

**Descriptions**

- General small signal application
- Switching application

**Features**

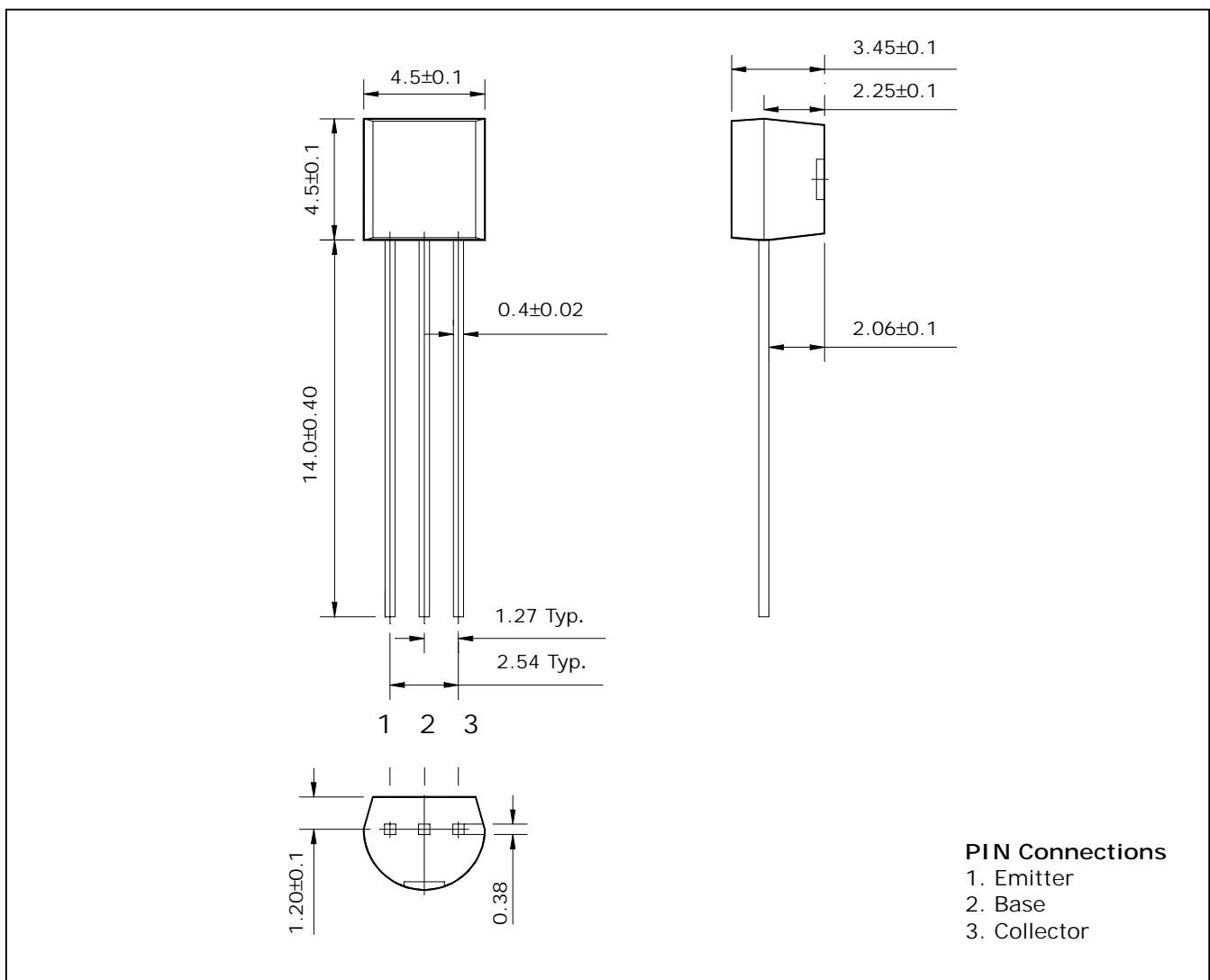
- Low collector saturation voltage
- Collector output capacitance
- Complementary pair with 2N3906

**Ordering Information**

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

**Outline Dimensions**

**unit : mm**



## Absolute maximum ratings

Ta=25°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       | °C   |
| Storage temperature range | $T_{stg}$ | -55 ~ 150 | °C   |

## Electrical Characteristics

Ta=25°C

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

Electrical Characteristic Curves

Fig. 1  $P_C$ - $T_a$

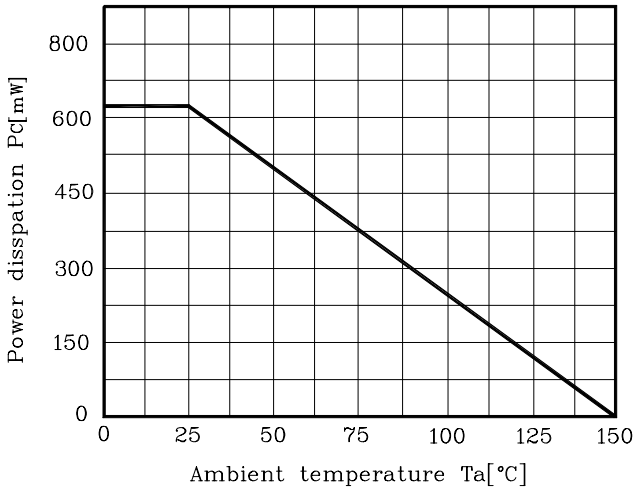


Fig. 2  $h_{FE}$ - $I_C$

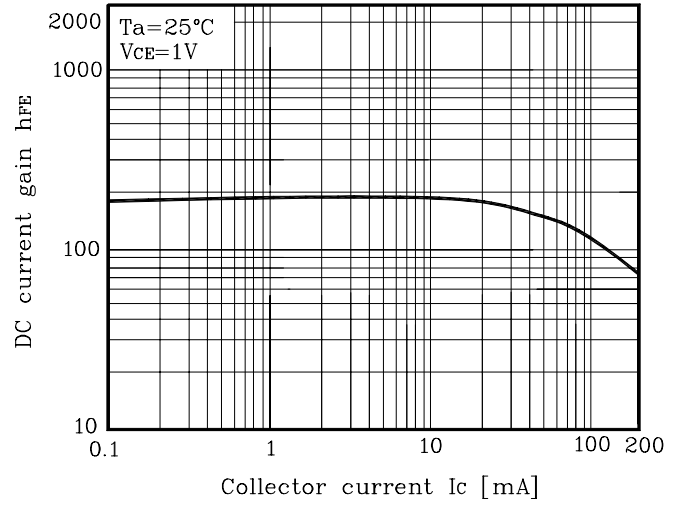


Fig. 3  $V_{CE(sat)}$ - $I_C$

