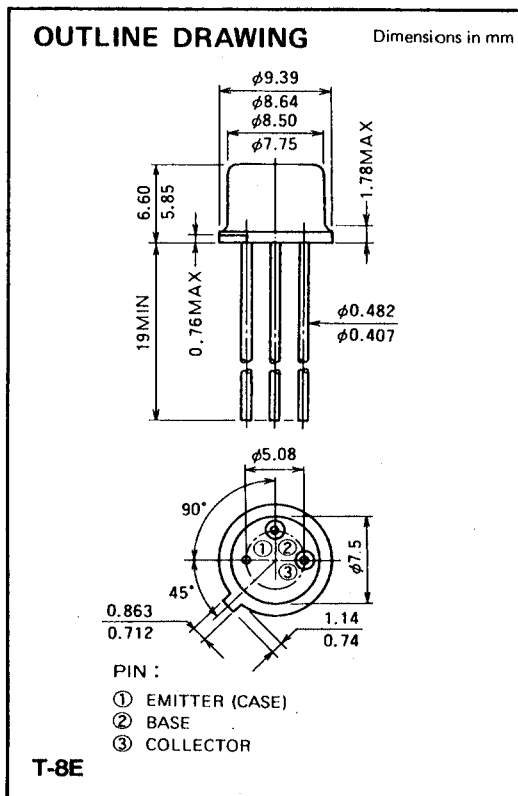
2SC1947 is a silicon NPN epitaxial planar type transistor designed for industrial use RF power amplifiers on VHF band mobile radio applications.

FEATURES

- High power gain: $G_{pe} \geq 10.7\text{dB}$
@ $V_{CC} = 13.5\text{V}$, $P_O = 3.5\text{W}$, $f = 175\text{MHz}$
- TO-39 metal sealed package for high reliability.
- Emitter electrode is connected electrically to the case.
- Equivalent input/output series impedance:
 $Z_{in} = 4 + j7.5\Omega$ @ $P_O = 3.5\text{W}$, $V_{CC} = 13.5\text{V}$, $f = 175\text{MHz}$
 $Z_{out} = 8 - j4\Omega$

APPLICATION

1 to 3 watt power amplifiers in VHF band mobile radio applications.



ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CB0}	Collector to base voltage		35	V
V_{EB0}	Emitter to base voltage		4	V
V_{CE0}	Collector to emitter voltage	$R_{BE} = \infty$	17	V
I_C	Collector current		1	A
P_C	Collector dissipation	$T_a = 25^\circ\text{C}$	1	W
		$T_C = 25^\circ\text{C}$	10	W
T_j	Junction temperature		175	$^\circ\text{C}$
T_{stg}	Storage temperature		-65 to 175	$^\circ\text{C}$
R_{th-a}	Thermal resistance	Junction to ambient	150	$^\circ\text{C}/\text{W}$
R_{th-c}		Junction to case	15	$^\circ\text{C}/\text{W}$

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	$I_E = 5\text{mA}$, $I_C = 0$	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	$V_{CB} = 25\text{V}$, $I_E = 0$			500	μA
I_{EBO}	Emitter cutoff current	$V_{EB} = 3\text{V}$, $I_C = 0$			500	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 **	$V_{CC} = 13.5\text{V}$, $P_{in} = 0.3\text{W}$, $f = 175\text{MHz}$	3.5	4		W
η_C	Collector efficiency		50	60		%

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

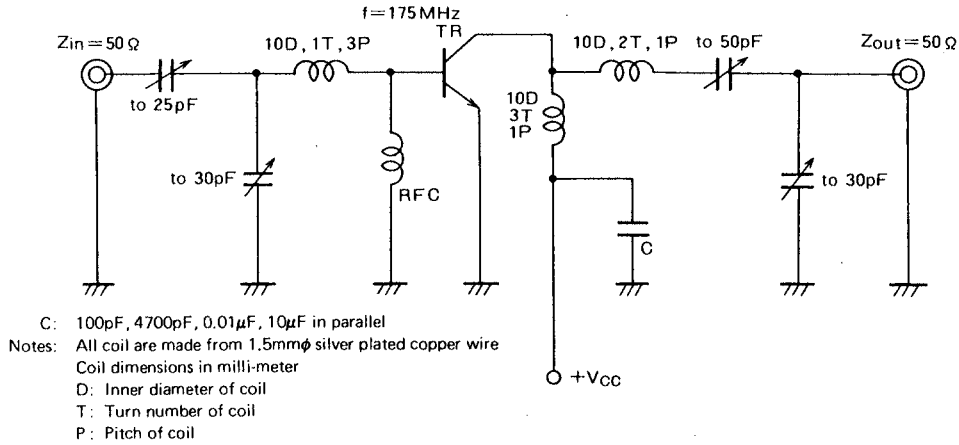
** In case of the case grounded.

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

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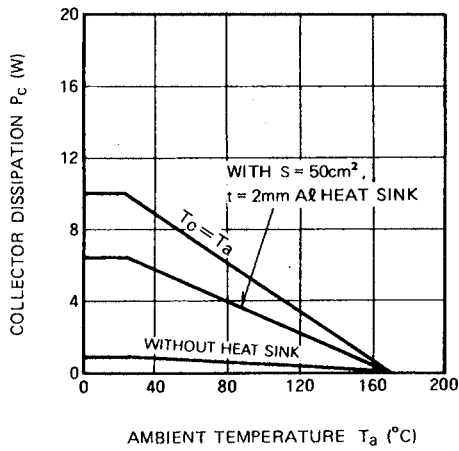
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TEST CIRCUIT

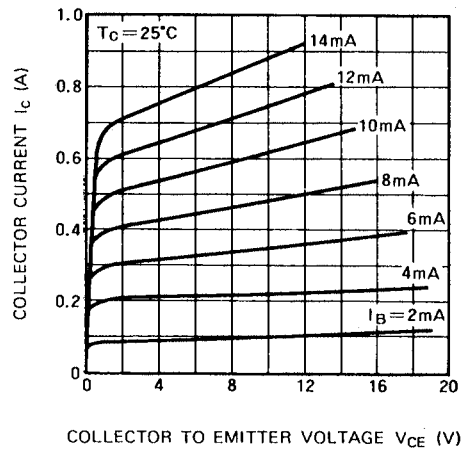


TYPICAL PERFORMANCE DATA

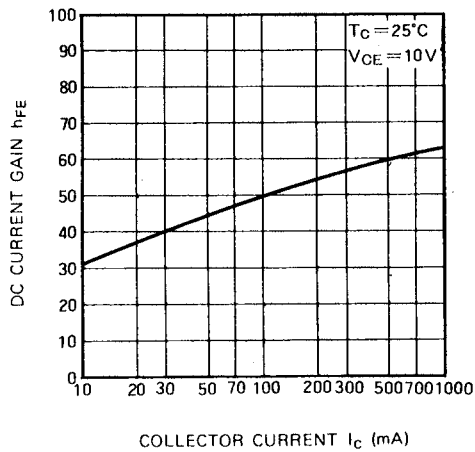
COLLECTOR DISSIPATION VS. AMBIENT TEMPERATURE



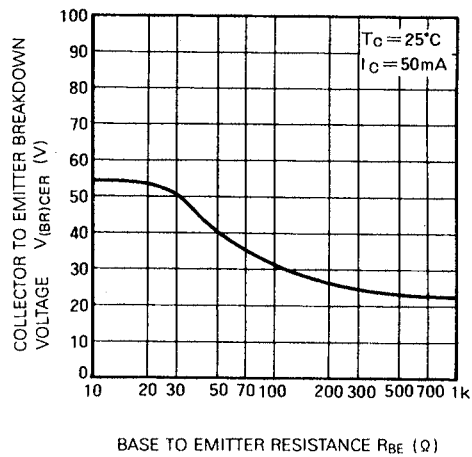
COLLECTOR CURRENT VS. COLLECTOR TO EMITTER VOLTAGE



DC CURRENT GAIN VS. COLLECTOR CURRENT



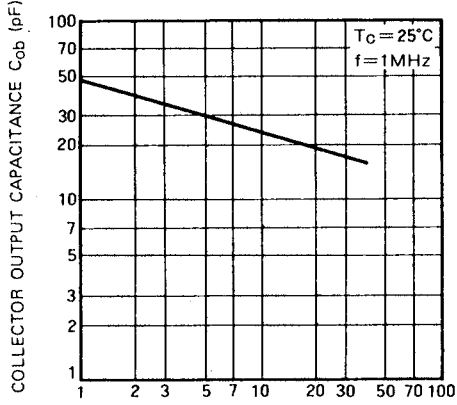
COLLECTOR TO EMITTER BREAKDOWN VOLTAGE VS. BASE TO EMITTER RESISTANCE



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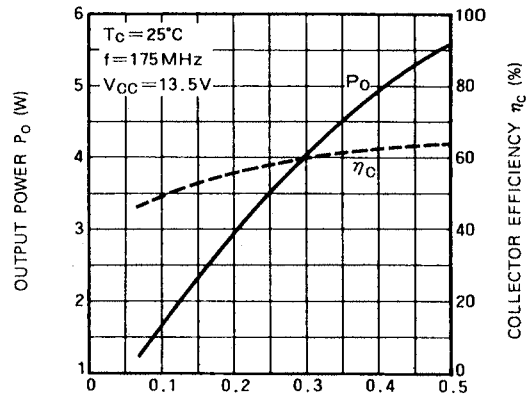
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COLLECTOR OUTPUT CAPACITANCE VS. COLLECTOR TO BASE VOLTAGE



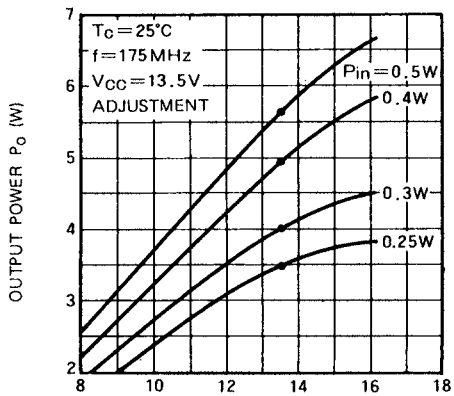
COLLECTOR TO BASE VOLTAGE V_{CB} (V)

OUTPUT POWER, COLLECTOR EFFICIENCY VS. INPUT POWER



INPUT POWER P_{in} (W)

OUTPUT POWER VS. COLLECTOR SUPPLY VOLTAGE



COLLECTOR SUPPLY VOLTAGE V_{CC} (V)