

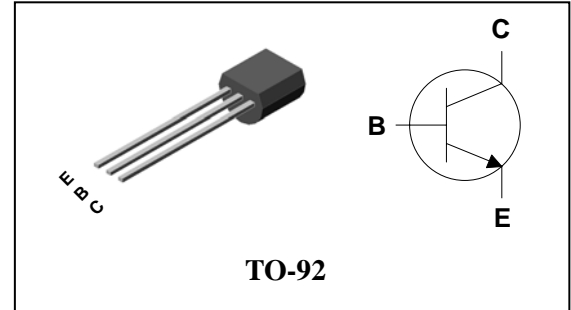
## Descriptions

- General small signal application
- Switching application

## Features

- Low collector saturation voltage
- Collector output capacitance
- Complementary pair with 2N3906

## PIN Connection



## Ordering Information

Type NO.	Marking	Package Code
2N3904	2N3904	TO-92

## Absolute maximum ratings

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

Characteristic	Symbol	Ratings	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
Collector dissipation	$P_C$	625	mW
Junction temperature	$T_j$	150	$^{\circ}\text{C}$
Storage temperature range	$T_{stg}$	-55 ~ 150	$^{\circ}\text{C}$

## Electrical Characteristics

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

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Collector-Base breakdown voltage	$BV_{CBO}$	$I_C=10\mu\text{A}, I_E=0$	60	-	-	V
Collector-Emitter breakdown voltage	$BV_{CEO}$	$I_C=1\text{mA}, I_B=0$	40	-	-	V
Emitter-Base breakdown voltage	$BV_{EBO}$	$I_E=10\mu\text{A}, I_C=0$	6	-	-	V
Collector cut-off current	$I_{CEX}$	$V_{CE}=30\text{V}, V_{EB}=3\text{V}$	-	-	50	nA
DC current gain	$h_{FE}$	$V_{CE}=1\text{V}, I_C=10\text{mA}$	100	-	300	-
Collector-Emitter saturation voltage	$V_{CE(sat)}$	$I_C=50\text{mA}, I_B=5\text{mA}$	-	-	0.3	V
Transition frequency	$f_T$	$V_{CE}=20\text{V}, I_C=10\text{mA}, f=100\text{MHz}$	300	-	-	MHz
Collector output capacitance	$C_{ob}$	$V_{CB}=5\text{V}, I_E=0, f=1\text{MHz}$	-	-	4	pF
Delay time	$t_d$	$V_{CC}=3V_{dc}, V_{BE(off)}=0.5V_{dc}, I_C=10\text{mA}_{dc}, I_{B1}=1\text{mA}_{dc}$	-	-	35	ns
Rise time	$t_r$		-	-	35	ns
Storage time	$t_s$	$V_{CC}=3V_{dc}, I_C=10\text{mA}_{dc}, I_{B1}=I_{B2}=1\text{mA}_{dc}$	-	-	200	ns
Fall Time	$t_f$		-	-	50	ns

Electrical Characteristic Curves

Fig. 1  $P_C$ - $T_a$

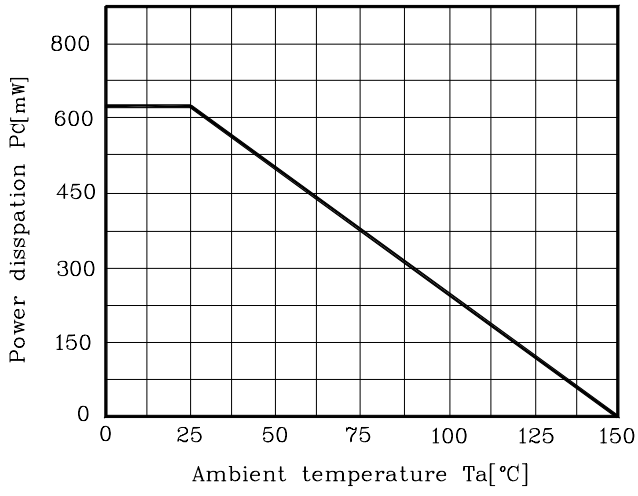


Fig. 2  $h_{FE}$ - $I_C$

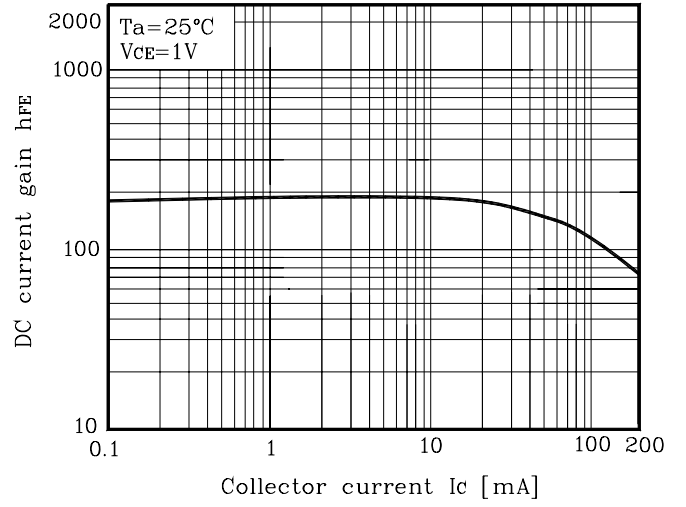
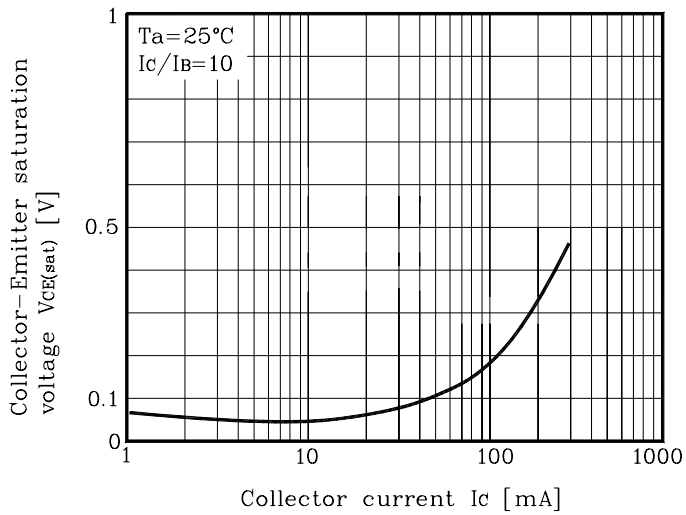


Fig. 3  $V_{CE(sat)}$ - $I_C$



Outline Dimension



SYMBOL	MILLMETERS(mm)		
	MINIMUM	NOMINAL	MAXIMUM
A	3.40	3.50	3.66
A1	2.46	2.51	2.59
b	0.39	0.44	0.53
b1	0.39	—	0.63
c	0.35	0.42	0.47
D	4.48	4.60	4.70
E	4.48	4.60	4.70
e	1.17	1.27	1.37
L	13.70	14.00	14.77
L1	1.55	1.70	2.15

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