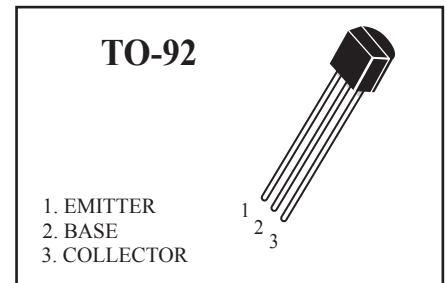


## NPN General Purpose Transistors

 Lead(Pb)-Free



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

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V <sub>CEO</sub>	25	Vdc
Collector-Base Voltage	V <sub>CBO</sub>	40	Vdc
Emitter-Base Voltage	V <sub>EBO</sub>	5.0	Vdc
Collector Current	I <sub>C</sub>	500	mAdc
Total Device Dissipation T <sub>A</sub> =25 °C	P <sub>D</sub>	0.625	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>	25	-	Vdc
Collector-Base Breakdown Voltage (I <sub>C</sub> = 100 μAdc, I <sub>E</sub> =0)	V <sub>(BR)CBO</sub>	40	-	Vdc
Emitter-Base Breakdown Voltage (I <sub>E</sub> = 100 μAdc, I <sub>C</sub> =0)	V <sub>(BR)EBO</sub>	5.0	-	Vdc
Collector Cutoff Current (V <sub>CE</sub> = 20 Vdc, I <sub>B</sub> =0)	I <sub>CEO</sub>	-	0.1	uAdc
Collector Cutoff Current (V <sub>CB</sub> = 40 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

**ELECTRICAL CHARACTERISTICS** ( $T_A=25^\circ\text{C}$  unless otherwise noted) (Continued)

Characteristics	Symbol	Min	TYP	Max	Unit
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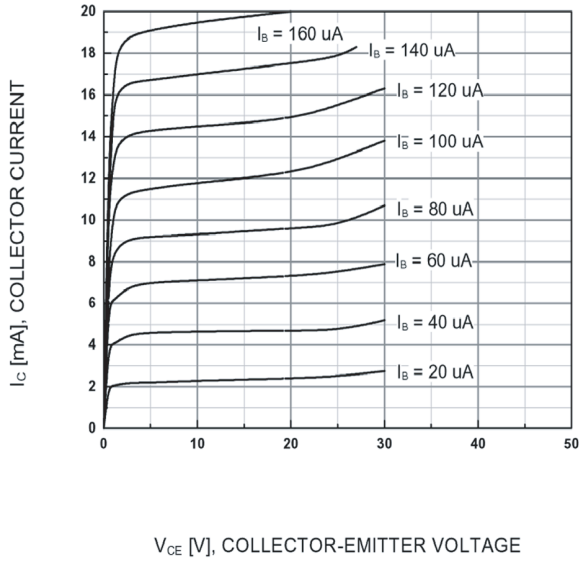
**ON CHARACTERISTICS**

DC Current Gain ( $I_C=50\text{ Adc}, V_{CE}=1.0\text{ Vdc}$ )	$h_{FE(1)}$	85	-	300	-
DC Current Gain ( $I_C=500\text{ mAdc}, V_{CE}=1.0\text{ Vdc}$ )	$h_{FE(2)}$	50	-	-	-
Collector-Emitter Saturation Voltage ( $I_C=500\text{ Adc}, I_B=50\text{ mAdc}$ )	$V_{CE(sat)}$	-	-	0.6	Vdc
Base-Emitter Saturation Voltage ( $I_C=500\text{ mAdc}, I_B=50\text{ mAdc}$ )	$V_{BE(sat)}$	-	-	1.2	Vdc
Current-Gain-Bandwidth Product ( $I_C=20\text{ mAdc}, V_{CE}=6.0\text{ Vdc}, f=30\text{ MHz}$ )	$f_T$	150	-	-	MHz

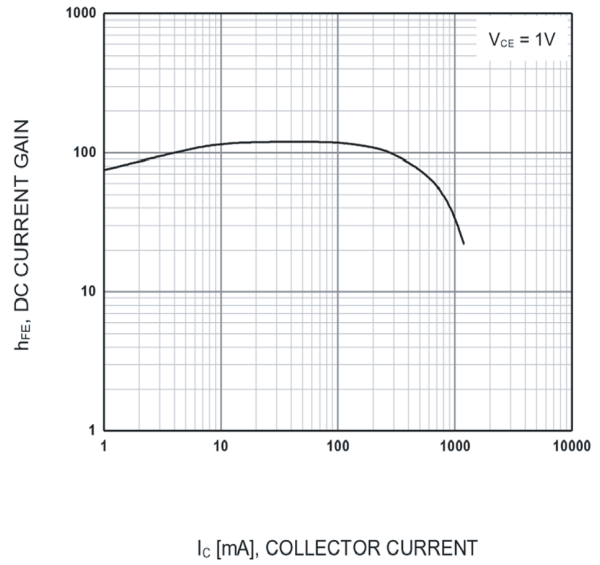
**Classification of  $h_{FE(1)}$** 

Rank	B	C	D
Range	85-160	120-200	160-300

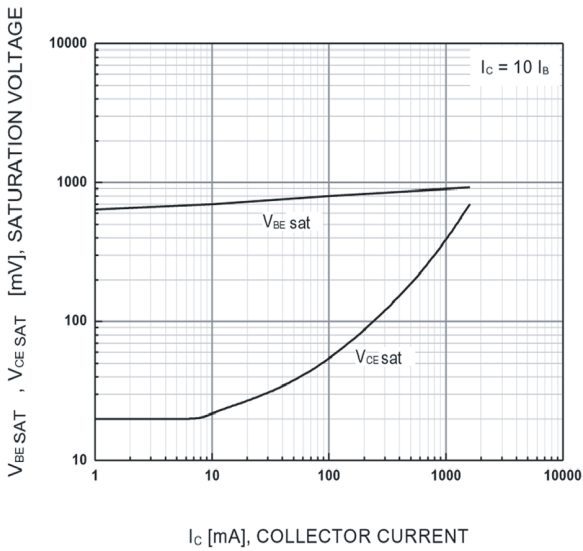
## Typical Characteristics



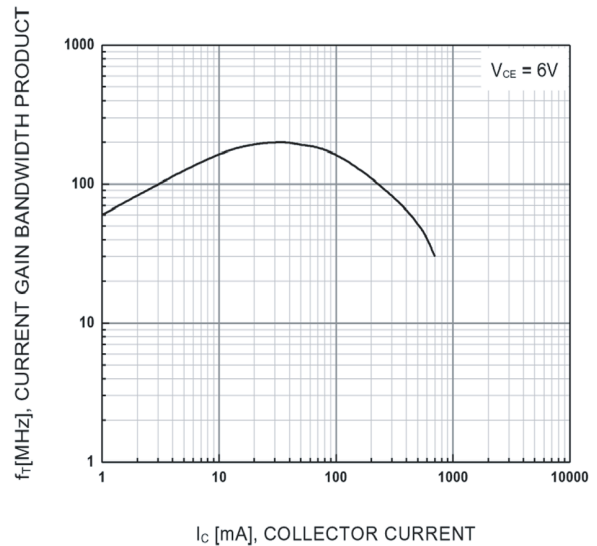
Static Characteristic



DC current Gain



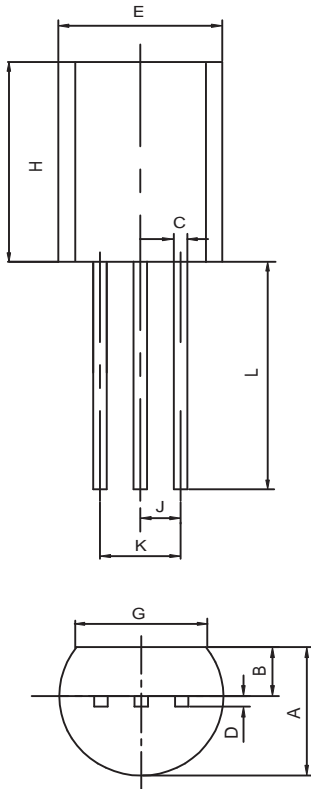
Base-Emitter Saturation Voltage  
Collector-Emitter Saturation Voltage



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