

# MITSUBISHI RF POWER TRANSISTOR 2SC2694

## NPN EPITAXIAL PLANAR TYPE

### DESCRIPTION

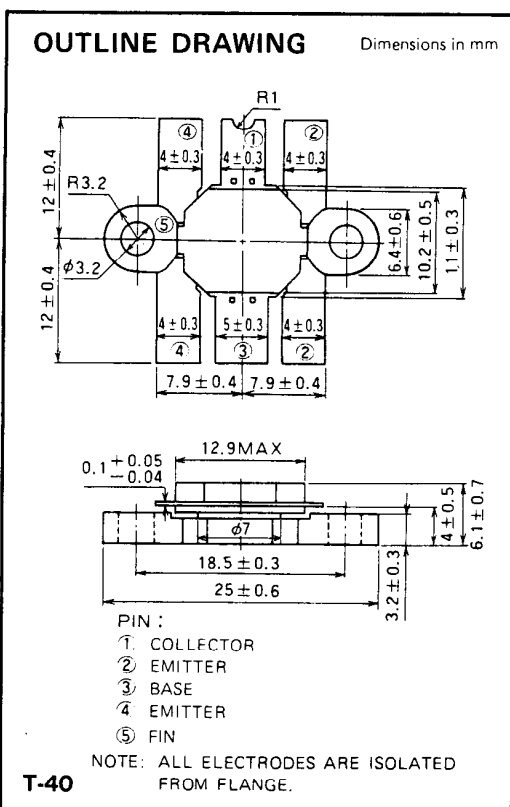
2SC2694 is a silicon NPN epitaxial planar type transistor designed for RF power amplifiers in VHF band mobile radio applications.

### FEATURES

- High power gain:  $G_{pe} \geq 6.7\text{dB}$   
@  $V_{CC} = 12.5\text{V}$ ,  $P_O = 70\text{W}$ ,  $f = 175\text{MHz}$
- 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  $V_{CC} = 15.2\text{V}$ ,  $P_O = 70\text{W}$ ,  $f = 175\text{MHz}$ ,  $T_C = 25^\circ\text{C}$ .
- Equivalent input/output series impedance:  
 $Z_{in} = 0.7 + j0.9\Omega$  @  $P_O = 70\text{W}$ ,  $V_{CC} = 12.5\text{V}$ ,  $f = 175\text{MHz}$   
 $Z_{out} = 1.2 - j0.3\Omega$

### APPLICATION

50 to 60 watts output 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
$V_{CBO}$	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		20	A
$P_C$	Collector dissipation	$T_a = 25^\circ\text{C}$	5.5	W
		$T_C = 25^\circ\text{C}$	140	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	27.2	$^\circ\text{C/W}$
$R_{th-c}$		Junction to case	1.07	$^\circ\text{C/W}$

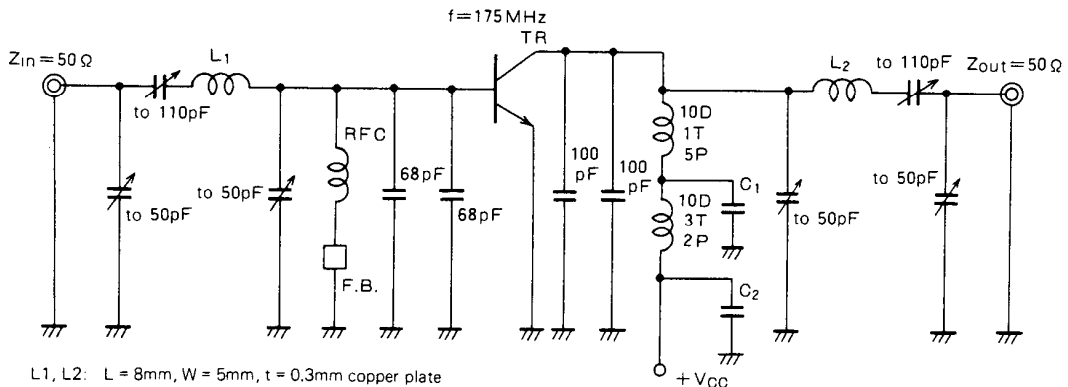
Note. Above parameters are guaranteed independently.

### 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	$I_E = 20\text{mA}$ , $I_C = 0$	4			V
$V_{(BR)CBO}$	Collector to base breakdown voltage	$I_C = 20\text{mA}$ , $I_E = 0$	35			V
$V_{(BR)CEO}$	Collector to emitter breakdown voltage	$I_C = 0.1\text{A}$ , $R_{BE} = \infty$	17			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	$V_{CC} = 12.5\text{V}$ , $P_{in} = 15\text{W}$ , $f = 175\text{MHz}$	70	75		W
$\eta_C$	Collector efficiency		60	70		%

Note. \* Pulse test.  $P_W = 150\mu\text{s}$ , duty=5%  
 Above parameters, ratings, limits and conditions are subject to change.

**TEST CIRCUIT**

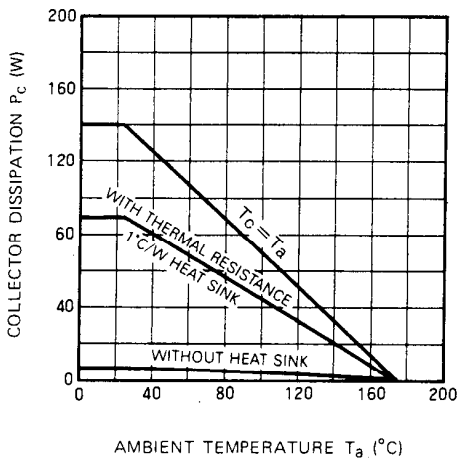


L1, L2: L = 8mm, W = 5mm, t = 0.3mm copper plate  
C1, C2: 150pF, 1000pF, 4.7μF in parallel  
F.B.: Ferrite Bead

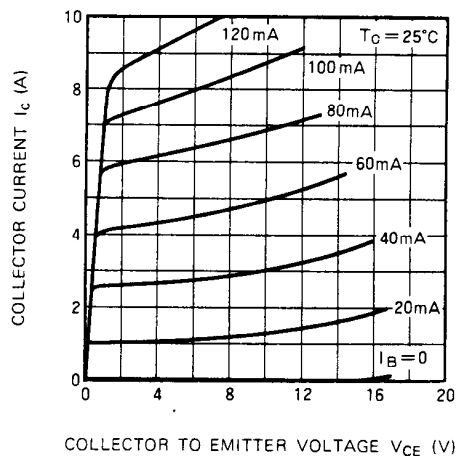
NOTES: All coils are made from 1.5mmφ silver plated copper wire  
D: Inner diameter of coil  
T: Turn number of coil  
P: Pitch of coil  
Dimension in milli-meter

**TYPICAL PERFORMANCE DATA**

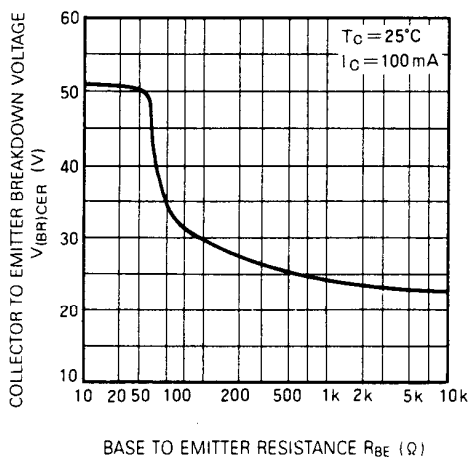
**COLLECTOR DISSIPATION VS. AMBIENT TEMPERATURE**



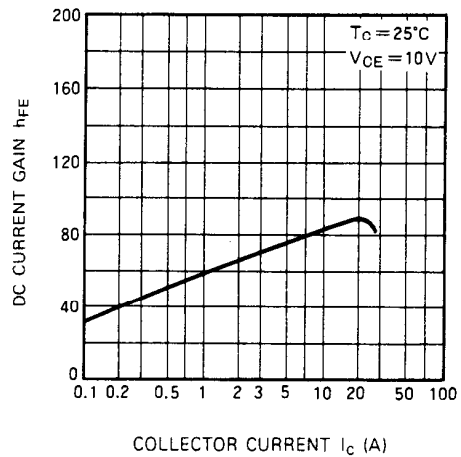
**COLLECTOR CURRENT VS. COLLECTOR TO EMITTER VOLTAGE**



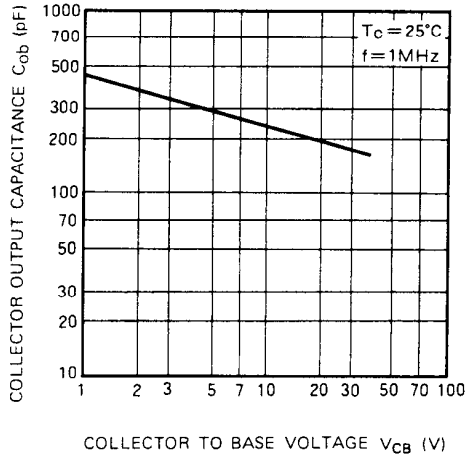
**COLLECTOR TO EMITTER BREAKDOWN VOLTAGE VS. BASE TO EMITTER RESISTANCE**



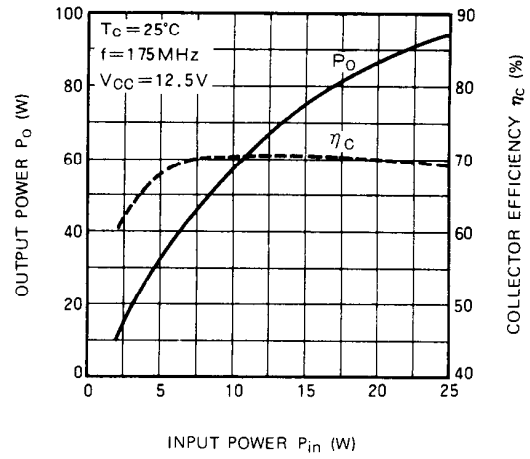
**DC CURRENT GAIN VS. COLLECTOR CURRENT**



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



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



**OUTPUT POWER VS. COLLECTOR SUPPLY VOLTAGE**

