MITSUBISHI RF POWER TRANSISTOR

2SC3020

NPN EPITAXIAL PLANAR TYPE

DESCRIPTION

2SC3020 is a silicon NPN epitaxial planar type transistor designed for UHF power amplifier applications.

FEATURES

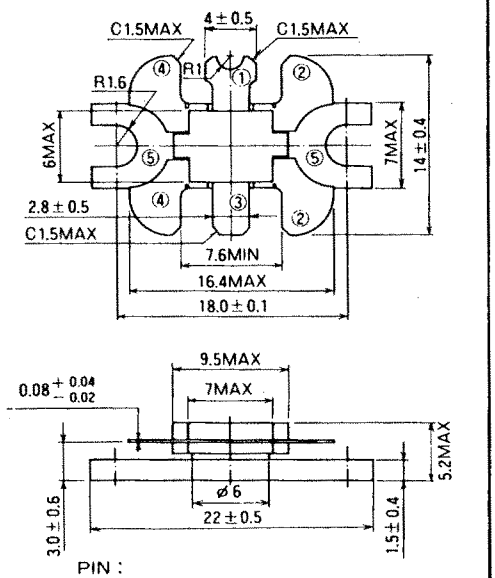
- High gain: $G_{pe} \geqq 10$dB, @f = 520MHz, $V_{CC} = 12.5$V, $P_{in} = 0.3$W.
- High ruggedness: Ability to withstand more than 20:1 load VSWR (all phase) when operated at $V_{CC} = 15.2$V, f = 520MHz, $P_O = 3$W.
- Emitter ballasted construction.
- Low thermal resistance: $R_{th} = 15$ °C/W($T_C = 25$°C)
- Convenient flange type ceramic package.

APPLICATION

For drive stage and output stage of 400MHz band mobile radio.

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		4.0	V
V_{CEO}	Collector to emitter voltage	$R_{BE} = \infty$	17	V
I_C	Collector current		1	A
P_C	Collector dissipation	$T_C = 25$°C	10	W
Tj	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	$I_E = 1$mA, $I_C = 0$	4.0			V
$V_{(BR)CBO}$	Collector to base breakdown voltage	$I_C = 10$mA, $I_E = 0$	35			V
$V_{(BR)CEO}$	Collector to emitter breakdown voltage	$I_C = 10$mA, $R_{BE} = \infty$	17			V
I_{CBO}	Collector cut off current	$V_{CB} = 15$V, $I_E = 0$			300	μA
I_{EBO}	Emitter cut off current	$V_{EB} = 3.0$V, $I_C = 0$			300	μA
h_{FE}	DC forward current gain*	$V_{CE} = 10$V, $I_C = 0.1$A	20	50	180	—
P_O	Power Output	$V_{CC} = 12.5$V, $P_{in} = 0.3$W, f = 520MHz	3.0	3.3		W
η_C	Collector efficiency		50	55		%

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

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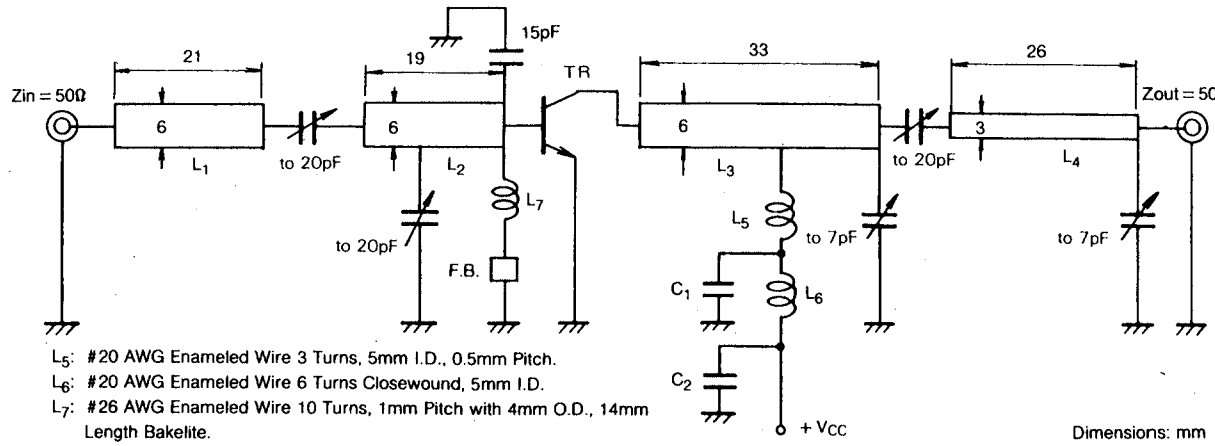
TEST CIRCUIT (f = 520MHz)

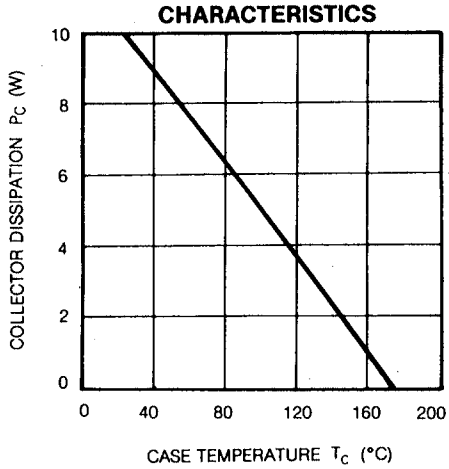


Dimensions: mm

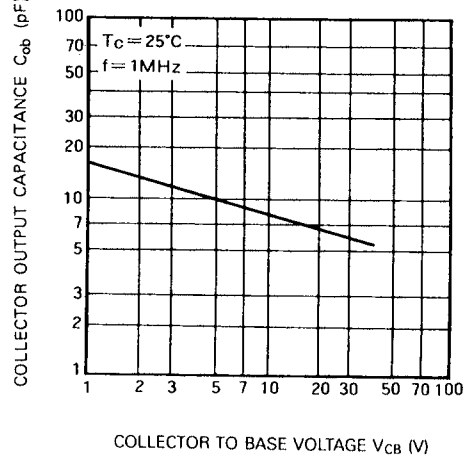
L_5: #20 AWG Enameled Wire 3 Turns, 5mm I.D., 0.5mm Pitch.
L_6: #20 AWG Enameled Wire 6 Turns Closewound, 5mm I.D.
L_7: #26 AWG Enameled Wire 10 Turns, 1mm Pitch with 4mm O.D., 14mm Length Bakelite.
L_1 to L_4: Microstripe (Board: 1.6mm Glass Teflon $\varepsilon_S = 2.7$)
C_1,C_2: 82pF, 220pF, 4700pF, 10μF in parallel.

TYPICAL PERFORMANCE DATA

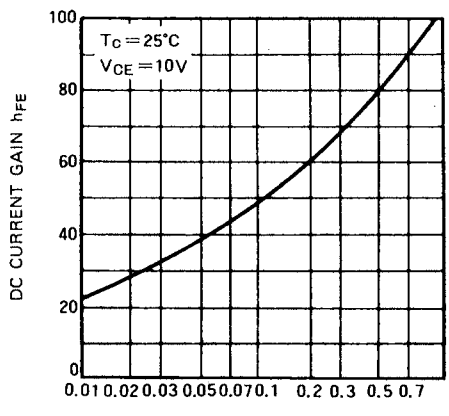
COLLECTOR DISSIPATION VS. CASE TEMPERATURE CHARACTERISTICS



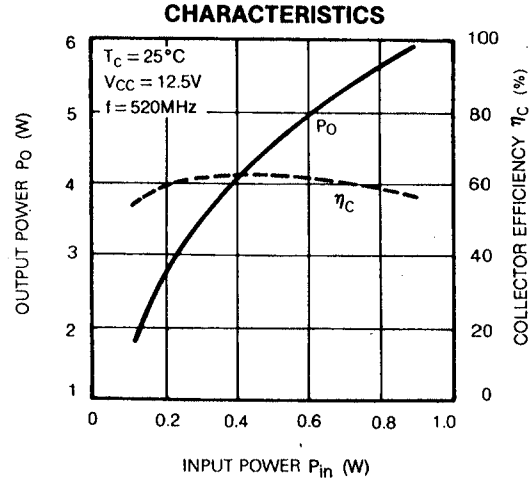
COLLECTOR OUTPUT CAPACITANCE VS. COLLECTOR TO BASE VOLTAGE



DC CURRENT GAIN VS. COLLECTOR CURRENT



OUTPUT POWER, COLLECTOR EFFICIENCY VS. INPUT POWER CHARACTERISTICS



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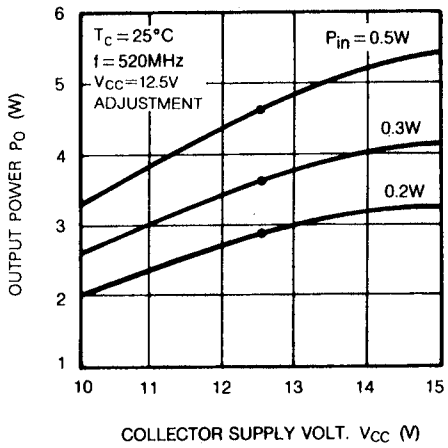
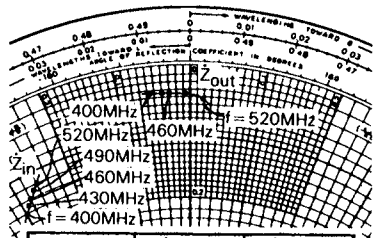
OUTPUT POWER VS. COLLECTOR SUPPLY VOLTAGE CHARACTERISTICS



SERIES INPUT AND OUTPUT IMPEDANCE VS. FREQUENCY CHARACTERISTICS



f (MHz)	$\dot{Z}_{in}(\Omega)$	$\dot{Z}_{out}(\Omega)$
400	1.7−j2.9	8.0−j15
430	1.75−j2.1	7.5−j14.5
460	1.85−j1.35	7.0−j14
490	1.85−j0.3	6.5−j13.5
520	2.1+j0.85	6.0−j13

Conditions:
P_O = 3.0W, T_C = 25°C, V_{CC} = 12.5V