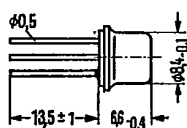


NPN Silicon Planar Transistor

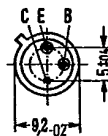
SIEMENS AKTIENGESELLSCHAFT

2 N 3019 is an epitaxial NPN silicon planar transistor in TO 39 case (5 C 3 DIN 41873). The collector is electrically connected to the case. The transistor is particularly suitable for use in Af amplifiers and for AF switching applications.

Type	Ordering code
2 N 3019	Q68000-A627



Approx. weight 1.5 g



Dimensions in mm

Maximum ratings

Collector-base voltage
Collector-emitter voltage

Emitter-base voltage

Collector current

Junction temperature

Storage temperature range

Total power dissipation ($T_{amb} \leq 25^\circ\text{C}$)Total power dissipation ($T_{case} \leq 25^\circ\text{C}$)

V_{CBO}	140	V
V_{CEO}	80	V
V_{EBO}	7	V
I_C	1	A
T_J	200	$^\circ\text{C}$
T_{stg}	-65 to +200	$^\circ\text{C}$
P_{tot}	0.8	W
P_{tot}	5	W

Thermal resistance

Junction to ambient air

Junction to case

R_{thJA}	≤ 218	K/W
R_{thJC}	≤ 35	K/W

SIEMENS AKTIENGESSELLSCHAFT

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

Collector-base breakdown voltage

($I_C = 100\ \mu\text{A}$) $V_{(\text{BR})\text{CBO}} > 140\ \text{V}$

Collector-emitter breakdown voltage

($I_C = 30\ \text{mA}$) $V_{(\text{BR})\text{CEO}} > 80\ \text{V}$

Emitter-base breakdown voltage

($I_E = 100\ \mu\text{A}$) $V_{(\text{BR})\text{EBO}} > 7\ \text{V}$

Collector-emitter saturation voltage

($I_C = 150\ \text{mA}$, $I_B = 15\ \text{mA}$) $V_{\text{CEsat}} < 0.2\ \text{V}$ ($I_C = 500\ \text{mA}$, $I_B = 50\ \text{mA}$) $V_{\text{CEsat}} < 0.5\ \text{V}$

Base-emitter saturation voltage

($I_C = 150\ \text{mA}$, $I_B = 15\ \text{mA}$) $V_{\text{BEsat}} < 1.1\ \text{V}$

Collector cutoff current

($V_{\text{CBO}} = 90\ \text{V}$) $I_{\text{CBO}} < 10\ \text{nA}$ ($V_{\text{CBO}} = 90\ \text{V}$, $T_{\text{amb}} = 150^\circ\text{C}$) $I_{\text{CBO}} < 10\ \mu\text{A}$

Emitter cutoff current

($V_{\text{EBO}} = 5\ \text{V}$) $I_{\text{EBO}} < 10\ \text{nA}$

DC current gain

($V_{\text{CE}} = 10\ \text{V}$, $I_C = 0.1\ \text{mA}$) $h_{\text{FE}} > 50$ ($V_{\text{CE}} = 10\ \text{V}$, $I_C = 10\ \text{mA}$) $h_{\text{FE}} > 90$ ($V_{\text{CE}} = 10\ \text{V}$, $I_C = 150\ \text{mA}$) $h_{\text{FE}} 100\ \text{to}\ 300$ ($V_{\text{CE}} = 10\ \text{V}$, $I_C = 500\ \text{mA}$) $h_{\text{FE}} > 50$ ($V_{\text{CE}} = 10\ \text{V}$, $I_C = 1\ \text{A}$) $h_{\text{FE}} > 15$ ($V_{\text{CE}} = 10\ \text{V}$; $I_C = 150\ \text{mA}$; $T_{\text{amb}} = -55^\circ\text{C}$) $h_{\text{FE}} > 40$ **Dynamic characteristics** ($T_{\text{amb}} = 25^\circ\text{C}$)

Transition frequency

($V_{\text{CE}} = 10\ \text{V}$, $I_C = 50\ \text{mA}$, $f = 20\ \text{MHz}$) $f_T > 100\ \text{MHz}$

Collector base capacitance

($V_{\text{CBO}} = 10\ \text{V}$, $f = 1\ \text{MHz}$) $C_{\text{CBO}} < 12\ \text{pF}$

Emitter base capacitance

($V_{\text{EBO}} = 0.5\ \text{V}$, $f = 1\ \text{MHz}$) $C_{\text{EBO}} < 60\ \text{pF}$

Small signal current gain

($I_C = 1\ \text{mA}$, $V_{\text{CE}} = 5\ \text{V}$, $f = 1\ \text{kHz}$) $h_{\text{fe}} 80\ \text{to}\ 400$

Feedback time constant

($V_{\text{CE}} = 10\ \text{V}$, $I_C = 10\ \text{mA}$, $f = 4\ \text{MHz}$) $r_{\text{bb}} \cdot C_{\text{bc}} < 400\ \text{ps}$

Noise figure

($I_C = 100\ \mu\text{A}$, $V_{\text{CE}} = 10\ \text{V}$, $f = 1\ \text{kHz}$, $R_g = 1\ \text{k}\Omega$) $NF < 4\ \text{dB}$

Switching times

($I_C = 500\ \text{mA}$; $I_{\text{B1}} = I_{\text{B2}} = 50\ \text{mA}$)

Turn-on time

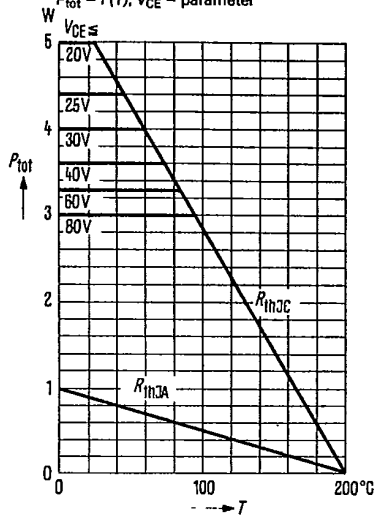
 $t_{\text{on}} < 100\ \text{ns}$

Turn-off time

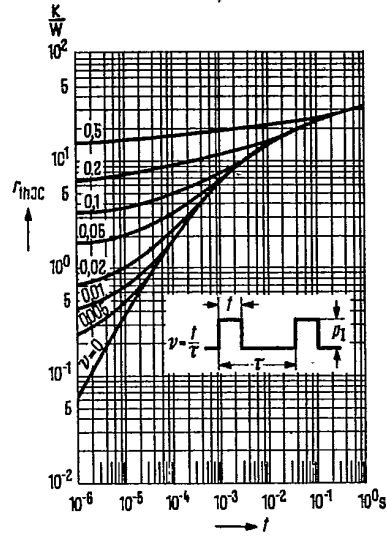
 $t_{\text{off}} < 500\ \text{ns}$

SIEMENS AKTIENGESELLSCHAFT

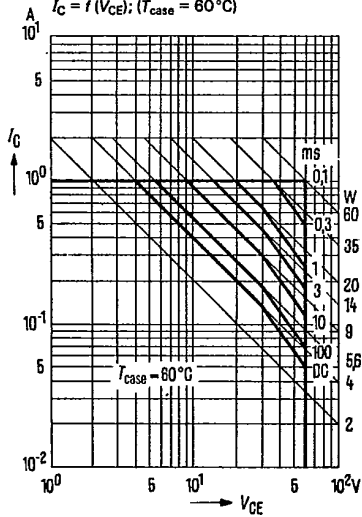
Total perm. power dissipation
versus temperature
 $P_{\text{tot}} = f(T)$; $V_{\text{CE}} = \text{parameter}$



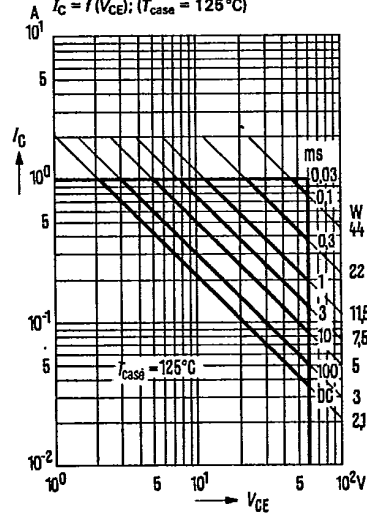
Permissible pulse load
 $r_{\text{thJC}} = f(t)$; $v = \text{parameter}$



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

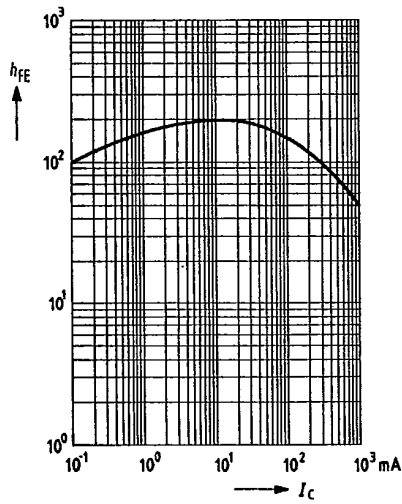


Permissible operating range
 $I_C = f(V_{\text{CE}})$; ($T_{\text{case}} = 125^\circ\text{C}$)

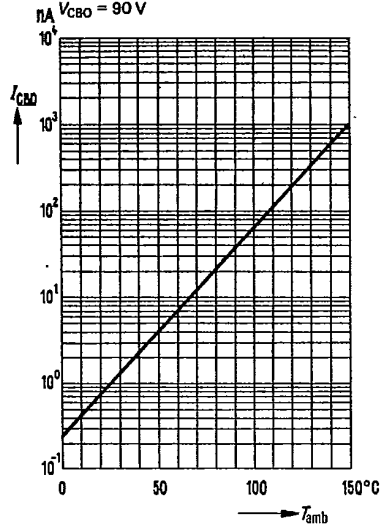


SIEMENS AKTIENGESELLSCHAFT

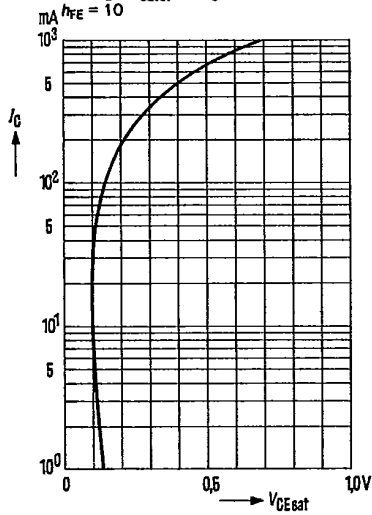
DC current gain $h_{FE} = f(I_C)$
 $V_{CE} = 10 \text{ V}$; $T_{amb} = \text{parameter}$



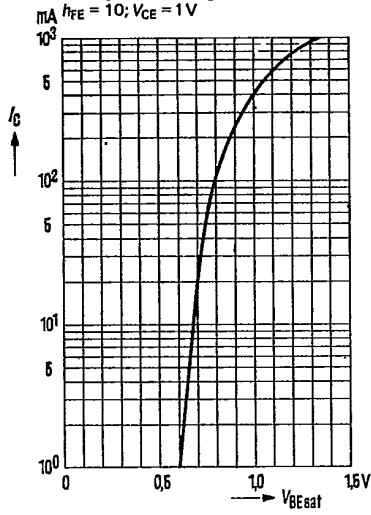
Collector cutoff current
 versus temperature $I_{CBO} = f(T_{amb})$
 $V_{CBO} = 90 \text{ V}$



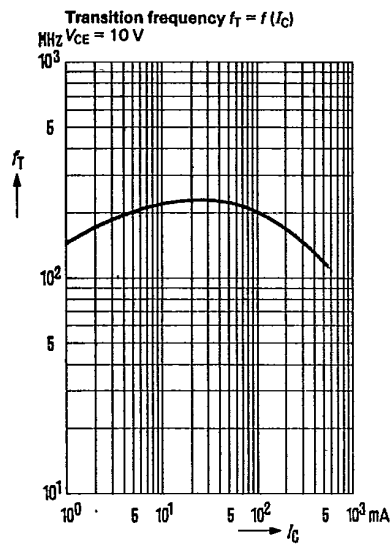
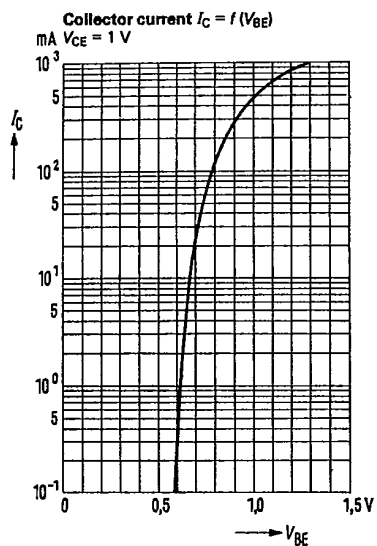
Collector-emitter saturation
 voltage $V_{CEsat} = f(I_C)$
 $h_{FE} = 10$



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



— SIEMENS AKTIENGESELLSCHAFT —



Test circuit for switching times

