

2SC5138

Silicon NPN Epitaxial Transistor

Application

VHF & UHF wide band amplifier

Features

- High gain bandwidth product
 $f_T = 6 \text{ GHz typ.}$
- High gain, low noise figure
 $PG = 13 \text{ dB typ.},$
 $NF = 1.8 \text{ dB typ. at } f = 900 \text{ MHz}$

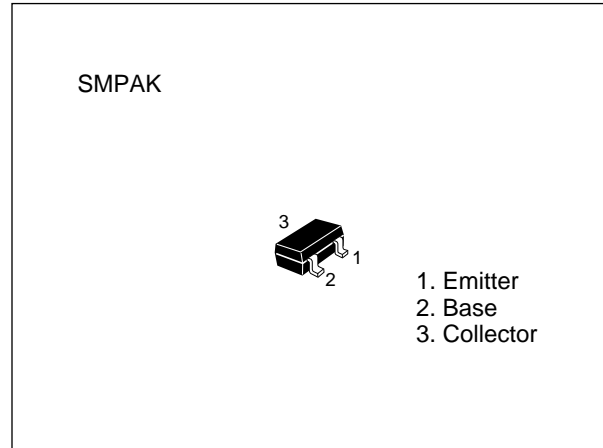


Table 1 Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	20	V
Collector to emitter voltage	V_{CEO}	12	V
Emitter to base voltage	V_{EBO}	2	V
Collector current	I_C	30	mA
Collector power dissipation	P_C	80	mW
Junction temperature	T_j	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

Note: Marking is "YL-"

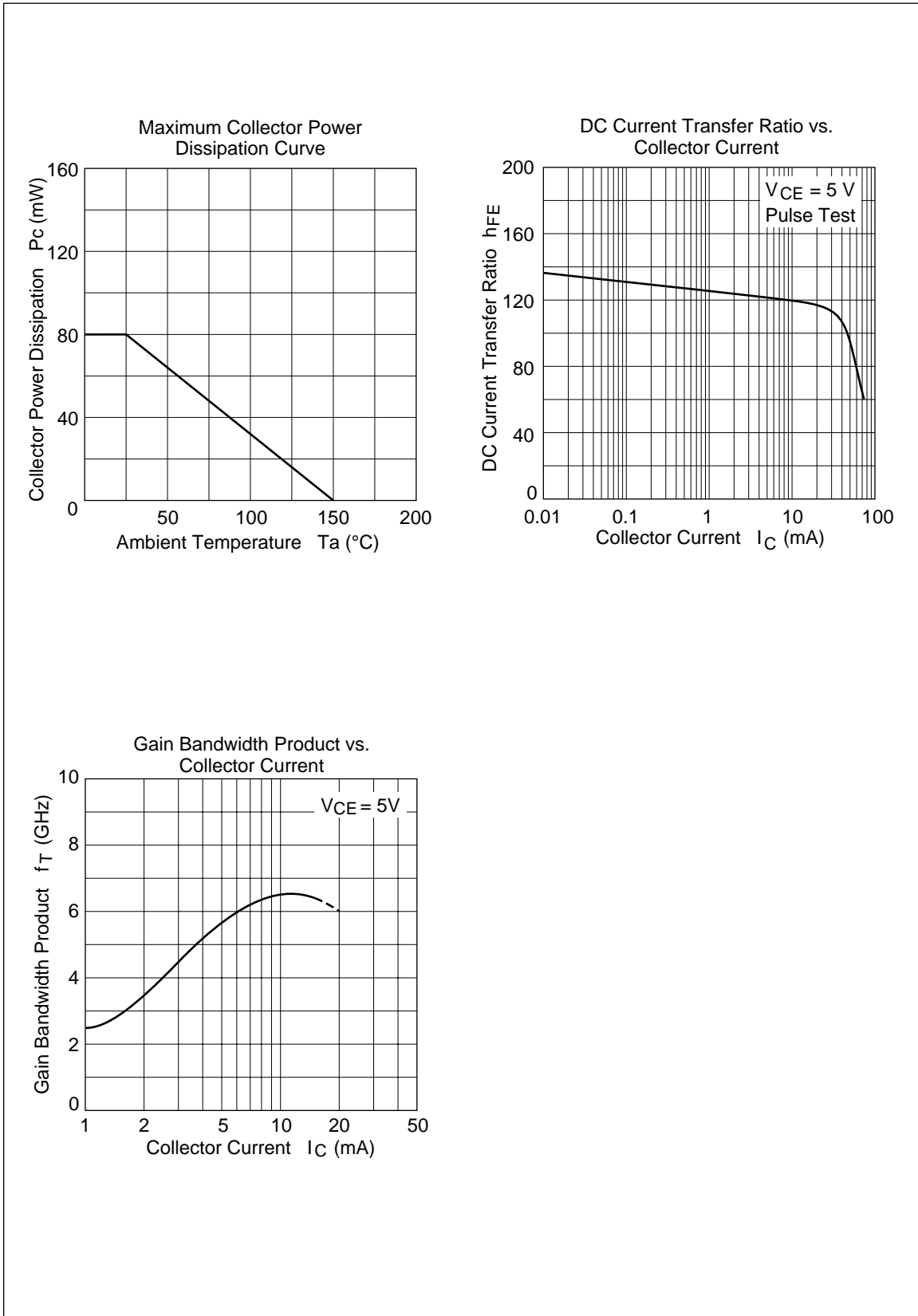
Attention: This device is very sensitive to electro static discharge.

It is recommended to adopt appropriate cautions when handling this transistor.

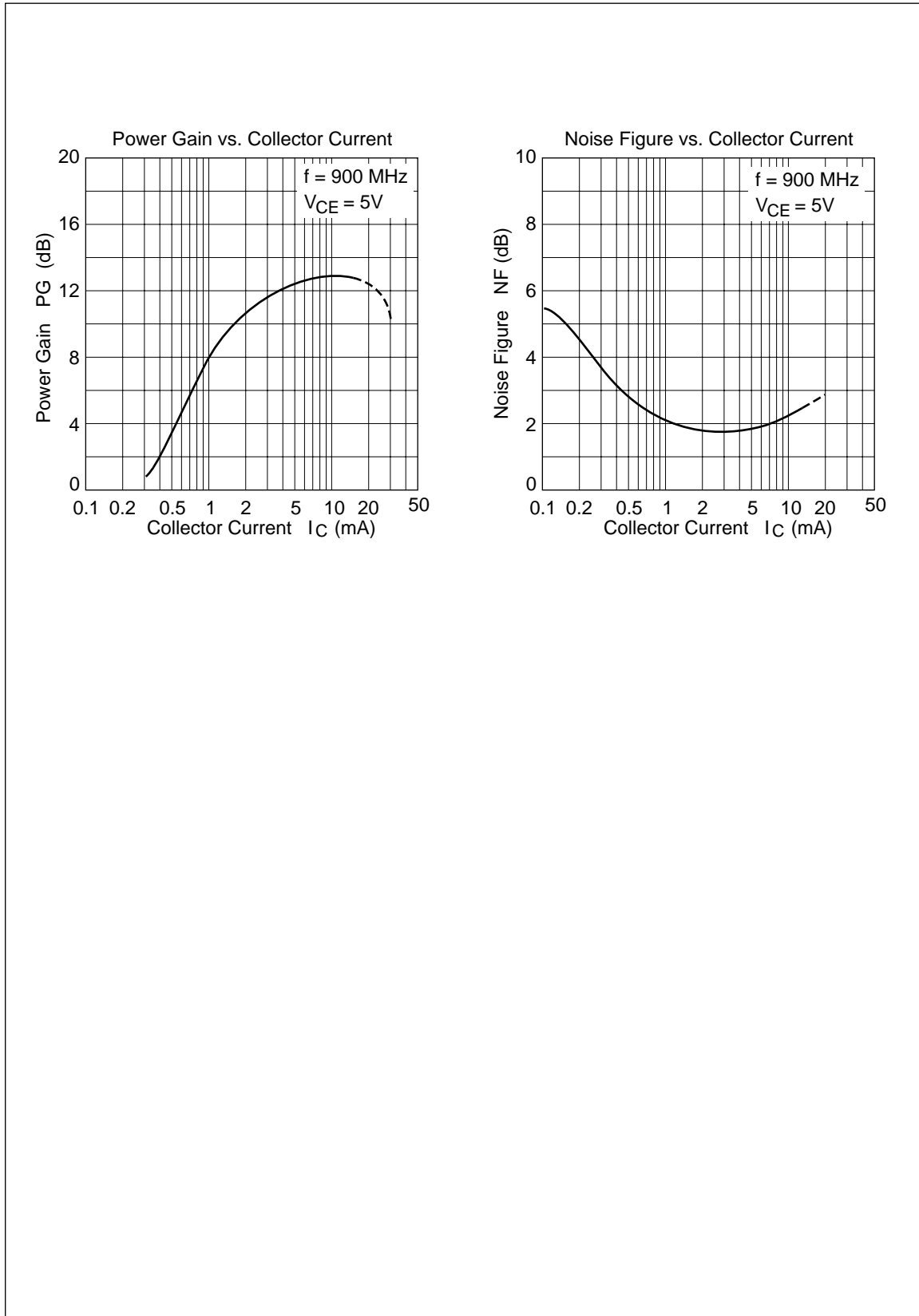
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Table 2 Electrical Characteristics (Ta = 25°C)

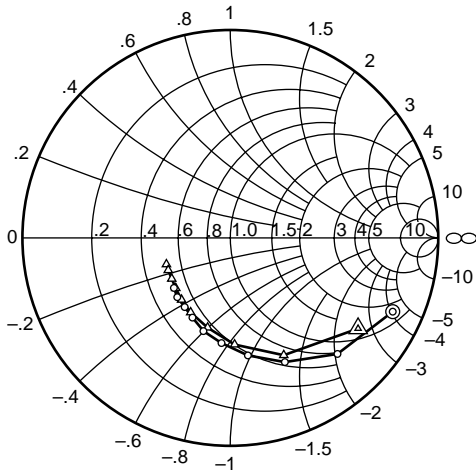
Item	Symbol	Min.	Typ.	Max.	Unit	Test conditions
Collector cutoff current	I_{CBO}	—	—	10	μA	$V_{CB} = 20\text{ V}$, $I_E = 0$
	I_{CEO}	—	—	1	mA	$V_{CE} = 12\text{ V}$, $R_{BE} = \infty$
Emitter cutoff current	I_{EBO}	—	—	10	μA	$V_{EB} = 2\text{ V}$, $I_C = 0$
DC current transfer ratio	h_{FE}	50	120	250		$V_{CE} = 5\text{ V}$, $I_C = 10\text{ mA}$
Output capacitance	C_{ob}	—	0.65	1.05	pF	$V_{CB} = 5\text{ V}$, $I_E = 0$, $f = 1\text{ MHz}$
Gain bandwidth product	f_T	4	6	—	GHz	$V_{CE} = 5\text{ V}$, $I_C = 10\text{ mA}$
Power gain	PG	9.5	13	—	dB	$V_{CE} = 5\text{ V}$, $I_C = 10\text{ mA}$, $f = 900\text{ MHz}$
Noise figure	NF	—	1.8	3.0	dB	$V_{CE} = 5\text{ V}$, $I_C = 5\text{ mA}$, $f = 900\text{ MHz}$



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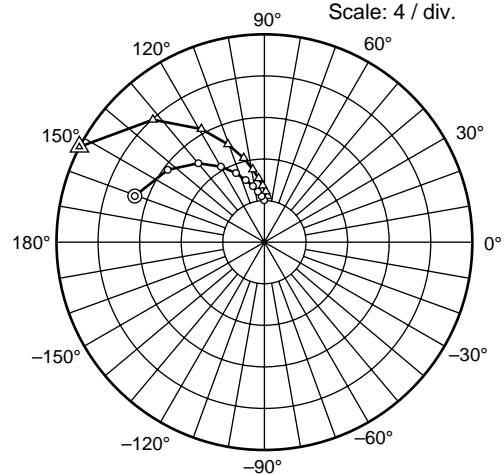


S11 Parameter vs. Frequency



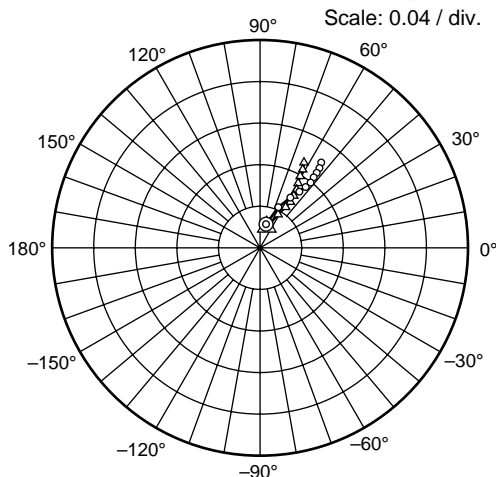
Condition: $V_{CE} = 5\text{ V}$, $Z_o = 50\ \Omega$
 100 to 1000 MHz (100 MHz step)
 ○ — ○ ($I_C = 5\text{ mA}$)
 △ — △ ($I_C = 10\text{ mA}$)

S21 Parameter vs. Frequency



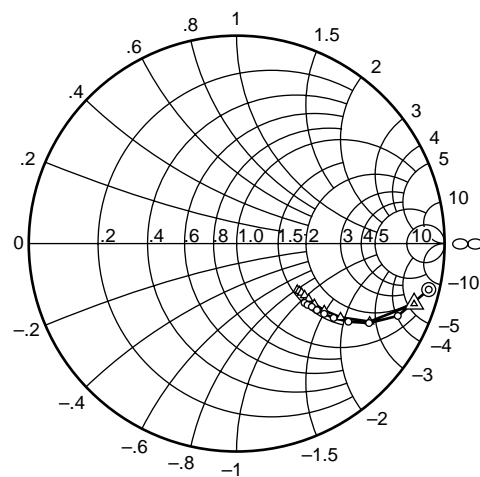
Condition: $V_{CE} = 5\text{ V}$, $Z_o = 50\ \Omega$
 100 to 1000 MHz (100 MHz step)
 ○ — ○ ($I_C = 5\text{ mA}$)
 △ — △ ($I_C = 10\text{ mA}$)

S12 Parameter vs. Frequency



Condition: $V_{CE} = 5\text{ V}$, $Z_o = 50\ \Omega$
 100 to 1000 MHz (100 MHz step)
 ○ — ○ ($I_C = 5\text{ mA}$)
 △ — △ ($I_C = 10\text{ mA}$)

S22 Parameter vs. Frequency



Condition: $V_{CE} = 5\text{ V}$, $Z_o = 50\ \Omega$
 100 to 1000 MHz (100 MHz step)
 ○ — ○ ($I_C = 5\text{ mA}$)
 △ — △ ($I_C = 10\text{ mA}$)

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Package Dimensions

Unit : mm

