MITSUBISHI RF POWER TRANSISTOR

2SC1969

NPN EPITAXIAL PLANAR TYPE

DESCRIPTION

2SC1969 is a silicon NPN epitaxial planar type transistor designed for RF power amplifiers on HF band mobile radio applications.

FEATURES

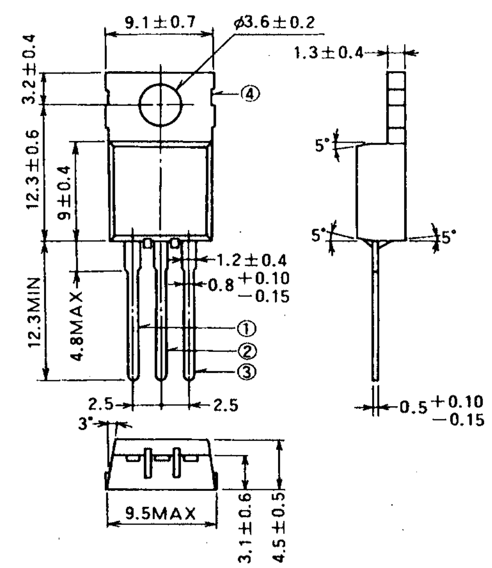
- High power gain: $G_{pe} \geq 12dB$
  $@V_{CC} = 12V, P_O = 16W, f = 27MHz$
- Emitter ballasted construction for high reliaiblity and good performances.
- TO-220 package similarly is combinient for mounting.
- Ability of withstanding infinite load VSWR when operated at $V_{CC} = 16V, P_O = 20W, f = 27MHz$.
- Equivalent input/output series impedance:
  Zin=3.4−j2.4Ω @Po=17W, Vcc=12V, f=27MHz
  Zout=5.5−j5.6Ω

APPLICATION

10 to 14 watts output power class AB amplifiers applications in HF band.

OUTLINE DRAWING

Dimensions in mm



PIN :
① BASE
② COLLECTOR (FIN)
③ EMITTER
④ FIN (COLLECTOR)

T-30

ABSOLUTE MAXIMUM RATINGS (T_C=25°C unless otherwise specified)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CBO}	Collector to base voltage		60	V
V_{EBO}	Emitter to base voltage		5	V
V_{CEO}	Collector to emitter voltage	$R_{BE}=\infty$	25	V
I_C	Collector current		6	A
P_C	Collector dissipation	Ta=25°C	1.7	W
		Tc=25°C	20	W
T_j	Junction temperature		150	°C
Tstg	Storage temperature		−55 to 150	°C
Rth-a	Thermal resistance	Junction to ambient	73.5	°C/W
Rth-c		Junction to case	6.25	°C/W

Note. Above parameters are guaranteed independently.

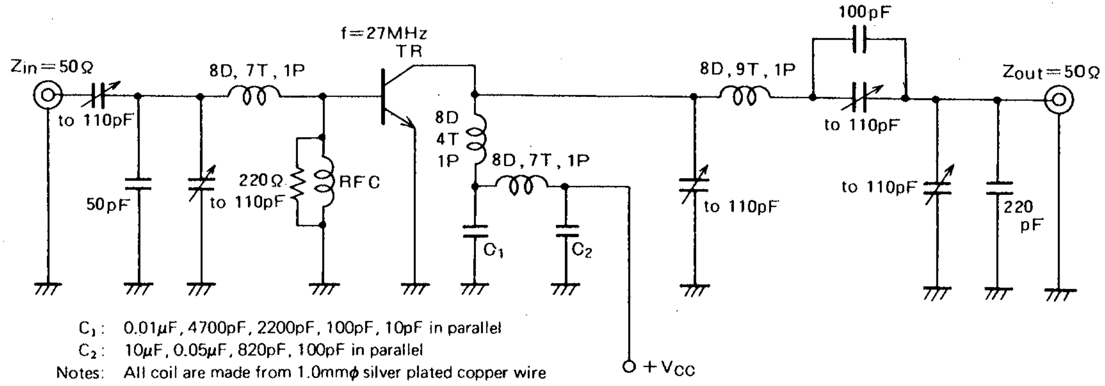
ELECTRICAL CHARACTERISTICS (T_C=25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
$V_{(BR)EBO}$	Emitter to base breakdown voltage	I_E=5mA, I_C=0	5			V
$V_{(BR)CBO}$	Collector to base breakdown voltage	I_C=1mA, I_E=0	60			V
$V_{(BR)CEO}$	Collector to emitter breakdown voltage	I_C=10mA, $R_{BE}=\infty$	25			V
I_{CBO}	Collector cutoff current	V_{CB}=30V, I_E=0			100	μA
I_{EBO}	Emitter cutoff current	V_{EB}=4V, I_C=0			100	μA
h_{FE}	DC forward current gain*	V_{CE}=12V, I_C=10mA	10	50	180	—
P_O	Output power	V_{CC}=12V, Pin=1w, f=27MHz	16	18		W
η_C	Collector efficiency		60	70		%

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

Item	X	A	B	C	D
h_{FE}	10-25	20-45	35-70	55-110	90-180

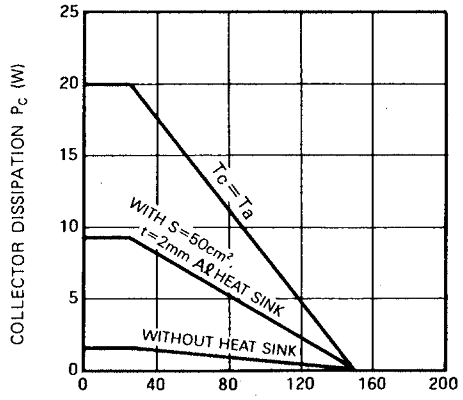
TEST CIRCUIT



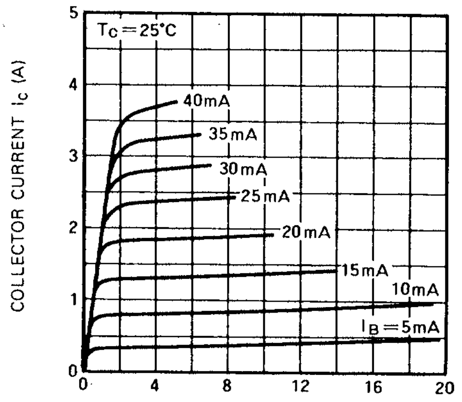
C_1: 0.01μF, 4700pF, 2200pF, 100pF, 10pF in parallel
C_2: 10μF, 0.05μF, 820pF, 100pF in parallel
Notes: All coil are made from 1.0mmϕ silver plated copper wire
Coil dimensions in milli-meter
D: Inner diameter of coil
T: Turn number of coil
P: Pitch of coil

TYPICAL PERFORMANCE DATA

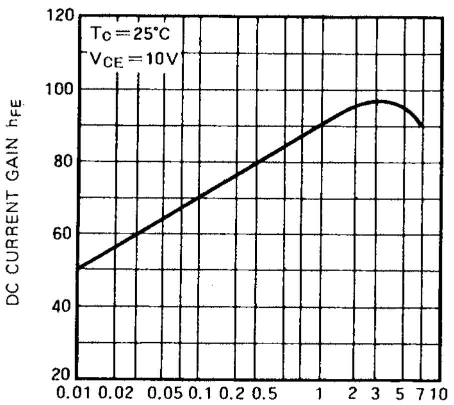
COLLECTOR DISSIPATION VS. AMBIENT TEMPERATURE



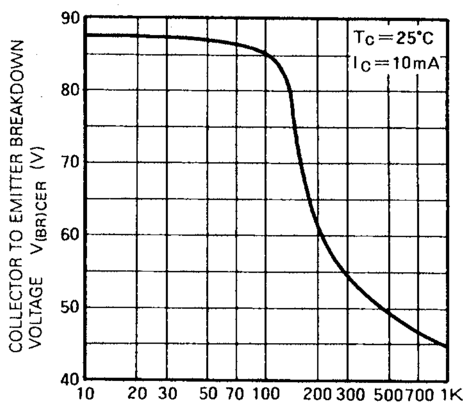
COLLECTOR CURRENT VS. COLLECTOR TO EMITTER VOLTAGE



DC CURRENT GAIN VS. COLLECTOR CURRENT

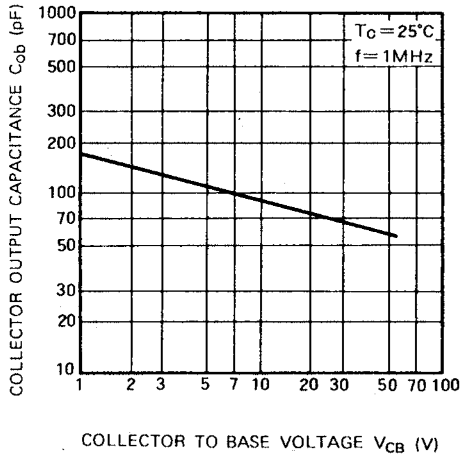


COLLECTOR TO EMITTER BREAKDOWN VOLTAGE VS. BASE TO EMITTER RESISTANCE

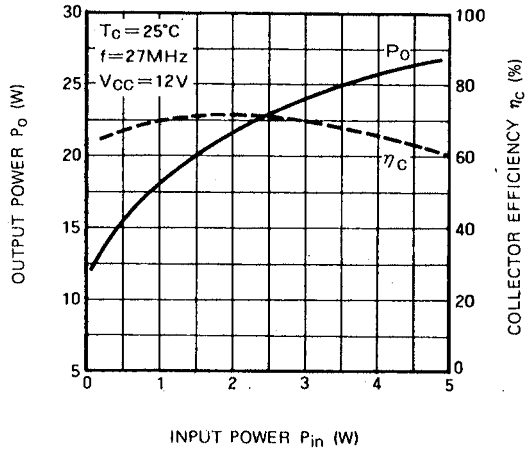


NPN EPITAXIAL PLANAR TYPE

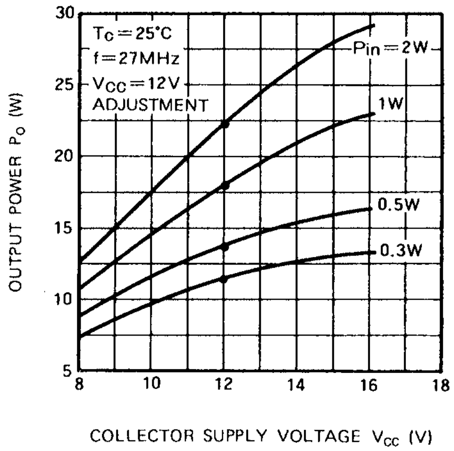
COLLECTOR OUTPUT CAPACITANCE VS. COLLECTOR TO BASE VOLTAGE CHARACTERISTICS



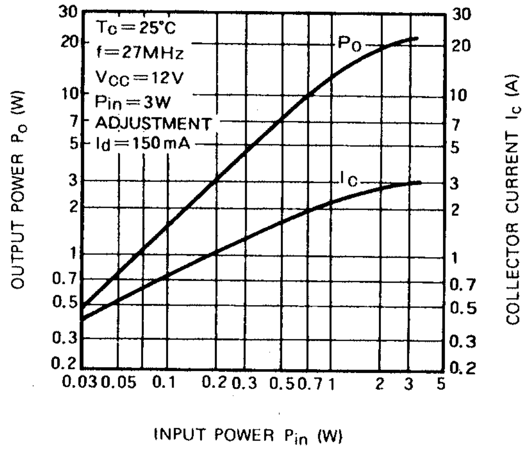
OUTPUT POWER, COLLECTOR EFFICIENCY VS. INPUT POWER



OUTPUT POWER VS. COLLECTOR SUPPLY VOLTAGE



IN CASE AB OPERATING OUTPUT POWER COLLECTOR CURRENT VS. INPUT POWER



THIRD ORDER INTERMODULATION DISTORTION VS. OUTPUT POWER