T-29-23

NPN Silicon Planar Transistor

2 N 3019

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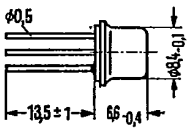
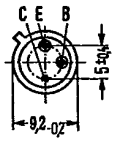
2 N 3019 is an epitaxial NPN silicon planar transistor in TO 39 case (5 C 3 DIN 41873). The collector is electrically connected to the case. The transistor is particularly suitable for use in Af amplifiers and for AF switching applications.

Type	Ordering code
2 N 3019	Q68000-A627





Approx. weight 1.5 g

Dimensions in mm

Maximum ratings

Collector-base voltage	V_{CBO}	140	V
Collector-emitter voltage	V_{CEO}	80	V
Emitter-base voltage	V_{EBO}	7	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 ($T_{amb} \leqq 25$ °C)	P_{tot}	0.8	W
Total power dissipation ($T_{case} \leqq 25$ °C)	P_{tot}	5	W

Thermal resistance

Junction to ambient air	R_{thJA}	≦218	K/W
Junction to case	R_{thJC}	≦35	K/W

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Static characteristics (T_{amb} = 25 °C)

Collector-base breakdown voltage (I_C = 100 µA)	$V_{(BR)CBO}$	> 140	V
Collector-emitter breakdown voltage (I_C = 30 mA)	$V_{(BR)CEO}$	> 80	V
Emitter-base breakdown voltage (I_E = 100 µA)	$V_{(BR)EBO}$	> 7	V
Collector-emitter saturation voltage (I_C = 150 mA, I_B = 15 mA)	V_{CEsat}	< 0.2	V
(I_C = 500 mA, I_B = 50 mA)	V_{CEsat}	< 0.5	V
Base-emitter saturation voltage (I_C = 150 mA, I_B = 15 mA)	V_{BEsat}	< 1.1	V
Collector cutoff current (V_{CBO} = 90 V)	I_{CBO}	< 10	nA
(V_{CBO} = 90 V, T_{amb} = 150 °C)	I_{CBO}	< 10	µA
Emitter cutoff current (V_{EBO} = 5 V)	I_{EBO}	< 10	nA
DC current gain			
(V_{CE} = 10 V, I_C = 0.1 mA)	h_{FE}	> 50	–
(V_{CE} = 10 V, I_C = 10 mA)	h_{FE}	> 90	–
(V_{CE} = 10 V, I_C = 150 mA)	h_{FE}	100 to 300	–
(V_{CE} = 10 V, I_C = 500 mA)	h_{FE}	> 50	–
(V_{CE} = 10 V, I_C = 1 A)	h_{FE}	> 15	–
(V_{CE} = 10 V; I_C = 150 mA; T_{amb} = −55 °C)	h_{FE}	> 40	–

Dynamic characteristics (T_{amb} = 25 °C)

Transition frequency (V_{CE} = 10 V, I_C = 50 mA, f = 20 MHz)	f_T	> 100	MHz
Collector base capacitance (V_{CBO} = 10 V, f = 1 MHz)	C_{CBO}	< 12	pF
Emitter base capacitance (V_{EBO} = 0.5 V, f = 1 MHz)	C_{EBO}	< 60	pF
Small signal current gain (I_C = 1 mA, V_{CE} = 5 V, f = 1 kHz)	h_{fe}	80 to 400	–
Feedback time constant (V_{CE} = 10 V, I_C = 10 mA, f = 4 MHz)	$r_{bb'}$ C_{bc}	< 400	ps
Noise figure (I_C = 100 µA, V_{CE} = 10 V, f = 1 kHz, R_g = 1 kΩ)	NF	< 4	dB
Switching times (I_C = 500 mA; I_{B1} = I_{B2} = 50 mA)			
Turn-on time	t_{on}	< 100	ns
Turn-off time	t_{off}	< 500	ns

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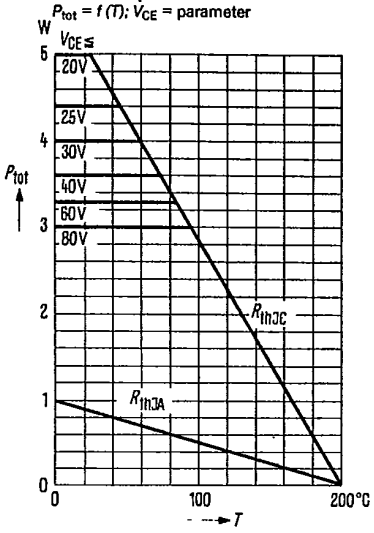
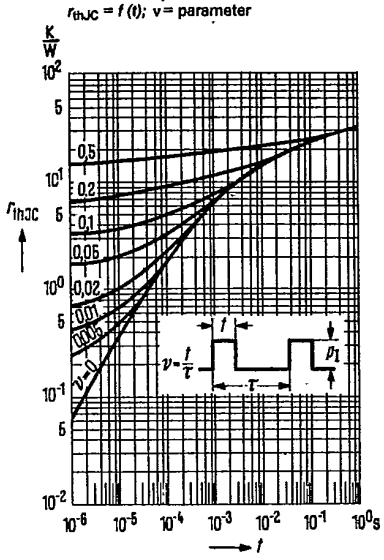
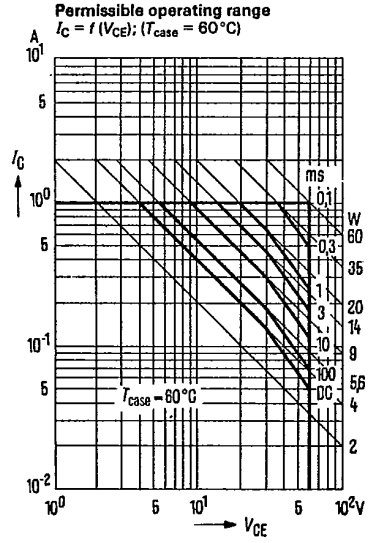
Total perm. power dissipation versus temperature
$P_{tot} = f(T)$; V_{CE} = parameter



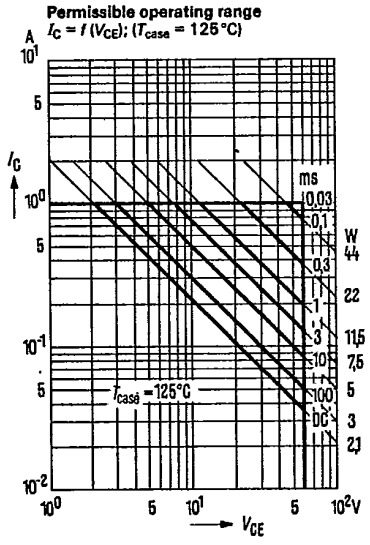
Permissible pulse load
$r_{thJC} = f(t)$; v = parameter



Permissible operating range
$I_C = f(V_{CE})$; (T_{case} = 60°C)



Permissible operating range
$I_C = f(V_{CE})$; (T_{case} = 125°C)



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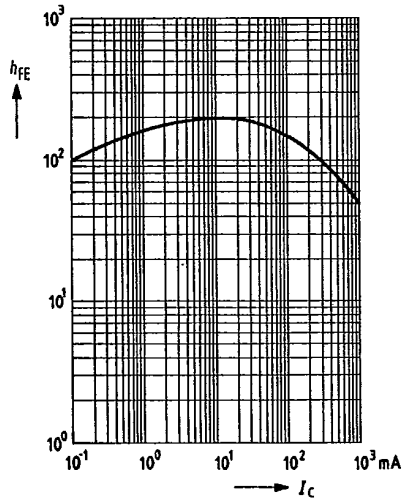
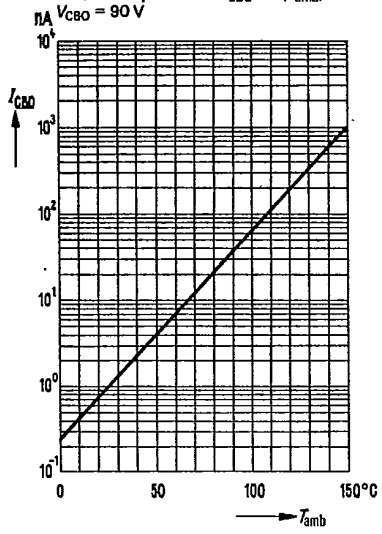
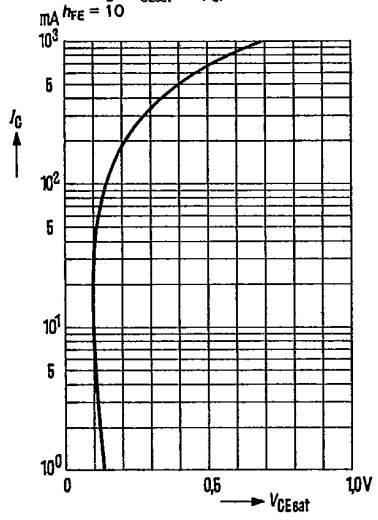
DC current gain $h_{FE} = f(I_C)$
$V_{CE} = 10$ V; T_{amb} = parameter



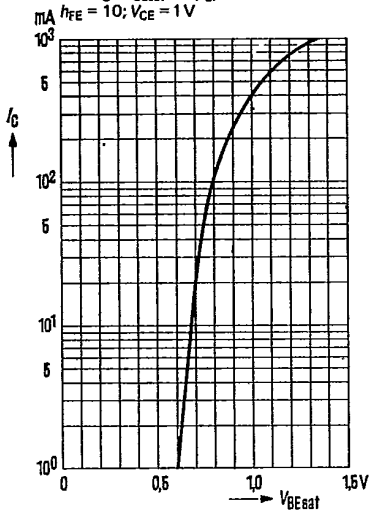
Collector cutoff current versus temperature $I_{CBO} = f(T_{amb})$
$V_{CBO} = 90$ V



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



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



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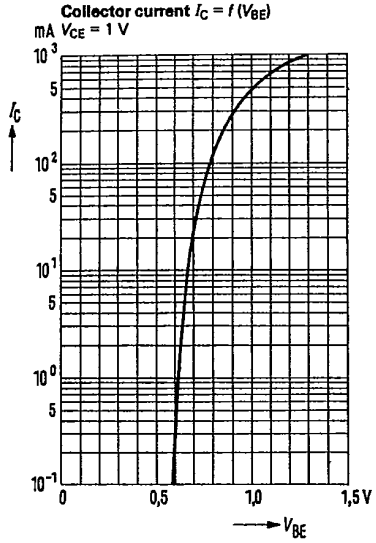
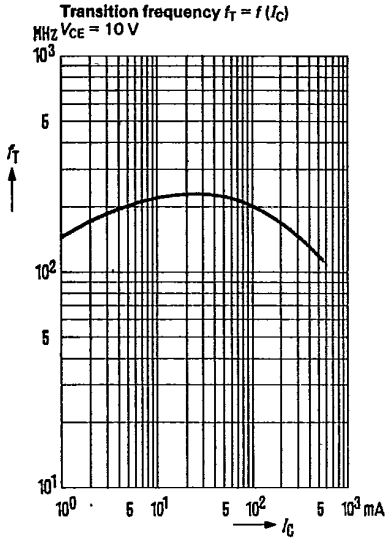
Collector current $I_C = f(V_{BE})$



Transition frequency $f_T = f(I_C)$



Test circuit for switching times