# DONGGUAN NANJING ELECTRONICS LTD.,

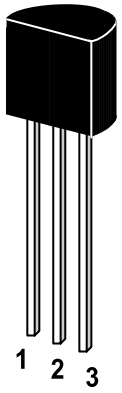
## NPN Epitaxial Silicon Transistor

## 2N4400 / 2N4401

General purpose transistor

Collector Emitter Voltage: $V_{CEO}$ = 40 V
Collector Dissipation: $P_C$ (max) = 625 mW

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 °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 | $I_C$ | 600 | mA |
| Power Dissipation | $P_{tot}$ | 625 | mW |
| Junction Temperature | $T_j$ | 150 | °C |
| Storage Temperature Range | $T_S$ | -55 to +150 | °C |

# 2N4400 / 2N4401

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

| Parameter | | Symbol | Min. | Max. | Unit |
|---|---|---|---|---|---|
| DC Current Gain | | | | | |
| at $V_{CE}$=1V, $I_C$=0.1mA | ST 2N4401 | $h_{FE}$ | 20 | - | - |
| at $V_{CE}$=1V, $I_C$=1mA | ST 2N4400 | $h_{FE}$ | 20 | - | - |
| | ST 2N4401 | $h_{FE}$ | 40 | - | - |
| at $V_{CE}$=1V, $I_C$=10mA | ST 2N4400 | $h_{FE}$ | 40 | - | - |
| | ST 2N4401 | $h_{FE}$ | 58 | - | - |
| at $V_{CE}$=1V, $I_C$=150mA | ST 2N4400 | $h_{FE}$ | 50 | 150 | - |
| | ST 2N4401 | $h_{FE}$ | 100 | 300 | - |
| at $V_{CE}$=2V, $I_C$=500mA | ST 2N4400 | $h_{FE}$ | 20 | - | - |
| | ST 2N4401 | $h_{FE}$ | 40 | - | - |
| Collector Cutoff Current at $V_{CB}$=35V | | $I_{CBO}$ | - | 100 | nA |
| Emitter Cutoff Current at $V_{EB}$=5V | | $I_{EBO}$ | - | 100 | nA |
| Collector Emitter Breakdown Voltage at $I_C$=1mA | | $V_{(BR)CEO}$ | 40 | - | V |
| Collector Base Breakdown Voltage at $I_C$=100µA | | $V_{(BR)CBO}$ | 60 | - | V |
| Emitter Base Breakdown Voltage at $I_E$=100µA | | $V_{(BR)EBO}$ | 6 | - | V |
| Collector Emitter Saturation Voltage | | | | | |
| at $I_C$=150mA, $I_B$=15mA | | $V_{CEsat}$ | - | 0.4 | V |
| at $I_C$=500mA, $I_B$=50mA | | $V_{CEsat}$ | - | 0.75 | V |
| Collector Saturation Voltage | | | | | |
| at $I_C$=150mA, $I_B$=15mA | | $V_{BEsat}$ | 0.75 | 0.95 | V |
| at $I_C$=500mA, $I_B$=50mA | | $V_{BEsat}$ | - | 1.2 | V |
| Gain Bandwidth Product | | | | | |
| at $V_{CE}$=10V, $I_C$=20mA, f=100MHz | ST 2N4400 | $f_T$ | 200 | - | MHz |
| | ST 2N4401 | $f_T$ | 250 | - | MHz |
| Collector Base Capacitance at $V_{CB}$=5V, f=100MHz | | $C_{CBO}$ | - | 6.5 | pF |
| Turn On Time at $V_{CC}$=30V, $V_{BE}$=2V, $I_C$=150mA, $I_{B1}$=15mA | | $t_{on}$ | - | 35 | ns |
| Turn Off Time at $V_{CC}$=30V, $I_C$=150mA, $I_{B1}$=$I_{B2}$=15mA | | $t_{off}$ | - | 255 | ns |

## ●Electrical characteristic curves

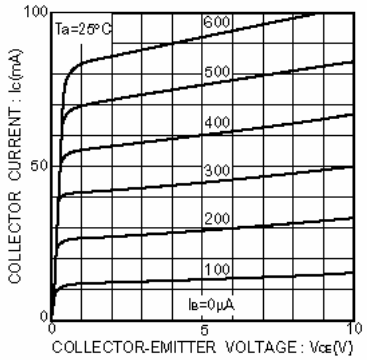



Fig.1 Grounded emitter output characteristics

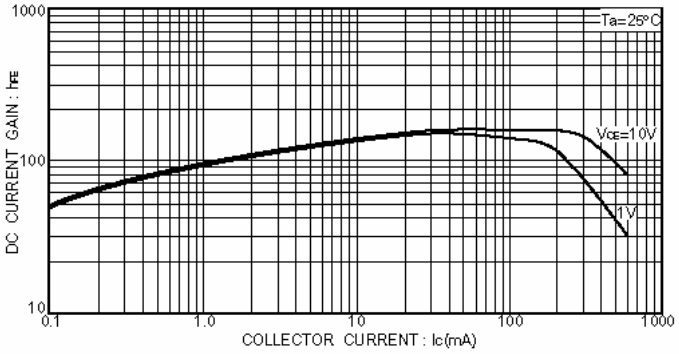



Fig.3 DC current gain vs. collector current(I)

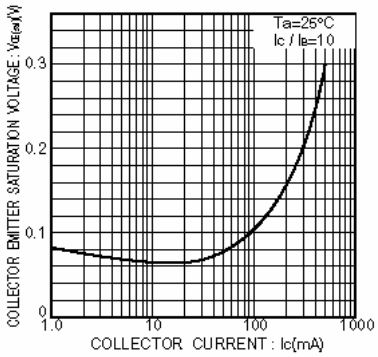



Fig.2 Collector-emitter saturation voltage vs. collector current

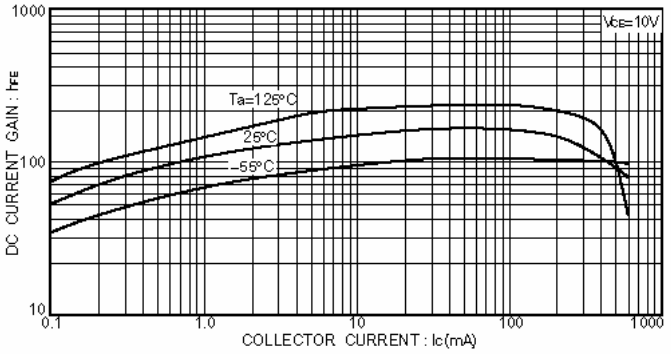



Fig.4 DC current gain vs. collector current(II)

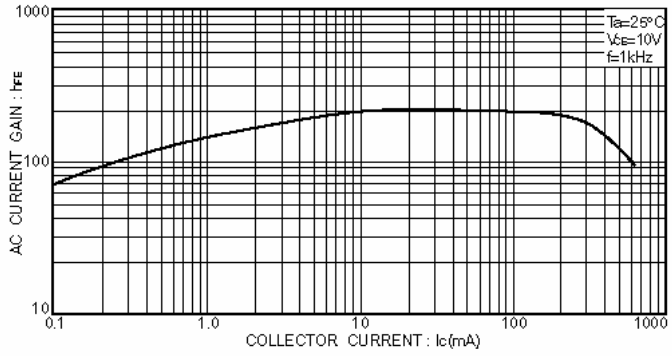



Fig.5 AC current gain vs. collector current

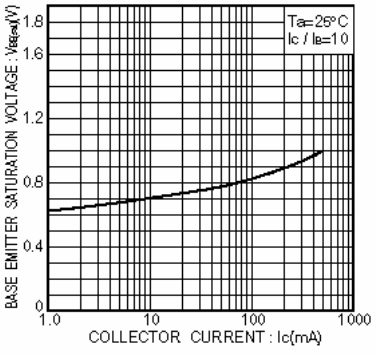



Fig.6 Base-emitter saturation voltage vs. collector current

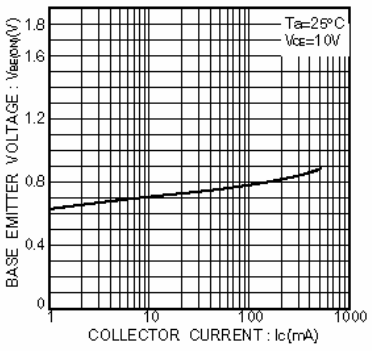



Fig.7 Grounded emitter propagation characteristics

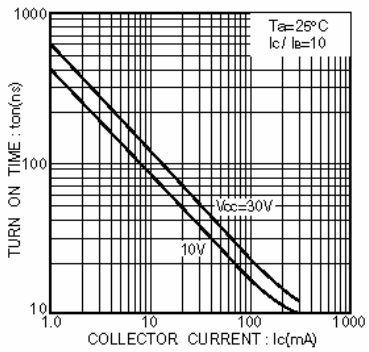



Fig.8 Turn-on time vs. collector current

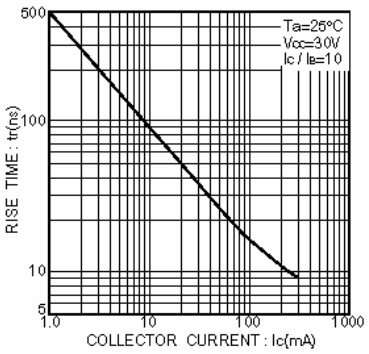



Fig.9 Rise time vs. collector current

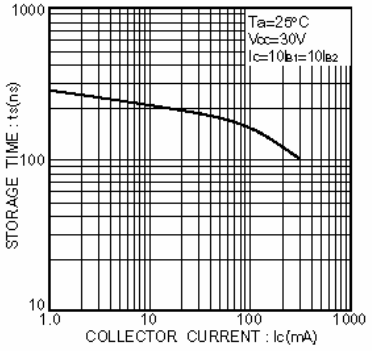



Fig.10 Storage time vs. collector current

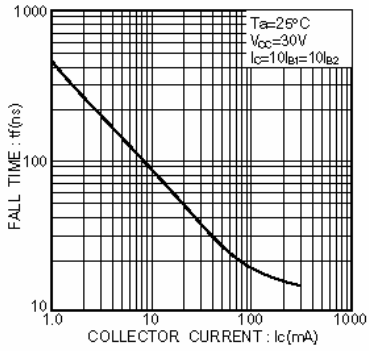



Fig.11 Fall time vs. collector current

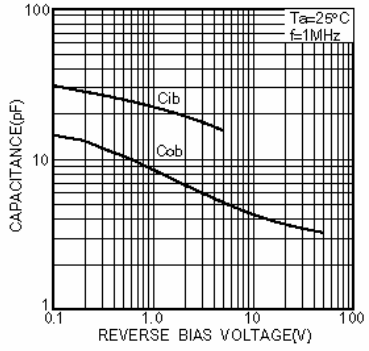



Fig.12 Input / output capacitance vs. voltage

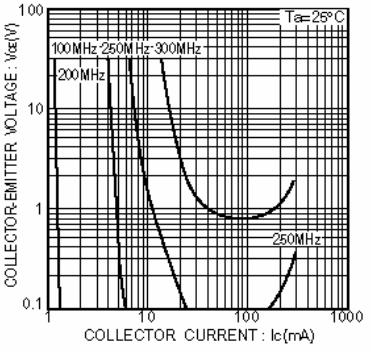



Fig.13 Gain bandwidth product

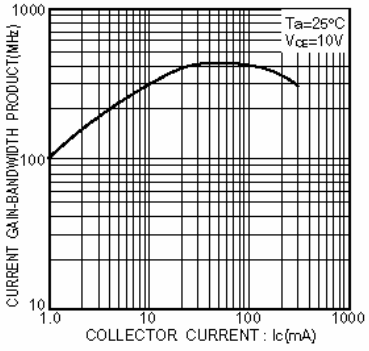



Fig.14 Gain bandwidth product vs. collector current