

2SC313

**Silicon NPN Transistor
 VHF-UHF Amplifier, Mixer/Osc**

Features:

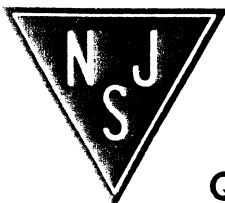
- High Current Gain-Bandwidth Product: $f_T = 600\text{MHz}$ (Min) @ $f = 100\text{MHz}$
- Low Output Capacitance: $C_{ob} = 1.7\text{pF}$ (Max) @ $V_{CB} = 10\text{V}$

Absolute Maximum Ratings:

Collector-Emitter Voltage, V_{CES}	45V
Collector-Base Voltage, V_{CBO}	45V
Emitter-Base Voltage, V_{EBO}	3V
Continuous Collector Current, I_C	50mA
Total Device Dissipation ($T_A = +25^\circ\text{C}$), P_D	200mW
Derate Above 25°C	1.14mW/ $^\circ\text{C}$
Total Device Dissipation ($T_C = +25^\circ\text{C}$), P_D	300mW
Derate Above 25°C	1.71mW/ $^\circ\text{C}$
Operating Junction Temperature Range, T_J	-65° to $+200^\circ\text{C}$
Storage Temperature Range, T_{stg}	-65° to $+200^\circ\text{C}$

Electrical Characteristics: ($T_A = +25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF Characteristics						
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 1.0\mu\text{A}$, $I_E = 0$	30	-	-	V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 10\mu\text{A}$, $I_C = 0$	3.0	-	-	V
Collector-Emitter Sustaining Voltage	$V_{CEO(sus)}$	$I_C = 3\text{mA}$, $I_B = 0$	15	-	-	V
Collector Cutoff Current	I_{CBO}	$V_{CB} = 15\text{V}$, $I_E = 0$	-	-	0.01	μA
		$V_{CB} = 15\text{V}$, $I_E = 0$, $T_A = +150^\circ\text{C}$	-	-	1.0	μA



Electrical Characteristics (Cont'd): ($T_A = +25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
ON Characteristics						
DC Current Gain	h_{FE}	$I_C = 3\text{mA}, V_{CE} = 1\text{V}$	20	–	–	
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 10\text{mA}, I_B = 1\text{mA}$	–	–	0.4	V
Base–Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 10\text{mA}, I_B = 1\text{mA}$	–	–	1.0	V
Small–Signal Characteristics						
Current Gain–Bandwidth Product	f_T	$I_C = 10\text{mA}, V_{CE} = 10\text{V}, f = 100\text{MHz}, \text{Note 1}$	600	–	–	MHz
Output Capacitance	C_{obo}	$V_{CB} = 10\text{V}, I_E = 0, f = 140\text{kHz}$	–	–	1.7	pF
		$V_{CB} = 0, I_E = 0, f = 140\text{kHz}$	–	–	3.0	pF
Input Capacitance	C_{ibo}	$V_{EB} = 0.5\text{V}, I_C = 0, f = 140\text{kHz}$	–	–	2.0	pF
Noise Figure	NF	$I_C = 1\text{mA}, V_{CE} = 6\text{V}, R_G = 400\Omega, f = 60\text{MHz}$	–	–	6.0	dB
Functional Test						
Amplifier Power Gain	G_{pe}	$V_{CB} = 12\text{V}, I_C = 6\text{mA}, f = 200\text{MHz}$	15	–	–	dB
Power Output	P_o	$V_{CB} = 15\text{V}, I_C = 8\text{mA}, f = 500\text{MHz}$	30	–	–	mW
Collector Efficiency	η	$V_{CB} = 15\text{V}, I_C = 8\text{mA}, f = 500\text{MHz}$	25	–	–	%

Note 1. f_T is defined as the frequency at which $|h_{fe}|$ extrapolates to unity.

