

25C D ■ 8235605 0004880 2 ■ SIEG - T-35-13

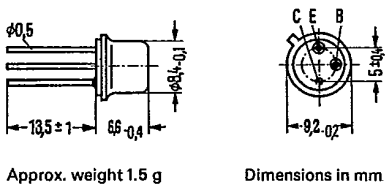
NPN Silicon Planar Transistors

2 N 2218
2 N 2219
2 N 2218 A
2 N 2219 A

SIEMENS AKTIENGESELLSCHAFT

2 N 2218, 2 N 2219, 2 N 2218 A, and 2 N 2219 A are epitaxial NPN silicon planar transistors in TO 39 case (5 C 3 DIN 41873). The collector is electrically connected to the case. The transistors are particularly suitable for use as high-speed switches of medium performance.

Type	Ordering code
2 N 2218	Q62702-F109
2 N 2219	Q62702-F133
2 N 2218 A	Q62702-S29
2 N 2219 A	Q62702-F59



Maximum ratings

	2 N 2218 2 N 2219	2 N 2218 A 2 N 2219 A	
Collector-base voltage	60	75	V
Collector-emitter voltage	30	40	V
Emitter-base voltage	5	6	V
Collector current	0.8	0.8	A
Junction temperature	175	175	°C
Storage temperature range	-65 to +200		°C
Total power dissipation ($T_{amb} \leq 25\text{ °C}$)	0.8	0.8	W
Total power dissipation ($T_{case} \leq 25\text{ °C}$)	3	3	W

Thermal resistance

Junction to ambient air	R_{thJA}	≤ 188	≤ 188	K/W
Junction to case	R_{thJC}	≤ 50	≤ 50	K/W

25C D ■ 8235605 0004881 4 ■ SIEG

25C 04881 D T-35-13

2 N 2218
2 N 2219

- SIEMENS AKTIENGESELLSCHAFT

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

		2 N 2218	2 N 2219	
Collector-emitter saturation voltage ($I_C = 150\text{ mA}$; $I_B = 15\text{ mA}$)	V_{CEsat}	≤ 0.4	≤ 0.4	V
($I_C = 500\text{ mA}$; $I_B = 50\text{ mA}$)	V_{CEsat}	≤ 1.6	≤ 1.6	V
Base-emitter saturation voltage ($I_C = 150\text{ mA}$; $I_B = 15\text{ mA}$)	V_{BEsat}	0.6 to 2	0.6 to 2	V
($I_C = 500\text{ mA}$; $I_B = 50\text{ mA}$)	V_{BEsat}	≤ 2.6	≤ 2.6	V
Collector cutoff current ($V_{\text{CBO}} = 50\text{ V}$)	I_{CBO}	≤ 0.01	≤ 0.01	μA
($V_{\text{CBO}} = 50\text{ V}$; $T_{\text{amb}} = 150^\circ\text{C}$)	I_{CBO}	≤ 10	≤ 10	μA
Collector-emitter breakdown voltage ($I_C = 10\text{ mA}$; $I_B = 0$)	$V_{(\text{BR})\text{CEO}}$	30	30	V
Collector-base breakdown voltage ($I_C = 10\text{ }\mu\text{A}$; $I_E = 0$)	$V_{(\text{BR})\text{CBO}}$	60	60	V
Emitter-base breakdown voltage ($I_E = 10\text{ }\mu\text{A}$; $I_C = 0$)	$V_{(\text{BR})\text{EBO}}$	5	5	V
DC current gain ($V_{\text{CE}} = 10\text{ V}$; $I_C = 0.1\text{ mA}$)	h_{FE}	> 20	> 35	—
($V_{\text{CE}} = 10\text{ V}$; $I_C = 1\text{ mA}$)	h_{FE}	> 25	> 50	—
($V_{\text{CE}} = 10\text{ V}$; $I_C = 10\text{ mA}$)	h_{FE}	> 35	> 75	—
($V_{\text{CE}} = 10\text{ V}$; $I_C = 150\text{ mA}$)	h_{FE}	40 to 120	100 to 300	—
($V_{\text{CE}} = 10\text{ V}$; $I_C = 500\text{ mA}$)	h_{FE}	> 20	> 30	—

电子產品世界
EEPW.com.cn

25C D ■ 8235605 0004882 6 ■ SIEG

25C 04882

D-7-35-13

2 N 2218 A

2 N 2219 A

SIEMENS AKTIENGESSELLSCHAFT

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

		2 N 2218 A	2 N 2219 A	
Collector-emitter saturation voltage ($I_C = 150\text{ mA}$; $I_B = 15\text{ mA}$)	V_{CEsat}	≤ 0.3	≤ 0.3	V
($I_C = 500\text{ mA}$; $I_B = 50\text{ mA}$)	V_{CEsat}	≤ 1	≤ 1	V
Base-emitter saturation voltage ($I_C = 150\text{ mA}$; $I_B = 15\text{ mA}$)	V_{BEsat}	0.6 to 1.2	0.6 to 1.2	V
($I_C = 500\text{ mA}$; $I_B = 50\text{ mA}$)	V_{BEsat}	≤ 2	≤ 2	V
Emitter cutoff current ($V_{EBO} = 3\text{ V}$)	I_{EBO}	≤ 10	≤ 10	nA
Collector cutoff current ($V_{CBO} = 60\text{ V}$)	I_{CBO}	≤ 0.01	≤ 0.01	μA
Collector cutoff current ($V_{CBO} = 60\text{ V}$; $T_{amb} = 150^{\circ}\text{C}$)	I_{CBO}	≤ 10	≤ 10	μA
Collector-emitter breakdown voltage ($I_C = 10\text{ mA}$; $I_B = 0$)	$V_{(BR)CEO}$	> 40	> 40	V
Collector-base breakdown voltage ($I_C = 10\text{ }\mu\text{A}$; $I_E = 0$)	$V_{(BR)CBO}$	> 75	> 75	V
Emitter-base breakdown voltage ($I_E = 10\text{ }\mu\text{A}$; $I_C = 0$)	$V_{(BR)EBO}$	> 6	> 6	V
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}	> 25	> 50	—
($V_{CE} = 10\text{ V}$; $I_C = 10\text{ mA}$)	h_{FE}	> 35	> 75	—
($V_{CE} = 10\text{ V}$; $I_C = 10\text{ mA}$; $T_{amb} = -55^{\circ}\text{C}$)	h_{FE}	> 15	> 35	—
($V_{CE} = 10\text{ V}$; $I_C = 150\text{ mA}$)	h_{FE}	40 to 120	100 to 300	—
($V_{CE} = 1\text{ V}$; $I_C = 150\text{ mA}$)	h_{FE}	> 20	> 50	—
($V_{CE} = 10\text{ V}$; $I_C = 500\text{ mA}$)	h_{FE}	> 20	> 40	—

25C D ■ 8235605 0004883 8 ■ SIEG

25C 04883 DT-35-13

2 N 2218
2 N 2219
2 N 2218 A
2 N 2219 A

SIEMENS AKTIENGESELLSCHAFT

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

		2 N 2218	2 N 2219	
Transition frequency ($V_{\text{CE}} = 20\text{ V}$; $I_{\text{C}} = 20\text{ mA}$; $f = 100\text{ MHz}$)	f_{T}	> 250	> 250	MHz
Collector-base capacitance ($V_{\text{CBO}} = 10\text{ V}$; $f = 100\text{ kHz}$)	C_{CBO}	≤ 8	≤ 8	pF
Emitter base capacitance ($V_{\text{EBO}} = 0.5\text{ V}$; $f = 100\text{ kHz}$)	C_{EBO}	< 30	< 30	pF

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

		2 N 2218 A	2 N 2219 A	
Transition frequency ($V_{\text{CE}} = 20\text{ V}$; $I_{\text{C}} = 20\text{ mA}$; $f = 100\text{ MHz}$)	f_{T}	> 250	> 300	MHz
Collector base capacitance ($V_{\text{CBO}} = 10\text{ V}$; $f = 100\text{ kHz}$)	C_{CBO}	< 8	< 8	pF
Emitter base capacitance ($V_{\text{EBO}} = 0.5\text{ V}$; $f = 100\text{ kHz}$)	C_{EBO}	< 25	< 25	pF
Feedback time constant ($V_{\text{CB}} = 20\text{ V}$; $I_{\text{C}} = 20\text{ mA}$; $f = 31.8\text{ MHz}$)	$r_{\text{bb'}}$; $C_{\text{b'c}}$	< 150	< 150	ps
Noise figure ($V_{\text{CE}} = 10\text{ V}$; $I_{\text{C}} = 100\text{ }\mu\text{A}$; $f = 1\text{ kHz}$; $R_{\text{g}} = 1\text{ k}\Omega$)	NF	—	< 4	dB

Switching times:($I_{\text{C}} = 150\text{ mA}$; $I_{\text{B1}} = -I_{\text{B2}} = 15\text{ mA}$, $V_{\text{CC}} = 30\text{ V}$)

Delay time	t_{d}	≤ 10	≤ 10	ns
Rise time	t_{r}	≤ 25	≤ 25	ns
Storage time	t_{s}	≤ 225	≤ 225	ns
Fall time	t_{f}	≤ 60	≤ 60	ns

Four-pole characteristics($V_{\text{CE}} = 10\text{ V}$; $I_{\text{C}} = 1\text{ mA}$; $f = 1\text{ kHz}$)

	$h_{11\text{e}}$	1 to 3.5	2 to 8	$\text{k}\Omega$
	$h_{12\text{e}}$	$< 5 \cdot 10^{-4}$	$< 8 \cdot 10^{-4}$	—
	$h_{21\text{e}}$	30 to 150	50 to 300	—
	$h_{22\text{e}}$	3 to 15	5 to 35	μS
($V_{\text{CE}} = 10\text{ V}$; $I_{\text{C}} = 10\text{ mA}$; $f = 1\text{ kHz}$)	$h_{11\text{e}}$	0.2 to 1	0.25 to 1.25	$\text{k}\Omega$
	$h_{12\text{e}}$	$2.5 \cdot 10^{-4}$	$4 \cdot 10^{-4}$	—
	$h_{21\text{e}}$	50 to 300	75 to 375	—
	$h_{22\text{e}}$	10 to 100	25 to 200	μS

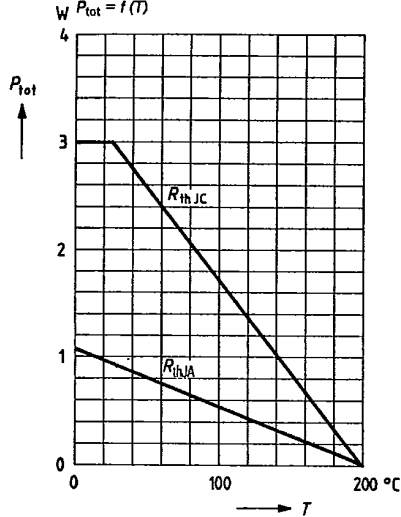
25C D ■ 8235605 0004884 T ■ SIEG

25C 04884 D T-35-13

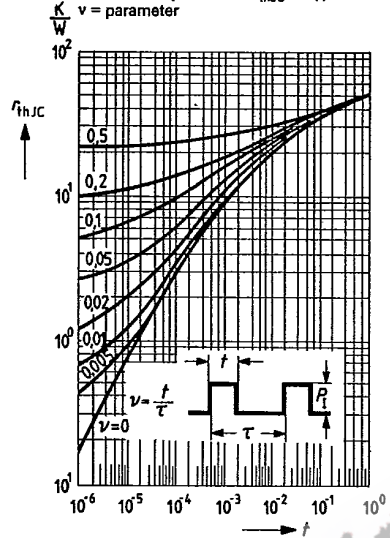
- SIEMENS AKTIENGESELLSCHAFT

2 N 2218
2 N 2219
2 N 2218 A
2 N 2219 A

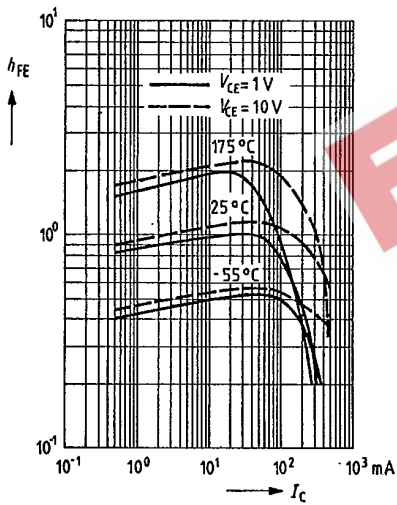
Total perm. power dissipation
versus temperature
 $P_{\text{tot}} = f(T)$



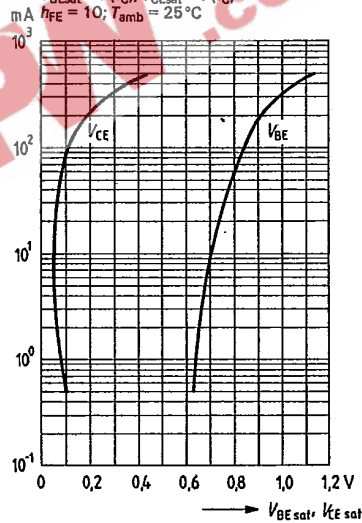
Permissible pulse load $r_{\text{thJC}} = f(t)$
 $v = \text{parameter}$



DC current gain $h_{\text{FE}} = f(I_{\text{C}})$
 $V_{\text{CE}} = 1 \text{ V}, V_{\text{CE}} = 10 \text{ V}; T_{\text{amb}} = 25^\circ \text{C}$



Saturation voltages
 $V_{\text{BE sat}} = f(I_{\text{C}}), V_{\text{CE sat}} = f(I_{\text{C}})$
 $h_{\text{FE}} = 10; T_{\text{amb}} = 25^\circ \text{C}$



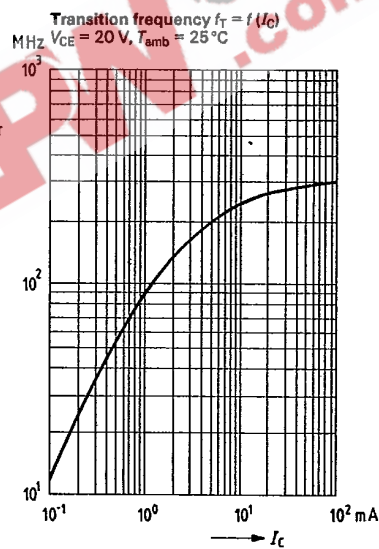
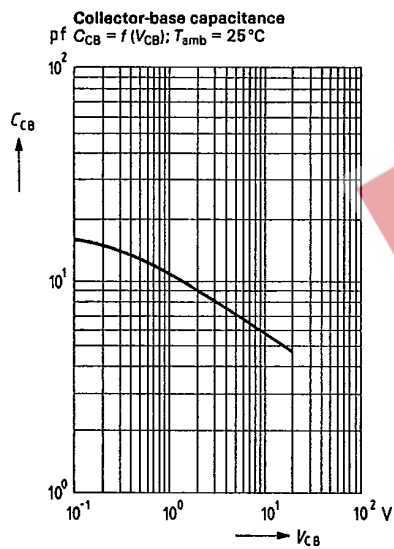
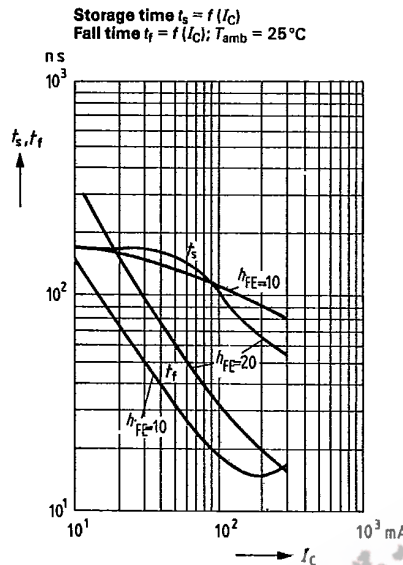
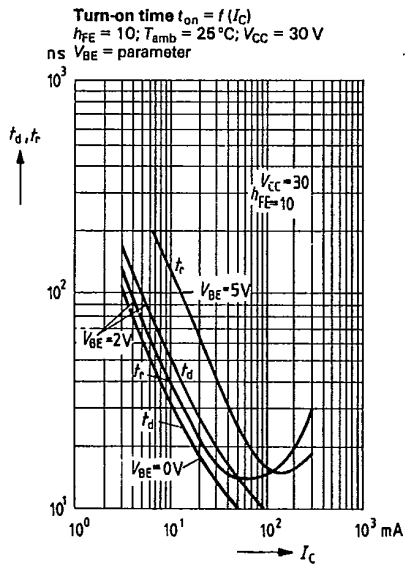
930 2246 G-01

25C D ■ 8235605 0004885 1 ■ SIEG

25C 04885 — 0-T-35-13

— SIEMENS AKTIENGESELLSCHAFT —

2 N 2218
2 N 2219
2 N 2218 A
2 N 2219 A



2247

G-02

931