Elektronische Bauelemente

# 2N2907A

**PNP Silicon**
**General Purpose Transistor**

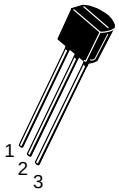
RoHS Compliant Product

A suffix of "-C" specifies halogen & lead-free

## Features

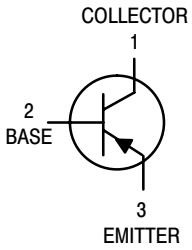
Epitaxial Planar Die Construction
Complementary NPN Type Available 2N2222A
Ideal for Medium Power Amplification and Switching

**TO–92**




### MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Collector–Emitter Voltage | $V_{CEO}$ | –60 | Vdc |
| Collector±Base Voltage | $V_{CBO}$ | –60 | Vdc |
| Emitter–Base Voltage | $V_{EBO}$ | –5.0 | Vdc |
| Collector Current — Continuous | $I_C$ | –600 | mAdc |
| Total Device Dissipation @ $T_A$ = 25°C<br>Derate above 25°C | $P_D$ | 625<br>5.0 | mW<br>mW/°C |
| Total Device Dissipation @ $T_C$ = 25°C<br>Derate above 25°C | $P_D$ | 1.5<br>12 | Watts<br>mW/°C |
| Operating and Storage Junction Temperature Range | $T_J$, $T_{stg}$ | –55 to +150 | °C |




### THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|---|---|---|---|
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 200 | °C/W |
| Thermal Resistance, Junction to Case | $R_{\theta JC}$ | 83.3 | °C/W |

### ELECTRICAL CHARACTERISTICS ($T_A$ = 25°C unless otherwise noted)

| Characteristic | Symbol | Min | Max | Unit |
|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | |
| Collector–Emitter Breakdown Voltage[1]<br>($I_C$ = –10 mAdc, $I_B$ = 0) | $V_{(BR)CEO}$ | –40 | — | Vdc |
| Collector–Base Breakdown Voltage<br>($I_C$ = –10 μAdc, $I_E$ = 0) | $V_{(BR)CBO}$ | –60 | — | Vdc |
| Emitter–Base Breakdown Voltage<br>($I_E$ = –10 μAdc, $I_C$ = 0) | $V_{(BR)EBO}$ | –5.0 | — | Vdc |
| Collector Cut-off Current<br>($V_{CE}$ = –50 Vdc, $V_{EB(off)}$ = –0.5 Vdc) | $I_{CEX}$ | — | –50 | nAdc |
| Collector Cut-off Current<br>($V_{CB}$ = –50 Vdc, $I_E$ = 0)<br>($V_{CB}$ = –50 Vdc, $I_E$ = 0, $T_A$ = 150°C) | $I_{CBO}$ | —<br>— | –0.10<br>–15 | μAdc |
| Emitter Cut-off Current<br>($V_{EB}$ = –3.0 Vdc) | $I_{EBO}$ | — | –100 | nAdc |
| Collector Cut-off Current<br>($V_{CE}$ = –35 V) | $I_{CEO}$ | — | –100 | nAdc |
| Base Cut-off Current<br>($V_{CE}$ = –30 Vdc, $V_{EB(off)}$ = –0.5 Vdc) | $I_{BEX}$ | — | –50 | nAdc |

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

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Any changing of specification will not be informed individual



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**ELECTRICAL CHARACTERISTICS** ($T_A$ = 25°C unless otherwise noted) (Continued)

| Characteristic | Symbol | Min | Max | Unit |
|---|---|---|---|---|
| **ON CHARACTERISTICS** | | | | |
| DC Current Gain | $h_{FE}$ | | | — |
| ($I_C$ = –0.1 mAdc, $V_{CE}$ = –10 Vdc) | | 75 | — | |
| ($I_C$ = –1.0 mAdc, $V_{CE}$ = –10 Vdc) | | 50 | — | |
| ($I_C$ = –10 mAdc, $V_{CE}$ = –10 Vdc) | | 100 | — | |
| ($I_C$ = –150 mAdc, $V_{CE}$ = –10 Vdc)(1) | | 100 | 300 | |
| ($I_C$ = –500 mAdc, $V_{CE}$ = –10 Vdc)(1) | | 50 | — | |
| Collector–Emitter Saturation Voltage(1) | $V_{CE(sat)}$ | | | Vdc |
| ($I_C$ = –150 mAdc, $I_B$ = –15 mAdc) | | — | –0.3 | |
| ($I_C$ = –500 mAdc, $I_B$ = –50 mAdc) | | — | –1.0 | |
| Base–Emitter Saturation Voltage(1) | $V_{BE(sat)}$ | | | Vdc |
| ($I_C$ = –150 mAdc, $I_B$ = –15 mAdc) | | — | –1.3 | |
| ($I_C$ = –500 mAdc, $I_B$ = –50 mAdc) | | — | –2.0 | |
| **SMALL–SIGNAL CHARACTERISTICS** | | | | |
| Current–Gain — Bandwidth Product(1), (2) ($I_C$ = –50 mAdc, $V_{CE}$ = –20 Vdc, f = 100 MHz) | $f_T$ | 200 | — | MHz |
| Output Capacitance ($V_{CB}$ = –10 Vdc, $I_E$ = 0, f = 1.0 MHz) | $C_{obo}$ | — | 8.0 | pF |
| Input Capacitance ($V_{EB}$ = –2.0 Vdc, $I_C$ = 0, f = 1.0 MHz) | $C_{ibo}$ | — | 30 | pF |
| **SWITCHING CHARACTERISTICS** | | | | |
| Turn–On Time | ($V_{CC}$ = –30 Vdc, $I_C$ = –150 mAdc, $I_{B1}$ = –15 mAdc) (Figures 1 and 5) | $t_{on}$ | — | 50 | ns |
| Delay Time | | $t_d$ | — | 10 | ns |
| Rise Time | | $t_r$ | — | 40 | ns |
| Turn–Off Time | ($V_{CC}$ = –6.0 Vdc, $I_C$ = –150 mAdc, $I_{B1}$ = $I_{B2}$ = –15 mAdc) (Figure 2) | $t_{off}$ | — | 110 | ns |
| Storage Time | | $t_s$ | — | 80 | ns |
| Fall Time | | $t_f$ | — | 30 | ns |

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.
2. $f_T$ is defined as the frequency at which $|h_{fe}|$ extrapolates to unity.

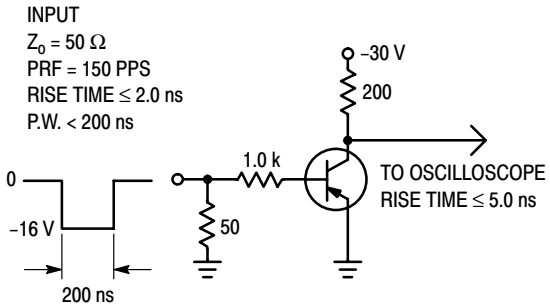


**Figure 1. Delay and Rise Time Test Circuit**

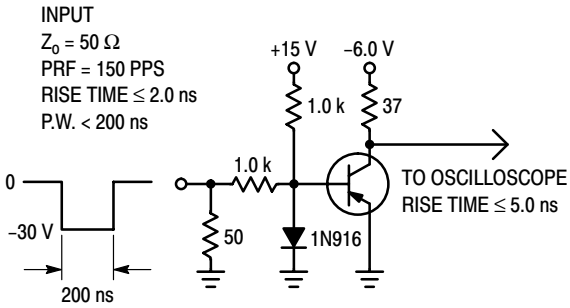


**Figure 2. Storage and Fall Time Test Circuit**



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## TYPICAL CHARACTERISTICS

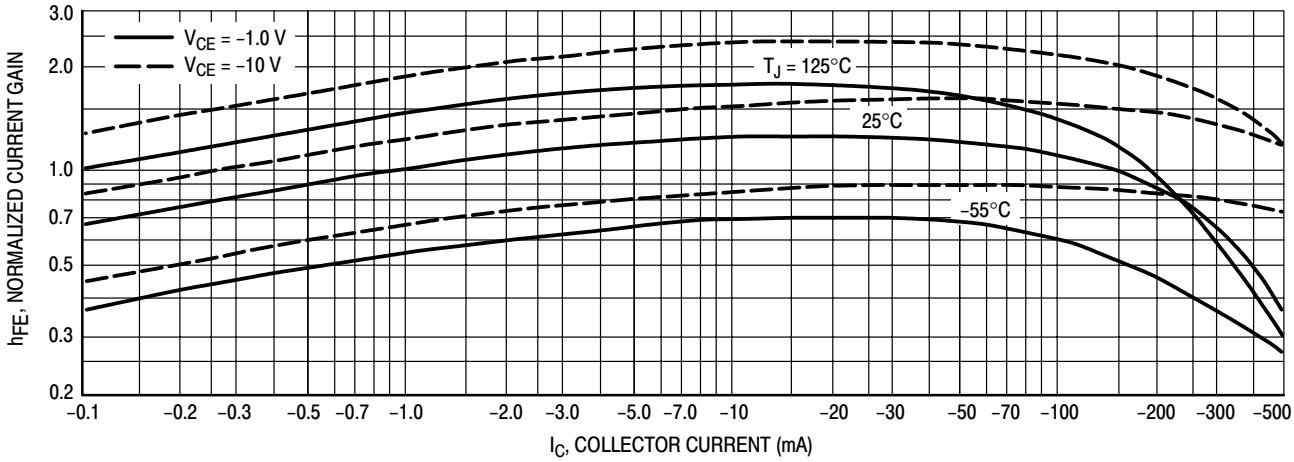


**Figure 3. DC Current Gain**

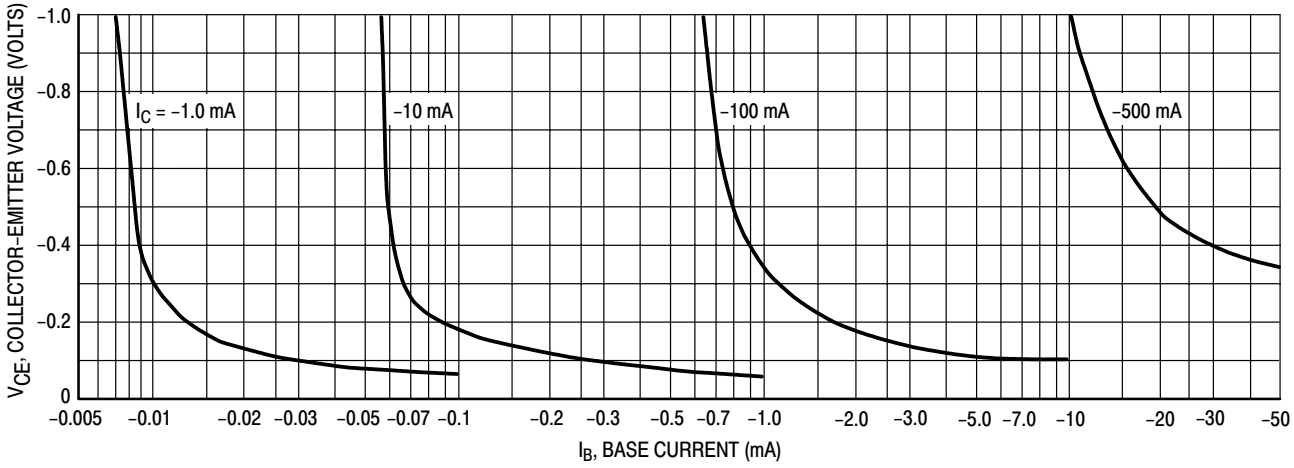


**Figure 4. Collector Saturation Region**

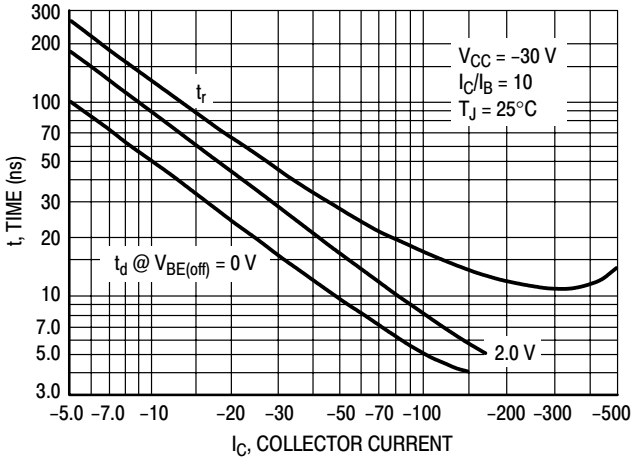


**Figure 5. Turn–On Time**

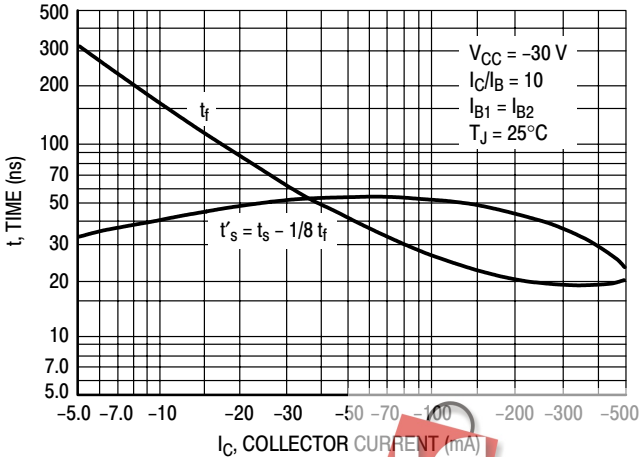


**Figure 6. Turn–Off Time**



Any changing of specification will not be informed individual

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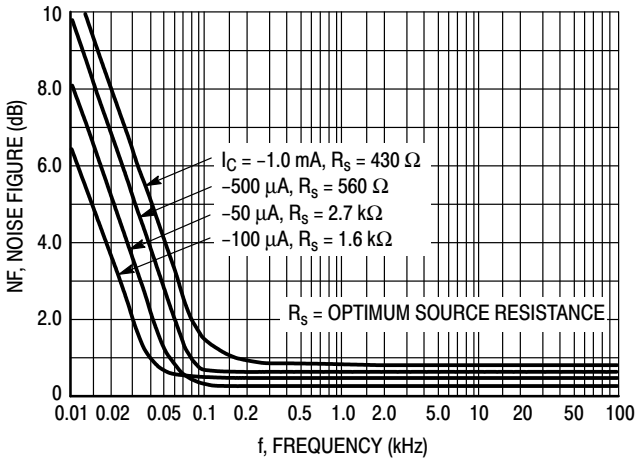


**Figure 7. Frequency Effects**

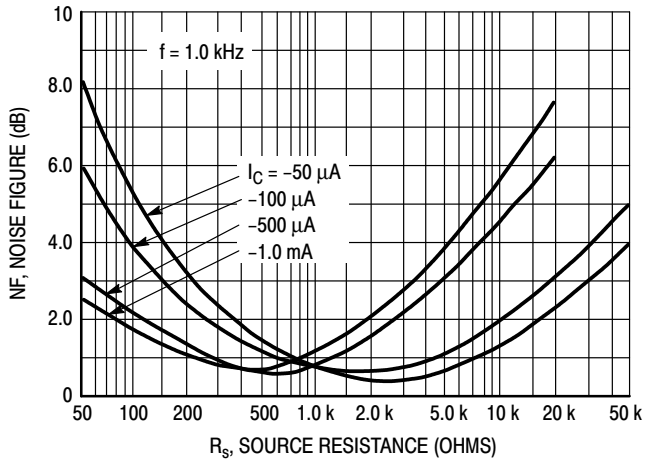


**Figure 8. Source Resistance Effects**

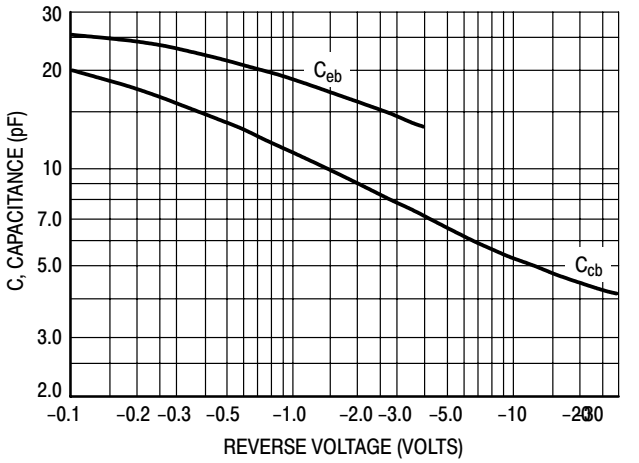


**Figure 9. Capacitances**

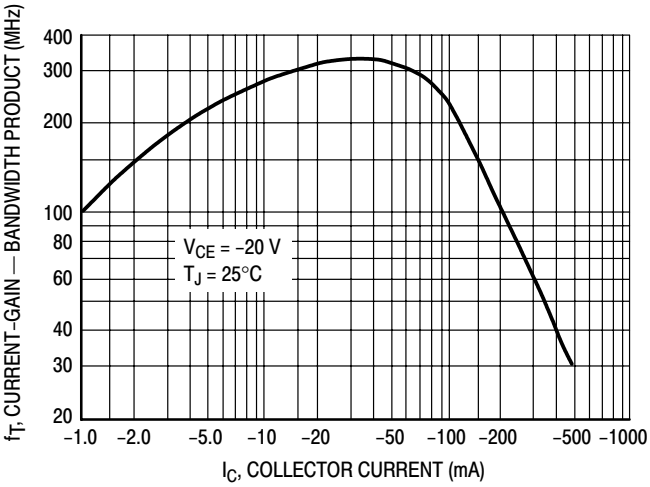


**Figure 10. Current–Gain — Bandwidth Product**

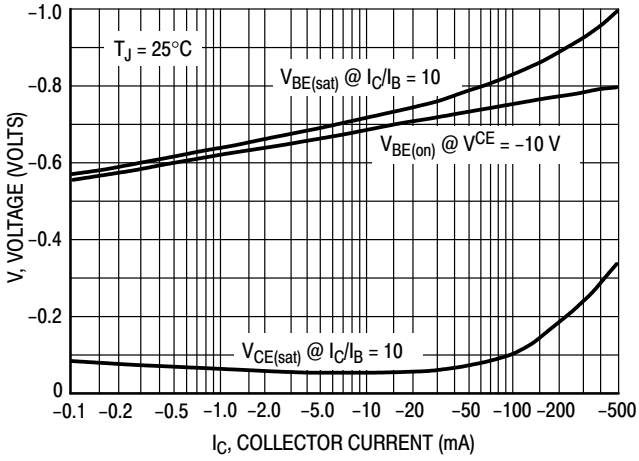


**Figure 11. “On” Voltage**

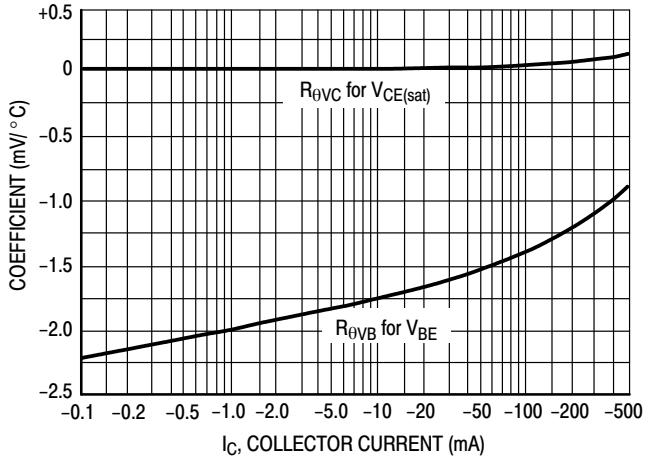


**Figure 12. Temperature Coefficients**

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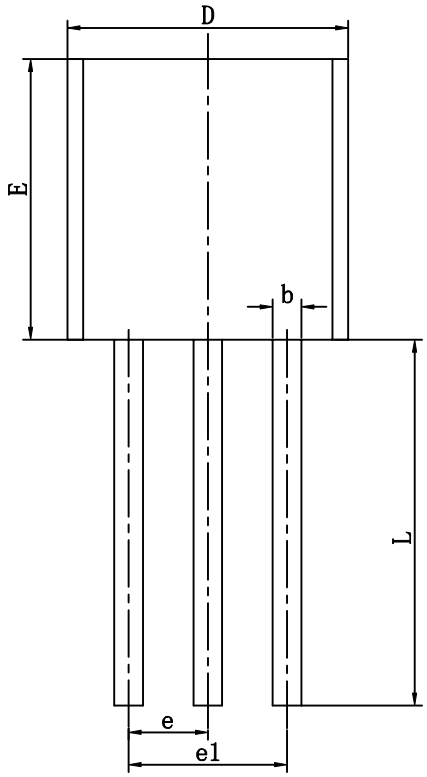
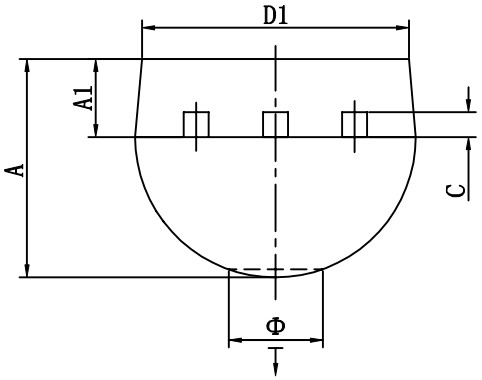
## ●TO-92 PACKAGE OUTLINE DIMENSIONS




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 3.300 | 3.700 | 0.130 | 0.146 |
| A1 | 1.100 | 1.400 | 0.043 | 0.055 |
| b | 0.380 | 0.550 | 0.015 | 0.022 |
| c | 0.360 | 0.510 | 0.014 | 0.020 |
| D | 4.400 | 4.700 | 0.173 | 0.185 |
| D1 | 3.430 | | 0.135 | |
| E | 4.300 | 4.700 | 0.169 | 0.185 |
| e | 1.270TYP | | 0.050TYP | |
| e1 | 2.440 | 2.640 | 0.096 | 0.104 |
| L | 14.100 | 14.500 | 0.555 | 0.571 |
| Ö | | 1.600 | | 0.063 |
| ⊤ | 0.000 | 0.380 | 0.000 | 0.015 |



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