

25C D ■ 8235605 0004886 3 ■ SIEG

25C 04886 D

T-35-19

NPN Silicon Planar Transistors

2 N 2220

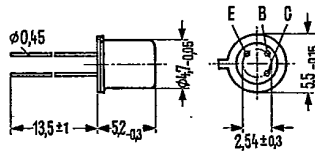
2 N 2221

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
$V_{CEO}$	30		V
$V_{CBO}$	60		V
$V_{EBO}$	5		V
$I_C$	0.8		A
$T_j$	175		°C
$T_{stg}$	-65 to +200		°C
$P_{tot}$	0.5		W
$P_{tot}$	1.8		W

#### 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

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Static characteristics ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ )		2 N 2220	2 N 2221	2 N 2222	
<b>Collector-base breakdown voltage</b>					
( $I_C = 10\text{ }\mu\text{A}$ )	$V_{(BR)CBO}$	> 60	> 60	> 60	V
<b>Collector-emitter breakdown voltage</b>					
( $I_C = 10\text{ mA}$ )	$V_{(BR)CEO}$	> 30	> 30	> 30	V
<b>Emitter-base breakdown voltage</b>					
( $I_E = 10\text{ }\mu\text{A}$ )	$V_{(BR)EBO}$	> 5	> 5	> 5	V
<b>Collector-emitter saturation voltage</b>					
( $I_B = 15\text{ mA}; I_C = 150\text{ mA}$ )	$V_{CEsat}$	< 0.4	< 0.4	< 0.4	V
( $I_B = 50\text{ mA}; I_C = 500\text{ mA}$ )	$V_{CEsat}$	-	< 1.6	< 1.6	V
<b>Base-emitter saturation voltage</b>					
( $I_C = 150\text{ mA}; I_B = 15\text{ mA}$ )	$V_{BEsat}$	< 1.3	< 1.3	< 1.3	V
( $I_C = 500\text{ mA}; I_B = 50\text{ mA}$ )	$V_{BEsat}$	-	< 2.6	< 2.6	V
<b>Emitter cutoff current</b>					
( $V_{EB} = 3\text{ V}$ )	$I_{EBO}$	< 10	< 10	< 10	nA
<b>Collector cutoff current</b>					
( $V_{CB} = 50\text{ V}$ )	$I_{CBO}$	< 10	< 10	< 10	nA
( $V_{CB} = 50\text{ V}; T_{amb} = 150\text{ }^{\circ}\text{C}$ )	$I_{CBO}$	< 10	< 10	< 10	$\mu\text{A}$
<b>DC current gain</b>					
( $V_{CE} = 10\text{ V}; I_C = 0.1\text{ mA}$ )	$h_{FE}$	-	> 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	-
<b>Dynamic characteristics (<math>T_{amb} = 25\text{ }^{\circ}\text{C}</math>)</b>					
<b>Collector base capacitance</b>					
( $V_{CB} = 10\text{ V}; f = 1\text{ MHz}$ )	$C_{CBO}$	< 8	< 8	< 8	pF
<b>Transition frequency</b>					
( $V_{CE} = 20\text{ V}; I_C = 20\text{ mA}; f = 100\text{ MHz}$ )	$f_T$	> 250	> 250	> 250	MHz
<b>Switching times:</b>					
(V <sub>CC</sub> = 20 V; I <sub>C</sub> = 150 mA; I <sub>B1</sub> approx. I <sub>B2</sub> 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