MITSUBISHI RF POWER TRANSISTOR

2SC3133

NPN EPITAXIAL PLANAR TYPE

DISCRIPTION

2SC3133 is a silicon NPN epitaxial planar type transistor designed for RF power amplifiers in HF band mobile radio applications.

FEATURES

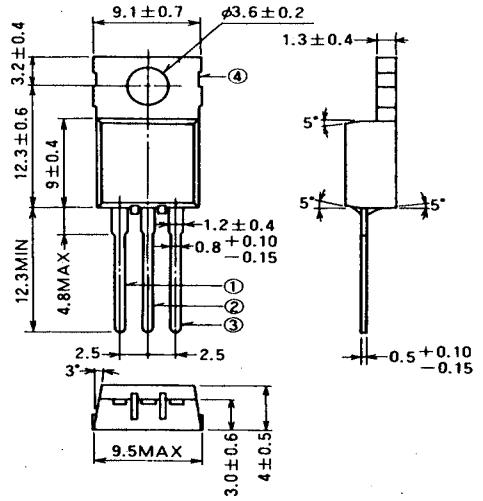
- High power gain: $G_{pe} \geqq 14$dB
  @f = 27MHz, V_{CC} = 12V, P_O = 13W
- Emitter ballasted construction for high reliability and good performances.
- High ruggedness: The ability withstand infinite VSWR when operated at f = 27MHz, P_O = 16W, V_{CC} = 16V.
- Intermodulation distortion: IMD $\leqq$ −25dB
  @f = 27MHz, V_{CC} = 12V, P_O = 13W (PEP)
- Input/output impedance:
  Z_{in} = 1.8 − j2.5(Ω), Z_{out} = 7.0 − j3.5(Ω)
  @f = 27MHz, V_{CC} = 12V, P_O = 13W

APPLICATION

10 watts output power amplifiers in HF band SSB mobile radio application.

OUTLINE DRAWING

Dimensions in mm



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

T-30E

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} = ∞	25	V
I_C	Collector current		6	A
P_C	Collector dissipation	T_a = 25°C	1.5	W
		T_C = 25°C	20	W
T_j	Junction temperature		150	°C
T_{stg}	Storage temperature		−55 to 150	°C
R_{th-a}	Thermal resistance	Junction to ambient	83.3	°C/W
R_{th-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 = 1mA, I_C = 0	5			V
$V_{(BR)CBO}$	Collector to base breakdown voltage	I_C = 5mA, I_E = 0	60			V
$V_{(BR)CEO}$	Collector to emitter breakdown voltage	I_C = 10mA, R_{BE} = ∞	25			V
I_{CBO}	Collector cutoff current	V_{CB} = 30V, I_E = 0			500	μA
I_{EBO}	Emitter cutoff current	V_{EB} = 4V, I_C = 0			500	μA
h_{FE}	DC current gain *	V_{CE} = 12V, I_C = 10mA	10	50	180	—
P_O	Output power	f = 27MHz, V_{CC} = 12V, P_{in} = 0.5W	13	16		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.

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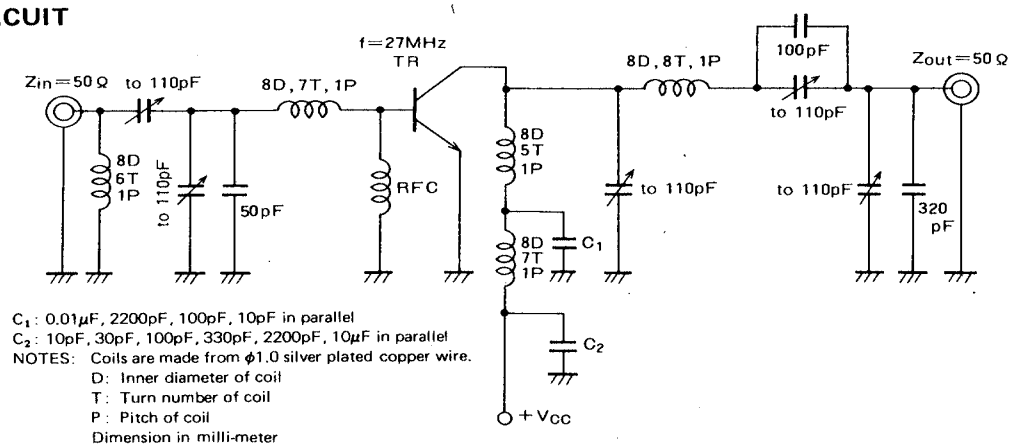
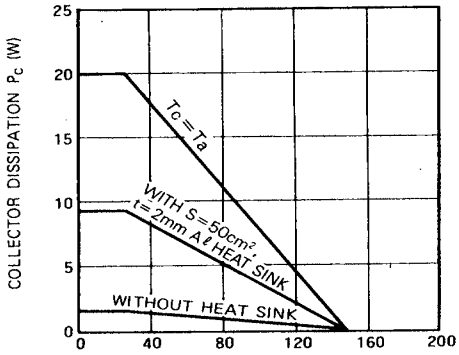
TEST CIRCUIT



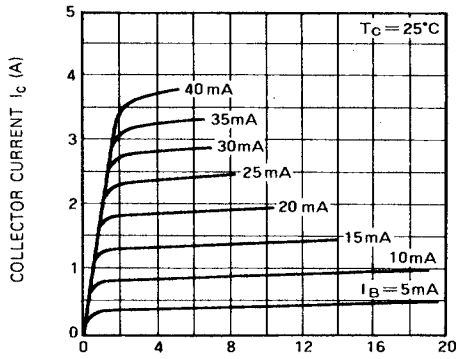
C_1 : 0.01μF, 2200pF, 100pF, 10pF in parallel
C_2 : 10pF, 30pF, 100pF, 330pF, 2200pF, 10μF in parallel
NOTES: Coils are made from φ1.0 silver plated copper wire.
D: Inner diameter of coil
T: Turn number of coil
P: Pitch of coil
Dimension in milli-meter

TYPICAL PERFORMANCE DATE

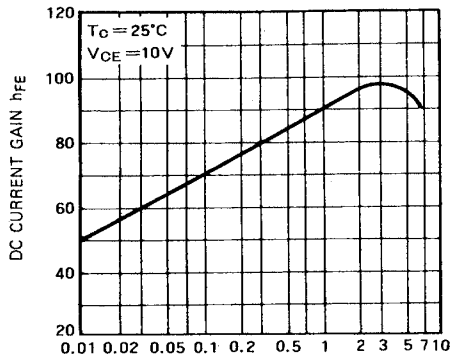
COLLECTOR DISSIPATION VS. AMBIENT TEMPERATURE



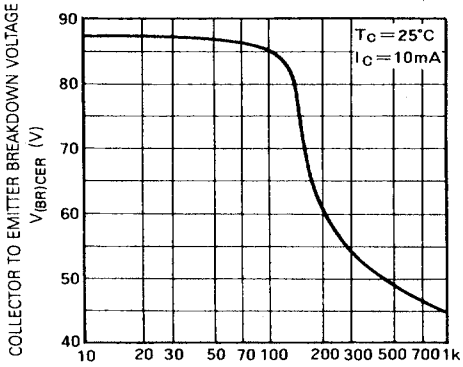
COLLECTOR CURRENT VS. COLLECTOR TO EMITTER VOLTAGE



DC CURRENT GAIN VS. COLLECTOR CURRENT



COLLECTOR TO EMITTER BREAKDOWN VOLTAGE VS. BASE TO EMITTER RESISTANCE



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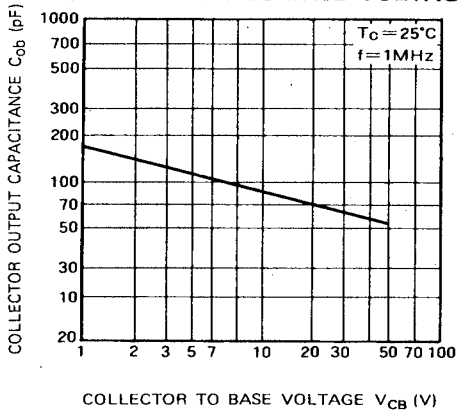
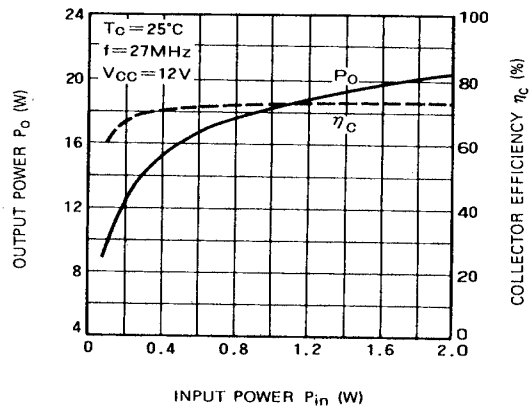
COLLECTOR OUTPUT CAPACITANCE VS. COLLECTOR TO BASE VOLTAGE



OUTPUT POWER, COLLECTOR EFFICIENCY VS. INPUT POWER



OUTPUT POWER VS. COLLECTOR SUPPLY VOLTAGE