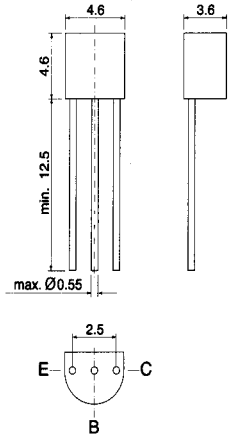
# HN / 2N 3905/3906

PNP Silicon Expitaxial Planar Transistor
for switching and amplifier applications.

As complementary types the NPN transistors
HN / 2N3903 and HN / 2N 3904 are recommended.

On special request, these transistors can be manufactured in different pin configurations. Please refer to the "TO-92 TRANSISTOR PACKAGE OUTLINE" on page 80 for the available pin options.




TO-92 Plastic Package
Weight approx. 0.18 g
Dimensions in mm

**Absolute Maximum Ratings ($T_a$ = 25°C)**

| | Symbol | Value | Unit |
|---|---|---|---|
| Collector Base Voltage | $-V_{CBO}$ | 40 | V |
| Collector Emitter Voltage | $-V_{CEO}$ | 40 | V |
| Emitter Base Voltage | $-V_{EBO}$ | 5 | V |
| Collector Current | $-I_C$ | 100 | mA |
| Peak Collector Current | $-I_{CM}$ | 200 | mA |
| Power Dissipation at $T_{amb}$ = 25°C | $P_{tot}$ | 500[1)] | mW |
| Junction Temperature | $T_J$ | 150 | °C |
| Storage Temperature Range | $T_S$ | -55 to +150 | °C |
| [1)] Valid provided that leads are kept at ambient temperature at a distance of 2 mm from case | | | |

**G S P FORM A AVAILABLE**

**Characteristics** at $T_{amb}$ =25 °C

| | | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| DC Current Gain | | | | | | |
| at $-V_{CE}$ = 1V, $-I_C$ = 0.1 mA | **HN / 2N 3905** | $h_{FE}$ | 30 | - | - | - |
| | **HN / 2N 3906** | $h_{FE}$ | 60 | - | - | - |
| at $-V_{CE}$ = 1V, $-I_C$ = 1 mA | **HN / 2N 3905** | $h_{FE}$ | 40 | - | - | - |
| | **HN / 2N 3906** | $h_{FE}$ | 80 | - | - | - |
| at $-V_{CE}$ = 1V, $-I_C$ = 10 mA | **HN / 2N 3905** | $h_{FE}$ | 50 | - | 150 | - |
| | **HN / 2N 3906** | $h_{FE}$ | 100 | - | 300 | - |
| at $-V_{CE}$ = 1V, $-I_C$ = 50 mA | **HN / 2N 3905** | $h_{FE}$ | 30 | - | - | - |
| | **HN / 2N 3906** | $h_{FE}$ | 60 | - | - | - |
| at $-V_{CE}$ = 1V, $-I_C$ = 100 mA | **HN / 2N 3905** | $h_{FE}$ | 15 | - | - | - |
| | **HN / 2N 3906** | $h_{FE}$ | 30 | - | - | - |
| Thermal Resistance Junction to Ambient | | $R_{thA}$ | - | - | 250 [1] | K/W |
| Collector Saturation Voltage | | | | | | |
| at $-I_C$ = 10 mA, $-I_B$ = 1 mA | | $-V_{CE\ sat}$ | - | - | 0.25 | V |
| at $-I_C$ = 50 mA, $-I_B$ = 5 mA | | $-V_{CE\ sat}$ | - | - | 0.4 | V |
| Base Saturation Voltage | | | | | | |
| at $-I_C$ = 10 mA, $-I_B$ = 1 mA | | $-V_{BE\ sat}$ | - | - | 0.85 | V |
| at $-I_C$ = 50 mA, $-I_B$ = 5 mA | | $-V_{BE\ sat}$ | - | - | 0.95 | V |
| Collector Cutoff Current | | | | | | |
| at $-V_{EB}$ = 3 V, $-V_{CE}$ = 30 V | | $-I_{CEV}$ | - | - | 50 | nA |
| Emitter Cutoff Current | | | | | | |
| at $-V_{EB}$ = 3 V, $-V_{CE}$ = 30 V | | $-I_{EBV}$ | - | - | 50 | nA |
| Collector Base Breakdown Voltage | | | | | | |
| at $-I_C$ = 10 µA, $I_E$ = 0 | | $-V_{(BR)CBO}$ | 40 | - | - | V |
| Collector Emitter Breakdown Voltage | | | | | | |
| at $-I_C$ = 1 mA, $I_B$ = 0 | | $-V_{(BR)CEO}$ | 40 | - | - | V |
| Emitter Base Breakdown Voltage | | | | | | |
| at $-I_E$ = 10 µA, $I_C$ = 0 | | $-V_{(BR)EBO}$ | 5 | - | - | V |
| Gain Bandwidth Product | | | | | | |
| at $-V_{CE}$ = 20 V, $-I_C$ = 10 mA, f = 100MHz | | | | | | |
| | **HN / 2N 3905** | $f_T$ | 200 | - | - | MHz |
| | **HN / 2N 3906** | $f_T$ | 250 | - | - | MHz |
| Collector Base Capacitance | | $C_{CBO}$ | - | - | 4.5 | pF |
| at $-V_{CB}$ = 5V, f = 100 kHz | | | | | | |
| Emitter Base Capacitance | | $C_{EBO}$ | - | - | 10 | pF |
| at $-V_{EB}$ = 0.5V, f = 100 kHz | | | | | | |

[1] Valid provided that leads are kept at ambient temperature at a distance of 2 mm from case.

**Characteristics** (continued)

| | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Rise Time (see Fig. 1)<br>at $-I_{B1}$ = 1 mA, $-I_C$ = 10mA | $t_r$ | - | - | 70 | ns |
| Fall Time (see Fig. 2)<br>at $I_{B1} = -I_{B2}$ = 1 mA, $-I_C$ = 10mA | $t_f$<br>$t_f$ | -<br>- | -<br>- | 200 | ns<br>ns |

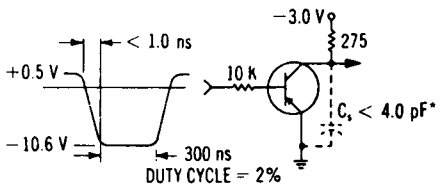



**Fig. 1:** Test circuit for delay and rise time
* total shunt capacitance of test jig and connectors

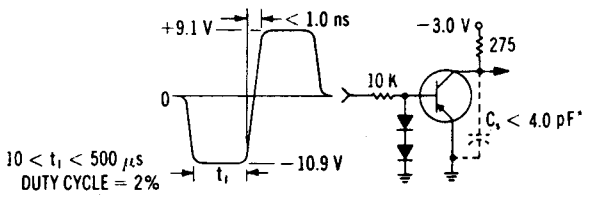



**Fig. 2:** Test circuit for storage and fall time
* total shunt capacitance of test jig and connectors