

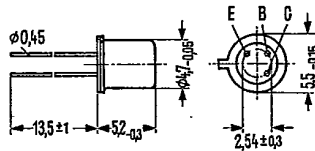
NPN Silicon Planar Transistors

2 N 2220
2 N 2221
2 N 2222

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2 N 2220, 2 N 2221, and 2 N 2222 are epitaxial NPN silicon planar transistors in TO 18 case (18 A 3 DIN 41 876). The collector is electrically connected to the case. The transistors are particularly suitable for use as high-speed switches.

| Type | Ordering code |
|----------|---------------|
| 2 N 2220 | Q68000-A4573 |
| 2 N 2221 | Q62702-F134 |
| 2 N 2222 | Q62702-F135 |



Approx. weight 0.33 g Dimensions in mm

Maximum ratings

Collector-emitter voltage
Collector-base voltage
Emitter-base voltage
Collector current
Junction temperature
Storage temperature range
Total power dissipation ($T_{amb} = 25^\circ\text{C}$)
Total power dissipation ($T_{case} = 25^\circ\text{C}$)

| | 2 N 2220 | 2 N 2221 | 2 N 2222 |
|-----------|-------------|----------|------------------|
| V_{CEO} | 30 | | V |
| V_{CBO} | 60 | | V |
| V_{EBO} | 5 | | V |
| I_C | 0.8 | | A |
| T_j | 175 | | $^\circ\text{C}$ |
| T_{stg} | -65 to +200 | | $^\circ\text{C}$ |
| P_{tot} | 0.5 | | W |
| P_{tot} | 1.8 | | W |

Thermal resistance

Junction to ambient air
Junction to case

| | | |
|------------|------------|-----|
| R_{thJA} | ≤ 300 | K/W |
| R_{thJC} | ≤ 83 | K/W |

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| Static characteristics ($T_{amb} = 25\text{ }^{\circ}\text{C}$) | | 2 N 2220 | 2 N 2221 | 2 N 2222 | |
|--|---------------|----------|-----------|------------|---------------|
| Collector-base breakdown voltage ($I_C = 10\text{ }\mu\text{A}$) | $V_{(BR)CBO}$ | > 60 | > 60 | > 60 | V |
| Collector-emitter breakdown voltage ($I_C = 10\text{ mA}$) | $V_{(BR)CEO}$ | > 30 | > 30 | > 30 | V |
| Emitter-base breakdown voltage ($I_E = 10\text{ }\mu\text{A}$) | $V_{(BR)EBO}$ | > 5 | > 5 | > 5 | V |
| Collector-emitter saturation voltage ($I_B = 15\text{ mA}$; $I_C = 150\text{ mA}$) | V_{CEsat} | < 0.4 | < 0.4 | < 0.4 | V |
| ($I_B = 50\text{ mA}$; $I_C = 500\text{ mA}$) | V_{CEsat} | - | < 1.6 | < 1.6 | V |
| Base-emitter saturation voltage ($I_C = 150\text{ mA}$; $I_B = 15\text{ mA}$) | V_{BEsat} | < 1.3 | < 1.3 | < 1.3 | V |
| ($I_C = 500\text{ mA}$; $I_B = 50\text{ mA}$) | V_{BEsat} | - | < 2.6 | < 2.6 | V |
| Emitter cutoff current ($V_{EB} = 3\text{ V}$) | I_{EBO} | < 10 | < 10 | < 10 | nA |
| Collector cutoff current ($V_{CB} = 50\text{ V}$) | I_{CBO} | < 10 | < 10 | < 10 | nA |
| ($V_{CB} = 50\text{ V}$; $T_{amb} = 150\text{ }^{\circ}\text{C}$) | I_{CBO} | < 10 | < 10 | < 10 | μA |
| DC current gain ($V_{CE} = 10\text{ V}$; $I_C = 0.1\text{ mA}$) | h_{FE} | - | > 20 | > 35 | - |
| ($V_{CE} = 10\text{ V}$; $I_C = 1\text{ mA}$) | h_{FE} | > 12 | > 25 | > 50 | - |
| ($V_{CE} = 10\text{ V}$; $I_C = 10\text{ mA}$) | h_{FE} | > 17 | > 35 | > 75 | - |
| ($V_{CE} = 10\text{ V}$; $I_C = 150\text{ mA}$) | h_{FE} | 20 to 60 | 40 to 120 | 100 to 300 | - |
| ($V_{CE} = 10\text{ V}$; $I_C = 500\text{ mA}$) | h_{FE} | - | > 20 | > 30 | - |
| ($V_{CE} = 1\text{ V}$; $I_C = 150\text{ mA}$) | h_{FE} | > 10 | > 20 | > 50 | - |
| Dynamic characteristics ($T_{amb} = 25\text{ }^{\circ}\text{C}$) | | | | | |
| Collector base capacitance ($V_{CB} = 10\text{ V}$; $f = 1\text{ MHz}$) | C_{CBO} | < 8 | < 8 | < 8 | pF |
| Transition frequency ($V_{CE} = 20\text{ V}$; $I_C = 20\text{ mA}$; $f = 100\text{ MHz}$) | f_T | > 250 | > 250 | > 250 | MHz |
| Switching times: ($V_{CC} = 20\text{ V}$; $I_C = 150\text{ mA}$; I_{B1} approx. I_{B2} approx. 150 mA) | | | | | |
| Delay time | t_d | 5 | 5 | 5 | ns |
| Rise time | t_r | 15 | 15 | 15 | ns |
| Storage time | t_s | 190 | 190 | 190 | ns |
| Fall time | t_f | 23 | 23 | 23 | ns |