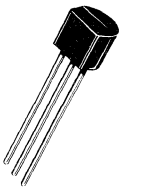
# 2N5223 (SILICON)

## NPN SILICON AMPLIFIER TRANSISTOR

. . . designed for low-level, small-signal, general-purpose amplifier applications.

- High Current-Gain–Bandwidth Product
  $f_T$ = 150 MHz (Min) @ $I_C$ = 10 mAdc–
- Collector-Emitter Saturation Voltage–
  $V_{CE(sat)}$ = 0.7 Vdc (Max) @ $I_C$ = 10 mAdc
- Collector-Base Capacitance–
  $C_{cb}$ = 4.0 pF (Max) @ $V_{CB}$ = 10 Vdc

## NPN SILICON AMPLIFIER TRANSISTOR



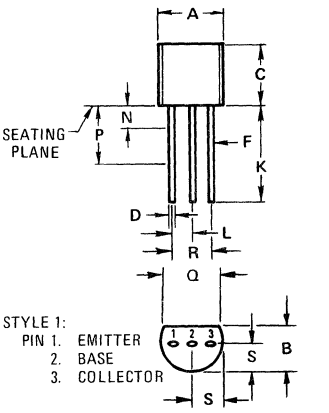
***MAXIMUM RATINGS**

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Collector-Emitter Voltage | $V_{CEO}$ | 20 | Vdc |
| Collector-Base Voltage | $V_{CB}$ | 25 | Vdc |
| Emitter-Base Voltage | $V_{EB}$ | 3.0 | Vdc |
| Collector Current – Continuous | $I_C$ | 100 | mAdc |
| Total Power Dissipation @ $T_A$ = 25°C<br>Derate above 25°C | $P_D$ | 350<br>2.8 | mW<br>mW/°C |
| Total Power Dissipation @ $T_C$ = 25°C<br>Derate above 25°C | $P_D$ | 1.0<br>8.0 | Watt<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 | $R_{\theta JA}$(1) | 357 | °C/W |
| Thermal Resistance, Junction to Case | $R_{\theta JC}$ | 125 | °C/W |

*Indicates JEDEC Registered Data.
(1) $R_{\theta JA}$ is measured with the device soldered into a typical printed circuit board.




| DIM | MILLIMETERS MIN | MILLIMETERS MAX | INCHES MIN | INCHES MAX |
|---|---|---|---|---|
| A | 4.450 | 5.200 | 0.175 | 0.205 |
| B | 3.180 | 4.190 | 0.125 | 0.165 |
| C | 4.320 | 5.330 | 0.170 | 0.210 |
| D | 0.407 | 0.533 | 0.016 | 0.021 |
| F | 0.407 | 0.482 | 0.016 | 0.019 |
| K | 12.700 | – | 0.500 | – |
| L | 1.150 | 1.390 | 0.045 | 0.055 |
| N | – | 1.270 | – | 0.050 |
| P | 6.350 | – | 0.250 | – |
| Q | 3.430 | – | 0.135 | – |
| R | 2.410 | 2.670 | 0.095 | 0.105 |
| S | 2.030 | 2.670 | 0.080 | 0.105 |

**CASE 29-02**
**TO-92**

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

| Characteristic | Symbol | Min | Max | Unit |
|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | |
| Collector-Emitter Breakdown Voltage ($I_C$ = 1.0 mAdc, $I_B$ = 0) | $BV_{CEO}$ | 20 | - | Vdc |
| Collector-Base Breakdown Voltage ($I_C$ = 100 μAdc, $I_E$ = 0) | $BV_{CBO}$ | 25 | - | Vdc |
| Emitter-Base Breakdown Voltage ($I_E$ = 100 μAdc, $I_C$ = 0) | $BV_{EBO}$ | 3.0 | - | Vdc |
| Collector Cutoff Current ($V_{CB}$ = 10 Vdc, $I_E$ = 0) | $I_{CBO}$ | - | 100 | nAdc |
| Emitter Cutoff Current ($V_{BE}$ = 3.0 Vdc, $I_C$ = 0) | $I_{EBO}$ | - | 500 | nAdc |
| **ON CHARACTERISTICS** | | | | |
| DC Current Gain ($I_C$ = 2.0 mAdc, $V_{CE}$ = 10 Vdc) | $h_{FE}$ | 50 | 800 | - |
| Collector-Emitter Saturation Voltage ($I_C$ = 10 mAdc, $I_B$ = 1.0 mAdc) | $V_{CE(sat)}$ | - | 0.7 | Vdc |
| Base-Emitter Saturation Voltage ($I_C$ = 10 mAdc, $I_B$ = 1.0 mAdc) | $V_{BE(sat)}$ | - | 1.2 | Vdc |
| **DYNAMIC CHARACTERISTICS** | | | | |
| Current-Gain–Bandwidth Product ($I_C$ = 10 mAdc, $V_{CE}$ = 10 Vdc, f = 20 MHz) | $f_T$ | 150 | - | MHz |
| Collector-Base Capacitance ($V_{CB}$ = 10 Vdc, $I_E$ = 0, f = 1.0 MHz) | $C_{cb}$ | - | 4.0 | pF |
| Small-Signal Current Gain ($I_C$ = 2.0 mAdc, $V_{CE}$ = 10 Vdc, f = 1.0 kHz) | $h_{fe}$ | 50 | 1600 | - |

* Indicates JEDEC Registered Data