

**Descriptions**

- General small signal application
- Switching application

**Features**

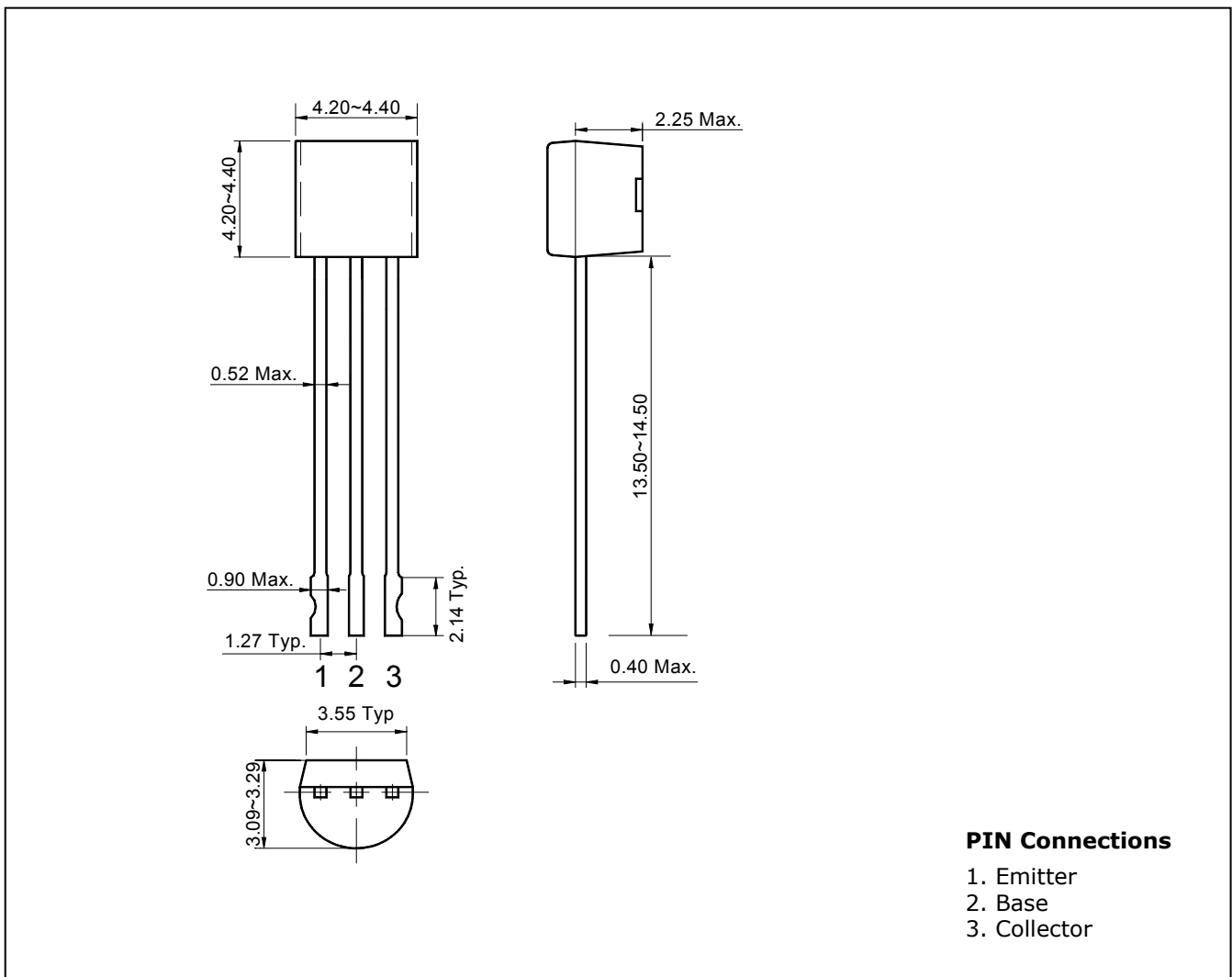
- Low collector saturation voltage :  $V_{CE(sat)}=0.3V(MAX.) @ I_C=50mA, I_B=5mA$
- Low collector output capacitance :  $C_{ob} = 3pF(Typ.) @ V_{CB}=5V, I_E=0, f=1MHz$
- Complementary pair with STA3906A

**Ordering Information**

| Type NO. | Marking | Package Code |
|----------|---------|--------------|
| 2N3904N  | 2N3904  | TO-92N       |

**Outline Dimensions**

**unit : mm**



**Absolute Maximum Ratings**

(Ta=25°C)

| Characteristic              | Symbol    | Rating  | 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 power dissipation | $P_C$     | 400     | 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-emitter breakdown voltage  | $BV_{CEO}$    | $I_C=1mA, I_B=0$   | 40   | -    | -    | 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    |
| Base-emitter voltage                 | $V_{BE}$      | $V_{CE}=1V, I_C=10mA$                                    | -    | 0.75 | 1.0  | V    |
| Transition frequency                 | $f_T$         | $V_{CE}=20V, I_C=10mA$                                   | -    | 300  | -    | MHz  |
| Collector output capacitance         | $C_{ob}$      | $V_{CB}=5V, I_E=0, f=1MHz$                               | -    | 3    | -    | pF   |
| Turn on delay time                   | $t_d$         | $V_{CC}=3V, V_{BE(off)}=0.5V,$<br>$I_C=10mA, I_{B1}=1mA$ | -    | -    | 35   | ns   |
| Rise time                            | $t_r$         |  | -    | -    | 35   | ns   |
| Storage time                         | $t_{stg}$     | $V_{CC}=3V, I_C=10mA,$<br>$I_{B1}=I_{B2}=1mA$            | -    | -    | 200  | ns   |
| Fall Time                            | $t_f$         |  | -    | -    | 50   | ns   |

## Electrical Characteristic Curves

Fig. 1  $P_C - T_a$

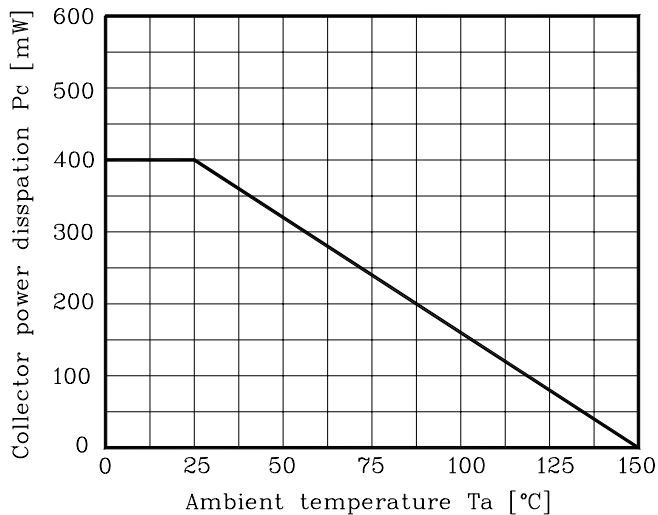


Fig. 2  $h_{FE} - I_C$

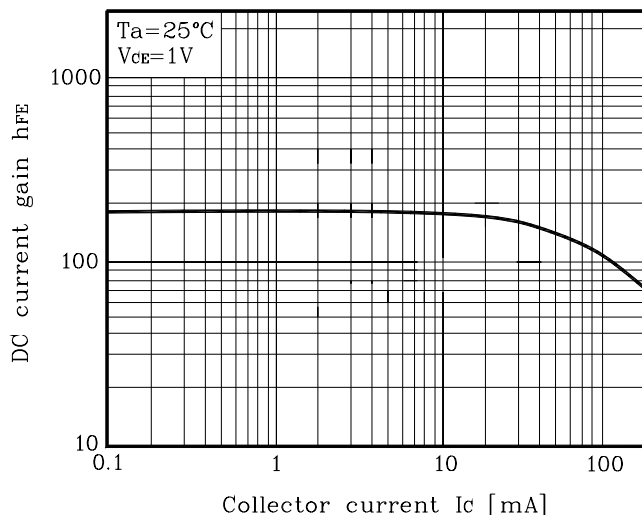
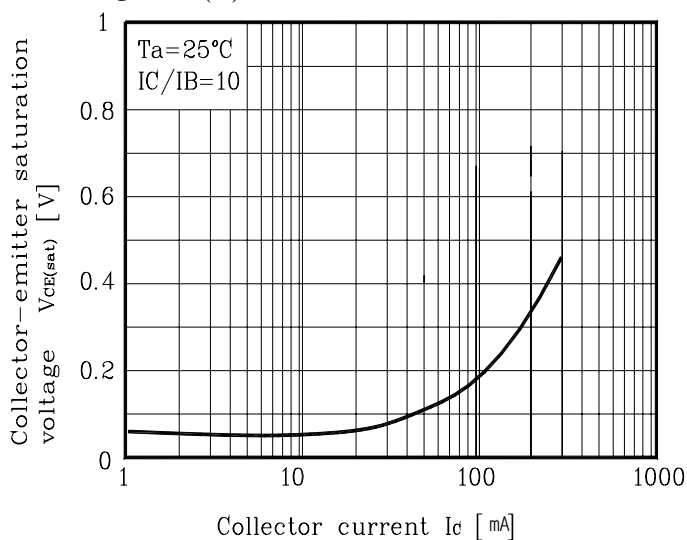


Fig. 3  $V_{CE(sat)} - I_C$



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