

# MITSUBISHI RF POWER TRANSISTOR 2SC3102

## NPN EPITAXIAL PLANAR TYPE

### DESCRIPTION

2SC3102 is a silicon NPN epitaxial planar type transistor specifically designed for high power amplifiers applications in UHF band.

### FEATURES

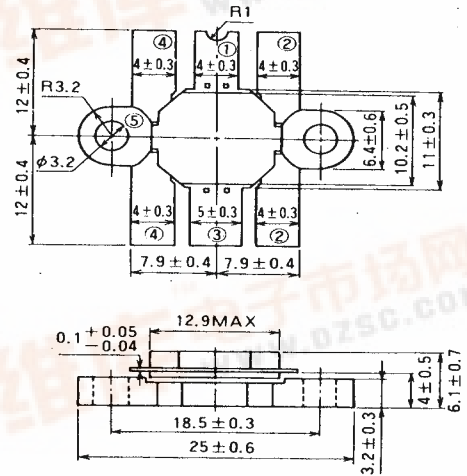
- High power output and high gain:  $P_O \geq 60W$ ,  $G_{pe} \geq 4.8dB$   
@  $V_{CC} = 12.5V$ ,  $f = 520MHz$ ,  $P_{in} = 20W$ .
- Emitter ballasted construction.
- High ruggedness: Ability to withstand more than 20:1 load VSWR when operated at  $V_{CC} = 15.2V$ ,  $P_O = 60W$ ,  $f = 520MHz$ .
- High reliability due to gold metalization die
- Flange type ceramic package
- $Z_{in} = 1.0 + j1.0\Omega$ ,  $Z_{out} = 1.1 + j1.0\Omega$   
@  $V_{CC} = 12.5V$ ,  $f = 520MHz$ ,  $P_O = 60W$ .

### APPLICATION

For output stage of 50W power amplifiers in UHF band.

### OUTLINE DRAWING

Dimensions in mm



PIN :

- ① COLLECTOR
- ② EMITTER (FLANGE)
- ③ BASE
- ④ EMITTER (FLANGE)
- ⑤ FIN (EMITTER)

T-40E

### ABSOLUTE MAXIMUM RATINGS ( $T_C = 25^\circ C$ )

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		18	A
$P_C$	Collector dissipation	$T_C = 25^\circ C$	170	W
$T_j$	Junction temperature		175	$^\circ C$
$T_{stg}$	Storage temperature		-55 to 175	$^\circ C$

Note. Above parameters are guaranteed independently.

### ELECTRICAL CHARACTERISTICS ( $T_C = 25^\circ C$ )

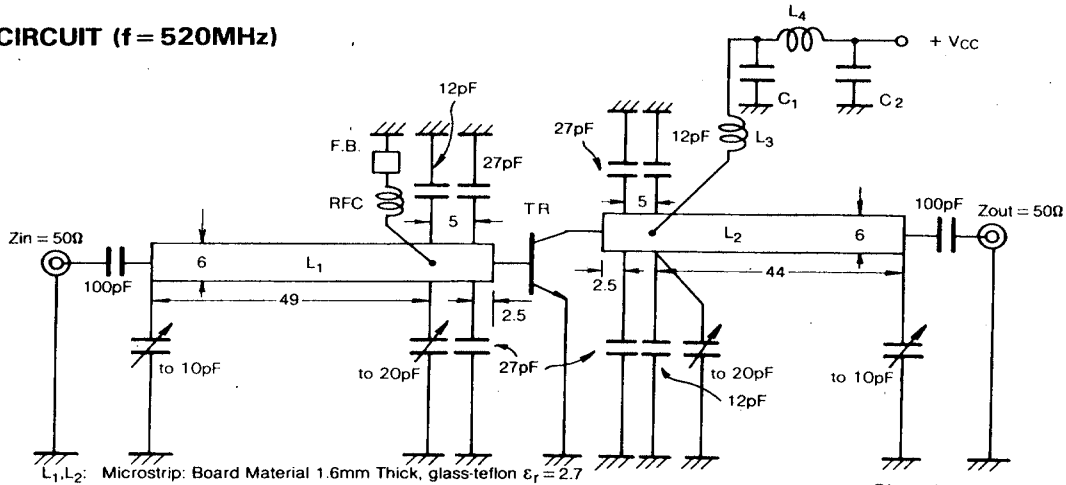
Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
$V_{(BR)EBO}$	Emitter to base breakdown voltage	$I_E = 20mA$ , $I_C = 0$	4			V
$V_{(BR)CBO}$	Collector to base breakdown voltage	$I_C = 20mA$ , $I_E = 0$	35			V
$V_{(BR)CEO}$	Collector to emitter breakdown voltage	$I_C = 0.2A$ , $R_{BE} = \infty$	17			V
$I_{CBO}$	Collector cut off current	$V_{CB} = 15V$ , $I_E = 0$			5	mA
$I_{EBO}$	Emitter cut off current	$V_{EB} = 3V$ , $I_C = 0$			5	mA
$h_{FE}$	DC forward current gain *	$V_{CE} = 10V$ , $I_C = 2A$	10	50	180	-
$P_O$	Power Output	$V_{CC} = 12.5V$ , $P_{in} = 20W$ , $f = 520MHz$	60	65		W
$\eta_C$	Collector efficiency		60	65		%

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

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**2SC3102**

**NPN EPITAXIAL PLANAR TYPE**

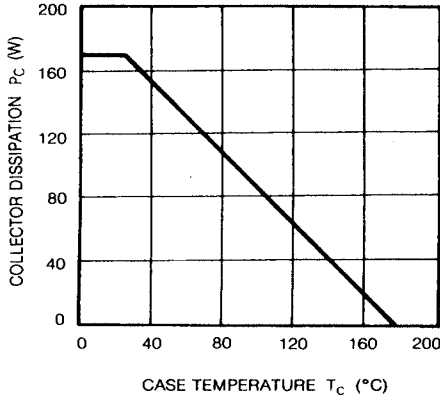
**TEST CIRCUIT (f = 520MHz)**



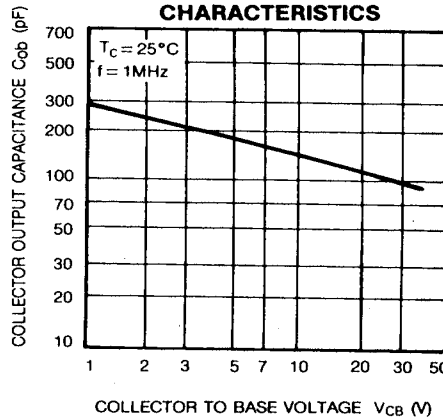
- L<sub>1</sub>, L<sub>2</sub>: Microstrip: Board Material 1.6mm Thick, glass-terflon  $\epsilon_r = 2.7$
  - L<sub>3</sub>: 1 Turn, AWG #13, 8mm I.D.
  - L<sub>4</sub>: 4 Turns, AWG #13, 8mm I.D.
  - RFC: 8 Turns, AWG #20, 4mm I.D.
  - F.B.: Ferrite Bead
  - C<sub>1</sub>: 82pF, 220pF, 2200pF, 4700pF, 33 $\mu$ F in Parallel
  - C<sub>2</sub>: 82pF, 220pF, 2200pF, 4700pF, 22 $\mu$ F in Parallel
- Dimensions: mm

**TYPICAL PERFORMANCE DATA**

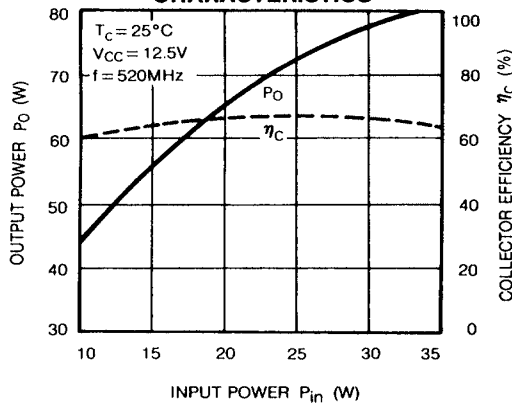
**COLLECTOR DISSIPATION VS. CASE TEMPERATURE CHARACTERISTICS**



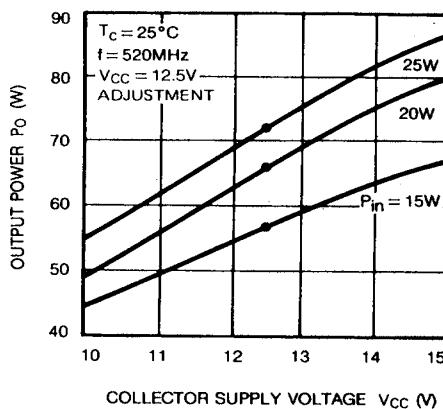
**COLLECTOR OUTPUT CAPACITANCE VS. COLLECTOR TO BASE VOLTAGE CHARACTERISTICS**



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



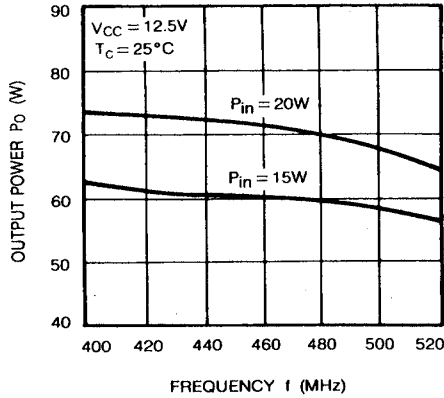
**OUTPUT POWER VS. COLLECTOR SUPPLY VOLTAGE CHARACTERISTICS**



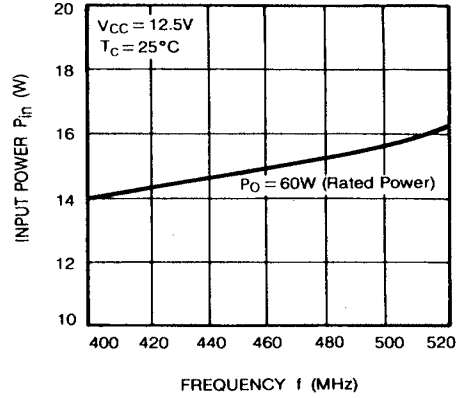
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**NPN EPITAXIAL PLANAR TYPE**

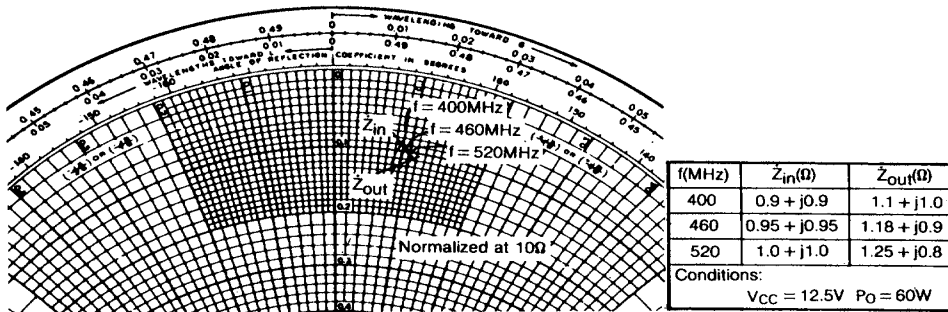
**OUTPUT POWER VS. FREQUENCY CHARACTERISTICS**



**INPUT POWER VS. FREQUENCY CHARACTERISTICS @ RATED POWER**



**SERIES INPUT AND OUTPUT IMPEDANCE VS. FREQUENCY CHARACTERISTICS, 2SC3102**



**TEST CIRCUIT BOARD LAYOUT (f = 520MHz)**

