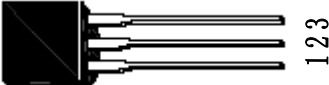
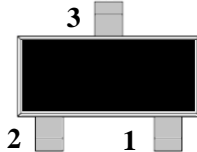


## 1、Features

- Lead(Pb)-Free
- Collector Current:  $I_C=500\text{mA}$
- Collector Power Dissipation:  $P_C=625\text{mW}(T_C=25^\circ\text{C})$
- Complimentary to 9012

## 2、Pinning information

PIN	Description	Simplified outline	
1	Emitter(E)		
2	Base(B)		
3	Collector(C)		
		TO-92	SOT-23

## 3、Limiting value

( $T_a = 25^\circ\text{C}$  unless otherwise noted).

SYMBOL	PARAMETER		Limit	UNIT
<b>V<sub>cb0</sub></b>	Collector-Base Voltage		40	V
<b>V<sub>ceo</sub></b>	Collector-Emitter Voltage		20	V
<b>V<sub>ebo</sub></b>	Emitter-Base Voltage		5	V
<b>I<sub>c</sub></b>	Collector Current		500	mA
<b>P<sub>c</sub></b>	Collector Power Dissipation	TO-92	625	mW
		SOT-23	240	
<b>T<sub>j</sub></b>	Junction Temperature		+150	°C
<b>T<sub>stg</sub></b>	Storage Temperature		-55 to +150	°C

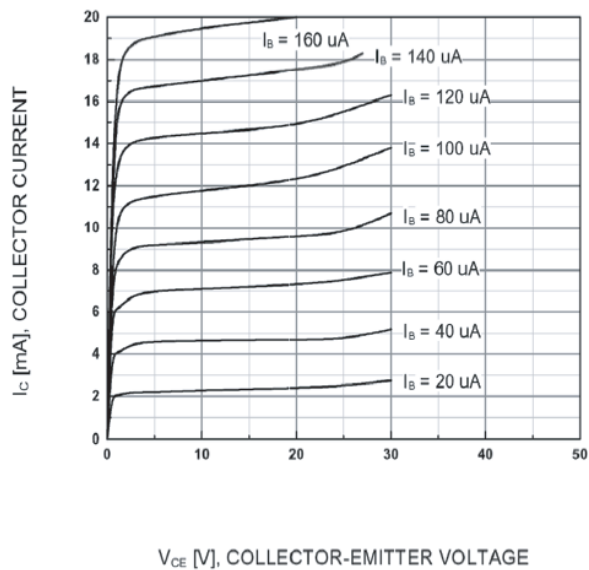
## 4、Electrical Characteristics ( $T_a = 25^\circ\text{C}$ unless otherwise noted)

SYMBOL	PARAMETER	CONDITIONS	MIN	Typ	MAX	UNIT
<b>BV<sub>cb0</sub></b>	Collector-Base Breakdown Voltage	$I_C = 100\mu\text{A}, I_B = 0$	40			V
<b>BV<sub>ceo</sub></b>	Collector-Emitter Breakdown Voltage	$I_C = 1\text{mA}, I_E = 0$	20			V
<b>BV<sub>ebo</sub></b>	Emitter-Base Breakdown Voltage	$I_E = 100\mu\text{A}, I_C = 0$	5			V
<b>I<sub>cbo</sub></b>	Collector Cut-off Current	$V_{CB} = 25\text{V}, I_E = 0$			100	nA
<b>I<sub>ebo</sub></b>	Emitter Cut-off Current	$V_{EB} = 3\text{V}, I_C = 0$			100	nA
<b>V<sub>ce(sat)</sub></b>	Collector-Emitter Saturation Voltage	$I_C=500\text{mA}$ $I_B=50\text{mA}$			0.6	V
<b>V<sub>be(sat)</sub></b>	Base-Emitter Saturation Voltage	$I_C=500\text{mA}$ $I_B=50\text{mA}$			1.2	V
<b>V<sub>be(on)</sub></b>	Base-Emitter On Voltage	$V_{CE} = 1\text{V}, I_C = 10\text{mA}$			1.0	V
<b>h<sub>FE</sub></b>	DC Current Gain	$V_{CE} = 1\text{V}, I_C = 50\text{mA}$	85		300	
<b>f<sub>T</sub></b>	Current Gain Bandwidth Product	$V_{CE}=10\text{V}, I_C = 50\text{mA}$	150			MHz
<b>C<sub>ob</sub></b>	Output Capacitance	$V_{CB}=10\text{V}, f = 1\text{MHz}$		9.0		pF

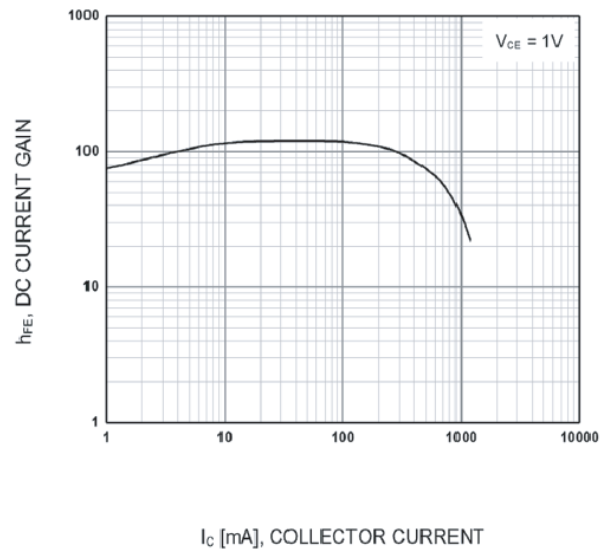
### h<sub>FE</sub> Classification

Rank	F	G	H	I
Range	85-135	112-166	144-202	170-300

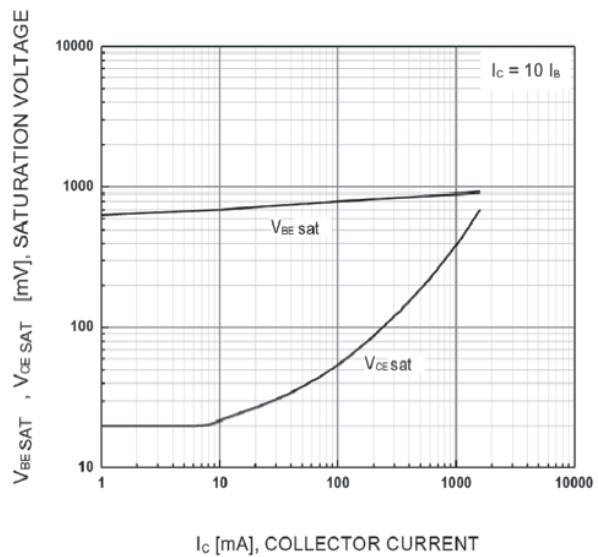
## 5、Electrical Characteristics Curve



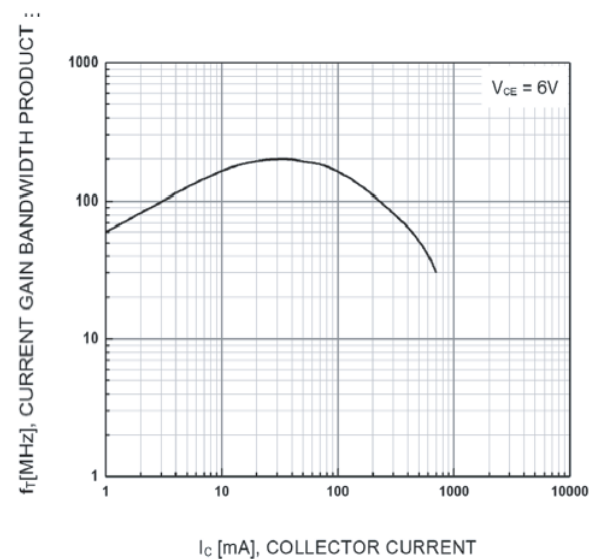
Static Characteristic



DC current Gain

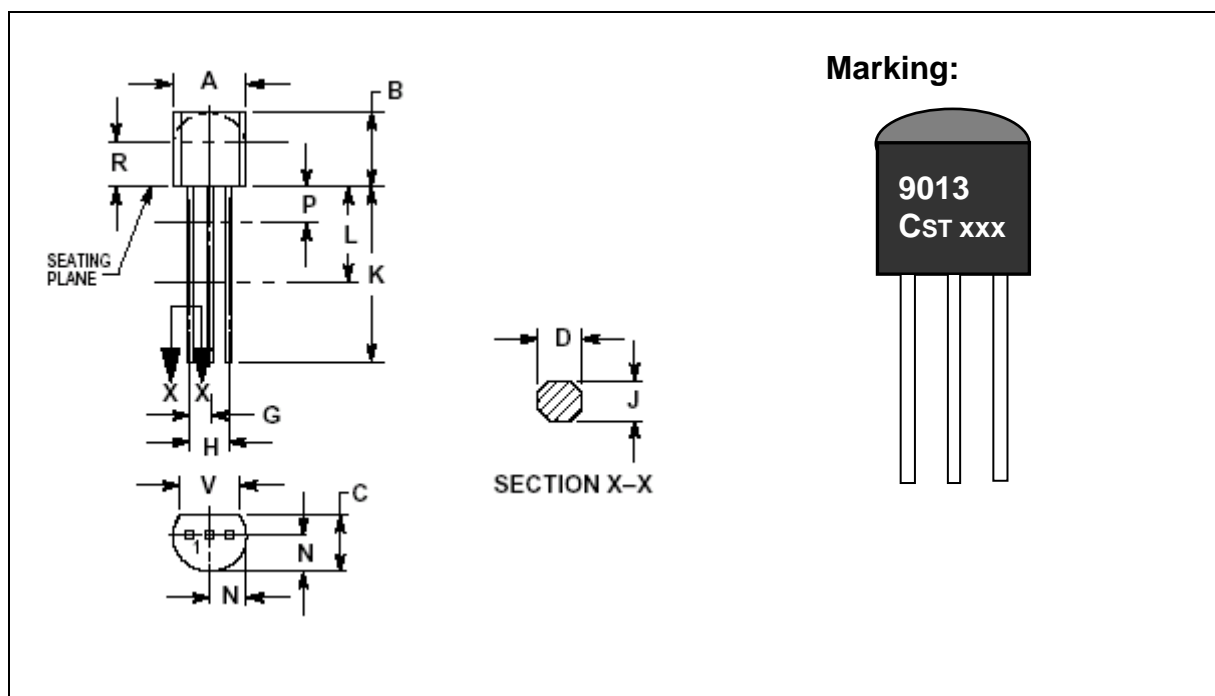


Base-Emitter Saturation Voltage  
Collector-Emmitter Saturation Voltage



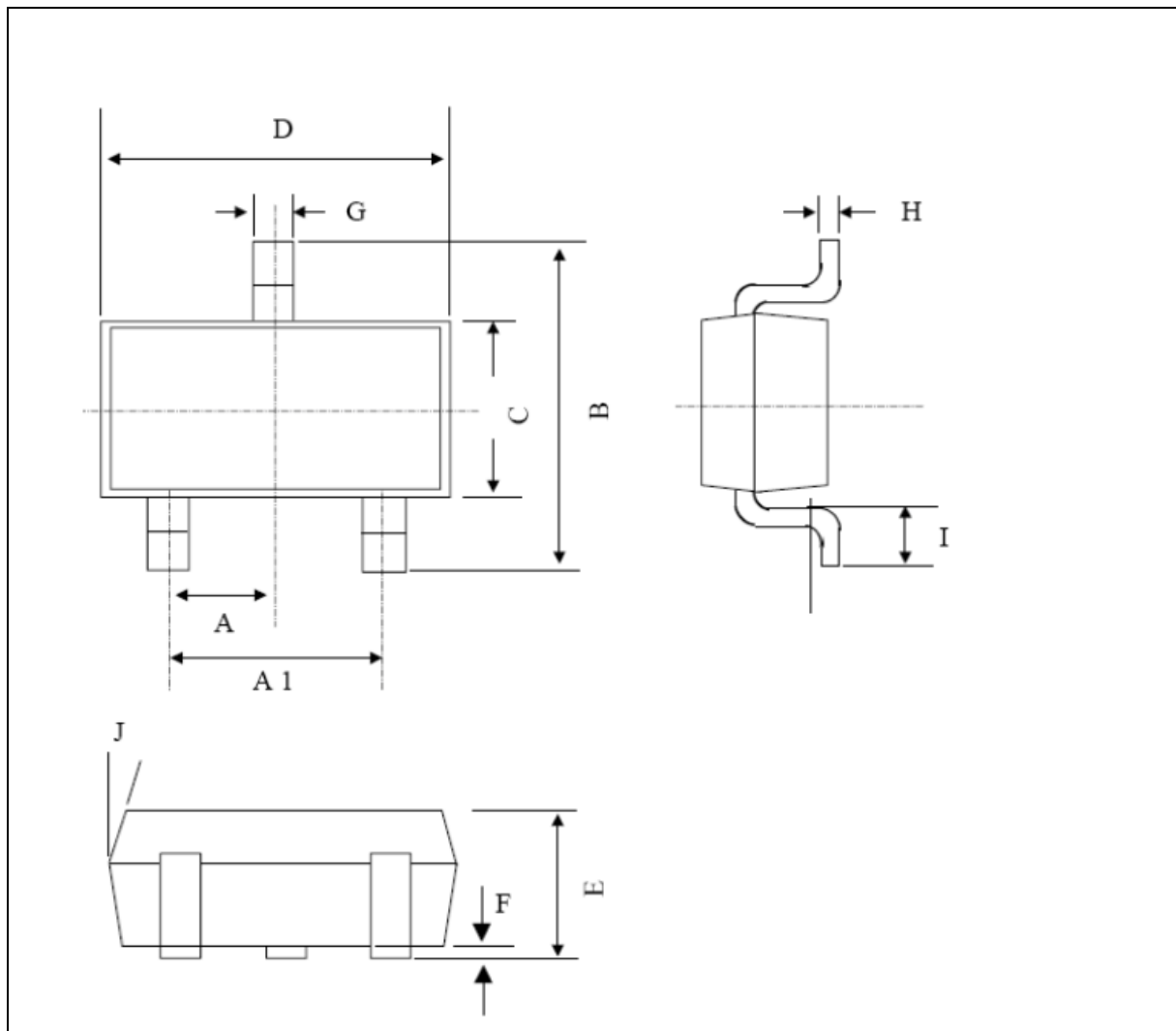
Current Gain Bandwidth Product

## 6、Package outline(TO-92)



DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min	Max	Min	Max		Min	Max	Min	Max
A	0.175	0.205	4.45	5.20	K	0.500	-	12.70	-
B	0.170	0.210	4.32	5.33					
C	0.134	0.142	3.40	3.60	N	0.080	0.105	2.04	2.66
D	0.016	0.021	0.407	0.533	P	-	0.100	-	2.54
G	0.045	0.055	1.27	2.41	R	0.079	-	2.00	-
H	0.095	0.105	2.42	2.66	V	0.135	-	3.43	-
J	0.012	0.018	0.30	0.45					

## 7、Package outline(SOT-23)



DIM	Inches		Milimeters		DIM	Inches		Milimeters	
	Min	Max	Min	Max		Min	Max	Min	Max
<b>A</b>	0.037BSC		0.95BSC		<b>F</b>	0.000	0.004	0.00	0.10
<b>A1</b>	0.074BSC		1.90BSC		<b>G</b>	0.012	0.020	0.30	0.50
<b>B</b>	0.089	0.100	2.25	2.55	<b>H</b>	0.003	0.006	0.08	0.15
<b>C</b>	0.047	0.055	1.20	1.40	<b>I</b>	0.012	0.020	0.30	0.50
<b>D</b>	0.114	0.122	2.9	3.10	<b>J</b>	5°	10°	5°	10°
<b>E</b>	0.039	0.045	0.90	1.15					