

# MITSUBISHI RF POWER TRANSISTOR 2SC2904

## NPN EPITAXIAL PLANAR TYPE

### DISCRIPTION

2SC2904 is a silicon NPN epitaxial planar type transistor specifically designed for high power amplifiers in HF band.

### FEATURES

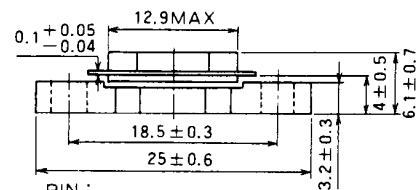
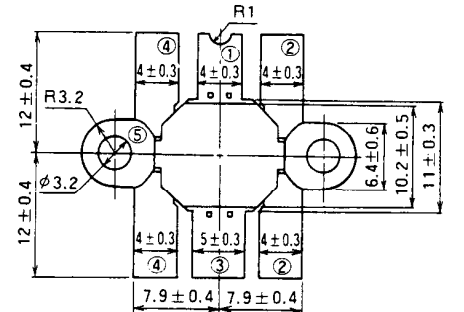
- High gain:  $G_{pe} \geq 11.5\text{dB}$   
@  $V_{CC} = 12.5\text{V}$ ,  $P_o = 100\text{W}$ ,  $f = 30\text{MHz}$
- High ruggedness: Ability to withstand 20:1 load VSWR when operated at  $f = 30\text{MHz}$   
 $P_o = 100\text{W}$ ,  $V_{CC} = 15.2\text{V}$
- Emitter ballansted construction
- Low thermal resistance ceramic package with flange.

### APPLICATION

Output stage of transmitter in HF band SSB mobile radio sets.

### OUTLINE DRAWING

Dimensions in mm



PIN :

- ① COLLECTOR
- ② EMITTER
- ③ BASE
- ④ EMITTER
- ⑤ FIN

NOTE: ALL ELECTRODES ARE ISOLATED FROM FLANGE.

T-40

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

Symbol	Parameter	Conditions	Ratings	Unit
$V_{CBO}$	Collector to base voltage		50	V
$V_{EBO}$	Emitter to base voltage		5	V
$V_{CEO}$	Collector to emitter voltage	$R_{BE} = \infty$	20	V
$I_C$	Collector current		22	A
$P_C$	Collector dissipation	$T_a = 25^\circ\text{C}$	7.8	W
		$T_C = 25^\circ\text{C}$	200	W
$T_j$	Junction temperature		175	$^\circ\text{C}$
$T_{stg}$	Storage temperature		-55 to 175	$^\circ\text{C}$
$R_{th-c}$	Thermal resistance		0.75	$^\circ\text{C/W}$

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	$I_E = 20\text{mA}$ , $I_C = 0$	5			V
$V_{(BR)CBO}$	Collector to base breakdown voltage	$I_C = 20\text{mA}$ , $I_E = 0$	50			V
$V_{(BR)CEO}$	Collector to emitter breakdown voltage	$I_C = 100\text{mA}$ , $R_{BE} = \infty$	20			V
$I_{CBO}$	Collector cutoff current	$V_{CB} = 15\text{V}$ , $I_E = 0$			5	mA
$I_{EBO}$	Emitter cutoff current	$V_{EB} = 3\text{V}$ , $I_C = 0$			5	mA
$h_{FE}$	DC forward current gain *	$V_{CE} = 10\text{V}$ , $I_C = 1\text{A}$	10	50	180	—
$P_O$	Output power	$f = 30\text{MHz}$ , $V_{CC} = 12.5\text{V}$ , $P_{in} = 7\text{W}$	100	110		W
$\eta_C$	Collector efficiency		55	60		%

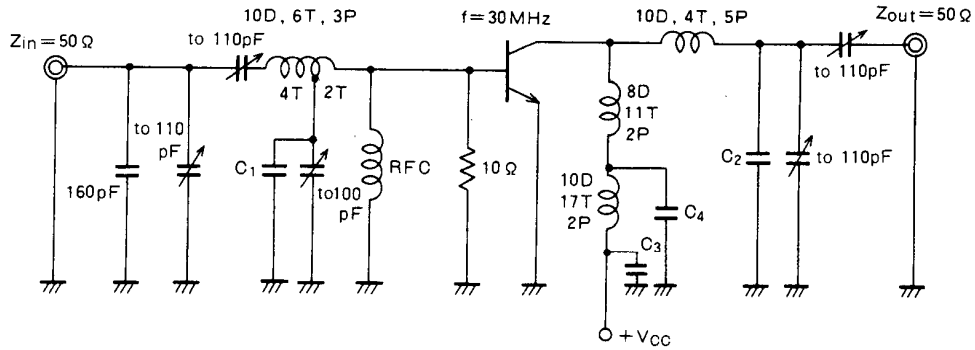
Note. \* Pulse test,  $P_W = 150\mu\text{s}$ , duty = 5%.

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

NOV. '97

**NPN EPITAXIAL PLANAR TYPE**

**TEST CIRCUIT**



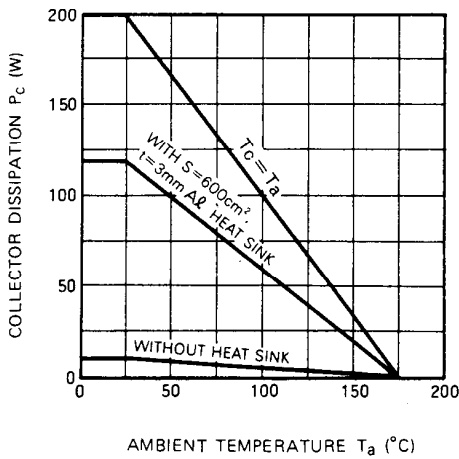
- C<sub>1</sub>: 160pF, 160pF, 82pF in parallel
- C<sub>2</sub>: 82pF, 82pF, 82pF in parallel
- C<sub>3</sub>: 100pF, 4700pF, 4700pF, 0.22μF, 0.22μF, 33μF, 330μF in parallel
- C<sub>4</sub>: 100pF, 220pF, 4700pF, 0.1μF, 330μF in parallel

NOTES: All coils but L<sub>1</sub> are made from 1.5mm silver plated copper wire, L<sub>1</sub> is made from 2.3mm copper wire.

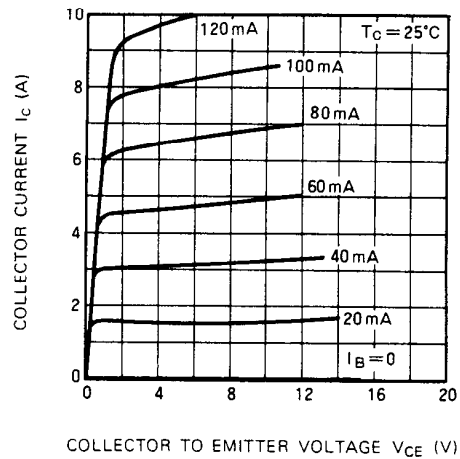
D: Inner diameter of coil      P: Pitch of coil  
T: Turn number of coil      Dimension is milli-meter

**TYPICAL PERFORMANCE DATE**

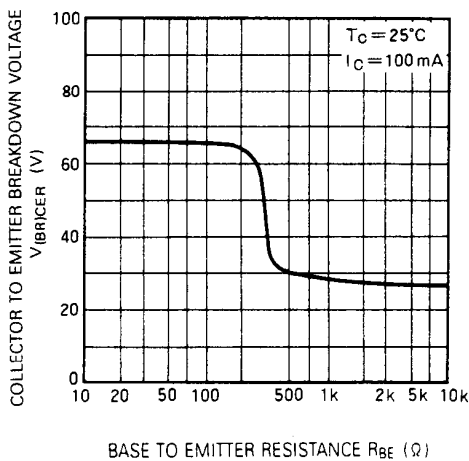
**COLLECTOR DISSIPATION VS. AMBIENT TEMPERATURE**



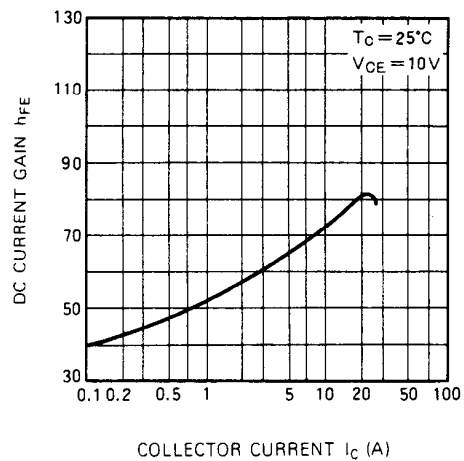
**COLLECTOR CURRENT VS. COLLECTOR TO EMITTER VOLTAGE**



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



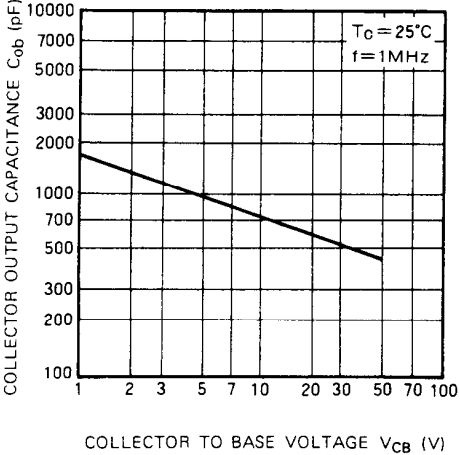
**DC CURRENT GAIN VS. COLLECTOR CURRENT**



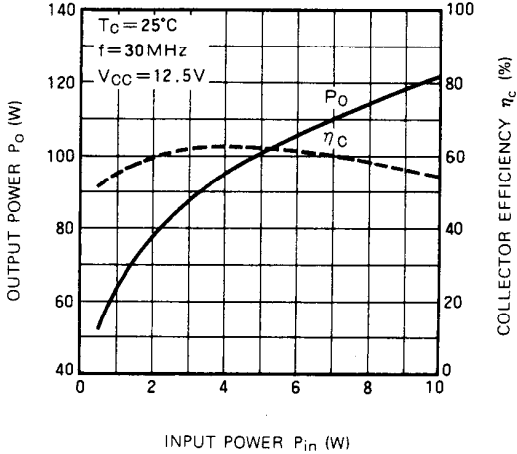
MITSUBISHI RF POWER TRANSISTOR  
**2SC2904**

**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**

