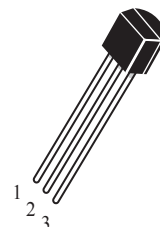


## NPN General Purpose Transistors

 Lead(Pb)-Free

**TO-92**

1. EMITTER  
2. BASE  
3. COLLECTOR



### ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V <sub>CEO</sub>	45	Vdc
Collector-Base Voltage	V <sub>CBO</sub>	50	Vdc
Emitter-Base Voltage	V <sub>EBO</sub>	5.0	Vdc
Collector Current	I <sub>C</sub>	100	mAdc
Total Device Dissipation T <sub>A</sub> =25°C	P <sub>D</sub>	0.4	W
Junction Temperature	T <sub>j</sub>	150	°C
Storage, Temperature	T <sub>stg</sub>	-55 to +150	°C

### ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Min	Max	Unit
Collector-Emitter Breakdown Voltage (I <sub>C</sub> = 0.1 mAdc, I <sub>B</sub> =0)	V <sub>(BR)CEO</sub>	45	-	Vdc
Collector-Base Breakdown Voltage (I <sub>C</sub> = 100uAdc, I <sub>B</sub> =0)	V <sub>(BR)CBO</sub>	50	-	Vdc
Emitter-Base Breakdown Voltage (I <sub>E</sub> = 100 uAdc, I <sub>C</sub> =0)	V <sub>(BR)EBO</sub>	5.0	-	Vdc
Collector Cutoff Current (V <sub>CB</sub> = 50 Vdc, I <sub>E</sub> =0)	I <sub>CBO</sub>	-	0.1	uAdc
Emitter Cutoff Current (V <sub>EB</sub> = 3.0Vdc, I <sub>C</sub> =0)	I <sub>EBO</sub>	-	0.1	uAdc

# S9014



## Electrical Characteristics ( $T_A=25^\circ\text{C}$ unless otherwise noted) (Continued)

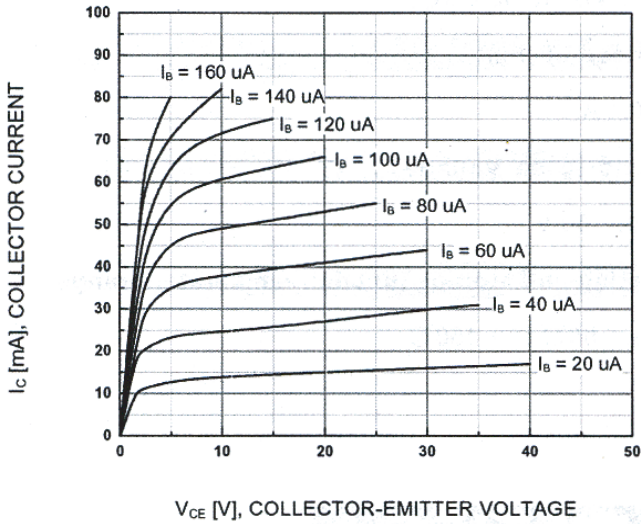
Characteristics	Symbol	Min	Max	Unit
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### On Characteristics

DC Current Gain ( $I_C=1\text{mA}_{dc}, V_{CE}=5\text{V}_{dc}$ )	$h_{FE}$	60	1000	-
Collector-Emitter Saturation Voltage ( $I_C=100\text{mA}_{dc}, I_B=5\text{mA}_{dc}$ )	$V_{CE(sat)}$	-	0.3	Vdc
Base-Emitter Saturation Voltage ( $I_C=100\text{mA}_{dc}, I_B=5\text{mA}_{dc}$ )	$V_{BE(sat)}$	-	1	Vdc
Transition Frequency ( $I_C=10\text{mA}_{dc}, V_{CE}=5\text{V}_{dc}, f=30\text{MHz}$ )	$f_T$	150	-	MHz

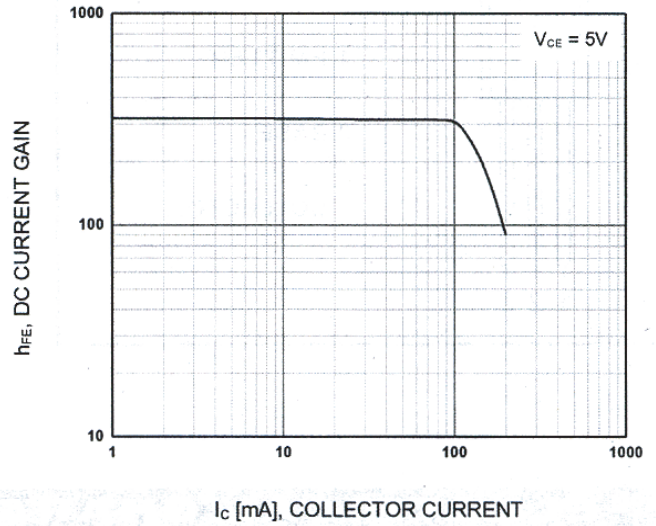
### CLASSIFICATION OF $h_{FE}$

Rank	A	B	C	D
Range	60-150	100-300	200-600	400-1000



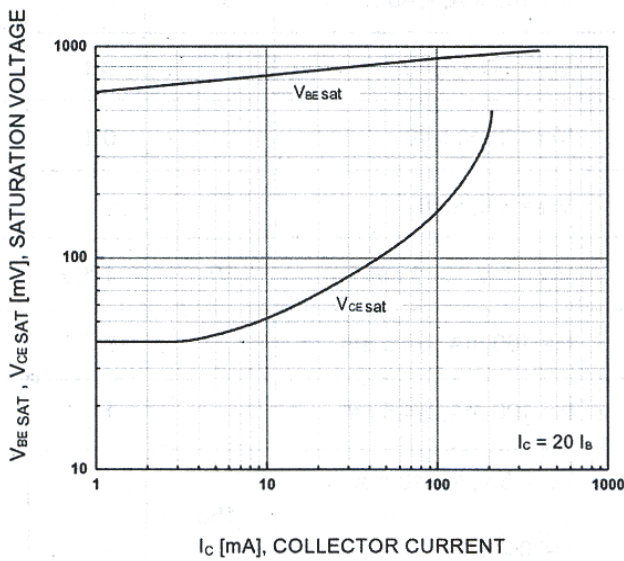
$V_{CE}$  [V], COLLECTOR-EMITTER VOLTAGE

**FIG.1 Static Characteristic**



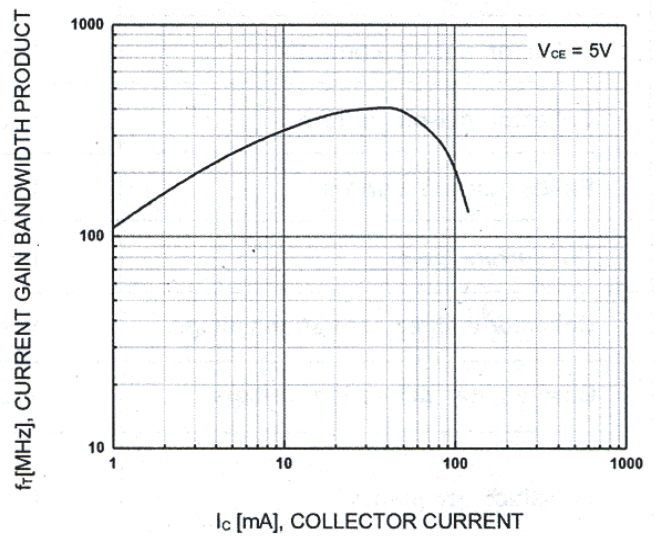
$I_c$  [mA], COLLECTOR CURRENT

**FIG.2 DC current Gain**



$I_c$  [mA], COLLECTOR CURRENT

**FIG.3 Base-Emitter Saturation Voltage  
Collector-Emitter Saturation Voltage**

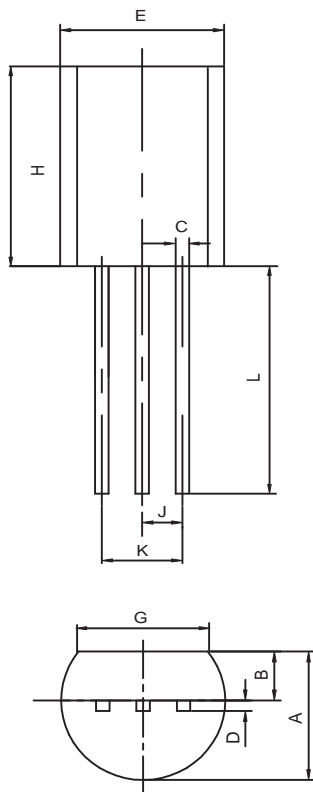


$I_c$  [mA], COLLECTOR CURRENT

**FIG.4 Current Gain Bandwidth Product**

**TO-92 Outline Dimensions**

unit:mm



<b>TO-92</b>		
<b>Dim</b>	<b>Min</b>	<b>Max</b>
<b>A</b>	3.30	3.70
<b>B</b>	1.10	1.40
<b>C</b>	0.38	0.55
<b>D</b>	0.36	0.51
<b>E</b>	4.40	4.70
<b>G</b>	3.43	-
<b>H</b>	4.30	4.70
<b>J</b>	1.270TYP	
<b>K</b>	2.44	2.64
<b>L</b>	14.10	14.50