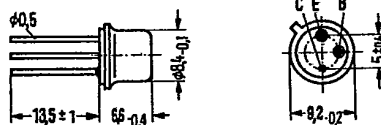


PNP Silicon Planar Transistor

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2 N 4033 is an epitaxial PNP silicon planar transistor in TO 39 case (5 C 3 DIN 41873). The collector is electrically connected to the case. The transistor is particularly intended for use in AF amplifiers and for AF switching applications up to 1 A.

Type	Ordering code
2 N 4033	Q62702-S154



Approx. weight 1.5 g

Dimensions in mm

Maximum ratings

Collector-base voltage	$-V_{CBO}$	80	V
Collector-emitter voltage	$-V_{CEO}$	80	V
Emitter-base voltage	$-V_{EBO}$	5	V
Collector current	$-I_C$	1	A
Junction temperature	$T_j$	200	°C
Storage temperature range	$T_{stg}$	-65 to +200	°C
Total power dissipation ( $T_{amb} \leq 25\text{ °C}$ )	$P_{tot}$	0.8	W
Total power dissipation ( $T_{case} \leq 25\text{ °C}$ )	$P_{tot}$	4	W

Thermal resistance

Junction to ambient air	$R_{thJA}$	$\leq 220$	K/W
Junction to case	$R_{thJC}$	$\leq 44$	K/W

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Static characteristics ( $T_{amb} = 25^\circ\text{C}$ )

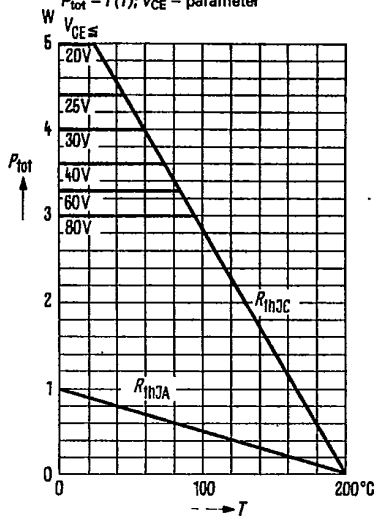
Collector-base breakdown voltage ( $-I_C = 10 \mu\text{A}$ )	$-V_{(BR)CBO}$	> 80	V
Collector-emitter breakdown voltage ( $-I_C = 10 \text{ mA}$ )	$-V_{(BR)CEO}$	> 80	V
Emitter-base breakdown voltage ( $-I_E = 10 \mu\text{A}$ )	$-V_{(BR)EBO}$	> 5	V
Collector-emitter saturation voltage ( $-I_C = 150 \text{ mA}$ , $-I_B = 15 \text{ mA}$ )	$-V_{CEsat}$	< 0.15	V
( $-I_C = 500 \text{ mA}$ , $-I_B = 50 \text{ mA}$ )	$-V_{CEsat}$	< 0.5	V
Base-emitter saturation voltage ( $-I_C = 150 \text{ mA}$ , $-I_B = 15 \text{ mA}$ )	$-V_{BEsat}$	< 0.9	V
( $-I_C = 500 \text{ mA}$ , $-I_B = 50 \text{ mA}$ )	$-V_{BEsat}$	< 1.1	V
Collector cutoff current ( $-V_{CBO} = 60 \text{ V}$ )	$-I_{CBO}$	< 50	nA
( $-V_{CBO} = 60 \text{ V}$ , $T_{amb} = 150^\circ\text{C}$ )	$-I_{CBO}$	< 50	$\mu\text{A}$
Emitter cutoff current ( $-V_{EBO} = 5 \text{ V}$ )	$-I_{EBO}$	< 10	mA
DC current gain ( $-V_{CE} = 5 \text{ V}$ , $-I_C = 100 \mu\text{A}$ )	$h_{FE}$	> 75	-
( $-V_{CE} = 5 \text{ V}$ , $-I_C = 1 \text{ mA}$ )	$h_{FE}$	> 25	-
( $-V_{CE} = 5 \text{ V}$ , $-I_C = 100 \text{ mA}$ )	$h_{FE}$	100 to 300	-
( $-V_{CE} = 5 \text{ V}$ , $-I_C = 100 \text{ mA}$ , $T_{amb} = 55^\circ\text{C}$ )	$h_{FE}$	> 40	-
( $-V_{CE} = 5 \text{ V}$ , $-I_C = 500 \text{ mA}$ )	$h_{FE}$	> 70	-

Dynamic characteristics ( $T_{amb} = 25^\circ\text{C}$ )

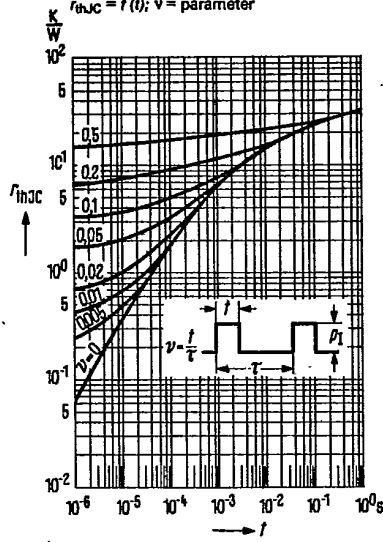
Transition frequency ( $-V_{CE} = 10 \text{ V}$ , $-I_C = 50 \text{ mA}$ , $f = 100 \text{ MHz}$ )	$f_T$	> 150	MHz
Collector-base capacitance ( $-V_{CBO} = 10 \text{ V}$ , $f = 1 \text{ MHz}$ )	$C_{CBO}$	< 20	pF
Emitter-base capacitance ( $-V_{EBO} = 0.5 \text{ V}$ , $f = 1 \text{ MHz}$ )	$C_{EBO}$	< 110	pF
Switching times: ( $-V_{CC} = 30 \text{ V}$ , $-I_C = 500 \text{ mA}$ , $-I_{B1} = I_{B2} = 50 \text{ mA}$ )			
Turn-on time	$t_{on}$	< 100	ns
Storage time	$t_s$	< 350	ns
Fall time	$t_f$	< 50	ns

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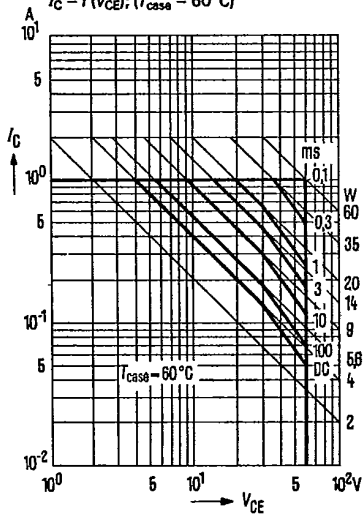
**Total perm. power dissipation versus temperature**  
 $P_{tot} = f(T); V_{CE} = \text{parameter}$



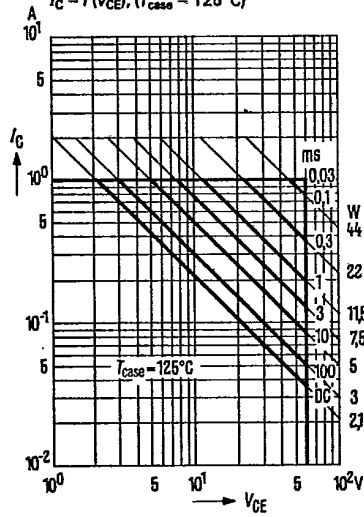
**Permissible pulse load**  
 $r_{thJC} = f(t); v = \text{parameter}$



**Permissible operating range**  
 $I_C = f(V_{CE}); (T_{case} = 60^{\circ}\text{C})$

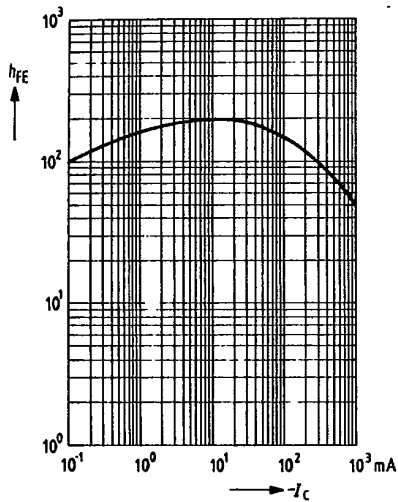


**Permissible operating range**  
 $I_C = f(V_{CE}); (T_{case} = 125^{\circ}\text{C})$

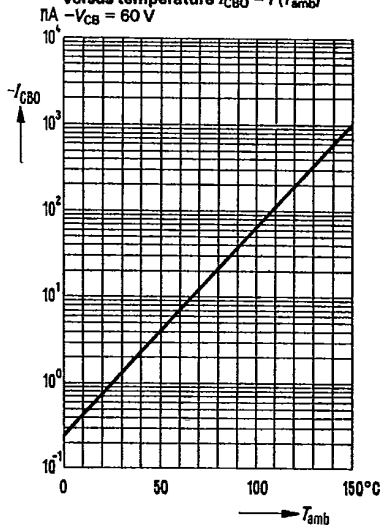


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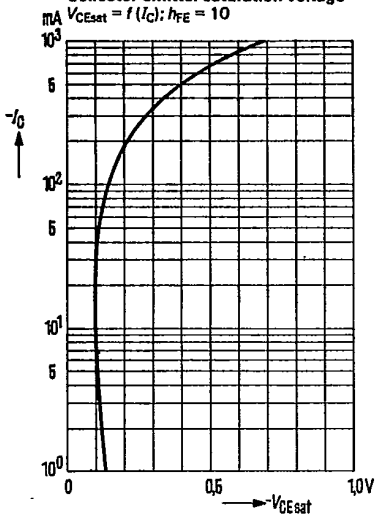
DC current gain  $h_{FE} = f(I_C)$   
 $V_{CE} = 5\text{ V}; T_{amb} = \text{parameter}$



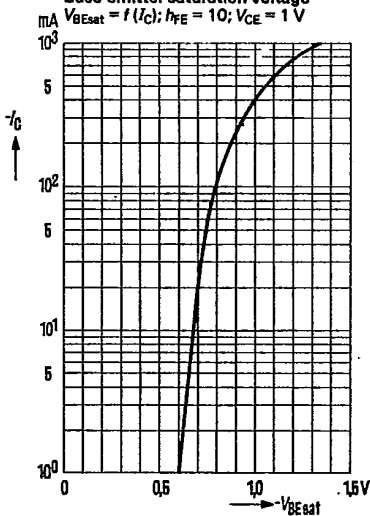
Collector cutoff current  
 versus temperature  $I_{CBO} = f(T_{amb})$   
 $-V_{CB} = 60\text{ V}$



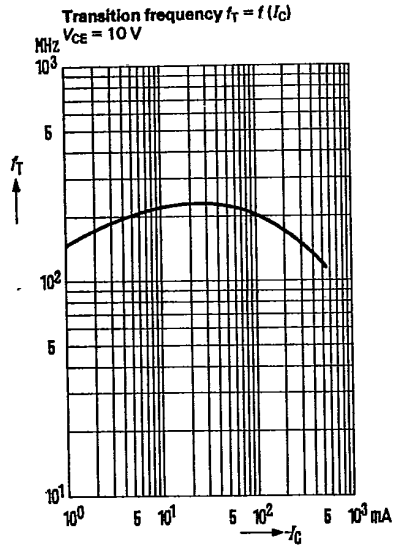
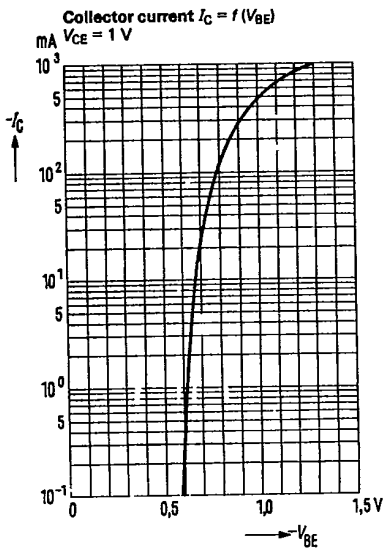
Collector-emitter saturation voltage  
 $V_{CEsat} = f(I_C); h_{FE} = 10$



Base-emitter saturation voltage  
 $V_{BEsat} = f(I_C); h_{FE} = 10; V_{CE} = 1\text{ V}$



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Test circuit for switching times

