MITSUBISHI RF POWER TRANSISTOR

2SC3021

NPN EPITAXIAL PLANAR TYPE

DESCRIPTION

2SC3021 is a silicon NPN epitaxial planar type transistor specifically designed for UHF power amplifiers applications.

FEATURES

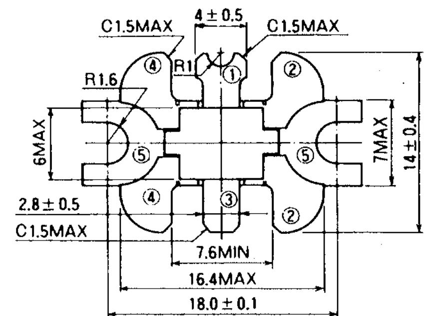
- High power gain: $G_{pe} \geqq 7.6dB$ @V_{CC} = 12.5V, f = 520MHz, P_{in} = 1.2W.
- Emitter ballasted construction.
- High ruggedness: Ability to withstand more than 20:1 load VSWR when operated at V_{CC} = 15.2V, f = 520MHz, P_O = 7W.
- Flange type ceramic package.
- $Z_{in} = 2.2 + j3.1\Omega$, $Z_{out} = 6 + j1.0\Omega$ @V_{CC} = 12.5V, f = 520MHz, P_O = 7W.

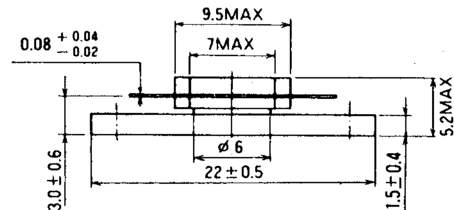
APPLICATION

For output stage of 5W power amplifiers and drive stage of higher 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-31E

ABSOLUTE MAXIMUM RATINGS (T_c = 25°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		2	A
P_C	Collector dissipation	T_c = 25°C	20	W
T_j	Junction temperature		175	°C
Tstg	Storage temperature		−55 to 175	°C

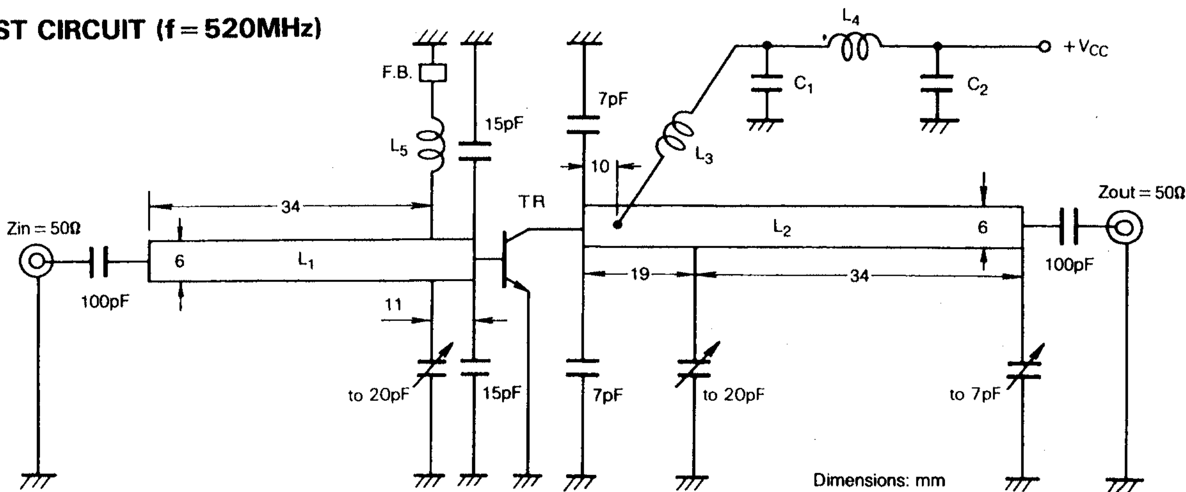
Note. Above parameters are guaranteed independently.

ELECTRICAL CHARACTERISTICS (T_c = 25°C)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
$V_{(BR)EBO}$	Emitter to base breakdown voltage	I_E = 5mA, I_C = 0	4			V
$V_{(BR)CBO}$	Collector to base breakdown voltage	I_C = 10mA, I_E = 0	35			V
$V_{(BR)CEO}$	Collector to emitter breakdown voltage	I_C = 50mA, $R_{BE} = \infty$	17			V
I_{CBO}	Collector cut off current	V_{CB} = 15V, I_E = 0			500	μA
I_{EBO}	Emitter cut off current	V_{EB} = 3V, I_C = 0			500	μA
h_{FE}	DC forward current gain *	V_{CE} = 10V, I_C = 0.1A	10	50	180	—
P_O	Power Output	V_{CC} = 12.5V, P_{in} = 1.2W, f = 520MHz	7	7.5		W
η_C	Collector efficiency		50	60		%

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

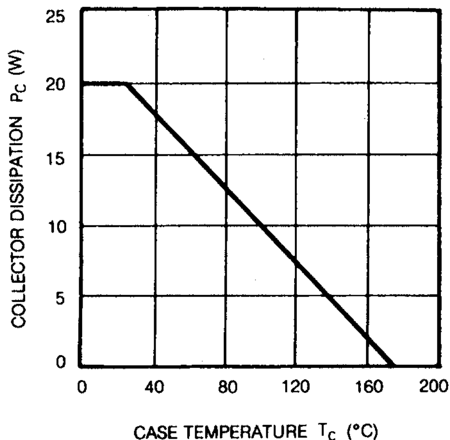
TEST CIRCUIT (f = 520MHz)



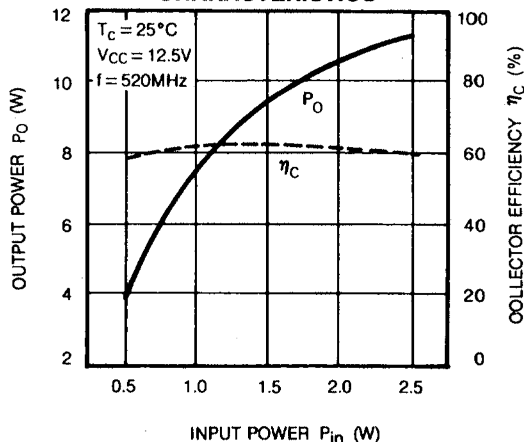
L_1,L_2: Microstrip: Board Material 1.6mm Thick, glass-teflon $\varepsilon_r = 2.7$
L_3: 3 Turns AWG #20, 5mm I.D.
L_4: 6 Turns AWG #20, 5mm I.D.
L_5: 10 Turns AWG #26 Enameled Wire on 4mm O.D., 14mm Length Bakelite.
F.B.: Ferrite Bead
C_1: 82pF, 220pF, 4700pF, 10μF in parallel
C_2: 82pF, 220pF, 10μF in parallel

TYPICAL PERFORMANCE DATA

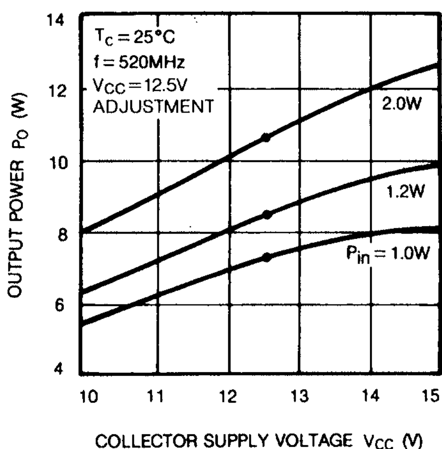
COLLECTOR DISSIPATION VS. CASE TEMPERATURE CHARACTERISTICS



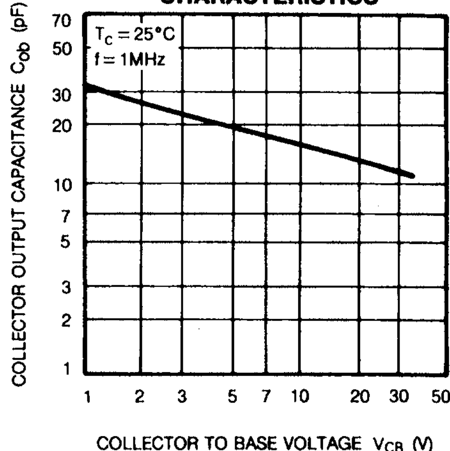
OUTPUT POWER, COLLECTOR EFFICIENCY VS. INPUT POWER CHARACTERISTICS

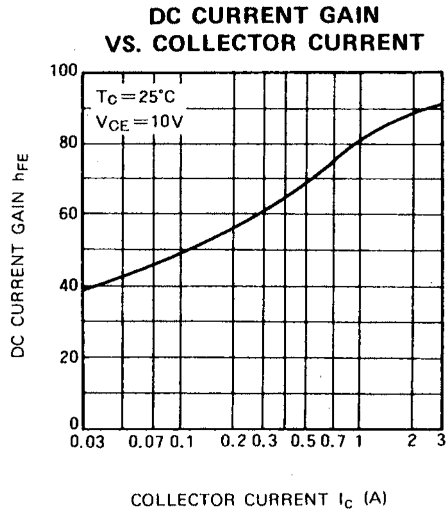


OUTPUT POWER VS. COLLECTOR SUPPLY VOLTAGE CHARACTERISTICS



COLLECTOR OUTPUT CAPACITANCE VS. COLLECTOR TO BASE VOLTAGE CHARACTERISTICS




DC CURRENT GAIN
VS. COLLECTOR CURRENT
Tc=25°C
VCE=10V
DC CURRENT GAIN hFE
100
80
60
40
20
0
0.03
0.07
0.1
0.2
0.3
0.5
0.7
1
2
3
COLLECTOR CURRENT Ic (A)