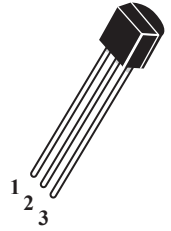


**NPN General Purpose Transistors**
**(Pb)** Lead(Pb)-Free

**TO-92**

 1. EMITTER  
 2. BASE  
 3. COLLECTOR

**MAXIMUM RATINGS**( $T_A=25^{\circ}\text{C}$  unless otherwise noted)

Rating	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	40	V
Collector-Emitter Voltage	$V_{CEO}$	25	V
Emitter-Base Voltage	$V_{EBO}$	5	V
Collector Current-Continuous	$I_C$	1.5	A
Total Device Dissipation $T_A=25^{\circ}\text{C}$	$P_D$	1.0	W
Junction and Storage, Temperature	$T_J, T_{stg}$	-55 to +150	$^{\circ}\text{C}$

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

Characteristics	Symbol	Min	Typ	Max	Unit
Collector-Base Breakdown Voltage $I_C=100\mu\text{A}, I_E=0$	$V_{(BR)CBO}$	40	-	-	V
Collector-Emitter Breakdown Voltage $I_C=0.1\text{mA}, I_B=0$	$V_{(BR)CEO}$	25	-	-	V
Emitter Base Breakdown Voltage $I_E=100\mu\text{A}, I_C=0$	$V_{(BR)EBO}$	5	-	-	V
Collector cut-off current $V_{CB}=40\text{V}, I_E=0$	$I_{CBO}$	-	-	0.1	$\mu\text{A}$
Emitter cut-off current $V_{CE}=20\text{V}, I_E=0$	$I_{CEO}$	-	-	0.1	$\mu\text{A}$
Emitter cut-off current $V_{EB}=5\text{V}, I_C=0$	$I_{EBO}$	-	-	0.1	$\mu\text{A}$

## ON CHARACTERISTICS

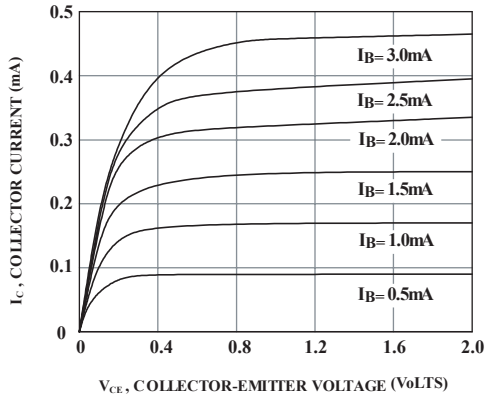
DC Current Gain $V_{CE}=1V, I_C=100mA$ $V_{CE}=1V, I_C=800mA$	$h_{FE(1)}$ $h_{FE(2)}$	85 40	-	400 -	-
Collector-Emitter Saturation Voltage $I_C=800mA, I_B=80mA$	$V_{CE(sat)}$	-	-	0.5	V
Base-Emitter Saturation Voltage $I_C=800mA, I_B=80mA$	$V_{BE(sat)}$	-	-	1.2	V
Base-Emitter ON Voltage $V_{CE}=1V, I_C=10mA$	$V_{BE(ON)}$	-	-	1	V

## DYNAMIC CHARACTERISTICS

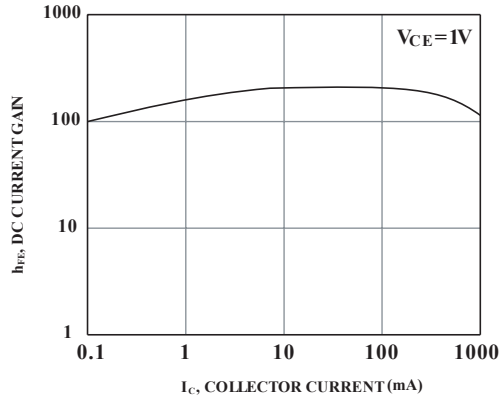
Transition frequency $V_{CE}=10V, I_C=50mA, f=30MHz$	$f_T$	100	-	-	MHz
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## CLASSIFICATION OF $h_{FE(2)}$

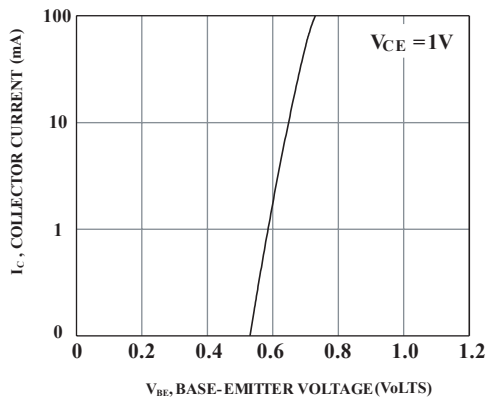
Rank	B	C	D	E
Range	85-160	120-200	160-300	300-400



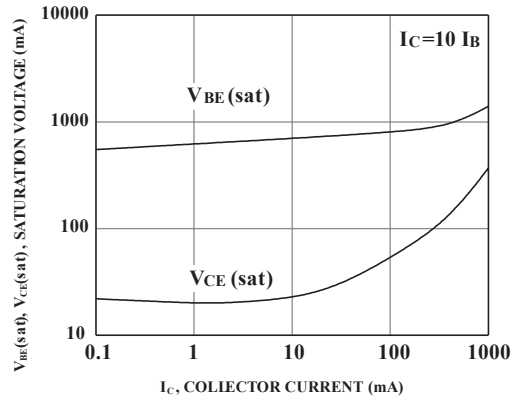
**FIG.1 Static Characteristic**



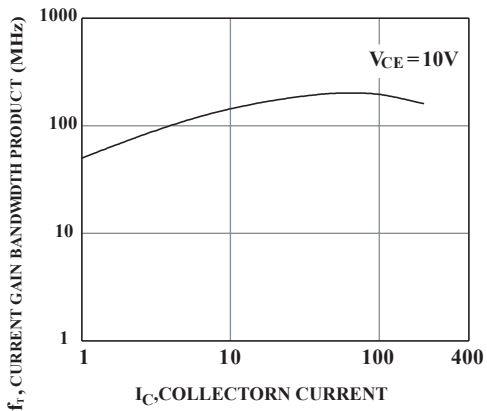
**FIG.2 DC Current Gain**



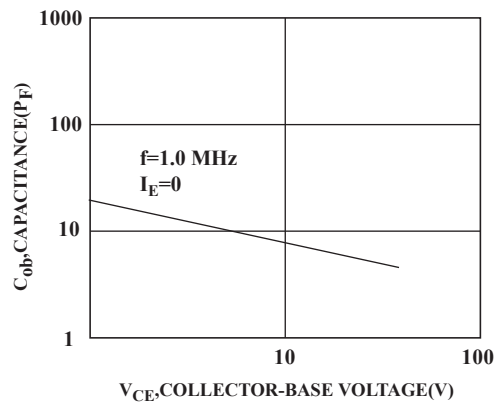
**FIG.3 Base-Emitter On Voltage**



**FIG.4 Base-Emitter Saturation Voltage  
Collector-Emitter Saturation Voltage**



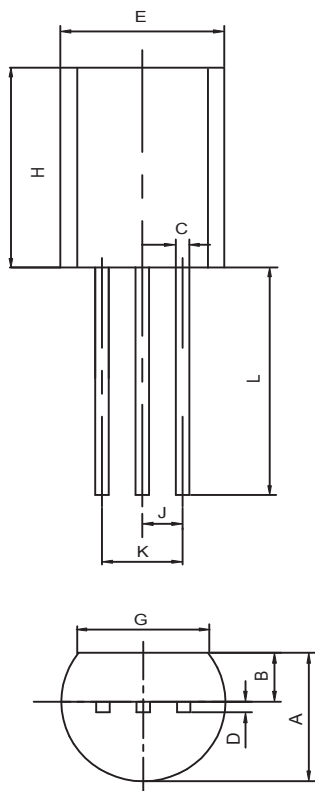
**FIG.5 Current Gain Bandwidth Product**



**FIG.6 Collector Output Capacitance**

**TO-92 Outline Dimensions**

unit:mm



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