

## 2N3903 / 2N3904

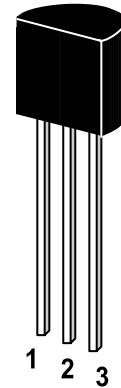


### NPN Silicon Epitaxial Planar Transistor

for switching and amplifier applications.

As complementary types the PNP transistors 2N3905 and 2N3906 are recommended.

On special request, these transistors can be manufactured in different pin configurations.



1. Emitter 2. Base 3. Collector  
TO-92 Plastic Package  
Weight approx. 0.19g

#### Absolute Maximum Ratings ( $T_a = 25\text{ }^\circ\text{C}$ )

Parameter	Symbol	Value	Unit
Collector Base Voltage	$V_{CBO}$	60	V
Collector Emitter Voltage	$V_{CEO}$	40	V
Emitter Base Voltage	$V_{EBO}$	6	V
Collector Current	$I_C$	200	mA
Power Dissipation	$P_{tot}$	625	mW
Junction Temperature	$T_j$	150	$^\circ\text{C}$
Storage Temperature Range	$T_s$	- 55 to + 150	$^\circ\text{C}$

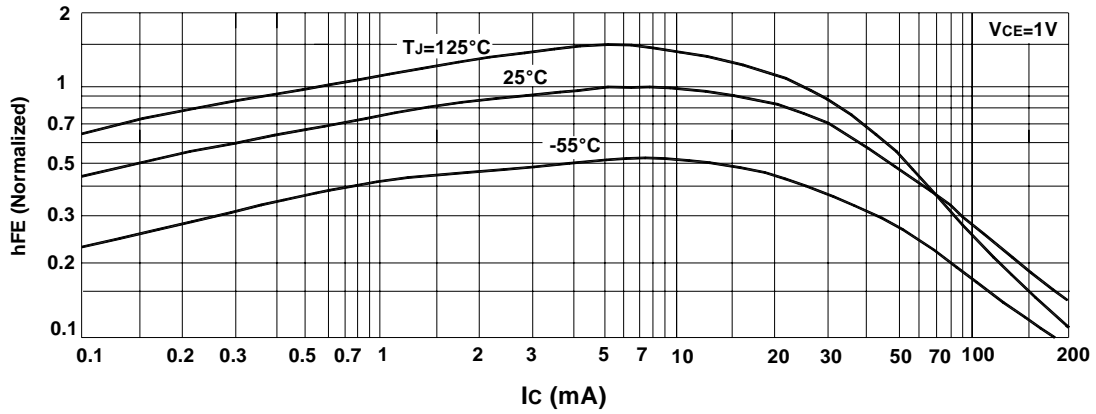


Characteristics at  $T_a = 25\text{ }^\circ\text{C}$

Parameter	Symbol	Min.	Max.	Unit	
DC Current Gain at $V_{CE} = 1\text{ V}$ , $I_C = 0.1\text{ mA}$ at $V_{CE} = 1\text{ V}$ , $I_C = 1\text{ mA}$ at $V_{CE} = 1\text{ V}$ , $I_C = 10\text{ mA}$ at $V_{CE} = 1\text{ V}$ , $I_C = 50\text{ mA}$ at $V_{CE} = 1\text{ V}$ , $I_C = 100\text{ mA}$	2N3903	$h_{FE}$	20	-	-
	2N3904	$h_{FE}$	40	-	-
	2N3903	$h_{FE}$	35	-	-
	2N3904	$h_{FE}$	70	-	-
	2N3903	$h_{FE}$	50	150	-
	2N3904	$h_{FE}$	100	300	-
	2N3903	$h_{FE}$	30	-	-
	2N3904	$h_{FE}$	60	-	-
	2N3903	$h_{FE}$	15	-	-
	2N3904	$h_{FE}$	30	-	-
	Collector Cutoff Current at $V_{CB} = 30\text{ V}$	$I_{CBO}$	-	50	nA
	Emitter Cutoff Current at $V_{EB} = 6\text{ V}$	$I_{EBO}$	-	50	nA
Collector Base Breakdown Voltage at $I_C = 10\text{ }\mu\text{A}$	$V_{(BR)CBO}$	60	-	V	
Collector Emitter Breakdown Voltage at $I_C = 1\text{ mA}$	$V_{(BR)CEO}$	40	-	V	
Emitter Base Breakdown Voltage at $I_E = 10\text{ }\mu\text{A}$	$V_{(BR)EBO}$	6	-	V	
Collector Emitter Saturation Voltage at $I_C = 10\text{ mA}$ , $I_B = 1\text{ mA}$ at $I_C = 50\text{ mA}$ , $I_B = 5\text{ mA}$	$V_{CEsat}$	-	0.2	V	
	$V_{CEsat}$	-	0.3	V	
Base Emitter Saturation Voltage at $I_C = 10\text{ mA}$ , $I_B = 1\text{ mA}$ at $I_C = 50\text{ mA}$ , $I_B = 5\text{ mA}$	$V_{BEsat}$	-	0.85	V	
	$V_{BEsat}$	-	0.95	V	
Gain Bandwidth Product at $V_{CE} = 20\text{ V}$ , $I_C = 10\text{ mA}$ , $f = 100\text{ MHz}$	2N3903	$f_T$	250	-	MHz
	2N3904	$f_T$	300	-	MHz
Collector Base Capacitance at $V_{CB} = 5\text{ V}$ , $f = 100\text{ KHz}$	$C_{cb}$	-	4	pF	
Emitter Base Capacitance at $V_{EB} = 0.5\text{ V}$ , $f = 100\text{ KHz}$	$C_{eb}$	-	8	pF	
Thermal Resistance Junction to Ambient	$R_{thA}$	-	250 <sup>1)</sup>	K/W	
<sup>1)</sup> Valid provided that leads are kept at ambient temperature at a distance of 2 mm from case					



DC Current Gain



Collector Saturation Region

