

25C D ■ 8235605 0004886 3 ■ SIEG

25C 04886 D

T-35-19

NPN Silicon Planar Transistors

2 N 2220

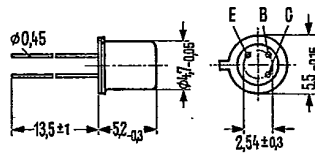
2 N 2221

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	$V_{CEO}$	30	V
Collector-base voltage	$V_{CBO}$	60	V
Emitter-base voltage	$V_{EBO}$	5	V
Collector current	$I_C$	0.8	A
Junction temperature	$T_j$	175	°C
Storage temperature range	$T_{stg}$	-65 to +200	°C
Total power dissipation ( $T_{amb} = 25^\circ\text{C}$ )	$P_{tot}$	0.5	W
Total power dissipation ( $T_{case} = 25^\circ\text{C}$ )	$P_{tot}$	1.8	W

2 N 2220  
2 N 2221  
2 N 2222

#### Thermal resistance

Junction to ambient air	$R_{thJA}$	$\leq 300$	K/W
Junction to case	$R_{thJC}$	$\leq 83$	K/W

932

2248

G-03

25C D ■ 8235605 0004887 5 ■ SIEG

25C 04887 D-T-35-19

2 N 2220  
2 N 2221  
2 N 2222

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Static characteristics ( $T_{amb} = 25^\circ\text{C}$ )		2 N 2220	2 N 2221	2 N 2222	
Collector-base breakdown voltage ( $I_C = 10 \mu\text{A}$ )	$V_{(BR)CBO}$	> 60	> 60	> 60	V
Collector-emitter breakdown voltage ( $I_C = 10 \text{ mA}$ )	$V_{(BR)CEO}$	> 30	> 30	> 30	V
Emitter-base breakdown voltage ( $I_E = 10 \mu\text{A}$ )	$V_{(BR)EBO}$	> 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
( $V_{CB} = 50 \text{ V}; T_{amb} = 150^\circ\text{C}$ )	$I_{CBO}$	< 10	< 10	< 10	$\mu\text{A}$
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 ( $T_{amb} = 25^\circ\text{C}$ )**

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