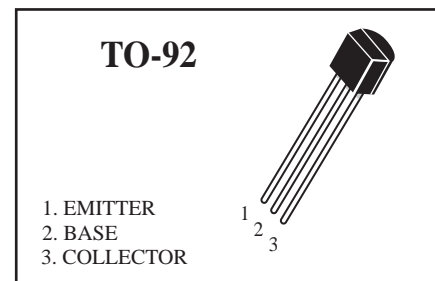


## NPN General Purpose Transistors



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

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V <sub>CEO</sub>	40	V <sub>dc</sub>
Collector-Base Voltage	V <sub>CBO</sub>	60	V <sub>dc</sub>
Emitter-Base Voltage	V <sub>EBO</sub>	6.0	V <sub>dc</sub>
Collector Current	I <sub>C</sub>	200	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> = 1.0 mAdc, I <sub>B</sub> =0)	V <sub>(BR)CEO</sub>	40	-	V <sub>dc</sub>
Collector-Base Breakdown Voltage (I <sub>C</sub> = 100 μAdc, I <sub>E</sub> =0)	V <sub>(BR)CBO</sub>	60	-	V <sub>dc</sub>
Emitter-Base Breakdown Voltage (I <sub>E</sub> = 100 μAdc, I <sub>C</sub> =0)	V <sub>(BR)EBO</sub>	6.0	-	V <sub>dc</sub>
Collector Cutoff Current (V <sub>CE</sub> = 40 V <sub>dc</sub> , I <sub>B</sub> =0)	I <sub>CE0</sub>	-	0.1	uAdc
Collector Cutoff Current (V <sub>CB</sub> = 60 V <sub>dc</sub> , I <sub>E</sub> =0)	I <sub>CBO</sub>	-	0.1	uAdc
Emitter Cutoff Current (V <sub>EB</sub> = 5.0V <sub>dc</sub> , I <sub>C</sub> =0)	I <sub>EBO</sub>	-	0.1	uAdc

**2N3904**
**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 ( $I_C = 10 \text{ mA}$ , $V_{CE} = 1.0 \text{ V}$ )	$h_{FE} (1)$	100	-	400	-
DC Current Gain ( $I_C = 50 \text{ mA}$ , $V_{CE} = 1.0 \text{ V}$ )	$h_{FE} (2)$	60	-	-	-
Collector-Emitter Saturation Voltage ( $I_C = 50 \text{ mA}$ , $I_B = 5 \text{ mA}$ )	$V_{CE(sat)}$	-	-	0.3	Vdc
Base-Emitter Saturation Voltage ( $I_C = 50 \text{ mA}$ , $I_B = 5 \text{ mA}$ )	$V_{BE(sat)}$	-	-	0.95	Vdc
Current-Gain-Bandwidth Product ( $I_C = 10 \text{ mA}$ , $V_{CE} = 20 \text{ V}$ , $f = 100 \text{ MHz}$ )	$f_T$	300	-	-	MHz

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

Rank	O	Y	G
Range	100-200	200-300	300-400

## Typical Characteristics

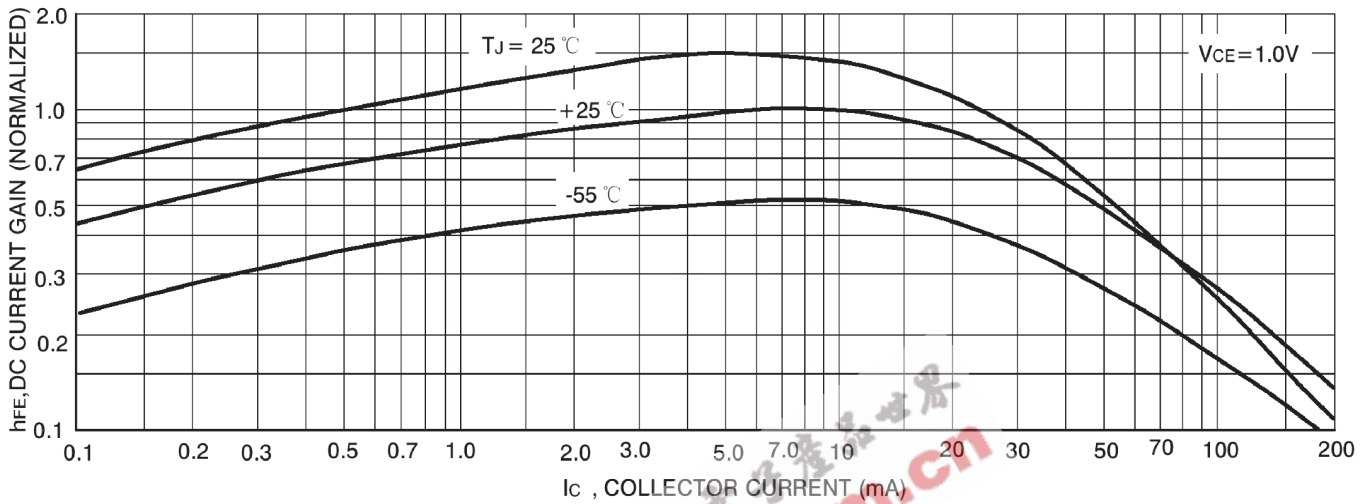


FIG1 DC CURRENT GAIN

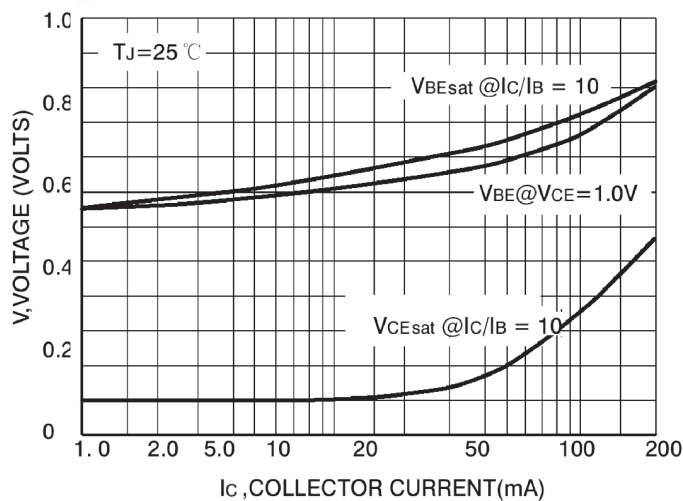


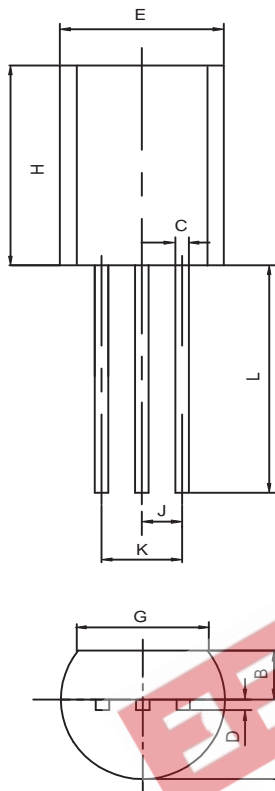
FIG2 "ON" VOLTAGES

2N3904

 WEITRON

### 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