

# 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

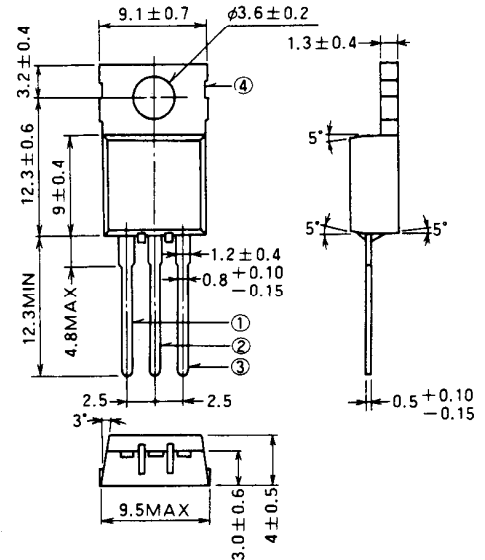
- High power gain:  $G_{pe} \geq 14\text{dB}$   
@f = 27MHz,  $V_{CC} = 12\text{V}$ ,  $P_O = 13\text{W}$
- Emitter ballasted construction for high reliability and good performances.
- High ruggedness: The ability withstand infinite VSWR when operated at f = 27MHz,  $P_O = 16\text{W}$ ,  $V_{CC} = 16\text{V}$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

### 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 ( $T_C = 25^\circ\text{C}$ 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	$T_a = 25^\circ\text{C}$	1.5	W
		$T_C = 25^\circ\text{C}$	20	W
$T_j$	Junction temperature		150	$^\circ\text{C}$
$T_{stg}$	Storage temperature		-55 to 150	$^\circ\text{C}$
$R_{th-a}$	Thermal resistance	Junction to ambient	83.3	$^\circ\text{C/W}$
		Junction to case	6.25	$^\circ\text{C/W}$

Note. Above parameters are guaranteed independently.

### ELECTRICAL CHARACTERISTICS ( $T_C = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
$V_{(BR)EBO}$	Emitter to base breakdown voltage	$I_E = 1\text{mA}$ , $I_C = 0$	5			V
$V_{(BR)CBO}$	Collector to base breakdown voltage	$I_C = 5\text{mA}$ , $I_E = 0$	60			V
$V_{(BR)CEO}$	Collector to emitter breakdown voltage	$I_C = 10\text{mA}$ , $R_{BE} = \infty$	25			V
$I_{CBO}$	Collector cutoff current	$V_{CB} = 30\text{V}$ , $I_E = 0$			500	$\mu\text{A}$
$I_{EBO}$	Emitter cutoff current	$V_{EB} = 4\text{V}$ , $I_C = 0$			500	$\mu\text{A}$
$h_{FE}$	DC current gain*	$V_{CE} = 12\text{V}$ , $I_C = 10\text{mA}$	10	50	180	—
$P_O$	Output power	$f = 27\text{MHz}$ , $V_{CC} = 12\text{V}$ , $P_{in} = 0.5\text{W}$	13	16		W
$\eta_C$	Collector efficiency		60	70		%

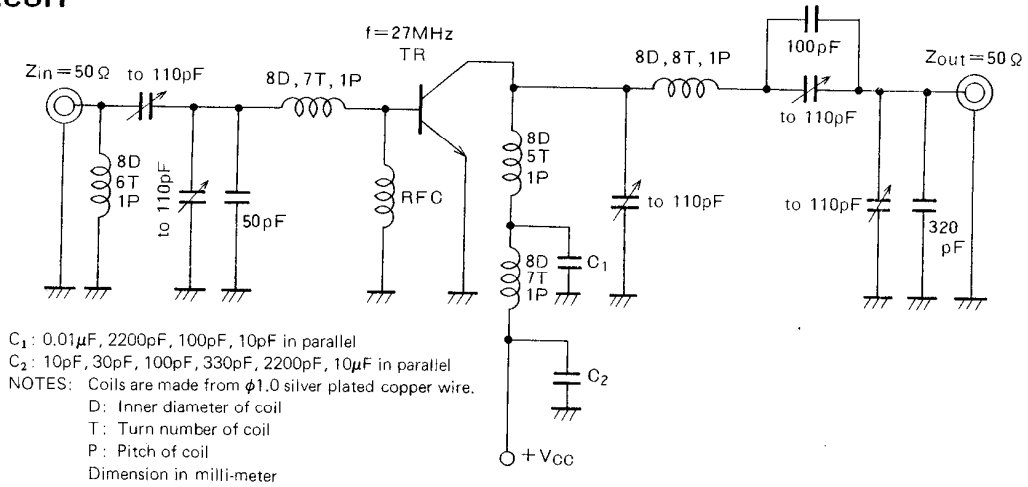
Note. \* Pulse test.  $P_W = 150\mu\text{s}$ , duty = 5%.

Above parameters, ratings, limits and conditions are subject to change.

NOV. '97

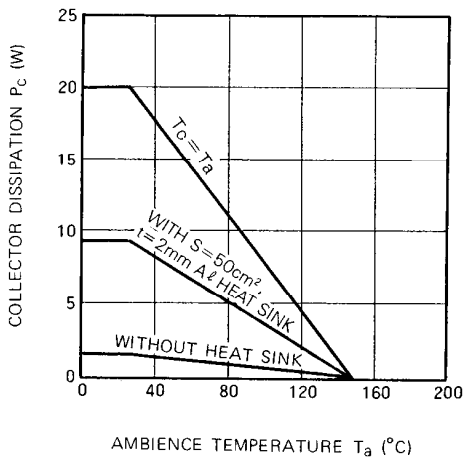
**NPN EPITAXIAL PLANAR TYPE**

**TEST CIRCUIT**

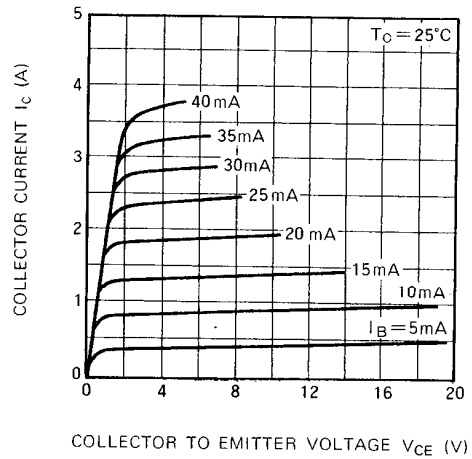


**TYPICAL PERFORMANCE DATE**

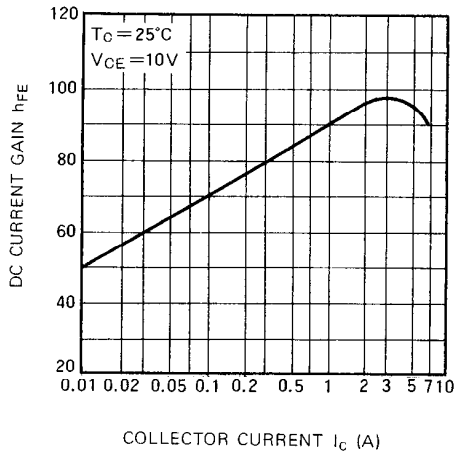
**COLLECTOR DISSIPATION VS. AMBIENT TEMPERATURE**



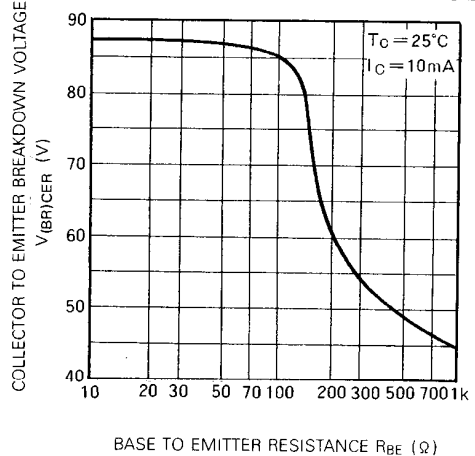
**COLLECTOR CURRENT VS. COLLECTOR TO EMITTER VOLTAGE**



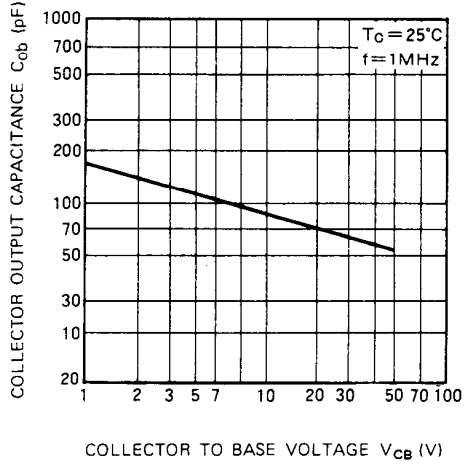
**DC CURRENT GAIN VS. COLLECTOR CURRENT**



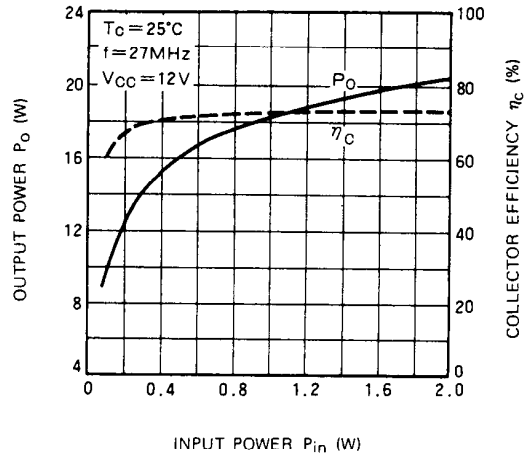
**COLLECTOR TO EMITTER BREAKDOWN VOLTAGE VS. BASE TO EMITTER RESISTANCE**



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



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



**OUTPUT POWER VS. COLLECTOR SUPPLY VOLTAGE**

